

August 14, 2009

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

In the Matter of	)	
	)	
Tennessee Valley Authority	)	Docket No. 50-391
	)	
(Watts Bar Unit 2)	)	
	)	

**PETITIONERS’ REPLY TO NRC STAFF’S AND  
TENNESSEE VALLEY AUTHORITY’S ANSWERS TO  
PETITION TO INTERVENE AND REQUEST FOR HEARING**

Pursuant to 10 C.F.R. § 2.309(h)(2), Petitioners Southern Alliance for Clean Energy (“SACE”), Sierra Club, Blue Ridge Environmental Defense League (“BREDL”), Tennessee Environmental Council (“TEC”), and We the People, Inc. (“WTP”) respectfully reply to the U.S. Nuclear Regulatory Commission (“NRC”) Staff’s Answer to Petition to Intervene and Request for Hearing (“NRC Staff Answer”) and the Tennessee Valley Authority’s (“TVA’s”) Answer Opposing the Southern Alliance for Clean Energy, et al., Petition to Intervene and Request for Hearing (“TVA Answer”).

**ARGUMENT**

**I. PETITIONERS SIERRA CLUB, BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE, TENNESSEE ENVIRONMENTAL COUNCIL, AND WE THE PEOPLE SHOULD BE ADMITTED TO THIS PROCEEDING AS LATE-FILED INTERVENORS.**

The NRC Staff and TVA argue that Sierra Club, BREDL, TEC and WTP (collectively “Co-Petitioners”) should not be permitted to intervene in this proceeding, and that their requests should not be entertained by the Board, because they did not file their contentions by the June

30, 2009 deadline set forth in the hearing notice. Staff Answer at 12-13; TVA Answer at 16-18. *See also* 74 Fed. Reg. 20,351 (May 1, 2009). They reason that the June 24, 2009 Order of the Secretary of the Commission extending the deadline for filing contentions to July 14, 2009, was applicable only to SACE, and that Co-Petitioners thus remained subject to the June 30, 2009 deadline. *Id.* Petitioners agree that because the Secretary's Order did not specifically permit co-Petitioners to submit a petition to intervene past the June 30, 2009, deadline, their request to participate in this proceeding is untimely. Therefore, Petitioners have filed, concurrent with this Reply, a Motion to Permit Late Addition of Co-Petitioners to Southern Alliance for Clean Energy's Petition to Intervene and Admit Them as Intervenors. For the reasons more-fully described in the motion, Co-Petitioners satisfy each of the factors in 10 C.F.R. § 2.309(c) for admission of late-filed petitions to intervene and, as such, should be permitted to intervene in this proceeding.

## **II. REPLY TO RESPONSES TO CONTENTIONS**

### **Contention 1: Failure to List and Discuss Compliance With Required Federal Permits, Approvals, and Regulations**

TVA initially agrees with Petitioners that NRC regulations require an operating license applicant "to include a list of 'all Federal permits, licenses, approvals and other entitlements which must be obtained in connection with the proposed action,' and include a description of the status of its compliance with these requirements in its environmental report." TVA Answer at 19 (quoting 10 C.F.R. § 51.45(d)). TVA also concedes that the applicant must "include 'a discussion of the status of compliance with applicable environmental quality standards and requirements including, but not limited to, . . . thermal and other water pollution limitations or requirements which have been imposed by Federal, State, regional and local agencies having responsibility for environmental protection.'" *Id.* (quoting 10 C.F.R. § 51.45(d)). Nevertheless,

TVA states that it has “fully satisfied these regulations,” and thus the contention should be dismissed. *Id.* at 20. The NRC Staff agrees. NRC Staff Answer at 14.

At the outset, it is difficult to see how TVA could be in compliance with 10 C.F.R. § 51.45(d) when no “list” of other Federal permits, licenses, approvals and other entitlements appears in the 2007 FSEIS, and TVA never asserts that it does. Moreover, as discussed below, the “discussions” in the FSEIS of TVA’s NPDES permit are little more than various passing references to the permit and conclusory statements regarding their compliance, without any substantive analysis of what the NPDES limits are, why TVA is not or will not violate those limits, or the fact that the permit is expired.

Petitioners have thus presented a genuine dispute on a material issue, and Contention 1 should be admitted.

1. *The 1991 Interagency Agreement*

The NRC Staff argues that Petitioners’ argument in Contention 1 that TVA’s FSEIS fails to discuss its compliance with an agreement between TVA and other federal and state agencies should be rejected because “Petitioners have not demonstrated that the . . . agreement is a required permit, license or approval that TVA must obtain in connection with the application.” NRC Staff Answer at 15.

TVA argues, meanwhile, that Petitioners’ argument “is deficient because it is unsupported by facts or expert opinion.” TVA Answer at 20. TVA claims that the agreement “is not relevant to any activities within the scope of this OL proceeding” because “TVA is not undertaking any action that affects fixed water intake from those areas of Watts Bar Reservoir governed by the [agreement].” TVA Answer at 21. TVA admits, however, that the supplemental condenser cooling water (“SCCW”) system currently serving Watts Bar Unit 1 lies within the

geographic area to which the agreement applies, and that “[w]ith the combined operation of Unit 1 and Unit 2, the SCCW system would serve both units.” TVA Answer at 21-22 (quoting the 2007 FSEIS at 37).

TVA’s statement that it is not taking any action that “affects” fixed water intake is thus completely irrelevant. The plain language of the agreement states that it applies to specific categories of actions which “*could* result in the disturbance, resuspension, removal and/or disposal of contaminated sediments or potentially contaminated sediments in the Watts Bar Reservoir.” Agreement at 2, 11 (emphasis added). Fixed water intake for commercial or industrial purposes is specifically listed as an activity that may create “major sediment disturbance,” and the notes to this category clarify that such actions “*must* be reviewed under the Interagency Agreement Watts Bar Reservoir Permit Coordination.” *Id.* (emphasis added). The agreement does not make any exceptions for new activities at the reservoir that will not increase fixed water intake. The fact that the operation of Watts Bar Unit 2 will utilize a fixed water intake for commercial or industrial purposes is sufficient to bring that activity within the purview of the agreement because such activity is a “potential major sediment disturbance.” Agreement at 11. It is therefore up to the interagency Working Group, and not TVA alone, to determine whether such water intake activities will disturb contaminated sediments in the reservoir.

Moreover, even if operation of Watts Bar Unit 2 will in fact not create any additional disturbance to the reservoir or its sediments, TVA has not shown that the SCCW system was ever reviewed by the Working Group and that it is not presently disturbing contaminated sediments.

Lastly, TVA blatantly and inexplicably contradicts itself regarding whether the SCCW system will need to be modified for the operation of Watts Bar Unit 2. TVA first acknowledges

that “some modifications to the SCCW system would be required for combined operation.” TVA Answer at 22 (quoting the 2007 FSEIS at 37). In the very next sentence, however, TVA claims that the list of “actions required to complete and operate WBN Unit 2, does not include any work on the SCCW.” *Id.* (citing the 2007 FSEIS at 20). No explanation or discussion is given for this obvious contradiction, which seriously calls into question whether Watts Bar Unit 2 will affect fixed water intake and whether modifications to the SCCW system will disturb the Watts Bar Reservoir sediments.

Petitioners have thus shown that the interagency agreement is directly applicable to TVA’s activities pertaining to fixed water intake for Watts Bar Unit 2, and that TVA has failed to comply with the plain language of the agreement.

2. *TVA’s Expired NPDES Permit*

With respect to Petitioners’ argument that TVA has failed to discuss the status of its expired National Pollution Discharge Elimination System (“NPDES”) permit, NRC Staff and TVA argue that the FSEIS provides the permit’s effective and expiration dates. NRC Staff Answer at 15; TVA Answer at 25. However, this information is buried at the end of the FSEIS in the “References” section and is not “discussed” anywhere in the body of the document. 2007 FSEIS at 124. Although TVA does state that it submitted an application for renewal of the permit in May 2006, no mention is made of the fact that the current permit is expired and that the new permit has not yet been issued. *Id.* at 46.

