

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
 )  
SOUTHERN NUCLEAR OPERATING CO. ) Docket No. 52-011-ESP  
 )  
(Early Site Permit for Vogtle ESP Site) )

NRC STAFF TESTIMONY OF MARK D. NOTICH, ANNE R. KUNTZLEMAN,  
REBEKAH H. KRIEG, JILL S. CAVERLY, AND LANCE W. VAIL  
CONCERNING ENVIRONMENTAL CONTENTION EC 6.0

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Q1. Please state your names, occupations, and by whom are you employed.

A1(a). (MDN) My name is Mark D. Notich. (MDN) I am employed as a Senior Project Manager in the Division of Site and Environmental Reviews, Office of New Reactors, U.S. Nuclear Regulatory Commission ("NRC"). I am the NRC Project Manager for the environmental review associated with the application submitted on August 14, 2006, by Southern Nuclear Operating Company, Inc. ("Southern" or "Applicant") for an early site permit ("ESP") for a site within the existing Vogtle Electric Generating Plant ("VEGP") site near Waynesboro, GA. A statement of my professional qualifications is attached hereto.

A1(b). (ARK) My name is Anne "Nancy" R. Kuntzleman (ARK). I am employed as an Aquatic Biologist in the Division of Site and Environmental Reviews, Office of New Reactors, NRC. I am a technical reviewer for the NRC on aquatic and terrestrial resources issues associated with the application submitted on August 14, 2006, by Southern for an ESP for a site within the existing VEGP site near Waynesboro, GA. A statement of my professional qualifications is attached hereto.

A1(c). (RHK) My name is Rebekah H. Krieg (RHK). I am employed as a Senior Research Scientist in the Ecology Group, Environmental Sustainability Division, Energy and

Environment Directorate of the Pacific Northwest National Laboratory (“PNNL”). I am a technical reviewer for PNNL’s contract with the NRC on aquatic resource issues associated with the application submitted on August 14, 2006, by Southern for an ESP for a site within the existing VEGP site near Waynesboro, GA. A statement of my professional qualifications is attached hereto.

A1(d). (JSC) My name is Jill S. Caverly (JSC). I am employed as a Hydrologist in the Division of Site and Environmental Reviews, Office of New Reactors, NRC. I am a technical reviewer for the NRC on hydrological alterations, water use, and water quality issues associated with the application submitted on August 14, 2006, by Southern for an ESP for a site within the existing VEGP site near Waynesboro, GA. A statement of my professional qualifications is attached hereto.

A1(e). (LWV) My name is Lance Vail (LWV). I am employed as a Sr. Research Engineer in the Hydrology Group, Environmental Sustainability Division, Energy and Environment Directorate of PNNL. I am a technical reviewer for PNNL’s contract with the NRC on hydrological alterations, water use, and water quality issues associated with the application submitted on August 14, 2006, by Southern for an ESP for a site within the existing VEGP site near Waynesboro, GA. A statement of my professional qualifications is attached hereto.

Q2. Please describe your current responsibilities in relation to this review.

A2(a). (MDN) As the NRC Project Manager for the environmental review, I was responsible for overseeing the preparation of NUREG-1872, the “Final Environmental Impact Statement for an Early Site Permit (ESP) at the Vogtle Electric Generating Plant Site,” August 2008 (“FEIS”) (Exhibit NRC-1).

A2(b). (ARK) In my capacity as the aquatic biologist assigned to the VEGP ESP review, I provided technical oversight to the PNNL reviewers during the preparation of Sections 2.7.2 (Aquatic Ecology), 4.4.2 (Aquatic Impacts from Construction), 5.4 (Ecological Impacts from Operation), and 7.5 (Aquatic Ecosystem - Cumulative Impacts) of the FEIS.

A2(c). (RHK) In my current responsibility as the aquatic ecology technical reviewer assigned to the VEGP ESP review, I wrote the descriptive information contained in Section 2.7.2 and performed the review of the impact to aquatic organisms due to interactions with the proposed station intake and discharge structures as presented in Sections 5.4 and 7.5 of the FEIS. I worked under the technical oversight of Dr. Michael T. Masnik and Ms. Nancy Kuntzleman of the NRC.

A2(d). (JSC) In my current responsibility as the hydrology technical reviewer assigned to the VEGP ESP review, I am responsible for reviewing the analysis prepared by Mr. Vail (LWV) related to surface and groundwater water and plant water systems and documented in Chapters 2, 3, 4, 5, 7, and 9 of the FEIS. I became familiar with this review when I was assigned to the VEGP ESP hydrology review in June 2008.

A2(e). (LWV) In my current responsibility as the hydrology technical reviewer assigned to the VEGP ESP review, I am responsible for the analysis related to surface water and plant water systems documented in Chapters 2, 3, 4, 5, 7, and 9 of the FEIS. I assumed responsibility as the PNNL hydrology technical reviewer following publication of the NRC Staff's Draft Environmental Impact Statement ("DEIS") in September 2007.

Q3. What is the purpose of this testimony?

A3. (ALL) The purpose of this testimony is to present the NRC Staff's views with respect to Contention EC 6.0, which challenges the adequacy of the analysis in the FEIS of potential cumulative impacts associated with the possible dredging of the Savannah River Federal navigation channel, as well as of potential upstream reservoir operations, to support river navigation.

