

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Kristine L. Svinicki, Chairman  
Jeff Baran  
Stephen G. Burns

In the Matter of

TENNESSEE VALLEY AUTHORITY  
(Browns Ferry Nuclear Plant Units 1, 2, and 3)

Docket Nos. 50-259,  
50-260, and 50-296

**CLI-17-05**

**MEMORANDUM AND ORDER**

The Bellefonte Efficiency & Sustainability Team/Mothers Against Tennessee River Radiation (BEST/MATRR) has appealed the Atomic Safety and Licensing Board's decision denying its request for a hearing and a stay in this license amendment proceeding.<sup>1</sup> For the reasons described below, we deny the stay request and affirm the Board's decision.

**I. BACKGROUND**

This proceeding involves the Tennessee Valley Authority's (TVA) application for a license amendment for an extended power uprate for Browns Ferry Nuclear Plant Units 1, 2,

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<sup>1</sup> *Appeal of the Bellefonte Efficiency & Sustainability Team/Mothers Against Tennessee River Radiation ("BEST/MATRR") Regarding the Atomic Safety and Licensing Board's Denial of BEST/MATRR's Hearing Request and Petition to Intervene Regarding Tennessee Valley Authority's License Amendment Request for Extended Power Uprates for Browns Ferry Nuclear Plant Units 1, 2, and 3* (Nov. 25, 2016) (Appeal); see LBP-16-11, 84 NRC \_\_ (Nov. 2, 2016) (slip op.).

and 3 in Athens, Alabama.<sup>2</sup> The proposed uprate would increase the authorized maximum reactor core power level for each unit from 3458 megawatts thermal (MWt) to 3952 MWt.

Among the supporting documents TVA supplied with its application are analyses of how fuel would react in a loss of coolant accident (LOCA) under increased power conditions.<sup>3</sup>

Section 50.46 of our regulations sets specific performance criteria for the emergency core cooling systems of reactors that limit the calculated peak cladding temperature, the extent of cladding oxidation, and the amount of hydrogen generation following a LOCA.<sup>4</sup> Appendix K to Part 50 requires that “the rate of energy release, hydrogen generation, and cladding oxidation from the metal/water reaction shall be calculated using the Baker-Just equation.”<sup>5</sup>

BEST/MATRR filed a petition to intervene, making the overarching argument that the evaluations TVA used to establish the safety of the extended power uprate during a LOCA are non-conservative because the Baker-Just equation is itself non-conservative.<sup>6</sup> As background

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<sup>2</sup> See Letter from J. W. Shea, Tennessee Valley Authority, to NRC Document Control Desk, Proposed Technical Specifications Change TS-505—Request for License Amendments—Extended Power Uprate (Sept. 21, 2015) (ADAMS accession no. ML15282A154 (package)).

<sup>3</sup> See *id.*, attach. 11, ANP-3377NP, Browns Ferry Units 1, 2, and 3 LOCA Break Spectrum Analysis for ATRIUM 10XM Fuel (EPU) (Non-Proprietary) (ML15282A184); *id.*, attach. 13, ANP-3378NP, Browns Ferry Units 1, 2, and 3 LOCA-ECCS Analysis MAPLHGR Limits for ATRIUM 10XM Fuel (EPU) (Non-Proprietary) (ML15282A185); *id.*, attach. 15, ANP-3384NP, Browns Ferry Units 1, 2, and 3 LOCA-ECCS Analysis MAPLHGR Limits for ATRIUM-10 Fuel (EPU) (Non-Proprietary) (ML15282A187).

<sup>4</sup> See 10 C.F.R. § 50.46(b).

<sup>5</sup> *Id.*, pt. 50, app. K § I.A.5 (citation omitted).