Moreover, TVA’s list of every reference in the FSEIS to the NPDES permit does not in any way demonstrate a sufficient discussion of compliance with the terms of the permit. TVA Answer at 24-25. The majority of the citations in TVA’s list amount to nothing more than vague passing references to the permit, with no actual discussion or analysis of the permit’s terms or

limitations, nor any real explanation of how TVA is in compliance with those limits. *See, e.g.*, 2007 FSEIS at 24 (“When there is a threat of exceeding the temperature limit in the river established by the plant’s NPDES permit, the bypass conduit is opened to provide precooling of the effluent before it enters the SCCW discharge structure.”); *Id.* at 26 (discussion of obsolete 2003 NPDES permit); *Id.* at 33 (“The potential for cumulative effects to surface water and aquatic resources are addressed by the plant’s NPDES permit and its monitoring requirements.”).

Additionally, the NRC Staff and TVA dismiss Petitioners’ reference to the possible existence of other, undisclosed permits as speculative and non-specific. NRC Staff Answer at 16; TVA Answer at 19. The NRC Staff and TVA thus impermissibly attempt to shift to Petitioners their burden to “*list* all Federal permits, licenses, [etc.]” 10 C.F.R. § 51.45(d) (emphasis added). Petitioners are not expected to guess which specific permits, licenses and/or approvals TVA must obtain. It is *their* job to provide a list of these things, which they have not done.

Petitioners have thus raised a genuine dispute regarding whether the 2007 FSEIS is in compliance with the language of 10 C.F.R. § 51.45(d) and Contention 1 should therefore be admitted.

**Contention 2: Inadequate SAMA Uncertainty Analysis**

TVA and the NRC Staff argue that Contention 2 should be dismissed because Petitioners have not identified any regulatory requirement that TVA must use 95th percentile values in its probabilistic risk assessments (“PRAs”) for its severe accident mitigation alternatives (“SAMA”) analysis. TVA Answer at 28-29, NRC Staff Answer at 18. NEPA has no prescriptive requirements, however. Instead, the standard for NEPA compliance is one of reasonableness. *See Northern States Power Co. (Prairie Island Nuclear Generating Plant, Units 1 and 2), Vermont*

*Yankee Nuclear Power Corp.* Vermont Yankee Nuclear Station), ALAB-455, 7 NRC 41, 48 (1978) and cases cited therein. Here, TVA itself has set the standard for reasonableness by claiming to use 95th percentile results in its sensitivity study for its entire SAMA analysis. As explained in the SAMA Analysis, TVA favors application of 95th percentile values because:

The results of the SAMA analysis can be impacted by implementing conservative values from the PRA's uncertainty distribution. If the best estimate failure probability values were consistently lower than the 'actual' failure probabilities, the PRA model would underestimate plant risk and yield lower than 'actual' averted cost-risk values for potential SAMAs. Re-assessing the cost benefit calculations using the high end of the failure probability distributions is a means of identifying the impact of having consistently underestimated failure probabilities for plant equipment and operator actions included in the PRA model. This sensitivity uses the 95th percentile results to examine the impact of uncertainty in the PRA model.

SAMA Analysis at 30.<sup>1</sup> Its failure to evaluate Level 3 uncertainties according to the same measure as for Level 1 and Level 2 -- especially with regard to meteorological data, which are readily available from the WinMACCS computer code outputs -- has not been explained and represents an inconsistency in the analysis. Inconsistencies of this nature undermine the credibility of the overall analysis unless they are adequately justified, which TVA has not done in this case.

Contention 2 is raises the a genuine and material dispute with TVA with respect to the fact that TVA, while representing application of the 95th percentile as a reasonably accurate

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<sup>1</sup> In this key respect, Contention 2 is very different from the contention that was dismissed in the *Indian Point* case, *Entergy Nuclear Operations, Inc.* (Indian Point Units 2 and 3), LBP-08-13, 68 NRC 43, 187 (2008). In that case, the SAMA analysis did not include a meteorological sensitivity analysis. The petitioner, with the expert assistance of Dr. Lyman, attempted to demonstrate the reasonableness of including a sensitivity analysis with respect to meteorological data parameters in its SAMA analysis, against the opposition of the applicant. Here, in contrast, the applicant has conceded the reasonableness of conducting a sensitivity analysis with regard to meteorological data parameters, and stated that it did such an analysis for the WBN site (although it did not provide the results of said analysis.) TVA SAMA at 31-32. Petitioners have a factual dispute with TVA regarding the adequacy of its Level 3 meteorological sensitivity analysis.

means of evaluating the impact of uncertainty in the PRA model used to assess the SAMA alternatives, and while claiming to apply the 95th percentile values in its SAMA analysis, does not fully and consistently do so – with the result that it significantly understates the potential consequences of accidents and the benefits of mitigation measures. There can be no doubt that TVA states in the SAMA analysis that it has applied the 95th percentile results throughout the PRA analysis:

Sensitivity cases were run for the following conditions to assess their impact on the overall SAMA evaluation:

\* \* \*

\* Use the 95th percentile PRA results in place of the mean PRA results.

SAMA Analysis at 29-30.

In contradiction of that claim, however, TVA actually used the 95th percentile results for *only* the Level 1 core damage frequency (“CDF”) analysis and Level 2 large early release frequency (“LERF”) analysis, neglecting to apply it to the Level 3 consequence analysis. Contention 7 challenges TVA’s failure to apply the 95th percentile results to its *entire* PRA in conducting its SAMA sensitivity analysis, in contradiction of TVA’s own representation, with the result that TVA unreasonably discards viable alternatives on the grounds that they are not cost-effective.

In responding to Contention 7, TVA denies that the SAMA Analysis represents that TVA applied the 95th percentile results to its Level 3 consequence analysis, and claims that Petitioners “admit” this. TVA Answer at 27. But TVA misconstrues Contention 7. As discussed in the contention and confirmed by the SAMA Analysis itself, there can be no doubt that TVA considers the term “PRA” to apply to Level 3 analysis as well as Levels 1 and 2. At pages 3-4 of the SAMA Analysis, TVA describes Level 3 as a “PRA Analysis” for Watts Bar 2. Even in its

Answer, TVA admits that “the probabilistic risk assessment (“PRA”) technique used in TVA’s SAMA analysis includes a ‘Level 3’ analysis intended to provide probabilistic analyses of the radiological impacts of severe accidents.” TVA Answer at 26. As Petitioners accurately point out, consistent with those statements, TVA makes a sweeping claim to have applied the 95th percentile results to the PRA as a whole at pages 29-30. Hearing Request at 10.

TVA’s sweeping claim is belied, however, by TVA’s more detailed discussion of the separate levels of the PRA. In discussing the specific results of the CDF (Level 1) study, the SAMA Analysis states that “[t]he PRA uncertainty calculation identifies the 95th percentile CDF as 4.28E-05 per year.” SAMA Analysis at 31. Similarly, in specifically discussing the LERF (Level 2) results, the SAMA Analysis states that “[t]he PRA uncertainty calculation identifies the 95th percentile LERF as 9.83E-07 per year.” In discussing the consequence (Level 3) sensitivity analysis, however, the SAMA Analysis makes no mention of consideration of 95th percentile results.. See SAMA Analysis at 31-32, Hearing Request at 10. Similarly, the SAMA Analysis bases its calculations on “release characteristics . . . based on representative accident scenarios that reflect the post core damage behavior for the dominant sequence or sequences within a plant damage state,” but fails to conduct any sensitivity analysis with respect to radionuclide release fraction uncertainties. SAMA Analysis at 8. TVA does not explain why it is appropriate to consider the 95th percentile in Level 1 and Level 2 uncertainty analysis but not appropriate to consider Level 3 uncertainties such as radionuclide release fractions, which NRC’s own analysis for ice condenser nuclear plants has shown could have a significant impact on the costs of a severe accident.<sup>2</sup>

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<sup>2</sup> TVA argues that radionuclide release fractions are part of the Level 2 PRA analysis, not Level 3. TVA Answer at 39. As explained in the “Methodology” section of the SAMA Analysis, however, “[t]he results of the combined Level 1 and Level 2 analysis are expressed as Release

Therefore TVA's attempt to show it did not contradict itself in the SAMA Analysis is without merit.

