

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Lawrence G. McDade, Chair**

**Dr. Paul B. Abramson**

**Dr. Gary S. Arnold**

In the Matter of	)	
	)	
TENNESSEE VALLEY AUTHORITY	)	Docket No. 50-391-OL
	)	
(Watts Bar Nuclear Plant Unit 2)	)	September 28, 2009
	)	

**TENNESSEE VALLEY AUTHORITY’S RESPONSE IN OPPOSITION TO  
PETITIONERS’ AMENDED CONTENTION 7 REGARDING TVA AQUATIC STUDY**

**I. INTRODUCTION**

Tennessee Valley Authority (“TVA”) hereby files, pursuant to 10 C.F.R. § 2.309(h)(1), its Response in Opposition to Petitioners’ Amended Contention 7 Regarding TVA Aquatic Study (“Amended Contention”) filed by Southern Alliance for Clean Energy (“SACE”), Sierra Club, Blue Ridge Environmental Defense League (“BREDL”), Tennessee Environmental Council (“TEC”), and We the People, Inc. (“WTP”) (collectively, “Petitioners”) on September 3, 2009.<sup>1</sup>

**II. PRELIMINARY STATEMENT**

After TVA’s Answer alerted Petitioners to the fact that they overlooked a significant reference document directly supporting TVA’s aquatic impacts analysis in the 2007 FSEIS,

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<sup>1</sup> TVA continues to oppose the intervention of the Sierra Club, BREDL, TEC, and WTP in this proceeding for the reasons stated in its Answer Opposing the Southern Alliance for Clean Energy, Et. Al. Petition to Intervene and Request for Hearing, filed on August 7, 2009 (“TVA’s Answer”), and its Answer Opposing the Motion to Permit Late Addition of Co-Petitioners to Southern Alliance for Clean Energy’s Petition to Intervene and Admit Them As Intervenors, filed on August 21, 2009. TVA also separately filed its objection to Petitioners’ September 3, 2009 Motion for Leave to Amend [C]ontention 7 Regarding TVA Aquatic Study, citing Petitioners’ lack of timeliness under 10 C.F.R § 2.309(f)(2). See Tennessee Valley Authority’s Response in Opposition to Petitioners’ Motion for Leave to Amend Contention 7 Regarding TVA Aquatic Study (Sept. 8, 2009) (“TVA’s September 8 Response”).

Petitioners proffer this late-filed Amended Contention.<sup>2</sup> TVA's September 8 Response demonstrates that because the reference is clearly identified in the 2007 FSEIS, the Amended Contention is untimely under 10 C.F.R. § 2.309(f)(2). In addition, this Response demonstrates that it is substantively inadmissible under 10 C.F.R. § 2.309(f)(1).

In the Amended Contention, the Petitioners admit that significant portions of their original contention regarding purported deficiencies in TVA's impingement and entrainment monitoring programs are, in fact, incorrect. Now, in an attempt to rehabilitate their unsupported contention, Petitioners again rely upon speculation, selective reading, and misinterpretations of TVA's data in support of their new claims. Petitioners also again fail to recognize or directly address contrary information in the record. Accordingly, and as discussed further below, Petitioners fail to raise a genuine dispute on a material issue of law or fact and, therefore, the Amended Contention is inadmissible.

### **III. BACKGROUND**

The Amended Contention focuses on TVA's report, "Aquatic Environmental Conditions in the Vicinity of Watts Bar Nuclear Plant During Two Years of Operation, 1996-1997" ("1998 Aquatic Study"), which, among other things, documents TVA's 1996 and 1997 entrainment and impingement monitoring program for the Condenser Cooling Water ("CCW") system for Watts Bar Nuclear Plant ("WBN") Unit 1.<sup>3</sup> As explained in TVA's Answer, the Tennessee Department of Environment and Conservation ("TDEC") has determined that the CCW system is the best

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<sup>2</sup> See generally Petitioners' Motion for Leave to Amend [C]ontention 7 Regarding TVA Aquatic Study (Sept. 3, 2009).

<sup>3</sup> See TVA's Answer at 85 n.431.

technology available to minimize adverse environmental impacts,<sup>4</sup> and this will not change with operation of WBN Unit 2.<sup>5</sup>

In their Amended Contention and the “Second Declaration of Shawn Paul Young, Ph.D,” (“Second Young Declaration”), Petitioners allege various deficiencies in TVA’s 1998 Aquatic Study. With respect to entrainment impacts, Petitioners withdraw the claim in their Initial Petition<sup>6</sup> that TVA has conducted no entrainment monitoring.<sup>7</sup> Instead, they now claim that: (1) according to the 1998 Aquatic Study, the 1997 rate of fish larvae entrainment was 17.65 percent, rather than TVA’s estimate of 0.1 percent; (2) TVA did not conduct entrainment monitoring for an adequate amount of time during each year, or for an adequate number of years; and (3) the information in the 1998 Aquatic Study is outdated because “aquatic health in the Tennessee River has declined markedly” in the twelve years since the study took place.<sup>8</sup> With respect to impingement impacts, Petitioners also retract their original allegations of deficiencies in TVA’s impingement monitoring program. Instead, they now simply claim that the 1996 and 1997 studies are “outdated, especially in light of the [alleged] deterioration that has occurred in the aquatic health of the Tennessee River” since those studies.<sup>9</sup> Finally, the Amended

