

From: Christian Araguas
To: <JTDAVIS@SOUTHERNCO.COM>
Date: 2/16/2007 3:23:48 PM
Subject: RAI Letter No. 3

Jim,

Attached is the electronic copy of what I sent you.

Christian

Hearing Identifier: Vogtle_Public
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Subject: RAI Letter No. 3
Creation Date: 2/16/2007 3:23:48 PM
From: Christian Araguas

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Reply Requested: No
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None

Concealed Subject: No
Security: Standard

February 16, 2007

Mr. J. A. "Buzz" Miller, Senior Vice President
Nuclear Development
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
P.O. Box 1295
Birmingham, Alabama 35201

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 3 - SOUTHERN
NUCLEAR OPERATING COMPANY (SNC) EARLY SITE PERMIT (ESP)
APPLICATION FOR THE VOGTLE ESP SITE

Dear Mr. Miller:

By letter dated August 14, 2006, SNC submitted an application for an ESP for the Vogtle ESP site. Subsequently, SNC submitted changes to the Vogtle ESP application by a letter dated September 13, 2006 and on November 13, 2006, submitted Revision 1 to the application.

The U.S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of your ESP application and has identified that additional information is needed to continue portions of the safety review. Therefore, the NRC staff is requesting additional information with respect to the application. The topics covered in the requests for additional information (RAIs) contained in Enclosure 1 are related to sections 2.1, 2.2, 3, 15 of the Site Safety Analysis Report and sections 5, 4 and 6.2 of the Environmental Report of the ESP application.

The RAIs were sent to your staff as draft via electronic mail on February 2, 2007 and a follow up teleconference was held on February 8, 2007. During the teleconference the staff was informed that some of the information being requested had already been provided in the application. The staff agreed, and therefore eight of the draft RAIs are considered resolved and do not appear in this letter.

Receipt of requested information within 30 days of the date of this letter will support the NRC's efficient and timely review of SNC's ESP application. Please note that failure to provide a response in a timely fashion may result in a delay of completion of the staff's safety evaluation report.

J. A. Miller

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If you have any questions or comments concerning this matter, you may contact me at (301) 415-3637 or cja2@nrc.gov.

Sincerely,

/RA/

Christian Araguas, Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-011

Enclosure:
As stated

cc: See next page

Requests for Additional Information (RAIs) for Vogtle ESP
SSAR Sections 2.1, 2.2, 3, 15 and ER Sections 5.4, 6.2

RAI Number	Reviewer	RAI
RAI 2.1.1-1	R. Tammara, K. Pinkston	Table 1-2, "Regulatory Compliance Matrix," presents the NRC regulations that are applicable and addressed in corresponding SSAR chapters and sections of the Vogtle Early Site Permit Application. However, there are noticeable discrepancies between the regulations cited and the corresponding chapter or section. Please review and update Table 1-2, to make all chapters and sections of SSAR consistent with the applicable regulatory requirements.
RAI 2.1.1-2	R. Tammara, K. Pinkston	The planned location of the proposed Units 3 and 4 has been changed since the SSAR was submitted. Please provide updated UTM coordinates for the proposed units. Also provide the latitude and longitude of the proposed new reactor site.
RAI 2.1.1-3	R. Tammara, K. Pinkston	SSAR Figure 1-4, "Site Layout - New Development", shows a map of the proposed units, the site boundary, and the exclusion area boundary (EAB) without a scale on the map. Please provide an updated SSAR Figure 1-4 that contains a scale for that Figure.
RAI 2.1.2-1	R. Tammara, K. Pinkston	Please provide the number of people who will be working at Plant Wilson and the following details about their working hours: how many days per week they will work and the number of hours expected per shift. Please also provide the number of people who will be working at the visitor center and the same details regarding their working hours. This information will help assist the determination of whether individuals can be evacuated prior to receiving doses that exceed the dose limits.
RAI 2.1.2-2	R. Tammara, K. Pinkston	Provide more details regarding the location of the visitor center, including a site map that shows the location of it.
RAI 2.1.2-3	R. Tammara, K. Pinkston	Provide the estimated evacuation time for the EAB, which would include visitor center and Plant Wilson.

