

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	Docket No. 52-011-ESP
)	
Southern Nuclear Operating Company)	ASLBP No. 07-850-01-ESP-BD01
)	
(Early Site Permit for Vogtle ESP Site))	May 8, 2009

**SOUTHERN NUCLEAR OPERATING COMPANY'S REPLY FINDINGS OF FACT
AND CONCLUSIONS OF LAW REGARDING ENVIRONMENTAL CONTENTIONS**

M. Stanford Blanton, Esq.
Grady Moore, III, Esq.
Peter D. LeJeune, Esq.
Leslie G. Allen, Esq.
BALCH & BINGHAM LLP
1710 Sixth Avenue North
Birmingham, AL 35203-2015
Telephone: (205) 251-8100
Facsimile: (205) 226-8798

COUNSEL FOR SOUTHERN NUCLEAR
OPERATING COMPANY

Kathryn M. Sutton, Esq.
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004
Telephone: (202) 739-5738
Facsimile: (202) 739-3001

CO-COUNSEL FOR SOUTHERN
NUCLEAR OPERATING COMPANY

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I. Introduction

Pursuant to 10 C.F.R. § 2.712(a)(1) and the Atomic Safety and Licensing Board's ("ASLB" or "Board") November 13, 2008 scheduling order,¹ Southern Nuclear Operating Company ("SNC") submits its Reply Findings of Fact and Conclusions of Law Regarding Environmental Contentions ("Reply Findings and Conclusions"). SNC filed its initial proposed findings of fact and conclusions of law on April 24, 2009. The NRC Staff filed proposed findings and conclusions of law on the same date.² SNC's and the Staff's proposed findings of fact and conclusions of law address and resolve all contested issues raised by Environmental Contentions EC 1.2, EC 1.3 and EC 6.0.

Joint Intervenors filed proposed findings of fact and conclusions of law on April 24, 2009.³ ("JTI Proposed Findings and Conclusions"). As discussed below, Joint Intervenors' proposed findings are contrary to the evidentiary record in this proceeding. In contrast, the

¹ *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), Docket No. 52-011-ESP, Memorandum and Order (Revised General Schedule) (Nov. 13, 2008).

² NRC Staff's Proposed Findings of Fact and Conclusions of Law Concerning Contested Environmental Matters (April 24, 2009).

³ Joint Intervenor's Proposed Findings of Fact and Conclusions of Law (April 24, 2009).

record supports each of the findings and conclusions proposed by SNC and a determination by this Board that, with respect to the issues raised in EC 1.2, EC 1.3 and EC 6.0, the Staff has satisfied its responsibility under the National Environmental Policy Act (“NEPA”) to assess the environmental impacts of the proposed Units 3 and 4 at Plant Vogtle, consistent with 10 C.F.R. Part 51.

II. Reply to Joint Intervenors’, Proposed Findings and Conclusions on EC 1.2s

A. Reply Findings on EC 1.2

1. EC 1.2 alleges that the Final Environmental Impact Statement (“FEIS”) does not identify and adequately consider the impacts of the proposed cooling system intake and discharge structures on aquatic resources. However, the testimony and evidence presented regarding EC 1.2 clearly establish that the Staff took the requisite “hard look” at these impacts to arrive at the conclusion that impacts would be SMALL, *i.e.*, “that they would neither destabilize nor noticeably alter any important attribute of the resource.” Accordingly, the FEIS, and the record as a whole, adequately consider the aquatic impacts of the cooling water system.

2. In general, Joint Intervenors’ Proposed Findings related to EC 1.2 involve only the alleged impacts of entrainment on “important” species in the vicinity of the intake structures for Vogtle Units 1 and 2 and proposed Units 3 and 4. These proposed findings represent a completely new alleged basis for EC 1.2. Joint Intervenors propose no findings regarding any of the issues of material fact identified by the Board in its Order of January 15, 2008, for which the evidentiary hearing was held.⁴ To that end, Joint Intervenors appear to concede that the record does contain adequate baseline data to assess impacts from impingement, entrainment and thermal discharges. *See* JTI Proposed Findings and Conclusions at 11. Joint

⁴ *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), Docket No. 52-011-ESP, Memorandum and Order (Ruling on Dispositive Motion and Associated Motions to Strike Regarding [EC] 1.2) (Jan. 15, 200).

Intervenors also appear to concede that the Staff's assumption of uniform drift and range of flows considered were proper. *See id.* through 20. Joint Intervenors have abandoned their earlier criticisms and bases for their contention that the analysis is inadequate and, instead, now ask this Board to change the conclusion in the FEIS and find that impacts to shortnose sturgeon and robust redhorse will be LARGE and to find that impacts to some state-listed mussels cannot be evaluated based on the record.

3. There is no evidence or testimony that supports Joint Intervenors' proposed findings. Joint Intervenors have mischaracterized the evidence presented during this proceeding, and they fail to show how their proposed findings are supported or relevant. To the contrary, the evidence and testimony demonstrates that the Staff's conclusion that aquatic impacts from the proposed cooling system will be SMALL is adequately supported by the FEIS and the hearing record.

Ecological Baseline

4. JTI 1.2 Proposed Finding 1: Joint Intervenors no longer assert that the FEIS does not contain an adequate discussion of the baseline aquatic data. Rather, Joint Intervenors propose this Board find that the baseline includes "both the ongoing impacts of past actions, and the current impacts of ongoing actions, to the extent they affect the aquatic biota of the Savannah River at Plant Vogtle." Joint Intervenors' proposed findings appear to be consistent with the positions of SNC and NRC Staff that the baseline aquatic data is adequate.

5. Following the appropriate Early Site Review Plans ("ESRP") guidelines, the Staff included in the FEIS over twenty (20) pages describing the aquatic environment and biota in the vicinity of the Vogtle site, and described the life cycles of "important species," Exhibit NRC000001a at 2-81 through 2-89, and "threatened and endangered aquatic species," *id.* at 2-89

through 2-93. Specifically, details of local life history, population sizes and relevance to occurrences at the Vogtle site are given for American shad, *id.* at 2-82, striped bass, *id.* at 2-83, robust redhorse, *id.* at 2-88, and shortnose sturgeon, *id.* at 2-89. *See also* Tr. 604 (Coutant 1.2 Direct at A.31); Exhibit NRC000001a at 2-72 through 2-93; Tr. 744 (Staff 1.2 Rebuttal at A.13). These considerations were included in the Staff’s analysis of the aquatic baseline and reflect “the ongoing impacts of past actions, and the current impacts of ongoing actions.”

6. JTI 1.2 Proposed Finding 2: SNC agrees that the Staff “properly focused” its analysis on “important” aquatic species, consistent with the ESRPs guidance. Also consistent with the ESRPs guidance, the Staff determined the anticipated level of impacts to aquatic communities, including “important” species through the standard practice of conducting a screening study. Tr. 712; *see also* Exhibit NRC000009 (ESRP sections 5.3.1.2-6; 2.4.2-6).

7. JTI 1.2 Proposed Finding 3: Joint Intervenor seek a finding that, because threatened and endangered species and species of concern are “rare,” they are necessarily “vulnerable to unacceptable impacts from construction or operation of nuclear power plants.” Threatened and endangered species and species of concern are labeled as “important” under NRC guidance, and the ESRPs make clear that the Staff should consider them, which the Staff does in the FEIS. However, the ESRP to which Joint Intervenors cite for this finding does not state that these species are somehow more vulnerable to unacceptable impacts from construction or operation of nuclear power plants.

8. Rather, as the Staff and Dr. Coutant testified, the proposed design features of the new units, including use of a closed-cycle cooling system, construction of a weir wall, and low intake velocity will significantly reduce the potential for such impacts. Dr. Coutant testified that “design features of the cooling system and water intake can minimize mortalities to aquatic

organisms from impingement on intake screens and entrainment through the cooling system to generally accepted low levels.” Tr. 604 (Coutant 1.2 Direct at A.27). He goes on to explain that the use of closed-cycle cooling, flow velocities below 0.5 feet/sec and a submerged weir “make significant mortalities of Savannah River biota from entrainment and impingement unlikely” *Id.*; *see also id.* at A.29 (“The weir could prevent water and organisms flowing along the river bottom from entering the canal except by rising above the weir. It is presumed that bottom-dwelling fish and invertebrates would be reluctant to rise above the weir and enter the intake. This should reduce the number of fish susceptible to impingement that would enter the intake canal. It may also reduce the number of drifting organisms such as fish and larvae and invertebrates that may be concentrated in bottom waters according to the studies in the Vogtle vicinity”); Tr. 699-702 (Dr. Coutant describing the design features that result in minimizing impacts); Exhibits SNC000006, SNC000007, SNC000008, SNC000009 and SNC000010 (photos depicting intake canal and weir wall for Units 1 and 2); Tr. 838 (Dr. Young agreeing that weir wall likely reduces entrainment); Tr. 787-788 (Dr. Masnik describing design features considered by the Staff to reduce impacts); Tr. 743 (Staff 1.2 Direct at A.14).

9. Joint Intervenors propose that the Board should find *any* impact on an *individual member* of an “important” species is significant and destabilizes the resource. The record does not support such a finding. *See, e.g.*, Exhibit SNC000022 (National Marine Fisheries Service (“NMFS”) letter concluding that proposed units will not adversely affect shortnose sturgeon); Tr. 1048-49 (Dr. Coutant testified that loss of one member of an important species does not equate to harm to the entire population). There is no evidence presented in the record to the contrary. In addition, the entire premise of the proposed finding is the assumption that important species will be entrained. SNC’s 2008 Impingement and Entrainment studies refute this assumption.

See Exhibits SNCR00004 and SNCR00005; Tr. 631; 705-06. There is no contrary evidence in the record showing actual entrainment of these species will occur. Moreover, the Staff considered this assumption as part of its analysis in any event. Tr. 1079-80 (Dr. Masnik explained that the Staff consulted with the NMFS); *see also* Exhibit NRC000001b at 5-41; Tr. 744 (Staff 1.2 Rebuttal at A.11).

Shortnose Sturgeon

10. JTI 1.2 Proposed Finding 4: Joint Intervenors suggest the Board find that “[a]dult shortnose sturgeon migrate past Plant Vogtle to spawn at sites upstream near Augusta,” and that “[a]fter hatching, larval shortnose sturgeon migrate downstream to get to the estuary.” The implication is that shortnose sturgeon are swimming back and forth past the Vogtle site and are therefore likely to be impacted. Putting these statements in context, Dr. Coutant testified that

shortnose sturgeon spawn on a limited amount of rocky substrate in the Savannah River near Augusta, Georgia. Their eggs are adhesive and would not naturally drift the 30 miles to the Vogtle site. Larvae seek bottom crevasses near the spawning site upon hatching, so they, too, would be unlikely to drift to the Vogtle site. No shortnose sturgeon larvae were collected in the 2008 SNC ichthyoplankton study.