Contrary to TVA's argument at page 40, 95th percentile values do not represent "worst cases," because by definition, five percent of consequence outcomes would be more severe than the 95th percentile. The MACCS2 code output also contains worst-case results which are typically considerably larger than the 95th percentile values. By the same token, the Petitioners' contention that 95th percentile meteorological uncertainties should be considered in the TVA SAMA sensitivity analysis does not violate the NEPA "rule of reason" because the resulting harms that would be considered would not be "highly speculative." By definition, they would be no more speculative than considering the 95th percentile parameter uncertainties for Level 1 and Level 2 PRA, as TVA has done.

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Category frequencies for input to the Level 3 analysis." *Id.* at 4. Thus, release category frequencies (as well as magnitudes) constitute parameters of the Level 3 PRA analysis. Uncertainties in these parameters, although derived from Level 2 analysis, would serve as inputs to a Level 3 sensitivity analysis. TVA is correct in part because radionuclide release fractions are outputs of the Level 2 analysis. However, this further underscores the deficiency of its Level 2 sensitivity analysis. By not considering variations in radionuclide release fractions, the 95th percentile uncertainty in LERF as stated in the SAMA analysis may not be correct, because it does not account for variations in radionuclide release that may change the determination of whether an accident sequence would or would not result in a "large" release.

TVA also asserts that Petitioners do not show that the alleged errors in the analysis of the radioactive release fraction would affect the outcome of the SAMA Analysis. TVA Answer at 39. But Dr. Lyman expresses his expert opinion that a more accurate assessment of the uncertainties associated with radioactive release fractions "could have a significant effect on SAMA outcomes" because of the "large range of possible release fractions for each containment damage stage." Hearing Request at 11. He also quantifies the difference, saying that the consequences (and hence the benefits) could increase by a factor of three or four. *Id.* at 12. Thus, TVA's argument is incorrect.

To the extent that TVA may be arguing that Petitioners did have not shown that its failure to apply the 95th percentile to the Level 3 analysis has a significant effect on the outcome of the analysis for WBN2 in particular, Petitioners respectfully submit that it is impossible to make that determination at this juncture, given the paucity of information provided by TVA in the SAMA Analysis regarding the details of the SAMA Analysis.

TVA argues that the Board should not consider the information in Dr. Lyman’s Indian Point Study because the “*Indian Point Study does not directly relate to WBN Unit 2 or the SAMA Analysis submitted by TVA*” (emphasis in original). TVA Answer at 36. TVA’s argument that a consequence analysis for another nuclear power plant could not be relevant to WBN2 is belied by TVA’s own SAMA Analysis, however, which explicitly relies on meteorological data uncertainty analyses from Vogtle and Wolf Creek – plants that are both considerable distances from WBN2. TVA does not explain in its initial SAMA analysis why it does not provide results from the site-specific meteorological sensitivity analysis for WBN2 that it claims to have conducted, but instead refers to the results of meteorological uncertainty studies from the Wolf Creek and Vogtle license renewal applications. The citation of Dr. Lyman’s Indian Point study and the results of the meteorological uncertainties it provides, is no more and no less relevant to the impact of these uncertainties on the WBN2 SAMA analysis as the analyses of such uncertainties in the Wolf Creek and Vogtle license renewal applications. TVA could easily resolve this issue simply by providing the 95th percentile results from its WinMACCS SAMA calculations for WBN2, which are readily available from the output files. On the other hand, Petitioners do not have access to the TVA’s WB site meteorological data files, and hence are not in a position to do the site-specific analyses themselves.

In any event, TVA also mischaracterizes the results of the Vogtle SAMA uncertainty analyses. In the WBN2 SAMA Analysis, TVA asserts that “[m]eteorological data and radionuclide release height have been studied extensively (e.g., the Vogtle and Wolf Creek SAMA Uncertainty analysis) and have been shown to result in relatively small changes in overall risk.” SAMA Analysis at 32. But the SAMA Analysis gives no elaboration regarding this allegedly extensive study, and it provides no direct citation to any supporting document. *Id.* In

reality, there are two Vogtle SAMA analyses. One is part of the license renewal application for the existing reactors at Vogtle. However, a second SAMA analysis was performed as part of the Vogtle Early Site Permit (ESP) application.<sup>3</sup> TVA does not indicate in its original filing to which SAMA analysis it is referring.

In its Answer, TVA indicates for the first time that its reference to a Vogtle SAMA analysis pertains to the SAMA analysis for license renewal. TVA Answer at 42 n.209). A review of that reference does not reveal an extensive study of uncertainties in meteorological data, but merely a very limited one that sheds little light on the issue at hand. However, TVA fails to reveal that in the Vogtle ESP SAMA analysis, MACCS2 input and output files were submitted that clearly support the Petitioners' argument that considering 95th percentile meteorological data would result in greater consequences by a factor of three or four.<sup>4</sup> Thus the results of the MACCS2 calculations done to support the Vogtle ESP SAMA analysis support the Petitioners' argument rather than TVA's argument.

TVA argues that because Dr. Lyman did not submit a declaration which separately provided the facts and opinions on which Contention 2 is based, the contention should be dismissed. TVA Answer at 34(citing *Entergy Nuclear Vermont Yankee L.L.C.* (Vermont Yankee Nuclear Power Station), LBP-04-28, 60 NRC 548, 560 n.16 (2004)). This issue was most recently addressed in the Yucca Mountain licensing proceeding, where the three separate panels

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<sup>3</sup> Southern Nuclear Operating Company, Vogtle Early Site Permit Application, Revision 5, Part 3, Environmental Report, Revision 2, Chapter 7, "Environmental Impacts of Postulated Accidents Involving Radioactive Materials" at 7.3-1 (December 31, 2008) (ADAMS Accession Number ML091540840).

<sup>4</sup> E-mail from Tom C. Moorer, Southern Nuclear Company, to Mark Notich, NRC, "MACCS2 Input and Output File Revisions" (July 18, 2007) (ADAMS Accession Number ML072140315). *See, for example*, the data set on page 74, which shows that the calculated 95th percentile population dose within 50 miles (80.5 km) is 32,600 person-Sievert, whereas the mean population dose within 50 miles is 7,580 person-Sievert. The ratio of the 95th percentile population dose to the mean population dose is 4.3.

of ASLB judges presiding over the proceeding agreed that to dismiss a contention on that basis would “exalt form over substance” because “[a]t bottom, what is important is that the claim made in [the contention] has the support of a clearly qualified expert.” *U.S. Department of Energy* (High Level Waste Repository), LBP-09-06, \_\_ NRC \_\_, slip op. at 44 (May 11, 2009). Petitioners respectfully submit that in this case, the ASLB should follow the example of the Yucca Mountain ASLB and rule that Petitioners have adequately supported Contention 2 with the factual knowledge and expert opinions of Dr. Lyman.