Q4. Are you familiar with Contention 6.0?

A4. (ALL) Yes. Contention EC 6.0, submitted in this proceeding by the Center for a Sustainable Coast, Savannah Riverkeeper, Southern Alliance for Clean Energy, Atlanta Women's Action for New Directions, and Blue Ridge Environmental Defense League

(collectively, "Joint Intervenors"), as restated by the Atomic Safety and Licensing Board in its Memorandum and Order of October 24, 2008, ruling on the Applicant's Motion for Summary Disposition, alleges that:

Because Army Corps of Engineers (Corps) dredging of the Savannah River Federal navigation channel has potentially significant impacts on the environment, the NRC staff's conclusion, as set forth in the "Cumulative Impacts" chapter of the FEIS, that such impacts would be moderate is inadequately supported. Additionally, the FEIS fails to address adequately the impacts of the Corps' upstream reservoir operations as they support navigation, an important aspect of the problem.

We are familiar with the contention and the bases submitted in its support presented in the Joint Intervenors' filing dated September 22, 2008, as well as with the declarations of Shawn Paul Young, Ph.D. dated September 22, 2008, and the declaration of Donald F. Hayes, dated September 21, 2008. It is our understanding that the contention concerns the possible environmental impacts of dredging of the Federal navigation channel on aquatic biota as well as postulated impacts to the Savannah River basin, if releases were made from upstream reservoirs to provide flows necessary to facilitate barge traffic to the VEGP site.

Q5. Please describe how you prepared for this testimony.

A5. (ALL) Our assessment of the impacts to aquatic biota in the Savannah River, including impacts due to potential dredging activities on the Savannah River, is presented in the FEIS. Our testimony therefore focuses on the Staff analysis documented in the FEIS. However, in preparing this testimony we have also considered the "U.S. Army Corps of Engineers Testimony of William G. Bailey, Carol L. Bernstein, Lyle J. Maciejewski, and Stanley L. Simpson Concerning Environmental Contention 6.0" provided on January 9, 2009, by the Corps of Engineers, Savannah District (hereinafter "USACE Testimony"), as well as the following specific documents:

NUREG-1555, Standard Review Plans for Environmental Reviews for Nuclear Power Plants ("ESRP") Rev. 1 (2007) (Exhibit NRC-10).

US Army Corps of Engineers, ER-1105-2-100, PLANNING GUIDANCE NOTEBOOK (2000) (Exhibit NRC-48).

US Army Corps of Engineers, ER-200-2-2 PROCEDURES FOR IMPLEMENTING NEPA (1988) (Exhibit NRC-49).

I. **Basis for NRC Staff Assumptions in FEIS Analysis**

A. **Barging and Navigation**

Q6. In the FEIS, did the NRC staff assume that heavy components would be delivered to the VEGP site by the use of barges on the Savannah River? If so, what was the basis for this assumption?

A6. (LWV, JSC) Yes. In the DEIS at pages 4-8, 4-16, and 4-25, the Staff mentioned Southern's plans for dredging the barge slip adjacent to the VEGP site. Given that Southern planned to refurbish and dredge the barge slip, it was reasonable to assume that it expected to use the barge slip to bring items to the site that might not be easily transported by conventional transport (e.g. roads or rail). Consistent with the DEIS, the FEIS identified and evaluated that dredging of the barge slip area as one of the construction impacts. Exhibit NRC-1 at pages 4-8, 4-9, 4-17, 4-26 through 4-27, and 4-37. Additionally, based on comments on the DEIS from the public and from Federal and state resource agencies, the Staff identified and evaluated the possible impacts of dredging the Federal navigation channel in the FEIS. Exhibit NRC-1 at pages 4-9 and 7-20.

Q7. Did the Staff in the FEIS discuss upstream reservoir operations in relation to support for navigation on the Savannah River?

A7. (LWV, JSC) No. The Staff assumed reservoir operations would not be altered solely for the purpose of navigation. The Staff assumed, based on informal discussions with members of the U.S. Army Corps of Engineers ("USACE" or "Corps"), that navigation would be feasible, at least during high flows on the Savannah River, without dredging of the Federal navigation channel. The Staff assumed that these high flows would occur in response to the Corps' flood control rule curve, which is the policy that specifies the releases from the reservoir to ensure that the safety of the dam structure is not compromised by overtopping. The Staff

assumed that the high flows resulting from implementation of the flood control rule curve would not, therefore, alter the conservation pools. Consistent with the above assumptions, the Staff would not expect that barging would occur until the current drought had ended and the reservoirs had sufficiently refilled to result in high flows without compromising the conservation pools. Accordingly the Staff did not consider it reasonably foreseeable that there would be impacts to the upstream reservoirs associated with releases for navigation, in connection with either the NRC's action or the potential dredging of the Federal navigation channel.

Q8. How does the testimony of the Corps witnesses in this proceeding relate to that assumption?

