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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
SOUTHERN NUCLEAR OPERATING COMPANY) Docket No. 52-011-ESP
)
(Early Site Permit – Vogtle Electric Generating Plant)) ASLBP No. 07-850-01-ESP-BD01
)
_____)

DECLARATION OF SHAWN PAUL YOUNG

I, Shawn Paul Young, do hereby declare as follows:

1. My name is Shawn Paul Young, Ph.D. I am currently a visiting Lecturer of Fisheries Management at the University of Idaho, Moscow, Idaho. I also currently hold Adjunct Faculty status at Clemson University, Clemson, South Carolina. I was previously a visiting Assistant Professor of Fisheries Biology at Purdue University, West Lafayette, Indiana. My current business address is 106B Natural Resources Building, Fish and Wildlife Resources, University of Idaho, Moscow, ID 83844. I submit this declaration as a private consultant to the Intervenors in this matter.

2. My professional and educational experience is summarized in the updated curriculum vitae attached to this declaration. I received a B.S. in Environmental Studies from Northland College; an M.S. in Aquaculture, Fisheries, and Wildlife Biology from Clemson University; and a Ph.D. in Fisheries and Wildlife Sciences from Clemson University. I have eleven years of experience researching the effects of human activities on fisheries and aquatic ecosystems, including six years of experience studying fisheries in the Savannah River Basin. In addition to

my professional qualifications, I am an avid outdoorsman – fishing, hunting, and enjoying nature in every manner since my early childhood.

3. I have in publication, in press, and in review twenty-seven peer-reviewed articles relevant to fisheries and aquatic ecology. I have been consulted by public, state, federal, and academic sectors in the subject area of fish and aquatic ecology. I have presented scientific presentations at numerous professional meetings, academic seminars, and citizen fishing association functions.

4. I am familiar with the application of Southern Nuclear Operating Company (“SNC”) for an Early Site Permit (an “ESP”) at the Vogtle Electric Generating Plant (the “VEGP”) site. I have reviewed excerpts of the Final Environmental Impact Statement (the “FEIS”) prepared by the staff of the Nuclear Regulatory Commission (the “NRC”), including those sections describing water intake, water consumption, and thermal discharge into the Savannah River associated with the proposed additional nuclear power generating units (the “New Units”), and the subsequent potential impacts of such New Units on the fish assemblage of the Savannah River.

5. I am providing this affidavit in support of Intervenor’s motion to admit new or amended contentions. The opinions and conclusions I express in this declaration are my own and should not be attributed to any academic institution. This declaration sets forth my scientific opinion that the FEIS (including the information cited therein) does not provide adequate data or analysis to properly evaluate the potential effects of the New Units on fishery resources of the Savannah River. I have applied my knowledge and experience to the scenarios and data explained in the FEIS, and I believe my opinions and conclusions to be true and correct.

6. The opinions and conclusions set forth in previous affidavits I have submitted in connection with SNC’s ESP application, supporting Intervenor’s previously admitted

environmental contentions, remain unchanged. Regrettably, the FEIS contains the same insufficiencies in data and logic which I opined upon in connection with the Draft Environmental Impact Statement (the “DEIS”). The NRC staff still has not provided a current detailed data set of Savannah River fish, including information regarding (1) life history stages of each species occurring near VEGP, (2) respective migration timing of each species, (3) distribution patterns of each species in the immediate vicinity of VEGP, and (4) population numbers. Moreover, the recent ichthyoplankton sampling data to address entrainment continues to be unavailable. Without the Savannah River fish and ichthyoplankton data (as further explained in the following paragraphs of this declaration), the FEIS conclusion that impacts due to entrainment, impingement, and thermal discharge will be small or minor is inappropriate and scientifically unsubstantiated.

7. In addition, as was the case with the DEIS, the FEIS provides limited background information and over-simplifies concepts in river ecology in an effort to support the conclusions of the NRC staff. The FEIS also fails to provide the comprehensive discussion required to properly evaluate the impacts from current operations at VEGP and from construction and operation of the New Units.

8. The Academy of Natural Sciences of Philadelphia (the “ANSP”) surveys continue to be used to support the NRC staff conclusion that VEGP has had no appreciable effects on Savannah River fish. In a previous affidavit that I submitted in connection with SNC’s ESP application, dated November 11, 2007, I explained in detail why ANSP surveys are not an adequate indicator of VEGP impacts (including impacts of the New Units) to the entire fish assemblage. My conclusions and opinions set forth in that affidavit regarding the adequacy of ANSP surveys remain unchanged. Briefly again, because ANSP surveys capture mainly small resident fish

species, with sampling occurring on a very limited basis, these surveys fail to (i) collect adequate data on diadromous fish species, and (ii) collect sufficient data to evaluate larger, main channel species such as sucker species and catfish species.

