

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

PRE-FILED REBUTTAL TESTIMONY OF SHAWN P. YOUNG CONCERNING

CONTENTION EC 1.3

Q1: In answer 15 of the Staff’s prefiled direct testimony, Mr. Vail discusses how the Staff reached its conclusion that it did not need to consider the dry cooling alternative in more detail. How do you respond to the Staff’s explanation?

A1: In answer 15 of his Pre-Filed Rebuttal, Mr. Vail utilizes the FEIS conclusion that impacts would be SMALL, in conjunction with the assessment that there would be some adverse impacts associated with the dry cooling alternative, as the basis for determining that there are no preferable heat dissipation systems. Mr. Vail’s conclusion concerning the heat dissipation system is flawed because he equates SMALL as the phrase is used in the FEIS with “no adverse impacts” as that phrase is used in § 9.4.1 of the ESRP. Specifically, § 9.4.1 states that “[w]hen no adverse impacts have been predicted for the proposed system[,] . . . the reviewer should conclude that there are no environmentally preferable heat dissipation-system alternatives.” On

the other hand, SMALL is defined on page 1-4 of the FEIS as “environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attributes of the resource.” Accordingly, it is possible that under a SMALL impacts situation, adverse impacts on aquatic species may still exist. In other words, SMALL incorporates numerous actions having some impacts and could potentially encompass a certain degree of adverse impacts as that phrase is used in § 9.4.1.

Q2: In answer 6 of his prefiled direct testimony, Dr. Coutant explains, “In my opinion, extremely sensitive biological resources means more than that endangered species such as the shortnose sturgeon or non-listed but sensitive species such as the robust redhorse are present in the Savannah River watershed (which they are) but that they are sensitive to alterations of the environment in the vicinity of the proposed cooling system. That is, the new cooling system would have to pose significant risks to these species. Is this the correct standard for assessing impacts?”

A2: No, the SNC is utilizing an inappropriately high standard for assessing impacts to aquatic species. Instead of analyzing impacts using the FEIS term SMALL, defined on page 1-4 of the FEIS as “environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attributes of the resource” or a similar counterpart, SNC created a higher threshold for determining that extremely sensitive biological resources exist by introducing this “significant risks” threshold. SNC erroneously shifted the impacts standard, and in doing so, its conclusions are not necessarily consistent with the definition of SMALL impacts, as defined in the FEIS.

Q3: In answer 22 of the Staff’s prefiled direct testimony, Dr. Masnik explains the process by which the Staff concluded that the impacts of the Vogtle 3 and 4 units would be

SMALL: “The Staff ...assessed the potential impacts that the design, location and operating parameters of the structures, systems and components of the VEGP Units 3 and 4 cooling water system would have on the populations of the important fish and shellfish. If the distribution, abundance, relevant life history, or past data collected in the Savannah River did not identify a causal link to a particular impact category (impingement, entrainment, or thermal effects) that could result in a population level impact to that species, then a SMALL impact was predicted.” Does Dr. Masnik’s SMALL impacts prediction necessarily follow from the Staff’s findings regarding causal links?

A3: No, Dr. Masnik’s prediction that impacts will be SMALL is not supported by the causal links identified by the Staff. The Staff considered whether a causal link could be identified between the design, location, and operation of Units 3 and 4 and individual impact category (impingement, entrainment, or thermal effects) that could result in a population level impact to a particular species, and ultimately concluded that no individual causal links could be identified. The flaw in Dr. Masnik’s SMALL impacts prediction is that he overlooks the possibility that even though no population level impact may exist between operation of Units 3 and 4 and individual impact categories, when one combines the impacts of impingement, entrainment, and thermal effects cumulatively, the impacts exceed the SMALL threshold.

Q4: In answers 9-11 of Dr. Coutant’s prefiled direct testimony, he summarizes his findings regarding the potential impacts of the proposed Vogtle 3 and 4 units on the shortnose sturgeon and robust redhorse. How do you respond to Dr. Coutant’s findings?

A4: Dr. Coutant begins his analysis of the impacts on the shortnose sturgeon by explaining that Units 1 and 2 are not located in any critical zones of passage for that species, which means pre-spawning adult sturgeon can move upstream, spawned adults can move

downstream, and juveniles can move downstream, all while in the presence of Units 1 and 2. He then concludes that since the Vogtle 1 and 2 units do not compromise any critical zones of passage for the shortnose sturgeon, similarly Vogtle units 3 and 4 will not compromise the movement of the shortnose sturgeon to and from the spawning site upstream of the Vogtle plant. However, Dr. Coutant's analysis fails to take into consideration the potential cumulative impacts that could occur as a result of the four Vogtle Units working in tandem. By definition in 40 CFR § 1508.7, "cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Accordingly, just because an effective zone of passage may exist in the presence of Units 1 and 2, and Units 3 and 4, alone, is meaningless. These impacts must be considered in concert with each other.