TVA and the Staff also argue that the contention should be dismissed because Dr. Lyman’s expert report regarding the deficiencies in the consequence analysis for the Indian Point SAMA Analysis was not attached to his declaration or to Contention 2. TVA Answer at 35-36, NRC Staff Answer at 19. In expressing his expert opinion, however, Dr. Lyman was not required to submit every document on which he relies for his opinion. His declaration of his expert opinion and explanation of the reasons for his opinion is sufficient to support the contention. As the ASLB ruled in the *Vermont Yankee* license renewal case, although NRC case law does not permit admission of contentions where petitioners offer “no tangible information, no experts, no substantial affidavits,” but instead submit only “bare assertions and speculation,” that is not the case where petitioners “present sworn statements by an unchallenged expert who describes his professional reasoning and arrives at recommendations and conclusions based on that reasoning.” *Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-06-20, 64 NRC 131, 190 (2006) (quoting *GPU Nuclear, Inc., Jersey Central Power & Light Co., and AmerGen Energy Company, LLC* (Oyster Creek Nuclear Generating Station), CLI-00-06, 51 NRC 193, 208 (2000)). A petitioner is:

not required to prove its contention at this time, but merely to identify the alleged shortcomings in [the applicant’s] application with enough specificity to ensure that ‘the

Applicants are sufficiently put on notice so that they will know at least generally what they have to defend against or oppose, and that there has been sufficient foundation assigned to warrant further exploration of [the] contention.

*Id.* (quoting *Kansas City Gas & Electric Co. (Wolf Creek Generating Station, Unit 1)*, LBP-84-1, 19 NRC 29, 34 (1984)). In any event, both TVA and the Staff clearly are familiar with Dr. Lyman's report.

**Contention 3: Inadequate Consideration of Severe Accident Mitigation Alternatives With Respect to AC Backup for Diesel Generators**

Both TVA and the NRC Staff confuse this NEPA contention with a safety contention. Contrary to their arguments, Petitioners do not seek to “modify the rules” (NRC Staff Answer at 23) or to establish new prescriptive requirements for resolution of GSI-189 (TVA Answer at 47). Instead, Petitioners assert that TVA's SAMA Analysis is deficient under the requirement of NRC NEPA implementing regulation 10 C.F.R. § 51.53(b) for an evaluation of alternatives to the proposed action. The requirement to satisfy NEPA, while potentially overlapping, is separate and independent of the requirement to satisfy NRC safety requirements. *Limerick Ecology Action v. NRC*, 869 F.2d 719, 729-30 (3rd Cir. 1989).

As explained in the contention, the SAMA analysis does not provide enough information to permit a reasonable assessment of the alternative to which TVA has committed – installation of mobile backup diesel generators – to mitigate the environmental impacts of that could occur if hydrogen igniters fail during a severe station blackout accident at WBN2.

TVA does not deny that its sole reference to the mobile diesel backup alternative consists of the cursory statement that: an “alternative power supply to the hydrogen igniters was implemented.” TVA Answer at 43 n.212 (citing SAMA Analysis at page 97). However, TVA does not point to any discussion in the SAMA Analysis of the relative risks of relying on its chosen the backup diesel generator alternative versus other alternatives that do not rely on human

intervention and therefore have higher reliability.<sup>5</sup> As documented in Contention 3, on at least two occasions, human errors have occurred in the use of backup diesel generators. While both TVA and the NRC Staff protest that these incidents had low safety significance (an issue that Petitioners did not conceal in the contention and do not deny), nevertheless they show that reliance on mobile backup diesel generators raises reliability issues. Petitioners continue to assert that the SAMA Analysis should address these issues and provide a comparison to the risks posed by other alternatives such as mandatory dedication of the power supply, independence of the backup power supply to the igniters from backup power to other systems, and seismic qualification. Hearing Request at 16.

**Contention 4: Inadequate Discussion of Need for Power and Energy Alternatives**

TVA and the NRC Staff both oppose admission of Contention 4. The Staff relies on the purely legal argument that Contention 4 is not within the scope of the proceeding or material to the NRC's findings for the licensing of WBN2 because 10 C.F.R. § 51.53(b) excuses TVA from discussing need for power and energy alternatives in the FSEIS. NRC Staff Response at 23. But the Staff overlooks other language in § 51.53(b), which, consistent with the National Environmental Policy Act ("NEPA") and judicial decisions interpreting NEPA (*see, e.g., Marsh v. Oregon Natural Resources Council*, 490 U.S. 360- 374 (1989)), requires environmental reports ("ERs") by operating license applicants to discuss matters that "differ" from matters discussed in the environmental impact statement ("EIS") prepared at the construction permit stage or that "reflect new information in addition to" the information presented in the

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<sup>5</sup> TVA erroneously confuses probabilistic risk analysis, which permit comparisons of alternatives to take into account such factors as human reliability, with NRC case law which precludes the legal assumption, in evaluating whether a license applicant satisfies NRC safety regulations, that the licensed applicant will violate license conditions. TVA Answer at 47 (citing *Curators of the Univ. of Mo.*, CLI-95-08, 41 NRC 386, 400 (1995)).

construction permit EIS. The Staff itself is also bound by 10 C.F.R. § 51.92 to consider new and significant information affecting its previous conclusions. And TVA, for its part, has institutionalized a process for regularly updating its own environmental analyses of energy demand and alternatives, through its Integrated Resource Plans (“IRP”) and associated EISs.

While § 51.53(b) may ordinarily be read to excuse operating licenses from revisiting need for power and alternatives analyses conducted at the construction permit stage, the regulation cannot reasonably be read to extinguish the requirement to consider new and significant information or changed circumstances. To do so would not only violate *Marsh*, 10 C.F.R. § 51.92, but it would also contradict basic principles of statutory and regulatory interpretation. *Rucker v. Wabash Railroad Co.*, 418 F.2d 146, 150 (7th Cir. 1969) (regulation may not be construed to “read out” one of its terms). By the same token, the regulations cannot be reasonably read to preclude Petitioners from challenging TVA’s analysis of changed circumstances that have occurred over the past thirty five years since the EIS was prepared for the WBN2 construction permit. Notably, TVA does not dispute Petitioners’ argument that they should be permitted to challenge TVA’s need for power and energy alternatives analyses.

With respect to Petitioners’ assertion that TVA relies on outdated need for power analyses in its 1972 FES and its 1995 IRP and associated EIS (Hearing Request at 17-18), TVA argues that the contention should be rejected because Petitioners have failed to acknowledge the FSEIS’ “updates” to those prior environmental documents, which now substitute for the earlier environmental studies. TVA Answer at 59. According to TVA, the only aspect in which it relies on the 1995 IRP is its “methodology.” *Id.*

TVA’s assertions are belied by the text of the FSEIS itself, which explicitly states that the FSEIS “updates analyses in the previous environmental reviews *and tiers from the IRP FEIS*,

*particularly utilizing the analysis of energy resource options therein.*” FSEIS at 8. Thus, while the FSEIS updates discrete data points in the IRP FEIS through 2006, it continues to rely to a significant extent on the analysis presented in the EIS for the 1995 IRP.

In any event, Petitioners do address the economic forecasts presented in the FSEIS, and criticize them for the facts that (a) they do not take into account the long-term effects of the extraordinary economic downturn now affecting the United States (including “devastating changes” in the auto industry that comprises a significant portion of TVA’s customer sector) and (b) TVA’s economic forecasts take too short a view, projecting out to only about 2015. Hearing Request at 18, Makhijani Report at 2.

