

DPO Case File for DPO-2012-003

The following pdf represents a collection of documents associated with the submittal and disposition of a differing professional opinion (DPO) from two NRC employees involving Protection from External Flooding at Watts Bar Unit 1 (G20120589).

Management Directive (MD) 10.159, "The NRC Differing Professional Opinions Program," dated May 16, 2004, describes the DPO Program.

<http://pbadupws.nrc.gov/docs/ML0417/ML041770431.pdf>

The DPO Program is a formal process that allows employees and NRC contractors to have their differing views on established, mission-related issues considered by the highest level managers in their organizations, i.e., Office Directors and Regional Administrators. The process also provides managers with an independent, three-person review of the issue (one person chosen by the employee). After a decision is issued to an employee, he or she may appeal the decision to the Executive Director for Operations (EDO).

Because the disposition of a DPO represents a multi-step process, readers should view the records as a collection. In other words, reading a document in isolation will not provide the correct context for how this issue was considered by the NRC.

The records in this are public and have been reviewed for redactions prior to discretionary release.

Document 1: DPO Submittal

Document 2: Memo Forwarding DPO from DPOPM to Office Manager

Document 3: Memo from Office Manager Establishing DPO Panel

Document 4: DPO Panel Report

Document 5: DPO Decision

Document 6: Memo from DPO Submitters to Office Manager in Response to DPO Decision

Document 1: DPO Submittal

NRC FORM 680 (11-2002) NRCMD 10.159		U.S. NUCLEAR REGULATORY COMMISSION		FOR PROCESSING USE ONLY	
DIFFERING PROFESSIONAL OPINION				1. DPO CASE NUMBER <i>DPO-2012-003</i>	
INSTRUCTIONS: Prepare this form legibly and submit three copies to the address provided in Block 14 below.				2. DATE RECEIVED <i>7/17/2012</i>	
3. NAME OF SUBMITTER Carl F. Lyon		4. POSITION TITLE Project Manager		5. GRADE GG-14	
6. OFFICE/DIVISION/BRANCH/SECTION NRR/DORL/LPL4		7. BUILDING OWFN	8. MAIL STOP O-8B1A	9. SUPERVISOR Michael Markley	
10. DESCRIBE THE PRESENT SITUATION, CONDITION, METHOD, ETC., WHICH YOU BELIEVE SHOULD BE CHANGED OR IMPROVED. <i>(Continue on Page 2 or 3 as necessary.)</i>					
<p>TVA is not in compliance at Watts Bar Nuclear Plant (WBN) Unit 1 with the current licensing basis or the NRC's regulations for protection from external flooding; therefore, there is not reasonable assurance of adequate safety at WBN Unit 1. The NRC issued the Fukushima 50.54(f) letter to all licensees on March 12, 2012, and issued a Confirmatory Action Letter (CAL) regarding WBN Unit 1 and Sequoyah Nuclear Plant to TVA on June 25, 2012. However, neither the Fukushima 50.54(f) letter nor the CAL provides a reasonable assurance of adequate safety for WBN Unit 1. The NRC has no documented safety basis or justification for allowing WBN Unit 1 to continue to operate, either with or without compensatory measures in place, until permanent resolution of the safety issues at WBN. (Continued on Page 2)</p>					
11. DESCRIBE YOUR DIFFERING OPINION IN ACCORDANCE WITH THE GUIDANCE PRESENTED IN NRC MANAGEMENT DIRECTIVE 10.159. <i>(Continue on Page 2 or 3 as necessary.)</i>					
<p>TVA is not in compliance at Watts Bar Nuclear Plant (WBN) Unit 1 with the licensing basis or the NRC's regulations for protection from external flooding; therefore, there is not reasonable assurance of adequate safety at WBN Unit 1. Of note, TVA has revised the flood levels and dam failure scenarios in the UFSAR several times since the mid-1990s, without prior NRC approval, and now has concluded that the flooding level in the UFSAR is incorrect and non-conservative. In a public meeting with NRC senior management on May 31, 2012, TVA's senior vice president for engineering confirmed that safety-related equipment required to mitigate a design-basis probable maximum flood (PMF) event will be flooded during the event and thus will not function as designed. TVA confirmed its lack of compliance with the design basis in an Event Notification to the NRC on June 29, 2012 (EN48056).</p> <p>The loss of certain flood mitigation equipment, the thermal barrier booster pumps (TBBPs), will result in the failure of the reactor coolant pump seals, leading to a small break loss-of-coolant-accident. (Continued on Page 3)</p>					
12. Check (a) or (b) as appropriate:					
<input checked="" type="checkbox"/> a. Thorough discussions of the issue(s) raised in item 11 have taken place within my management chain; or					
<input type="checkbox"/> b. The reasons why I cannot approach my immediate chain of command are:					
SIGNATURE OF SUBMITTER <i>CF Lyon</i>		DATE <i>7/17/12</i>		SIGNATURE OF CO-SUBMITTER (if any) <i>[Signature]</i>	
				DATE <i>07-17-2012</i>	
13. PROPOSED PANEL MEMBERS ARE (in priority order):			14. Submit this form to:		
1. Lois James			Differing Professional Opinions Program Manager		
2. Eva Brown			Office of: Enforcement		
3. Rick Ennis			Mail Stop: O-4A15A		
15. ACKNOWLEDGMENT					
THANK YOU FOR YOUR DIFFERING PROFESSIONAL OPINION. It will be carefully considered by a panel of experts in accordance with the provisions of NRCMD 10.159, and you will be advised of any action taken. Your interest in improving NRC operations is appreciated.			SIGNATURE OF DIFFERING PROFESSIONAL OPINIONS PROGRAM MANAGER (DPOPM) <i>[Signature]</i>		
			PRE-CONDITIONS MET <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		DATE OF ACKNOWLEDGMENT <i>7/17/2012</i>

DIFFERING PROFESSIONAL OPINION (Continued)

CONTINUE ITEM 10, ITEM 11, AND/OR ITEM 12 FROM PAGE 1. (Indicate the block number to which this information applies.)

Page 2 (Item 10 continued) The NRC's inaction to address TVA's noncompliance with the regulations and the lack of reasonable assurance of adequate safety at WBN Unit 1 are contrary to the NRC's obligations under the Atomic Energy Act to assure adequate safety, and the Davis-Besse Lessons-Learned. Therefore, we submit a differing professional opinion; the NRC must address TVA's noncompliance with the regulations and the lack of reasonable assurance of adequate safety at WBN Unit 1.

1. In a public meeting with NRC senior management on May 31, 2012, TVA's senior vice president for engineering confirmed that safety-related equipment required to mitigate a design-basis probable maximum flood (PMF) event will be flooded during the event and thus will not function as designed. TVA confirmed its lack of compliance with the design basis in an Event Notification to the NRC on June 29, 2012 (EN48056). The regulation at 10 CFR Part 50, Appendix A, GDC 2, "Design Bases for Protection against Natural Phenomena," states that,

"Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect: (1) Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena, and (3) the importance of the safety functions to be performed."

In addition, the regulation at 10 CFR 50.54(h) states that, "The licensee shall be subject to...all rules, regulations, and orders of the Commission." The operating license for WBN Unit 1 states that, "The facility will operate in conformity with...the rules and regulations of the Commission...." TVA is in violation of GDC 2, 10 CFR 50.54(h), and its operating license. Adequate safety presumes compliance with the regulations. Therefore, there is not reasonable assurance of adequate safety at WBN Unit 1. In accordance with the Atomic Energy Act, there must always be adequate safety.

2. The CAL documented the commitments TVA made in the May 31, 2012, public meeting to mitigate potential external flooding hazards at WBN Unit 1 and Sequoyah Nuclear Plant. Though TVA has plans to install barriers to protect some flood mitigation equipment from flooding, it has not installed them. Since TVA does not have compensatory measures fully installed for any of its flood mitigation equipment, it has not restored compliance with its current licensing basis or the regulations. Compensatory measures allow a licensee to restore compliance. Operating licenses are issued on the premise that the licensee is currently in compliance with its licensing basis and the regulations, not that they will be able to achieve compliance before the design basis event occurs. A staged compensatory measure is not acceptable, because it does not restore compliance. Since TVA's compensatory measures are not in place, they have not restored compliance and there is not reasonable assurance of adequate safety. A commitment to comply with a regulation is not the same as complying with the regulation.

3. Compensatory measures to restore compliance would require an evaluation under 10 CFR 50.59. An operability determination is not sufficient, because operability does not equate to adequate safety. The issue is a licensing basis issue, not a technical specification issue. The temporary modification to install a flood barrier around the thermal barrier booster pumps (TBBPs) has been staged, but is not in place. The barrier is no longer a compensatory measure to gain additional margin, because it is required for the survival of the pumps during a flooding event. Without the flood barrier in place, the facility is not in compliance with the licensing basis. A required design basis modification cannot be used as a contingency for reasonable assurance. Therefore, it is a design change that requires NRC approval prior to installation under 10 CFR 50.59 (see Section 7.3 of the Attachment to RIS 2005-20, Rev.1; the MC9900 guidance).

TVA has installed sand baskets to raise the embankment heights on four dams upstream of WBN Unit 1; however, the sand baskets are not fully installed at any of the four affected dams. The sand baskets are required as an input assumption by TVA to its PMF calculations. The NRC staff stated in a letter to TVA on January 25, 2012, that it does not have confidence that the sand baskets will withstand the impact of large debris during a flood. TVA has known that the sand baskets were required for flood mitigation since at least January 2010. The NRC staff is unaware of any operability determination, functional evaluation, or 50.59 review of the sand baskets prior to May 7, 2012; and, based on the NRR project manager's and the senior resident inspector's review, TVA's functional evaluation dated May 7, 2012, is inadequate to address the sand baskets as a design change. When TVA revised its PMF based, in part, on (1) the added reservoir capacities obtained with the sand baskets and (2) changes in the assumptions for dam failures, it should have triggered a need for NRC review and approval in accordance with 10 CFR 50.59. (Continued on Page 3)

DIFFERING PROFESSIONAL OPINION (Continued)

CONTINUE ITEM 10, ITEM 11, AND/OR ITEM 12 FROM PAGE 1. (Indicate the block number to which this information applies.)

Page 3 (Item 10 continued) Since TVA made the changes without NRC review and approval, TVA is in violation of 10 CFR 50.59.

4. Noncompliance with the regulations is not like a violation of the technical specifications (TSs). Unlike TSs, there is no specified required action or completion time for a noncompliance with a regulation. Compliance with the regulations is required at all times. If a licensee is not in compliance with a regulation, they must restore compliance promptly, in accordance with Criterion XVI of 10 CFR Part 50, Appendix B. Compliance with the regulations is the minimum standard for adequate safety. TVA has had temporary modifications for flood mitigation partially installed or staged for 3 years at WBN Unit 1 without taking permanent corrective actions or updating the UFSAR. TVA is in violation of 10 CFR 50.71(e) and Criterion XVI of 10 CFR Part 50, Appendix B.

5. TVA is not in compliance with the regulations. There is no process by which the NRC may allow a licensee to violate the regulations.

a. The NRC has not approved a license amendment request from TVA to change the licensing basis. The NRC therefore appears to be allowing TVA to operate WBN Unit 1 by de facto license amendment without public notice or environmental consideration. This is contrary to the Atomic Energy Act and 10 CFR 50.92.

b. The NRC has issued no enforcement discretion for TVA to operate WBN Unit 1, because there is no process to allow enforcement discretion for a violation of the regulations.

c. The NRC has issued no exemption from the regulations in accordance with 10 CFR 50.12 for TVA to operate WBN Unit 1 without compliance with the regulations.

TVA is not in compliance at WBN Unit 1 with the current licensing basis or the NRC's regulations for protection from external flooding; therefore, there is not reasonable assurance of adequate safety at WBN Unit 1. The NRC has no documented safety basis or justification for allowing WBN Unit 1 to continue to operate, either with or without compensatory measures in place, until permanent resolution of the safety issues at WBN. The NRC's inaction to address TVA's noncompliance with the regulations and the lack of reasonable assurance of adequate safety at WBN Unit 1 are contrary to the NRC's obligations under the Atomic Energy Act to assure adequate safety, and the Davis-Besse Lessons-Learned. Therefore, we submit a differing professional opinion; the NRC must assure adequate safety.

(Item 11 continued) The loss of other flood mitigation equipment, which has less than 6 inches of safety margin, will result in inability to cool the reactor and the radioactive spent fuel in the spent fuel pool, and would lead to a containment breach and a radiological release to the public. There are no compensatory measures fully installed for any flood mitigation equipment. TVA has no procedures to cope with a loss of the flood mitigation equipment. Any actions TVA takes after loss of the flood mitigation equipment are ad hoc. Though TVA has plans to install barriers to protect the TBBPs and some of the other flood mitigation equipment from flooding, it has not installed them. Furthermore, TVA does not fully meet the assumptions and input conditions used in its flooding analysis calculations regarding the retention capacities in the upstream dam reservoirs. Accordingly, TVA is not in compliance with the licensing basis or the NRC's regulations for WBN Unit 1 and; therefore, there is not reasonable assurance of adequate safety at the facility.

The NRC's CAL documented TVA's commitments made in the May 31, 2012, public meeting to mitigate potential external flooding hazards at WBN Unit 1 and Sequoyah Nuclear Plant. However, since TVA does not have compensatory measures fully installed for any of its flood mitigation equipment, it has not restored compliance with its current licensing basis or the regulations, specifically, GDC 2. The CAL does not provide a basis for reasonable assurance of adequate safety at WBN Unit 1. In its June 13, 2012, letter to the NRC, which the staff used as the basis for the CAL, TVA lists a number of proposed but not implemented future actions.

(Continued on Page 4)

DIFFERING PROFESSIONAL OPINION
(Continued)

CONTINUE ITEM 10, ITEM 11, AND/OR ITEM 12 FROM PAGE 1. (Indicate the block number to which this information applies.)

Page 4 (Item 11 continued) However, TVA did not address the basic requirement to provide NRC with its justification as to (a) why it believes it has regained compliance with the regulations and licensing basis, and (b) why it is safe to operate until the actions, if found adequate, are completed. A CAL is not appropriate because it is only a commitment by the licensee to do certain things. A promise by the licensee is not a sufficient basis for reasonable assurance, and it does not restore compliance with the regulations.

TVA's flood mitigation strategy at WBN Unit 1 is the same as its strategy at its other nuclear sites, Sequoyah and Browns Ferry. The result of a design-basis flood in the Tennessee Valley would be very similar to the result at Fukushima in Japan, with potential accidents at multiple nuclear plants. The difference is that only a flood, rather than an earthquake followed by tsunami, is necessary to cause the loss of the plants. The NRC concluded in the Fukushima 50.54(f) letter dated March 12, 2012, that it has "confidence...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 operation and the continuation of licensing activities did not pose an imminent risk to public health and safety." One of the premises of the NRC's conclusion was that all plants were complying with GDC 2 and their current licensing basis. WBN, Sequoyah, and Browns Ferry are examples of plants that do not support the NRC's conclusion in the Fukushima 50.54(f) letter. The Fukushima 50.54(f) letter requested:

1. a flood hazard reevaluation report and an integrated assessment report where the current licensing basis does not bound the reevaluation. The hazard reevaluation report is not due for WBN Unit 1 until March 2013.
2. submittal of the flooding walkdown process to be used or confirmation that an NRC-approved procedure will be used. TVA plans to use NEI 12-07 and to submit walkdown reports for WBN Unit 1 on November 27, 2012.