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<sup>4</sup> See *id.* at 87-88. Recently, TDEC published a draft renewed National Pollution Discharge Elimination System (“NPDES”) permit for WBN, reiterating this conclusion. See Public Participation Opportunity, Tenn. Dept. of Env’t and Conservation (TDEC), Division of Water Pollution Control, Notice Requesting Public Comments on Draft Permit Actions (Aug. 24, 2009), *available at* [http://www.tennessee.gov/environment/wpc/ppo/mdi/MMIX016\\_082409.pdf](http://www.tennessee.gov/environment/wpc/ppo/mdi/MMIX016_082409.pdf).

<sup>5</sup> TVA’S Answer at 88 n.443 (*citing* Final Supplemental Environmental Impact Statement, Completion and Operation of Watts Bar Nuclear Plant Unit 2, Rhea County, Tenn. at 30 (June 2007) (“intake flows would stay within the original design basis for operation of the two-units in closed cycle mode, and discharge changes would remain within existing NPDES limits”)) (encl. to Letter from M. Bajestani, TVA, to U.S. NRC, “Watts Bar Nuclear Plant (WBN) – Unit 2 – Final Supplemental Environmental Impact Statement for the Completion and Operation of Unit 2,” (Feb. 15, 2008), *available at* ADAMS Accession No. ML080510469) (“2007 FSEIS”).

<sup>6</sup> Petition to Intervene and Request for Hearing (July 13, 2009).

<sup>7</sup> See Amended Contention at 3.

<sup>8</sup> *Id.*

<sup>9</sup> See *id.* at 4.

Contention claims that the 1998 Aquatic Study “contains information about the decline in the health of mussels which supports Contention 7 in these respects.”<sup>10</sup>

#### **IV. THE AMENDED CONTENTION IS INADMISSIBLE**

##### **A. Applicable Legal Standards**

The standards governing the admissibility of Petitioners’ Amended Contention are set forth in 10 C.F.R. § 2.309(f)(1)(i) through (vi). This rule requires a petitioner to “set forth with particularity the contentions sought to be raised,” and to satisfy the six admissibility criteria.<sup>11</sup> The extensive case law associated with these standards is discussed in TVA’s Answer.<sup>12</sup> TVA incorporates this discussion by reference in this Response. Failure to comply with any one of the six admissibility criteria is grounds for rejecting a proffered contention.<sup>13</sup> As explained below, under Sections 2.309(f)(1)(v) and (vi), the Amended Contention is inadmissible.

##### **B. The Amended Contention Fails to Meet the Criteria of 10 C.F.R. § 2.309(f)(1)**

Petitioners’ Amended Contention should be rejected because it is insufficiently supported by alleged facts or expert opinion and fails to raise a genuine dispute on a material issue of law or fact, contrary to 10 C.F.R. § 2.309(f)(1)(v) and (vi). Significantly, the amended contention retracts substantial portions of Petitioners’ original claims, rendering those claims moot. With regard to any purported new bases, none of them are adequately supported or raise any new genuine dispute.

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<sup>10</sup> *Id.*

<sup>11</sup> The contention must: (i) provide a specific statement of the legal or factual issue sought to be raised; (ii) provide a brief explanation of the basis for the contention; (iii) demonstrate that the issue raised is within the scope of the proceeding; (iv) demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the licensing action that is the subject of the proceeding; (v) provide a concise statement of the alleged facts or expert opinions, including references to specific sources and documents which support the petitioner’s position on the issue and upon which the petitioner intends to rely at hearing; and (vi) provide sufficient information to show that a genuine dispute exists with regard to a material issue of law or fact. *See* 10 C.F.R. § 2.309(f)(1)(i)-(vi).

<sup>12</sup> *See* TVA’s Answer at 8-16.

<sup>13</sup> *See* Final Rule, Changes to Adjudicatory Process, 69 Fed. Reg. 2182, 2221 (Jan. 14, 2004).

1. *Amended Contention 7 Retracts Significant Portions of Petitioners' Original Contention*

Contrary to Petitioners' claim that they are expanding the bases for proposed Contention 7, they have in fact significantly narrowed the scope of their contention. Specifically, Petitioners now admit that certain allegations in the original proposed Contention 7 regarding impingement and entrainment impacts are erroneous.

With respect to entrainment, Petitioners' original allegations focus on the alleged lack of direct operational entrainment measurements.<sup>14</sup> Specifically, Petitioners criticize TVA for allegedly failing to "provide any data" for entrainment of fish eggs.<sup>15</sup> Petitioners now acknowledge that "TVA did conduct entrainment measurements, and thus Petitioners no longer make" the assertion to the contrary.<sup>16</sup> Similarly, Petitioners originally criticized TVA for failing to collect impingement data for the CCW intakes,<sup>17</sup> but now admit that TVA "actually monitor[ed] impingement at the WBN1 Component Cooling Water intake."<sup>18</sup> Accordingly, Petitioners' claims that TVA failed to provide or collect entrainment and impingement data are no longer within the scope of the contention.

