

December 20, 2011

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

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In the Matter of )

Tennessee Valley Authority )

(Watts Bar Unit 2) )  
\_\_\_\_\_

Docket No. 50-391-OL

**SOUTHERN ALLIANCE FOR CLEAN ENERGY’S OPPOSITION  
TO TENNESSEE VALLEY AUTHORITY’S MOTION  
FOR SUMMARY DISPOSITION OF CONTENTION 7 REGARDING  
AQUATIC IMPACTS OF WATTS BAR UNIT 2**

**I. INTRODUCTION**

Pursuant to 10 C.F.R. §§ 2.1205 and the Atomic Safety and Licensing Board’s (“ASLB’s”) orders of May 26, 2010 and December 1, 2011, Southern Alliance for Clean Energy (“SACE”) hereby responds to Tennessee Valley Authority’s (“TVA’s”) Motion for Summary Disposition of Contention 7 (Nov. 21, 2011). This response is supported by the attached Statement of Disputed Material Facts and Declaration of Dr. Shawn Young (Dec. 20, 2011) (“Young Declaration”).

As discussed below and as demonstrated in the Statement of Disputed Material Facts and Young Declaration, TVA fails to demonstrate that the concerns raised in Contention 7 have been resolved by recent studies conducted by TVA. To the contrary, as discussed in Dr. Young’s declaration, although the new data is incomplete and inaccurately analyzed, it shows that Watts Bar Unit 1 (“WBN1”) has a significant impact on the environment that will be exacerbated by the operation of Watts Bar Unit 2

(“WBN2”). Therefore there is a genuine dispute of material fact between the parties and summary disposition should be denied.

## II. STANDARD FOR SUMMARY DISPOSITION

NRC regulations at 10 C.F.R. § 2.1205 govern summary disposition motions and direct Licensing Boards to “apply the standards for summary disposition set forth in Subpart G.”<sup>1</sup> Under Subpart G, summary disposition is appropriate if the filings in the proceedings, statements of the parties and affidavits, if any, “show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law.”<sup>2</sup> In a motion for summary disposition, the moving party bears the burden to demonstrate the absence of a genuine issue as to any material fact.<sup>3</sup> Any doubt as to the existence of a genuine issue of material fact is resolved against the moving party.<sup>4</sup> “Because the burden is on the moving party, the Board must examine the record in the light most favorable to the non-moving party and give the non-moving party the benefit of all favorable inferences that can be drawn from the evidence.”<sup>5</sup>

A party opposing a motion for summary disposition need not show a likelihood of success on the merits, but rather, only that there is a genuine issue of fact to be evaluated

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<sup>1</sup> 10 C.F.R. § 2.1205(c).

<sup>2</sup> *Id.* § 2.710(d)(2).

<sup>3</sup> *Id.* § 2.325; *Advanced Med. Sys., Inc.* (One Factory Row, Geneva, Ohio, 44041), CLI-93-22, 38 NRC 98, 102 (1993); *Entergy Nuclear Vermont Yankee LLC* (Vermont Yankee Nuclear Power Station), LBP-06-5, 63 NRC 116, 121 (2006) (quoting *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), LBP-01-39, 54 NRC 497 (2001)).

<sup>4</sup> *Entergy Nuclear Vermont Yankee LLC* (Vermont Yankee Nuclear Power Station), LBP-06-5, 63 NRC 116, 121 (2006) (citing *Advanced Med. Sys., Inc.* (One Factory Row, Geneva, Ohio, 44041), CLI-93-22, 38 NRC 98, 102 (1993)).

<sup>5</sup> *Id.*

at the evidentiary hearing.<sup>6</sup> Indeed, summary disposition “is not a tool for trying to convince a Licensing Board to decide, on written submissions, genuine issues of material fact that warrant resolution at a hearing.”<sup>7</sup> A licensing board should not conduct a “trial on affidavits,” but rather “determine whether there is a genuine issue for [hearing].”<sup>8</sup> In making this determination, “the evidence of the non-movant is to be believed, and all justifiable inferences are to be drawn in his favor.”<sup>9</sup>

Moreover, summary disposition is rarely appropriate when conflicting expert opinions are involved.<sup>10</sup> Indeed, “competing expert opinions present the ‘classic battle of the experts’ and it [is] up to [the finder of fact] to evaluate what weight and credibility each expert opinion deserves.”<sup>11</sup> At the summary disposition stage, “[r]egardless of the level of the dispute . . . it is not proper for a Board” to choose which expert has the better of the argument.<sup>12</sup>

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<sup>6</sup> *Advanced Med. Sys., Inc.* (One Factory Row, Geneva, Ohio, 44041), CLI-93-22, 38 NRC 98, 102 (1993)

<sup>7</sup> *Entergy Nuclear Vermont Yankee LLC* (Vermont Yankee Nuclear Power Station), LBP-06-5, 63 NRC 116, 121 (2006) (quoting *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-01-39, 54 N.R.C. 497, 509 (2001)).