Tr. 605 (Coutant 1.2 Rebuttal at A.19, internal citations omitted). While Dr. Coutant did testify that shortnose sturgeon would migrate past the site, he went on to explain that, it was highly unlikely that a significant number of shortnose sturgeon would be entrained or impinged,

the fish have a lot of river that they can use without getting caught up in the intake at all. The zone of influence for the intake is really pretty small, whether you look at it in terms of cross sectional area or volume of water that's drawn into the intake. So I think one of the measures that the staff used, and certainly the measure that I've used in judging significance is whether there's a reasonable likelihood that these fish are going to be exposed to the kind of condition that would be harmful to them. And personally I see plenty of river out there for them to migrate in without being caught up in the intake.

Tr. 702-703; *see also* Tr. 668 (Dr. Coutant testified that shortnose sturgeon “spawn in the few available hard straits that are in the Savannah – up in the Savannah River Shoals. The eggs attach to the substrate. The larvae when they hatch are bottom seekers. They tend to go right down into the bottom substrate and don’t drift willy-nilly through the water column.”); Tr. 1364 (Dr. Coutant testified that “[t]he sturgeon, both the shortnose and the Atlantic sturgeon at adult sizes and juvenile sizes also are deep water, deep channel species in their migration up and down the Savannah. . . .”). Joint Intervenors offered no evidence to contradict this testimony.

11. JTI 1.2 Proposed Finding 5: Joint Intervenors’ proposed finding 5 is based on testimony taken completely out of context and is nonetheless irrelevant. Dr. Masnik did testify that “organisms affected [by entrainment] could include the larval stages of both the robust redhorse and the shortnose sturgeon,” but went on to testify:

However, other factors, such as the use of closed-cycle cooling, the design, location and operation of the intake structure, the location of the site on the Savannah River, and the river hydrology, as well as consideration of life history information (i.e., fecundity, spawning sites, spawning period), also affect the number of individuals lost due to entrainment. Exhibit NRC000001 at 5-30 to 5-32; Staff EC 1.2 Direct Testimony at Section II.C.

Therefore, the Staff agrees that at least some individual organisms, particularly those in early developmental stages (egg, larvae, and post-larvae, and in some cases juvenile fish), and including those from species identified as “important species,” will not be able to overcome the through-screen intake velocity and will be entrained and lost from the fishery. However, the susceptibility of these early life stages for almost all species to entrainment due to the lack of or limited motility is fully consistent with the Staff’s analysis in the FEIS. It is the consideration of the other abiotic and biotic factors identified above and the results of past field studies described in the FEIS that leads the Staff to conclude that the number of individuals lost will be sufficiently small that there will be no detectable changes in fish populations attributable to the operation of VEGP Units 3 and 4. Exhibit NRC000001 at 5-30 to 5-33; Staff EC 1.2 Direct Testimony at II.C. This conclusion is supported by the results of the Applicant’s entrainment study conducted during 2008.

Tr. 744 (Staff 1.2 Rebuttal at A.11). As noted in Dr. Masnik's testimony, the 2008 Impingement and Entrainment studies conducted by SNC support the Staff's conclusion that impacts will be SMALL. In fact, no robust redhorse or sturgeon were identified in these studies. See Exhibits SNCR00004 and SNC000005; Tr. 631; 705-06.

12. Dr. Masnik's testimony that "even the loss of one individual [shortnose sturgeon] may be important" is also taken out of context. Dr. Masnik went on to testify:

what typically would happen is we -- and what we did was we did an environmental assessment and a biological assessment, which we submitted to the National Marine Fisheries. National Marine Fisheries came back with a letter. I think it's SNC-000022. And they reach a conclusion at the end that basically states -- I'll read it. It says, "Based on the above information, National Marine Fisheries Service concludes that this proposed action is not likely to adversely affect shortnose sturgeon. Therefore, this concludes your consultation responsibilities under the ESA for species under National Marine Fisheries Service purview."

Tr. 1079-80.

13. Joint Intervenors' proposed finding is irrelevant and contrary to a preponderance of the evidence. The evidence in the record is clear that impacts to all species of fish, including important species, from impingement and entrainment will be SMALL.

14. JTI 1.2 Proposed Finding 6: Joint Intervenors seek a finding regarding the NMFS 1998 Recovery Plan for the shortnose sturgeon. SNC does not dispute that NMFS published a Recovery Plan for the shortnose sturgeon in 1998. The NMFS Recovery Plan does list cooling water intakes as one of nine listed factors affecting recovery of shortnose sturgeon. As noted above in response to proposed finding 5, Joint Intervenors fail to point out that NMFS, *the very agency responsible for administering the 1998 NMFS Recovery Plan*, issued a letter regarding the Vogle site, which reads in relevant part:

NMFS has identified . . . potential effects to shortnose sturgeon and concluded that **[shortnose sturgeon] are not likely to be adversely affected by the proposed ESP.**

The installation of the weir wall would also **reduce the potential of sturgeon larvae entrainment**, since their larvae are demersal, tending to stay near the river bottom.

The risk of sturgeon impingement within the intake structures will be **discountable due to the very small chance of sturgeon being trapped**, as detailed above.

Exhibit SNC0000022 (emphasis added).

15. JTI 1.2 Proposed Finding 7: Joint Intervenors assert that larval sturgeon were collected in the vicinity of the VEGP site during ichthyoplankton surveys conducted between 1982 and 1985 and that “a significant number of shortnose sturgeon larvae were entrained while the [Savannah River Site] reactors were operating.” Joint Intervenors cite to Exhibit SNC000012 (which is Dr. Coutant’s Curriculum Vitae); however, the citation likely should have been made to Exhibit NRC000012. At page 3-112 of Exhibit NRC000012, the authors state that seven larval sturgeon, two of which were probably shortnose sturgeon, were collected. Exhibit NRC000012 at 3-112. These were source water samples and not evidence of entrained sturgeon. Thus, there is no support for Joint Intervenors’ assertion that the authors “concluded that some sturgeon could be entrained by the [SRS] cooling water intake, but were unable to provide an estimate.” Moreover, Joint Intervenors fail to demonstrate how such a finding is relevant to this Board’s decision relative to the impacts of Vogtle 3 and 4, which will employ different intake design features that will reduce entrainment and impingement. Exhibit SNC0000022.

16. Rather, Joint Intervenors endorse the Staff’s method of relying on available data pertaining to the SRS to suggest that the impacts from the operation of the SRS “contributed to

the endangered status of the Savannah River population” **and that those impacts were not considered by the Staff.** To the contrary, this shows that the Staff’s analysis properly considered the baseline of the shortnose sturgeon in its analysis. The FEIS contains a discussion of the local life history, population sizes and relevance to occurrences at the Vogtle site for shortnose sturgeon. Exhibit NRC0000001a at 2-89. The FEIS clearly demonstrates the Staff’s consideration of past impacts of the SRS:

Studies have been performed that looked at entrainment rates for reactor facilities at the Savannah River Site. Between 1982 and 1985, ichthyoplankton studies occurred between rkm 47.2 and 301.1 (RM 29.3 and 187.1) and in intake canals and mouths of three creeks along the Savannah River Site (Paller et al. 1986). During these four years, it was estimated that between 8.3 and 12.3 percent of the ichthyoplankton that drifted past the canals were entrained. However, there are significant differences between the Savannah River Site intakes and the existing and proposed intakes at the VEGP site. First, the volume of water withdrawn [at the Savannah River Site] . . . is about three times the anticipated water withdrawal rate of the proposed VEGP Units 3 and 4. Second, the intake velocity at the Savannah River Site intakes . . . is 2.5 times as great as for the proposed VEGP Units 3 and 4.

Exhibit NRC0000001b at 5-32. Moreover, the analysis in the FEIS is supported by record evidence. The Staff testified at the hearing regarding compilation of information on the shortnose sturgeon in accordance with the ESRPs:

We talk about where the sturgeon is located during the year that the juveniles stay down near that estuary and the adults come up for their spawning migrations. And we've identified through the literature three spawning areas and in the FEIS we disclosed which river miles those were. There's two of them above the Vogtle site, one of them above the Vogtle site and two of them below the site, downstream. And we talk about the orientation of the eggs in the water, that they're demersal and they're adhesive so that they sink to the bottom and that attach to cobbles or other structures in the bottom, the hard bottom of the river and we also talked about how the larva are -- when they're hatched out, they tend to stay near the bottom, you know, in the first few days and then after awhile, they start to swim up. So we were -- that's spacial there and also temporal because we also discussed times of year that the sturgeon would spawn, which is in the early part of the spawning season, in that February to March time frame for the short-nose sturgeon. Tr. 767-768.

17. Finally, no robust redhorse or sturgeon were identified in SNC's 2008 Impingement and Entrainment studies. *See* Exhibits SNCR00004 and SNC000005; Tr. 631; 705-06. Joint Intervenors may disagree with the Staff's conclusion, but it is clear that the Staff considered this information in reaching its conclusion. The record does not support Joint Intervenors' proposed finding.

18. JTI 1.2 Proposed Finding 8: Joint Intervenors again invoke the NMFS Recovery Plan and ask this Board to find that because users of water along the Savannah River are "likely impacting shortnose sturgeon," that the intake structure for Vogtle Units 3 and 4 could entrain shortnose sturgeon. Joint Intervenors cite no evidence for their assumption that facilities along the Savannah River, including the SRS D-Area Powerhouse and Vogtle Units 1 and 2, are impacting shortnose sturgeon, nor for their prediction that Vogtle 3 and 4 would impact the sturgeon. To the contrary, as explained above, the same agency that issued the Recovery Plan issued a letter to SNC indicating that shortnose sturgeon were not likely to be adversely affected by Units 3 and 4. Exhibit SNC000022. Similarly, Joint Intervenors cite the Staff's finding that at extremely low flow rates, "the cumulative effect of all four units combined with the potential for losses at the SRS" may result in "significant and detectable" entrainment of some species of fish. However, there is no evidence that "some species of fish" includes shortnose sturgeon. Second, Joint Intervenors neglect to point out that the Staff went on to conclude that "[a]lthough the resource may be affected through the alteration of the fish community, with some species declining in abundance while others increasing, the staff concludes that the resource would not be destabilized (i.e., the effects would not result in the collapse of the fishery)". Exhibit NRC000001b at 7-24. The preponderance of the evidence is contrary to a finding that sturgeon entrainment or that impacts are LARGE, *i.e.*, would noticeably alter and destabilize the resource.

19. JTI 1.2 Proposed Finding 9: Joint Intervenors ask this Board to find that although there is no evidence of shortnose sturgeon being entrained at Units 1 and 2, shortnose sturgeon are, in fact, being entrained. First, Joint Intervenors offer no evidence that shortnose sturgeon are being, or will be, entrained. Curiously, Joint Intervenors cite to SNC's 2008 entrainment study, which indicated that no shortnose sturgeon were entrained for the proposition that "Units 1 and 2 in fact entrain a small, but not insignificant, number of larval shortnose sturgeon." To the contrary, Mr. Dodd testified for SNC that for "both [the] impingement and entrainment study we didn't see any protected species at all." Tr. 705-706; *see also* Exhibits SNCR00004 and SNCR00005.

