

March 19, 2013

MEMORANDUM TO: Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

FROM: Carl F. Lyon, Project Manager /RA/
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Patrick D. Milano, Senior Project Manager /RA/
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

SUBJECT: DIFFERING PROFESSIONAL OPINION INVOLVING EXTERNAL
FLOODING AT WATTS BAR NUCLEAR PLANT, UNIT 1
(DPO-2012-003)

This memorandum is to document our response to the memorandum to you from the Differing Professional Opinion (DPO) Panel, dated January 17, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13016A452), and your subsequent memorandum to us dated March 5, 2013 (ADAMS Accession No. ML13064A349). Thank you for spending so much time listening to our safety concerns. We are very grateful to Mr. Steve West, Ms. Eileen McKenna, Ms. Lois James, and Ms. Eva Brown for their willingness to serve on the DPO Panel and the professionalism with which they conducted their review. We appreciate that they spent a tremendous amount of time and effort in talking to us and other involved individuals, both here and in Region II, and in evaluating the issues and developing their report. Nevertheless, we do not agree with several of the conclusions of the DPO Panel's report. Since raising our safety concerns with our U.S. Nuclear Regulatory Commission (NRC) management over a year ago, we have been committed to resolving them in a professional manner using the NRC's internal processes. We have fulfilled our responsibilities to raise our safety concerns to NRC senior management. Based on your memorandum to us and on our experience with raising our concerns over the past year, we have concluded that it would be unproductive to continue further; therefore, we do not intend to appeal your DPO decision.

Our disagreements with several of the conclusions of the DPO Panel's report are documented below:

1. The DPO Panel concluded that there is not an immediate safety concern regarding external flooding at Watts Bar Nuclear Plant (WBN) Unit 1. We do not agree. The panel's report does not address our primary concern: the Tennessee Valley Authority (TVA, the licensee) is not in compliance at WBN Unit 1 with the current licensing basis or the NRC's regulations for protection from external flooding, and there is no documented basis for

concluding that there is reasonable assurance of adequate safety at WBN Unit 1. The panel's report provides no justification for its conclusion. In fact, it recognizes that "as a result of both NRC inspection and its own assessment and reanalysis, the licensee determined that the PMF [probable maximum flood level] exceeded the current licensing basis, putting the plant in an unanalyzed condition." The licensee has made two Event Notifications (EN48056, as updated, and EN48723) informing the NRC that WBN Unit 1 is in an unanalyzed condition related to flooding. TVA acknowledges that its flood mitigation equipment, its last line of defense for removing reactor core heat, will be lost in a design-basis flood. TVA has plans for, but has not installed, compensatory measures to restore the plant to compliance. In fact, the licensee has not developed adequate procedures, has no adequate supporting analysis, has not adequately demonstrated the functionality, and has not completed installation of its compensatory measures. TVA's proposed installation of modular flood barriers (Hesco barriers; sand baskets) in case of flooding is not even under the control of TVA's nuclear organization. TVA has provided no justification for why it should be allowed to continue to operate in an unanalyzed condition, and the NRC staff has neither questioned the licensee nor developed and documented its own justification. This is contrary to the NRC's Davis-Besse Lessons-Learned and the NRC's rules and regulations.

2. The DPO Panel concluded that the NRC staff's decision to issue the confirmatory action letter (CAL) met the applicable regulatory policy and guidance, was consistent with past practice, and was a reasonable regulatory decision. We do not agree. Our reasons were provided to you in an e-mail dated June 21, 2012 (ADAMS Accession No. ML12173A323), and have not changed. The CAL is simply a promise from the licensee to address the problem in the future. It does not provide reasonable assurance now of adequate safety at WBN, Unit 1. Based on TVA's past history of addressing the flooding issues at WBN, there is insufficient reason for the NRC staff to base its conclusion solely on TVA's statements.
3. In summary, there are three courses of action that could be pursued: (1) TVA may return to compliance with the regulations and its licensing basis; (2) TVA may apply for, and the NRC staff may approve, an exemption to the regulations; or (3) the NRC staff may revise the regulations. Regarding the first course of action, we agree that, as documented in its CAL, TVA has, or will take, some actions to protect certain plant equipment, and has submitted a license amendment request (LAR) to revise its PMF level in its current licensing basis. However, the compensatory measures proposed by TVA do not in themselves restore TVA to compliance. In particular, the Hesco barriers *are not compensatory*, they *are mandatory*, because they are part of TVA's design-basis assumption in the safety-related calculation of PMF. Partially installed barriers, which were not installed under a 10 CFR Part 50, Appendix B program, do not correlate with the needed reservoir height (i.e., surge capacity) in the safety-related calculation of PMF; therefore, the facility remains in an unanalyzed condition.