<sup>6</sup> *Bellefonte Efficiency & Sustainability Team/Mothers Against Tennessee River Radiation's Hearing Request and Petition to Intervene Regarding Tennessee Valley Authority's License Amendment Request for Extended Power Uprates for Browns Ferry Nuclear Plant Units 1, 2, and 3* (Sept. 9, 2016) (Petition). The petition was supported by the declaration of Mr. Mark Leyse. *Declaration of Mark Leyse to Support the Hearing Request and Petition for Leave to Intervene by the Bellefonte Efficiency and Sustainability Team/Mothers Against Tennessee*

for its contentions, BEST/MATRR asserted that the Baker-Just equation is “inadequate for use in computer safety models” such as those used in TVA’s application.<sup>7</sup> BEST/MATRR provided a detailed discussion of the history of the Baker-Just equation.<sup>8</sup> Specifically, BEST/MATRR argued that the Baker-Just equation under-predicts the rate of energy release, hydrogen generation, and cladding oxidation caused by the metal-water reaction in a LOCA.<sup>9</sup> Therefore, it argued that “the Baker-Just correlation is inadequate for use in computer safety models that simulate LOCAs.”<sup>10</sup> BEST/MATRR also referred to PRM-50-93/95, a pending rulemaking petition filed by its declarant, Mr. Mark Leyse, which raises the same challenges to the use of the Baker-Just equation in modeling LOCAs.<sup>11</sup>

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*River Radiation Regarding Tennessee Valley Authority’s License Amendment Request for Extended Power Uprates for Browns Ferry Nuclear Plant Units 1, 2, and 3* (Sept. 6, 2016) (Leyse Declaration).

<sup>7</sup> Petition at 7-10.

<sup>8</sup> *Id.* at 7-23.

<sup>9</sup> *See, e.g., id.* at 7-9, 29; Leyse Declaration ¶¶ 25-27, 40.

<sup>10</sup> Petition at 9; *see also* Leyse Declaration ¶¶ 79, 88.

<sup>11</sup> Petition at 23-28; *see* PRM-50-93, Letter from Mark Leyse to Annette L. Vietti-Cook, Secretary, NRC, “Petition for Rulemaking Submitted Pursuant to 10 C.F.R. § 2.802” (Nov. 17, 2009) (ML093290250) (PRM-50-93). In his petition for rulemaking, which remains pending before the NRC, Mr. Leyse requests that the NRC revise 10 C.F.R. § 50.46 and 10 C.F.R. Part 50, Appendix K. Mr. Leyse argues (among other things) that the maximum cladding temperature set by 10 C.F.R. § 50.46(b)(1)—2200° F—is non-conservative and should be re-set based on data from other severe fuel damage experiments. PRM-50-93 at 5. Mr. Leyse also asserts in the rulemaking petition that the Baker-Just equation is non-conservative and that rates of oxidation, hydrogen generation, and energy generation from the metal-water reaction should likewise be based on data from such experiments. PRM-50-93 at 73. PRM-50-93 was combined with rulemaking petition PRM-50-95, a similar petition filed by Mr. Leyse and Raymond Shadis related specifically to Vermont Yankee Nuclear Power Station. *See* Letter from Mark Leyse to R. William Borchardt, NRC, “10 C.F.R. § 2.206 Request to Lower the Licensing Basis Peak Cladding Temperature of Vermont Yankee Nuclear Power Station (Docket-50-271) in Order to Provide a Necessary Margin of Safety—to Help Prevent a

BEST/MATRR offered three interrelated contentions, all resting on the argument that the safety justification for the proposed extended power uprate at Browns Ferry is flawed because it used models employing the Baker-Just equation.<sup>12</sup> First, BEST/MATRR claimed that the modeling in the LOCA analyses is “scientifically indefensible.” Second, BEST/MATRR argued that TVA had not “scientifically demonstrated” that peak cladding temperatures during a LOCA would not exceed 2200° F as required by 10 C.F.R. § 50.46(b)(1). Third, BEST/MATRR argued that, in view of these deficiencies, its members and the public are threatened by the proposed power uprate.

Both the NRC Staff and TVA opposed the intervention on the ground that none of BEST/MATRR’s proposed contentions were admissible.<sup>13</sup> Among other things, the Staff argued that, by virtue of the pendency of Mr. Leyse’s petition for rulemaking, BEST/MATRR’s contentions (raising claims substantively identical to those raised by the rulemaking petition) were barred because they were (or were about to become) the subject of general rulemaking.<sup>14</sup>

BEST/MATRR focused its reply on the fact that PRM-50-93/95 has been long pending (since 2009) and suggested that the rulemaking petition should not bar admission of its

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Meltdown—in the Event of a Loss-of-Coolant Accident” (June 7, 2010) (ML102770018). We refer to the combined petitions as “PRM-50-93/95.”