Additionally, Dr. Coutant's testimony regarding the impacts on the robust redhorse is incomplete, because Dr. Coutant fails to discuss whether the robust redhorse will still have an effective zone of passage through the portion of the Savannah River following the addition of the Vogtle Units 3 and 4. In answer 12 of his prefiled direct testimony, Dr. Coutant concludes that the robust redhorse will not be affected by the Vogtle 3 and 4 units, specifically because there is no critical habitat for the robust redhorse near the Vogtle site. However, as I discuss in my testimony and rebuttal, robust redhorse utilize the Savannah River in the vicinity of VEGP and down river to approximately river mile 70 as summer, fall, and winter habitat, which necessitates spring migration upriver past VEGP to spawning areas. Therefore, Dr. Coutant should have discussed whether the robust redhorse would also have an effective zone of passage through the water affected by the Vogtle 3 and 4 units.

Q5: In answers 18-20 of his prefiled direct testimony, Dr. Coutant explains the contents of the National Marine Fisheries Service ("NMFS") Letter: "As the letter states,

the NMFS found the impacts insignificant and the Vogtle reach of the river to not contain essential fish habitat. The letter is the formal document providing the legal concurrence by NMFS.” What do you think about the NMFS letter?

A5: Dr. Coutant contends that this letter provides additional support for the Staff’s finding that the shortnose sturgeon will not likely be affected by the addition of the Vogtle Units 3 and 4. However, this letter is potentially unreliable, because it does not analyze year-round impacts. Additionally, the letter contains a number of overly broad generalizations as illustrated in SNC 1.3 Position Statement at 20. Specifically, in the Position Statement, SNC supports this conclusion by citing the Letter’s finding that shortnose sturgeon “generally do not inhabit this section of the Savannah River at this time of year” and that “sturgeon are generally found upstream from the site during the proposed construction months.” Therefore, the NMFS letter at most, tenuously supports the Staff’s conclusion that the Vogtle 3 and 4 units will not adversely impact the shortnose sturgeon population. Further, I have personally witnessed sturgeon species breaching the river surface from below New Savannah Bluff Lock and Dam down to the vicinity of VEGP and SRS throughout the year in contrary to information fisheries agency biologists have relayed to me in personal communications.

Q6: In answer 7 of his prefiled direct testimony, Dr. Coutant states that there are no “extremely sensitive biological resources” necessary for the maintenance of the shortnose sturgeon or robust redhorse in the Savannah River near the Vogtle site. Do you agree with his findings?

A6: I do not agree with Dr. Coutant’s conclusion that there are no “extremely sensitive resources” in the vicinity of the Vogtle site as that phrase is used in answer 7. Dr. Coutant is misinterpreting the EPA’s definition of “extremely sensitive resources.” In answer 6 of his

prefiled direct testimony, Dr. Coutant explains that “the new cooling system would have to pose significant risks to these species” in order to support a finding that there are extremely sensitive resources present. However, the term extremely sensitive resources as used by the EPA, does not require that the federally protected species be subjected to “significant risks” by the proposed cooling system. In contrast, federally and state protected species are inherently extremely sensitive resources, which is why they are formally protected. Additionally, it is undisputed by several studies that robust redhorse and shortnose sturgeon inhabit the Savannah River in the vicinity of plant Vogtle. In fact, SNC’s expert Dr. Coutant, in answer 9 of his prefiled direct testimony, references a prior study where 13 larval shortnose sturgeon were collected at the Vogtle site. Because shortnose sturgeon and the robust redhorse are present in the stretch of the Savannah River near the Vogtle site and are either federally or state protected, they are extremely sensitive biological resources as that phrase is used by the EPA.

Q7: Dr. Young, do SNC’s expert witnesses conduct a complete inquiry regarding the impacts on fish species within the vicinity of the Vogtle site?

A7: No, the SNC unnecessarily restricts the inquiry to the impacts on the shortnose sturgeon and the robust redhorse. The EPA rulemaking provision referring to “extremely sensitive resources (e.g. endangered species, specially protected areas)” represents a non-exhaustive list. For example, the Atlantic sturgeon is a federal candidate species and SNC should have considered the impacts on this species. In fact, Staff expert Krieg at Answer 20 states that the “Atlantic sturgeon should have been included in the FEIS under the definition of “important species” as provided in ESRP 2.4.2.” Instead, SNC completely omits an analysis of how the proposed Vogtle site could affect this important species by applying its narrow definition of extremely sensitive biological resources. The Staff did address the Atlantic

sturgeon, but as evidenced by Answer 8 below, this analysis was inadequate, thus SNC failed to supplement the record regarding the Atlantic sturgeon.