The NRC's Fukushima 50.54(f) letter is not adequate to address the safety concern at WBN Unit 1. The Fukushima 50.54(f) information requests are for long-term actions (i.e., reevaluation and walkdowns), because the NRC concluded that it does not have an immediate safety concern. The Fukushima 50.54(f) letter is not appropriate for WBN because the NRC staff now has information in its possession that TVA is not in compliance at WBN Unit 1 with the current licensing basis or the NRC's regulations. It is not acceptable for the NRC to wait a year for a reevaluation of WBN, since TVA has already informed the NRC that WBN Unit 1 is in an unanalyzed condition.

NRC management, in particular, technical staff management, has provided no reason or basis for why WBN Unit 1 should be allowed to operate until the safety concern is resolved. Reasonable assurance of adequate safety presumes that the activities authorized by the license can be conducted without endangering the health and safety of the public, and that those activities will be conducted in compliance with the Commission's regulations. TVA is not in compliance with the regulations, and the NRC is allowing TVA to operate WBN Unit 1 in noncompliance. The NRC's inaction to address TVA's noncompliance with the regulations and the lack of reasonable assurance of adequate safety at WBN Unit 1 are contrary to the NRC's obligations under the Atomic Energy Act to assure adequate safety, and the Davis-Besse Lessons-Learned. Therefore, we submit a differing professional opinion.

We see two available options:

1. An Order is appropriate. Since TVA is not in compliance at WBN Unit 1 with the regulations for flood protection, i.e., GDC 2, there is not reasonable assurance of adequate safety. In its current condition, the flood mitigation equipment is unprotected and the facility cannot be maintained in a safe shutdown condition. The Order could be a shutdown Order or a "show cause" Order.
2. A second option is a DFI under 10 CFR 2.204, for the purpose of determining whether an Order under 10 CFR 2.202 should be issued, or whether other action should be taken. A DFI would give TVA another chance to tell NRC why it should be allowed to continue to operate WBN Unit 1. Also, a DFI places the burden of proof on TVA to demonstrate adequate safety, even though, in our opinion, no additional information is required to issue an Order.

A chronology of the safety concern at WBN Unit 1 is provided below with ADAMS accession numbers listed for relevant documents.

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DIFFERING PROFESSIONAL OPINION
(Continued)

CONTINUE ITEM 10, ITEM 11, AND/OR ITEM 12 FROM PAGE 1. (Indicate the block number to which this information applies.)

Page 5 (Item 11 continued)

CHRONOLOGY OF WBN UNIT 1 SAFETY CONCERN FROM NRR/DORL/LPWB

6/3/11 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 Unit 1 Updated FSAR (UFSAR).

7/12/11 Advisory Committee on Reactor Safeguards discussed hydrology concerns at WBN Unit 2 and raised questions about potential impact on WBN Unit 1.

12/6/11 TVA 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 would be submitted by end of 2011; TVA subsequently stated that it would be delayed to the end of January, then February, then March 2012.

3/28/12 LPWB discussed the safety concern at WBN Unit 1 and proposed a 50.54(f) letter to the Watts Bar Unit 2 Reactivation Assessment Group (WRAG; chaired by Mr. Bruce Boger, NRR/DD; charter at ML091250168).

3/29/12 Public pre-application meeting with TVA re: change to WBN Unit 1 flooding licensing basis (ML12097A293 pkg). TVA stated that the LAR would be submitted April 16, but that calculations would not be completed until end of July. TVA stated that safety margins were minimal (from < 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 Based on the 3/29/12 public meeting, a draft 50.54(f) letter (ML12088A118) was provided to MEvans (DORL/D) and AHowe (DORL/DD) and sent to OGC for concurrence.

4/9/12 DORL/BC meeting: PMilano (acting BC) informed DORL/D that the 50.54(f) letter was at OGC for concurrence. DORL/D directed that the letter be retrieved from OGC.

DORL/D emailed that the 50.54(f) must have NRR alignment before proceeding, and proposing a briefing the following week.

4/10/12 FLYon email responded to DORL/D raising the safety concern and providing justification for a 50.54(f) letter separate from the Fukushima 50.54(f) letter (ML121010030 pkg). DORL/D met with FLYon to discuss concerns.

DORL/D met with FLYon and PMilano to discuss safety concern. DORL/D directed that draft 50.54(f) be withheld from OGC (ML12110A313 pkg). DORL/D acknowledged that she understood the concern and had responsibility to get alignment with NRR, NRO, and JLD senior management to move forward.

4/11/12 DORL/DD discussed safety concern with FLYon and PMilano.

4/24/12 PMilano and FLYon sent memo to ELeeds (NRR/D) (ML12115A165).

4/25/12 DORL/D, DORL/DD, LRaghavan, FLYon, and SCampbell (LPWB/BC) discussed safety concern and path forward (ML121290576 and clarification email ML121210319).

5/1/12 FLYon 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 (ML121240466).

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**DIFFERING PROFESSIONAL OPINION
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Page 6 (Item 11 continued)

5/3/12 PMilano, FLyon, and LRaghavan sent memo to EDO (ML12122A427 pkg).

5/7/12 Email from NMamish to FLyon (ML12181A388) acknowledging memo to EDO.

5/10/12 LRaghavan, FLyon, and PMilano discussed concerns with NRR/D. (ML12138A270).

FLyon provided LIC-504 recommendations to DORL/D, et al., for consideration (ML12195A076, ML12195A078).

5/11/12 Internal NRC meeting (DORL, DE, DSS, JLD, NRO/DSEA, RII) discussed safety concern and path forward. FLyon provided feedback to NRR/D (ML12138A270).

5/22/12 Discussion with DORL/DD, DBroaddus, PMilano, GWilson, SCampbell, LRaghavan, SShaeffer, and FLyon on safety concern for pre-brief of NRR/D and VMcCree (RII/RA).

5/23/12 Pre-brief of NRR/D and RII/RA for 5/31/12 public meeting. FLyon provided feedback to NRR/D (ML12150A040).

LRaghavan, FLyon, and PMilano discussed safety concerns with MJohnson (DEDR).

5/30/12 LRaghavan, FLyon, and PMilano discussed safety concerns with Chairman Jazcko.

AHowe memo (ML12150A067), follow-up on 5/11 meeting. PMilano provided feedback (ML12152A133).

5/31/12 NRC/TVA senior management public meeting to discuss WBN and SQN flooding/hydrology issues (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. FLyon provided feedback to NRR/D (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 (ML12157A551).

6/12/12 FLyon and PMilano memo to ELeeds (ML12158A508) regarding May 31 meeting. TVA's presentation demonstrated that the situation is worse than previously thought; there is no margin to TBBPs.

6/18/12 Email from senior resident inspector RMonk (ML12172A250) regarding poor quality of TVA's functional evaluation/operability determination (FE/OD) on sand baskets.

PMilano and FLyon discussed safety concerns with Commissioner Magwood.

6/20/12 PMilano and FLyon discussed safety concerns with NRR/D.

6/21/12 Email from FLyon to ELeeds stating that a CAL is insufficient to resolve the issues and recommending a DFI or Order, and ELeeds response (ML12173A323).

PMilano and FLyon discussed safety concerns with EDO.

6/25/12 CAL issued to TVA (ML12165A527).

6/29/12 FLyon and PMilano discussed concerns with NRR/D regarding GWilson email (ML12181A435) of 6/28/12, draft safety basis at WBN.

TVA submitted EN48056, confirming that WBN Unit 1 is in an unanalyzed condition due to the increase in PMF level.

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DIFFERING PROFESSIONAL OPINION
(Continued)

CONTINUE ITEM 10, ITEM 11, AND/OR ITEM 12 FROM PAGE 1. *(Indicate the block number to which this information applies.)*

Page 7 (Item 11 continued)

7/2/12 FLyon response to GWilson memo (ML12184A281). FLyon response to ELeeds status memo (ML12184A276, copy to others ML12184A271).

**Document 2: Memo Forwarding DPO from
DPOPM to NRR Office Manager**

July 20, 2012

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

FROM: Renée M. Pedersen, Sr. Differing Views Program Manager */RA/*
Office of Enforcement

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

The purpose of this memorandum is to advise you of a Differing Professional Opinion (DPO) that was submitted to me while serving as the Differing Professional Opinions Program Manager (DPOPM). I received the DPO on July 17, 2012, and in coordination with the Director, Office of Enforcement, screened it in accordance with the guidance included in Management Directive (MD) 10.159, "The NRC Differing Professional Opinions Program." On July 18, 2012, I notified senior management and the submitter that the preconditions for acceptance were met and that the submittal was accepted for review within the DPO Program as DPO-2012-003.

The DPO (Enclosure 1) raises concerns about whether Tennessee Valley Authority is in compliance at Watts Bar Nuclear Plant Unit 1 with the current licensing basis or the Nuclear Regulatory Commission's regulations for protection from external flooding. Because the DPO takes issue with a position established by your organization, in accordance with section (D)(3)(c) of the Management Directive (MD) Handbook, I am forwarding this DPO to you for appropriate action.

MD 10.159-036 specifically addresses your responsibilities as an Office Director. In brief, you are required to:

- Establish an independent ad hoc panel (DPO Panel) to review the issue, draw conclusions, and make recommendations to you regarding the disposition of the issues presented in the DPO.

CONTACT: Renee M. Pedersen, OE/CRB
(301) 415-2742

E. Leeds

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- Provide appropriate oversight of and support to the DPO Panel to ensure a thorough and timely review of the DPO (while maintaining process independence).
- Review the DPO Panel's report to ensure that it clearly, accurately, and completely addresses the tasks outlined in your memorandum establishing the panel.
- Issue a DPO Decision to the submitter within the 120-day timeliness goal (November 15, 2012).
- Request approval from the Executive Director for Operations (EDO) for DPO extensions beyond the 120-day timeliness goal. (Requests should be forwarded thru the DPOPM with the reason for the delay and a new completion date.)
- Forward status updates during the disposition of the DPO and until the time that all followup actions are complete.
- Identify and assign appropriate followup actions and establish completion dates within 2 weeks of issuing the DPO Decision. (The DPOPM and submitter should be copied on any followup action memoranda or correspondence.)
- Notify the DPOPM of followup action schedule delays, including the reason for the delay and a revised completion schedule. (The DPOPM will subsequently notify the submitter and report it to the applicable Deputy EDO.)
- Forward a summary of the DPO to the DPOPM for inclusion in the Weekly Information Report. (In the event the DPO is appealed, the summary will be postponed until the DPO Appeal Decision is issued.)
- Take action to positively recognize the DPO submitter if the submitter's actions result in significant contributions to the mission of the agency.
- Review the DPO Case File for public release when the case is closed if the submitter requests discretionary public release.

Disposition of this DPO should be considered an important and time sensitive activity. The timeliness goal included in the MD for issuing a DPO Decision is 120 calendar days from the day the DPO is accepted for review. The timeliness goal for issuing this DPO Decision is November 15, 2012.

Process Milestones and Timeliness Goals for this DPO are included as Enclosure 2. The timeframes for completing process milestones are identified strictly as goals-a way of working toward reaching the DPO timeliness goal of 120 calendar days.

Although timeliness is an important DPO Program objective, the DPO Program also sets out to ensure that issues receive a thorough and independent review. Therefore, if you or the DPO Panel determines that an extension beyond 120 calendar days is necessary at any time during the process, please send me an email with the reason for the extension request and a new completion date. I will subsequently forward this request to the EDO for approval.

In an effort to support effective implementation, the Office of the EDO will establish tracking to address the three key deliverables for the DPO process:

- (1) DPO Decision for DPO-2012-003 (November 15, 2012);
- (2) Followup action memorandum (2 weeks after DPO Decision); and
- (3) Weekly Information Report summary (2 weeks after DPO Decision);

Please ensure that all DPO-related activities are charged to Activity Code ZG0007.

Because this process is not routine, I will be meeting and communicating with all parties during the process to ensure that everyone understands the process, goals, and responsibilities. I will be subsequently sending you information intended to aid you, the DPO Panel, and support staff in implementing the DPO process.

An important aspect of our internal safety culture includes maintaining an environment that encourages, supports, and respects differing views. As such, all employees involved in the process should be instructed to exercise discretion and treat this as a sensitive matter. In an effort to preserve privacy, minimize the effect on the work unit, and keep the focus on the issues, employees should be instructed to simply refer to the employee as the DPO submitter. Managers and staff should be reminded to not engage in "hallway talk" on the issue and to refrain from behaviors that could be perceived as retaliatory and or are chilling the DPO submitter or creating a chilled environment for others.

On an administrative note, please ensure that all correspondence associated with this case include the DPO number in the subject line, be profiled in accordance with the Agencywide Document Access Management System (ADAMS) template OE-011, be identified as non-public and declared an official agency record when the correspondence is issued. Please email the ADAMS accession number for the record to DPOPM.Resource@nrc.gov and the record will be filed in the applicable DPO case file folder (DPO-2012-003) in the ADAMS Main Library. Following this process will ensure that a complete agency record is generated for the disposition of this DPO. If the submitter requests that the documents included in the DPO Case File be made public when the process is complete, you will be provided specific guidance to support a releasability review.

E. Leads

- 4 -

Finally, it would be helpful if you identify a point of contact (POC) who I can work with to support effective implementation of the DPO process. The POC can be one of the Office of Nuclear Reactor Regulation's Open Collaborative Work Environment Champions (Trent Wertz or Laura Gerke) or someone else.

Enclosures:

1. DPO submittal
2. Milestones and Timeliness Goals

cc:

MWeber, DEDMRT
MJohnson, DEDR
NMamish, AO

E. Leeds

- 4 -

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Enclosures:

1. DPO submittal
2. Milestones and Timeliness Goals

cc:

MWeber, DEDMRT
MJohnson, DEDR
NMamish, AO

DISTRIBUTION:

BBoger, NRR
PMilano, NRR
LGerke, NRR
OE R/F

CLyon, NRR
TWertz, NRR
DPO-2012-003 File

ADAMS ACCESSION NO.: Package (ML12201B322)

OFFICE	OE/CRB	OE/CRB	OE: D
NAME	RPedersen	DSolorio	RZimmerman /RA by ACampbell for/
DATE	7/19/2012	7/19/2012	7/19/2012

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DPO Milestones and Timeliness Goals

DPO-2012-003: Protection from External Flooding at Watts Bar Unit 1

Assigned to: Eric Leeds, NRR

DPO Milestone	Timeliness Goals*	Actual Date
Individual submits DPO (NRC Form 680)	None	7/17/2012
DPOPM receives, screens, and accepts DPO	8 days	7/18/2012
DPOPM forwards DPO to office manager	7 days	7/19/2012
Office manager establishes DPO Panel	14 days	
DPO Panel conducts review and issues report <ul style="list-style-type: none"> – meets with submitter (≈7 days) – establishes Statement of Concern (≈7 days) – confirms schedule with office manager (≈7 days) – completes review (≈ 49 days after start of review) – writes report (≈21 days after completion of review) 	70 days	
Office manager issues DPO Decision	21 days	
DPO TIMELINESS (time from acceptance of DPO to DPO Decision)	120 days 11/15/ 2012	

*The timeframes for completing process milestones are identified strictly as goals—a way of working towards reaching the Differing Professional Opinions (DPO) timeliness goal of 120 calendar days.