TVA also argues that the fact that TVA has started a process for updating the IRP does not support Petitioners’ argument that the need for power analysis in the FSEIS is inadequate, citing the ASLB’s *Vogtle* decision in which the Board found that the pendency of a new demand study by the state regulatory agency did not provide sufficient support for a contention criticizing the applicant’s need for power analysis. *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP), LBP-07-03, 65 NRC 237, 272 (2007). But in *Vogtle*, the ASLB found that the petitioners relied too heavily on the prospect of a new study, and provided “no direct critique of the analysis currently in the ER and no factual or expert support for their claim that a new analysis would yield a materially different result.” 65 NRC at 271. Here, in contrast, Petitioners have, with the support of an expert report by Dr. Makhijani, criticized the FSEIS and its departure from the 1995 IRP as unjustified. Hearing Request at 18-19, Makhijani Report at 2-4. As Dr. Makhijani states in his report, TVA’s faulty and obsolete analysis in the FSEIS puts TVA at risk of repeating the mistakes of the 1970s, when it ordered nuclear plants that it was later forced to cancel. Makhijani Report at 3.

TVA argues that because there is a “substantial margin of uncertainty” in energy demand forecasting, Petitioners have no basis for claiming that TVA should have extended its forecasting for a longer period. TVA Answer at 61-62 (citing *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 365-67 (1975); *Kansas Gas & Elec. Co.* (Wolf Creek Generating Station, Unit 1), ALAB-462, 7 NRC 320, 328 (1978); *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, & 4), CLI-79-5, 9 NRC 607, 609-10 (1979); *Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), ALAB-355, 4 NTC 397, 410 (1976); *Exelon Generating Co.* (Early Site Permit for Clinton ESP Site), LBP-05-19, 62 NRC 134, 167 (2005); *South Carolina Elec. & Gas Co.* (Virgil C. Summer Nuclear Station, Units 2 & 3), LBP-09-02, slip op. at 21 (Feb. 18, 2009); *Tennessee Valley Authority* (Bellefonte Nuclear power Plant, Units 3 & 4), LBP-08-16)). But as stated in *Niagara Mohawk*, the standard for judging economic forecasts is one of reasonableness. 1 NRC at 366-67. *See also Wolf Creek*, ALAB-462, 7 NRC at 328 (the forecast must be a “reasonable one”); *Catawba*, ALAB-355, 4 NRC at 410 (forecasts must be “reasonably accurate”); *Clinton*, LBP-05-19, 62 NRC at 167 (NEPA forecasts must be “judged on their reasonableness”).

Moreover, in the recent cases cited by TVA in which contentions that asserted a failure to consider the current economic conditions were dismissed, the contentions were dismissed primarily due to a lack of specificity and materiality. *Summer*, LBP-09-02, slip op. at 21 (“although we are aware of the serious nature of the current national economic problems, the contention does not challenge the COLA with any (let alone the requisite) specificity nor provide sufficient information to show that a genuine dispute exists”); *Bellefonte*, LBP-08-16, slip op. at 47 (the petitioners’ focus on near-term economic conditions failed to provide sufficient support for an admissible contention, nor was there any attempt to establish the materiality of the

allegation). Here, however, Petitioners contend, with the support of TVA's own quarterly report to the SEC, as evaluated by Dr. Makhijani, that the recent economic crisis has had very severe impacts on TVA, such that the "business-as-usual" type of energy demand forecasting which may be appropriate in other circumstances no longer suffices. Makhijani Report at 3. Moreover, as Dr. Makhijani discusses at page 10 of his Report, TVA has been in similar economic circumstances before, when its economic projections turned out to be wildly inaccurate. Finally, Dr. Makhijani discusses a range of legislative measures with economic components that are likely to have a profound impact on energy demand, including the climate legislation now pending in Congress.<sup>6</sup>

TVA also claims to have "explicitly considered a low or no economic growth scenario in both the 1995 IRP EIS and the 2007 FSEIS that effectively provides what Petitioners seek regarding the current economic downturn." TVA Answer at 63. To the contrary, Petitioners seek an analysis that is based on a *decrease* in economic growth and energy demand and the prospect that any recovery -- even to the level of 2008 -- may take a long time, as was the case in the crisis of the late 1970s and 1980s. Hearing Request at 18-19, Makhijani Report at 3-4 and at 11.

In a subsequent paragraph, TVA appears to acknowledge that Petitioners seek a new need for power analysis based on decreased demand, but states that Petitioners do not explain how consideration of "specific, current economic factors will materially impact the results of the need for power analysis" and that Petitioners "have not established how such short term differences

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<sup>6</sup> TVA characterizes these legislative changes as "ill-defined future events." TVA Answer at 64. As Dr. Makhijani points out, however, TVA itself repeatedly refers to the impacts of climate changes on energy demand repeatedly in its recent Federal Register announcement of a new IRP decision-making process, thus indicating that TVA believes the effects of the new laws should be considered in TVA's energy planning process. Makhijani Report at 8.

between predicted and actual demand are material to a long term need for power analysis.” In making this argument, TVA simply misses Petitioners’ point that today’s economic crisis is so severe that it promises to have lasting effects, just as did the economic downturn of the 1970’s when demand did not recover to the level of the mid-1970s for over a decade-and-a-half, Makhijani, at 11. Moreover, during that earlier crisis, there was no prospect of a further significant demand reductions that are likely to result as a result of climate legislation, including a price on carbon dioxide emissions. Taken together, the economic crisis and climate legislation may well result in an even more prolonged process of demand recovery than TVA experienced over a decade-and-a-half after the mid-1970s peak. Makhijani Report at 11.

TVA next asserts that in any event, the question of whether demand may decrease is immaterial because the WBN2 plant will provide “additional fuel diversity, operating flexibility, and a lower delivered cost of power.” TVA Answer at 64. But these claims are also addressed in Dr. Makhijani’s Report. With respect to fuel diversity and operating flexibility, Dr. Makhijani criticizes the FSEIS for failing to discuss energy efficiency and alternative energy sources that could diversify TVA’s baseload energy supply, including construction of facilities with shorter lead times. Makhijani Report at 4-5. With respect to TVA’s claim of lowered power cost, Dr. Makhijani points out that TVA’s prediction of decreasing power costs is based on the very questionable assumption that demand will increase. *Id.* at 6. Dr. Makhijani also criticizes the FSEIS for failing to take account of the history of delays and cost escalations that have plagued TVA nuclear projects, including Watts Bar 1 which took 23 years to complete. *Id.* at 4.

TVA claims that the reports by the National Renewable Energy Laboratory (“NREL”) and American Wind Energy Association (“AWEA”) do not support Dr. Makhijani’s assertion that wind energy is a viable source of baseload power. TVA Answer at 67. In claiming that the

AWEA report “does not even discuss the possibility of wind energy becoming a baseload generating source,” TVA ignores the fact that Dr. Makhijani’s analysis is based on the *combined* use of compressed air and wind power, with a small supplement of natural gas. In arguing that the NREL report refers only to the “possibility” that wind energy can meet baseload capacity requirements, TVA quotes selectively from the NREL report, which goes significantly beyond a discussion of a mere possibility and states that baseload wind power systems using compressed air storage “could provide a large fraction of a region’s electricity demand, *far beyond the 10-20% often suggested as an economic upper limit* for conventional wind generation deployed without storage.” (emphasis added) The report also asserts that compressed air energy storage could be used “to enable a nearly constant output by smoothing the highly variable output from wind turbine generation.” Thus, Petitioners have proffered an admissible contention and TVA’s assertion is without merit. *See Luminant Generation Company* (Comanche Peak Nuclear Power Plant, Units 3 and 4), LBP-09-17, slip op. at 82 (August 6, 2009) (admitting a contention challenging an ER for failure “to include consideration of alternatives . . . consisting of combinations of renewable energy sources such as wind and solar power, with technological advances in storage methods and supplemental use of natural gas, to create baseload power.”)

