

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before the Licensing Board:

G. Paul Bollwerk, III, Chairman
Nicholas G. Trikouros
Dr. James Jackson

In the Matter of

SOUTHERN NUCLEAR OPERATING CO.

(Early Site Permit for Vogtle ESP Site)

Docket No. 52-011-ESP

ASLBP No. 07-850-01-ESP-BD01

**PREFILED REBUTTAL TESTIMONY OF DR. DONALD HAYES CONCERNING
CONTENTION EC 6.0**

Q1. Have you reviewed or aided in preparing environmental impact statements previously?

A1. Yes, I have more than two decades' experience reviewing and aiding in preparing environmental impacts statements and other NEPA documents related to dredging and water quality. I have consulted on NEPA-related issues on behalf of the U.S. Department of Justice, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, as well as numerous state and municipal government and private entities. My curriculum vitae, attached as JTI000045, supplies a detailed summary of my expert consulting activities, depositions, and testimony.

Q2. Is this FEIS as detailed as you would expect with regard to dredging impacts, based on your prior experience with environmental impact statements?

A2. No, for a project that includes substantial dredging requirements, like the project described in the FEIS, I would expect a more detailed treatment of dredging impacts.

Q3. Is dredging inextricably linked to the granting of an Early Site Permit with Limited Work Authorization for the Vogtle ESP site, such that it should be analyzed in the FEIS?

A3. Yes, the project, as described in Southern's ER and the FEIS, includes construction of a new barge slip and heavy haul road from the barge slip to the construction laydown area, and barging modular components to the site. Based on the materials provided, dredging is a necessary and likely component of the construction project to transport essential equipment for the Vogtle Plant. The FEIS states that most areas of the navigation channel will require dredging, which leads me to conclude that dredging is within the scope of the NRC action under consideration. My understanding of the process is that the dredging will support the activities being authorized under the Limited Work Authorization, which will be issued along with the ESP. As a result, the FEIS for the ESP and LWA should include an in-depth analysis of potential dredging-related impacts.

Q4. You indicated in answer 14 of your prefiled direct testimony that 2 million cubic yards of sediment may need to be dredged per foot of deepening. Testimony from Southern's witnesses indicates that significantly less than that will need to be dredged to support barging. How did you estimate the amount of material to be dredged?

A4. Southern's witnesses misunderstood my statement. I did not estimate, or attempt to estimate, the sediment volume to be dredged because I did not have the bathymetric survey data

to base such an estimate on. The FEIS indicated that dredging would be required along the entire length of the Federal Navigation Channel between RM 35 and Plant Vogtle at RM 150.9.

Exhibit NRC000001 at 7-20. In the absence of data on existing depths, I estimated the sediment volume that would need to be removed per foot of required dredging if the entire length of the channel were dredged, per the FEIS statements.

Q5. Southern's witness, Captain David Scott, conducted a survey in which he noted areas in the river with depths of less than 5 feet (Neubert, Smith, and Scott Prefiled Direct Testimony at Answer 20). The barge will, however, have draft of 5.5 feet. Would this method accurately indicate what areas need to be dredged?

A5. No. There should be some space between the bottom of the barge and the channel bottom for the barges to operate safely. Thus, 6.0 feet of depth would be more logical to accommodate a barge draft of 5.5 feet. Thus, the dredging volume required to deepen the channel to 6.0 feet would be a more appropriate estimate. Southern's testimony and exhibits do not include sufficient information for me to calculate an estimate of the amount of dredging required, however.

Q6. Southern's witness, Captain David Scott, conducted a survey in which he noted areas in the river with depths of less than 5 feet (Neubert, Smith, and Scott Pre-Filed Direct Testimony at Answer 20). In answer 15, Mr. Smith and Mr. Scott noted that the river has been in drought conditions for the past 6 to 7 years (Smith and Scott Pre-Filed Direct Testimony at Answer 15). In answer 7, Southern's witnesses stated that they anticipated barging would occur between March 2012 and November 2014 (Neubert, Smith, and Scott Pre-Filed Direct Testimony at Answer 7). Is it possible for the river depth to fall further

between the time of the survey and the time of the actual barging, requiring unanticipated dredging?