A8. (LWV, JSC) The Staff considers the Corps testimony in this proceeding to be consistent with the Staff's assumptions. The Corps witnesses state that "The USACE has made no study of minimum river flow needed to eliminate the need for dredging of the Savannah River Federal navigation channel or whether releases from upstream reservoirs could enable barge traffic to reach as far upstream as the Vogtle Electric Generating Plant. The region is presently experiencing a drought and excess water is not available in the lakes for such purposes." USACE Testimony at A15. Thus the Staff believes that upstream releases for navigation would not occur under drought conditions.

B. Potential Dredging of the Federal Navigation Channel

Q9. In the DEIS, did the Staff discuss a potential need for dredging the Savannah River Federal navigation channel as far upstream as the VEGP site?

A9. (LWV, JSC) Dredging of the Federal navigation channel was not mentioned in the DEIS, because it was not expected to occur based on informal Staff discussions with members of the Corps. This continued to be the opinion of the Staff at the time of the writing of the FEIS. However, based on comments to the DEIS, the Staff added an analysis in the FEIS regarding the potential dredging of the Federal navigation channel.

Q10. In preparing the DEIS, what assumptions (if any) did the Staff make regarding the need for dredging of the Federal navigation channel?

A10. (LWV, JSC) As mentioned in the response to Question 9, at the time of the preparation of the DEIS, the Staff did not believe that dredging for the Federal navigation channel was expected to occur. Moreover, the Staff did not assume that barging would be entirely infeasible without dredging nor that barging was the only possible transportation option for bringing components to the VEGP site. While road and rail transportation are other available options, the Staff evaluated the barging because this was the transportation option that was being contemplated by Southern in the ER.

Q11. Did those assumptions change between the issuance of the DEIS and the preparation of the FEIS?

A11. (LWV, JSC) No.

Q12. Did the Staff determine in the FEIS whether dredging of the Savannah River Federal navigation channel would be necessary for barge transportation of heavy components to the VEGP site?

A12. (LWV, JSC) In preparing the FEIS, the Staff expected that dredging was not essential to get large components to the VEGP site, even if barging were determined to be the only transportation option. Based on informal conversations with members of the Corps, the Staff believes that large components could be barged during periods of naturally occurring high flow. The Staff recognizes that this approach (i.e., having barging dependent on periods of high flow) could expose Southern to financial risk because of the inability to reliably predict naturally occurring periods of high flow, and thus could impact its desired construction schedule. However, the Staff does not consider such factors to be material to an ESP environmental review.

Q13. Were the Staff's assumptions regarding the need for dredging based on any specific communications with the applicant or with the USACE?

A13. (LWV, JSC, ARK, MDN) Yes. (MDN) In informal discussions with the Staff before and after the DEIS was issued, the applicant stated that the Corps had a mandate to maintain the Federal navigation channel. Also in informal discussions with the Staff occurring before and after the DEIS was issued, members of the Corps stated that while the Corps had authorization for maintaining the Federal navigation channel, the channel had not been maintained for several decades and Congress would need to provide funding before maintenance dredging could resume. Members of the Corps also stated to the Staff that the Corps had received no formal request from Southern regarding such dredging either by Southern or by the Corps.

(LWV, JSC) Based on informal discussions with members of the Corps following the publication of the DEIS, the Staff determined that it was unlikely that dredging of the Federal navigation channel would occur and certainly not within any short-term time frame. [ARK] This Staff view was also supported by the Staff's understanding of the Corps authorization and review process that would need to occur before dredging would begin. [LWV, JSC] Furthermore, members of the Corps did state in informal discussions with the Staff their view that without dredging Southern could barge during high flow (flood) periods. Based on these considerations, the Staff determined that it was not implausible that Southern could move large components via barge during high flows.

Q14. Did the Staff assume that intentional releases of water from the upstream dams would be authorized to enable navigation and that those releases would be capable of providing adequate flows for barging regardless of whether or not dredging occurs?

A14. (LWV, JSC) No. As stated above in response to Question 12, the Staff assumed, based on informal discussions with the Corps before and after publication of the DEIS, that navigation would be feasible during high flows. The Staff assumed that these high flows would occur as a result of the Corps' implementation of the flood control rule curve, rather than being scheduled for the specific purpose of allowing barging.

Moreover, the testimony of Stanley L. Simpson of the USACE in this proceeding states that “[t]ransportation of large industrial components upstream by barge is not currently possible due to the shallow river depths. However, transportation of large components upstream by barge has occurred several times in the last 10 years. Shipment was made by Chem Nuclear of contaminated power plant reactor vessels to Barnwell, South Carolina (SC) for disposal. However, it required about a 10,000 cubic feet per second (cfs) discharge.” USACE Testimony at A7. Mr. Simpson’s testimony further notes that “from previous experience with nuclear waste shipments, it has required about 10,000 cfs discharge for more than one week to get a barge to Jackson, SC and back from Savannah Harbor.” USACE Testimony at A15. The Staff considers that testimony to be consistent with the Staff’s assumptions regarding the possibility of barging during high flow periods.

Q15. Did the Staff identify or assume a specific minimum flow at which dredging would not be necessary to enable barge traffic to the site?