<sup>12</sup> Petition at 29-36; see also Leyse Declaration ¶¶ 122-152.

<sup>13</sup> *NRC Staff Answer to BEST/MATRR Petition to Intervene and Hearing Request* (Oct. 4, 2016) (Staff Answer), *Tennessee Valley Authority’s Answer Opposing Petition for Leave to Intervene and Request for Hearing* (Oct. 4, 2016).

<sup>14</sup> Staff Answer at 9-10 (citing *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-10-19, 72 NRC 98, 100 (2010)).

contentions because it remains unresolved.<sup>15</sup> BEST/MATRR, in its reply, also requested a stay of action on TVA's application.<sup>16</sup>

The Board denied BEST/MATRR's hearing request for lack of an admissible contention.<sup>17</sup> First, the Board found that the contentions were "all expressions of [BEST/MATRR's] fundamental challenge" to 10 C.F.R. Part 50, Appendix K § I.A.5 and thereby improperly challenged a regulation of general applicability.<sup>18</sup> Second, the Board held that the contentions were inadmissible because they raise matters that are the subject of a current rulemaking petition.<sup>19</sup> And third, the Board found that inasmuch as BEST/MATRR did not assert that the modeling in TVA's application was not performed in accordance with NRC rules, or

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<sup>15</sup> See *Reply of the Bellefonte Efficiency & Sustainability Team/Mothers Against Tennessee River Radiation to Answers of the Nuclear Regulatory Commission Staff and Tennessee Valley Authority on the License Amendment Request for Extended Power Uprates for Browns Ferry Nuclear Plant Units 1, 2, and 3* (Oct. 14, 2016). BEST/MATRR asserted further that the Staff has engaged in "bad faith" behavior over the course of its review of the rulemaking petition. *Id.* at 4-11.

<sup>16</sup> *Id.* at 12.

<sup>17</sup> The Board found that BEST/MATRR demonstrated standing. LBP-16-11, 84 NRC at \_\_\_ (slip op. at 5). That ruling has not been appealed.

<sup>18</sup> *Id.* at \_\_\_ (slip op. at 5-6) (citing 10 C.F.R. § 2.335(b), which provides, in relevant part, "No rule or regulation of the Commission or any provision thereof, concerning the licensing of production and utilization facilities . . . is subject to attack by way of discovery, proof, argument, or other means in any adjudicatory proceeding" unless the Commission grants a petition for waiver of the rule in the particular proceeding). The Board noted that BEST/MATRR did not request a waiver, and it further found that there were no special circumstances that would warrant one. *Id.* at \_\_\_ (slip op. at 6).

<sup>19</sup> *Id.* at \_\_\_ (slip op. at 6) (citing *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 345 (1999)).

point to any other error in the application, the contentions failed to raise a genuine dispute with the application.<sup>20</sup>

The Board did not rule on BEST/MATRR's stay request. Although the Board observed that BEST/MATRR's request appeared to be late, the Board held that it lacked the authority to issue a stay under the circumstances presented here.<sup>21</sup>

BEST/MATRR now appeals the Board's denial of its hearing request. TVA and the Staff oppose the appeal.<sup>22</sup>

## II. DISCUSSION

Our regulations allow a petitioner whose hearing request has been wholly denied to appeal as of right.<sup>23</sup> We generally defer to the Board on matters of contention admissibility unless an appeal demonstrates an error of law or abuse of discretion<sup>24</sup>

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<sup>20</sup> *Id.* at \_\_\_ (slip op. at 6-7) (citing 10 C.F.R. § 2.209(f)(1)(vi)). The Board noted that, although BEST/MATRR asserted that a LOCA could result in peak cladding temperatures exceeding the regulatory limits set forth in 10 C.F.R. § 50.46(b), its claim was predicated on the use of its own preferred modeling approach, not the modeling approach required by Appendix K. *Id.* at \_\_\_ (slip op. at 7 n.35).