20. Second, the evidence does not support a finding that if even one shortnose sturgeon is entrained, the result would be that impacts would be "clearly noticeable and sufficient to destabilize important attributes of the resource." The only testimony that is in the record runs contrary to this assertion. For example, Dr. Coutant testified:

Well, usually one fish doesn't trigger the action. It would have to be enough to be -- enough harm to have a population effect. And, again, I think of the Endangered Species Act situations we have in other places. In the Columbia River, for instance, we have a number of endangered salmon. And, yet, both the federal hydropower system is allowed to operate and the commercial fishery is allowed to operate that does take some of the salmon. In that case, they go to great lengths to determine what the take is and then determine whether that take is enough to affect the population extinction risk for that stock of salmon. So, again, the precedent is that it isn't the occurrence of one individual fish impinged. If we had a sturgeon impinged, which we have not, that in itself would not under the basis of what I am using as precedent be enough to trigger canceling the site, for instance.

Tr. 1048-49.

21. There is no evidentiary support for a finding that "the impact of the proposed Units 3 and 4 on shortnose sturgeon will be LARGE," i.e., will be clearly noticeable and sufficient to destabilize important attributes of the resource. Rather, the preponderance of the

evidence establishes that the Staff adequately and correctly assessed impacts to shortnose sturgeon to support its conclusion that impacts would be SMALL.

Robust Redhorse

22. JTI 1.2 Proposed Findings 10 and 11: These proposed findings recite factual information for purposes of background and generally warrant no further reply by SNC, with one clarification. Joint Intervenors attribute the conclusion that the size of the Savannah River robust redhorse population is believed to be small to Dr. Coutant. Dr. Coutant simply testified that the robust redhorse “is found in small numbers in the lower 300 km (186 miles) of the Savannah River.” Tr. 950 (Coutant 1.3 Direct at A.11).

23. JTI 1.2 Proposed Findings 12 and 13: These proposed findings relate to the location, spawning and migration patterns of robust redhorse. Joint Intervenors seek a finding that “[i]n the winter, robust redhorse disburse from their spawning grounds along the length of the river down to River Mile 56, and return to their spawning sites in the spring.” The citation Joint Intervenors provide does not support this finding. Rather, Joint Intervenors point out one of the conservatisms in the Staff’s analysis of impacts to robust redhorse – the assumption that robust redhorse “would likely move downstream.” As Ms. Krieg testified, “the eggs are deposited in a gravel bar. That’s where they spawn and the eggs remain there until the larva are hatched. And the larva spend some time and the larva spends some time in that vicinity, but then they could potentially move downstream. I did not see information in the literature that said whether they actually did move downstream or whether they would stay in the vicinity. So I made the assumption that they would likely move downstream.” Tr. 777.

24. Dr. Masnik also testified that “[t]he early life history of [robust redhorse] is not well-known. Because it is so rare, they have cultured the species in laboratories but they really don't know the behavior of the post-larval forms.” Tr. 778. Dr. Coutant testified that

it's a reasonable conclusion that [robust redhorse] would not be vulnerable to the shoreline more shallow area intake of the plant. So, you know, you're making sort of general conclusion that the impact on the adult Robust Redhorse probably is not significant. Because they just aren't -- they don't occur in the location of the intake even though they're in that reach of river . . . [Robust Redhorse have] not been tracked right in the intake. We can pull out the study and be sure. But I think what the study showed was that they were located at a point downstream of Vogtle. So sometime between the time that they were tagged in the Augusta Shoals area and where they were identified with the telemetry downstream, they must have passed the site. And that their habitat is the deep channel where they've been tracked.

Tr. 704-705.

25. Joint Intervenors take Dr. Masnik’s testimony regarding susceptibility of robust redhorse to entrainment out of context. Dr. Masnik testified that while organisms affected by entrainment could include the larval stages of robust redhorse, “other factors, such as the use of closed-cycle cooling, the design, locations and operation of the intake structure, the location of the site on the Savannah River, and the river hydrology, as well as consideration of life history information (i.e., fecundity, spawning sites, spawning period), also affect the number of individuals lost due to entrainment.” Tr. 744 (Staff 1.2 Rebuttal at A.11).

26. JTI 1.2 Proposed Finding 14: Joint Intervenors seek a finding implying that SNC’s entrainment study captured robust redhorse eggs. There is no evidence that supports such a finding. Rather, Mr. Dodd testified at the hearing that no robust redhorse were collected and that, **using state-of-art analysis**, going as far as one could in terms of identifying taxa, no robust redhorse larva were identified. Tr. 631. Even if the possible entrainment of robust redhorse in the total of 5 instances of entraining unidentified suckers cannot be eliminated to an absolute

certainty due to technological limitations on taxa identification, (Exhibit SNCR00005 Table D-1), the conclusion of SNC's entrainment study was plain that impacts to all fish species, including all sucker species, were insignificant. Exhibit SNCR00005. There is no evidence to the contrary in the record.

27. JTI 1.2 Proposed Finding 15: The evidence does not support a finding that impacts to robust redhorse from entrainment at proposed Units 3 and 4 will be LARGE, *i.e.*, will noticeably alter and destabilize this resource. Rather, as Dr. Coutant testified, "there really isn't much substantiation that these Robust Redhorse are the species that are coming down by Vogtle." Tr. 670. Mr. Dodd testified that no robust redhorse were identified in the 2008 impingement and entrainment study. Tr. 630; *see also* Exhibit SNC000004 and SNCR00005. That evidence, combined with the evidence from Dr. Coutant and Dr. Masnik, is certainly sufficient to rebut Joint Intervenors' assertion that Units 1 and 2 entrain a significant number of robust redhorse, regardless of its status as an important species.

State-Listed Mussels

28. JTI 1.2 Proposed Findings 16, 17, 18 and 19: Joint Intervenors propose findings related to the species of mussels found on the Savannah River near the Vogtle site and studies considered by the Staff in its analysis of impacts from impingement, entrainment or thermal discharges. As Joint Intervenors point out, the FEIS includes a discussion of the state-listed mussels in the vicinity of the Vogtle site. Exhibit NRC000001a at 2-87 – 2-88. The FEIS also includes a list of the native, resident diadromous, marine and upland fish species of the Middle Savannah River. *Id.* at 2-77 – 2-79. The Staff concluded that "impacts on aquatic ecosystems due to impingement and entrainment would likely be minor." Exhibit NRC000001b at 5-38. This conclusion is based on the proper methodology of using a screening study to

indicate impacts – if the screening study indicates that impacts are small, additional, detailed study is not necessary. Tr. 713. As Mr. Moorer explained, for purposes of NEPA,

you use indicator type organisms. In other words, you don't have to look at all -- every organism in the river system. There are 95 fish, if I remember correctly, in the Savannah River in the area of Vogtle . . . [T]he process as we understand it is that you would use a group of indicators and you would look at those. And if you determined from that group that that the impact was small, there's really no need to go any further with that. In other words, you're able to characterize the NEPA impact with a reasonable subset of the entire set. If the NEPA impact was determined to be moderate or large, you would then go out and gather more data.

Tr. 676. Dr. Coutant also testified that “[t]here's a long history of environmental impact assessments dating back to the early '70s where the use of key species or representative important species, or however you want to call them, selecting a few of the many species that are out there as your indicators; that's certainly the precedent for most analyses of this sort. And is certainly appropriate in this case, too.” Tr. 678.

29. JTI 1.2 Proposed Finding 20: Despite the FEIS analysis described above, Joint Intervenors propose the Board find that some host species for state-listed mussels will likely be entrained or impinged and that it is not possible to evaluate the secondary impacts of such fish loss on the state-listed mussels. Essentially, Joint Intervenors maintain that the impacts to mussels are unknown because the impacts of impingement and entrainment to their host fish are not described *in those terms*. The evidence is contrary to such a finding. The Staff concluded that impacts to all aquatic resources would be SMALL. The 2008 Impingement and Entrainment studies conducted by SNC confirm these results. See Exhibits SNCR00004 and SNCR00005. Dr. Coutant explained that indicator species are used to assess impacts and once impacts are determined to be small, further studies are not required by NEPA. Tr. 676. Because impacts to all fish species have been analyzed in this accepted manner and determined to be SMALL, and because the record supports this conclusion, there is no basis to claim that the impacts to a given

host fish are unknown. Those impacts are known, even if the fish species are not cataloged by their role as fish host – they are SMALL. In keeping with the definition of a SMALL impact, which means that the effect of the cooling system will not even noticeably alter the aquatic resources, the proper finding is that each fish species serving as a host fish will continue to perform its biological functions, including those which benefit mussels, as well as other functions, without any noticeable alteration. Accordingly, Joint Intervenors’ proposed finding is counter to the evidence presented and to NEPA.

B. Reply Conclusions on EC 1.2

30. JTI Proposed 1.2 Conclusions 1 through 4: Joint Intervenors allege that, as a matter of law, the Staff has not taken a “hard look” at the environmental impacts associated with issuing the ESP and therefore has not satisfied its NEPA obligation. According to Joint Intervenors, the FEIS did not include adequate consideration of impacts to “important species” and therefore does not constitute the requisite “hard look.” Joint Intervenors ask this Board to substitute the Joint Intervenors’ preferred conclusion of impacts for the Staff’s. The evidence does not support such a conclusion. Rather, as the evidence demonstrated, the Staff identified and adequately considered the direct, indirect and cumulative impacts from impingement, entrainment and thermal discharges. The conclusion in the FEIS was clearly made in light of the Staff’s consideration of impacts to “important species.” *See, e.g.*, NRC000001a at 2-81 (defining “important species” to include threatened or endangered species or species of concern). Section 2.7.2.1 contains descriptions of Georgia and South Carolina State-listed and proposed threatened and endangered aquatic species. *Id.* at 2-85 through 2-87. Section 2.7.2.2 describes the Federally listed threatened and endangered species. *Id.* at 2-89 through 2-93. The Staff consulted with NMFS which determined that impacts to shortnose sturgeon would not likely be

adversely affected. *See* Exhibit SNC000022. These considerations support a conclusion that the Staff took a “hard look.”

31. Therefore, the Board should reject Joint Intervenors’ proposed 1.2 conclusions 1 through 4, and, instead, conclude that the FEIS demonstrates the Staff’s requisite “hard look” at the impacts of issuance of the ESP. To the extent the Board wants to supplement the Staff’s analysis with evidence in the hearing record, the testimony and evidence presented further support the Staff’s conclusion that impacts would be SMALL. To conclude otherwise would be based on some standard other than NEPA. There is no basis for a conclusion that impacts will be greater than SMALL, and therefore no basis to deny the ESP.