A15. (LWV, JSC) No. The Staff believes this view is consistent with the Corps testimony in this proceeding. Moreover, the testimony of Stanley L. Simpson of the USACE in this proceeding states that “The USACE has made no study of minimum river flow needed to eliminate the need for dredging of the Savannah River Federal navigation channel.” USACE Testimony at A15.

Q16. At the time of the preparation of the FEIS, had the Staff reviewed or become aware of any formal USACE plan for dredging or channel maintenance of the Federal navigation channel (or any formal request to the USACE for such a project)?

A16. (LWV, JSC) No. The Staff believes this view is confirmed by the Corps testimony in this proceeding. Moreover, the testimony of Lyle J. Maciejewski of the USACE in this proceeding responds “No” to the question of whether the Corps has developed a plan or received a formal request or authorization for dredging of the Savannah River Federal

navigation channel in the near future to facilitate barge traffic as far north as the Vogtle Electric Generating Plant. USACE Testimony at A8.

Q17. At the time of the preparation of the FEIS, had the Staff reviewed or become aware of any formal USACE plan for intentionally releasing water from the upstream dams to provide adequate flows for barging?

A17. (LWV, JSC) No.

Q18. As of the date of this testimony, is the Staff aware of (or has the Staff reviewed) any such formal proposal pending before the Corps - whether proposed by the Corps or submitted to the Corps as an application by a private entity - for dredging of the Federal navigation channel or for intentionally releasing water from the upstream dams to provide adequate flows for barging?

A18. (LWV, JSC) No. The Staff believes this view is confirmed by the Corps testimony in this proceeding. The testimony of Lyle J. Maciejewski of the USACE in this proceeding responds "No" to the question of whether the Corps has developed a plan or received a formal request or authorization for dredging of the Savannah River Federal navigation channel in the near future to facilitate barge traffic as far north as the Vogtle Electric Generating Plant. USACE Testimony at A8. The testimony of Carol L. Bernstein of the USACE also indicates that Southern has not indicated an intention to submit a permit application for dredging of the Federal navigation channel. USACE Testimony at A10.

**C. Cumulative Impacts**

Q19. Ultimately, did the Staff decide to include a discussion in the FEIS of the potential impacts of dredging the Federal navigation channel?

A19. (LWV/RHK) Yes. The Staff decided to include in the FEIS a discussion of the potential impacts of dredging the Federal navigation channel after receiving comments on the DEIS from the public and from Federal and state resource agencies. Some of these comments stated that the dredging of the Savannah River navigation channel would have major impacts or

was not fully analyzed or considered. These comments are provided in Appendix E of the FEIS. Exhibit NRC-1 at E-55 to E-58, E-69, E-70, E-72 and E-73-74. The organizations that commented included the South Carolina Department of Natural Resources, the Georgia Department of Natural Resources, the U.S. Department of Interior, the U.S. Fish and Wildlife Service, the USACE, the Southern Alliance for Clean Energy, and the Nature Conservancy.

Q20. Where in the FEIS did the Staff analyze the potential impacts of dredging the Federal navigation channel?

A20. (RHK) The Staff analyzed the potential impacts in Chapter 7 – Cumulative Impacts. Exhibit NRC-1 at 7-20 and 7-21. The Staff determined this was the appropriate section for the discussion of dredging because the action of dredging the Federal navigation channel in the Savannah River is not under the NRC's jurisdiction and would require a separate review under the National Environmental Policy Act ("NEPA").

Q21. How does the NRC staff determine what actions to include in its discussion of cumulative impacts in Chapter 7 of the FEIS? And what steps are used in the review of cumulative impacts?

A21. (RHK, ARK) ESRP 4.7, "Cumulative Impacts Related to Construction Activities" (NRC 2007) "directs the staff's summarization of potential cumulative environmental impacts associated with construction activities for the proposed project." Exhibit NRC-10 at 4.7-1. The ESRP defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." This definition appears in the regulations of the Council on Environmental Quality (CEQ) implementing NEPA (40 CFR 1508.7). NRC regulations state that 40 CFR 1508.7 will be used by NRC in implementing NEPA. 10 CFR 51.14(b); Exhibit NRC-10 at 4.7-1.

According to the ESRP guidance, the evaluation of cumulative impacts is a three-step review. Exhibit NRC-10 at 4.7-3. The first step guides the Staff to identify past, present and reasonably foreseeable Federal, non-Federal, and private actions that could have meaningful cumulative impacts with the proposed action. The second step involves identifying the geographic area to be considered in evaluating cumulative impacts (in this case the Savannah River at and below the VEGP site). The final step involves the identification and tabulation of the cumulative impacts.

As described in ESRP Section 4.7, CEQ guidance directs agencies to focus on cumulative impact information that is relevant to reasonably foreseeable significant adverse impacts, is essential to a reasoned choice among alternatives, and can be obtained without exorbitant cost. Exhibit NRC-10 at 4.7-3.

Q22. Why did the Staff analyze the potential dredging of the Federal navigation channel as a cumulative impact?