2. *The New Allegations in Petitioners' Amended Contention 7 Are Inadequately Supported and Fail to Raise a Genuine Dispute*

TVA's Answer describes the detailed aquatic monitoring program documented in its 2007 FSEIS, as well as documents referenced and incorporated therein, including analyses of the environmental impacts on aquatic ecology such as impingement, entrainment, and thermal

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<sup>14</sup> See TVA's Answer at 84 (*citing* Initial Petition at 34; First Young Declaration paras. III.D.7 to 10).

<sup>15</sup> See *id.* at 86 (*citing* Initial Petition at 34-35; First Young Declaration para. III.D.14).

<sup>16</sup> See Amended Contention at 3 (*referring to* Initial Petition at 34-35).

<sup>17</sup> See Initial Petition at 35; First Young Declaration para. III.D.17. Petitioners' original contention also included other impingement-related allegations related to the 2005 to 2007 study conducted for the Supplemental Condenser Cooling Water ("SCCW") system. TVA's Answer explains why these allegations fail to raise a genuine dispute. See TVA's Answer at 86-87.

<sup>18</sup> Amended Contention at 4.

impacts.<sup>19</sup> Now, after TVA alerted the Petitioners to significant deficiencies in their original contention, they attempt to reformulate the contention. In doing so, however, they fail to bring forth any information leading to a significant, material change in TVA's overall aquatic impact analysis and conclusion that "operation of both WBN Unit 1 and Unit 2 would have little or no effect on larval fish and egg populations in Chickamauga Reservoir."<sup>20</sup> As a result, Petitioners fail to allege a significant material deficiency in TVA's 2007 FSEIS and therefore fail to raise a genuine dispute on a material issue of law or fact.<sup>21</sup>

*a. Petitioners Raise No New Genuine Dispute Regarding Entrainment Impacts*

*Entrainment of Larval Fish:* According to the Petitioners and Dr. Young, the data in the 1998 Aquatic Study show that the 1997 rate of fish larvae entrainment was 17.65 percent, rather than TVA's estimate of 0.1 percent.<sup>22</sup> Dr. Young calculated the entrainment percentage by simply dividing the value for estimated larvae entrainment in 1997 (120,000) by 680,000, which he assumes to be the number of larvae transported past WBN in 1997. This "analysis," however, is inconsistent with the entrainment estimation equation and methodology used by TVA. As described on page 9 of the 1998 Aquatic Study, the applicable entrainment equation is based on the ratio of plant intake water demand to river flow, along with the overall density of eggs or larvae in the river and found in intake samples. Accordingly, Dr. Young ignores at least two of the four variables in the referenced entrainment equation.

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<sup>19</sup> See TVA's Answer at 80; see generally *id.* at 80-93.

<sup>20</sup> 2007 FSEIS at 54.

<sup>21</sup> See *Sys. Energy Res., Inc.* (Early Site Permit for Grand Gulf ESP Site), CLI-05-4, 61 NRC 10, 13 (2005) (adding that Boards do not sit to "flyspeck" environmental documents or to add details or nuances).

<sup>22</sup> See Amended Contention at 3; Second Young Declaration paras. II.A.3 to 4.

Dr. Young does identify an apparent discrepancy in the larval fish entrainment data for 1997 that appears on page 15 of the 1998 Aquatic Study.<sup>23</sup> As explained in the attached Affidavit of Dennis Baxter (“Baxter Affidavit”), to respond to the Amended Contention and Dr. Young’s Declaration, TVA has retrieved and reviewed the original source data used in the preparation of the 1998 Aquatic Study.<sup>24</sup> Based on this review, Mr. Baxter has verified that the conclusions regarding entrainment in the 1998 Aquatic Study remain valid.<sup>25</sup> In particular, he has confirmed the overall conclusion in the 1998 Aquatic Study: “[e]stimated percentage entrainment of fish eggs and larvae being transported past WBN during both years of operational monitoring was 0.1%.”<sup>26</sup>

Dr. Young, therefore, has identified no significant material deficiency in TVA’s analysis of entrainment-related impacts.<sup>27</sup> In particular, he has not disputed the ultimate basis for TVA’s conclusion that, with respect to the CCW system, “operation of both WBN Unit 1 and Unit 2 would have little or no effect on larval fish and egg populations in Chickamauga Reservoir because the WBN condenser cooling water system (CCW) is commensurate with a closed cycle cooling system.”<sup>28</sup> In addition, Petitioners do not dispute that the overall hydraulic entrainment

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<sup>23</sup> See Second Young Declaration paras. II.A.3 to 4 (discussing the number of fish larvae entrained and transported past WBN in 1997).

<sup>24</sup> See Baxter Affidavit para. 7.

<sup>25</sup> See Baxter Affidavit paras. 8-9.

<sup>26</sup> Baxter Affidavit para. 9; 1998 Aquatic Study at 15.