<sup>21</sup> *Id.* at \_\_\_ (slip op. at 7-8) (citing *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-04-25, 60 NRC 223, 225 (2004); 10 C.F.R. § 2.802(e); *Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee Nuclear Power Station), CLI-07-3, 65 NRC 13, 22 n.37 (2007)). The Board likewise held that it lacked the authority to review BEST/MATRR's claim of unreasonable delay in the disposition of PRM-50-93/95. *Id.*

<sup>22</sup> See *NRC Staff's Brief in Opposition to BEST/MATRR's Appeal of LBP-16-11* (Dec. 20, 2016); *Tennessee Valley Authority's Answer Opposing Bellefonte Efficiency & Sustainability Team/Mothers Against Tennessee River Radiation Petition for Review of LBP-16-11* (Dec. 20, 2016).

<sup>23</sup> 10 C.F.R. § 2.311(c).

<sup>24</sup> See, e.g., *Pacific Gas & Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-16-9, 83 NRC 472, 482 (2016); *Crow Butte Resources, Inc.* (Marsland Expansion Area), CLI-14-2, 79 NRC 11, 13-14 (2014).

BEST/MATRR asks that we either reverse the Board's decision denying it a hearing or that we grant a stay of this licensing action pending resolution of the rulemaking petition.<sup>25</sup> But BEST/MATRR focuses its appeal on concerns associated with PRM-50-93/95, rather than on the Board's findings.<sup>26</sup>

We affirm the Board's decision with respect to BEST/MATRR's proposed contentions. BEST/MATRR does not assert specific error in the Board's decision, and we find none. The Board correctly held that all three contentions fundamentally challenge the adequacy of the Baker-Just equation that is required for use in emergency core cooling system evaluation models pursuant to 10 C.F.R. Part 50, Appendix K § I.A.5. A challenge to that general rule is not cognizable in this license amendment proceeding. BEST/MATRR did not seek a waiver of the regulation for this matter, and we find no grounds for a waiver in any event. "The sole ground" for waiver "is that special circumstances with respect to the subject matter of a particular proceeding are such that the application of the rule or regulation . . . would not serve the purposes for which the rule was adopted."<sup>27</sup> In applying this standard, we have long required the proponent of waiver to demonstrate that these special circumstances are "unique to

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<sup>25</sup> Appeal at 2.

<sup>26</sup> BEST/MATRR submitted a reply to the Staff and TVA's answers to its appeal that reiterated its request to suspend the licensing proceeding. See *The Bellefonte Efficiency & Sustainability Team/Mothers Against Tennessee River Radiation ("BEST/MATRR") Response to the U.S. Nuclear Regulatory Commission Staff and Tennessee Valley Authority's Answers in Opposition to BEST/MATRR's Appeal of LBP-16-11* (Dec. 30, 2016). The NRC's rules of procedure do not provide an appellant the right to reply to answers. See 10 C.F.R. § 2.311(b). Nonetheless, we reviewed the reply as a matter of discretion and were not persuaded that suspension would be appropriate.

<sup>27</sup> 10 C.F.R. § 2.335(b).

the facility rather than common to a large class of facilities.”<sup>28</sup> We find nothing in BEST/MATRR’s filings to indicate that the Browns Ferry facility has any unusual feature that invalidates the Baker-Just equation as applied to that facility. In this vein, we likewise agree with the Board that the petition for rulemaking is a more appropriate avenue for resolving BEST/MATRR’s generic concerns about the Baker-Just equation (codified in our rules) than is a site-specific contention in this adjudication.<sup>29</sup> Further, as the Board correctly noted, because BEST/MATRR did not dispute that the evaluations supporting TVA’s application complied with applicable regulatory requirements, the contentions failed to raise a genuine, material dispute with the application.<sup>30</sup>

BEST/MATRR renews its request that we stay final action on the license amendment request until the Staff has acted on rulemaking petition PRM-50-93/95.<sup>31</sup> BEST/MATRR has not met its burden to justify staying the licensing proceeding until a final disposition of PRM-50-93/95.<sup>32</sup> We consider such a suspension “drastic action” and will grant one only where we find

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<sup>28</sup> *E.g., Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-05-24, 62 NRC, 551, 560-61 (2005) (internal quotations omitted).