<sup>8</sup> *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 297 (2010).

<sup>9</sup> *Id.* (quoting *Anderson v. Liberty Lobby*, 477 U.S. 242, 247-48 (1986)).

<sup>10</sup> *Entergy Nuclear Vermont Yankee LLC* (Vermont Yankee Nuclear Power Station), LBP-06-5, 63 NRC 116, 122 (2006) (citing *Phillips v. Cohen*, 400 F.3d 388, 399 (6th Cir. 2005)).

<sup>11</sup> *Id.*

<sup>12</sup> *Entergy Nuclear Vermont Yankee LLC* (Vermont Yankee Nuclear Power Station), LBP-06-5, 63 NRC 116, 121 (2006) (citing *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-01-39, 54 NRC 497, 510 (2001)).

### III. ARGUMENT

#### A. TVA Mischaracterizes the Requirements of NEPA.

With respect to two issues TVA claims that it is entitled to summary disposition as a matter of law under the National Environmental Policy Act (“NEPA”). But TVA misinterprets NEPA and ignores the salient facts of this case. First, TVA asserts that it is permissible under NEPA to use the “current” *i.e.*, degraded condition of the aquatic ecosystem in the Tennessee River near WBN1 and WBN2 as a “baseline” to evaluate the cumulative impacts of WBN2. TVA Motion at 21. In support of this proposition, TVA cites *Calvert Cliffs Unit 3 Nuclear Project, LLC* (Combined License Application for Calvert Cliffs Unit 3), LBP-09-04, 69 NRC 170, 201 (2009), in which the Atomic Safety and Licensing Board (“ASLB”) approved the use of a baseline that effectively constituted a “snapshot” of the current condition of the aquatic environment. But, as the ASLB recognized in *Calvert Cliffs*, NEPA sets no hard and fast rule regarding appropriate baseline conditions and instead calls for application of a “rule of reason.” *Id.* at 203. In each case, the appropriate scope of the baseline for a project is a “functional project: an applicant must provide enough information and in sufficient detail to allow for an evaluation of important impacts.” *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-3, 65 NRC 237, 256 (2007) (citing Office of Nuclear Reactor Regulation, “Standard Review Plans for Environmental Review for Nuclear Power Plants,” NUREG-155 at 4.3.2-1 to -2 (Oct. 1999); office of Nuclear Regulatory Research, General Site Suitability Criteria for Nuclear Power Stations, Regulatory Guide 4.7 at 4.7-14 to -15 (rev. 2, April 1998).

In *Calvert Cliffs*, the ASLB did not rule out the possibility that past conditions could be relevant to a baseline analysis. 69 NRC at 203. Instead, it found that the petitioners had “not justified requiring individual examination of the environmental effects of reactors located at a substantial distance from the Calvert Cliffs site.”

In this case, SACE has made a very strong case that historic conditions in the Tennessee River are uniquely relevant to the cumulative impacts of WBN2. As discussed in Contention 7, the Tennessee River “is an extraordinarily diverse and unique ecosystem that supports over 200 fish species, including twenty species that are found only in the Tennessee River.” Petition to Intervene at 33. Moreover, the river “harbors the highest number of imperiled species of any large river basin in North America.” *Id.* TVA does not dispute these assertions. In fact, TVA itself has recognized that the Tennessee River is a unique environmental resource from not just a national perspective but a global one:

Aquatic resources occurring in the TVA region are important from local, national, and global perspectives. Tennessee has approximately 319 fish species, including native and introduced species, and 129 freshwater mussels (Etnier and Starnes 1993), Parmalee and Bogan 1998). The Tennessee-Cumberland Rivers have the highest number of endemic fish, mussel, and crayfish species in North America (Schilling and Williams 2002). *This is the most diverse temperate freshwater ecosystem in the world.*