The timeliness goal for dispositioning a DPO (i.e., DPO Decision) will be established as 120 calendar days after a DPO has been accepted for review under the DPO Program.

Office managers should send requests for extension beyond the 120-day timeframe to the Differing Professional Opinions Program Manager (DPOPM), who will forward the request to the Executive Director for Operations with a recommendation.

**Document 3: Memo from NRR Office Manager
Establishing Panel**

August 2, 2012

MEMORANDUM TO: Steve K. West - Chair
Eileen M. McKenna - Member
Lois M. James - Member

FROM: Eric J. Leeds, Director */RA/*
Office of Nuclear Reactor Regulation

SUBJECT: AD HOC REVIEW PANEL - DIFFERING PROFESSIONAL
OPINION INVOLVING EXTERNAL FLOODING AT WATTS BAR
UNIT 1 (DPO-2012-003)

In accordance with Management Directive (MD) 10.159, "The NRC Differing Professional Opinions Program," I am appointing you as members of a Differing Professional Opinion (DPO) Ad Hoc Review Panel (DPO Panel) to review a DPO that was forwarded to me to disposition.

The DPO (Enclosure 1) raises concerns about external flooding at Watts Bar Unit 1.

I have designated Steve West chairman of this DPO Panel and Eileen McKenna as a DPO Panel member. Lois James was proposed by the DPO submitter and serves as the third member of the DPO Panel. In accordance with the guidance included in MD 10.159 and consistent with the DPO Program objectives, I task the DPO Panel to do the following:

- Review the DPO submittal to determine if sufficient information has been provided to undertake a detailed review of the issue.
- Meet with the submitter, as soon as practicable, to ensure that the DPO Panel understands the submitter's concerns and scope of the issues. (Normally within 7 days)
- Promptly after the meeting, document the DPO Panel's understanding of the submitter's concerns, provide the Statement of Concerns (SOC) to the submitter, and request that the submitter review and provide comments, if necessary. (Normally within 7 days)
- Maintain the scope of the review to not exceed those issues as defined in the original written DPO and confirmed in the SOC.
- Consult with me as necessary to discuss schedule-related issues, the need for technical support (if necessary), or the need for administrative support for the DPO Panel's activities.
- Perform a detailed review of the issues and conduct any record reviews, interviews, and discussions you deem necessary for a complete, objective, independent, and impartial review. The DPO Panel should re-interview individuals as necessary to clarify information during the review. In particular, the DPO Panel should have periodic discussions with the submitter to provide the submitter the opportunity to further clarify the submitter's views and to facilitate the exchange of information.

- ❑ On or about the last day of the month, provide via email to Renee Pedersen, Differing Views Program Manager (DVPM), monthly status updates on your activities. This information will be reflected in the Milestones and Timeliness Goals for this DPO. Please provide a copy of email status updates to the submitter and to me.
- ❑ Issue a DPO Panel report, including conclusions and recommendations to me regarding the disposition of the issues presented in the DPO. The report should be a collaborative product and include all DPO Panel member's concurrence. Follow the specific processing instructions for DPO documents.
- ❑ Consult me as soon as you believe that a schedule extension is necessary to disposition the DPO.
- ❑ Recommend whether the DPO submitter should be recognized if the submitter's actions result in significant contributions to the mission of the agency.

Disposition of this DPO should be considered an important and time sensitive activity. The timeliness goal included in the MD for issuing a DPO Decision is 120 calendar days from the day the DPO is accepted for review. The timeliness goal for issuing this DPO Decision is November 15, 2012.

Process Milestones and Timeliness Goals for this DPO are included as Enclosure 2. The timeframes for completing process milestones are identified strictly as goals—a way of working towards reaching the DPO timeliness goal of 120 calendar days. The timeliness goal identified for your DPO task is 70 calendar days.

Although timeliness is an important DPO Program objective, the DPO Program also sets out to ensure that issues receive a thorough and independent review. The overall timeliness goal should be based on the significance and complexity of the issues and the priority of other agency work. Therefore, if you determine that your activity will result in the need for an extension beyond the overall 120-day timeliness goal, please send me an email with the reason for the extension request and a new completion date. I will subsequently forward this request to the DVPM who will forward it to the EDO for approval.

Please ensure that all DPO-related activities are charged to Activity Code ZG0007.

Because this process is not routine, the DVPM will be meeting and communicating with all parties during the process to ensure that everyone understands the process, goals, and responsibilities. The DVPM will be subsequently sending you information intended to aid you in implementing the DPO process.

An important aspect of our internal safety culture includes respect for differing views. As such, you should exercise discretion and treat this matter sensitively. Documents should be distributed on an as-needed basis. In an effort to preserve privacy, minimize the effect on the work unit, and keep the focus on the issues, you should simply refer to the employee as the DPO submitter. Avoid conversations on the issue that could be perceived as "hallway talk." We need to do everything that we can in order to create an organizational climate that does not chill employees from raising dissenting views.

As a final administrative note, please ensure that all correspondence associated with this case include the DPO number in the subject line, be profiled in accordance with ADAMS template OE-011, be identified as non-public and declared an official agency record *when the correspondence is issued*. Please email the ADAMS accession number for the record to DPOPM.Resource@nrc.gov, and the record will be filed in the applicable DPO case file folder (DPO-2012-003) in the ADAMS Main Library. Following this process will ensure that a complete agency record is generated for the disposition of this DPO. If the submitter requests that the documents included in the DPO Case File be made public when the process is complete, you will be provided specific guidance to support a releasability review.

I appreciate your willingness to serve and your dedication to completing an independent and objective review of this DPO. Successful resolution of the issues is important for NRC and its stakeholders. If you have any questions, you may contact me, Trent Wertz, NRR OCWE Champion, or Renée Pedersen, DVPM, at (301) 415-2742 or email Renee.Pedersen@nrc.gov.

I look forward to receiving your independent review results and recommendations.

Enclosures:

1. DPO-2012-003
2. Milestones and Timeliness Goals

cc w/o enclosures: Submitter
DVPM

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As a final administrative note, please ensure that all correspondence associated with this case include the DPO number in the subject line, be profiled in accordance with ADAMS template OE-011, be identified as non-public and declared an official agency record *when the correspondence is issued*. Please email the ADAMS accession number for the record to DPOPM.Resource@nrc.gov and the record will be filed in the applicable DPO case file folder (DPO-2012-003) in the ADAMS Main Library. Following this process will ensure that a complete agency record is generated for the disposition of this DPO. If the submitter requests that the documents included in the DPO Case File be made public when the process is complete, you will be provided specific guidance to support a releasability review.

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Enclosures:

- 1. DPO-2012-003
- 2. Milestones and Timeliness Goals

cc w/o enclosures: Submitter
 DVPM

Accession Number: ML12214A302

OFFICE	NRR/OD
NAME	ELeeds
DATE	08/02/12

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Document 4: DPO Panel Report



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

January 17, 2013

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

FROM: K. Steven West, DPO Panel Chair */RA/*
Eileen M. McKenna, DPO Panel Member */RA/*
Eva A. Brown, DPO Panel Member */RA/*

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

On July 17, 2012, two individuals (the submitters) filed a differing professional opinion (DPO) regarding external flood issues at Watts Bar Nuclear Plant, Unit 1 (WBN1) (DPO-2012-003, ADAMS Accession No. ML12201B322). In your memoranda of August 2, 2012, and November 15, 2012 (ADAMS Accession Nos. ML12214A302 and ML12321A133), you appointed us to serve as the Ad Hoc Review Panel. In accordance with Management Directive 10.159, "The NRC Differing Professional Opinions Program," you asked us to conduct a thorough and independent review of the DPO and to issue a report with our conclusions and recommendations. We have completed our review. Our report is enclosed.

The Statement of Concerns we developed with the submitters (Appendix A of our report) framed the scope of our review. For the overarching issues included in the Statement of Concerns, we concluded that there was not an immediate safety concern associated with the WBN1 flood issue when the staff issued the confirmatory action letter (CAL) to Tennessee Valley Authority. Our conclusion on the immediate safety question is tempered to a degree, however, because the staff did not develop and document a common understanding of either the significance of the flood issue itself or the safety basis for continued operation of WBN1. We also concluded that the staff's decision to issue the CAL met the applicable regulatory policy and guidance, was consistent with past practice, and was a reasonable regulatory decision. Finally, we concluded that the staff's decision to continue to work on the known flood issue at WBN1 in parallel with its work on post-Fukushima activities was appropriate.

In addition, for the reasons detailed in our report, we concluded that the 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 LIC-504, Revision 3, "Integrated Risk-Informed Decision-Making Process for Emergent Issues." Not following an available process, like LIC-504, suggests to us that the staff may not have fully internalized the lessons learned from past significant events or there may be gaps in the staff's training or understanding about how to handle emergent issues. Overall, we considered our observations and conclusions regarding process and documentation to be the most important outcomes of our review.

CONTACT: K. Steven West, DPO Panel Chair
(630) 829-9600

Our report includes for your consideration several recommendations associated with our conclusions.

Thank you for giving us the opportunity to review this important issue and for your support throughout our review. For us, our review and the interactions we had with everyone involved (see Appendix C of our report) served to reinforce the value of our differing professional opinion program and the important role it plays in an open and collaborative work environment. We received outstanding support from everyone we interacted with during our review. To a person, they spoke candidly and frankly about the WBN1 flood issue and their involvement in the handling of the issue and several similar issues, e.g., Oconee Nuclear Station flooding. In particular, we acknowledge the ongoing work of the WBN1 senior resident inspector, his branch chief, and others in Region II to raise and follow up on issues related to external flooding at WBN1. In our view, their frontline focus, which is an outcome of the submitters' concerns, on the proposed compensatory measures, the permanent corrective actions, and associated licensee activities has contributed directly to continued plant safety.

During the course of our review, we developed information about the sand baskets that may be relevant to the ongoing inspections and technical review of their use at WBN1. We will provide this information under separate cover to the Division of Operating Reactor Licensing for its consideration and use.

Please let us know if you would like additional information about our review, our conclusions, or our recommendations.

Enclosure:
DPO Panel Report

cc: C.F. Lyon
P.D. Milano
R.P. Zimmerman, OE
R.M. Pedersen, OE
L.S. Gerke, NRR
T.L. Wertz, NRR
J. Heck, Region III

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L.S. Gerke, NRR
T.L. Wertz, NRR
J. Heck, Region III

DISTRIBUITION:

Eva A. Brown, NRR
Eileen M. McKenna, NRO
K. Steven West, RIII

ADAMS ACCESSION NO. :ML13016A452

*concurred via email

OFFICE	NRR	E	NRO	E	RIII	E	
NAME	EABrown:rj*		EMMcKenna*		KSWest		
DATE	01/17/2013		01/17/2013		01/17/2013		

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**Differing Professional Opinion (DPO)
Involving External Flooding at
Watts Bar, Unit 1
(DPO-2012-003)**

DPO Panel Report

/RA/

K. Steven West, Panel Chair

/RA/

Eileen M. McKenna, Panel Member

/RA/

Eva A. Brown, Panel Member

Date: January 17, 2013

1. Introduction

On July 17, 2012, in accordance with Management Directive (MD) 10.159, "The NRC Differing Professional Opinions Program," two individuals (the submitters) filed a differing professional opinion (DPO) associated with external flood issues at Watts Bar Nuclear Plant, Unit 1 (WBN1) (DPO-2012-003, ADAMS Accession No. ML12201B322). By memorandum dated July 20, 2012, the Senior Differing Views Program Manager provided the DPO to the Director of the Office of Nuclear Reactor Regulation (NRR) for appropriate action (ADAMS Accession No. ML12201B322). By memoranda dated August 2, 2012, and November 15, 2012 (ADAMS Accession Nos. ML12214A302 and ML12321A133), the Director of NRR established an Ad Hoc Review Panel (DPO Panel or Panel) in accordance with MD 10.159. Consistent with DPO program objectives, the Director of NRR directed the DPO Panel to conduct a thorough and independent review of the DPO and to issue a report with its conclusions and recommendations.

The issues raised by the DPO submitters occurred roughly between the spring and the summer of 2012. The DPO Panel focused its review on this period. However, during the course of its review the Panel learned about licensee and staff activities that occurred before and after this timeframe. As an example, many of the individuals interviewed by the DPO Panel offered information and views about actions that NRR and Region II are currently taking to follow up on the licensee's commitments and corrective actions and to achieve final resolution of the flood issue. As appropriate to facilitate understanding of the issue, the DPO Panel has included information it learned about activities that occurred before and after the specific timeframe associated with the DPO.

2. Background

The Tennessee Valley Authority (TVA, the licensee) initially licensed the WBN site assuming that a significant external flood would occur due to a high rainfall event. The limiting external flood event involved a probable maximum precipitation (PMP) rainfall scenario and the flood mitigation strategy assumed a probable maximum flood (PMF) of 738.1 feet (ft). The original PMF licensing basis for WBN1 determined that some essential equipment would be below postulated flood levels, i.e., submerged. Given that the postulated flood scenario, unlike a seismic event, would include advance warning and would take time to fully develop, the licensee included in its flood mitigation strategy operator actions that would be taken to establish core cooling by alternate means.

During February 2008, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a broad hydrologic inspection of Bellefonte Nuclear Plant, Units 3 and 4 (BLN), in Chattanooga, Tennessee, to determine whether or not the quality assurance (QA) processes and procedures were effectively implemented with regards to the flood model for the BLN combined license application. The inspectors found that TVA used the operating QA program for the other TVA nuclear facilities, including WBN, to control the activities associated with the flood model. The staff found that TVA had not identified that it had not adequately implemented its design control process (including design inputs and associated quality records) as it related to the flood model. The staff also found that TVA had not used prescribed quality-related procedures as required by its QA program, and had not implemented the appropriate procedures when it applied the flood model for the 1998 Reassessment for the Effects of Dam Safety Modifications calculation package. On March 19, 2008, the NRC issued a Notice of Violation to TVA for these issues (ADAMS Accession No. ML080640487). Further review by the NRC staff determined that in 1998, TVA had revised the WBN1 flood analysis and reduced the PMF from 738.1 ft. to 734.9 ft. A later TVA revision to the WBN1 flood analysis again revised the PMF, increasing it to 739.7 ft.