III. Reply to Joint Intervenors’ Proposed Findings and Conclusions on EC 1.3

A. Reply Findings on EC 1.3

Feasibility of Dry Cooling

Technical Feasibility

32. JTI 1.3 Proposed Finding 1: Joint Intervenors assert that the standard design for the AP1000 can be modified to accommodate any cooling system, wet or dry, as long as the cooling system maintains steam turbine backpressure within its design limitations. Joint Intervenors’ assertion is misleading and incomplete as to the compatibility of an AP1000 with a dry cooling system. SNC witness, Mr. James Cuchens, testified that the AP1000 standard turbine generator could experience backpressure in the range of ~ 1.0” of mercury absolute (“HgA”) to a maximum of less than 5.0” HgA during normal operations and that backpressure in excess of 5.0” HgA would exceed the functional operational limit of the turbine. Tr. 955 (Cuchens Direct at A.9); Tr. 957 (Cuchens Rebuttal at A.6); Tr. 971 (Pierce Rebuttal at A.7); Tr. 983-985, 1210-1213; Exhibits SNCR00024 at p. 6, SNC000027, and SNC000028 at 10.2.1.

However, in order to achieve its designed megawatt output, the cooling system must allow the AP1000 to operate at an average of 2.92” HgA backpressure. *Id.* Mr. Cuchens’ testimony established that the closed-cycle wet cooling system specified in the Design Certification Document (“DCD”) will allow the AP1000 to operate in such a manner and that an air cooled condenser (“ACC”) (*i.e.*, dry cooling system) will not. Exhibit SNC000065. Mr. Cuchens explained that a state-of-the-art ACC hypothetically sized to accommodate the AP1000 turbine would produce turbine backpressure of not less than 4.5” HgA at the design temperature of 95 F, and that any rise above 4.5” HgA would put the AP1000 turbine near or above its alarm point and at risk of tripping. Tr. 955 (Cuchens Direct at A.10); Tr. 983-987, 1272; Exhibit SNCR00024 at p. 6. Moreover, factors commonly experienced in the operation of ACCs such as wind influence, recirculation and fouling would cause an increase in backpressure by as much as 1.5” HgA, which would push the turbine beyond its trip point. Accordingly, even if an ACC were sized to accommodate the AP1000 turbine it would not be capable of maintaining a backpressure necessary for the AP1000 to achieve its designed megawatt output and would not be capable of reliably maintaining steam turbine backpressure within the design limitations established by the DCD. Tr. 955 (Cuchens Direct at A.10, 23-24); Tr. 1272.

33. In support of JTI 1.3 Proposed Finding 1, Joint Intervenors reference the testimony of Mr. Cuchens and state “SNC’s expert states that cost aside, a dry-cooling system is feasible.” *See* JTI 1.3 Proposed Finding 1, fn. 105. This is mischaracterization of Mr. Cuchens’ testimony. Mr. Cuchens actually stated that feasibility is dependent on a number of factors, including “cost, operations, reliability, stability, and [...] state of the art.” Tr. 1012: 10-18. Based on these factors, Mr. Cuchens testified that dry cooling is not feasible for an AP1000 unit

located at the Vogtle site. Tr. 955 (Cuchens Direct at A.5, A.7, and A.14); Tr. 982; Exhibit SNCR00024.

34. JTI 1.3 Proposed Finding 2: Joint Intervenors concede that a high backpressure turbine would likely be required in order for an ACC to maintain the appropriate backpressure for an AP1000. While they acknowledge that there are none currently in existence, Joint Intervenors claim that such a turbine could be designed to handle the steam flow of the AP1000. However, Joint Intervenors did not submit any evidence that a high backpressure turbine has been utilized with a nuclear power plant or that such a turbine could even be built. Tr. 955 (Cuchens Direct at A.13); Tr. 1170-1172, 1210-1213, 1218. Moreover, both Mr. Cuchens and Mr. Powers testified that a large, multi-exhaust turbine (such as the AP1000 standard turbine) that is capable of safely operating at elevated backpressures has never been designed or manufactured anywhere in the world. Tr. 955 (Cuchens Direct at A.13); Tr. 1210-1213. Accordingly, because a high backpressure turbine capable of handling the AP1000's 8.4 million pounds of steam does not exist, such a turbine would be a first-of-a-kind technology.

35. JTI 1.3 Proposed Finding 3: Notwithstanding that no commercial nuclear power plant utilizes dry cooling, Joint Intervenors argue that a "dry cooled turbine" could support the 1,117 megawatt capacity of the AP1000. In support of this argument, Joint Intervenors assert that "General Electric committed to build (but has not actually built) an exclusively dry cooled, triple exhaust turbine with a 1,500-plus megawatt capacity (the "ESBWR")." However, Joint Intervenors failed to present any evidence to support this claim. Joint Intervenors evidence is limited to one paragraph in the North Anna Early Site Permit FEIS, which is not based upon a specific reactor design, that commits the unit to dry cooling *if* it is built. In fact, Mr. Powers testified that General Electric has not built a prototype and that a combined license application

for North Anna 4 (where this turbine is supposedly being built) has not been submitted. *See* “Tr. 1089 (Powers Rebuttal at A.6); Exhibits JTIR00050 and JTI000051; Tr. 1212, 1215-1220. Mr. Powers testified that in his expert opinion, North Anna’s commitment to use a totally dry system on North Anna 4 was not technically feasible. The commitment to use dry cooling at North Anna 4 does not support a finding that dry cooling is a feasible, or preferable, cooling system for Vogtle Units 3 and 4.

36. JTI 1.3 Proposed Finding 4: Joint Intervenors state that the modifications required to the standard AP1000 design to accommodate a dry cooling system and a high backpressure turbine would not be extensive. However, Joint Intervenors witness, Mr. Powers, had not conducted a detailed review of the AP1000 design information to support his position. SNC’s expert witnesses presented substantial evidence to the contrary and based it on detailed knowledge of the AP1000 design. Specifically, Mr. Cuchens and Mr. Pierce testified that significant modifications to the AP1000 standard design would be required, including changes to the turbine building, turbine pedestal, feed water heaters and associated piping and steam surface condensers. Tr. 955 (Cuchens Direct at A.31); Tr. 971 (Pierce Rebuttal at A.9); Tr. 1004-1007, 1013, 1016-1019, 1263-1267. Mr. Pierce also stated that a new site safety analysis report would be required. Tr. 971 (Pierce Rebuttal at A.9); Tr. 1263-1267. Mr. Cuchens and Mr. Pierce also testified that the use of a high backpressure turbine would require substantial modifications to the AP1000 standard design, including the redesign of the turbine building, the turbine building structural steel cross bracing, and the main turbine deck support system. Tr. 955 (Cuchens Direct at A.22-25, A.31-33); Tr. 971 (Pierce Rebuttal at A.9); Tr. 957 (Cuchens Rebuttal at A.8); Tr. 1004-1006, 1263-1267. Joint Intervenors did not present any technical analysis or data to rebut Mr. Cuchens’ and Mr. Pierce’s testimony on this issue. This evidence supports SNC’s

position that converting the AP1000 to a dry cooling system would entail significant design changes and significant additional licensing reviews.

37. Joint Intervenors claim that the only modification necessary is the removal of the “last stage bucket” from the AP1000 standard turbine, which they further claim will make the standard turbine a high backpressure turbine. However, Joint Intervenors’ witness, Mr. Powers, could not identify an instance where this had actually been done. Mr. Cuchens testified that this modification has never been made to a turbine for application in a plant the size of the AP1000. Tr. 1207. Accordingly, assuming it could even be done in any instance, this type modification to the AP1000 turbine would constitute unproven and first-of-a-kind technology.

38. JTI 1.3 Proposed Finding 5: Notwithstanding the ample evidence presented at hearing regarding differences between the thermal cycles of nuclear plants and fossil plants, Joint Intervenors continue to cite the Matimba plant in South Africa as proof that an ACC can be utilized with an AP1000. As Mr. Cuchens explained, the Matimba plant consists of six 700 megawatt units and, therefore, each individual unit does not have a comparable capacity or steam flow to the AP1000. Tr. 957 (Cuchens Rebuttal at A.9); Tr. 1210-1211, 1212-1213. Further, none of the Matimba units utilize the triple exhaust, six-flow turbine-generator package specified in the AP1000 standard design. Accordingly, the Matimba example does not establish that dry cooling at the Vogtle site is feasible.

39. JTI 1.3 Proposed Finding 6: Joint Intervenors also claim that the operating procedures and wind skirts implemented at Matimba demonstrate that measures can be taken to mitigate weather fluctuations that affect the operation, efficiency, and reliability of an ACC. Mr. Cuchens and Mr. Powers both testified that the Matimba plant experienced many problems with dry cooling, including load swings, weather shifts, wind patterns and foiling of the dry cooling

modules. Tr. 979-986; Exhibit SNC000098. While many of these issues may have been resolved over the course of years, Mr. Cuchens explained that an ACC located at the Vogtle site (or any site) would have its own set of unique issues to address based on site specific factors such as site layout and weather patterns. Tr. 1283-1284. Therefore, the “lessons learned” at Matimba would not necessarily be applicable to or benefit an ACC located in a different location.

40. JTI 1.3 Proposed Finding 7: Joint Intervenors submit that a dry cooling system would have little impact on the performance of an AP1000 unit located at the Vogtle site. The weight of the evidence demonstrates that this statement is erroneous. SNC presented extensive evidence that the use of an ACC with the AP1000 standard turbine would result in significant degradation in capacity and efficiency. Specifically, Mr. Cuchens testified that the use of an ACC with an AP1000 would result in an output loss of approximately 55 MW per unit and an additional consumptive power demand of approximately 30 MW per unit (which would be a net loss of approximately 85 MW per unit). Tr. 955 (Cuchens Direct at A.28); Exhibit SNCR00024 at App. A.; Tr. 1029-1030; 1230-1232. In addition, SNC submitted evidence that established that the efficiency penalty could be as much as 12 percent of the total output of the facility Exhibit JTIR00050 at p. 3-12 and Exhibit SNC000095 at p. 8-4 and the station service requirement could be 8.5 to 11%. Exhibit SNC000095 at p. 8-4. Finally, Joint Intervenors’ evidence also demonstrated that dry cooling is less efficient and less productive than wet cooling. See Tr. 1088, 1098 (Powers Direct at A.23 and A.28 and Powers Rebuttal at A.2 and A.3); Tr. 1152, 1162, 1247.