A22. (ARK, RHK) The dredging of the Federal navigation channel was, in the Staff's opinion, not required for the NRC's licensing action, since there are other ways to move the large components to the VEGP site besides dredging the river (see the Staff response above to Question A10). In addition, the Staff did not assume that dredging would be necessary to allow barging, and it was the Staff's understanding that no formal request or permit application for dredging was before the Corps (see the Staff responses above to Questions A12 and A16). However, as a result of comments received on the DEIS, the Staff decided it was appropriate to consider dredging the Federal navigation channel as a potential future Federal action, even though the Staff did not believe it was certain to occur. Accordingly it was only discussed as a cumulative impact.

Q23. Why did the Staff not analyze in the FEIS any cumulative impacts to upstream reservoirs from intentionally releasing water from upstream dams?

A23. (LWV) As discussed in the response above to Question 7, the Staff did not believe there would be any alterations to the upstream reservoirs.

**II. Staff Analysis of Potential Dredging Impacts**

**A. Assessment of Potential Impacts**

Q24. Did the Staff identify in the FEIS the types of impacts to aquatic biota that might result from dredging of the Federal navigation channel?

A24. (ARK) Yes. In the FEIS at 7-20 the Staff concluded that dredging the Federal navigation channel in the Savannah River downstream of the VEGP site would likely have an effect on aquatic organisms for most trophic levels. These potential impacts could include: temporary loss of benthic habitat, disruption of spawning migrations, and resuspension of sediments that might be contaminated. In addition, the Staff mentioned that dredging would also require the disposal of dredged materials. Exhibit NRC-1 at 7-20.

Q25. Do you have professional experience in assessing the environmental impacts of such dredging projects?

A25. (ARK) Yes. From October 1987 until June 2006 I was a biologist with the Department of the Navy, Engineering Field Activity Northeast (EFANE), a former component of the Naval Facilities Engineering Command, Atlantic Division, Lester, PA. EFANE performed engineering services for Naval Bases throughout the northeastern United States (U.S.). For almost 18 years, I served as the sole professional/technical authority at EFANE for the preparation and coordination of all Department of the Army permit applications, state wetland permit applications, and water quality certificate applications for activities in waters of the U.S. and navigable waters of the U.S. within the regulatory authority of Sections 401 and 404 of the Clean Water Act, Sections 9 and 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972. In addition, I also assisted in the preparation of federal consistency determinations pursuant to Section 307 of the Coastal Zone Management Act and 15 CFR Part 930, Federal Consistency. As the Authorized Agent for

Corps of Engineers Permits at EFANE, I had signatory authority for permit applications and attendant issues. I worked on very complex, controversial, and environmentally sensitive dredging projects during my EFANE tenure, which included the following locations: Naval Station Newport, RI; Naval Submarine Base New London, CT; the former Naval Station New York, Staten Island, NY; US Merchant Marine Academy, Kings Point, NY; Naval Weapons Station Earle, Leonardo, NJ; and the Naval Inactive Ship Maintenance Facility, Philadelphia, PA.

Q26. What was the Staff's basis for identifying the types of impacts discussed in the FEIS with respect to the potential dredging of the Savannah River Federal navigation channel?

A26. (ARK) Maintenance dredging involves the periodic removal of accumulated sediment (e.g., sand, silt, and clay) from a previously dredged area (e.g., navigation channel, harbor, marina) for the purpose of maintaining an authorized water depth and width for safe navigation. The general types of potential adverse environmental effects I have evaluated with previous dredging projects include: destruction of benthic habitat; disruption of spawning migrations, impairment of water quality, and the direct (e.g., toxicological) and indirect (e.g., habitat alteration) effects on fish and their prey species. It is reasonable to assume that the regulatory and natural resource agencies responsible for reviewing a possible maintenance dredging project in the Savannah River Federal navigation channel would consider similar factors.

Maintenance dredging may result in adverse effects to benthic habitat either by direct removal of the benthic substrate by the dredging operation itself, or via disposal of the dredged material onto the benthic habitat at the disposal site. Various fish species can also lose a source of forage from removal of benthic macroinvertebrates within the dredged area. Sediment disturbance can also impact fish spawning, egg and larval development, and juvenile survivorship.

Water quality impacts from dredging and dredged material disposal include physical, chemical, and biological impacts. Physical impairment of the water column occurs from changes in dissolved oxygen, pH, oxidation-reduction state, and turbidity with a resultant decrease in light penetration. Chemical impairment is caused by release of various chemical contaminants that may occur within the sediment. Biological impairment can occur when introduction of dredged material into the water column kills submerged aquatic vegetation and macroalgae (either through direct smothering or via impaired light penetration) leading to higher rates of bacterial decomposition and a resultant increase in bacterial oxygen demand.

Due to my experience with very complex environmentally sensitive dredging projects in the northeastern U.S., I concluded that these considerations would also be potentially relevant to the analysis of maintenance dredging of the Savannah River Federal navigation channel.

Q27. What level of detail did the Staff use in its analysis of impacts to aquatic biota as a result of dredging the Federal navigation channel?

A27. (ARK, RHK) The Staff performed a qualitative impact analysis because it was the Staff's understanding that there was no formal request or permit application for maintenance dredging of the Federal navigation channel before the Corps (see Staff response above to Question 22). The qualitative analysis was based on the Staff's familiarity with previous dredging projects and the fact that the Savannah River Federal navigation channel had previously been dredged.