RAI Number	Reviewer	RAI
RAI 2.1.3-1	R. Tammara, K. Pinkston	In Section 2.1.3.2 (page 2.1-5), the citation of figure numbers in the text appears to be incorrect. The cited figure number in the second sentence should be Figure 2.1-9 instead of Figure 2.1-10, and the cited figure number in the second sentence of the second paragraph should be Figure 2.1-11 instead of Figure 2.1-10. Please confirm and provide corrected citations.
RAI 2.1.3-2	R. Tammara, K. Pinkston	In Section 2.1.3, Figures 2.1-10 through 2.1-15 contain population distributions from 10-50 miles (population within 10 miles is not included), but the figures are labeled as 50-mile Resident Population Distribution, thereby implying that the population distribution presented is from 0-50 miles. Please change the title of the figures to represent the 10-50 miles Resident Population Distribution.
RAI 2.1.3-3	R. Tammara, K. Pinkston	Please provide a pointer to the section of the ESP application that contains a description of appropriate protective measures that would be taken on behalf of the populace in the low population zone in the event of a radiological emergency.
RAI 2.1.3-4	R. Tammara, K. Pinkston	Provide a scaled map of the low population zone that includes topographic features, highways, railways, waterways, and any other transportation routes. Also, provide a scaled map of the location of all facilities within the LPZ.
RAI 2.1.3-5	R. Tammara, K. Pinkston	On page 2.1-7, the application states that "Given an approved ESP period of 20 years, a conservative start up date of 2025, and an operational period of 40 years, operations could extend until 2065." This information would have been correct if the ESP approval had been obtained in 2005. It may properly be accounted if modified to state "Given an ESP approval date of 2010, a conservative startup date of 2030, an assumed startup at the end of an ESP approval period of 20 years, and an operational period of 40 years, operations could extend until 2070."
RAI 2.1.3-6	R. Tammara, K. Pinkston	Please include the 0-50 mile total populations for the base year 2000 in the text on page 2.1-5.
RAI 2.2.2-1	R. Tammara, K. Pinkston	The onsite chemicals for proposed Units 3 and 4 (AP1000) presented in Table 2.2-6 do not provide estimated quantities for chemicals listed. Please provide these details such that Table 2.2-6 will be consistent with Table 2.2-5.
RAI 2.2.2-2	R. Tammara, K. Pinkston	An onsite railroad spur, with the potential for transport of chemicals, was observed to have a tank car on it during the site visit conducted November 1-3, 2006. Please clarify whether or not chemicals are brought in using this railroad spur, and discuss the potential for any related hazards.

RAI Number	Reviewer	RAI
RAI 2.2.3-1	R. Tammara, K. Pinkston	SSAR Section 2.2.3.1.1 addressed truck-borne hazards from six chemicals. Please provide the basis for the selection of these six chemicals used for the truck-borne hazards analysis. In addition, state whether any new chemicals have been identified since the analysis for Units 1 and 2 was performed, and state whether any new chemicals will be addressed for the proposed Units 3 and 4. Please address these details with the analysis cited in item 1 of the response to information needs letter AR-06-2720, dated December 15, 2006.
RAI 2.2.3-2	R. Tammara, K. Pinkston	In response 3 of letter AR-06-2720, you stated that an analysis of the potential formation of flammable vapor clouds from a gasoline truck is currently being performed. Please provide the results of this analysis, as well as a description of the input parameters and methodology used.
RAI 2.2.3-3	R. Tammara, K. Pinkston	Please clarify whether an 8500 gallon gas truck with a TNT equivalent of 50,700 lbs is considered bounding for the truck traffic explosion and flammable vapor cloud analysis in SSAR Section 2.2.3.1.1. Additionally, the critical distance resulting in a peak overpressure of 1 pound-per-square-inch (psi) for a TNT equivalent of 50,700 lbs calculated based on the equation $kW^{1/3}$ from Regulatory Guide (RG) 1.91 is about 1700 ft. In SSAR section 2.2.3.1.1 this critical distance is reported as 1900 ft. Please explain the discrepancy between the RG 1.91 calculation and what is reported in the SSAR.
RAI 2.2.3-4	R. Tammara, K. Pinkston	The concentrations provided in response 4 of letter AR-06-2720 are the concentrations at the control room intake rather than the concentrations calculated for a flammable vapor cloud. Please provide the concentrations generated from the vapor cloud analysis to confirm the following conclusion presented in SSAR Section 2.2.3.1.1: "The analysis demonstrated that truck-borne substances transported within a 5-mile radius of the VEGP Units 1 and 2, as well as explosions and flammable vapor clouds induced by these chemicals, will not adversely affect safe operation of the units."
RAI 2.2.3-5	R. Tammara, K. Pinkston	For clarification regarding the chemicals considered in SSAR Section 2.2.3.1.1, please provide the quantity of each chemical, the distance to the control room, wind speed, stability, and calculated concentration along with the compared limiting concentration. A similar approach is suggested for SSAR Sections 2.2.3.2 and 2.2.3.3.
RAI 2.2.3-6	R. Tammara, K. Pinkston	Section 2.2.3.1.3 of Revision 0-S1 of the SSAR states that an analysis for VEGP Units 1 and 2 determined that the concentration of flammable material in the vapor-space of the tanks carrying the fuel oil is below the lower limit of flammability. Additionally, response 5 of letter AR-06-2720 states that the concentration inside any of the three 3-million-gallon fuel tanks is lower than the lower flammability limit of #2 diesel fuel. Please provide details of the analyses performed to determine that the concentration of fuel oil in the vapor space of tanks carrying fuel oil on a barge and in the Plant Wilson storage tanks is below the lower limit of flammability.

