

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

Originally Filed: February 6, 2009

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**REVISED PREFILED REBUTTAL TESTIMONY OF DR. SHAWN YOUNG
CONCERNING CONTENTION EC 1.2**

Rebuttal of Prefiled Direct Testimony of Mr. Moorer

Q1: Do you agree with Mr. Moorer's assertion, in answer 7 of his prefiled direct testimony that the ER/EIS successfully identifies and considers the impacts of the proposed cooling system intake because the Vogtle ER and responses to the RAIs provided more than a hundred references describing the baseline conditions of the Savannah River in the area near Vogtle?

A1: I do not agree with Mr. Moorer's assertion that the ER/EIS successfully identifies and considers the impacts of the proposed cooling system intake. The EIS contains a woefully poor summary of the aquatic life stages of those organisms living in the Savannah River. The EIS even omitted vulnerable life history attributes of these organisms. So for Mr. Moorer to

conclude that the EIS successfully identifies the impacts of the proposed cooling system intake, based on the references cited, does nothing to resolve the glaring omissions and inadequacies of the EIS in regards to aquatic life stages.

Q2: Mr. Moorer, in answer 7 of his prefiled direct testimony, agreed with the SRS staff who concluded that at intake flows many times larger than those proposed for Vogtle, impingement and entrainment impacts remain small and do not result in any quantifiable impact to the fishery or the general aquatic community. Do you also agree with the SRS conclusions?

A2: No I do not agree with the SRS staff conclusions. This is not my opinion, but the opinion of leading scientists who study the Savannah River; including, M. H. Paller who is a SRS fish biologist, author of some of the SRS studies and co-author of the Fishes of the Middle Savannah River Basin, the text listing nuclear power plants, including SRS and VEGP, as having negative impacts on Savannah River fisheries. As co-author of Fishes of the Middle Savannah River Basin, M. H. Paller would not have or should not have included the passage if he/she did not support this claim concerning their employer.

Q3: Do you agree with Mr. Moorer's assertion in answer 9 of his prefiled direct testimony that the ANSP studies were appropriate for determining the aquatic baseline because these studies are an ongoing annual study for the past 50 years?

A3: I do not agree with Mr. Moorer's assertion that the ANSP studies were appropriate for determining the aquatic baseline. These studies occur for only three days in September every year. This brief amount of time is simply not enough to legitimately determine the status of fisheries, particularly anadromous and migratory species.

Rebuttal of Prefiled Rebuttal Testimony of Mr. Montz and Mr. Dodd

Q4: In answer 14 of their prefiled direct testimony, Mr. Montz and Mr. Dodd described their entrainment study at VEGP. Do you agree with how they conducted this study and the accuracy of its results?

A4: I do not agree with some aspects of how Mr. Montz and Mr. Dodd conducted their entrainment study at the VEGP and at the site of intake for Units 3 and 4. I disagree with the accuracy of its results. First, the two first started their study of entrainment at the mouth of the canal and then switched to the middle of the canal. They never explain why they decided to make this switch and such an explanation is needed given that the mouth of the canal is the best indicator of entrainment. Also as acknowledged by Mr. Montz and Mr. Dodd, due to sampling mid-canal, eggs might have settled near the mouth before they were vulnerable to their sampling mid-canal. Settlement of eggs withdrawn from the main channel would still lead to mortality of most species. Further, significantly fewer ichthyoplankton samples were taken at the site of the proposed intake for Units 3 and 4. Given the importance of predicting impacts from the proposed additional units, there should have been an equal sampling effort to acquire an adequate data set concerning the drift community at the proposed intake for new units. Yet for some reason, this did not occur.

Q5: In answer 17 of their prefiled direct testimony, Mr. Montz and Mr. Dodd stated that because no eggs were observed in the entrainment samples that these eggs likely settled out of the water column due to sediment catchment, and would not be entrained. Do you agree with this conclusion?