9. The FEIS (2-81) does not adequately describe the ichthyoplankton community near VEGP in its discussion regarding ichthyoplankton distribution. While the FEIS states that American shad were the most dominant ichthyoplankton in the river, its discussion regarding the American shad is limited. In fact, the FEIS merely states that American shad eggs were concentrated along the bottom of the water column, and then concludes – because of such concentrations – that the current and future operation of the VEGP will result in only minor impacts. In reaching this conclusion, the NRC staff fails to discuss other factors which could affect American shad egg distribution, and thus VEGP’s impacts on ichthyoplankton. By contrast, such impacts were considered when Paller (1995) in a study of the horizontal distribution of American shad eggs in the drift at two main intakes for the Savannah River Site (“SRS”). Paller found a higher abundance of American shad eggs along the Georgian bank, and stated that the study results revealed “the importance of site specific assessments of ichthyoplankton distribution near existing or proposed water intakes using statistical designs that permit sensitive resolution of spatial patterns.” I agree with Paller, and assert that specific ichthyoplankton studies are required to determine the current and future impact of VEGP on ichthyoplankton populations. It should be noted that the discussion in the FEIS regarding oxbow habitat has no relevance to evaluating impacts on the ichthyoplankton population.

10. The FEIS sets forth certain information regarding the six fish species in decline and considered most imperiled and/or most important to Savannah River fisheries (FEIS, 2-81 – 2-91); however, very little information is provided regarding causes for such population decline.

In order to accurately evaluate impacts of the construction of the New Units and operation of the VEGP (including the New Units) on these fish species, causes for population decline must be more fully articulated. In addition, chapter 2 of the FEIS does not contain a sufficient discussion regarding other fish species at risk of population decline as a result of construction of the New Units and operation of VEGP (including the New Units).

11. Although the proposed dredging required ~~for construction of the New Units (including dredging required~~ to re-open the shipping channel) will likely have very large and severely negative impacts on the aquatic species located in the Middle, Lower, and estuarine Savannah River, these impacts are insufficiently assessed and analyzed. Freshwater mussels, shortnose sturgeon, Atlantic sturgeon, striped bass, robust redhorse, and other catostomids, catfish species, and numerous benthic organisms may be affected by the dredging.

12. Such dredging may (i) disrupt food web dynamics, affecting the aforementioned species, including the endangered shortnose sturgeon (Shortnose Sturgeon Recovery Team 1998) and rare robust redhorse (which are benthic feeders), and (ii) affect spawning success of some of the aforementioned species, including the striped bass. In fact, previous dredging activities have been cited as a cause for the decline of numerous Savannah River fish (Duncan et al. 2003) such as Atlantic sturgeon (Atlantic Sturgeon Review Team 2007). Dredging may also degrade chemical aspects of water quality and re-suspend contaminants, which contaminants may then in turn be bioaccumulated by mussels and other organisms (Bellas et al. 2007). Further, previous dredging has been identified as a major cause for freshwater mussel decline (Ricciardi and Rasmussen 1999). The EIS mentions the potential for benthic organism (i.e. the freshwater mussel) relocation, yet surprisingly provides no detail concerning this potentially disastrous

proposal. Relocations of freshwater mussels have had variable success (Cope and Waller 2006) – with some relocation attempts resulting in 100% mortality (Killeen et al. 1998).

13. With the large-scale dredging, a thorough freshwater mussel survey for the entire affected area should be completed. The last survey conducted by the U.S. Fish and Wildlife Service in 2006 (FEIS, 2-76) was incomplete, as it failed to survey a forty-four mile segment around VEGP. Further, because each mussel species has specific fish hosts and habitat requirements, a thorough discussion of each mussel species' life history is also required. Unfortunately, the FEIS does not contain sufficient information to adequately assess and analyze the impacts of the construction of the New Units and operation of the VEGP (including the New Units) on these freshwater mussels.