Since about 2009, in response to the questions about the adequacy of its design basis flood analyses and potential adverse impacts resulting from changes in the operations of river dams along the Tennessee Valley Watershed, TVA has been updating its hydrologic analyses and considering the need to change the current licensing bases for all of its nuclear power plant sites to reflect the results of the new analyses. TVA has presented interim results of its updated analyses to the staff at various meetings. The new results indicated that projected external flood levels have challenged the levels defined in the current licensing basis and the margins to equipment that would be relied upon to mitigate a probable maximum flood event. Specifically, for WBN1, the new analyses generally show a trend of increasing PMF levels. With these increased flood levels, additional plant equipment that would be needed to maintain safe shutdown would be at or below the postulated flood levels. Thus, the new results called into question the adequacy of the current WBN1 licensing basis for external flood.

In 2012, in light of the new hydrologic results and the projected increase in the PMF level for WBN1, and following continuing interactions with the staff, TVA committed to provide compensatory measures to protect certain equipment and initiated actions to permanently resolve the flood issue. TVA also committed to submit a license amendment request (LAR) that would update the WBN1 Updated Final Safety Analysis Report (UFSAR) to reflect the updated hydrologic analysis methods and results and describe the interim and permanent corrective actions it would take to mitigate the updated PMF. The staff confirmed the licensee's commitments and specific implementation dates in a confirmatory action letter (CAL) that it issued to TVA on June 25, 2012 (ADAMS Accession No. ML12165A527). (In addition to WBN1, the CAL addressed commitments made by TVA to mitigate potential external flooding hazards at Sequoyah, Units 1 and 2. The DPO did not involve Sequoyah. Therefore, the DPO Panel did not include Sequoyah in its review of the DPO.)

The measures instituted by TVA at WBN1 included, as examples, using sand baskets to provide confidence that certain dams would not be overtopped due to rainfall, and staging flood barriers for the thermal barrier booster pump.

Through its review of the DPO submittal and its discussions with the DPO submitters, the DPO Panel learned that the submitters had an immediate safety concern with the level of flood protection provided at WBN1 because they believed WBN1 was not in compliance with its operating license or General Design Criterion (GDC) 2, "Design bases for protection of natural phenomenon." The DPO Panel also learned from the submitters that they did not agree with the staff's decision to issue the CAL of June 25, 2012. They believed the CAL was not appropriate because it merely documented commitments or promises by the licensee to take future actions. The submitters also had concerns about the timing for implementing permanent corrective actions should the staff rely on the so called Fukushima 50.54(f) letter of March 12, 2012, to resolve the WBN1 flood issue. Additional documentation of the submitters' concerns is included in Section 3, "Statement of Concerns," and in Appendix A, "Statement of Concerns."

During the course of its review of the DPO, the Panel learned that by letter dated July 19, 2012, TVA submitted the LAR for WBN1 to change the UFSAR to adopt a revised hydrology analyses and to reflect the changes to the facility and the flood mitigation measures, both temporary and permanent (ADAMS Accession No. ML12236A167). The DPO Panel understands that the staff has accepted the LAR for review, but has not started the licensing review in earnest.

The DPO Panel also found that both NRR and Region II have been engaged for several years in ongoing inspection and follow up at WBN1 on plant-specific flood issues, associated compensatory actions, permanent corrective actions, and potential enforcement action. During 2012, Region II has dealt with such issues as inadequate augmented in-service testing

for the flood-mode boration charging pumps, the thermal barrier booster pump flood barrier installation, intake pumping station maintenance, spool-piece installation, and aggregate impacts affecting the ability to perform flood mode operations. The region also addressed the licensee's failure to recognize that the shutdown board room and the main control room circulating chilled water pumps could be submerged during a flood, and raised new questions about the sand baskets and their installation.

3. Statement of Concerns

On August 15, 2012, the DPO Panel met for the first time with the submitters to discuss their DPO submittal and their perspectives on their concerns. After this meeting, the DPO Panel and the submitters worked together to develop the Statement of Concerns. The agreed upon Statement of Concerns includes two overarching issues. The first is that there is an immediate safety concern at WBN1, and the second is that neither the Fukushima 50.54(f) letter nor a confirmatory action letter provides reasonable assurance of adequate protection for WBN1. The full Statement of Concerns document is included as Appendix A to this report. In addition to the two overarching issues, the Statement of Concerns includes the submitter's supporting points. In accordance with the DPO process, the Statement of Concerns defined the scope of the DPO Panel's review.

4. Evaluation

In support of its independent evaluation of DPO-2012-003, the DPO Panel met with DPO submitters several times to obtain their perspectives on their concerns and to discuss with them the status and results of its review. The Panel also reviewed the documents, records, and references cited throughout this report and listed in Appendix B, "Records and Documents Reviewed by the DPO Review Panel." The Panel also interviewed the individuals listed in Appendix C, "NRC Staff and Managers Interviewed by the DPO Review Panel," at NRC Headquarters or Region II, to obtain additional background information and their perspectives on the WBN1 flood issue, the design basis and the licensing and inspection aspects of the issue, and the processes that were (or are being) followed by the licensee and the staff to address the issue. Finally, the Panel members met amongst themselves to plan their work, to review and evaluate the issues, and to document their conclusions and recommendations.

The DPO Panel focused on understanding how the WBN1 flood issue and the regulatory decisions evolved and why alignment was not reached on the significance of the issue or the appropriate regulatory approach for addressing the issue with the licensee.

4.1. Preview of the Panel's Conclusions

To facilitate easier reading of the DPO Panel's evaluation, it offers the following overview of its principal conclusions. For the overarching issues included in the Statement of Concerns, the Panel concluded that there was not an immediate safety concern associated with the WBN1 flood issue when the staff issued the CAL to TVA. This conclusion is tempered to a degree because the staff did not develop and document the significance of the flood issue and the safety basis for continued operation. The Panel also concluded that the staff's decision to issue the CAL met the applicable regulatory policy and guidance and was a reasonable regulatory decision. Finally, the Panel concluded that the staff's decision to continue to work on the known flood issue at WBN1 in parallel with its work on post-Fukushima activities was appropriate.

In addition, the Panel concluded that the 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 fully assessed and documented the significance of the issue, the safety bases for continued operations, and the bases for the chosen regulatory approach. It was the Panel's view that LIC-504, "Integrated Risk-Informed Decision-Making process for Emergent Issues," (ADAMS Accession No. ML100541776) was the appropriate process.

4.2. Framing the Issue

At first glance, the WBN1 external flood issue appears to be a fairly straightforward regulatory issue that could be resolved with a change to the UFSAR and a license amendment, activities that the staff is well versed in and comfortable performing. Specifically, for a number of years it appeared that an operating reactor (WBN1) had been complying with its licensing basis for mitigating a PMF event. Later, as a result of both NRC inspection and its own assessment and reanalysis, the licensee determined that the PMF exceeded the current licensing basis, putting the plant in an unanalyzed condition. In response, the licensee acknowledged the issue and informed the staff that it would update the UFSAR and the licensing basis to reflect: (1) the results of its new hydrologic analysis, (2) any changes to its flood mitigation strategy, and (3) any plant modifications that would be needed to implement the new strategy and cope with the new PMF.

By digging a little deeper, the DPO Panel developed a clearer picture of the true challenges presented by the issue. This picture helped the Panel better understand the factors and circumstances that led to the DPO and suggested certain things the staff could have done differently to achieve better understanding and alignment on both the significance of the issue and the best regulatory approach for addressing the issue. The most significant of these factors and circumstances are summarized below.

First, in reviewing the timeline associated with the issue, the Panel noted that more than four years had passed between the point when the staff first questioned the methods and results of TVA's hydrologic analysis and the point when the staff issued the CAL. From interviews, the Panel learned that during this period some staff and managers involved in the WBN1 issue became increasingly frustrated with the slow pace of the licensee's efforts to resolve the issue. Some also felt that they were not able to gain traction or secure support for their particular concerns and issues.

Second, from a regulatory perspective, the scope of the underlying issue itself—external flood—is somewhat out of the ordinary and has proved to be more challenging than many licensing actions. To fully understand and successfully resolve the issue would require the coordinated efforts of projects staff, technical reviewers, regional inspectors, as well as their first line supervisors and the senior managers. All things considered, the DPO Panel believed the staff worked well together. However, the Panel found gaps that contributed to misunderstandings and divisiveness. For example, some headquarters individuals interviewed by the Panel did not appear to clearly understand certain aspects of the region's role and responsibilities regarding the issue and how inspectors approach issues. Similarly, some in the region were equally unclear about certain aspects of the headquarters role and approach. As another example, during interviews, the Panel learned that the staff may not have had a good understanding about how the licensees and the NRC should treat third-party information that could affect information in a plant's UFSAR. (In this case, for example, changes to off-site dam operations by third parties could impact flood analyses and plant safety.) Some staff members believed that licensees are required by regulation to address safety issues presented by new information while others were not sure. The Panel noted that a staff white paper, "NRC and Licensee

Actions in Response to New Information From a Third party,” March 8, 2012 (ADAMS Accession No. ML112730055), stated that NRC expects licensees to address new information, but that there is no explicit requirement for licensees to do so. The paper also described the regulatory processes that are available to the staff should it want to persuade a licensee to act on such information. As a further example, the technical expertise needed to address the WBN1 flood issue resided in multiple offices. While the reviewers worked together, it is not clear to the Panel that all of the appropriate reviewers were always included in key decisions. While a question may have benefitted from the consideration of both a hydrologist and a structural engineer, for example, there were cases where only one participated in the discussion. As a final example, and perhaps most significant, the DPO Panel believed that staff were sometimes operating in different regulatory paradigms, which put individuals at odds with one another. This key observation is explored further in Section 4.3.

Third, after several years of what some staff saw as little progress in resolving the WBN1 flood issue, the Fukushima Dai-ichi nuclear power plant accident occurred. For some of those interviewed by the Panel, the Fukushima accident was a tipping point that should have served as a catalyst for both the licensee and the staff to take more aggressive actions to address the WBN1 issue. While the accident caused the staff to relook at its current regulatory approach and at plant capabilities for external floods, some saw the systematic and methodical review proposed by the staff as adding an unnecessary delay in addressing the known issue at WBN1. As noted above, the DPO submitters, in particular, raised concerns about relying on the post-Fukushima activities as a means to address the known WBN1 flood issue. The post-Fukushima activities also introduced new players, such as the Fukushima Steering Committee and the Japan Lessons Learned Directorate. While the Panel did not identify any instances where these groups impacted progress on WBN1, their plans to address external flooding caused some staff concern that the WBN1 resolution could be delayed. In hindsight, this stress may have been relieved by targeted communication with staff who were working on operating reactor issues but who were not directly involved in or knowledgeable about the post-Fukushima activities.

Lastly, throughout its review of the WBN1 flood issue the staff formed differing opinions and positions about the safety significance of the issue, how the safety significance affected compliance and continued operations, and the appropriate regulatory process for resolving the licensing and safety concerns. The DPO Panel felt it was healthy for staff to raise and consider diverse positions and options. Doing so was, in fact, one indicator of an effective open and collaborative work environment. However, in this case, the Panel found that various members of the staff were operating in closely related but different paradigms which resulted in some key questions being left unanswered. Most notably, the Panel found that the staff did not develop a good and common understanding of either the safety significance of the issue or the safety basis for continued operations. Equally important, the Panel concluded that the staff should have and could have done more to gain alignment on answers to these safety questions. In the Panel's opinion, this was a significant reason for why there was not full agreement with the regulatory approach taken (CAL with continuing oversight) and reinforced the importance of using a structured and thoughtful decision-making and documentation process. The Panel considered its observations and conclusions regarding process and documentation to be the most important outcomes of its review.

4.3. Regulatory Paradigms and Concern About an Immediate Safety Issue

The DPO Panel found that individuals appeared to have been sometimes operating in closely related but different paradigms during the review of the WBN1 issue. The paradigm of “compliance” and the paradigm of “safety/risk” arose frequently in the documents the Panel reviewed and during its interviews. The Panel believed that during the WBN1 review, staff did

not always make a connection between the two. As a result, certain aspects of the WBN1 hydrology issue may not have been viewed as important or may have been treated differently by one person or the other. The Panel also believed that staff probably did not realize that they were, at times, talking past or around one another's concerns or points of view.

During the WBN1 review, factors of considerable staff discussion were whether TVA was in compliance with its current licensing basis, with its corollary as to when the licensing basis should have been updated to reflect the new hydrologic information. The DPO Panel felt that the answers to these questions framed the range of opinions about the most appropriate course of regulatory action to take, as well as how most of the individuals involved in the review viewed the issue. Also within the compliance arena, there were questions focused on whether WBN1 was in compliance with the applicable regulatory requirements. It appeared to the Panel that, at that time, staff agreed that WBN1 was nominally in compliance with the current licensing basis as stated in the UFSAR, but the current licensing basis did not meet the applicable regulatory requirements in light of the new information about the effects of river operations and rainfall on resultant water levels at the WBN site. The DPO Panel agreed with this view and noted that this prevailing staff view appeared to hold even at the time of the writing of this report.

The Panel also found that there was an overarching concern about whether the configuration at WBN1 was safe during the period leading up to the issuance of the CAL. This can be further divided into concerns about both interim and long-term considerations. Much of the discussion among the staff centered on the acceptability of the temporary use of sand baskets to prevent dam overtopping under some flood scenarios, until such time as TVA could develop and implement a permanent solution. Some of the uncertainty revolved around the way assumptions about rainfall, dam response, and flood levels at particular site buildings were viewed as being within the licensing basis. Further, the information from TVA had changed over time and thus the potential impacts on the plant may have changed too.

As noted in Section 3, "Statement of Concerns," the DPO submitters said they had an immediate safety concern regarding the external flood at WBN1. They stated that because TVA had not yet implemented the results of its new hydrologic analysis (from the standpoint of licensing, updated mitigating strategy, and permanent plant corrective actions), WBN1 was not in compliance with the applicable regulatory requirements and the new (but not yet submitted or implemented) licensing basis. Therefore, from their paradigm, on the basis of noncompliance, the submitters concluded that there was not reasonable assurance of safety at WBN1. However, the DPO Panel noted that the NRC has long held that while compliance with the regulations presumptively provides adequate protection, the converse (i.e., that noncompliance results in inadequate protection) is not necessarily true. In fact, long-standing NRC guidance addresses functionality, the use of compensatory measures, and the timeliness of corrective actions. The current guiding document is Regulatory Issue Summary (RIS) 2005-020, Revision 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degrade or Nonconforming Conditions Adverse to Quality or Safety"," April 16, 2008 (ADAMS Package Accession No. ML073531473). Therefore, the existence of a noncompliance does not automatically equate to an absence of adequate protection. Furthermore, the Panel noted that there could be circumstances where compliance does not result in adequate protection, for instance, when a new hazard is identified.