A5: No, I do not agree with this conclusion. If this conclusion regarding sediment catchment was right, then the entrainment would be higher than the results indicate. A settled

egg of most species would likely die. For example, American shad eggs die if they experience siltation.

Q6: Please describe the methodological inadequacies of Mr. Montz and Mr. Dodd's study of the VEGP thermal plume.

A6: In answer 23 of their prefiled direct testimony, Mr. Montz and Mr. Dodd never calculated what the impact of the hydraulic zone influence would be at full-capacity operation or at drought flow levels. In answer 24 of their prefiled direct testimony, the two never discussed the ichthyoplankton drift distribution in the thermal plume. In answer 26 of their prefiled direct testimony, the two never included any analysis of other seasons of the year beyond summer. An analysis of spring conditions during which the highest ichthyoplankton biomass is present would have been most appropriate. Additionally, in answer 29 of their prefiled direct testimony, the two neglected to include what the ichthyoplankton distribution was in relation to the thermal plume at any time of the year.

Rebuttal of Prefiled Direct Testimony of Dr. Charles Coutant

Q7: Dr. Coutant stated in answer 51 of his prefiled direct testimony that there is no causal link between entrainment and impingement in cooling water and effects on fish populations in the middle Savannah River? How do you respond?

A7: Dr. Coutant is wrong. This is not my opinion, but the opinion of leading scientists who study the Savannah River; including, M. H. Paller who is a SRS fish biologist and co-author of the Fishes of the Middle Savannah River Basin, the text listing nuclear power plants, including VEGP, as having negative impacts on Savannah River fisheries. NRC000006. As co-authors of this text, M. H. Paller and the other distinguished scientists would not have or should

not have written about this subject if they did not agree with the statement or were unable to substantiate the claim.

Q8: Dr. Coutant stated in answer 67 of his prefiled direct testimony that low river flows are not likely to coincide with high ichthyoplankton density or high temperature risks. How do you respond to this assertion?

A8: Dr. Coutant's assertion is not true. I have seen the Savannah River at low flows during spring spawning season, where flow regulation has left sucker spawning beds dry in a colleague's field studies. This has been discussed in a recent publication by my colleagues. JTI000046.

Rebuttal of Prefiled Direct Testimony of the Staff

Q9: In their answer to question four, the staff testifies regarding the latest surveys that were conducted on the Savannah River in the vicinity of the Vogtle site by the ANSP. Specifically, the surveys occurred at River mile 122 and 161. In your opinion, are these surveys sufficient to identify the species composition and habitat conditions at River mile 151, the location of the proposed intake structure?

A9: Surveys conducted at other locations on the river provide some simple information on diversity and abundance which can be extrapolated, in a general way, to the site of the intake at RM 151. In my opinion, however, it is incorrect to presume that a single survey performed in the fall of 2001 at sites at least 10 miles distant from the Vogtle site are representative of conditions at the site. First, habitat conditions can be highly variable from site to site and as a result there could be significant variation in habitat type, utilization, and species composition. Second, the ANSP study provides only a snapshot of conditions in the fall of 2001 but tells us nothing about other seasons of the year. Third, the EIS and Staff testimony discuss only the

most abundant and common species. The baseline conditions include both common and rare species and in many instances we are more concerned with potential impacts on the uncommon and rare. We also need to know whether species we expect to find are absent because this gives us information on the baseline habitat conditions.

Q10: In your opinion, does the description of baseline population and habitat conditions in the FEIS comply with the directive in the ESRP, discussed in answer 6 of the Staff's prefiled direct testimony, to describe the aquatic environment and biota at the Vogtle site?

A10: No, the FEIS includes no data from recent surveys conducted at the Vogtle site. As indicated in my answer to the previous question, the ANSP (and other) studies conducted in the vicinity of the Vogtle site provide useful information but are insufficient to draw definitive conclusions about habitat and species at the site. Also, the ANSP study that the Staff relies on so heavily was conducted in the fall, and therefore does not comply with the ESRP mandate that the analysis be based on at least one year of data.