41. JTI 1.3 Proposed Finding 8: Joint Intervenors further claim that implementation of a dry cooling system would have no impact on the ability of the AP1000 to maintain a typical

95 percent capacity factor. Other than Mr. Powers' blanket assertion to this effect, Joint Intervenors did not present any analysis, modeling, or technical data to support this position. Conversely, SNC's testimony and evidence established that there are a number of factors that would affect the efficiency and capacity of the units, including wind influence, weather fluctuations, recirculation and fouling. Tr. 955 (Cuchens Direct at A.10, 23-24); Tr. 995, 1272. Moreover, if a high backpressure were utilized with an AP1000, as Joint Intervenors suggest, the nameplate capacity of the unit would be reduced thereby preventing the unit from even reaching 95 percent of its designed output. Tr. 1208.

Economic Feasibility

Operating Costs

42. JTI 1.3 Proposed Finding 9: Joint Intervenors compare mechanical draft wet cooling systems with mechanical draft dry cooling systems, and natural draft wet cooling systems with natural draft dry cooling systems in order to support their contention that the differences in parasitic operating load and efficiency impacts of dry cooling are relatively minor and, under certain scenarios, the parasitic load advantage goes to the dry cooling system. This comparison is based on Mr. Powers' contention during the hearing that a natural draft dry cooling system should have been the basis of Mr. Cuchens' comparison rather than an ACC. However, the evidence demonstrates that the capital cost of a natural draft dry system would be two to three times higher than an ACC, which makes Mr. Cuchens' comparison of an ACC to a natural draft closed cycle wet system reasonable. Exhibits SNCR00024 at p. 27 and SNC000098 at p. 10. Finally, Joint Intervenors' claim that the maintenance costs associated with a dry cooling system are less than those of a wet cooling system is erroneous because it is based on a comparison with a mechanical draft cooling system and not the proposed natural draft system.

43. JTI 1.3 Proposed Finding 10: Joint Intervenors challenge the NRC Staff's evaluation of the cost difference between operating wet and dry cooling systems and the NRC Staff's calculation of the efficiency penalty of a dry cooling system. Contrary to these claims, the FEIS provided an adequate analysis of dry cooling. Moreover, SNC provided extensive analysis and data that established that the efficiency penalty associated with the use of dry cooling could be as much as 12 percent of the total output of the facility. Exhibit JTIR00050 at p. 3-12 and Exhibit SNC000095 at p. 8-4. Finally, Mr. Cuchens provided a detailed analysis of the costs of a state-of-the-art ACC, which Joint Intervenors' expert, Mr. Powers, found to be reasonable. Tr. 1152.

Capital Costs

44. JTI 1.3 Proposed Finding 11: Joint Intervenors claim that the additional \$200 million in capital costs for an ACC is not significant compared to the overall cost of an AP1000 unit. Such an increase would increase the capital cost of the proposed units by approximately \$90 per Kilowatt, which is a material increase. Moreover, this cost estimate includes only the cost of the ACC and does not include the multitude of incremental costs that would be incurred. Specifically, this estimate does not include the cost of: (i) the additional equipment and materials needed to connect the ACC to the unit; (ii) the engineering and construction for the large steam ducts, condensate tanks/pumps, foundations, and associated vacuum systems; (iii) the additional engineering and construction associated with design changes to the turbine island; (iv) increased maintenance costs; or (v) the value of the loss of electrical output. Tr. 955 (Cuchens Direct at A.36); Exhibit SNCR00024; Tr. 1247-1250, 1262. In addition, this estimate does not include costs associated with the use of a high backpressure turbine, including cost of the turbine, re-design and engineering costs, and loss in value from capacity degradation. Tr. 955 (Cuchens

Direct at A.32); Tr. 971 (Pierce Rebuttal at A.10); Tr. 1247-1248. Accordingly, the total cost of a dry cooling system for use with an AP1000 unit at the Vogtle site would be substantially more than the estimate provided above and, thus, account for a significantly larger portion of the overall cost of the unit. Tr. 1244-1245, 1279-1280.

Land Development and Licensing Costs

45. JTI 1.3 Proposed Finding 12: Joint Intervenors claim that a state-of-the-art ACC (202 cells) would not require SNC to develop significantly more land than would be necessary for the wet cooling system. This claim has no merit. A 202 cell ACC would require approximately 170 acres, which is substantially larger than the 70 acres necessary for the wet cooling system. *See* Tr. 967 (Moorer 1.3 Direct at A.9); Exhibits SNCR00024 at p. 19 and SNC000040; Tr. 1024-1025, 1057. Accordingly, the development of the additional 100 acres would be a significant increase in land development costs and harm to the environment. *Id.*

46. JTI 1.3 Proposed Finding 13: Joint Intervenors assert that implementation of a dry cooling system will not result in significant licensing costs; however, they do acknowledge that the biggest impact may be schedule delays. Mr. Pierce testified that SNC would incur substantial costs in the preparation of the necessary licensing review and documentation related to the implementation of a dry cooling system and/or a high backpressure turbine. Tr. 1244-1245, 1279-1280. Moreover, any delay that ultimately affects the commercial operation date of the facility could result in replacement power costs and could result in additional environmental impacts on account of the generation used to replace the output from Vogtle 3 and 4.

Impacts on Aquatic Species

47. JTI 1.3 Proposed Findings 14, 15 and 16: Joint Intervenors claim that construction and operation of the proposed wet cooling system would likely impact the robust redhorse and shortnose sturgeon as well as other aquatic species. Joint Intervenors also challenge the finding in the FEIS that the impact to aquatic species would be SMALL. Finally, Joint Intervenors assert that dry cooling would largely eliminate any impacts. Joint Intervenors, however, failed to present any evidence of these alleged impacts. Conversely, NRC Staff and SNC presented evidence that establish that any impacts would be SMALL. *See* Exhibit NRC000001b at Section 9.3.2; Tr. 950 (Coutant 1.3 Direct at A.9, A. 16); Tr. 1042-1048; Exhibits SNCR00004 and SNCR00005. *See also* SNC’s Reply to JTI Proposed 1.2 Findings 4, 9, 10-11, 15, and 20.

B. Reply Conclusions on EC 1.3

48. JTI 1.3 Proposed Conclusions 1, 2, 3 and 4: Joint Intervenors conclude that NEPA requires NRC Staff to analyze dry cooling as an alternative. Joint Intervenors also conclude that Section 316(b) of the Clean Water Act, which governs cooling water intake structures at new electricity generation facilities, states that dry cooling may be the appropriate cooling technology when “extremely sensitive biological resources” are present. *See* National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities; Final Rule, 66 Fed. Reg. 65,255, at 65,282 (Dec. 18, 2001) (“Final Rule”); Tr. 1042-1048.

49. Joint Intervenors concede that the Final Rule does not fully define the term “extremely sensitive biological resources,” but argues that the term at least includes endangered species, which would include the robust redhorse and shortnose sturgeon.

50. In the preamble to the Final Rule, the EPA rejected dry cooling as the best available technology for power generation cooling systems, finding that the environmental benefits of dry cooling are not so great as to offset its costs, regional disparities, and losses in energy efficiency. EPA stated, however, that it “does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities . . . in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas).” *Id.*

51. The mere presence of the shortnose sturgeon and robust redhorse in the Savannah River is not equivalent to their presence at the “Vogtle site” nor does it mean that the portion of the river around the Vogtle site contains sensitive areas for these species. Moreover, extremely sensitive biological resources means more than that endangered species such as the shortnose sturgeon or non-listed, sensitive species such as the robust redhorse are present in the Savannah River watershed, but instead requires that such species be impacted by alterations of the environment in the vicinity of the proposed cooling system.

52. Accordingly, because the evidence established that there are no “extremely sensitive biological resources,” as that term is used in EC 1.3, present in the area of the Savannah River that will be impacted by the proposed Vogtle 3 and 4 intake or discharge facilities, 10 C.F.R. § 51.45(b)(3) does not require a more detailed analysis of dry cooling as an alternative to closed-cycle wet cooling than is described in the FEIS.

53. JTI 1.3 Proposed Conclusion 5: Joint Intervenors contend that NRC Staff’s conclusion that the impacts of a wet cooling system would be SMALL is inaccurate, and therefore that the NRC Staff and SNC inappropriately and prematurely dismissed dry cooling from consideration. Joint Intervenors contend that the impacts of wet cooling on aquatic biota

may actually be LARGE. Joint Intervenors, however, did not present any evidence to support such a contention. Conversely, NRC Staff and SNC presented evidence that establish that any impacts would be SMALL. *See* Exhibit NRC000001b at Section 9.3.2; Coutant 1.3 Direct at A.9, A. 16; Tr. 1042-1048; Exhibits SNCR00004 and SNCR00005. *See also* SNC's Reply to JTI Proposed 1.2 Findings 4, 9, 10-11, 15, and 20.

54. JTI 1.3 Proposed Conclusions 6, 7, 8 and 9: Joint Intervenors conclude that dry cooling is both technically and economically feasible. Moreover, Joint Intervenors conclude that increased costs, efficiency penalty, and environmental impacts are insignificant. Joint Intervenors also conclude that dry cooling should be implemented at Plant Vogtle because the benefits of a dry cooling system outweigh the burdens. Finally, Joint Intervenors conclude that the ESP should not be issued because (1) the requirements of NEPA regarding consideration of alternatives have not been satisfied; (2) the overall balance does not support issuance of the ESP with a wet cooling system; and (3) protection of the environment requires denial of the ESP.

55. The evidence has clearly established that dry cooling in the context of proposed AP1000 units at the Vogtle site would (i) constitute an unproven, non-existent technology, (ii) prove impractical for the proposed Vogtle units, (iii) present unique problems, and (iv) cause extraordinary costs. For these reasons, dry cooling is not a feasible alternative for use with the an AP1000 unit located at the Vogtle site and, therefore, further discussion of dry cooling beyond that contained in the FEIS is not required by NEPA or Commission regulations. *See Kelley v. Selin*, 42 F.3d 1501, 1521 (6th Cir. 1995) (no need to discuss alternatives which depend on unproven or non-existent technology); *In re Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-03-30, 58 NRC 454, 479 (2003) ("NEPA does not require the consideration of alternatives that are impractical; that present unique problems; or that cause

extraordinary costs.”); *see also Entergy Corp. v. Riverkeeper, Inc.*, 129 S. Ct. 1498, 1509-10 (2009) (which affirmed the EPA’s use of economic considerations in assessing the feasibility of best available cooling technology).

56. Finally, whether dry cooling should be implemented is beyond the scope of EC 1.3. The focus of this contention is whether the analysis of dry cooling in the FEIS is adequate. In this regard, the Board finds that FEIS adequately analyzed dry cooling as an alternative and satisfies the requirements of 10 C.F.R. § 51.45(b)(3).

IV. Reply to Joint Intervenors’ Proposed Findings and Conclusions on EC 6.0

A. Reply Findings on EC 6.0

Connected Actions

57. Joint Intervenors offer no proposed findings on 1) how issuing the ESP automatically triggers dredging and how dredging automatically triggers issuance of the ESP; 2) that construction of Units 3 and 4 cannot or will not proceed unless dredging occurs; or 3) that these actions are interdependent parts of a larger action and depend on the larger action for their justification, as required by 40 C.F.R. § 1508.25(a). Rather, Joint Intervenors ask this Board to make six findings that are irrelevant to a conclusion that the actions of issuing an ESP and dredging the Savannah River Federal navigation channel are connected actions, within the context of NEPA.