Finally, TVA cites *Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-04, 53 NRC 31, 55 (2001) and *Citizens Against Burlington v. Busey*, 938 F.2d 190, 197, cert. denied, 502 U.S. 994 (1991) for the proposition that in considering alternatives, the NRC must accord “substantial weight” to the business choices of the applicant. TVA Answer at 53-54. TVA overlooks the fact that in NRC cases which have applied this rule, its application has been strictly limited to “private” business applicants. *See Hydro Resources, Inc.*, 53 NRC at 55; *Exelon Generation Company, L.L.C.* (Early Site Permit for Clinton ESP Site), LBP-05-19, 62

NRC 134, 168 (2005), *aff'd* CLI-05-29, 62 NRC 801 (2005), *aff'd sub nom. Env'tl. Law & Policy Ctr. V. NRC*, 470 F.3d 676 (7th Cir. 2006); *Louisiana Energy Services, L.P.* (National Enrichment Facility), LBP-06-08, 63 NRC 241, 259 (2006). Here, in contrast, the TVA is a federal agency, and thus no deference is due to TVA.

**Contention 5: Inadequate Basis for Confidence in Availability of Spent Fuel Repository and Safe Means of Interim Storage**

NRC Staff and TVA argue that Contention 5 should be dismissed because it impermissibly challenges NRC's ongoing rulemaking proceeding regarding the Proposed Waste Confidence Decision and the Proposed Temporary Storage Rule. NRC Staff Answer at 28-29; TVA Answer at 70-71. Petitioners recognize the Commission's long-standing policy that Licensing Boards "should not accept in individual license proceedings contentions which are (or are about to become) the subject of general rulemaking by the Commission." *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 345 (1999). Nevertheless, Petitioners raise this issue for the purpose of preserving it for appeal.

**Contention 6: TVA's EIS Fails to Satisfy the Requirements of NEPA Because it Does Not Contain an Adequate Analysis of the Environmental Effects of the Impact of a Large, Commercial Aircraft into the Watts Bar Nuclear Plant.**

NRC Staff and TVA argue that Contention 6 should not be admitted because Petitioners' assertion that NEPA requires a discussion of the impacts of an aircraft attack on Watts Bar Unit 2 conflicts with NRC precedent that "the NRC does not need to consider, as part of its environmental review, terrorist attacks on nuclear power plants." TVA Answer at 76 (citing *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-07-8, 65 NRC 124 (2007); *Sys. Energy Res., Inc.* (Early Site Permit for Grand Gulf ESP Site) CLI-07-10, 65 NRC

144 (2007); *Nuclear Mgmt. Co., LLC* (Palisades Nuclear Plant), CLI-07-9, 65 NRC 139 (2007).  
*See also* NRC Staff Answer at 33.

Although Petitioners recognize that the Commission has consistently refused to require consideration of terrorist attacks as part of an environmental review, Petitioners respectfully disagree with the Commission's reading of NEPA and thus raise this issue for the purpose of preserving it for appeal.

**Contention 7: Inadequate Consideration of Aquatic Impacts**

TVA and the NRC attempt to compare Contention 7 with contentions or portions of contentions that were rejected as inadmissible in the *Vogtle* and *Bellefonte* cases. TVA Response at 81, NRC Staff Response at 36-37 (citing *Southern Nuclear Operating Co.* (Early Site Permit for *Vogtle* ESP), LBP-07-03, 65 NRC 237 (2007); *Tennessee Valley Authority* (Bellefonte Nuclear Power Plant, Units 3 and 4), LBP-08-16, 68 NRC 361 (2008)). But they fail to acknowledge that in both of those cases, the ASLB *admitted* contentions or portions of contentions that are similar to Petitioners' Contention 7 in this case. In *Vogtle*, the ASLB admitted a contention similar to Contention 7, which stated that the ER failed to "identify and consider direct, indirect and cumulative impacts of the proposed cooling system intake and discharge systems on aquatic structures." 65 NRC at 258-59. And in *Bellefonte*, the ASLB concluded that information cited by Petitioners, showing a drastic decline in the health of the aquatic environment, "justif[ied] a further inquiry into whether the addition of the facility will have significant impacts on an ecosystem that apparently is already undergoing an appreciable alteration." 68 NRC at 401.

Contrary to TVA's argument at page 81, Contention 7 is not "similar" to the contentions that were rejected in *Vogtle* and *Bellefonte*. In both *Vogtle* and *Bellefonte*, the ASLB rejected

challenges to the adequacy of the applicant’s discussion of baseline conditions in isolation, holding that “the appropriate scope of the baseline for a project is a functional concept: an applicant must provide enough information and in sufficient detail to allow for an evaluation of important impacts.” *Bellefonte*, 68 NRC at 400 (quoting *Vogtle*, 65 NRC at 257). But in both cases, the ASLB ruled that baseline conditions could be relevant to the discussion of impacts in an admitted contention. *Bellefonte*, 68 NRC at 401; *Vogtle*, 65 NRC at 258-59. Here, petitioners’ criticisms of TVA’s description of existing aquatic conditions are made in the context of their challenge to the discussion of the environmental impacts of WBN2. Petitioners do not seek to litigate the adequacy of TVA’s discussion of baseline conditions in isolation. Instead, as stated in the contention, TVA’s mischaracterization of the current health of the ecosystem as good leads to TVA’s failure to evaluate the impacts of WBN2 “in light of the fragility of the host environment.” Hearing Request at 31.

The *Bellefonte* Board also rejected aspects of Petitioners’ contention which claimed inadequacies or omissions in the TVA’s environmental report (“ER”), but did not discuss portions of the ER that addressed their concerns. 68 NRC at 401. Despite TVA’s and that Staff’s protestations to the contrary, that situation does not exist here, where Dr. Young has thoroughly addressed all relevant portions of the FSEIS. Thus, the adverse rulings in *Vogtle* and *Bellefonte* are inapposite to Contention 7.<sup>7</sup>

In response to Petitioners’ first assertion, that TVA “mischaracterizes the current health of the ecosystem as good, and therefore fails to evaluate the impacts of WBN2 in light of the

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<sup>7</sup> It should also be noted that in *Bellefonte*, although Dr. Young submitted a declaration in support of the petitioners’ contention, it was not timely filed, and therefore was not considered by the ASLB. 68 NRC at 399-400. Here, in contrast, Contention 7 is supported by a timely-filed declaration by Dr. Young which sets forth in detail his analysis of the technical inadequacies of the FSEIS. Thus, contrary to TVA’s suggestion at page 83, the *Bellefonte* decision was not based on Dr. Young’s statements.

fragility of the host environment,” both TVA and the NRC Staff flyspeck the extensive evidence cited in Section C of Dr. Young’s declaration. NRC Staff Response at 39, TVA Response at 82. For instance, TVA disputes the significance of a ten-point decrease in the Reservoir Fish Assemblage Index (“RFAI”) between 1993 and 2005. TVA Answer at 82 n.415. TVA’s argument only serves to demonstrate the existence of a dispute between TVA and the Petitioners. And TVA ignores the other evidence of declining fish health presented in paragraphs III.C.4 and III.C.5 of Dr. Young’s Declaration.<sup>8</sup>

As a general matter, the Staff argues that the ASLB should not admit the portion of Contention 7 which criticizes TVA’s failure to provide more site-specific data on aquatic health, arguing that the contention is fatally flawed because Petitioners have not provided factual or expert analysis to support their conclusions. This is simply not the case. Dr. Young explains at length in his declaration why the generic data provided by TVA is inadequate to assess the environmental impacts of WB2. As he states in paragraph III.D.6, for example:

Knowledge of ichthyoplankton population distribution in relation to intakes across time and space is very important to an understanding of entrainment impacts, because ichthyoplankton tend to be patchy (high numbers clumped into a specific portion of the water column). This patch distribution creates a high level of vulnerability to entrainment mortality if the organisms are located near the intakes, because they cannot simply avoid the intakes.

*See also* paragraphs III.D.11-13. In paragraph III.D.10, Dr. Young also cites EPA guidance for entrainment monitoring which calls for sampling at water intake structures.