Q11: Do you agree with the Staff's opinion in answer 9 of their prefiled direct testimony that the ANSP studies provide a current understanding of the species of fish and mollusks present in the vicinity of the Vogtle site?

A11: No, I do not. As I said earlier, the ANSP studies do provide useful data but, in my opinion, the Staff overstates the value of these studies. The last reported ANSP data was collected in 2000 at some distance from the Vogtle sites. Both the location of the sites and the age of the data make me highly suspicious of the reliability of the ANSP studies for this purpose.

Q12: Does Exhibit NRC000006 (Marcy et al. 2005) specifically address species composition and abundance or habitat conditions in the stretch of river adjacent to the Vogtle site?

A12: No, it does not. As the Staff notes in answer 9 of their prefiled direct testimony, Marcy et al. is not an impact assessment, and therefore does not address conditions specific to plant Vogtle. Marcy et al. is the most comprehensive source for information on the fish species of the Middle Savannah River and is an invaluable resource. However, it does not have the level of specificity necessary for an analysis of potential impacts of two additional Units at the Vogtle site.

Q13: Do you agree with the Staff, in answer 14 of their prefiled direct testimony, that aquatic organisms inhabiting rivers and streams flowing into the Atlantic are preadapted to tolerate large variation in water flow?

A13: Yes, the species of the Savannah River have evolved to tolerate the range of conditions they experience in nature, including periodic extreme low flows. Construction of Thurmond Reservoir eliminated the extremely low flows that would normally occur in nature, and this is one of the causes of decline in populations of some native species. Many species don't just "tolerate" large variations in flow, they *require* variable flow to thrive. The Staff's answer also disregards the frequency, rise and recession rates, and duration of low flows, which is at least as important as the rate of flow.

Additional Rebuttal Testimony

Q14: In your opinion, have cooling water intake structures contributed to the decline of shortnose sturgeon populations?

A14: Yes, the Recovery Plan for the shortnose sturgeon attributes power plant cooling water intakes as a source of sturgeon mortality. Exhibit JTI000026. The recovery plan states that “Documented mortalities of sturgeon have occurred in the Delaware, Hudson, Connecticut, Savannah and Santee rivers.”

Q15: In your opinion, is it significant that no incidents of unusual fish kills at the Unit 1 and 2 intake have been reported by Southern to NRC?

A15: Just because no incidents have been reported, does not mean that the intake is not a significant cause of mortality to the already-depleted sturgeon population of the Savannah River. The shortnose sturgeon Recovery Plan documents one case where impingement occurred at a nuclear power plant, but was not reported by the plant operator to the NRC. Exhibit JTI000026. In addition, the plant operators would not see or report losses of early life stage fish that are entrained in the intake structure.

Q16: Does Southern’s application include at least one year of data collected at the Vogtle site?

A16: No, it does not. After admission of Intervenors’ contentions for litigation, Southern studied impingement and entrainment at the existing intake canal for Units 1 and 2. These studies are limited in scope and do not include a full year of data.

Q17: Dr. Young, is the uniform drift distribution assumption contained within the FEIS accurate? Exhibit NRC0000001 at 5-31.

A17: No, the uniform drift distribution assumption is incorrect. The most widely recognized studies indicate that the drift community is not uniformly distributed. For example, JTI000006 (Wiltz (1983)) studied fish egg and larval drift, and JTI000007 (Nichols (1983)) surveyed macroinvertebrate drift distribution near Plant Vogtle during pre-operation monitoring.

Both found that the drift community, including eggs and larvae of 34 fish species, were non-uniformly distributed and varied over time and space in the vicinity of Plant Vogtle. Further, JTI000004 (Paller (1995)) studied American Shad egg distribution at the Savannah River Site intakes which are near Plant Vogtle. Paller found a higher abundance of American Shad eggs along the Georgian Bank than the South Carolina bank, reaffirming that the drift community is not uniformly distributed.

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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