The DPO submitters also suggested that the sole function of compensatory measures is to restore compliance and stated that WBN1 did not have adequate compensatory measures in place to restore compliance. The DPO Panel noted that Section 7.3 of Part 9900 (ADAMS Accession No. ML073531346) could be read to imply that a potential outcome of compensatory

measures may be restoration of compliance. Specifically, the guidance discusses the use of compensatory measures to restore plant operating margins, but does not directly equate this to restoring compliance. Nevertheless, the guidance does more directly allow for the use of compensatory measures to restore inoperable structures, systems, and components to an operable (i.e., functional) but degraded status. The guidance also specifies that the NRC expects that conditions calling for compensatory measures to restore operability, such as the WBN1 flood issue, will be more quickly resolved than conditions that do not rely on compensatory measures. The guidance also specifies that if a compensatory measure involves a temporary facility or procedure changes, the NRC regulation in Title 10 of the *Code of Federal Regulations*, Part 50, Section 50.59, "Changes, tests, and experiments," (10 CFR 50.59) should be applied.

From a communications standpoint, the Panel believed the DPO submitters may have used the term "immediate safety concern" to emphasize their position that both the licensee and the staff needed to do more to expedite the licensing action needed for WBN1 to address the licensing basis issue and the plant modifications and other plant-specific actions needed to mitigate the design basis flood derived from the new hydrologic analysis. However, this nonstandard use of the term appears to have caused confusion, resulting in a lack of a common and full understanding of the issue. The DPO submitters' concerns about safety stretched beyond an immediate need to determine whether WBN1 should be shut down until the issue is resolved, to whether the interim measures proposed by TVA were sufficient to compensate for the nonconforming condition. This is important because the staff's criteria and bases for accepting a nonconforming condition changes based on the proposed duration and significance of the plant-specific condition.

The DPO Panel noted that TVA's license amendment request of July 19, 2012 (ADAMS Accession No. ML12236A165), requested staff approval of all of the technical changes to the WBN1 UFSAR and to incorporate the cumulative effects that have occurred in the WBN1 hydrologic analysis since issuance of the operating license. This request included the use of temporary flood barriers (sand baskets). The Panel also found that both NRR and Region II have been engaged in ongoing inspection and follow up at WBN1 on plant-specific flood issues, associated compensatory measures, and permanent corrective actions. During 2012, Region II has dealt with many issues including the thermal barrier booster pump motor flood barrier installation, intake pumping station maintenance, spool-piece installation, aggregate impacts affecting the ability to perform flood mode operations, and questions associated with the sand baskets and their installation. In addition, NRR had performed a technical audit and prepared a safety evaluation report (SER) input about the structural capability of the sand baskets (ADAMS Accession No. ML112170389).

As noted above, the licensee used sand baskets to prevent dam overtopping under some flood scenarios. With the exception of the DPO submitters and one other individual, everyone interviewed by the Panel who had been involved in the review of the sand baskets agreed that when the CAL was issued, the baskets were an acceptable interim (or short-term) measure until the licensee could develop and implement permanent corrective actions. The one individual mentioned above, a hydrologist, believed additional technical review was needed to assess the need to structurally secure the sand baskets. A structural engineer involved in the review informed the Panel that he did not have a concern with using the sand baskets as proposed by the licensee as an interim measure. The Panel understands that the staff's consideration of the structural stability of the sand baskets is ongoing.

The Panel also understands that TVA may now be considering using the sand baskets as a permanent corrective action. The individuals interviewed by the Panel generally indicated that either the sand baskets were not acceptable as a permanent solution or the licensee had not yet demonstrated that they were adequate as a permanent solution. In addition, since the staff issued the CAL, Region II has raised questions about the effectiveness of the sand baskets for the applications intended by the licensee and about the potential adverse impact of the extra volume of water that they could collect. The Panel understands that the region has provided its questions to both the licensee and the staff and that the licensee is working to resolve the questions. The panel recognizes that the ultimate regulatory decision on whether or not the sand baskets are acceptable as either interim or permanent corrective actions, or both, is outside of the scope of its review. Nevertheless, the Panel noted that with the issuance of the CAL, the submittal of the WBN1 LAR (and the technical and safety review that will entail), along with the continued inspection and on-site follow up by Region II, the issue is now being handled within an established and formal regulatory process. Therefore, the Panel expects that staff with the appropriate technical expertise will address and resolve any issues with the use of sand baskets in due course and commensurate with the safety significance of the issue.

As previously stated, the DPO Panel did not believe the staff realized that it was sometimes operating in different paradigms. In essence, as a result, important discussions were sometimes overly focused by one party or the other on the either/or question of compliance or safety/risk, without fully considering both aspects in an integrated and risk-informed way. In the Panel's view, the staff should have considered both aspects together in an overall assessment of the significance of the WBN1 flood issue and in its strategizing and decision-making regarding the most appropriate regulatory approach for resolving the issue. This indicated to the Panel that the staff should have and could have done more to gain alignment on answers to questions about the significance of the issue and the chosen regulatory approach. In fact, the staff missed a number of opportunities to do so.

4.4. Missed Opportunities

During its review of the DPO submittal, the DPO Panel found that the staff missed a number of opportunities to use an existing structured process to develop and document its decisions for handling the WBN1 external flood issue. The Panel identified the following five examples of missed opportunities.

4.4.1. Closure Plan for Dam/Hydrology Issues

The DPO Panel found and reviewed an NRR Action Plan titled "Closure Plan for Dam/Hydrology Issues," dated July 15, 2009, and updated January 19, 2011 (ADAMS Accession No. ML13011A134), and a subsequent version dated May 1, 2012 (ADAMS Accession No. ML13011A139). The purpose of the action plan was to address hydrology issues for Oconee and the TVA fleet, as well as any potential generic issues. With respect to the TVA sites, the scope of the plan was to address the operability and safety concerns related to TVA hydrology issues. The Panel believed the action plan could have served as a starting point for a structured assessment of the WBN1 issue and its significance, and could have been used as a communications tool. However, the Panel found that it was not used for these purposes.

4.4.2. Branch Chief Request for LIC-504 Assessment of WBN1 Flood Issue

In April 2012, about two months before the staff issued the CAL; the Division of Operating Reactor Licensing (DORL) branch chief at the time arranged a meeting with staff to discuss a process for documenting staff decisions associated with the WBN1 flood issue. In an email

(ADAMS Accession No. ML12335A059), the branch chief stated that NRR Office Instruction LIC-504 (ADAMS Accession No. ML100541776) would be used. On the bases of its interviews, the Panel determined that the branch chief could not gain alignment among the staff to apply LIC-504 to the WBN1 issue. Therefore, the branch chief's idea was not implemented.

4.4.3. DORL White Paper

During June 2012, the new DORL branch chief summarized several aspects of the WBN1 flood issue including licensing, compensatory measures, NRC follow up activities, and the basis for reactor safety in a white paper, "Safe Plant Operations," (ADAMS Accession No. ML12181A435). The branch chief included information that had originally been documented in the SER input that the staff had prepared for WBN2 (ADAMS Accession No. ML112170389), and from other information sources he had gathered about the WBN1 issue. This white paper was the closest thing the DPO Panel found to a documented comprehensive assessment of the WBN1 issue. However, the paper did not include a risk assessment, was not subjected to internal technical and management review and approval, and was not made an official agency record. Nevertheless, on the basis of its interviews, the Panel believed Region II may have used this document as the basis for resolving some of its questions about the acceptability of one of the licensee's temporary modifications—modifying dams with sand baskets.

4.4.4. Region II White Paper

During interviews, the Region II Division of Reactor Projects (DRP) branch chief responsible for WBN1 gave the DPO Panel a document titled "RII Inspector follow up activities for Watts Bar Flood Mode Mitigation Verification," dated November 13, 2012 (ADAMS Accession No. ML13015A112). According to the branch chief he periodically updated the document and used it to track issues and their status, and as a guide during management briefings. When interviewed, senior regional managers informed the Panel that they had also used the information in the document to brief other NRC staff and managers who were involved in addressing the flood issue. The Panel understands that the document was treated as a living document and updated periodically. The DPO Panel found the document to be a valuable summary of many of the outstanding WBN1 flood issues and their status. The DPO Panel decided that this document could have contributed to a more complete and accurate understanding of the hazards, of the compensatory measures, and the significance of the overall issue. However, like the white paper prepared by the DORL branch chief, the Region II document did not include a risk assessment, was not subjected to internal technical and management review and approval, and was not made an official agency record.

4.4.5. Oconee Nuclear Station LIC-504 Assessment

During its independent search for relevant documentation, the Panel found a memorandum of August 12, 2009, from Mark Cunningham, et al, to Bruce Boger, et al, subject, "Technical Basis for Allowing Oconee Nuclear Station to Remain in Operation Through November 2010," (ADAMS Accession No. ML090570117). The stated purpose of the memorandum was to document the staff's basis for allowing continued operation of Oconee Nuclear Station (ONS). The staff based its decision on the low level of risk associated with operating the site for two years as supported by deterministic information regarding current dam conditions and monitoring, and the time available to perform mitigating actions in the event of an external flood.

In the enclosure to the memorandum, "Technical Basis for Allowing Oconee Nuclear Station to Remain in Operation Through November 2010," the staff stated that its decision was based principally on risk considerations and that the conditional core damage frequency and

conditional LERF for external flooding were substantially below those noted in LIC-504. The staff also stated that in evaluating the applicable LIC-504 criteria, the increased risk over the short term when balanced against the defense in depth and safety margin criteria of LIC-504 over the same period was deemed acceptable. Therefore, continued operation during this time period was not inimical to the public health and safety. Because a number of the individuals who had been involved in the ONS issue were also involved in the WBN1 issue, the Panel found the apparent disparate treatment of the two plants particularly interesting and counted it as its final example of a missed opportunity.

4.5. Fukushima 50.54(f) Letter and Confirmatory Action Letter

In response to the DPO submitters' concerns, the DPO Panel assessed the role of the Fukushima 50.54(f) letter of March 12, 2012 (ADAMS Accession No. ML12053A340), and the staff's decision to use a CAL (ADAMS Accession No. ML12165A527) to confirm TVA's commitments to mitigate the potential external flood hazards at WBN1.

4.5.1 Fukushima 50.54(f) Letter of March 12, 2012

On March 12, 2012, pursuant to 10 CFR 50.48(f), the staff issued a request for information to all licensees to obtain information it needed to support its evaluation of the Near-Term Task Force (NTTF) review of the accident at the Fukushima Dai-ichi nuclear facility (ADAMS Accession No. ML12053A340). The letter, which is commonly referred to as the Fukushima 50.54(f) letter, addressed seismic and flood hazards and emergency preparedness. For floods, the overall purpose of the letter was to require licensees (1) to reevaluate flood hazards against present-day regulatory guidance and methodologies (NTTF Recommendation 2.1) and (2) to conduct flood protection walkdowns (NTTF Recommendation 2.3) to identify any degraded, nonconforming, or unanalyzed conditions and any cliff-edge effects, and to address them through the site's corrective action program. Item (2) specifically addressed the current plant-specific flood basis and is, therefore, applicable to this DPO and the submitters' concern that the Fukushima 50.54(f) letter was not adequate to address the safety concerns at WBN1.

With respect to the current flood basis (as opposed to the reevaluated flood hazards addressed under Item (1)) Enclosure 4 to the Fukushima 50.54(f) letter specified the requested actions for the plant-specific flood walkdowns and the assessment and documentation of any findings. Of some interest here, the enclosure also told the licensees what to do if they found any degraded, nonconforming, or unanalyzed conditions. The staff asked the licensees to (1) describe the actions taken to address the conditions using the guidance in RIS 2005-20, Revision 1 (ADAMS Accession No. ML073440103), and to enter the condition in their corrective action programs; (2) consider the reporting requirements pursuant to 10 CFR 50.72; and (3) to describe any measures taken to address any cliff-edge effects.

During its review of the submitters' concern, the Panel determined that the staff continued to work on the known flood issues at WBN1 in parallel with its work on the Fukushima 50.54(f) letter. As described in detail in the following section of this report, several months after the staff issued the Fukushima 50.54(f) letter; it issued a confirmatory action letter to TVA. In the Panel's view, the approach taken by the staff on WBN1 was appropriate and likely resulted in some progress on the WBN1 issues well ahead of the broader industry effort described in the Fukushima 50.54(f) letter. The Panel determined that the approach that the staff had taken with TVA on the issues at WBN1 was consistent with the direction prescribed in the Fukushima 50.54(f) letter. That is, TVA had found degraded, nonconforming, and unanalyzed conditions, had implemented compensatory measures, and had entered the deficiencies into the WBN1 corrective action program.

All things considered, on the basis of its retrospective review of the requirements of the Fukushima 50.54(f) letter and the actions taken by the staff to address the known flood issues at WBN1, the Panel concluded that the staff's action to continue to work on the known flood issues at WBN1 in parallel with its work on the Fukushima 50.54(f) letter was appropriate. However, the Panel believed that the basis for using the Fukushima 50.54(f) letter as part of a comprehensive approach should have been documented.

4.5.2. Confirmatory Action Letter of June 25, 2012

On June 25, 2012, the NRC issued a confirmatory action letter to TVA (ADAMS Accession No. ML12165A527) to confirm the commitments TVA would implement at WBN1 to mitigate potential external flood hazards. (In addition to WBN1, the CAL addressed commitments made by TVA to mitigate potential external flooding hazards at Sequoyah, Units 1 and 2. The DPO did not include Sequoyah. Therefore, the Panel did not include Sequoyah in its review of the DPO.) In their DPO submittal and the Statement of Concerns, the submitters indicated that a CAL was not appropriate because it is merely a commitment or a promise by the licensee to take future actions. In response to this concern, the Panel assessed the staff's decision to use a CAL to confirm TVA's commitments to mitigate potential external flood hazards at WBN1.

When an apparent safety issue is identified, the NRC Enforcement Manual (Manual) (ADAMS Accession No. ML102630150) specifies that the region take action to correct the condition. Corrective action can include either a CAL or an immediately effective order. As defined in the NRC Enforcement Policy (Policy) (ADAMS Accession No. ML12132A394), a CAL is issued by the NRC to confirm an NRC licensee's agreement to take certain actions to remove significant concerns regarding health and safety, safeguards, or the environment. Consistent with the Policy, the Manual states that the NRC issues CALs to emphasize and confirm a licensee's agreement to take certain actions in response to specific issues. The NRC expects licensees to adhere to any obligations and commitments addressed in a CAL and will consider issuing additional Orders, as needed, to ensure compliance. The Manual notes that the level of significance of the issues included in a CAL should be such that if a licensee did not agree to meet the commitments in the CAL, the staff would likely proceed to issue an order. The Manual also specifies that the staff should issue an order instead of a CAL when the licensee will not agree to take appropriate corrective action, there is an integrity issue, there is some likelihood that the licensee may not comply with a CAL commitment, or the staff has concluded that the CAL will not achieve the desired outcome.

As noted above, on June 25, 2012, the NRC issued a CAL to confirm the commitments TVA made to mitigate the potential external flood hazards at WBN1 that resulted from the new TVA flood analyses and the increase in the probable maximum flood level. The Panel compared the CAL against the Policy and Manual and concluded that CAL itself and its expected outcomes met the intent of the Policy and the guidance of the Manual.