RAI Number	Reviewer	RAI
RAI 2.2.3-7	R. Tammara, K. Pinkston	Response 5 of letter AR-06-2720 states that for fuel oil, Plant Wilson is bounding for explosion and flammable vapor cloud formation and that for vapor cloud toxicity, a fuel barge is limiting. Please provide the basis for your determination that a 3 million gallon fuel tank at Plant Wilson is bounding for explosion hazard and flammable vapor formation, but not for vapor cloud toxicity, compared to a lower volume of fuel oil on a barge. Please provide the details of the analysis, along with input parameters and assumptions pertaining to waterway traffic addressed in SSAR Section 2.2.3.1.3. Provide a brief discussion of the release scenario (i.e., leak or spill) from the Plant Wilson storage tank and the barge, as well as all other parameters used in performing the vapor cloud toxicity analysis.
RAI 2.2.3-8	R. Tammara, K. Pinkston	Section 2.2.3.1.3 of Revision 1 of the SSAR states that "This substance is neither a solid explosive material, nor is it a hydrocarbon which has been liquefied under pressure. Therefore, in accordance with RG 1.91, this material is not required to be evaluated for explosion." However, this is inconsistent with RG 1.91. RG 1.91 states that the regulatory guide is limited to solid explosives and hydrocarbons liquified under pressure, and is not applicable to cryogenically liquefied hydrocarbons such as liquefied natural gas (LNG). This regulatory guide does not state that hazardous materials other than solid explosives and hydrocarbons liquefied under pressure do not need to be evaluated. Please clarify and provide the basis for not evaluating fuel oil for explosion.
RAI 2.2.3-9	R. Tammara, K. Pinkston	Please provide a justification for the selection of chemicals for the railroad traffic analyses in SSAR Section 2.2.3.1.4. In addition, there appears to be an incorrect citation on pages 2.2-12 and 2.2-13, since toxic vapor concentrations are based on RG 1.78 rather than RG 1.91.
RAI 2.2.3-10	R. Tammara, K. Pinkston	Please provide in tabular form the amount of each chemical analyzed and the calculated concentration in SSAR Section 2.2.3.1.4 along with the input parameters (distance, stability, wind speed, etc.) for the model used. Please also discuss the methodology, including salient assumptions, used for the analyses.
RAI 2.2.3-11	R. Tammara, K. Pinkston	SSAR Section 2.2.3.1.4 states that the critical distance that would yield an overpressure of 1 psi for railroad traffic is 2250 ft. Please provide the basis for the calculation of this critical distance.
RAI 2.2.3-12	R. Tammara, K. Pinkston	In the analysis of the potential explosion hazard from a railcar containing cyclohexane in Section 2.2.3.1.4, the TNT equivalent mass is calculated based on the mass of cyclohexane that would be present in a railcar filled with cyclohexane vapor. However, in the analyses done for the potential explosion hazards from truck-borne hazards, the TNT equivalent mass is calculated based on a truck filled with the total amount shipped. Please explain why a different approach was used for cyclohexane than for the other chemicals.