58. JTI 6.0 Proposed Finding 1: Joint Intervenors claim that “SNC intends to barge . . . because of the ease of delivery, cost, and accessibility of barging.” Joint Intervenors omit SNC’s testimony in which SNC made clear that while barging was the preferred method, the components could be transported to the site via other methods. Mr. Neubert testified that “[a]lthough barging on the Savannah River is the preferred method for delivering the

components, construction of Vogtle 3 & 4 does not depend on delivery of the components by barge.” Tr. 1291 (Neubert/Scott/Smith 6.0 Direct at A.9) (emphasis added). He testified at the hearing:

We are absolutely certain that we will be able to deliver all the components to the site even without the barge delivery for Vogtle. Westinghouse has built nuclear power plants around this country and around the world. Many of those plants are in locations that are not accessible by water, and we have not had a situation where we weren't able to deliver the components.

Tr. 1323. Regarding barging being preferable, he also testified:

I've been in this business for a number of years, I think in excess of 30, and there's sort of a natural order of things Westinghouse has built these plants throughout the United States and around the world, and the natural order of things is that we typically try and go as far as we can by water because of the ease and the accessibility of it, and then when we've exhausted the ability to go by water, we transfer to some other mode, and again, the natural order tends to be water, rail and then over land. But that's just a generality. Each project kind of stands on its own.

Tr. 1342-43. The evidence is simply that SNC has preserved the option of barging and does not support a finding that SNC will necessarily barge components for construction of Units 3 and 4.

59. JTI 6.0 Proposed Finding 2: Joint Intervenors claim that SNC and the Staff did not “meaningfully consider[] any mode of transporting large reactor components to the VEGP site other than barging.” However, the testimony at the reference provided by Joint Intervenors as support for this finding is Mr. Neubert stating “there have been those evaluations [of non-barge transportation] made. We're currently working on additional details of those evaluations, and I was challenged in my position at Westinghouse to come up with at least two viable delivery methods for every component that goes into the AP-1000.” Tr. 1322. The Staff did not testify that they did not consider other modes of transportation. In fact, Dr. Cook testified: “we did in our Draft EIS equally weigh dredging with transportation by road as well as transportation to the site by rail, and all three of those modes are still viable for the applicant to transport

components to the site” Tr. 1497. The evidence presented is clearly contrary to Joint Intervenors’ proposed finding.

60. JTI 6.0 Proposed Finding 3: Joint Intervenors again request a finding supported by testimony taken out of context. Joint Intervenors fail to point out that the “previous shipments” that required a 10,000 cfs flow was a 1,000 ton component on a 200 by 48 foot deck barge. “The draft of that barge with the component on deck was about an eight foot draft.” Tr. 1329. And, as Captain Scott, the acting surveyor for that very “previous shipment” testified, the 10,000 cfs was in excess of what was required. Tr. 1330. Moreover, there is no evidence that flows available from normal operations would not be sufficient. As discussed more fully below, the evidence is that once rainfall resumes, it would not take long for the river to recover. Tr. 1445. Finally, the evidence presented by SNC in the form of Southeastern Marine’s River Survey indicates that even at the current, historically low flows, only minimal dredging would be required. Exhibit SNC000046.

61. JTI 6.0 Proposed Findings 4, 5 and 6: Joint Intervenors ask this Board to find that barging cannot occur without dredging, dredging cannot occur without an SNC request, and that SNC intends to make such a request. The implication of these proposed findings, when combined with the prior proposed findings, is that dredging will necessarily occur. The record does not support such a finding. The testimony is clear that no funding is available for dredging: “There are no funds currently available in the budget for dredging of the Savannah River Federal navigation channel. In addition, there are currently no funds available for the environmental scoping, review and documentation that would be necessary prior to the start of any dredging project”. Tr. 1387 (Corps 6.0 Direct at A.14). Moreover, Joint Intervenors’ proposed findings ignore record evidence that barging can proceed without dredging, at least to some extent. Mr.

Neubert confirmed that many components could be barged using less water than the reference barge for which the River Survey was performed. Tr. 1327. In this context, Mr. Neubert then directly contradicted the presumption that barging cannot proceed at all without dredging, and pointed out that simple increases in natural flows as the area recovers from drought may be sufficient. Tr. 1349. According to the River Survey performed by Captain Scott, a very low drought flow of only 3,700 cfs is sufficient for barging even the heaviest components for 99% of the navigation channel. Exhibit SNC000046; Tr. 1291 (Neubert Scott Smith 6.0 Direct at A.20) (showing that over 110 miles of river, only 5500 linear feet would need to be dredged). In sum, the evidence is that dredging, however desirable, is not “reasonably foreseeable” in light of the lack of funding and lack of concrete plans, may not be necessary for at least some barging to proceed, and that construction of the proposed units could and would proceed with partial barging or no barging at all.

NRC Staff’s Consideration of the Environmental Impacts of Dredging the FEIS

62. Joint Intervenors propose no findings of fact establishing that dredging is “reasonably foreseeable” within the context of NEPA. The evidence is clear that the Corps has no funding to dredge and that any potential dredging is speculative at best. Therefore, any findings related to the adequacy of the impacts analysis are without support.

63. Joint Intervenors also offer no alternative findings regarding the adequacy of the Staff’s analysis of dredging impacts in light of the unavailable information about any such dredging. NEPA provides a method for assessing impacts when information is incomplete or unavailable, and Joint Intervenors provide no basis for a conclusion that the Staff did not properly follow this method. *See* 40 C.F.R. § 1502.22(b). Specifically, Joint Intervenors provide no evidence to contradict the evidence that the Staff stated that the information is incomplete or

unavailable, stated the relevance of the missing information, summarized the existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts, and evaluated such impacts based on theoretical approaches or scientific methods generally accepted in the scientific community. *Id.*

64. JTI 6.0 Proposed Finding 7: Joint Intervenors state that the Staff did not meaningfully analyze the environmental impacts of dredging the Savannah River Federal navigation channel in the FEIS. This proposed finding *assumes* that barging would require dredging and that dredging was reasonably foreseeable at the time the Staff issued the FEIS. The evidence is to the contrary. The Corps' action of dredging was speculative in the NEPA context. The Corps had not yet been formally requested to perform any dredging, has no concrete plans for dredging on which an analysis could be based, and has no funding with which to conduct dredging in any event. *See* Tr. 1242 (Moorer 6.0 Direct at A.12); *see also* Exhibit SNC000049 (December 15, 2008 Email from Matt Montz to Tom Moorer). Even though the generic concept of future dredging was imaginable to the Staff at the time the FEIS was published, the lack of any concrete information necessary to further the purposes of NEPA renders the project speculative for purposes of the cumulative impacts standard. This proposed finding also assumes that the Staff is required to somehow provide analysis beyond the scope of the available data. Even if some dredging were theoretically possible or desired by SNC, the details were and are certainly not known, and there is no evidence that the Staff did not properly address the unavailability of such information.

65. JTI 6.0 Proposed Findings 8 and 9: Joint Intervenors state that the Staff gave no weight to comments from the Corps and other environmental agencies regarding dredging. In fact, the discussion in the FEIS of all that was known to the Staff at the time the FEIS was

published was provided because of those comments. Ms. Krieg testified for the Staff: “we reflected back the concerns that the authors of those comment letters had, and said yes, there would be impacts if the Federal navigation channel were to be dredged. And then we gave an impact level of small - or of up to moderate.” Tr. 1487. The fact that these comments did not change the Staff’s *conclusion* about the reasonable foreseeability of dredging does not establish that the Staff did not consider these impacts. To the contrary, the evidence very plainly supports a finding that the Staff did consider these comments.

66. JTI 6.0 Proposed Findings 10, 11 and 12: These proposed findings actually support SNC’s position that the Staff’s analysis, if even necessary, was proper in light of the information available (or unavailable) to the Staff at the time the FEIS was published. As Joint Intervenors point out, Exhibit NRC000001b at 7-20 – 7-21 provides the Staff’s statement regarding the unavailability of information.

67. Ms. Krieg explained that the Staff “did not have adequate information to do a quantitative analysis,” and would not have such information until which time a formal proposal to dredge was submitted. Tr. 1526. Therefore, the staff performed a qualitative analysis of potential dredging impacts. Ms. Krieg agreed that the NRC Staff’s “could be MODERATE” conclusion “open[ed] up more of a range,” that considered that impacts might be small, but unlikely would be large. *Id.*

The goal would be to make the impact small. But without details, I selected moderate. It's unlikely the project would have a large impact, and that has to do with the permitting process. The Army Corps of Engineers, their process is actually overseen by the Environmental Protection Agency. And the Environmental Protection Agency has promulgated the 404(b)(1) guidelines, and once again there are two ways of conducting this 404(b)(1) analysis which I've described in my testimony. But the end result of this process is that if Southern were the applicant, or if the Army Corps were conducting dredging, the least environmentally damaging practicable alternative must be selected. So given that

process, I see it very unlikely that you would have a permit issue with a large impact.

Tr. 1526-27.

68. JTI 6.0 Proposed Finding 13: Joint Intervenors seek a finding that the Staff “justified its cursory treatment of dredging impacts in part because it assumed that ‘these impacts would be evaluated in more detail in the NEPA analysis that would need to be conducted by the [Corps].’” Joint Intervenors’ proposed finding is irrelevant. The Staff did not “assume” that maintaining the Savannah River Federal navigation channel has been subject to a previous NEPA analysis and any future dredging will be subject to further NEPA analysis. This fact is established and uncontroverted by the record. *See, e.g.*, Tr. 1396.

69. Further, that fact supports SNC’s position that the actions of issuing the ESP and of dredging the channel are not connected for purposes of NEPA. Moreover, Joint Intervenors continue to assert, without any supporting evidence, that the Staff’s consideration of the Corps’ future NEPA analysis somehow equates to an abdication of their own analysis. This is not the case. *See* Tr. 1508-10.

Additional Information Regarding Dredging Impacts Introduced after Publication of the FEIS

70. Joint Intervenors do not dispute SNC’s best estimates of potential dredging or of the impacts associated with such. Rather, Joint Intervenors try to obfuscate the fact that they have presented no contrary evidence of what a potential dredging project would look like with proposed findings that are irrelevant to the conclusions this Board must make. Joint Intervenors’ proposed findings with respect to sediment studies and snag removal are contrary to the only credible evidence offered in this hearing regarding the composition of potential spoil related to dredging and impacts associated with snag removal.

Navigation Survey

71. JTI 6.0 Proposed Finding 14: SNC supports this proposed finding with the addition that this survey conducted by Captain Scott which projected that 8 locations and a total of only approximately 36,500 cubic yards of dredged material would need to be removed was the only evidence available regarding the potential scope of any dredging.