Although it is not expressly addressed in the Policy or the Manual, it has been the Panel member's experience that a CAL is but one component of an integrated regulatory response that includes staff action to monitor licensee performance, including ensuring that the licensee takes appropriate steps to achieve the desired safety outcome. As such, it is typical for the staff to use a CAL in conjunction with continued NRC oversight and inspection of the licensee's commitments, compensatory measures, and corrective actions. During interviews with the Panel, several individuals, including the Region II Administrator, agreed that CALs are usually coupled with ongoing regulatory oversight commensurate with the safety significance of the CAL issues and indicated that this was the case for the WBN1 flood issue. The Panel confirmed this to be the case during its interviews of Region II staff and managers and its review of an internal

document prepared and routinely updated by Region II to track its oversight of the flood issues it is reviewing and inspecting at WBN1 (ADAMS Accession No. ML13015A112). (The Panel found this Region II document to be one of the better sources of information on the oversight of the WBN1 flood issue.)

The Panel found that both NRR and Region II have been engaged for several years in ongoing inspection and follow up at WBN1, on plant-specific flood issues, associated compensatory actions, permanent corrective actions, and potential enforcement action. During 2012, Region II has dealt with many issues including inadequate augmented in-service testing for the flood-mode boration charging pumps, the thermal barrier booster pump flood barrier installation, intake pumping station maintenance, spool-piece installation, aggregate impacts affecting the ability to perform flood mode operations, failure to recognize that the shutdown board room and the main control room circulating chilled water pumps are subject to flooding, and questions associated with the sand baskets and their installation. The results of these ongoing regional activities indicate that the CAL is working and is achieving the objectives intended by the staff. Through its document search and interviews, the Panel also learned that the licensee has submitted the license amendment request for WBN1 that was included in the CAL (ADAMS Accession No. ML12236A167). This provided additional assurance that the CAL was contributing to the desired outcome.

As noted above, issuance of a CAL does not preclude issuance of an order formalizing the licensee's commitments or requiring other action by the licensee; nor does it preclude the NRC from taking enforcement action for violations of NRC requirements that may have prompted the issuance of the CAL. In the case of the WBN1 flood issue, the Director of NRR informed the Panel that the staff would pursue an order if the CAL becomes ineffective, and Region II indicated that among its activities, it was pursuing appropriate enforcement action.

The DPO Panel also noted that as a result of the staff's follow up of the Fukushima events, it has identified WBN1 as a Category 1 plant for completing the flood hazard reevaluation that was specified in the Fukushima 10CFR 50.54(f) letter. (The site categorization is documented in a letter of May 11, 2012, from the Director of NRR, to all power reactor licensees and holders of construction permits (ADAMS Accession No. ML12097A509)). Although this particular follow up activity involves the reevaluation of flood hazards using present-day methodologies and guidance, rather than the current flood bases issues included in the CAL, it did put WBN1 under the most demanding schedule for assessing the flood issues and WBN1 will likely continue to be among the plants subject to the closest agency oversight in this area. This coupled with the other regulatory activities in play (CAL, licensing review, and regional oversight) provide added assurance that TVA will meet its CAL commitments.

The Panel observed that the Fukushima 10CFR 50.54(f) letter (discussed in Section 4.5.1) requires the licensees to address any cliff-edge effects as part of its assessment of the current flood bases. (Cliff-edge effects are now referred to as available physical margin or APM.) This particular issue may not have been a consideration for WBN1 at the time the staff issued the CAL. Nevertheless, TVA received the 10CFR 50.54(f) letter and will need to respond to it in its entirety for WBN1, including any APM issues. The Panel included this insight for completeness and did not have any concerns in this area.

Overall, on the basis of the documentation it reviewed and the additional information and perspectives it obtained from its meetings with staff and managers involved in this issue, the Panel's judgment is that the staff appropriately assessed the regulatory options available to address the WBN1 flood issue. It is also the Panel's judgment that the staff's decision to issue a CAL as part of its overall regulatory strategy met the requirements of the Enforcement Policy

and the guidance of the Enforcement Manual, and was, therefore, reasonable and acceptable. Finally, the Panel determined that the staff would pursue other appropriate regulatory actions, including an immediately effective order, should the licensee fail to meet the commitments included in the CAL.

4.6. Summary

While deliberating the totality of the information it had obtained during its review, the Panel first confirmed the value and the importance (if not the expectation) the Agency places on using risk considerations when assessing potentially significant reactor issues. In this context, the Panel also discussed the general principle that when using risk in decision-making, it is important to consider not only the frequency of the initiating event, but also to assess the consequences of a failure to mitigate the event.

The Panel concluded that the staff should have performed a risk assessment of the issue and prepared a clear safety bases for continued operations of WBN1. However, even though several years had passed since concerns had first been raised about the potential for a higher flood level at WBN1, neither a risk assessment nor the bases for continued operations had been prepared or documented. Rather, it appeared to the panel, the staff had relied on a qualitative risk-informed decision based largely on the common perception that the PMF is “unlikely” and that the compensatory measures would work. Almost everyone the Panel asked suggested that the corrective action schedule proposed by TVA was acceptable to them because the design basis flood was unlikely or of low probability. Through its interviews, the Panel had also learned that at least one manager asked for a risk assessment. The Panel understands that the staff started a risk assessment but did not complete it. All things considered, the Panel decided that the staff came up short on the assessment that was warranted by the potential significance of the WBN1 issue.

With this decision and the missed opportunities in mind, the Panel also decided that the staff should have followed an established and structured process to fully assess and document the significance of the WBN1 issue. (By documentation, the Panel meant an official agency record that described key safety and process decisions and their bases, that had been reviewed and approved by the appropriate projects and technical staff and managers, is was shared and communicated with the appropriate stakeholders, and is retrievable, for example, by placing it in ADAMS.) In other words, the Panel felt that for the WBN1 flood issue, the staff should have followed a process similar to what it had done to assess the ONS flood issue.

For completeness, the DPO Panel considered the applicability of such currently available decision-making processes as Management Directive 8.3, “NRC Incident Investigation Program,” (ADAMS Accession No. ML031250592); Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” (ADAMS Accession No. ML100910006); NRR Office Instruction LIC-504, Revision 3, “Integrated Risk-Informed Decision-Making Process for Emergent Issues,” (ADAMS Accession No. ML100541776); and several inspection procedures. The DPO Panel concluded that the staff should have performed a risk assessment and should have used the guidance of LIC-504 to ensure that it had fully assessed and documented the significance of the WBN1 flood issue and the safety bases for continued operations.

With the exception of a true risk assessment, it appeared to the Panel that the staff had all of the building blocks and the process it needed to assess and document the WBN1 flood issue. Because at least one manager asked that the issue be assessed in accordance with LIC-504, another manager asked for a risk assessment, and a number of the individuals who participated

in the ONS assessment were also involved in the WBN1 issue, it was curious that the staff did not use the guidance of LIC-504 to assess and document the WBN1 issue. The Panel decided that there could be a variety of reasons for this and developed several possible contributing factors. First, many of those interviewed simply told the Panel that LIC-504 did not apply to the WBN1 flood issue. In retrospect, the Panel does not recall that any compelling reasons for this were offered. (For example, one manager stated that he relied on the advice of a staff member who had more experience with the office instruction.) Second, the lessons learned from past significant events may not yet be fully internalized by the staff. Third, the title or a casual reading of LIC-504 with its emphasis on risk-informed decision making could have caused some to conclude that it did not apply to the WBN1 flood issue. (Remember, from the paradigms discussion above, for some the WBN1 flood issue was all about compliance. Risk was not a consideration. Therefore, under a strict compliance paradigm, any guidance about risk-informed decision-making would not come into play.) Finally, as one senior manager acknowledged during an interview, it is possible that some did not consider the WBN1 issue to be "significant."

In sum, it was the Panel's view that LIC-504 applies. As a minimum, the staff should have screened the WBN1 flood issue against the criteria of LIC-504 and documented its assessment. For reference, the LIC-504 process flow diagram is included as Appendix D.

With respect to immediate reactor safety, the majority of the staff interviewed by the Panel felt that the safety significance of the issue was low for a variety of reasons. Almost everyone interviewed mentioned the low likelihood that a design basis flood would occur, the warning time that would be available to take certain mitigating actions, and the fact that compensatory measures had been provided to mitigate any identified nonconformance related to the design basis flood. All things considered, the DPO Panel agreed with the majority of the staff it interviewed: on the basis of the information available when the CAL was issued, there was not an immediate safety concern at WBN1 arising from the flood issue. The Panel's agreement with the staff's consensus on the immediate safety question is tempered to a degree, however, by the fact that the staff did not develop and document a common understanding of either the significance of the issue itself or the safety basis for continued operations. Nevertheless, the Panel concluded, based largely on the insights gained during its discussions with the involved staff, that there were reasonable bases for the staff to accept the compensatory measures that are included in the CAL on an interim basis, and therefore, there was not an immediate safety concern.

The Panel also decided that the staff's bases for accepting the licensee's commitments and its reasons for choosing to issue a CAL may have been clearer and perhaps less divisive had it better documented its assessment and the bases for its decisions. The Panel noted that even after reviewing the many documents and records cited throughout this report, including those listed in Appendix B, it was unclear about certain aspects of the staff's handling of the WBN1 issue. Talking with the individuals listed in Appendix C helped close most of the gaps, but not all. As a simple example, from the docket it is clear that the staff issued a CAL to TVA and, through a review of the CAL, that the staff accepted the licensee's commitments. However, from the available documentation, it is not as clear why the staff decided to use a CAL instead of an order or why the staff found the commitments that it confirmed in the CAL, especially the compensatory measures and the timeframes for completing corrective actions, acceptable. Better documentation would have helped here. (For ONS, on the basis of its risk assessment and deterministic factors, the staff had established a two year time period for continued safe operation. Such an analysis was not done for WBN1.)

5. Conclusions

For the reasons stated above, the DPO Panel concluded:

- (1) The staff should have fully assessed and documented the significance of the flood issue, the safety bases for continued operations, and the bases for the chosen regulatory approach. LIC-504 was the appropriate process.
- (2) Not having used LIC-504, suggests that the staff may not have fully internalized the lessons learned from past significant events or its training on handling emergent issues.
- (3) When the staff issued the CAL to TVA, there was not an immediate safety concern associated with the WBN1 flood issue. This conclusion is tempered to a degree because the staff did not develop and document the significance of the flood issue and the safety basis for continued operations.
- (4) The staff's decision to issue the CAL met the applicable regulatory policy and guidance, was consistent with past practice, and was a reasonable regulatory choice. In addition, the staff's action to continue to work on the known flood issue at WBN1 in parallel with its work on the Fukushima 50.54(f) letter was appropriate.

6. Recommendations

In light of the DPO Panel's evaluation and conclusions:

- (1) Consider whether currently available guidance is clear and adequate to ensure that staff appropriately and consistently evaluate emergent issues and document the bases for important decisions associated with those issues.
- (2) Consider whether currently available training about landmark events and how to handle emergent issues is adequate to ensure that staff has a full appreciation for and understands how to properly handle emergent issues.
- (3) Because the staff considered handling the emergent WBN1 flood issue using LIC-504, but decided not to, consider looking further into whether or not the staff has consistently handled emergent issues in accordance with the appropriate Agency guidance.

8. Appendices

- A. Statement of Concerns
- B. Records and Documents Reviewed by the DPO Review Panel
- C. NRC Staff and Managers Interviewed by the DPO Review Panel
- D. LIC-504 Process Flow Diagram

Appendix A

Statement of Concerns

DPO-2012-003

September 11, 2012

1. **There is an immediate safety concern at WBN Unit 1.** The plant is in an unanalyzed condition with respect to its external flooding analysis. Certain flood mitigation equipment will be lost, and the safety margins to other flood mitigation equipment are less than 6 inches, during a design-basis flood. In the worst case scenario, a SBLOCA and a loss of the ultimate heat sink occur from the loss of function of the flood mitigation equipment. Therefore, TVA is not in compliance with its licensing basis, GDC 2, its operating license, or 10 CFR Section 50.54, "Conditions of licenses," paragraph (h).
 - TVA does not have adequate compensatory measures in place to restore compliance. The NRC staff has stated that it does not have confidence in the sand baskets on the embankments of 4 upstream dams, which are not fully installed. The sand baskets allow for an increase in the assumed reservoir retention capabilities (total and surge), which are assumptions in the safety-related calculations for determining probable maximum flood levels. Also, the vendor for the temporary barrier around the TBBP will not certify that it can withstand the hydraulic pressure of the water against it should a flood occur. The compensatory measures are required and assumed to be in place in the licensee's flooding analysis. TVA has no procedures in place to cope with loss of the flood mitigation equipment.
 - Adequate safety is required at all times by the AEA. The NRC is obligated by the AEA to ensure adequate protection of the health and safety to the public. Adequate protection is presumptively assured by compliance with NRC requirements. Since TVA is not in compliance and no sound technical determination has been made to show safe operation while in noncompliance, there is no assurance of adequate safety at WBN Unit 1.
 - Licensees must be in compliance. Compensatory measures allow a licensee to restore compliance. A staged compensatory measure is not acceptable, because it does not restore compliance. We do not license based on a promise that the facility will be in compliance when the design-basis event occurs. The facility must be in compliance because *we assume in the analysis that the design basis event has occurred, not that it is going to occur in the future.*
 - TVA has notified the NRC that it has conducted calculations of the probable maximum flood (PMF) level at the Watts Bar site and found the PMF level is above the level accepted by the NRC staff in the SER related to the operating license for Unit 1. Furthermore, TVA made a number of modification to its dams, embankments, river operations, and assumed dam failure scenarios, which were done without prior NRC approval pursuant to 10 CFR 50.59. Thus, the staff needs to evaluate the changes made since the SER (NUREG-0847) when reviewing the recent license basis change request. Because of this and the loss of margin to protection of flood mitigation equipment, the staff needs to conduct a rigorous review.

2. **Neither the Fukushima 50.54(f) letter nor the CAL provides a reasonable assurance of adequate protection for WBN Unit 1.** The NRC has no documented safety basis or justification for allowing WBN Unit 1 to continue to operate, either with or without compensatory measures in place, until permanent resolution of the safety issues at WBN. The NRC's *inaction* to address TVA's noncompliance with the regulations and the lack of reasonable assurance of adequate protection at WBN Unit 1 are contrary to the NRC's obligations under the AEA to assure adequate protection, and the Davis-Besse Lessons-Learned.
- A CAL is not appropriate because it is only a commitment by the licensee to do certain things. A promise by the licensee is not a sufficient basis for reasonable assurance. We do not issue licenses based on promises of actions. TVA has listed a number of proposed, but not implemented, future actions but has not provided its justification as to (a) why it believes it has regained compliance with the regulations and licensing basis, and (b) why it is safe to operate until the actions, if found adequate, are completed.
 - The Fukushima 50.54(f) letter is not adequate to address the safety concern at WBN Unit 1. The Fukushima 50.54(f) information requests are for long-term actions (i.e., reevaluation and walkdowns), because the NRC concluded that it does not have an immediate safety concern. The Fukushima 50.54(f) letter is not appropriate for WBN because the NRC staff *now* has information in its possession that TVA is not in compliance at WBN Unit 1 with the current licensing basis or the NRC's regulations. It is not acceptable for the NRC to wait a year for a reevaluation of WBN, since TVA has already informed the NRC that WBN Unit 1 is in an unanalyzed condition.