RAI Number	Reviewer	RAI
RAI 2.2.3-13	R. Tammara, K. Pinkston	The analysis of an explosion of a railcar containing cyclohexane presented in Section 2.2.3.1.4 of Revision 1 of the SSAR states that a TNT equivalent mass of 117.5 lbs of cyclohexane would produce a peak overpressure of 1 psi at a distance of 1026 ft from the railroad. This distance is not consistent with the critical distance calculated using $kW^{1/3}$. Please clarify.
RAI 2.2.3-14	R. Tammara, K. Pinkston	Please clarify whether any analyses were done to evaluate the potential hazards from an explosion or flammable vapor cloud formation due to accidents associated with onsite storage tanks and nearby storage facilities, such as the fuel tanks at Plant Wilson. If these analyses were performed, please provide the details of these analyses, and if not, please provide an explanation for why these analyses were not performed.
RAI 2.2.3-15	R. Tammara, K. Pinkston	Please identify and evaluate potential hazards, if any, associated with the existing Vogtle Units 1 and 2 (excluding severe accidents) that may affect the proposed Units 3 and 4 to be located at the ESP site.
RAI 2.2.3-16	R. Tammara, K. Pinkston	SSAR Section 2.2.3.2.3 states that the potential hazard due to ammonia and hydrazine from onsite storage tanks will be addressed at the COL stage. Responses 16 and 17 in letter AR-06-2720 discuss analyses for the potential hazard due to onsite storage of hydrazine, methoxypropylamine, and phosphoric acid. Please explain why ammonia was not similarly analyzed in these responses, and clarify whether the potential hazard from onsite storage of ammonia will be addressed at the COL stage.
RAI 3.5.1.6-1	R. Tammara, K. Pinkston	Please provide the assumptions and methodology used in determining the effective areas and assumed fractions for the general aviation, air taxi and commercial, air carrier, and military aircrafts addressed in SSAR Section 3.5.1.6.2 (page 3.5-3), which were used to calculate the weighted effective plant area.

RAI Number	Reviewer	RAI
RAI 11-1	J. Dehmel	<p>Section 5.4 of the ER presents an assessment of radiation exposures and doses due to liquid and gaseous effluents based on models, assumptions, and site-specific data described in two key documents. They are:</p> <ul style="list-style-type: none"> • Southern Nuclear Operating Company, Offsite Dose Calculation Manual for Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Ver. 22, June 25, 2004 (ODCM). • Southern Nuclear Operating Company, Vogtle Electric Generating Plant - Units 1 and 2, Annual Radioactive Effluent Release Report for January 1, 2003 to December 31, 2003. <p>A review of ER Section 5.4 and cited references indicates that Section 5.4 does not provide information used to model exposure pathways, and does not include a list of all input parameters used to derive dose estimates to members of the public. In its evaluation, NRC Staff will be using the GASPAR II and LADTAP II computer codes, and will not rely on the ODCM method described in the application for the purpose of assessing doses to members of the public from liquid and gaseous effluents.</p> <p>Accordingly, update ER Section 5.4 to include descriptions of all required model assumptions and include input parameters necessary to run the GASPAR II and LADTAP II computer codes. Without this information, the staff cannot perform an independent evaluation and conclude, with reasonable assurance, that the application demonstrates compliance with 10 CFR Part 50, Appendix I dose objectives.</p>