Q28. Was this level of detail appropriate for the ESP FEIS? Why?

A28. (RHK, ARK) The qualitative nature of the review was appropriate for the ESP FEIS. As explained in the FEIS, the potential dredging project is incompletely defined, the amount of material that would be removed is unknown, and the locations of the dredged material disposal areas have not been identified. Exhibit NRC-1 at 7-20.

In addition, the Staff analysis in the FEIS emphasized that any dredging of the Federal navigation channel would require a separate NEPA process with a separate environmental

review performed by the agency with the appropriate authority or jurisdiction, in this case the USACE. This review would be conducted at the time an actual project is formally requested or a permit application is submitted. The Corps in its environmental review presumably would be able to consider the specific details rather than trying to speculate about those details. For these reasons, the Staff determined that a qualitative review for the purposes of this FEIS was appropriate.

B. Basis for Staff Determinations

Q29. Did the Staff make a determination in the FEIS as to what the cumulative impacts to aquatic biota might be as a result of potential dredging of the Federal navigation channel?

A29. (ARK, RHK) Yes. In the FEIS, the Staff concluded that “the cumulative impacts to aquatic organisms in the region from the construction including dredging of a navigation channel could be MODERATE, depending on the type of mitigation.” Exhibit NRC-1 at 7-20. However, in reaching that conclusion, the Staff explained that “these impacts would be evaluated in more detail in the NEPA analysis that would need to be conducted by the USACE.” Exhibit NRC-1 at 7-21.

Q30. What was the basis for the determination that cumulative impacts to aquatic organisms in the region could be MODERATE depending on the type of mitigation?

A30. (ARK, RHK) The Staff determined that if the Corps were to pursue maintenance dredging of the Savannah River Federal navigation channel, the Corps would conduct its own NEPA review of that action. This review would likely include the preparation of either an Environmental Assessment (EA) or Environmental Impact Statement (EIS) in order to maintain the authorized navigation channel depth and width and manage the dredged material in a cost-effective, environmentally acceptable, and, wherever possible, beneficial manner. In the Staff's view, as a result of this anticipated Corps' review process, appropriate and practicable steps would be taken to minimize potential adverse impacts of the dredging and dredged material disposal on the aquatic ecosystem. The testimony of William G. Bailey of the USACE confirms

that the Corps "...would prepare an environmental assessment of the proposed action...The process would conclude with either an Environmental Assessment (with a Finding of No Significant Impact) or an Environmental Impact Statement (with a Record of Decision)." USACE Testimony at A9.

It is the Staff's understanding that, as part of that environmental review, the Corps would conduct consultations with the Federal resource agencies, including the U.S. Fish and Wildlife Service ("USFWS") and National Marine Fisheries Service ("NMFS"), and would coordinate with the State regulatory and resource agencies where the dredging and dredged material disposal would occur. The agencies would work together to identify the biota at risk and determine the time of the year the areas proposed for maintenance dredging would be used by important species (e.g., birds, fish, macroinvertebrates) for breeding, foraging, rearing, or migration. Because of these Federal and state consultations, the Staff anticipates that the Corps would likely be required to avoid dredging activities during peak reproductive and migratory activities, and seasonal restrictions (or environmental windows) would be established by the Federal and state resource agencies for the project.

The testimony of the Corps witnesses is consistent with the Staff's understanding of this process. The testimony of William G. Bailey and Carol L. Bernstein describes the Corps' process for an environmental review including consultation with other Federal and state agencies. USACE Testimony at A10 and A12. Their testimony also confirms the possibility of "special requirements/conditions for the dredging activities" including time-of-year restrictions. USACE Testimony at A11. The testimony of William G. Bailey also acknowledges that a coastal zone consistency certification may be required. USACE Testimony at A19.

The Staff understands that Section 401 of the Clean Water Act would require that maintenance dredging of the Savannah River Federal navigation channel comply with applicable State water quality standards authorized pursuant to Section 404 of the Clean Water Act. The states of both Georgia and South Carolina would likely require implementation of a

water quality monitoring plan, and violation of state water quality standards would not be permitted to occur beyond a designated mixing zone. The testimony of William G. Bailey and Carol L. Bernstein confirms the need to obtain clearances under the Clean Water Act. USACE Testimony at A9 and A10.

The Staff acknowledged in the FEIS that “at the present time the dredging project is incompletely defined, the amount of material to be removed is unknown, and the locations of the dredged material disposal areas have not been identified.” Exhibit NRC-1 at 7-20. The testimony of Lyle J. Maciejewski states that “[t]he USACE does not currently know how much sediment would need to be removed, the nature of those materials, or where they could be deposited.” USACE Testimony at A17. The testimony of William G. Bailey states that “[t]he USACE has not sampled sediments in the Savannah River Federal navigation channel and can not accurately predict what contaminants may be present in those sediments.” USACE Testimony at A21.

Nevertheless, the Staff performed a qualitative review and concluded that cumulative impacts to aquatic organisms in the region from the construction, including dredging of a navigation channel, could be MODERATE, defined as “environmental effects [being] sufficient to alter noticeably, but not to destabilize, important attributes of the resource.” Exhibit NRC-1 at 1-4 and 7-20. The Staff anticipated that the Federal and state regulatory and resource agencies responsible for reviewing the dredging project would require project-specific mitigation measures to ensure that the cumulative impacts to aquatic organisms in the region would not be LARGE, defined as clearly noticeable environmental effects that would be sufficient to destabilize important attributes of the resource.