4. The DPO Panel concluded that the NRC staff's decision to continue work on the known flood issue at WBN Unit 1 in parallel with its work on post-Fukushima activities was appropriate. We do not agree. The NRC's request for information to licensees in accordance with 10 CFR 50.54(f), dated March 12, 2012, assumed that licensees were in compliance with their licensing basis. It stated, in part, that,

The current regulatory approach, and the resultant plant capabilities, gave the NTTF [Near-Term Task Force] and the NRC the confidence to conclude that an accident with consequences similar to the Fukushima accident is unlikely to occur in the United States (U.S.). The NRC concluded that continued plant operation and the continuation of licensing activities did not pose an imminent risk to public health and safety....

The NRC has concluded that it requires the information requested in the enclosures to this letter to verify the compliance with your plant's design basis and to determine if additional regulatory actions are appropriate.

TVA does not meet the assumptions made by the NRC staff for delaying to take immediate action following the Fukushima event. NRC inspectors and the licensee have verified that WBN Unit 1 is not, and was not, in compliance with the design basis for flooding. In this case, only the probable maximum precipitation event, without a concurrent earthquake or tsunami or any other accident, is needed at WBN Unit 1 to produce a loss of all decay heat removal systems. The NRC staff has information available to it now that WBN Unit 1 is not in compliance with the design basis. Until TVA returns to compliance, the licensee and the NRC staff are obliged under the NRC rules and regulations to provide a justification for why WBN Unit 1 should be allowed to operate outside its design basis for flooding. Furthermore, subsequent to its initial licensing in 1995 and without NRC approval, TVA has made numerous changes to the dam failure assumptions in the Final Safety Analysis Report for WBN Unit 1 that significantly impact its design basis for flooding.

5. The DPO Panel concluded that the NRC staff's bases for accepting the licensee's commitments and its reasons for choosing to issue a CAL instead of an order may have been clearer and less divisive had the staff followed the process prescribed in [NRR Office Instruction] LIC-504, "Integrated Risk-Informed Decision-Making Process for Emergent Issues," Revision 3. The casual reader of the Panel's report may form the impression that our concerns were simply a result of miscommunication among the staff. We do not agree, and we maintain that our memorandums and e-mails as documented in ADAMS clearly show otherwise. For example, we provided a decision process form in accordance with LIC-504, Table B-4 to our management (ADAMS Accession No. ML12195A076), and our management did not complete it. While the form would have provided a documented NRC decision had it been completed by our management, we continue to assert that low risk is not an allowable justification

for concluding that a licensee may continue to operate outside the regulations. In a design-basis accident (e.g., a flood in accordance with 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena"), it is assumed that the accident *has occurred*. It is not acceptable to operate outside the design basis because the accident has a low probability of occurring. Also, as discussed with you on February 28, 2013, LIC-504 is a cumbersome process that is not easy to use, and in fact has rarely been used since its promulgation, and has not been used to completion on the flooding concerns at WBN Unit 1. Therefore, to this date, there is no documented NRC staff justification for why there is reasonable assurance of adequate safety at WBN Unit 1.

For completeness, we have enclosed an updated chronology with references to ADAMS accession numbers of associated documentation of our concerns over the past year. Based on the available information, the NRC staff has no reasonable assurance of safe operation of WBN Unit 1. The staff has no analysis or safety basis to allow WBN Unit 1 to continue to operate with compensatory measures in place while the flooding issues are resolved.

In accordance with the guidance in Management Directive 10.159, "The NRC Differing Professional Opinions Program," we do not choose to submit an appeal to the DPO decision, and the DPO process is complete. We request that the DPO case file be made PUBLIC immediately.