<sup>27</sup> See *Sys. Energy Res., Inc.*, CLI-05-4, 61 NRC at 13. As previously noted, Dr. Young raised similar aquatics-related allegations in the *Vogtle* early site permit (“ESP”) proceeding. See TVA’s Answer at 89 n.452. After assessing the merits of Dr. Young’s claims, the *Vogtle* Board found that the existing environmental studies “were not materially deficient to the extent that it would adversely impact the staff’s impingement/entrainment/thermal impacts analysis.” *Southern Nuclear Operating Co.* (Early Site Permit for *Vogtle* ESP Site), LBP-09-07, 69 NRC \_\_\_ slip op. at 39 (June 22, 2009).

<sup>28</sup> 2007 FSEIS at 54; see also TVA’s Answer at 84-86. TVA’s Answer to the Initial Petition addresses Petitioners’ allegations relating to the entrainment impacts of the separate SCCW system. See TVA’s Answer at 84-86. The Amended Contention does not raise allegations related to the SCCW system, which commenced operation in 1999, after TVA completed the 1998 Aquatic Study. See 2007 FSEIS at 21.

rate of the WBN CCW system is very low, again commensurate with a closed cycle cooling system.<sup>29</sup>

Duration of Sampling: TVA's operational sampling in 1996 and 1997 took place between April and June of those years.<sup>30</sup> Petitioners next allege that "TVA did not conduct entrainment monitoring for an adequate amount of time during each year, or for an adequate number of years, to provide a reasonably reliable or accurate portrait of WBN's aquatic impacts."<sup>31</sup> In support, Dr. Young focuses on the freshwater drum, a species whose eggs have been observed to occur in peak abundance between May and early July.<sup>32</sup> Dr. Young speculates that, "[i]f freshwater drum spawning is delayed, the timing of egg and larval transport *may* also have been delayed outside the sampling window."<sup>33</sup>

Unfortunately for Petitioners, Dr. Young provides no support or bases for his speculation. Nor does he even allege that the peak abundance for eggs or larvae of this species was actually delayed outside of the sampling window in 1996 or 1997. In fact, Table 2-7 of the Aquatic Study specifically identifies that the date of peak density for larval fish of all species occurred in June of both 1996 and 1997.<sup>34</sup> Indeed, for all monitored years between 1976 and 1997, the peak density for larval fish occurred between April 26 and June 23.<sup>35</sup> Dr. Young either ignored or did

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<sup>29</sup> See 1998 Aquatic Study at 15 ("Estimated average hydraulic entrainment by WBN (proportion of the Tennessee River flow entrained) during operation is very low (0.6%).").

<sup>30</sup> See *id.* at 6.

<sup>31</sup> See Amended Contention at 3; Second Young Declaration paras. II.A.5.a to c.

<sup>32</sup> See 1998 Aquatic Study at 9.

<sup>33</sup> Second Young Declaration para. II.A.5.a (emphasis added).

<sup>34</sup> See 1998 Aquatic Study, Table 2-7, at 86.

<sup>35</sup> See *id.*



not review this information and, therefore, his speculation to the contrary does not raise a genuine dispute.<sup>36</sup>

Dr. Young also alleges that, contrary to the information presented in the 1998 Aquatic Study, TVA did not actually perform the reported operational sampling in April and May of 1996 because, “[a]ccording to the NRC’s website, WBN1 did not begin operating until May 27, 1996.”<sup>37</sup> Dr. Young’s insinuations are entirely unsupported, as evidenced by readily available public records. While it is true that WBN Unit 1 commenced *commercial* operation on May 27, 1996, the NRC in fact issued a full-power operating license to WBN Unit 1 on February 7, 1996<sup>38</sup> and the facility commenced operation long before May 27, 1996, including operational testing periods in April and May.<sup>39</sup> This testing, of course, included the operation of condenser pumps such that normal operational aquatic sampling could take place during April and May of 1996. Dr. Young again overlooks this readily available information.

Continued Validity of the 1998 Aquatic Study: Petitioners next claim simply recycles arguments from the original Petition to Intervene that information in the 1998 Aquatic Study is somehow outdated because “aquatic health in the Tennessee River has declined markedly” in the twelve years since the study took place.<sup>40</sup> In support, Dr. Young simply points to his previous statements in Paragraphs III.C.3, C.4, and B.3 of his original declaration.

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<sup>36</sup> See, e.g., *Fansteel, Inc.* (Muskogee, Okla. Site), CLI-03-13, 58 NRC 195, 203 (2003).

<sup>37</sup> Second Young Declaration para. II.A.5.b.

<sup>38</sup> See NRC Press Release 96-29A, NRC Staff Issues Full-Power License for Watts Bar 1 (Feb. 7, 1996), available at ADAMS Accession No. ML003710821.

<sup>39</sup> See Letter from John Scalice, TVA, to NRC Document Control Desk, Watts Bar Nuclear Plant (WBN) – May 1996 Monthly Operating Report encl. at 1 (June 17, 1996), available at ADAMS Accession No. ML073330945 (explaining that WBN Unit 1 began in May 1996 in an operating mode, with operational testing continuing through the commencement of commercial operation); Monthly Operating Report to the Nuclear Regulatory Commission encl. 1, at 1 (Apr. 1996), available at ADAMS Accession No. ML073330942 (explaining that operational testing also took place throughout April 1996).