Q31. Does the Staff still consider the bases for the Staff’s analysis and determination to be reasonable?

A31. (ARK) Yes. The Staff believes that the Staff’s assumptions and approach are supported by the Corps testimony in this proceeding. First, the testimony of William G. Bailey

acknowledges that if a project is eventually proposed, the Corps would conduct an environmental review in accordance with the US Army *Planning Guidance Notebook* (ER 1105-2-100) and the US Army *Procedures for Implementing NEPA* (ER 200-2-2). Exhibit NRC-48; Exhibit NRC-49; USACE Testimony at A12. As stated in his testimony, the Corps' environmental review document would identify the dredging that would be performed, the locations where the sediment would be deposited, and the environmental impacts of those actions. USACE Testimony at A9. The Corps would coordinate the document with the public and natural resource agencies and conclude with a Finding of No Significant Impact (FONSI) or a Record of Decision (ROD). *Id.* at A9. Through this coordination process, the Corps "would hope to obtain clearances under NEPA, the National Historic Preservation Act, the Coastal Zone Management Act, the Magnuson Fishery Conservation and Management Act, the Endangered Species Act, the Clean Water Act, and the Clean Air Act." *Id.* at A9.

As mentioned earlier in my testimony, the testimony of William G. Bailey and Carol L. Bernstein also acknowledges that "[s]pecial requirements/conditions for the dredging activities would likely result if a review of the project scope warrants such action." *Id.* at A11. In addition, their testimony states that "coordination with other federal and state agencies may result in a determination that time-of-year restrictions would be required in order to prevent impacts to threatened and endangered species or aquatic resources." *Id.* at A11. This description of the Corps' environmental review process is consistent with the Staff's conclusion in the FEIS that environmental impacts would be evaluated in more detail in the Corps' NEPA analysis. Exhibit NRC-1 at 7-21.

The testimony of Lyle J. Maciejewski also verifies that the Corps has neither developed a plan nor received a formal request or authorization for dredging of the Savannah River Federal navigation channel in the near future to facilitate barge traffic as far north as the VEGP site. USACE Testimony at A8. His testimony explains that there are no funds currently available in the budget for either dredging the Savannah River Federal navigation channel or for

conducting the environmental scoping, review, and documentation that would be necessary prior to the start of any dredging project. *Id.* at A14. In my view, this description of the Corps' understanding of the current absence of any formal action to dredge the Federal navigation channel is consistent with the Staff's assumptions in the FEIS.

Q32. Did the Staff assume that mitigating actions would be taken as part of any future dredging action, and what kinds of mitigating actions did the Staff consider to be possible or likely?

A32. (ARK) Yes, in the FEIS, the Staff discussed potential mitigation measures. In my experience, these mitigative measures, including the use of best management practices, time-of-year restrictions, relocation of benthic organisms, and restrictions on equipment types, are fairly standard and routine measures for dredging projects. Exhibit NRC-1 at 7-20. They were provided in the FEIS as examples only and not as specific recommendations for mitigative measures because there was (and is) no formal request or permit application to dredge the Federal navigation channel before the Corps for its review. See USACE Testimony at A8. The Staff indicated in the FEIS that "Specifics of the project including any time-of-year restrictions or mitigation to protect aquatic resources would be provided in the Corps' assessment to fulfill the NEPA requirement." Exhibit NRC-1 at 4-27.

The Staff also considers it likely that the Corps would conduct an evaluation of the physical, chemical, and biological characteristics of the sediment proposed for dredging in order to determine the dredging methodology (e.g., mechanical versus hydraulic) and dredged material disposal options and locations. But as stated in the FEIS, "[a]t the present time the dredging project is incompletely defined, the amount of material to be removed is unknown, and the locations of the dredged material disposal areas have not been identified." Exhibit NRC-1 at 7-20. The testimony of Lyle J. Maciejewski confirms that the Corps does not currently know how much sediment would need to be removed, the nature of those materials, or where they could be deposited. USACE Testimony at A17. Without this information the Staff was not able

to address the impacts of sediment disposal more specifically without entering into undue speculation.

The Staff anticipated that if dredging were conducted, by employing best management practices, impacts to water quality would be minimized and the water quality of the Savannah River would return to pre-project conditions. In my experience, some examples of best management practices to control sediment resuspension and downriver transport of resuspended sediments include selection of the proper dredge type and/or size, use of a sealed or environmental bucket for mechanical dredging, deployment of silt curtain containments, use of sheet pile enclosures, management of barge overflow, and control of sediment loss from bucket to barge as well as from the barge to the upland offloading location.

The Staff also considered that time-of-year restrictions on dredging operations would reduce water quality impacts (including physical, chemical, and biological impairment) due to dredging operations during migration, breeding, and early life history stages of sensitive aquatic species. The testimony of William G. Bailey and Carol L. Bernstein has noted that “[s]pecial requirements/conditions for the dredging activities would likely result if a review of the project scope warrants such action.” USACE Testimony at A11.