14. The assessment of cumulative impacts on aquatic resources from the construction and operation of the New Units is lacking adequate analysis, reasoning and detail. First, the NRC staff states that “natural” stressors will contribute to cumulative impacts from operation of the New Units (FEIS, 7-21). This statement disingenuously portrays nature as the culprit for the decline of fisheries and general aquatic health, instead of human activities (including operation of VEGP). Second, the NRC staff contends that because the southeastern United States suffers from periodic drought, and because aquatic species have the ability to tolerate these natural temporary reductions in habitat, such species can withstand operation of four units at VEGP. Accordingly, the NRC staff concludes that the cumulative impacts of the New Units will be minor (FEIS, 7-22). This conclusion does not hold merit as aquatic animals have the ability to withstand natural seasonal cycles of flow without compounding effects from anthropogenic stressors. Anthropogenic effects (including operation of VEGP) will increase and maintain added stress that will be exacerbated during periodic drought. Natural resilience does not equate

into resilience to human activities. Third, the NRC staff's explanation of how ichthyoplankton population size and productivity vary between "oxbows"¹ and "straight" portions is grossly oversimplified. The ichthyoplankton community, while passively drifting with the river flow, moves through both "oxbows" and "straight" sections. A substantial portion of the drift community will not simply occupy a small limited habitat within the "oxbows" or "straights", but will drift substantial linear distances across multiple river segments. This drifting must be considered when evaluating the cumulative impacts across time and space within a river basin, as well as the localized impacts. Inexplicably, the NRC staff fails to consider it. Fourth, the NRC staff cites conclusions made by Paller et al. (1986) and Sprecht (1987) that SRS operations (resulting in entrainment during water withdrawals and thermal discharge) have had minor effects on the Middle Savannah River Basin (FEIS 7-22, 23). Then, the NRC staff asserts that VEGP has had minor or no observable impacts in the past, and predicts that it will continue to have minor or no observable impacts in the future. Such assertions and predictions are wholly unsubstantiated. As stated in a previous affidavit, Marcy et al. (2005) identifies SRS and VEGP as direct causes to decline of the Middle Savannah River Ecosystem. Fifth, the FEIS fails to consider the cumulative impacts the construction and operation of the New Units will have on each individual aquatic species. Instead, the FEIS lumps all species together, and purports to analyze the impacts from an "aquatic ecological perspective." Such an analysis is inaccurate and insufficient – because activities may affect each species differently, the impact of each activity must be evaluated on a species-by-species basis.

15. The FEIS (7-23) examines cumulative impacts to aquatic biota under "normal" operation scenarios (operation at average capacity during average river flow). However, the cumulative

¹ Because the river does not enter the floodplain under current flow regulation, true oxbows are no longer accessible. Therefore, I assume "oxbows" refer to meanders.

impacts from four unit operation should also be evaluated for the worst case scenario (operation at maximum capacity during severely reduced flow). Extreme drought may severely impact fish and aquatic organisms and needs to be considered. Moreover, an evaluation of both normal operation conditions and worst case conditions would reveal chronic and acute effects, all of which may substantially impact fish and aquatic organism populations. In fact, the impacts on fish and aquatic organism populations during extreme (worst case) conditions are at least as harmful as long-term impacts associated with normal operation conditions. Paller (1992) supports the proposition that direct and cumulative impacts of additional units must be evaluated for worst case flow scenarios (in addition to “normal” scenarios) at water intake structures, and concludes that “[e]ntrainment at SRS intakes is greatest when periods of high river water usage coincides with low river discharge. American shad and striped bass are the two species of greatest concern because of their recreational and commercial importance and because they produce drifting eggs and larvae vulnerable to entrainment.”

16. The Hydraulic Zone Influence study was conducted while water intake was only at 56% capacity during a limited range of flows. For a complete and accurate analysis, the modeling should also include the impact at full capacity under different flows.

~~17. The FEIS completely fails to evaluate cumulative impacts from the multitude of water users in the Middle Savannah River Basin. Duncan et al. (2003) discuss the need for adequate and natural flow regimes to improve status of Savannah River fish populations, in particular the six species of main interest discussed on pages 2-81 – 2-91. Increased water withdrawal, thermal discharge, and construction from the New Units, together with increased withdrawals and discharges by other users, will impede such natural flow regimes and thus negatively impact~~

~~many Savannah River organisms. The FEIS simply does not provide the information required to determine the magnitude of such impacts.~~

I declare under penalty of perjury that the foregoing is true and correct.

Date: September 22, 2008

DECLARANT:

[Executed in Accord with 10 CFR 2.304(d)]

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