A6. My understanding of the testimony is that the required depth was based upon a specific flowrate of 3700 cfs. They did not address the likelihood of that flow rate being delivered, but it is approximately the same as the 2008 average flow – the lowest since 1952 based upon the chart provided in VESP_D0000965.pdf. There will likely be additional sedimentation between now and the time of the deliveries. The extent of that deposition depends upon how near the current river condition is to an equilibrium sediment level. Sustaining a flowrate of 3700 cfs probably depends upon relief from the continuing drought conditions.

Q7. Southern’s witnesses, Neubert, Smith, and Scott, concluded that in each location where the depth of the river was 5 feet or less, no more than 2 feet of depth would need to be added to the channel for a total depth of 7 feet (Neubert, Smith, and Scott Pre-Filed Direct Testimony at Answer 20). However, the authorized dimensions of the Savannah River include a depth of 9 feet (FEIS page 4-27). Based on your experience and Southern’s barging needs, is the 2 foot estimation resulting in 7 feet of depth appropriate? What impacts could result from failure to dredge deep enough? What impacts result from needing to dredge deeper?

A7. The limited dredging described by Southern’s witnesses will not restore the Federal Navigation Channel to its authorized dimensions of nine (9) feet deep by ninety (90) feet wide. Southern stated that they now anticipate dredging to an assured depth of only 5 feet, so that only shoals less than 5 feet will require dredging. I deduce from their statements – although it is not clearly stated – that the areas to be dredged have minimum depth of 3 feet and will only be dredged to 5 feet. This depth doesn’t seem to be adequate for the 5.5 foot draft barges

anticipated. Dredging deeper, however, whether to a depth of 6.0 feet or to the 9 foot authorized depth, would increase dredging impacts. The limited depth demonstrates that the project is tailored to meet Southern's needs for construction of Units 3 and 4, not the Corps' need for operation of the Navigation Channel.

Q8. In answer 12 of your prefiled direct testimony, you state that dredging impacts could be significant. However, the NRC Staff in the FEIS and in prefiled direct testimony maintains that the impacts could be moderate. In your opinion, are the effects more likely to be significant or more likely to be moderate?

A8. There is some terminology confusion here. Impacts are often classified as Small, Moderate, or Large. Moderate impacts could well be significant, depending upon the sensitivity of the river environment. My point was that the FEIS did not provide any information upon which to base any estimate of the level of impacts. I intentionally did not state whether I believed their estimate of Moderate was correct or not. Based on the supplemental information provided in Southern's and the Staff's prefiled direct testimony, there is still insufficient data to evaluate whether impacts will likely be Small, Moderate, or Large.

Q9. In the report prepared by Southern's witness, Mr. Coutant, he states that "only slightly more than one mile [it] is would need to be dredged in total. Thus, dredging would occur in less than one percent of the surveyed river" (SNC 000051, page 4). The dredging, however, is not estimated to be on one isolated mile. Are the impacts different if the dredging were throughout the river, as opposed to on one isolated mile?

A9. At this time, I do not anticipate any significant differences in water quality impacts. If there were any, the scattered dredging operations might be slightly better. I cannot opine on potential biological impacts.

Q10. Do you agree with Dr. Coutant, in answer 15 of his prefiled direct testimony, that the “impacts of dredging on aquatic life will be localized, temporary and not biologically significant on a broad scale of geography or animal population of the 110 miles of the Savannah River”?

A10. I am not qualified to opine on biological impacts. However, Dr. Coutant’s conclusion is not surprising for a volume of 36,000 cy over a 110 mile length of the river. This volume is much smaller than intimated in the FEIS.

Q11. In answer 12 of your prefiled direct testimony you state that “the FEIS does not provide sufficient data and information to estimate the extent of these impacts on the Savannah River ecosystem.” Given the prefiled direct testimony of Southern’s witnesses, do you now believe that extent of impacts can be better estimated? Do you have an estimation of their extent?