<sup>40</sup> See Amended Contention at 3; Second Young Declaration para. II.A.5d.

TVA's full response to this argument is included in TVA's Answer, and that response is incorporated by reference here.<sup>41</sup> In addition, in making this same claim, Dr. Young again overlooks available public data on the broader ecological health of the Chickamauga Reservoir.<sup>42</sup> Those data show "good" ecological health ratings for the Reservoir throughout the history of WBN operation with the exception of 2007, which was attributed to low reservoir flows in 2007—the driest year in the past 118 years of record.<sup>43</sup> Again, Dr. Young makes no attempt to address or explain these contrary available data. In addition, Paragraphs III.C.4 and B.3 of Dr. Young's First Declaration do not even relate to events between the 1998 Aquatic Study and the present day. These paragraphs are therefore simply irrelevant to the question of whether the 1998 Aquatic Study is somehow outdated.<sup>44</sup>

Thus, Dr. Young has provided no alleged facts supporting his bare assertion that the 1998 Aquatic Study is outdated, and his conclusory statements do not provide sufficient support for this contention.<sup>45</sup>

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<sup>41</sup> See TVA's Answer at 82-86.

<sup>42</sup> See "Chickamauga Reservoir – Ecological health rating," <http://www.tva.com/environment/ecohealth/chickamauga.htm>, based on the monitoring of five parameters (dissolved oxygen, chlorophyll, fish, bottom life, and sediment) at four reservoir locations.

<sup>43</sup> See *id.*

<sup>44</sup> Paragraph III.C.4 identifies an alleged decline in freshwater fish species in the Chickamauga Reservoir between 1970 to 1973, and 1991 to 1996. All of the studies and information Dr. Young discusses predate the operation of WBN Unit 1 and predate the 1996 to 1997 surveys discussed in the 1998 Aquatic Study, with the exception of one reference to a 2005 study of fish in the Savannah River Basin, *i.e.*, not the Tennessee River. See First Young Declaration para. III.C.4 (*citing* "Marcy et al. 2005"). Therefore, contrary to Dr. Young's assertion, this paragraph presents no information suggesting that there has been a "decline in the number of fish species captured in sampling" in the vicinity of WBN over the past 12 years. Second Young Declaration para. III.A.5.d. Paragraph B.3 of Dr. Young's First Declaration merely alleges facts related to the current numbers of proposed or listed endangered or threatened species and current candidates for such listings. Once again, contrary to Dr. Young's assertion, this paragraph presents no information suggesting that, over the past 12 years, there has been an "increased number of fish species that are threatened or endangered or that are likely candidates for threatened and endangered status." Second Young Declaration para. III.A.5.d.

<sup>45</sup> See *USEC, Inc. (American Centrifuge Plant)*, CLI-06-10, 63 NRC 451, 472 (2006).

b. *Petitioners Raise No New Genuine Dispute Regarding Impingement Impacts*

As to impingement impacts, Petitioners essentially reiterate their entrainment claim: that the 1996 and 1997 monitoring studies are now “outdated, especially in light of the [alleged] deterioration that has occurred in the aquatic health of the Tennessee River.”<sup>46</sup> As is the case with respect to entrainment-related impacts discussed above, the Petitioners and Dr. Young simply present no information supporting their claim that the impingement data and corresponding analysis in the 1998 Aquatic Study are outdated.<sup>47</sup>

Dr. Young also states that it is “important to recognize that the relatively low impingement rates observed at WBN1 should not be extrapolated to a conclusion that entrainment rates will also be low.”<sup>48</sup> As a preliminary matter, in making this statement, Dr. Young acknowledges that observed impingement impacts have been low at WBN. Nowhere, however, does he identify where or how TVA “extrapolates” from impingement data to draw conclusions regarding entrainment impacts. In fact, TVA does not rely on any such extrapolation, either in the 1998 Aquatic Study or in its 2007 FSEIS.<sup>49</sup> Moreover, Petitioners agree that this is the case by readily acknowledging that TVA conducted actual entrainment measurements.<sup>50</sup>

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<sup>46</sup> Amended Contention at 4 (*citing* Second Young Declaration para. II.A.6).

<sup>47</sup> *See id.*; Second Young Declaration paras. II.A.5.d & II.A.6.

<sup>48</sup> Second Young Declaration para. II.A.6.

<sup>49</sup> *See* 1998 Aquatic Study at 15-16.