Programmatic EIS for Reservoir Operations Study, § 4.7.<sup>13</sup> Clearly, any impacts to an ecosystem that is unique in the entire *planet* for its diversity are “important.” *Southern*, 65 NRC at 256. To accept TVA’s assertion that for purpose of an EIS affecting this unique ecosystem, current deteriorated condition could be considered appropriate for purposes of evaluating impacts and alternatives would be equivalent to pounding nails

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<sup>13</sup> ([http://www.tva.gov/environment/reports/ros\\_eis/](http://www.tva.gov/environment/reports/ros_eis/)).

into its coffin. If the narrow species diversity of a reservoir is considered the baseline for the WBN2 environmental analysis, then any hope of mitigation measures to sustain or restore the vestiges of diversity that remain will be effectively extinguished by the environmental analysis whose purpose is to protect the environment.

For instance, as Dr. Young discusses in his Declaration in Section F, TVA operates the dams and the power plants on the Tennessee River as a single system. This system includes ten different tributaries with a high number of fish and mussel species. By failing to use a baseline that takes into account the fragile health of these tributaries, TVA effectively writes off any mitigation measures that could aid their survival and consigns them to oblivion. This is the type of blindered and harmful decision-making that NEPA was intended to avoid. *Robertson*, 490 U.S. at 349. Such a result would be all the more egregious in light of the fact that the indefinite existence of dams on major rivers is no longer a foregone conclusion. As reported on the American Rivers website, over 600 dams in the U.S. have been removed over the past 50 years.<sup>14</sup>

The licensing and operation of WBN2 is just one of many industrial projects that will affect the aquatic health of the Tennessee River. If TVA and the NRC are allowed to ignore the true baseline condition of the river in the EIS for Watts Bar, then not only is any opportunity for mitigation of the effects of WBN2 lost, but future decisions will be affected by the bad assumptions of these EISs. That outcome is not consistent with the purposes of NEPA.

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<sup>14</sup> <http://www.americanrivers.org/our-work/restoring-rivers/dams/projects/2011-dam-removal-resource-guide.html>.

TVA also asks the ASLB to dismiss SACE’s claim that TVA fails to show that it accounted for the hydrothermal impacts of overflow from the holding pond, on the ground that the holding pond has never been used. TVA Motion at 19. According to TVA, this shows that use of the holding pond is a “worst case scenario” which need not be addressed under Supreme Court precedent. *Id.* (citing *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 354-55 (1989)). This argument is absurd. Clearly, TVA anticipated that a holding pond might be needed, otherwise TVA would never have included a holding pond in its design. Thus, the potential need for the holding pond can hardly be characterized as “speculative.” TVA Motion at 19. TVA’s argument therefore should be rejected.

**B. TVA Has Failed To Demonstrate that Facts Material to the Claims Of Contention 7 are Undisputed.**

**1. Claims of Contention 7**

Contention 7 challenges the adequacy of TVA’s Final Supplemental Environmental Impact Statement (“FSEIS”) for the proposed Watts Bar Unit 2 nuclear power plant (“WBN2”). Contention 7 disputes the reasonableness of the FSEIS’ conclusion that the cumulative impacts of WBN2 on the aquatic ecology of the Tennessee River are insignificant in three respects. First, TVA mischaracterizes the current health of the ecosystem as good, and therefore fails to evaluate the impacts of WBN2 in light of the fragility of the host environment. Second, TVA relies on outdated and inadequate data to predict thermal impacts and the impacts of entrainment and impingement of aquatic organisms in the plant’s cooling system. Third, TVA fails completely to analyze the cumulative effects of WBN2 when taken together with the

impacts of other industrial facilities and the effects of the many dams on the Tennessee River.

**2. Summary disposition of Contention 7 is inappropriate because material facts are in dispute.**

TVA claims that it has conducted studies that resolve the three major deficiencies identified in Contention 7. As discussed in Dr. Young's attached Declaration, this is not correct. With respect to the inadequacy of TVA's previous data and analyses, TVA has made some progress by collecting new data on entrainment, impingement, freshwater mussels, and thermal impacts during 2010. But TVA has only started to catch up with its failure to collect the appropriate data that would be reasonably sufficient to evaluate impacts on aquatic resources by collecting only one year of data for entrainment, impingement, freshwater mussels, and thermal impacts over the preceding years. TVA still has not collected an amount of data that is reasonably necessary to evaluate the effects of WBN1 on aquatic organisms in the Tennessee River, and therefore it does not have enough information to extrapolate the impacts of WBN2. Young Declaration, par. II-2.