A11. The impacts should be able to be better estimated now that we have locations and volumes of sediments. However, I have not attempted to estimate the water quality impacts because Southern did not provide enough data to do so.

Q12. Are the studies relied upon by Southern and the Staff sufficient? In your opinion, are more studies necessary to determine the likely effects in the aquatic environment?

A12. More information is necessary to quantify potential the effects on the aquatic environment. For example, no sediment quality data is available to show that the sediment is not contaminated. The FEIS (pages 7-20) mentions and describes a host of potential negative effects

on mussels, benthic habitat, contaminated sediments, etc. None of these have been addressed quantitatively.

Q13. Given the prefiled direct testimony that has been provided through Southern’s witnesses, have sediment placement impacts been sufficiently discussed and analyzed?

A13. No. Sediment placement has not been defined. In Answer 21 of the Nuebert, Smith, and Scott testimony where they stated “(All) Based on our collective experience, we believe that the dredged material would be disposed of in a regulated spoils area.” In Mr. Moorers’ testimony, Answer 8, he states “Whereas, the 1976 EIS indicates that ‘within bank’ disposal methods would be used, it is my opinion that the Corps will instead use existing upland disposal areas or move the material to heavily eroded areas to replenish sand lost to hurricane or heavy wave damage.” It seems that Southern’s witnesses are assuming that dredging and disposal will be the responsibility of the Corps of Engineers. However, there is no discussion or analysis of potential sediment placement impacts.

Q14. Given the supplemental information in the prefiled direct testimony of Southern’s witnesses, particularly Thomas Moorers regarding practices employed by the Army Corps of Engineers, are the likely impacts from sediment placement consistent with the MODERATE designation?

A14. Assuming that Southern’s witnesses are correct that only 36,000 cy of sediment will be dredged, the small volume and the use of existing disposal facilities (if available) reduce the likelihood of significant impacts. However, no information has been provided on the condition of the disposal sites. If major construction is necessary to restore these disposal sites prior to use, the impacts will increase. Also, as I noted previously, more dredging may be

required than Southern estimates. If the volume of sediment is significantly more than Southern estimates, the impacts will increase.

Q15. In your opinion, has the FEIS and subsequent testimony provided adequate information regarding potential contamination of sediment with hazardous material and the potential impacts of that contamination during dredging?

A15. No. Sediment quality data were not provided. The Corps, in Answer 21 states “The 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. (CLB) If Southern elects to apply for a permit to dredge the Savannah River, Southern would need to comply with Savannah District sediment testing requirements in addition to identifying the disposal site.”

Q16. According to Mr. Coutant’s report, if the dredged material were loaded on barges and transported to permitted disposal sites, “there would be essentially no environmental impacts of material disposal in the project reach.” Is this method feasible? Are there any foreseeable impacts associated with that method? Is it proper for the report to make the assumption that this method will be used?

A16. Mr. Coutant is likely to be correct if the sediments are loaded into a watertight scow barge and supernatant water is not allowed to overflow as is typically done to reach an economic load. Overflow will release suspended sediment (and toxic constituents, if present) into the water column at a rate that would likely exceed any direct impacts from dredging. I am concerned, however, that these limitations are not clearly stated just how this dredging operation will be executed; thus, if the project moves forward, the approach may be changed in the interest of cost savings. The same is true for the sediment volume. Although impacts from 36,000 cy may not be

significant, I am not sure what will prevent the project from expanding to a much larger volume once approved.

This approach may also expand the dredging requirements. The sediment barge will need to dock near the disposal facility to be pumped out or have the sediment removed mechanically. Either way, the docking area will need to be sufficiently deep to handle the barge draft. Further, it is also possible that the draft required by the sediment scow will exceed the 5.5 feet mentioned for the equipment delivery and may increase the dredging requirements.

In accordance with 28 U.S.C. § 1746, I state under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on February 6, 2009.

Executed in Accord with 10 C.F.R. 2.304(d)
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