<sup>50</sup> *See* Amended Contention at 3 (“The Aquatic Study reports that TVA did conduct entrainment measurements . . .”).

c. *Petitioners Raise No New Genuine Dispute Regarding Impacts to Mussel Species*

TVA's Answer explains why Dr. Young's original allegations regarding the impact of WBN on mussel populations failed to raise a genuine dispute.<sup>51</sup> In an attempt to rehabilitate these claims, Petitioners allege that the 1998 Aquatics Study "contains information about the decline in the health of mussels" that support their original allegations.<sup>52</sup> According to Dr. Young, this study shows that "TVA found and reported a 35% decline in mussel abundance just below WBN1 from 1996 to 1997. This was the year following initial plant start up."<sup>53</sup>

Contrary to Dr. Young's selective reading of the 1998 Aquatic Study, a review of the total numbers of individuals and mussel species collected near WBN during pre-operational and operations surveys reveals that the identified change from 1996 to 1997<sup>54</sup> is well within the typical year-to-year variations in sampling results.<sup>55</sup> Dr. Young does not even allege that his 35 percent value is outside of the typical observed variation, and it is not. Moreover, Dr. Young does not explain *how*, from a practical perspective, the commencement of WBN Unit 1

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<sup>51</sup> See TVA's Answer at 81 n.410 (explaining that the overall decline in mussel species in the Tennessee River is well documented and has taken place over many years since the construction of the Chickamauga and Watts Bar reservoirs in the 1940s).

<sup>52</sup> Amended Contention at 4. Arguably, Petitioners are taking an unauthorized "second bite at the apple" with regard to this part of the contention. While TVA responds below to the specific issues raised by Petitioners on mussel health, TVA does not waive any rights to argue that such arguments are time barred.

<sup>53</sup> Second Young Declaration para. II.B.3.

<sup>54</sup> The overall reported change in mussel abundance from 1996 to 1997 (846 to 697) is 18 percent. See 1998 Aquatic Study at 114, Table 3-7. Dr. Young obtains his 35 percent value by focusing only on the middle and downstream beds, and ignoring the upstream beds, but he does not explain his basis for ignoring the upstream data. See Second Young Declaration para. II.B.3.

<sup>55</sup> See 1998 Aquatic Study at 114, Table 3-7. The Fall 1986 through 1990 data are particularly instructive. From 1986 to 1988 there was a 36 percent increase in total mussels collected, followed by a 38 percent decrease between 1988 and 1990. *Id.* Yearly variations in the data may be influenced by "differences in diver harvest speed and the relatively short time (22 minutes) involved in each timed dive" for mussel collection. *Id.* at 54-55. The observed variations also may be related to the manner in which mussels are returned to the beds following sampling. See *id.* at 55.

operations could have impacted the general health of mussel communities in its vicinity,<sup>56</sup> so this claim fails to raise a genuine dispute on a material issue of law or fact.<sup>57</sup>

## V. CONCLUSION

In this Amended Contention, the Petitioners retract significant portions of their original proposed Contention 7. The remaining portions of the Amended Contention rely upon speculation, selective reading, and misinterpretations of TVA's data. It also fails to recognize or address directly contrary information in the record, and therefore fails to raise a genuine dispute on a material issue of law or fact. Accordingly, the Amended Contention should be rejected as inadmissible.

Respectfully submitted,

*Signed (electronically) by Kathryn M. Sutton*

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*Counsel for TVA*

Dated in Washington, D.C.  
this 28th day of September 2009

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<sup>56</sup> Specifically, Dr. Young does not even attempt to explain how the operation of WBN Unit 1 in 1996 and 1997 allegedly impacted mussel species in its vicinity, *i.e.*, through chemical, thermal, or some other mechanism. See Second Young Declaration paras. II.B.1 to 4.

<sup>57</sup> See *USEC, Inc.*, CLI-06-10, 63 NRC at 472; see also *Vogtle*, LBP-09-07, slip op. at 39 (requiring, at the merits stage, a showing of a material deficiency in the Staff's environmental analysis).

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TENNESSEE VALLEY AUTHORITY	)	Docket No. 50-391-OL
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(Watts Bar Nuclear Plant Unit 2)	)	September 28, 2009
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**AFFIDAVIT OF DENNIS S. BAXTER**

Knox County )

)

State of Tennessee )

Dennis S. Baxter, being duly sworn, states as follows:

**INTRODUCTION**

1. This Affidavit is submitted to support the Tennessee Valley Authority's ("TVA's") Response in Opposition to Petitioners' Amended Contention 7 Regarding TVA Aquatic Study, in the above-captioned proceeding. The purpose of this affidavit is to describe the results of my recent review of the original source data used in the preparation of "Aquatic Environmental Conditions in the Vicinity of Watts Bar Nuclear Plant During Two Years of Operation, 1996-1997" ("1998 Aquatic Study"), particularly as it relates to the reported conclusions for entrainment of eggs and larval fish in 1996 and 1997.
2. I am an Aquatic Zoologist in the Office of Environment and Research, Aquatic Monitoring and Management at TVA's headquarters in Knoxville, Tennessee. I have been employed by TVA as a Fisheries Biologist for over 23 years.