Appendix B

Records and Documents Reviewed by the DPO Review Panel (Listed in Chronological Order of Issuance from Earliest to Latest) DPO-2012-003

Criterion 2, *Design basis for protection against natural phenomena*, of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.

Regulatory Guide 1.59, Revision 2, "Design Basis Floods for Nuclear Power Plants," August 1977 (ADAMS Accession No. ML003740388).

NRC Management Directive and Handbook 8.3, "NRC Incident Investigation Program," Approved March 31, 1997, Revised March 27, 2001 (ADAMS Accession No. ML031250592).

NRC Inspection Procedure 71005, Inspector Review of Licensing-Related Information," August 5, 2003 (ADAMS Accession No. ML032190054).

NRR Office Instruction LIC-106, "Issuance of Safety Orders," December 17, 2003 (ADAMS Accession No. ML032590319).

NRR Office Instruction LIC-100, Revision 1, "Control of Licensing Bases for Operating Reactors," January 7, 2004 (ADAMS Accession No. ML033530249).

NRC Management Directive and Handbook 10.159, "The NRC Differing Professional Opinions Program," Approved December 15, 1999, Revised May 16, 2005 (ADAMS Accession No. ML041770431).

NRC Management Directive and Handbook 6.8, "Lessons-Learned Program," August 1, 2006 (ADAMS Accession No. ML062220175).

Letter from Patrick L. Hiland, NRR, to Ashok S. Bhatnagar, Tennessee Valley Authority (TVA), "Bellefonte Combined License Application – Nuclear Regulatory Commission Inspection of the Implementation of the Quality Assurance Program Governing the Simulated Open Channel Hydraulics Model – Inspection Report Numbers 05200014/2008-001 and 052000015/2008-001 and Notice of Violation," March 19, 2008 (ADAMS Accession No. ML080640487).

RIS 2005-20, Rev. 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degrade or Nonconforming Conditions Adverse to Quality or Safety"," April 16, 2008 (ADAMS Accession Nos.: Package ML073531473, RIS ML073440103, Attachment ML073531346).

Memorandum from Bradley Jones, OGC, to Melanie Galloway, NRR, "Adequate Protection," June 4, 2009 (available from Office of the General Counsel, not in ADAMS).

Memorandum from Eric J. Leeds, NRR, and Luis A. Reyes, Region II, "Watts Bar Nuclear Plant, Unit 2, Reactivation Assessment Group and Charter," July 10, 2009 (ADAMS Accession No. ML091250168).

Memorandum from Mark A. Cunningham, Patrick L. Hiland, and Joseph G. Giitter, NRR, to Bruce A. Boger and Michele G. Evans, NRR, and Victor M. McCree, Region II, "Technical Basis for Allowing Oconee Nuclear Station to Remain in Operation Through November 2010," August 12, 2009 (ADAMS Accession No. ML090570117).

NRR Action Plan – *Closure Plan for Dam/Hydrology Issues*, dated July 15, 2009, and updated January 19, 2011. Lead Division: NRR/Division of Engineering (ADAMS Accession Nos., Package ML13011A059, Action Plan ML13011A059).

TVA Temporary Alteration Control Form (TACF) 1-09-006-070, Rev 0, December 23, 2009, which addressed the need to install a temporary flood barrier around WBN1 thermal barrier booster (TBB) pump (TBBP) motors 1-MTR-070-130-B and 1-MTR-070-131-A. (ADAMS Accession No. ML12110A368).

NRR Office Instruction LIC-504, Revision 3, "Integrated Risk-Informed Decision-Making Process for Emergent Issues," April 12, 2010 (ADAMS Accession No. ML100541776).

Watts Bar Final Safety Analysis Report, Revision 8, Section 2.4, "Hydrologic Engineering," April 20, 2010 (ADAMS Accession No. ML101230410).

NRC Inspection Report 2010-002 for Watts Bar, April 29, 2010 (ADAMS Accession No. ML101200093).

NRR Office Instruction LIC-202, Revision 2, "Procedures for Managing Plant-Specific Backfits and 50.54(f) Information Requests," May 12, 2010 (ADAMS Accession No. ML092010045).

Public Meeting Summary prepared by Siva Lingam, NRR, "Summary of July 7, 2010, Public Meeting With TVA Regarding Status of Hydrology Issues Including the Flooding Effects on the TVA Operating Nuclear Plants," August 26, 2010, (ADAMS Accession No. ML101930181) and Tennessee Valley Authority meeting presentation slides, "Hydrology Status for Operating Reactor Fleet," July 7, 2010 (ADAMS Accession No. ML101930166).

Nuclear Regulatory Commission Enforcement Manual, Revision 7, October 1, 2010 (ADAMS Accession No. ML102630150)

Letter from R.M. Krich, TVA, to NRC Document Control Desk, "Responses to Hydrology Issues," January 14, 2011 (ADAMS Accession No. ML12136A439)

Regulatory Guide 1.174, Revision 2, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," May 2011, (ADAMS Accession No. ML100910006).

Memorandum from Meena K. Khanna, NRR, to Stephen J. Campbell, NRR, "Input to the Safety Evaluation Report for Watts Bar Nuclear Plant Unit 2 (WBN-2) Amendment No. 104, FSAR Sections 2.4 Through 2.4.14, Regarding Hydrologic Engineering (TAC No. ME5031)," August 3, 2011 (ADAMS Accession No. ML112170389).

SECY-11-0124, from R.W. Borchardt, EDO, for The Commissioners, "Recommended Actions to be Taken Without Delay from the Near-Term Task Force Report," September 9, 2011 (ADAMS Accession No. Package ML11245A158).

SECY-11-0134, from R.W. Borchardt, Executive Director for Operations (EDO), for The Commissioners, "Annual Review of the Lessons-Learned Program," September 28, 2011 (ADAMS Accession No. ML112500452).

SECY-11-0137, from R.W. Borchardt, EDO, for The Commissioners, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," October 3, 2011 (ADAMS Accession No. ML11272A111).

Memorandum from Annette L. Vietti-Cook, Secretary, to R.W. Borchardt, EDO, "Staff Requirements—SECY-11-0124—Recommended Actions to be Taken Without Delay From the Near-Term Task Force Report," October 18, 2011 (ADAMS Accession No. ML112911571).

Memorandum from Annette L. Vietti-Cook, Secretary, to R.W. Borchardt, EDO, "Staff Requirements—SECY-11-0137—Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," December 15, 2011 (ADAMS Accession No. ML113490055).

Letter from Siva P. Lingam, NRR, to Joseph W. Shea, TVA, "Tennessee Valley Authority (TVA) Long-Term Hydrology Issues for Operating Nuclear Plants-Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. ME5026, ME5027, and ME5028); Sequoyah Nuclear Plant, Units 1 and 2 (TAC Nos. ME5029 and ME5030); and Watts Bar Nuclear Plant, Unit 1 (TAC No. ME5031)," January 25, 2012 (ADAMS Accession No. ML11241A166).

Audit Report, "Audit of NRC's Use of Confirmatory Action Letters," OIG-12-A-09," February 10, 2012 (ADAMS Accession No. ML120410534).

SECY-12-0025, from R.W. Borchardt, EDO, for The Commissioners, "Proposed Orders and Requests for Information in Response to Lessons Learned From Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," February 17, 2012 (ADAMS Accession No. ML12039A103).

Memorandum from Michele G. Evans, NRR, to Eric J. Leeds, NRR, "Issuance of White Paper Entitled, "NRC and Licensee Actions in Response to New Information From a Third Party"," March 8, 2012 (ADAMS Accession Nos.: Package ML112730055, Memo ML122730058, White Paper ML112730379).

Letter from Eric J. Leeds, NRR, and Michael R. Johnson, Office of New Reactors (NRO), to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident," March 12, 2012. (This document is commonly called the Fukushima 50.54(f) letter.) (ADAMS Accession No. ML12053A340).

Memorandum from Carl F. Lyon, NRR, to Stephen J. Campbell, NRR, "Forthcoming Pre-Submittal Meeting with Tennessee Valley Authority (TVA)," March 15, 2012 (ADAMS Accession No. ML12070109).

Public meeting presentation materials (handouts) used by TVA at the public meeting of March 29, 2012 (ADAMS Accession No. ML12097A312).

Email from Fred Lyon, NRR, to Michele Evans and Allen Howe, NRR, "WBN1 draft 50.54(f) letter re: hydrology," April 6, 2012, with associated emails (ADAMS Accession No. ML121010026).

Draft 50.54f letter from Michele G. Evans, NRR, to Preston D. Swafford, TVA, "Watts Bar Nuclear Plant, Unit 1 – Information Request Pursuant to 50.54(f) Related to Hydrology and Flood Protection Issues," undated, but attached to email of April 6, 2012, cited above (ADAMS Accession No. ML121010026). This draft letter was not completed or issued. (ADAMS Accession No. ML12088A118).

Email from Fred Lyon, NRR, to Michele Evans, NRR, "Safety Concern Regarding WBN Unit 1 and OCWE," April 10, 2012 (ADAMS Accession No. ML121010062).

Public Meeting Summary prepared by Carl F. Lyon, NRR, "Summary of March 29, 2012, Pre-Application Meeting With Tennessee Valley Authority on Changing the Licensing Basis for Hydrologic Engineering (TAC No. ME8200)," April 11, 2012, (ADAMS Accession No. Package ML12097A293, Memorandum ML12097A306, Presentation Materials ML12097A312).

Memorandum from Carl F. Lyon, NRR, to File, "Watts Bar Nuclear Plant, Unit 1 – Summary of Meeting to Discuss Safety Concern Regarding Hydrology/Flooding (TAC No. MD7169)," April 20, 2012 (ADAMS Accession No. ML12110A339)

Memorandum From Carl F. Lyon and Patrick D. Milano, NRR, to Eric J. Leeds, NRR, Watts Bar Nuclear Plant, Unit 1 – Follow Up to Safety Concern Regarding Hydrology/Flooding (TAC No. MD7169)," April 24, 2012 (ADAMS Accession No. ML12115A165)

Email from Stephen Campbell, NRR, to Patrick Milano, et al, NRR, "Completing LIC-504, Integrated Risk-Informed Decision-Making Process," April 26, 2012 (and related emails) (ADAMS Accession No. ML12335A059).

Email from Fred Lyon, NRR, to Michele Evans and Allen Howe, NRR, "Clarification of Safety Concern at WBN Unit 1," April 30, 2012 (ADAMS Accession No. ML121210319).

Enclosure 2, "Path Forward in Addressing TVA's Hydrology Issues," of NRR Action Plan – *Closure Plan for Dam/Hydrology Issues*, update dated May 1, 2012. Lead Division: NRR/Division of Engineering (ADAMS Accession Nos., Package ML13011A059, Enclosure 2 ML13011A139).

Email from Fred Lyon, NRR, to Michele Evans, NRR, "Draft Supplemental 50.54(f) Letter for WBN Unit 1," May 2, 2012 (and related emails) (ADAMS Accession No. ML121240466).

Memorandum from Carl F. Lyon, Patrick D. Milano, and L. Raghavan, NRR, to R. William Borchardt, EDO, "Open Door Policy in the Matter of Watts Bar Nuclear Plant, Unit 1 – Safety Concern Regarding Hydrology/Flooding (TAC No. MD7169)," May 3, 2012 (ADAMS Accession No. ML12122A674)

Memorandum from Carl F. Lyon, NRR, to File, "Watts Bar Nuclear Plant, Unit 1 – Summary of Meeting to Discuss Safety Concern Regarding Hydrology/Flooding (TAC No. MD7169)," May 9, 2012 (ADAMS Accession No. 121290576).

Email from Nader Mamish, OEDO, to Fred Lyon, NRR, "Watts Bar Flooding Memo," May 7, 2012 (ADAMS Accession No. ML12181A388)

Memorandum from Carl F. Lyon, NRR, to File, "Watts Bar Nuclear Plant, Unit 1 – Summary of [April 25, 2012, internal] Meeting to Discuss Safety Concern Regarding Hydrology/Flooding (TAC No. MD7169)," May 9, 2012 (ADAMS Accession No. ML121290576).

Email from Fred Lyon, NRR, to Michele Evans, et al, NRR, "Options for WBN Unit 1," May 10, 2012 (ADAMS Accession No. ML12195A076).

Handouts from internal meeting of May 11, 2012, to discuss safety concern regarding WBN1 flooding/hydrology licensing basis (ADAMS Accession No. ML12195A078).

Letter from Eric J. Leeds, NRR, to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Prioritization of Response Due Dates for Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Flooding Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident," May 11, 2012 (ADAMS Accession No. ML12097A509).

Email with attachments regarding internal meeting of May 10, 2012, from Fred Lyon, NRR, to Eric Leeds, NRR, "Status Regarding WBN Unit 1, Safety Concern," May 16, 2012 (ADAMS Accession No. ML12138A270).

Email from Fred Lyon, NRR, to Eric Leeds, NRR, "Talking Points for May 23 Prebrief," May 29, 2012, with related emails. (ADAMS Accession No. ML12150A040).

Memorandum from Allen G. Howe, NRR, to Michele Evans, NRR, "Follow Up to Hydrology Concern at Watts Bar Nuclear Plant, Unit 1," May 30, 2012 and feedback (ADAMS Accession Nos. ML12150A067).

Email from Patrick Milano, NRR, to Allen Howe, NRR, "Follow-up to Hydrology Concern," May 30, 2012 (ADAMS Accession No. ML12152A133).

Public meeting presentation materials (handouts) used by TVA at the public meeting of May 31, 2012 (ADAMS Accession No. ML12156A076).

Meeting Summary prepared by Carl F. Lyon, NRR, for signature of Michele Evans, NRR, "Summary of May 31, 2012, NRC Staff Caucus on the Licensing Basis for Flooding/Hydrology," undated and unsigned (ADAMS Accession No. ML12157A551).

White paper, "Safe Plant Operations," prepared by George Wilson, NRR, circa June 28, 2012 (Attached to e-mail, ADAMS Accession No. ML12181A435).

Public Meeting Summary prepared by Carl F. Lyon, NRR, "Summary of May 31, 2012, Senior Management Meeting With Tennessee Valley Authority on the Licensing Basis for Flood/Hydrology," June 6, 2012 (ADAMS Accession No. ML12157A457).

NRC Enforcement Policy, June 7, 2012 (ADAMS Accession No. ML12132A394).

Memorandum from Carl F. Lyon and Patrick D. Milano, NRR, to Eric J. Leeds, NRR, "Watts Bar Nuclear Plant, Unit 1 – Status of Safety Concern Regarding Hydrology/Flooding Subsequent to May 31, 2012, Public Meeting (TAC No. MD7169)," June 12, 2012 (ADAMS Accession No. ML12158A508).