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<sup>8</sup> In a lengthy footnote (note 410 at page 81), TVA criticizes Dr. Young’s reliance on fish data provided in TVA environmental documents to show a decline in fish health. But none of the qualifications about the comparability of the fish data presented in TVA’s footnote are mentioned in the TVA environmental documents. TVA’s *post hoc* and self-serving attempt to undermine the portrait of declining fish health provided in its own environmental documents should be disregarded.

The Staff also argues that Contention 7 is inadmissible because Petitioners fail to demonstrate “that TV’s use of the data led to a flawed assessment of environmental consequences.” NRC Staff at 41 (citing *Winthrop v. FAA*, 535 F.3d 1, 10 (1st Cir. 2008)). *See also id.* (Petitioners “point to no error or misuse of data by TVA” regarding impingement impacts) and *id.* at 42 (with respect to thermal impacts, “it appears that Petitioners are seeking more site-specific data, which does not support admission of a contention.”)

To the contrary, Dr. Young repeatedly asserts that TVA’s use of outdated and inaccurate data leads it to underestimate the environmental impacts of WB2. For example, in paragraph III.A.2, he states his conclusion that due to its reliance on outdated and inadequate data, “the FSEIS understates the potential impacts of the coolant intake system (*i.e.*, entrainment and impingement) and the thermal impacts of the coolant discharge system on fish and benthic organisms.” Similarly, in paragraph III.D.12, Dr. Young states his opinion that “[i]f the number of organisms is greater on the riverbank where WBN water intakes are located, *then there is a greater probability that numbers of entrained organisms may greatly exceed TVA’s estimated impact of entrainment.*” He also states that TVA’s estimates of impacts on fish eggs “may be greatly underestimated.” *Id.*, par. III.D.14. Dr. Young also demonstrates that entirely different species of fish may be affected by impingement at the WB2 intake than the SCCW intake, clearly a significant difference in impacts. *Id.*, par. III.D.13. In addition, Dr. Young repeatedly shows how TVA’s complete failure to provide a technical assessment of thermal impacts on fish undermines its conclusion that thermal impacts are insignificant. *Id.*, pars. III.E.3.d-e and par. III.E.4.

The *Winthrop* case cited by the NRC Staff provides no support for the Staff’s argument because, in that case, the court specified that an agency may rely on outdated data so long as

“there has been no major change that would cause one to expect contemporaneous conditions to vary significantly from conditions at the time the data were gathered.” *Winthrop*, 535 F.3d at 10. See also NRC Staff Answer at 41.<sup>9</sup> The court found it reasonable for the agency to base its decision on the data underlying an impact statement issued three years earlier. *Winthrop*, 535 F.3d at 9. Here, however, TVA relies on entrainment and impingement data that is as much as thirty-four years old. Young Declaration at par. II.D.8 (TVA based its conclusions of ichthyoplankton entrainment on ichthyoplankton surveys conducted in 1975-76 and 1996-97). Since that time, Watts Bar Unit 1 has been in operation and Watts Bar Unit 2 has been constructed on the Watts Bar site. It is therefore entirely unreasonable to presume that contemporaneous conditions do not vary significantly from the time the data was first gathered.

The NRC also erroneously relies on *Theodore Roosevelt Conservation Partnership v. Salazar*, 605 F.Supp.2d 263 (D.D.C. 2009). NRC Staff Answer at 40-41. In that case, the agency based its projections regarding the proposed project’s effects on air quality on data that was collected using a method for analyzing ozone air quality that was outdated and had been discredited. *Roosevelt*, 605 F. Supp. 2d. at 272. However, the court found that, at the time the agency conducted its analysis, that method “was the best method available.” *Id.* at 273. Additionally, the ozone analysis was “already complete” and the agency had “carefully considered” the appropriateness of relying on that data. *Id.* Here, however, TVA has made no showing that it carefully considered the appropriateness of using such outdated data. Nor has TVA sufficiently demonstrated that it would be difficult to collect current data. TVA thus

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<sup>9</sup> The NRC Staff makes much of the fact that Dr. Young cannot state with certainty that the results of TVA’s studies would be different if it gathered its data in a more accurate way. NRC Staff Response at 41. But it would not be responsible for any scientist to claim certainty regarding the outcome of a study that has never been conducted. Undoubtedly, had Dr. Young expressed such certainty, he would have been criticized for his lack of professionalism and objectivity.

cannot hide behind cases such as *Winthrop* and *Roosevelt* in order to avoid its NEPA obligations. *See also Northwest Ecosystem Alliance v. Rey*, 380 F. Supp. 2d 1175, 1195 (W.D. Wash. 2005) (“Relying on outdated data or not acknowledging the limitations in a methodology are grounds for setting aside an EIS.” (citing *Lands Council v. Powell*, 395 F.3d 1019, 1032 (9th Cir. 2005))).

The Staff argues that Petitioners have mischaracterized the FSEIS by claiming it portrays mussel health as “excellent,” because FSEIS Table C-4 also shows that TVA gave mussel health (as included in overall benthic health) both “good” and “poor” scores in addition to an “excellent” score. NRC Staff Response at 39; 2007 FSEIS at 152. But the Staff overlooks the fact that the location of the mussels that are in assertedly “good” health is a significant distance downstream of the WB2 outfall, and the location of mussels in assertedly “poor” health is above the outfall – in fact, it is above the Watts Bar dam. *See* FSEIS Figure 3-4 at page 58. At the location of the outfall itself – *i.e.*, the location where WB2’s aquatic environmental impacts will be greatest – Table C-4 asserts that mussel health is “excellent.” 2007 FSEIS at 152.

With respect to entrainment impacts, TVA argues that Petitioners have not provided a basis for disputing the Tennessee Department of Environment and Conservation’s approval of TVA’s 1996-97 entrainment and impingement monitoring program. TVA Response at 84. But in fact, Dr. Young identifies numerous deficiencies in the FSEIS with respect to the evaluation of entrainment impacts. In the absence of a valid and up-to-date NPDES permit (which TVA does not have), his criticisms are admissible. *Vogtle*, 65 NRC at 258-59.

TVA also asserts that Petitioners and Dr. Young ignore TVA’s 1998 report regarding two years of entrainment and entrapment monitoring: *Aquatic Environmental Conditions in the Vicinity of Watts Bar Nuclear Plant During Two Years of Operation, 1996-97 (1998)* (“Aquatic Study”). TVA Answer at 85 n.431. But TVA identifies no information in the FSEIS that would

contradict Dr. Young's statement, in paragraph III.D.7 of his Declaration, that "[t]he FSEIS presents no post-operational entrainment monitoring for the Condenser Cooling Water ("CCW") or Supplemental Condenser Cooling Water (SCCW) intakes . . ." Regardless of what entrainment data TVA may have collected, they simply are not reported in the FSEIS.