RAI Number	Reviewer	RAI
RAI 11-2	J. Dehmel	<p>A review of ER Section 5.4 indicates that the dose assessment excludes potential exposure pathways (for liquid and gaseous effluents), with no basis provided for their omissions. In particular, ER Tables 5.4-2 and 5.4-4 exclude boating, shoreline activity, crop and pasture irrigation, livestock watering, and goat milk production. Given that the assessment relies on information presented in the 2004 ODCM and 1988 results of the land-use census (see Ref. 14 in the ODCM, p.ix), confirm that the results of the most current land-use census will be used in determining whether all potential exposure pathways have been considered in assessing doses to members of the public.</p> <p>Similarly, a review of the Vogtle Electric Generating Plant Annual Radiological Environmental Operating Report for 2005 indicates that for gaseous effluent releases, there are several other nearby residences that are closer to the plant than the one considered in the ER analysis (as described in Section 5.4, Table 5.4-5). For example, ER Section 5.4 assumes that the maximally exposed individual is located 4.7 miles away in the SSW sector. However, a review of the land-use census results presented in the 2005 operating report (Table 4.1-1, p.4-5) indicates that there are residences that are located in closer proximity to the plant, ranging from 1.2 to 4.6 miles. ER Section 5.4 does not acknowledge this fact and does not provide justification for excluding residences that are closer to the proposed plant site.</p> <p>Accordingly, update ER Section 5.4 to identify and justify the selection of the most appropriate location of the nearest residence and maximally exposed individual, include all applicable exposure pathways using the results of the most current land-use census, and provide the rationale for excluding specific ones. Identify and provide full citations for all applicable references forming the basis of all updated assumptions. Without this information, the staff cannot perform an independent evaluation and conclude, with reasonable assurance, that the application demonstrates compliance with 10 CFR Part 50, Appendix I dose objectives.</p>

RAI Number	Reviewer	RAI
RAI 11-3	J. Dehmel	<p>Pursuant to 10 CFR Part 52.18, applications are reviewed against the applicable standards of 10 CFR Part 50 and its appendices and 10 CFR Part 100. A review of SSAR Part 1, Chapter 2, (Section 2.1) and SSAR Part 2, Chapter 1 (Section 1.8) indicates that there is no information in the SSAR demonstrating compliance with the following:</p> <ul style="list-style-type: none"> a. 10 CFR Part 52.17(a)(1) as it relates to a characterization of liquid radiological effluents associated with normal plant operations and demonstration of compliance with Section II.A of Appendix I to Part 10 CFR Part 50 as part of the description and assessment of the site on which the facility is to be located. b. 10 CFR Part 100.21(c)(1) as it relates to a characterization of gaseous radiological effluents associated with normal plant operations and demonstration of compliance with Sections II.B and II.C of Appendix I to Part 10 CFR Part 50 for any individual located offsite. <p>Accordingly, update the appropriate section(s) of the SSAR to include the information specified by the above NRC regulations. Without this information, the staff cannot complete its evaluation and conclude, with reasonable assurance, that the application demonstrates compliance the applicable requirements of 10 CFR Part 52 and 10 CFR Part 100.</p>
RAI 11-4	J. Dehmel	<p>A review of ER Sections 3.5 and 5.4 indicates the radiological effluent source term is based on the AP1000 Design Control Document (Rev. 15, November 2005). A comparison between radionuclides and associated liquid and gaseous effluent source terms was made between the data presented in ER Section 3.5 and in the AP1000 DCD (Table 11.2-7). The review indicates that for one nuclide, a different isotope (Na-24 vs Na-22) was used in ER Table 3.5-1 for liquid effluents. NRC staff recommends that the data presented in ER Tables 3.5-1 be reviewed against that of the AP1000 DCD and be updated accordingly.</p>

RAI Number	Reviewer	RAI
RAI 11-5	J. Dehmel	<p>The staff's review of ER Section 5.4 and supporting sections of the ER and SSAR identified a number of internal inconsistencies in referencing information and parameters used in calculating doses to members of the public. NRC staff requests that the following items be reviewed and corrected or clarified, as needed. They are:</p> <ul style="list-style-type: none"> a. The basis for the dilution factor applied to liquid effluents - A review of ER Section 5.4.1.1 and Table 5.4-1 indicates that the stated dilution factor is not qualified as to the location of the receptor. In addition, Table 5.4-1 characterizes the effluent discharge rate of 1.3 gpm being diluted in a cooling tower blowdown flow rate of 6,000 gallons per minute (gpm) (assumed to be for one plant), as compared to ER Table 3.0-1 which lists a dilution flow rate of 4,650 gpm (one plant). Also, ER Table 3.1-1 cites a dilution flow rate of 9,300 gpm and a discharge rate of 3 gpm, but ER Figure 3.3-1 gives a dilution flow rate of 9,605 gpm and a discharge rate of 3 gpm, taken to be from two plants. b. Basis for atmospheric dispersion data - A review indicates that the bases of the atmospheric dispersion factors between SSAR Section 2.3.5 and ER Section 2.7.6 are different than those cited in ER Section 5.4. ER Section 5.4.1.2 and ER Tables 5.4-3 and 5.4-5 are based on ODCM data for the existing plants, while SSAR Section 2.3.5 presents atmospheric dispersion data derived from the XOQDOQ computer code. c. Designations of wind sectors and distances for the maximally exposed individual and nearest site boundary - A review of ER Section 5.4.1.2 and ER Tables 5.4-3 and 5.4-5 indicates that designations of wind sectors and distances for the maximally exposed individual and nearest site boundary for gaseous effluents differ from those set forth in ER Section 2.7.6 and SSAR Section 2.3.5. ER Tables 5.4-3 and 5.4-5 are based on ODCM data for existing plants, while SSAR Section 2.3.5 presents atmospheric dispersion data derived anew for the application.