<sup>29</sup> *See, e.g., Vermont Yankee/Pilgrim*, CLI-07-3, 65 NRC at 17, 20-21.

<sup>30</sup> LBP-16-11, 84 NRC at \_\_\_ (slip op. at 7); *see also* Leyse Declaration ¶ 21.

<sup>31</sup> Appeal at 12.

<sup>32</sup> In support of its stay request BEST/MATRR cites to 5 U.S.C. § 705, which is inapposite here as it pertains to judicial stays. *Id.* Because BEST/MATRR seeks a stay pending resolution of PRM-50-93/95, we look to 10 C.F.R. § 2.802(e). That section provides that “the [petitioner may request the Commission to suspend all or any part of any licensing proceeding to which the petitioner is a participant pending disposition of the petition for rulemaking.” Mr. Leyse is a contractor to BEST/MATRR in this proceeding and has not represented that he is a member of BEST/MATRR and therefore a “participant” in the adjudication. Leyse Declaration ¶ 1. It is not clear, therefore, that BEST/MATRR is entitled to request relief under section 2.802(e), where BEST/MATRR is not itself a proponent of the rulemaking petition. BEST/MATRR has not,



that moving forward with the proceeding presents an “immediate threat[] to public health and safety,” would be an “obstacle to fair and efficient rulemaking,” or would prevent implementation of the contemplated policy or rule change.<sup>33</sup>

BEST/MATRR claims, without elaboration, that its members and the public will suffer irreparable harm if the license is granted using a non-conservative evaluation method.<sup>34</sup>

Although BEST/MATRR’s intervention petition argued generally that the Baker-Just equation is “nonconservative,” it made no specific showing that the electrical power uprate requested in TVA’s application would challenge the emergency core cooling system in case of a LOCA at Browns Ferry Nuclear Plant. Instead, it provided Mr. Leyse’s general assertion that “[i]f a reactor’s power level is set too high after being ‘qualified by LOCA analyses that do not ensure an adequate margin of safety, a real-life LOCA would lead to a beyond design-basis accident.’”<sup>35</sup> “‘Merely raising the specter of a nuclear accident’ does not demonstrate irreparable harm.”<sup>36</sup>

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however, made the case for a suspension of the licensing proceeding in any event, as discussed *infra*.

<sup>33</sup> *DTE Electric Co.* (Fermi Nuclear Power Plant, Unit 3), CLI-14-7, 80 NRC 1, 7 (2014) (quoting *Union Electric Co.* (Callaway Plant, Unit 2), CLI-11-5, 74 NRC 141, 158 (2011); see also *Pacific Gas & Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), CLI-03-4, 57 NRC 273, 277 (2003)).

<sup>34</sup> See Appeal at 4, 11, 12.

<sup>35</sup> Leyse Declaration ¶ 27.

<sup>36</sup> *Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee Nuclear Power Station), CLI-06-8, 63 NRC 235, 237-38 (2006) (quoting *Mass. Coal. of Citizens with Disabilities v. Civil Def. Agency*, 649 F.2d 71, 75 (1st Cir. 1981)).

BEST/MATRR's assertions that its members will face "irreparable injury" fall short of the necessary showing.<sup>37</sup> We therefore find that a suspension is not warranted.<sup>38</sup>

BEST/MATRR focuses much of its appeal on claims that the Staff has acted in bad faith or unreasonably delayed resolving PRM-50-93/95—tantamount to a constructive denial of the rulemaking petition. We observe that, while the Staff's review of PRM-50-93/95 has spanned several years, consistent progress on review of the petition has been documented and released to the public, highlighting the Staff's careful consideration of each of the claims Mr. Leyse and the other petitioners have raised.<sup>39</sup> Thus, PRM-50-93/95 has not been constructively denied.

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<sup>37</sup> BEST/MATRR likewise does not argue that moving forward with the licensing proceeding would interfere with fair and efficient decision-making or that it would prevent the implementation of a new rule or policy.