In addition, there are still big gaps in the information that TVA has collected. For example, TVA collected entrainment data for the Condenser Cooling Water ("CCW") system only and did not include the Supplemental Condenser Cooling Water ("SCCW") system. In addition, TVA did not collect impingement data for all key locations. And TVA's Hydrothermal Study does not address important parameters such as Outfall 101 or the amount of time that fish larvae remain in the thermal plume. Young Declaration, par. II-3.



Finally, TVA's description of its method of analyzing aquatic impacts indicates a troubling lack of care or competence. For example, by adding widely divergent diurnal and nocturnal entrainment measurement, TVA violates guidance of the U.S. Environmental Protection Agency ("EPA") and grossly overstates the size and diversity of the fish population. Some of the studies relied on by TVA had to be revised after they were released, indicating that TVA has significant problems ensuring the quality of its measurements and analyses. It is reasonable to expect that the results from TVA's biological studies will be accurate in order to support TVA's conclusions. In too many instances, however, TVA makes significant mistakes. Young Declaration, par. II-4.

With respect to TVA's mischaracterization of the health of the aquatic environment as good, TVA has done nothing to alleviate the concerns raised by Contention 7. Although as discussed above, TVA's data collection is insufficient to present a reasonable picture of the health of the Tennessee River, the data that TVA has collected do not indicate, as TVA claims, that WBN1's impacts on the aquatic ecosystem have been insignificant. Rather, they point to already-significant aquatic impacts by WBN1 that are likely to be significantly exacerbated by the operation of WBN2. Young Declaration, par. II-5.

Further, despite alarming evidence of significant decline in the diversity and numbers of aquatic organisms in the Tennessee River in the vicinity of WBN, TVA continues to assert that the aquatic health of the river is good. The only way that TVA can present such a clean bill of health is to mischaracterize the baseline condition of the Tennessee River as a large reservoir where one would expect to see a limited number of

species of aquatic organisms. In reality, the Tennessee River is a fragile and rapidly deteriorating riverine ecosystem with remnants of the greatest species diversity of any river in the United States. By falsely painting a rosy picture of aquatic health in the river, TVA understates the significance of the impacts of WBN1 and WBN2, and thus minimizes the benefits that could be achieved by implementing alternatives that would reduce the impacts of the cooling system on organisms in the river. Young Declaration, par. II-6.

Finally, TVA still does not address the cumulative impacts of WBN2 in conjunction with the impacts of the numerous water impoundments on the Tennessee River, or with other industrial facilities such as the ten fossil fuel-burning plants, the six nuclear reactors that are already in operation, and the five additional reactors for which TVA has sought operating licenses. The combined operation of WBN1 and WBN2, by itself, may cause changes in how Watts Bar Dam is operated. TVA and the NRC Staff both acknowledge that in order to stay within thermal discharge limits stated in the NPDES that requests for additional discharge from Watts Bar Dam may be needed. Thus, operating WBN alone would change reservoir operations in the middle- Tennessee Basin that would be supported by water releases or hydrological adjustments in upper- Tennessee River Basin. The effects of more alterations to the hydrological cycle of the basin on aquatic organisms, especially the already declining native fish and freshwater mussel species, must be addressed. Given the extensive portfolio of energy and industrial facilities that the Tennessee River supports and that the management agencies must

maintain adequate water for all these facilities, this is an extremely important omission. Young Declaration, par. II-7.

TVA's claims are also contradicted by the NRC Staff's Draft Supplemental Environmental Statement ("DSES") for WBN2. TVA claims, for instance, that WBN Unit 1 was originally designed to operate only in a closed cycle cooling mode via the Condenser Cooling Water ("CCW") system. After TVA began operation of Unit 1, it determined that a supplemental cooling system would increase the efficiency of the plant. Accordingly, TVA began to use a Supplemental Condenser Cooling Water ("SCCW") system in 1998. Disputed as to the reason TVA began to use the SCCW. The original cooling system was under-designed and would have prevented WB1 from achieving rated power output on hot summer days. Some form of cooling tower enhancement or supplemental cooling was/is necessary for WB1 to achieve rated output on hot summer days (when the highest annual demand is experienced on the TVA system). This is supported by the NRC's Draft SFEIS at page 3-4, which states:

Evaporation of cooling-water system water from the cooling-tower increases the concentration of dissolved solids in the cooling-water system. In most closed-cycle wet cooling systems, a portion of the cooling water is removed and replaced with makeup water from the source (for WBN, the Tennessee River) to limit the concentration of dissolved solids in the cooling system and in the discharge to the receiving water body.