RAI Number	Reviewer	RAI
		<p>d. The basis for total population within the 50-mile radius - A review of ER Section 5.4.3 and Table 5.4-10 reveals an inconsistency in the size of the total population within the 50-mile radius used in assessing collective doses between ER Section 2.5.1 (Table 2.5.1-1) and ER Section 5.4. ER Section 2.5.1 cites a population of 674,102 and ER Table 5.4-10 states 667,092, while referencing ER Table 2.5.1-1 as the basis of this value. Also, note that ER Section 2.9, Table 2.9-1 gives a value of 670,000 for the total population.</p> <p>e. The operational radiological monitoring program of onsite groundwater wells - SSAR Section 2.4.12 states that onsite groundwater wells will be used as a source of potable water as well as supplying plant systems. In light of the information presented in ER Sections 2.3.3, 6.2.3, and 6.3.3, and SSAR Section 2.4.12, describe how groundwater from onsite wells will be monitored for the presence of radioactivity generated by plant operations. Note that ER Section 6.2, Table 6.2-1 refers to "surface water" and "drinking water," but does not identify water from onsite groundwater wells. Finally, a review of the 2004 ODCM (Rev. 22) indicates that the current REMP only considers the analysis of river water samples collected downstream from the plant.</p> <p>Accordingly, revise the relevant ER and SSAR Sections in light of the above observations, and provide the information, references, rationale, etc., in support of any proposed revisions. Without this information, the staff cannot perform an independent evaluation and conclude, with reasonable assurance, that the application demonstrates compliance with (a) 10 CFR Part 50, Appendix I dose objectives, (b) compliance with the EPA drinking water standards of 40 CFR Part 141 for man-made radionuclides.</p>

RAI Number	Reviewer	RAI
RAI 11-6	J. Dehmel	<p>The staff's review of ER Section 6.2 indicates that there is no discussion about whether the current REMP program would be augmented in light of the NEI and nuclear utility initiative in response to the NRC's Liquid Radioactive Release Lessons Learned Task Force Report on contamination of ground and surface water (ADAMS Accession No. ML062650312). Provide descriptions of how facility design and operational procedures would minimize, to the extent practicable, contamination of site facilities, surface and groundwater, and prevent uncontrolled and unmonitored releases of radioactive materials in the environment.</p> <p>Accordingly, update ER Section 6.2 and provide a discussion describing how the scope of the existing radiological environmental monitoring program information might be augmented to address the recommendations of the NEI and nuclear utility initiative in light of the issues identified in the NRC's Liquid Radioactive Release Lessons Learned Task Force Report on contamination of ground and surface water.</p>
RAI 15-1	J. McGuire M. Hart	<p>Please provide the Chapter 15 reference (Westinghouse 2006b) Westinghouse Document No. LTR-CRA-06-21, <i>AP1000 Accident Releases and Doses as Function of Time</i>, Westinghouse Electric Company, February 1, 2006, and explain the methodology used to determine the time-dependent activity releases for each design basis accident.</p>

cc:

Mr. Jeffrey T. Gasser
Executive Vice President
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

Mr. Louis B. Long
Vice President Technical Support
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