Q8: In answer 20-21 of the Staff's pre-filed direct testimony, Staff experts the potential impacts of Vogtle Units 3 and 4 on the Atlantic sturgeon, shortnose sturgeon and robust redhorse. Do you agree with the Staff's analysis?

A8: No, the Staff fails to analyze important periods of each species' development. With regard to the Atlantic Sturgeon (discussed in answer 20 of the Staff's testimony), the Staff fails to address the period of time between when the larvae's yolk sac is fully absorbed and when the fish reaches the juvenile stage. This omission is significant because during the period of time between the embryo stage (age 1-8 days old) and the young juvenile stage (greater than 40 days old), the adhesive eggs are no longer adhered to the bottom, yet have not developed the strength to avoid dangers such as entrainment and the thermal heat plume of Units 3 and 4. Thus, during this approximately 30 day period, the Atlantic sturgeon would face an elevated risk of adverse impacts due to their dependence on the current flow of the Savannah River.

With regard to the robust redhorse (discussed in answer 21 of the Staff's testimony), the Staff fails to address the period of time between when the larvae's yolk has been fully absorbed and adulthood. This omission is significant because the Staff fails to address the potential exposure of the robust redhorse during the larval, juvenile, and young adult stages in which the species would be especially vulnerable to impingement and the thermal plume of Units 3 and 4. Although the adult robust redhorse may be a relatively strong swimmer as the Staff asserts, the Staff fails to analyze these two important developmental periods in which the robust redhorse is not yet a strong swimmer and would face an elevated risk of exposure to impingement and the thermal plume.

Additionally, with regard to the impacts on the shortnose sturgeon (discussed in answer 21 of the Staff's testimony), the Staff fails to address the period of time when the larvae's yolk sac is fully absorbed and when the fish reaches the juvenile stage. This omission is significant because during the period of time between the embryo stage (age 1-8 days old) and the young juvenile state (greater than 40 days old), the adhesive eggs are no longer adhered to the bottom, yet the fish would not have developed the strength to avoid dangers such as entrainment and the thermal heat plume of Units 3 and 4. Thus, during this approximately 30 day period, the shortnose sturgeon would face an elevated risk of adverse impacts due to their dependence on the current flow of the Savannah River.

Q9: In answer 7 of Dr. Coutant's prefiled direct testimony, in reference to the robust redhorse, he states that "this species also has been found to spawn in limited gravel habitats near Augusta and is merely presumed to be distributed elsewhere in the Savannah River (none have been collected near Vogtle)." Is this statement made by Dr. Coutant factually correct?

A9: No. This statement is wrong. Robust redhorse are known to utilize the Savannah River in the vicinity of VEGP and down river to approximately river mile 70 as summer, fall, and winter habitat. The individuals residing in this area undertake spring migrations up-river past VEGP to spawning areas near river mile 185, just below New Savannah Bluff Lock and Dam, and the Augusta Shoals if they are able to pass the lock-and-dam. These facts were the results of an extensive telemetry study of which I participated. Exhibit NRC 000017.

Also, as I explained in answer 15 of my prefiled direct testimony, members of the drift community will be affected by the proposed Vogtle 3 and 4 units, and the larval fish of the robust redhorse are part of the drift community. Since the drift community constantly changes

location within the Savannah River, it is appropriate to conclude that the larval fish of the robust redhorse will also redistribute itself within the Savannah River. It is therefore likely that young robust redhorse will redistribute closer to the proposed Vogtle site. Since the drift community is susceptible to human-induced environmental changes, it is likely that the larval fish of the robust redhorse will be adversely impacted by the proposed cooling system at the Vogtle 3 and 4 units.

Q10: In answer 16 of Dr. Coutant’s prefiled direct testimony, he states that “NRC Staff determined that design and operation of the proposed cooling water intake system are not likely to adversely impact shortnose sturgeon because the area affected by thermal discharge is small in comparison to the width of the Savannah River at the Vogtle site.”

How do you respond?

A10: Even though the thermal discharge will not affect the entire width of the Savannah River at the Vogtle site, it is likely that the shortnose sturgeon, particularly the larval and early juvenile fish, will be adversely impacted by the proposed wet cooling system. Since the larval and early juvenile fish cannot swim as quickly as their adult counterparts, they will likely have a difficult time avoiding the thermal plume. Also, thermal resistance changes with maturation. Rapid temperature change affects early life stages much more than adults.

Q11: Will fish eggs and larval fish likely be affected by the thermal discharge as they travel downstream after the spawning season?

A11: Yes. These youngest life history stages are the most vulnerable to rapid temperature change. Thermal resistance changes with maturation, and also varies from species to species. At no point other than Dr. Coutant’s testimony does anyone discuss the potential exposure time of ichthyoplankton in the thermal plume. Dr. Coutant does not cite the origin of the data he uses in his calculation.

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 January 9, 2009.

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