Docket No. 50-390

Enclosure:
As stated

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ADAMS Accession No. ML13072A121 *via email

OFFICE	NRR/DORL/LPL4/PM	NRR/DLR/PB1/SPM	NRR/DORL/LPL4/LA	NRR/DORL/LPL4/PM
NAME	FLyon	PMilano	JBurkhardt*	FLyon
DATE	3/18/13	3/19/13	3/14/13	3/19/13

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CHRONOLOGY OF WATTS BAR NUCLEAR PLANT UNIT 1 SAFETY CONCERNS

- 6/3/11 The Watts Bar Nuclear Plant (WBN) Unit 2 Final Safety Analysis Report (FSAR) Amendment 104 raised probable maximum flood (PMF) level and added sand basket description. This change conflicted with the Unit 1 Updated FSAR (UFSAR).
- 7/12/11 Advisory Committee on Reactor Safeguards (ACRS) discussed hydrology concerns at WBN Unit 2 and raised questions about the potential impact on WBN Unit 1.
- 12/6/11 The Tennessee Valley Authority (TVA, the licensee) informed the Watts Bar Special Branch (LPWB; subsequently dissolved on June 17, 2012) staff that a change to the PMF level in the Unit 1 UFSAR was necessary. TVA stated that the license amendment request (LAR) would be submitted by end of 2011; subsequently delayed to end of January, then February, then March 2012.
- 3/28/12 LPWB discussed safety concerns at WBN Unit 1 and proposed a 50.54(f) letter with the Watts Bar Unit 2 Reactivation Assessment Group (WRAG; chaired by Mr. Bruce Boger; charter at Agencywide Documents Access and Management System (ADAMS) Accession No. ML091250168).
- 3/29/12 Public pre-application meeting with TVA re: change to WBN Unit 1 flooding licensing basis (ADAMS Accession No. ML12097A293). TVA stated that the LAR would be submitted April 16, 2012, but that calculations would not be completed until end of July. TVA stated that safety margins were minimal (< 1-inch to < 1-foot to flood mitigation equipment), calculation uncertainties were unknown and new adverse information had not been considered, and that the new PMF levels depended on compensatory measures that were not fully installed.
- 4/6/12 Draft 50.54(f) letter (ADAMS Accession No. ML12088A118) provided to Ms. Michele Evans, Director, Division of Operating Reactor Licensing (DORL/D) and Mr. Allen Howe, Deputy Director, Division of Operating Reactor Licensing (DORL/DD); sent to the Office of the General Counsel (OGC) for concurrence.
- 4/9/12 DORL Branch Chief meeting: Mr. Patrick Milano (acting Branch Chief, LPWB) informed the DORL/D that the 50.54(f) letter was with OGC for concurrence. DORL/D (1) directed that the letter be retrieved from OGC and that no correspondence was to go outside DORL without her permission, and (2) berated Mr. Milano for raising the issue at the WRAG.
- DORL/D e-mailed that 50.54(f) must get Office of Nuclear Reactor Regulation (NRR) alignment before proceeding, and proposing a briefing the following week.