3. A copy of my resumé is attached. Briefly, I received an A.S. Degree in Fish Culture and a B.A. Degree in Biology from Mansfield University in Mansfield Pennsylvania. During my tenure at TVA, I have conducted and coordinated multiple aquatic resource monitoring studies assessing environmental effects on aquatic resources throughout the Tennessee and Cumberland River Valleys. For the last eight years, I have managed TVA's impingement and entrainment monitoring program to ensure compliance with Section 316(b) of the Clean Water Act. This program characterizes any impingement and entrainment impacts resulting from withdrawing cooling water at TVA's Fossil and Nuclear Steam Electric Power plants. In addition to my professional qualifications, I have made numerous scientific presentations at professional meetings and fishing association functions.
4. My responsibilities include management of aquatic resource monitoring programs in support of National Pollution Discharge Elimination System ("NPDES") permits for TVA's Fossil and Nuclear Power Plants. These programs include entrainment and impingement mortality characterizations, fish and benthic community assessments utilizing community assemblage indices and the assessment of thermal impacts. With respect to the Watts Bar Nuclear Plant ("WBN"), I have planned and coordinated aquatic monitoring programs, including the WBN-related studies that are listed on my attached resumé.
5. In support of this Affidavit, I have reviewed the following documents:
  - The 1998 Aquatic Study
  - Petitioners' Amended Contention 7 Regarding TVA Aquatic Study (Sept. 3, 2009)
  - Second Declaration of Shawn Paul Young, Ph.D. (Sept. 2, 2009)

- The original source data on entrainment of eggs and larval fish collected in support of the 1998 Aquatic Study

**STATEMENT OF DENNIS S. BAXTER**

6. Dr. Young's Declaration identifies an apparent discrepancy in the larval fish entrainment data for 1997 that appear on page 15 of the 1998 Aquatic Study. In particular, Dr. Young focuses on the number of fish larvae entrained and transported past WBN in 1997.
7. As part of TVA's effort to respond to the Amended Contention and Dr. Young's Declaration, TVA has retrieved and I have reviewed the original source data used in the preparation of the 1998 Aquatic Study. The 1998 Aquatic Study source entrainment data is stored on a TVA secure server in spreadsheet form. These data include specific biotic and abiotic information collected in the surveys.
8. Using this original source data, for both fish eggs and larval fish in both 1996 and 1997, I used the following equation that appears on page 9 of the 1998 Aquatic Study to verify estimated entrainment rates (E):

$$E = \frac{100 D_i Q_i}{D_r Q_r}$$

where  $D_i$  = mean density (N/1000 m<sup>3</sup>) of eggs or larvae in intake samples;  
 $D_r$  = mean density (N/1000 m<sup>3</sup>) of eggs or larvae in river;  
 $Q_i$  = plant intake water demand (m<sup>3</sup>/d);  
 $Q_r$  = river flow (m<sup>3</sup>/d).

9. The results of my analysis of the original source data establishes that, in 1996 and 1997, the percentage of both fish eggs and larval fish entrained at Watts Bar Nuclear Plant was approximately 0.1% of the total number of fish eggs and larval fish transported past the plant.



10. This review confirms that the conclusions regarding entrainment in the 1998 Aquatic Study remain valid. Specifically, as stated in the 1998 Aquatic Study, “[e]stimated percentage entrainment of fish eggs and larvae being transported past WBN during both years of operational monitoring was 0.1%.”

\* \* \*

I declare under penalty of perjury that the statements attributed to me in the foregoing affidavit are true and correct to the best of my knowledge, information, and belief.

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

Dennis S. Baxter  
Aquatic Zoologist  
Tennessee Valley Authority  
400 West Summit Hill Dr.  
Knoxville, Tennessee 37902  
E-mail: [dsbaxter@tva.gov](mailto:dsbaxter@tva.gov)  
Phone: 865-632-6404  
Fax: 865-632-4582

Executed this 28th day of September 2009.

# Dennis S. Baxter

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## Education

B.A. Biology, Mansfield University, 1986  
A.S. Fish Culture, Mansfield University, 1985

## Professional Summary

I have 23 years of experience in the field of Environmental Resource monitoring. I manage all biological monitoring activities for TVA's Nuclear and Fossil Plant's discharge permit requirements. I have worked extensively with TVA's Nuclear, Fossil and River Operations personnel to provide the best biological monitoring programs to ensure environmental compliance. I also had the privilege to manage TVA's Aquatic Monitoring and Management Team during 2007.

## Professional Experience

***Aquatic Zoologist managing a variety of aquatic resource monitoring projects, 1992 to present.***

Duties include:

- Responsible for planning, budget development and monitoring, directing field and/or laboratory activities, analyzing data, and preparation of reports.
- Consults, Negotiates and prepares monitoring plans and contracts for customers.
- Recommends and implements activities relating to the protection and management of natural resources to ensure their proper stewardship.
- Develop and implement quality assurance and control procedures for aquatic monitoring projects.
- Directs work of biologists, technicians, and contract employees engaged in collection of data and/or completion of assigned projects and activities.
- Provides technical review and guidance to other organizations.
- Participates [on] or leads interdisciplinary teams as needed, utilizing established procedures and processes to solve operational problems, such as analyzing discharge permit requirements and providing innovative thinking to develop new approaches to solve environmental compliance issues.
- Serves as a TVA Fish Kill Biologist in the Tennessee Valley and point of contact with state and federal agencies.
- Participates as one of TVA's representative on the Ohio River Ecological Resource Program which develops innovative monitoring protocols to comply with the Clean Water Act section 316.
- Maintains a good working knowledge of and relationship with professional biologists and state regulators in the region.