Mr. Charles R. Pierce
ESP Project Manager
P.O. Box 1295
Birmingham, AL 35201-1295

Mr. Thomas O. McCallum
ESP Project Manager
P.O. Box 1295
Birmingham, AL 35201-1295

Mr. Steven M. Jackson
Senior Engineer - Power Supply
Municipal Electric Authority of Georgia
1470 Riveredge Parkway, NW
Atlanta, GA 30328-4684

Mr. Reece McAlister
Executive Secretary
Georgia Public Service Commission
244 Washington St., SW
Atlanta, GA 30334

Mr. Adrian Heymer
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Attorney General
Law Department
132 Judicial Building
Atlanta, GA 30334

Mr. Laurence Bergen

Oglethorpe Power Corporation
2100 East Exchange Place
P.O. Box 1349
Tucker, GA 30085-1349

Arthur H. Dombay, Esquire
Troutman Sanders
Nations Bank Plaza
600 Peachtree Street, NE
Suite 5200
Atlanta, GA 30308-2216

Resident Inspector
Vogtle Plant
8805 River Road
Waynesboro, GA 30830

Mr. Paul Gunter
Director of the Reactor Watchdog Project
Nuclear Information & Resource Service
1424 16th Street, NW, Suite 404
Washington, DC 20036

Mr. Russell Bell
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. James Riccio
Greenpeace
702 H Street, NW, Suite 300
Washington, DC 20001

Mr. Jay M. Gutierrez
Morgan, Lewis & Bockius, LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Mr. Robert E. Sweeney
IBEX ESI
4641 Montgomery Avenue
Suite 350
Bethesda, MD 20814
Ms. Vanessa E. Quinn, Chief
Radiological Emergency Preparedness

Branch
Nuclear and Chemical Preparedness and
Protection Division
Department of Homeland Security
1800 South Bell Street, Room 837
Crystal City-Arlington, VA 22202-3546

Mr. Paul Leventhal
Nuclear Control Institute
1000 Connecticut Avenue, NW
Suite 410
Washington, DC 20036

Mr. David Lochbaum
Union of Concerned Scientists
1707 H Street, NW
Suite 600
Washington, DC 20006-3919

Mr. Marvin Fertel
Senior Vice President
and Chief Nuclear Officer
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Jim Davis
ESP Project Engineer
Southern Nuclear Company
Post Office Box 1295, BIN B056
Birmingham AL 35201

O.C. Harper IV
Vice President - Resources Planning and
Nuclear Development
Georgia Power Company
241 Ralph McGill Boulevard
Atlanta, GA 30308

Bentina C. Terry
Southern Nuclear Operating Company, Inc.
Bin B-022
P.O. Box 1295
Birmingham, AL 35201-1295

Director, Consumers' Utility

Counsel Division
Governor's Office of Consumer Affairs
2 M.L. King, Jr. Drive
Plaza Level East; Suite 356
Atlanta, GA 30334-4600

Resident Manger
Oglethorpe Power Corporation
Alvin W. Vogtle Nuclear Plant
Electronic Mail Distribution

Mr. Thomas P. Miller
U.S. Department of Energy
Headquarters - Germantown
19901 Germantown Road
Germantown, MD 20874-1290
Mr. Joseph (Buzz) Miller
Senior Vice President
Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

Mr. M. Stanford Blanton, Esquire
Balch and Bingham, LLP
P.O. Box 306
Birmingham, AL 35201

Ms. Sarah J. Lynch - (Meeting Notice Only)
Senior Analyst
Natural Resources and Environment
441 G St. NW
Washington, DC 20548

Email:

TOMCCALL@southernco.com

CRPIERCE@southernco.com

erg-xl@cox.net

patriciaL.campbell@ge.com

bob.brown@ge.com

mark.beaumont@wsms.com

sfrantz@morganlewis.com

ksutton@morganlewis.com

jgutierrez@morganlewis.com

tom.miller@hq.doe.gov or

tom.miller@ nuclear.energy.gov

steven.hucik@ge.com

david.hinds@ge.com

James1.Beard@ge.com

chris.maslak@ge.com

jim@ncwarn.org

pshastings@duke-energy.com

ronald.hagen@eia.doe.gov

lynchs@gao.gov - (Meeting Notice Only)