Enclosure

- 4/10/12 Mr. Fred Lyon e-mailed response to the DORL/D raising safety concern, and provided justification for a 50.54(f) letter separate from the Fukushima letter (ADAMS Accession Nos. ML121010062 and ML121010030). DORL/D met with Mr. Lyon to discuss concerns.
- DORL/D met with Mr. Lyon and Mr. Milano to discuss safety concern. DORL/D directed Mr. Lyon and Mr. Milano to withhold the draft 50.54(f) from OGC (ADAMS Accession No. ML12110A313). DORL/D acknowledged that she understood the concern and had the responsibility to get alignment with NRR, the Office of New Reactors (NRO), and the Japan Lessons Learned Project Directorate (JLD) senior management to move forward.
- 4/11/12 DORL/DD discussed safety concern with Mr. Lyon and Mr. Milano.
- 4/24/12 Mr. Milano and Mr. Lyon sent a memorandum to Mr. Eric Leeds, Director, NRR (NRR/D) (ADAMS Accession No. ML12115A165).
- 4/25/12 DORL/D, DORL/DD, Mr. L. Raghavan, LPWB, Mr. Lyon, and Mr. Stephen Campbell, Chief, LPWB (LPWB/BC), discussed safety concern and path forward (ADAMS Accession No. ML121290576 and clarification e-mail; ADAMS Accession No. ML121210319).
- 5/1/12 Mr. Lyon provided a draft supplemental Fukushima 50.54(f) letter to DORL/D and requested permission to get an OGC review.
- 5/2/12 DORL/D declined to allow the draft supplemental Fukushima 50.54(f) letter to be given to OGC for review (ADAMS Accession No. ML121240466).
- 5/3/12 Mr. Milano, Mr. Lyon, and Mr. Raghavan sent a memorandum to the Executive Director for Operations (EDO) (ADAMS Accession No. ML12122A427).
- 5/7/12 Mr. Nadar Mamish, Office of the Executive Director for Operations (OEDO), e-mail to Mr. Lyon (ADAMS Accession No. ML12181A388), acknowledging the May 3, 2012, memorandum to the EDO; states that "OEDO has been in dialogue with Eric Leeds and I understand that Eric Leeds will be working with you to set up a meeting to discuss your concerns more fully with him."
- 5/10/12 Mr. Raghavan, Mr. Lyon, and Mr. Milano discussed concerns with NRR/D. (ADAMS Accession No. ML12138A270).
- Mr. Lyon provided LIC-504 recommendations to DORL/D, et al., for consideration (ADAMS Accession Nos. ML12195A076 and ML12195A078).
- 5/11/12 Internal NRC meeting with DORL, the NRR Divisions of Engineering (DE), NRR Division of Safety Systems (DSS), JLD, the NRO Division of Site Safety and Environmental Analysis (DSEA), and Region II (RII) discussed safety concern and path forward. Mr. Lyon provided feedback to NRR/D (ADAMS Accession No. ML12138A270).

- 5/22/12 Discussion with DORL/DD, Mr. Doug Broaddus, Chief, Plant Licensing Branch II-2, DORL, Mr. Milano, Mr. George Wilson, Chief, Plant Licensing Branch I-1, DORL, Mr. Scott Shaeffer, Chief, Reactor Projects Branch 6, RII, and Mr. Lyon on safety concern for pre-brief of NRR/D and Mr. Victor McCree, Regional Administrator, RII (RII/RA).
- 5/23/12 Pre-brief of NRR/D and RII/RA for 5/31/12 public meeting. Mr. Lyon provided feedback to NRR/D (ADAMS Accession No. ML12150A040).
- Mr. Raghavan, Mr. Lyon, and Mr. Milano discussed safety concerns with Mr. Michael Johnson, Deputy Executive Director for Reactor and Preparedness Programs (DEDR).
- 5/30/12 Mr. Raghavan, Mr. Lyon, and Mr. Milano discussed safety concerns with Chairman Gregory Jazcko.
- DORL/DD memorandum (ADAMS Accession No. ML12150A067) as a follow-up to the 5/11/12 meeting. Mr. Milano provided feedback (ADAMS Accession No. ML12152A133).
- 5/31/12 NRC and TVA senior management public meeting to discuss WBN and Sequoyah Nuclear Plant, Units 1 and 2 (SQN), flooding/hydrology issues (ADAMS Accession No. ML12157A457). TVA stated that PMF level is even higher than estimated at the March 29, 2012, public meeting, and some flood mitigation equipment will be flooded during the PMF event. Mr. Lyon provided feedback to NRR/D (ADAMS Accession No. ML12158A508).
- NRC internal caucus to issue a Confirmatory Action Letter (CAL) after TVA submits its commitment letter. There was no discussion of reasonable assurance of adequate safety (ADAMS Accession No. ML12157A551).
- 6/12/12 Mr. Lyon and Mr. Milano memorandum to NRR/D (ADAMS Accession No. ML12158A508) regarding May 31 meeting. TVA's presentation demonstrated that the situation is worse than previously thought; there is no margin to thermal barrier booster pumps (TBBPs).
- 6/18/12 Mr. Robert Monk, WBN Senior Resident Inspector (SRI) e-mail (ADAMS Accession No. ML12172A250) regarding poor quality of TVA's functional evaluation/operability determination (FE/OD) on sand baskets.
- Mr. Milano and Mr. Lyon discussed safety concerns with Commissioner William Magwood.
- 6/20/12 Mr. Milano and Mr. Lyon discussed safety concerns with NRR/D.