*Because the WBN cooling tower cannot remove the desired amount of heat from the circulating water during certain times of the year, TVA added the Supplemental Condenser Cooling Water (SCCW) system to the cooling system for the WBN reactors (TVA 1998). The SCCW draws water from behind Watts Bar Dam and delivers it, by gravity flow, to the cooling-tower basins to supplement cooling of WBN Unit 1. This cooling system would also be used for Unit 2. The temperature of this water is usually lower than the temperature of the water in the cooling-tower basin and, as a result, lowers the temperature of the water being used to cool the steam in the condensers. Slightly less water enters the cooling-*

tower basins through the SCCW intake than leaves the cooling-tower basins and is discharged to the Tennessee River through the SCCW discharge structure (TVA, 2010). *Since the SCCW has been operating, elevated total dissolved solids in blowdown water have not been a concern because a large volume of water continually enters and leaves the cooling-tower basins* (PNNL 2009).

(emphasis added). Had TVA more robust cooling system in the first place, the SCCW would never have been considered necessary by TVA and TVA would not now be proposing to operate WBN2 with the SCCW.

Accordingly, all of the allegedly undisputed material facts alleged by TVA are disputed by SACE. Therefore summary disposition of Contention 7 is inappropriate.

**B. TVA’s Studies Have Not Mooted Contention 7.**

TVA argues that Contention 7 is “fundamentally a contention of omission.” Motion at 1. Therefore, according to TVA, the ASLB should dismiss Contention 7 because it has now performed the studies demanded by the contention. *Id.* TVA contradicts its own argument, however, by conceding that the contention claims that TVA’s aquatic studies were “inadequate and outdated.” *Id.* Indeed, the contention itself repeatedly refers to the inadequacy of TVA’s discussion of aquatic impacts:

TVA claims that the cumulative impacts of WBN Unit 2 on aquatic ecology will be insignificant (FSEIS Table S-1 at page. S2, and Table 2-1 at page. 30). *TVA’s conclusion is not reasonable or adequately supported*, and therefore fails to satisfy 10 C.F.R. § 51.53(b) and NEPA. *TVA’s discussion of aquatic impacts is deficient* in three key respects. First, TVA mischaracterizes the current health of the ecosystem as good, and therefore fails to evaluate the impacts of WBN2 in light of the fragility of the host environment. Second, *TVA relies on outdated and inadequate data* to predict thermal impacts and the impacts of entrainment and impingement of aquatic organisms in the plant’s cooling system. Third, TVA fails completely to analyze the cumulative effects of WBN2 when taken together with the impacts of other industrial facilities and the effects of the many dams on the Tennessee River.

Petition to Intervene and Request for Hearing at 31-32 (July 13, 2009) (emphasis added). A discussion of the inadequacy and inaccuracy of TVA's studies also runs throughout the basis for the contention. *See id.* at 32 ("TVA's finding that WBN Unit 2 will have no significant impacts on aquatic life in the Tennessee River is inadequately supported"); *id.* at 33 ("TVA incorrectly portrays the ecosystem as healthy"); *id.* at 33 ("TVA relies on outdated and inadequate data to predict the effects of WBN Unit 2's cooling system on fish, mussels and other aquatic organisms"); *id.* (TVA relies on "poor and out dated data, distorted interpretations of data, and assumptions and extrapolations in lieu of recent monitoring studies"); *id.* at 34 ("TVA has not collected sufficient data to understand the distribution of ichthyoplankton populations or how they are affected by Watts Bar intakes") *id.* (TVA's conclusion that entrainment impacts are insignificant is based upon an unsupported assumption"); *id.* at 36 ("TVA does not adequately address the cumulative impacts of WBN Unit 2 in conjunction with the impacts of the numerous water impoundments on the Tennessee River). Thus, both the plain language and the context of the contention show that it is a contention of adequacy, not omission. *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-08-2, 67 NRC 54, 65 (2008). Accordingly, contrary to TVA's arguments, SACE was not required to amend the contention to address each study that TVA prepared in order to maintain the viability of Contention 7.

#### **IV. CONCLUSION**

For the foregoing reasons, the ASLB should deny TVA's Motion for Summary Disposition of Contention 7.

Respectfully submitted,

*Electronically signed by*

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