<sup>38</sup> See *Fermi*, CLI-14-7, 80 NRC at 7-9; see also *Diablo Canyon*, CLI-03-4, 57 NRC at 277 (because "every license the Commission issues is subject to the possibility of additional requirements, moving forward" with a licensing action "does not foreclose the implementation of any new rules originating from the pending rulemaking petition" (emphasis and internal quotations omitted)).

<sup>39</sup> Several draft interim evaluations have been publicly released; these evaluations demonstrate that the Staff continues to make progress in its assessment of the rulemaking petition. See, e.g., Memorandum from Brian W. Sheron, Director, Office of Nuclear Regulatory Research, to Eric J. Leeds, Director Office of Nuclear Reactor Regulation, "Transmittal of an Evaluation of CORA Severe Accident Data Related to the User Need Request for Technical Analysis of Petition for Rulemaking on 10 CFR 50" (Aug. 23, 2011) (ML112211930) (package) (Interim Review—CORA Tests); Memorandum from Brian W. Sheron, Director, Office of Nuclear Regulatory Research, to Eric J. Leeds, Director Office of Nuclear Reactor Regulation, "Transmittal of a Revised Evaluation of LOFT LP-FP-2 Data Related to the User Need Request for Analysis of Petition for Rulemaking on 10 CFR 50" (Dec. 6, 2011) (ML113050370) (package) (Interim Review—LOFT LP-FP-2 Test); "Draft Interim Review of PRM-50-93/95 Issues Related to Conservatism of 2200 degrees F, Metal-Water Reaction Rate Correlations, and 'The Impression Left from [FLECHT] Run 9573'" (Oct. 16, 2012) (ML12265A277) (Interim Review—Conservatisms); Memorandum from Brian W. Sheron, Director, Office of Nuclear Regulatory Research, to Eric J. Leeds, Director Office of Nuclear Reactor Regulation, "Evaluation of PRM-50-93/95 Request for Rulemaking to Specify a Minimum Allowable Core Reflood Rate" (Feb. 27, 2013) (ML13015A703) (package) (Interim Review—Minimum Allowable Core Reflood Rate). Mr. Leyse has provided extensive comments on these interim evaluations; the NRC staff will consider those comments in its development of the final evaluation of PRM-50-93. See, e.g.,

Regardless, this site-specific licensing proceeding is not the forum in which to pursue claims about a pending rulemaking petition. The Staff's review of the rulemaking petition thus far has not identified any non-conservatisms in the regulations.<sup>40</sup> Were it to do so, we would expect that the Staff would notify us promptly so that we can consider whether further action is warranted.

**III. CONCLUSION**

For the foregoing reasons, we *affirm* the Board's decision in LBP-16-11.

IT IS SO ORDERED.

For the Commission

**NRC SEAL**

**/RA/**

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Annette L. Vietti-Cook  
Secretary of the Commission

Dated at Rockville, Maryland,  
this 4<sup>th</sup> day of April, 2017.

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E-mail from A. Mohseni, NRC, to M. Leye (Nov. 6, 2015) (ML15317A054); E-mail from M. Leye to A. Mohseni, NRC, et al., "Re: Fwd: Status of PRM-50-93/95" (Dec. 3, 2015) (ML15341A237).

<sup>40</sup> See Interim Review—CORA Tests at 1; Interim Review—LOFT LP-FP-2 Test at 5; Interim Review—Conservatisms at 10; Interim Review—Minimum Allowable Core Reflood Rate at 7.

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NUCLEAR REGULATORY COMMISSION

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TENNESSEE VALLEY AUTHORITY ) Docket Nos. 50-259, 50-260 and 50-296-LA  
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(Browns Ferry Nuclear Plant - )  
Units 1, 2 and 3) )

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **COMMISSION MEMORANDUM AND ORDER (CLI-17-05)** have been served upon the following persons by the Electronic Information Exchange.

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[Original signed by Herald M. Speiser \_\_\_\_]  
Office of the Secretary of the Commission

Dated at Rockville, Maryland  
this 4<sup>th</sup> day of April, 2017