72. JTI 6.0 Proposed Finding 15: Joint Intervenors propose this Board find that Southeastern Marine's estimate of 36,500 cubic yards is insufficient because it is based on data taken every tenth of a mile, it assumes 0.5 feet of under-keel clearance, and it assumes dredging will be performed to 6 feet. Joint Intervenors' own witness, Dr. Hayes testified that normal Corps surveys are "done on 500-foot intervals . . . which is about a tenth of a mile." Tr. 1596-97. Further, Dr. Hayes testified that he believed that the survey conducted by Captain Scott would be "acceptable" to the Corps "in the planning and protection of yardage." Tr. 1597. Captain Scott described the study as "good to determine where trouble spots may be and a fairly accurate determination of the quantity of spoil." Tr. 1313. He also stated that "if a navigator was given this document to go up any river in the world, he'd be absolutely ecstatic." *Id.*

73. With respect to the under-keel clearance, Mr. Smith testified that because the barges will be moving very slowly, a two foot under-keel clearance is not needed: "In our experience as barge operators, a half foot is more than enough to keep a barge moving . . . [W]e don't ever see a two foot under keel clearance." Tr. 1313. Joint Intervenors' witness Dr. Hayes agreed that at least some barging would not be an issue at this depth. *See* Tr. 1598. Finally, the assumption in the survey that the river will be dredged to six feet is fully consistent with the Corps' current practices. Mr. Smith testified that because the Corps is currently challenged with funding, when they receive funding to dredge, they concentrate on shoal areas only. Tr. 1319-

20; *see also* Tr. 1383 (clarifying that it would be consistent with Corps practice for them to only dredge to a six-foot channel). Therefore, the evidence does not support a finding that the Southeastern Marine survey is insufficient.

74. JTI 6.0 Proposed Finding 16: The evidence does not support a finding that the Staff concluded the Southeastern Marine survey was insufficient for its impacts analysis. Rather, Ms. Kuntzleman testified only that the survey would not change her conclusion of moderate because “the dredging process has many, many parameters that need to be defined in order to better define an impact assessment.” Tr. 1533. Indeed, Ms. Kuntzleman testified that the survey made her more comfortable that her assessment bounded the possible impacts. Tr. 1547.

Sediment Studies

75. JTI 6.0 Proposed Findings 17 and 18: These proposed findings relating to sediment analysis and disposal at potential dredging sites are irrelevant. First, they again simply *assume* dredging is “reasonably foreseeable.” The Corps testified that if dredging becomes more than speculative, when the Corps considers the action, it will require sediment testing. Tr. 1396. Second, the testimony is that there is no reason to believe sediment would be contaminated. *See* Tr. 1358-59; Exhibit SNCR20051. Consistent with NEPA practice, further studies are not required when the impacts are expected to be SMALL. Tr. 712. Moreover, it is not possible for any sediment testing to be performed when the Corps of Engineers has not developed a dredging plan to indicate where such testing would be performed.

Mussel Studies

76. JTI 6.0 Proposed Finding 19: Joint Intervenors’ proposed finding that SNC did not conduct mussel surveys at the potential dredging sites is also irrelevant. Because the evidence does not support a finding that mussels will be impacted, additional studies are not

warranted. *See* Exhibit NRC000005 (concluding that the sand bars subject to dredging impacts are not good habitat for mussels); *see* Tr. 1351-1353.

77. In assessing the possible impact on mussels, Dr. Coutant reviewed studies on both the Savannah River and the Pee Dee Rivers. His analysis of those reports led him to conclude that “the specific sites to be dredged contain some mussels but are not those habitats where mussels are particularly abundant.” Exhibit SNCR20051 at 9. Although Dr. Young initially testified on behalf of the Joint Intervenors that the Catena Group survey relied upon in the FEIS and discussed by Dr. Coutant notes an instance of locating mussels in shifting sands, he conceded on cross-examination that he could not discern from that report whether the mussels were collected from the sandbars where dredging might occur or in the muddy banks. Tr. 1629. Accordingly, there is no credible evidence that dredging sandbars in the river would have a significant impact on mussel populations. Dr. Coutant also explained that the dredging of shallow sandbars would not be expected to affect the robust redhorse, which prefers deep channel habitats where dredging would not occur. Tr. 1364. There is no contrary evidence in the record; therefore, a finding that SNC did not conduct mussel surveys is irrelevant. Moreover, it is not possible for any mussel surveys to be performed when the Corps of Engineers has not developed a dredging plan to indicate where such surveys would be performed.

Snag Removal

78. JTI 6.0 Proposed Findings 20 and 21: These proposed findings relate to the number of snags that would potentially need to be moved and the associated impact to robust redhorse. SNC supports a finding that the best estimate of the amount of snag removal needed is 277 snags at 180 locations. These snags would likely be replaced in the river outside the navigation channel to maintain aquatic habitat. *See* Tr. 1292 (Moorer 6.0 Direct at A.11). Dr.

Coutant has analyzed the potential impacts of snag removal on the order contemplated in the Southeastern Marine River Survey, and he concluded that the impacts would be small and temporary. *See* Exhibit SNCR20051 at 11-12; Tr. 1294 (Coutant 6.0 Direct at A.15). “Overall, the impacts of dredging and snag removal operations on the scale suggested in the survey are expected to be localized and not biologically significant” Exhibit SNCR20051 at 13. In fact, according to Dr. Coutant’s report, the Staff’s conclusion in the FEIS that impacts could be moderate is conservative. *Id.*

79. JTI 6.0 Proposed Finding 22: Joint Intervenors state that no study has been conducted that denudes or removes snags and woody debris from a robust redhorse habitat and monitors the impacts on the fish. There is no requirement that such an “experimental” study be performed, as suggested by Dr. Young. *See* Tr. 1571 (Young 6.0 Rebuttal at A.9). Rather, consistent with NEPA, and using the accepted method of relying on existing information, Dr. Coutant explained that impacts associated with such snag removal would be temporary and minor. *See* Exhibit SNCR200051. As Dr. Coutant testified:

In the scope of a river the size of the Savannah, those that are in the main channel that would be affected by any snag removal for navigation usually are a small percentage of that kind of habitat that occurs throughout the rest of the river, including the shallows and side channels and bends in the river and other places where the same thing occurs. And one of the questions that I had asked was what percentage of these potential velocity breaks, the big stuff out there, is going to be actually moved or removed, and it turns out to be only about a third of what actually occurs in a channel, and that's not all of it. That's just what would occur in the potentially cleared channel. So considering that there's a lot of that kind of habitat still out there and that these snags really aren't going to be removed; they're going to be moved to another spot out of the way of the barges, gives me a fair amount of confidence that that ecological function is still going to occur. The follow-on thought is if it's moved and you spend, let's say, even six months in the process of moving material to Vogtle, is this stuff going to reappear? Well, folks who work on the river as I have, not necessarily this river, but many other rivers, this material tends to reappear quite quickly as you have a feeding cycle. Trees come in. More stuff washes down. It washes out of the back water. So this kind of habitat is reestablished very quickly, and there are studies that I cited in my

testimony that dealt mostly with the macro invertebrates, not the velocity issue, but that demonstrate how quickly this kind of material reappears and then is recolonized.

Tr. 1361-62. It is not credible to accept the implication that removing one snag could imperil robust redhorse when the evidence in the record is that snags move due to natural forces regularly.

80. Moreover, even Joint Intervenors' witness, Dr. Young, conceded, "if a particular stretch of river is identified for large scale tree removal, [the Corps] will probably conduct fish surveys to determine if there is an abundance of robust redhorse or any presence of robust redhorse in that area." Tr. 1615-16. This proposed finding is irrelevant to the Board's decision.

Releases from Upstream Reservoirs

81. It is clear from the record that the Corps would not be asked to release water specifically to facilitate barging. Tr. 1539; *see also* Tr. 1292 (Moorer 6.0 Direct at A.14), *citing* Exhibits SNC 000018 and SNC000048. Joint Intervenors' proposed findings related to this issue *assume*, contrary to the evidence, that these special releases will nonetheless be made. Moreover, Joint Intervenors attempt to confuse the anticipated, previously-reviewed impacts of normal releases with the potential impacts of speculative and remote "special" releases.

82. JTI 6.0 Proposed Findings 23 and 24: Joint Intervenors maintain that the Staff has not considered the potential impacts of upstream reservoir releases for purposes of barging. First, there is no evidence that such special releases will be made. Rather, the evidence supports a finding that any reservoir releases made by the Corps which may support navigation will only be in accordance with the Corps' existing reservoir management plans. Mr. Simpson testified for the Corps that any time the Corps is operating under its Drought Contingency Plan, they will not make releases for barge shipments. Tr. 1442. The Corps has already completed an

environmental analysis of releasing water and any releases under the Corps's existing plans would "fall[] within the parameters" of that environmental analysis – whether the released water was used for navigation or not. Tr. 1453-56.

83. JTI 6.0 Proposed Finding 25: As with JTI Proposed 6.0 Finding 3, this proposed finding ignores that the "previous shipments" that required a 10,000 cfs flow was for a shipment of a 1,000 ton component on a 200 by 48 foot deck barge. "The draft of that barge with the component on deck was about an eight foot draft." Tr. 1329. Joint Intervenors provide no evidence supporting a finding that releases of 10,000 cfs or more would be required to support navigation of the components for Units 3 and 4. SNC provided evidence that the draft needed for barging to the Vogtle site would be 6 feet; therefore, there is no basis upon which this Board can find that 10,000 cfs would be required. In fact, only 3,700 cfs is required for 99% of the river. *See* Exhibit SNC000046.

84. JTI 6.0 Proposed Finding 26: Joint Intervenors state that the amount of water required to eliminate the need for dredging and support 60 barge trips "would cause serious concern to the Corps, especially during drought conditions." They also claim that "such releases could cause significant environmental impacts to aquatic species, including disrupting spawning patterns and critical habitat." First, Mr. Simpson's testimony cited by Joint Intervenors actually states that these impacts would be specific to the time of year the releases were made, and that some impacts might be seen if releases were made during the spawning season. Tr. 1449. Second, Mr. Simpson also testified that these impacts have already been subject to an environmental assessment, and that any such releases would be made in light of that assessment. Tr. 1446. Again, Joint Intervenors provide no evidence to support a finding that special releases will be made to support navigation of barges for transportation of components for Units 3 and 4.