In any event, the FSEIS does not identify the Aquatic Study as a document that is relevant to entrainment impacts. Although the Aquatic Study is listed as reference document "TVA 1998b" in Chapter 6 of the FSEIS, the text of the FSEIS cites "TVA 1998b" for only two propositions, neither of which has any relevance to entrainment impacts. One is a statement that "[f]or the operation of one unit [of WBN], the performance of the diffuser was confirmed by field studies after the startup of Unit 1" (FSEIS at 35); and the other is a statement that "[t]o protect [nearby] mussel beds, the state has established a mussel sanctuary extending 10 miles from TRM 520 to TRM 529.9 (Appendix C, Table C-7)." FSEIS at 57. In no other part of the FSEIS is the Aquatic Study; nor is any data from the study reported. If, in fact, TVA did collect actual entrainment data at the WBN1 intake in 1996-97, in compliance with EPA's 1977 draft guidance document (TVA Answer at 85 n.426), TVA's complete failure to discuss the results of the study only serves to highlight the existence of a material dispute regarding the adequacy of the FSEIS' evaluation of entrainment impacts.<sup>10</sup>

TVA also disputes Petitioners' reliance on a draft EPA guidance document that calls for direct monitoring of entrainment impacts at intakes, arguing that the guidance document is not binding. TVA Answer at 85 and n.426 (citing *Int'l Uranium (USA Corp)*, CLI-00-1, 51 NRC 9, 19 (2000)). Petitioners do not rely on the EPA guidance as binding precedent, however. Instead, Dr. Young relies on the document to support the reasonableness of his expert opinion that direct

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<sup>10</sup> Petitioners have obtained a copy of the Aquatic Study from TVA and are reviewing it. They intend to report to the ASLB regarding its effect on Contention 7 within twenty days.

monitoring of his expert the guidance document provides a basis for the contention because it contains evidence of sound scientific practice that is necessary in order to evaluate environmental impacts with reasonable accuracy. In addition, NRC case law recognizes that guidance documents provide evidence of methods for complying adequately with NRC regulations and NEPA. *See, eg., Public Service Co. of New Hampshire* (Seabrook Station, Units 1 & 2), CLI-77-8, 5 NRC 503, 523 (1977) (NRC regulatory guides establish “guidelines as to the type of information and analysis an applicant should provide in an application for purposes of facilitating NEPA review.”); *Consumers Power Co.* (Big Rock Point Nuclear Plant), ALAB-725, 17 NRC 562, 568 (1983) (NRC regulatory guide entitled to “considerable weight” ).

TVA disputes Dr. Young’s criticism of TVA’s reliance on outdated data in Table C.16 of the NRC’s 1978 FES to for its assumption that distribution of organisms across the river channel and from the surface to the bottom of the river is uniform. TVA Answer at 85 and n.427. According to TVA, Dr. Young focuses on the 1978 FES and ignores TVA’s subsequent submittals to the NRC. TVA Answer at 85. Dr. Young *did* address TVA’s subsequent submittals, however, explaining why they provided no useful information: in paragraph III.D.8 of Dr. Young’s Declaration, he states:

In lieu of relying on an actual field study of ichthyoplankton entrainment at the WBN1 intakes, TVA bases its conclusion of no significant impact on extrapolations from pre-operational ichthyoplankton surveys conducted over 30 years ago during the 1970’s (*i.e.*, a pre-operational 1975-76 ichthyoplankton study reported in the NRC’s 1978 FEIS) *and a general ichthyoplankton survey completed in 1996-97 at the SBN site*. Neither study used the appropriate methodology to evaluate entrainment by WBN1, nor are the appropriate data from these surveys listed in the FSEIS to support TVA’s conclusions concerning adverse impacts.

(emphasis added). TVA does not deny Dr. Young’s assertion that the 1996-97 study was a general survey to which TVA would have had to apply assumptions about fish density in order to reach its conclusions about entrainment impacts. This is borne out by simply reviewing Table C-

1 of the 2007 FSEIS which lists 1996-1997 post-operational data. 2007 FSEIS at 141-149. The table does not provide data for the individual sampling stations across the river near WBN1 intakes which is necessary to determine if there is a uniform distribution, so it is worthless in the matter. Most important, nothing in either Table C.16 or Table C-1 indicates that they provide actual measures of entrained organisms.

Moreover, TVA does not deny that it assumes uniform distribution of organisms (“TVA does not rely *solely* upon any assumptions regarding population distributions of organisms”). TVA Answer at 85 (emphasis added). And its Answer provides no information to justify that assumption.

Throughout its Answer, TVA insinuates that the SCCW intake entrainment estimates are true measures of actual entrained organisms. *See, e.g.*, TVA Answer at 85 n. 430. But TVA does not point to any data, in the FSEIS or elsewhere, providing actual entrainment mortality numbers for the Watts Bar Unit 1 and 2 CCW intake.<sup>11</sup>

With respect to impingement impacts, TVA claims that Petitioners wrongly accuse TVA of failing to follow up on a 2005-07 survey conducted at the SCCW intake that found an increased level of impingement in comparison to other surveys. TVA Answer at 86. According to TVA, did follow up in its 2009 RAI Response regarding the FSEIS. *Id.* But the RAI response merely cites the 2005-07 survey for the proposition that “the WBN SCCW intake is not adversely impacting the fish community in the vicinity of WBN.” The Impingement Report itself states that “[p]eak impingement periods were during late winter and *may* be related to cold-

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<sup>11</sup> In note 430, TVA states that it also relies on the 1998 SCCW EA, which “estimated extremely low levels of entrainment.” TVA Answer at 85. As TVA admits, TVA relied on no actual entrainment measurements. In any event, the SCCW intake is above the Watts Bar dam, and thus does not provide information about the principal intake for WBN1 and 2, located below the dam on the Chickamauga Reservoir.

shock, which would have made shad [one of the two most prevalent species sampled] more vulnerable to impingement.” Impingement Report at 5. Thus, TVA speculated as to what the cause might be, but did not take any further measures to determine the actual cause of the significantly increased impingement rates. Dr. Young’s criticism is justified.

Finally, TVA accuses Petitioners and Dr. Young of ignoring the 1996-97 operational impingement study reported on in the Aquatic Study. *See* discussion *supra* at 30. Once again, however, the FSEIS makes no mention of the Aquatic Study in the discussion of impingement impacts, nor does it present any data from the study. It is unclear why the FSEIS completely fails to mention such an assertedly important study.

With respect to thermal impacts, TVA disputes Petitioners’ assertion that TVA provides no evidence, such as scientific studies or field observations, to justify its conclusions. TVA Answer at 89. While these documents show that TVA has measured the temperature of the receiving water, they do not show that TVA has actually done any studies of the environmental impacts of discharge water temperatures on aquatic organisms over time and space, other than acknowledging the need to relocate mussels in the vicinity of the SCCW discharge. To give just one example, TVA provides no data in the FSEIS as to what organisms are located in the thermal plumes. Further, as discussed above, TVA RFAI scores derived from their own sampling show a decline in fish community health ratings from 1993 to 2005 after operation of WBN1 with the SCCW. 2007 FSEIS, Table C-3 at 151.

Moreover, although Dr. Young identifies the specific types of data sets that are completely missing from TVA’s studies, and explains why it is essential to understanding thermal impacts, TVA does not point to the existence of those data sets. While TVA claims to

provide data about the mixing zones, it does not claim to have addressed the impacts on aquatic organisms of variations in the mixing zone characteristics. Answer at 89-90.

TVA claims that Petitioners and Dr. Young have not supported their claim that TVA fails to show it has accounted for the impacts of overflow from the holding ponds, where excess cooling water may be stored at very high temperatures. TVA Answer at 90. According to TVA, Dr. Young's "scenario" is "erroneous," because TVA's NPDES permit prevents its discharge from exceeding 95 degrees. *Id.* But the FSEIS states that the NPDES thermal permit limits are "end-of-pipe" and therefore apply at the *outfall*. FSEIS at 34. Thus, Dr. Young is correct that water held in the storage pond may exceed 95 degrees. Therefore, if the storage pond capacity is exceeded and water is discharged into the river, it may cause adverse thermal impacts not anticipated in the FSEIS.

### III. CONCLUSION

For the foregoing reasons, Petitioners' contentions should be admitted.

Respectfully submitted,

Signed electronically by:

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## CERTIFICATE OF SERVICE

I certify that on August 14, 2009, I posted on the NRC's Electronic Information Exchange System copies of the foregoing Reply to NRC Staff's and Tennessee Valley Authority's Answers to Petition to Intervene and Request for Hearing and Motion to Permit Late Addition of Co-Petitioners to Southern Alliance for Clean Energy's Petition to Intervene and Admit Them as Intervenors. It is my understanding that as a result, the following parties were served:

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