Finally, the Staff considered the concerns expressed in comments on the DEIS from members of the public and from Federal and state resource agencies regarding the potential impacts that dredging of the Savannah River Federal navigation channel would have on aquatic resources (e.g., freshwater mussels). These comments are provided in Appendix E of the FEIS. Exhibit NRC-1 at E-56, E-57, E-69, E-71 to E-73 and E-76. The Staff anticipated that if such a dredging action were to occur, the Corps’ environmental review process (including consultation with other Federal and state agencies) would consider impact avoidance, but would then consider minimization with, ultimately, mitigative actions to preserve the threatened, endangered, and sensitive mussel species that occur in the Savannah River. In the Staff’s view, if avoidance of the freshwater mussels during future dredging of the Federal navigation

channel were deemed to be infeasible by the Corps based on its review, then, as stated in the FEIS, in combination with other mitigative measures described above, relocation of benthic organisms could ameliorate many of the impacts. Exhibit NRC-1 at 7-20.

The types of project-specific mitigation required by the regulatory and resource agencies might involve sediment testing and analyses, dredge plume modeling, pre-and post-dredge biological surveys, mussel relocation and survival monitoring. Dredging operations could be limited to a few months each year or restricted to certain times of the day, limitations could be imposed on size and type of dredge and disposal equipment used, and special requirements/monitoring could be required at the dredged material disposal locations. Based upon my personal experiences, these special mitigation efforts have been successfully implemented elsewhere to minimize impacts to biological resources.

Q33. Why did the Staff ultimately conclude that the cumulative impacts to aquatic organisms in the region could be MODERATE rather than another impact level?

A33. (ARK) After considering the potential types of impacts, likely mitigation measures and the Corps' review process as discussed above, the Staff ultimately concluded that the cumulative impacts to aquatic organisms in the region could be MODERATE. This impact level is defined as "environmental effects [being] sufficient to alter noticeably, but not to destabilize, important attributes of the resource." The considerations discussed above support the finding of MODERATE.

Pursuant to Title 33 CFR 335, Operation and Maintenance of Army Corps of Engineers Civil Works Project Involving the Discharge of Dredged or Fill Material into Water of the U.S. or Ocean Waters, Section 335.2 Authority, "the Corps does not issue itself a CWA [Clean Water Act] permit to authorize Corps discharges of dredged material or fill material into U.S. waters, but does apply the 404(b)(1) guidelines and other substantive requirements of the CWA and other environmental laws." These Guidelines, prepared by the US Environmental Protection

Agency in consultation with the Corps, are the Federal environmental regulations for evaluating the filling of waters and wetlands.

As defined at 40 CFR 230.1(a), "The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material." Compliance with the Guidelines at Subpart B, 40 CFR 230.10 (a) through (d), prohibits discharges under various circumstances, including: (a) "...if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences..." [also known as Least Environmentally Damaging Practicable Alternative (LEDPA)]; (b) if the action causes or contributes to violations of any applicable State water quality standard, violates any applicable toxic effluent standard or prohibition under section 307 of the Act, the Endangered Species Act, or Marine Protection, Research, and Sanctuaries Act; (c) if the action "...will cause or contribute to significant degradation of waters of the US..."; and (d) "... unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem..." It should be noted that the goal of the Section 404(b)(1) Guidelines is to provide a framework for arriving at the LEDPA.

Appendix C of the US Army *Planning Guidance Notebook* (ER 1105-2-100) addresses the integration of environmental evaluation and compliance requirements into the planning of Civil Works projects. In particular, Exhibit C-1 provides a recommended outline for completing a Section 404(b)(1) evaluation. Exhibit NRC-48 at C-48 to C-55. The testimony of William G. Bailey acknowledges that if a Federal project is eventually proposed, the Corps would conduct an environmental review in accordance with ER 1105-2-100. USACE Testimony at A12.

It is the Staff's understanding that in order for the Corps to complete its NEPA analysis, the project must be in compliance with the CWA Section 404(b)(1) Guidelines. The testimony of Carol L. Bernstein notes that if the Corps were to receive a permit application from Southern,

the Corps would also evaluate the dredging project with respect to Section 404(b)(1) analysis, 31 public interest factors, and cumulative impacts. USACE Testimony at A10. It is the Staff's understanding that these criteria would constrain the potential impacts of maintenance dredging of the Savannah River Federal navigation channel, were such a project to be undertaken. In the Staff's opinion, if a potential dredging project for the Federal navigation channel were to comply with these standards, it would not result in a cumulative impact of LARGE, which is defined as "environmental effects [being] clearly noticeable and [being] sufficient to destabilize important attributes of the resource." For that reason, I consider it unlikely that a dredging project that would destabilize the Savannah River would obtain the necessary approvals from the Federal and state regulatory agencies. Accordingly, the Staff determined that cumulative impacts from construction of Vogtle Units 3 and 4 including dredging of the Federal navigation channel could be MODERATE, depending on the type of mitigation. Exhibit NRC-1 at 1-4 and 7-20.

Q34. Does this conclude your testimony?

A34. (ALL) Yes.