B. Reply Conclusions on EC 6.0

85. JTI 6.0 Proposed Conclusions 1, 2 and 3: The evidence simply does not support a conclusion that, as a matter of law, the Corps' action of dredging the Savannah River Federal navigation channel and the NRC's action of issuing an ESP are "connected actions," as that phrase is defined by NEPA law. 40 C.F.R. § 1508.25(a). There is no evidence that the ESP automatically triggers dredging and that dredging automatically triggers issuance of the ESP. In fact, the law and the evidence is to the contrary. There is no evidence that construction of Units 3 and 4 cannot or will not proceed unless dredging occurs. Again the evidence is clear that issuance of the ESP and construction of Units 3 and 4 can (and will, if approved) proceed with or without the Corps dredging the Savannah River Federal navigation channel. Finally, there is no evidence that these actions are interdependent parts of a larger action and depend on the larger action for their justification. To conclude that these actions are "connected" and that the Staff must therefore consider the direct impacts of dredging in its ESP NEPA analysis would be contrary to established NEPA law.

86. JTI 6.0 Proposed Conclusion 4: The evidence does not support a conclusion that the Staff's consideration of the environmental impacts of dredging in the FEIS was insufficient. Because these actions are not connected, the Staff need only address these impacts if they are "reasonably foreseeable." The evidence shows that the possibility of the Corps' dredging is speculative and therefore not "reasonably foreseeable" in the context of NEPA. As a legal matter, just because the possibility of dredging can be imagined, or is desired by the Applicant, does not mean that such an activity is more than speculative. *See City of Oxford*, 428 F. 3d at 1353-54. There is no support for a conclusion that, as a matter of law, dredging is "reasonably foreseeable."

87. Moreover, though not required, the analysis provided in the FEIS regarding impacts of dredging comports with NEPA law on consideration of impacts in light of unavailable information. Joint Intervenors have offered no evidence to support a conclusion that the Staff did not comply with NEPA law; rather, the evidence demonstrates that the Staff followed the proper procedure for disclosing that the conclusion regarding impacts from dredging was based on unavailable information. *See* 40 C.F.R. §1502.22. This approach satisfies the Staff's "hard look" requirement.

88. Finally, the subsequent studies addressing the environmental impacts associated with dredging support the Staff's conservative conclusion regarding impacts from dredging, and were not contradicted by Joint Intervenors. These studies may be considered to supplement the record and to assure the Board that, although the Staff's conclusion was based on unavailable information, the evidence supports the Staff's conclusion and, in fact, suggests it is conservative.

89 JTI 6.0 Proposed Conclusion 5: Joint Intervenors ask this Board to conclude that, as a matter of law, "Given that the Board cannot take the requisite hard look at the environmental impacts of dredging now, before the ESP is issued, subsequent studies of the environmental impacts of dredging by the Corps or any other entity would not satisfy the NRC's obligations under NEPA." First, this proposed conclusion assumes that the Staff is required to consider such impacts. Next, it seems to imply that, if the Staff is required to consider such impacts, and if all of the information is not available at the time of the Staff's analysis of its proposed action, *i.e.*, issuance of the ESP, then the Staff can never satisfy its NEPA obligations. This is simply not true and there is no evidence or NRC or NEPA law to support such a conclusion. Rather, NEPA caselaw is clear that "[s]ituations often arise when information that would be considered important for the preparation of an environmental impact statement is

unavailable. If [NEPA] barred agency action until this information became available, it is unlikely that any project requiring an environmental impact statement would ever be completed.” *Village of False Pass v. Watt*, 565 F. Supp. 1123, 1149 (D. Alaska 1983); *Jicarilla Apache Tribe of Indians v. Morton*, 471 F.2d 1275, 1280 n.11 (9th Cir. 1973). “[T]he unavailability of information should not be permitted to halt all government action.” *Village of False Pass*, 565 F. Supp. at 1144. As the Fifth Circuit has recognized, “[t]his is particularly true when information may become available at a later time and can still be used to influence [agency] decision.” *Sierra Club v. Sigler*, 695 F.2d 957, 970 (5th Cir. 1983).

90. The qualitative assessment in the FEIS of the impacts of possible dredging is consistent with the NRC's regulations implementing NEPA. 10 C.F.R. § 51.45(c) expressly provides that qualitative analysis is permissible in an EIS, where there are "factors that cannot be quantified." *See Duke Cogema Stone & Webster (Mixed Oxide Facility) LBP-01-35*, 54 NRC 403, 448 (Dec. 6, 2001). Clearly, where the agency that would conduct the dredging has neither determined whether it will dredge or where and how much it will dredge if dredging is performed, the factors necessary for a quantitative analysis are not present. Accordingly, qualitative analysis of dredging impacts in the FEIS satisfies any potential NEPA obligation that the Staff might have with respect to dredging.

91. JTI 6.0 Proposed Conclusion 6: Joint Intervenors assert that the Staff's conclusion that impacts of dredging could be MODERATE improperly relies on speculation regarding mitigation measures the Corps might take. To the contrary, the Staff's reference to mitigation of impacts from dredging is in the context of the Corps' legal obligation to ensure that the least environmentally damaging alternative is selected and the practical experience of NRC witnesses in such matters. Tr. 1526-27 (describing § 404(b) requirements).

92. The cases cited by Joint Intervenors to support this conclusion dealt with agencies attempting to use mitigation measures as the basis of a finding of no significant impact. In *Nat'l Parks & Conservation Ass'n v. Babbitt*, the Parks Service was unsure of whether the mitigation plan would even work. 241 F. 3d 722 (9th Cir. 2001). The court characterized the mitigation plan proposed by the Corps in *Wyoming Outdoor Council v. United States Army Corps of Eng'rs*, as vague and speculative. 351 F. Supp. 1232 (D. Wy. 2005). In both cases, the court distinguished the facts from those in *Wetlands Action Network v. United States Army Corps of Eng'rs*, in which the court upheld, as here, reliance on the Corps of Engineers' special conditions in a permit to mitigate impacts. 222 F. 3d 1105 (9th Cir. 2000). The court found that "[a] careful review of the record demonstrate[d] that mitigation measures were developed to a reasonable degree and had been reviewed by the Corps and other federal agencies at the time the permit issued." *Id.* at 1121; *see also N. Alaska Envtl. Ctr. v. Kempthorne*, 457 F. 3d 969 (9th Cir. 2006) (upholding agencies' reliance on general mitigation measures, including stipulations and pre-application requirements, procedures, management practices and design features to satisfy NEPA obligation to include possible mitigation measures).

93. In light of the applicable caselaw and the testimony in the record, Joint Intervenors' proposed conclusion is irrelevant and without merit.

94. JTI 6.0 Proposed Conclusion 7: Joint Intervenors assert that the Staff must take a "hard look" at impacts from upstream reservoir releases. NEPA law is clear that the Staff is only required to analyze those impacts that are "reasonably foreseeable." Joint Intervenors confuse the releases that would be regularly made, pursuant to the Corps' established water control plans, with special releases for navigation purposes. With regard to the former, the evidence established that impacts associated with planned releases were subject to a Corps' environmental

analysis, and it is this operational plan (and its resulting flow history) that forms the baseline of the Staff's analysis in the FEIS. With respect to the latter, there is no evidence that the Corps will be asked to provide special releases; indeed the only evidence is that no such requests will be made. To conclude that the Staff should have considered impacts from some action the Corps has testified it would not take would be contrary to NEPA law.

95. JTI 6.0 Proposed Conclusion 8: This proposed conclusion claims that the Board “cannot satisfy its NEPA obligations” with respect to consideration of impacts associated with dredging and upstream reservoir releases. The evidence is to the contrary. The Staff's NEPA obligation is to take a “hard look” at the impacts associated with issuance of an ESP. The impacts of dredging (and upstream reservoir releases) need only be considered to the extent they are “reasonably foreseeable.” This phrase is defined by NEPA caselaw and does not include impacts that are speculative. The evidence supports a conclusion that impacts associated with dredging and special upstream reservoir releases are speculative and therefore not reasonably foreseeable.

96. Moreover, this “hard look” requirement is subject to a “rule of reason,” and analysis of impacts based on unavailable information is grounded in this “rule of reason.” The Staff has demonstrated that it took the requisite “hard look” at the environmental impacts of dredging. Joint Intervenors provide no legal support for a conclusion otherwise.

Respectfully submitted,

(Original signed by M. Stanford Blanton)

Stanford Blanton, Esq.
Grady Moore, III, Esq.
Peter D. LeJeune, Esq.
Leslie G. Allen, Esq.
BALCH & BINGHAM LLP

1710 Sixth Avenue North
Birmingham, AL 35203-2015
Telephone: (205) 251-8100
Facsimile: (205) 226-8798

COUNSEL FOR SOUTHERN NUCLEAR
OPERATING COMPANY

Kathryn M. Sutton, Esq.
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004
Telephone: (202) 739-5738
Facsimile: (202) 739-3001

CO-COUNSEL FOR SOUTHERN NUCLEAR
OPERATING COMPANY

Dated this 8th day of May, 2009.

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

)	
In the Matter of)	Docket No. 52-011-ESP
)	
Southern Nuclear Operating Company)	ASLBP No. 07-850-01-ESP-BD01
)	
(Early Site Permit for Vogtle ESP Site))	May 8, 2009
)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of SOUTHERN NUCLEAR OPERATING COMPANY'S REPLY FINDINGS OF FACT AND CONCLUSIONS OF LAW REGARDING ENVIRONMENTAL CONTENTIONS in the above captioned proceeding has been served by electronic mail on each individual listed below and/or by e-submittal this 8th day of May, 2009.

Administrative Judge
G. Paul Bollwerk, III, Chair
Atomic Safety and Licensing Board
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
(Email: gpb@nrc.gov)

Administrative Judge
Dr. Nicholas G. Trikouros
Atomic Safety and Licensing Board
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
(E-mail: ngt@nrc.gov)

Administrative Judge
Dr. James Jackson
Atomic Safety and Licensing Board
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
(E-mail: jackson538@comcast.net)

Office of the Secretary
ATTN: Docketing and Service
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
(E-mail: HEARINGDOCKET@nrc.gov)

Margaret Parish
Law Clerk
Atomic Safety and Licensing Board
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
(E-mail: map4@nrc.gov)

Brooke D. Poole, Esq.
Jonathan M. Rund, Esq.
Tison A. Campbell, Esq.
Office of the General Counsel
U.S. Nuclear Regulatory Commission
(E-mail: bdp@nrc.gov, jmr3@nrc.gov,
tac2@nrc.gov)

Diane Curran, Esq.
Harmon, Curran, Spielberg &
Eisenberg, LLP
1726 M Street, NW
Suite 600
Washington, D.C. 20036
(E-mail: dcurran@harmoncurran.com)

Office of Commission Appellate Adjudication
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
(E-mail: ocaamail@nrc.gov)

Mary Maclean D. Asbill, Esq.
Lawrence D. Sanders, Esq.
Turner Environmental Law Clinic
Emory University School of Law
(E-mail: masbill@law.emory.edu
lsanders@law.emory.edu)

* And upon any other persons designated on
the official service list compiled by the Nuclear
Regulatory Commission in this proceeding.

(Original signed by M. Stanford Blanton)

M. Stanford Blanton
Counsel for Southern Nuclear Operating Company