- Participates on TVA's Invasive Species Implementation Team in developing a plan to comply with the President's Executive Order 13112-Invasive Species.
- Member of the Tennessee Aquatic Invasive Species Taskforce in developing the Tennessee Aquatic Invasive Species management plan.
- Presents various environmental resource topics to State Regulators, Electric Power Research Institute and American Fisheries Society conferences.
- Responsible for managing TVA's Zebra Mussel Laboratory and reporting to TVA's power plants of possible risk of biofouling.
- Responsible for design, implementation, and presentation of a Zebra Mussel growth study conducted for TVA's Nuclear Plants.
- Responsible for the biological monitoring and participated in the design and implementation of the Zeta Rod Zebra Mussel Research Study conducted at Shawnee Fossil Plant.

***Aquatic Biologist project/crew leader of aquatic resource monitoring projects 1986 to 1992.***

- Responsible for writing aquatic resource monitoring reports to support TVA power plants environmental compliance requirements.
- Directs work of biologists, technicians, and contract employees engaged in collection of aquatic monitoring data and/or completion of assigned projects and activities.
- Responsible to implement aquatic monitoring and bank stabilization projects to support the Reservoir Release Improvement and Reservoir Release Re-evaluation program in the Norris Dam Tailwater, Clear Creek and Camp Creek with Trout Unlimited and State Resource Agencies.
- Presented results of TVA's RRI and RRR program to the Regional Cold Water meeting with State and Federal Agencies including Trout Unlimited.
- Participated as a scientific SCUBA diver collecting freshwater mussel, benthic macroinvertebrate, water chemistry and sediment samples for various monitoring programs.
- Responsible for radio telemetry tracking projects used to study the behavior of fish in the vicinity of TVA's power plants.
- Develop and implement quality assurance/control procedures and Job Safety Analysis for aquatic monitoring activities.

## **Publications, Reports, and Symposium Presentations (abbreviated)**

Simmons, J.W. and D.S. Baxter. 2009. Biological Monitoring of the Tennessee River Near Watts Bar Nuclear Plant 2008. Tennessee Valley Authority, Office of Environment and Research, Knoxville, TN.

Simmons, J.W. and D.S. Baxter. 2009. Biological Monitoring of the Tennessee River Near Sequoyah Nuclear Plant 2008. Tennessee Valley Authority, Office of Environment and Research, Knoxville, TN.

Simmons, J.W. and D.S. Baxter. 2009. Biological Monitoring of the Tennessee River Near Browns Ferry Nuclear Plant 2008. Tennessee Valley Authority, Office of Environment and Research, Knoxville, TN. 48pp.

Baxter, D.S. 2007. Effects of Impingement at Colbert Fossil Plant on the Fish Community in Pickwick Reservoir. Tennessee Valley Authority, Office of Environment and Research, Knoxville, TN. Electric Power Research Institute 316 Symposium, Denver Co. 46pp.

Baxter, D.S. and J.P. Buchanan. 2007. Entrainment and Impingement of Fish at John Sevier Fossil Plant During 2005 Through 2007. Tennessee Valley Authority, Environmental Stewardship and Policy, Knoxville, TN. 33pp.

Baxter, D.S., G.D. Hickman and K.D. Gardner. 2001. Watts Bar Nuclear Plant Supplemental Condenser Cooling Water System Fish Monitoring Program, 2001. Tennessee Valley Authority, Resource Stewardship, Knoxville, TN. 41pp.

Baxter, D. S., Buchanan, J. P., Hickman, G. D., Jenkinson, J. J., Milligan, J. D., O'Bara, C. J. 1998. Aquatic Environmental Conditions in the Vicinity of Watts Bar Nuclear Plant during Two Years of Operation, 1996-1997. Tennessee Valley Authority, Resource Group, Water Management, Norris, TN. 133pp.

Baxter, D.S. and J.P. Buchanan. 1998. Browns Ferry Nuclear Plant Thermal Variance Monitoring Program including Statistical Analyses - Final Report. Tennessee Valley Authority, Water Management, Aquatic Biology Lab, Norris, Tennessee. Revised August 1998. 64pp.

Soderberg, R.W., D.S. Baxter and W.F. Krise. 1987. Growth and Survival of Fingerling Lake Trout Reared at Four Densities. Progressive Fish Culturist 49: 284-285.

## **Professional Affiliations and Awards**

American Fisheries Society

Trout Unlimited Gold Trout Award, Outstanding Biologist of the Year, 1993.

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Lawrence G. McDade, Chair**

**Dr. Paul B. Abramson**

**Dr. Gary S. Arnold**

\_\_\_\_\_ )  
In the Matter of )

TENNESSEE VALLEY AUTHORITY )

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

) Docket No. 50-391-OL

) September 28, 2009

**CERTIFICATE OF SERVICE**

I hereby certify that, on September 28, 2009, copies of “Tennessee Valley Authority’s Response in Opposition to Petitioners’ Amended Contention 7 Regarding TVA Aquatic Study” and the attached “Affidavit of Dennis Baxter,” were filed electronically with the Electronic Information Exchange on the following recipients:

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