- 6/21/12 Mr. Lyon e-mail to NRR/D regarding insufficiency of a CAL to resolve issues and recommending a demand for information (DFI) or Order, with subsequent NRR/D response (ADAMS Accession No. ML12173A323).
- Mr. Milano and Mr. Lyon discussed safety concerns with EDO.
- 6/25/12 CAL issued to TVA (ADAMS Accession No. ML12165A527).
- 6/29/12 Mr. Lyon and Mr. Milano discussed concerns with NRR/D over Mr. Wilson's e-mail of 6/28/12, regarding draft safety basis at WBN (ADAMS Accession No. ML12181A435).
- TVA submitted EN48056, confirming that WBN Unit 1 is in an unanalyzed condition due to the increase in PMF level.
- 7/2/12 Mr. Lyon's response to Mr. Wilson's memorandum (ADAMS Accession No. ML12184A281). Mr. Lyon's response to NRR/D status memo (ADAMS Accession No. ML12184A276, copy to others at ADAMS Accession No. ML12184A271).
- 7/10/12 Mr. Lyon discussed the option of filing a differing professional opinion (DPO) with Ms. Renee Pedersen, Office of Enforcement (OE).
- 7/18/12 Ms. Pedersen's e-mail accepting DPO-2012-003.
- 7/20/12 Ms. Pederson's memorandum forwarding DPO to NRR/D (ADAMS Accession No. ML12201B322).
- 8/2/12 NRR/D memorandum to DPO panel members, Mr. Steve West, Ms. Eileen McKenna, and Ms. Lois James (ADAMS Accession No. ML12214A302).
- 11/15/12 NRR/D memorandum to DPO panel members, superseding the 8/2/12 memo (replaces Ms. James with Ms. Eva Brown; ADAMS Accession No. ML12321A133).
- 11/29/12 TVA updated EN48056, stating that "the chilled water circulating pump motors for the Train A and B Main Control Room and 6.9kV Shutdown Board Room, including various sub-components, would be partially submerged during a Probable Maximum Flood (PMF) event. These components were not previously considered as affected by the PMF...Compensatory measures have been prepared to install temporary flood protection..."
- 12/3/12 Public meeting between TVA and RII senior management at RII.
- 12/13/12 Public meeting between TVA and NRC senior management at NRC Headquarters.
- 1/17/13 DPO panel report issued (ADAMS Accession No. ML13016A452).

- 2/7/13 TVA submitted EN48723, stating that “On July 28, 2009, TVA identified, in the Corrective Action Program, the potential to overtop and fail earthen embankments at Cherokee, Fort Loudoun, Tellico, and Watts Bar Dams. This condition could have resulted in an increase in the probable maximum flood (PMF) level at Watts Bar Unit 1. TVA initiated immediate actions to address the condition by conducting additional analyses and the development of contingent actions. Additional actions were developed including the installation of modular flood barriers [which were] completed in December 2009. The barriers increase the effective height of the affected embankments preventing their overtopping and failure. The increase in PMF could have affected plant equipment including the emergency diesel generator system, the essential raw cooling water system, the thermal barrier booster pumps and the control room chillers. [In fact, installation of modular flood barriers is still incomplete.]
- Additional details regarding the modular flood barriers and the results of TVA's subsequent hydrologic analyses for Watts Bar were discussed in public meetings between TVA and the NRC staff on July 7, 2010 and May 31, 2012, and provided in TVA letters to the NRC dated July 19, 2012, October 30, 2012 and January 18, 2013.”
- 2/7/13 A significance and enforcement review panel (SERP) was held in RII on WBN Unit 1.
- 2/28/13 Mr. Lyon discussed the DPO Panel Report with NRR/D.
- 3/5/13 NRR/D issued DPO Decision (ADAMS Accession No. ML13064A349).
- 3/12/13 Region II issued NRC Inspection Report 50-390/20120009 (ADAMS Accession No. ML13071A289).