Letter from J.W. Shea, Tennessee Valley Authority (TVA), to NRC Document Control Desk, "Commitments Related to Updated Hydrologic Analysis Results for Sequoyah Nuclear Plant, Units 1 and 2, and Watts Bar Nuclear Plant, Unit 1," June 13, 2012 (ADAMS Accession No. ML12171A053).

Email from Fred Lyon, NRR, to Robert Monk, Region II, "Watts Bar Operability on sandbaskets," June 19, 2012 (ADAMS Accession No. ML12172A250).

Email from Fred Lyon, NRR, to Eric Leeds, NRR, "Next Actions for Safety Concern at WBN1," and email response from Eric Leeds, June 21, 2012 (ADAMS Accession No. ML12173A323).

Letter from Eric J. Leeds, NRR, to Joseph W. Shea, TVA, "Confirmatory Action Letter – Watts Bar Nuclear Plant, Unit 1, and Sequoyah Nuclear Plant, Units 1 and 2, Commitments to Address External Flooding Concerns (TAC Nos. ME8805, ME8806, and ME8807)," June 25, 2012 (ADAMS Accession No. ML12165A527).

Email with attachments from George Wilson, NRR, to Justin Poole, NRR, et al, "Regulatory Process for WBN," June 28, 2012 (ADAMS Accession No. ML12181A435)

Email from George Wilson, NRR, to Justin Poole, NRR, et al, "Regulatory Process for WBN," June 28, 2012, with associated response from Fred Lyon, NRR, of July 2, 2012 (ADAMS Accession No. ML12184A281).

Event Notification (EN) 48056, "Unanalyzed Condition Due to Increase in Probable Maximum Flood Level," submitted by TVA for WBN1, June 29, 2012, <http://www.nrc.gov/reading-rm/doc-collections/event-status/event/2012/20120702en.html>.

Email from Eric Leeds, NRR, to Fred Lyon, NRR, et al, "WBN Unit 1 LER," July 2, 2012 (ADAMS Accession No. ML12184A271).

Email from Eric Leeds, NRR, to Fred Lyon, NRR, et al, "WBN Unit 1 LER," July 2, 2012, with associated response from Fred Lyon, NRR (ADAMS Accession No. ML12184A276).

NRC Form 680, "Differing Professional Opinion," Case No. DPO-2012-003, July 17, 2012 (ADAMS Accession No. Package ML12201B322).

Letter from J.W. Shea, TVA, to NRC Document Control Desk, "Application to Revise Watts Bar Nuclear Plant Unit 1 Updated Final Safety Analysis Report Regarding Changes to Hydrologic Analysis, TAC No. ME8200 (WBN-UFSAR-12-01)," July 19, 2012 (ADAMS Accession No. ML12236A167)

Memorandum from Renee M. Pedersen, Office of Enforcement, to Eric J. Leeds, NRR, "Differing Professional Opinion Involving External Flooding at Watts Bar Unit 1 (DPO-2012-003)," July 20, 2012. This memorandum included the DPO submittal (NRC Form 680, "Differing Professional Opinion," Case No. DPO-2012-003, July 17, 2012.) (ADAMS Accession No. Package ML12201B322).

Memorandum from Eric J. Leeds, NRR, to K. Steven West, Region III, Eileen M. McKenna, NRO, and Lois M. James, NRR, "Ad Hoc Review Panel—Differing Professional Opinion Involving External Flooding at Watts Bar Unit 1 (DPO-2012-003)," August 2, 2012 (ADAMS Accession No. ML12214A302).

NRC Inspection Report 2012-003 for Watts Bar dated August 14, 2012 (ADAMS Accession No. ML12227A760)

Letter from D.E. Grissette, WBN/TVA, to NRC Document Control Desk, "Licensee Event Report, 390/2012-002, Unanalyzed Condition Affecting Probable Maximum Flood Level" [for Watts Bar Nuclear Plant], August 28, 2012, (ADAMS Accession No. ML12241A315)

Audit Report, "Audit of NRC's Use of Orders," OIG-12-A-19," September 25, 2012 (ADAMS Accession No. ML12269A003).

Region II White Paper, "RII Inspection follow up activities for Watts Bar Flood Mode Mitigation Verification," November 13, 2012 (ADAMS Accession No. ML13015A112).

Memorandum from Eric J. Leeds, NRR, to Steve West, Region III, Eileen McKenna, NRO, and Eva Brown, NRR, "Ad Hoc Review Panel—Differing Professional Opinion Involving External Flooding at Watts Bar Unit 1 (DPO-2012-003)," November 15, 2012 (ADAMS Accession No. ML12321A133).

Appendix C

NRC Staff and Managers Interviewed by the DPO Review Panel DPO-2012-003

Stephen J. Campbell, Senior Reactor Systems Engineer, IRIB, DIRS, Office of Nuclear Reactor Regulation (NRR)

Christopher B. Cook, Branch Chief, RGS2, DSEA, Office of New Reactors (NRO)

Richard P. Croteau, Director, Division of Reactor Projects (DRP), Region II

Michele G. Evans, Director, Division of Operating Reactor Licensing (DORL), NRR

Eugene F. Guthrie, Branch Chief, DRP, Region II

Patrick L. Hiland, Director, Division of Engineering (DE), NRR

Dan V. Hoang, Structural Engineer, EMCB, DE, NRR

Allen G. Howe, Deputy Director, DORL, NRR

Eric J. Leeds, Director, NRR

C.F. Lyon, Project Manager, NRR

Kamal A. Manoly, Senior Level Adv for Structural Mechanics, DE, NRR

Victor M. McCree, Regional Administrator, Region II

Patrick D. Milano, Senior Project Manager, NRR

Robert L. Monk, Senior Resident Inspector, Watts Bar, Unit 1

Scott Shaeffer, Branch Chief, DRP, Region II

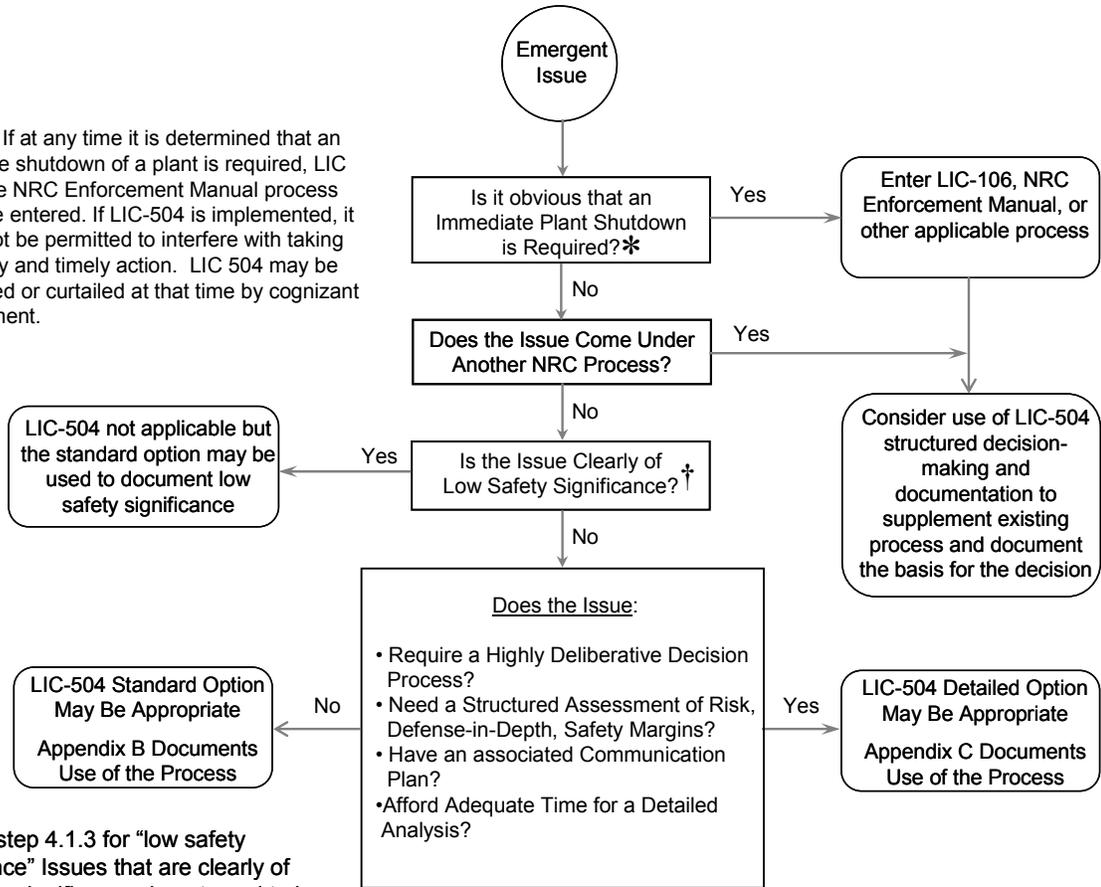
Kenneth R. See, Senior Hydrologist, DSEA, NRO

George A. Wilson, Jr., Branch Chief, LPL1-1, DORL, NRR

Appendix D

LIC-504 Process Flow Diagram

* **Caution:** If at any time it is determined that an immediate shutdown of a plant is required, LIC 106 or the NRC Enforcement Manual process should be entered. If LIC-504 is implemented, it should not be permitted to interfere with taking necessary and timely action. LIC 504 may be suspended or curtailed at that time by cognizant management.



† Refer to step 4.1.3 for “low safety significance” Issues that are clearly of low safety significance do not need to be assessed using this instruction.

FIGURE 4-10 LIC-504 PROCESS FLOW

Document 5: DPO Decision

March 5, 2013

MEMORANDUM TO: Patrick Milano, Senior Project Manager
Projects Branch 1,
Division of License Renewal
Office of Nuclear Reactor Regulation

Fred Lyon, Project Manager
Plant Licensing Branch IV,
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Eric J. Leeds, Director */RA/*
Office of Nuclear Reactor Regulation

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

On July 17, 2012, in accordance with Management Directive 10.159, "The NRC Differing Professional Opinions Program", you submitted a differing professional opinion (DPO) concerning external flooding at Watts Bar Nuclear Unit 1 (DPO-2012-003). Specifically, your DPO states that there is an immediate safety concern at Watts Bar Unit 1 (WBN) in that the plant is in an unanalyzed condition with respect to its external flooding analysis. You also indicated that neither the Fukushima 50.54(f) letter nor the confirmatory action letter (CAL) issued to WBN provides a reasonable assurance of adequate protection for WBN. The purpose of this memorandum is to respond to your DPO.

On August 2, 2012, I established a DPO Ad Hoc Review Panel (the Panel) and tasked them to meet with you, review your DPO submittal, and issue a DPO report, including conclusions and recommendations to me regarding the disposition of the issues presented in your DPO. The Panel initially met with you on August 15, 2012, to establish a concise statement of your concerns and indicated that they completed that statement on September 11, 2012. On January 17, 2013, after reviewing the applicable documents, completing internal interviews of relevant individuals and completing their deliberations, the Panel issued their report to me.

Following receipt of their report, I provided a copy of the report to you for your review. On February 28, 2013, I met with Fred to discuss the Panel's report and to get his insights and comments. He provided me additional insights into his concerns and his thoughts for resolving the issues concerning WBN.

In order to make a decision with regard to your DPO, I reviewed the DPO Panel's report, met with the DPO Panel, met with you, discussed the issues with the relevant Division Director and then re-considered your comments to me.

CONTACT: Trent L. Wertz, NRR
(301) 415-1568

The DPO Panel concluded that there was not an immediate safety concern associated with the WBN flood issue when the staff issued the CAL to Tennessee Valley Authority. The conclusion on the immediate safety question was tempered to a degree, however, because the staff did not develop and document a common understanding of either the significance of the flood issue itself or the safety basis for continued operation of WBN.

The Panel also concluded that the staff's decision to issue the CAL met the applicable regulatory policy and guidance, was consistent with past practice, and was a reasonable regulatory decision. Finally, they concluded that the staff's decision to continue to work on the known flood issue at WBN1 in parallel with its work on post-Fukushima activities was appropriate.

In addition, the Panel concluded that the 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 LIC-504. Not following an available process, like LIC-504, suggests that the staff may not have fully internalized the lessons learned from past significant events or there may be gaps in the staff's training or understanding about how to handle emergent issues.

Nevertheless, your DPO highlighted two issues that would have helped the development of this issue, those being (1) the staff should have performed a risk assessment of the issue and prepared a clear safety bases for continued operations of WBN, and (2) the staff should have followed an established and structured process to fully assess and document the significance of the WBN issue.

Based on their review of your DPO, the Panel recommended the staff consider three tasks to help the staff process similar issues in the future. I assigned the following tasks to a Leadership Team (LT) task group:

1. Consider whether currently available guidance is clear and adequate to ensure that staff appropriately and consistently evaluate emergent issues and document the bases for important decisions associated with those issues.
2. Consider whether currently available training about landmark events and how to handle emergent issues is adequate to ensure that staff has a full appreciation for and understands how to properly handle emergent issues.
3. Because the staff considered handling the emergent WBN flood issue using LIC-504, but decided not to, consider looking further into whether or not the staff has consistently handled emergent issues in accordance with the appropriate Agency guidance.

The LT task group agreed that the available guidance was clear and adequate and that currently available training was adequate (tasks 1 and 2) although they recommended items that could be used to improve the guidance and training. The LT task group also determined that if task 3 were pursued, the probable conclusion would be to perform the recommendations in tasks 1 and 2, therefore, they recommend pursuing the improvements mentioned in tasks 1 and 2, which I agree with.

A summary of the DPO will be included in the Weekly Information Report (when the case is

closed) to advise interested employees of the outcome. Also, you will be included on correspondence involving the development/listing of follow-up actions and implementation schedules.

Thank you for raising your DPO and for your active participation in the DPO process. An open and thorough exploration of how we carry out our regulatory process is essential to keeping these programs effective. I believe that in raising the safety significant issues involving WBN flooding, you helped mobilize the Agency to expedite actions to ensure safety at that site. Your willingness to raise concerns with your colleagues and managers and ensure that your concerns are heard and understood is admirable and vital to ensuring a healthy safety culture within the Agency.

Enclosure:
DPO Panel Report January 17, 2013.

cc: J. Uhle, NRR
D. Dorman, NRR
M. Evans, NRR
R. Pedersen, OE
R. Zimmerman, OE
S. West, RIII
E. McKenna, NRO
E. Brown, NRR

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Enclosure:
DPO Panel Report January 17, 2013.

- cc: J. Uhle, NRR
- D. Dorman, NRR
- M. Evans, NRR
- R. Pedersen, OE
- R. Zimmerman, OE
- S. West, RIII
- E. McKenna, NRO
- E. Brown, NRR

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ADAMS Accession Numbers: package: ML13064A349; incoming: ML12221A189;
 Response: ML13064A363

Office	NRR	NRR
Name	TWertz	ELeeds
Date	03/05/13	03/05/13

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**Document 6: Memo from DPO Submitters to
Office Manager in Response to DPO Decision**



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 19, 2013

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

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

Patrick D. Milano, Senior Project Manager *Patrick D. Milano*
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

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).