



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

August 28, 2012

10 CFR 50.73

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 1  
Facility Operating License No. NPF-90  
NRC Docket No. 50-390

**Subject: Licensee Event Report 390/2012-002, Unanalyzed Condition Affecting Probable Maximum Flood Level**

This submittal provides Licensee Event Report (LER) 390/2012-02. This LER provides details concerning an unanalyzed condition affecting the probable maximum flood level for Watts Bar Nuclear Plant. The condition is reported as an LER in accordance with 10 CFR 50.73(a)(2)(ii)(B).

There are no regulatory commitments in this letter. Please direct any questions concerning this matter to Donna Guinn, WBN Site Licensing Manager, at (423) 365-1589.

Respectfully,

A handwritten signature in black ink, appearing to read 'D. E. Grissette', written over a horizontal line.

D. E. Grissette  
Site Vice President  
Watts Bar Nuclear Plant

Enclosure  
cc: See Page 2

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Enclosure  
cc (Enclosure):

NRC Regional Administrator - Region II

NRC Senior Resident Inspector - Watts Bar Nuclear Plant

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Watts Bar Nuclear Plant (WBN) Unit 1	<b>2. DOCKET NUMBER</b> 05000390	<b>3. PAGE</b> 1 OF 5
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**4. TITLE**  
Unanalyzed Condition Affecting Probable Maximum Flood (PMF) Level

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	29	2012	2012	- 002 -	0	08	28	2012	N/A	
									FACILITY NAME	DOCKET NUMBER
									N/A	

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> (Check all that apply)			
<b>10. POWER LEVEL</b>  100%	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Julie Hough, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) (423) 365-8048
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 29, 2012, Tennessee Valley Authority (TVA) approved an updated calculation titled "PMF Determination for Tennessee Valley Watershed" that increased the WBN probable maximum flood (PMF) level to Elevation 739.2 feet (ft) mean sea level (MSL). The current Updated Final Safety Analysis Report (UFSAR) PMF elevation is 734.9 ft MSL.

All flood sensitive safety-related systems, structures, and components have been reviewed. The only equipment affected by the revised PMF level is Essential Raw Cooling Water and High Pressure Fire Protection equipment required for flood mode operation located on Elevation 722 ft of the Intake Pumping Station (IPS) and the Thermal Barrier Booster Pump (TBBP) motors. The increase in calculated PMF elevation resulted from new rim leakage paths (i.e., leakage that occurs when water contained in a reservoir finds an alternate path around the dam) identified during aerial surveys for the proposed TVA Clinch River Site.

No actual flooding has occurred. However, because of the unanalyzed condition, the potential existed for WBN to exceed its design basis PMF and adversely affect plant safety. Contingency measures have been put into place to protect the TBBPs and equipment located on Elevation 722 ft of the IPS. Permanent plant modifications will be made to protect affected equipment during a PMF event.

**LICENSEE EVENT REPORT (LER)  
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Watts Bar Nuclear Plant (WBN) Unit 1	05000390	YEAR	SEQUENTIAL NUMBER	REV No.	2 OF 5
		2012	002	0	

**NARRATIVE**

**I. PLANT CONDITIONS:**

WBN Unit 1 was operating at approximately 100 percent power at the time the Probable Maximum Flood (PMF) calculation was issued.

**II. DESCRIPTION OF EVENT:**

**A. Event:**

On June 29, 2012, Tennessee Valley Authority (TVA) approved an updated calculation titled "PMF Determination for Tennessee Valley Watershed" that increased the WBN PMF level to Elevation 739.2 feet (ft) Mean Sea Level (MSL). The current Updated Final Safety Analysis Report (UFSAR) PMF elevation is 734.9 ft MSL. All flood sensitive safety-related systems, structures, and components have been reviewed. The only equipment affected by the revised PMF level is Essential Raw Cooling Water (ERCW) [EISS code KP] and High Pressure Fire Protection (HPFP) [EISS code BI] equipment required for flood mode operation located on Elevation 722 ft of the Intake Pumping Station (IPS) and the Thermal Barrier Booster Pump (TBBP) motors [EISS code MO]. The increase in calculated PMF elevation resulted from new rim leakage paths (i.e., leakage that occurs when water contained in a reservoir finds an alternate path around the dam) identified during aerial surveys for the proposed TVA Clinch River Site. No actual flooding has occurred. However, because of the unanalyzed condition, the potential existed for WBN to exceed its design basis PMF and adversely affect plant safety.

**B. Inoperable Structures, Components, or Systems that Contributed to the Event**

None.

**C. Dates and Approximate Times of Major Occurrences**

Date	Event
December 30, 2009	A hydrological analysis for WBN Unit 2, which included updated input information and analysis methodology, revised the PMF elevation for WBN Unit 1 and Unit 2 to 738.8 ft MSL. All flood sensitive safety-related systems, structures, and components were reviewed and determined to be unaffected by the increased PMF level. Due to the small margin (less than one inch) between the surge elevation in flooded structures and the TBBP motors, procedures were updated to install a flood protection barrier around the TBBPs during a PMF event.

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**NARRATIVE**

**C. Dates and Approximate Times of Major Occurrences (continued)**

Date	Event
February 1, 2012	While conducting preliminary hydrologic analysis for the proposed TVA Clinch River site, topographical areas upstream of the Watts Bar Dam were identified that are potential overflow/rim leakage areas during a PMF event. These areas were not discovered during previous hydrology analyses. No immediate/interim actions for impacted safety related equipment were required.
June 29, 2012	Updated PMF calculation changed the WBN design basis PMF to Elevation 739.2 ft. This would result in a design basis flood level of 741.7 ft MSL exterior of the IPS on the Intake Channel side. Because the interior of the IPS is hydraulically connected to the exterior of the IPS on this side of the structure, the water could enter the interior of the IPS on Elevation 741 ft, travel over concrete door thresholds located at Elevation 741.5 ft and potentially affect safety related ERCW and HPFP equipment located on Elevation 722 ft of the IPS. Earlier preliminary calculations had indicated that the WBN PMF elevation could be increased to 739.2 ft MSL and affect IPS equipment, and sandbags were already staged at the IPS to protect equipment during a PMF event.
July 19, 2012	An application to revise the WBN Unit 1 UFSAR regarding changes to hydrologic analysis was submitted for NRC review.

**D. Other Systems or Secondary Functions Affected**

No other systems or secondary functions were affected by this event.

**E. Method of Discovery**

While conducting preliminary hydrologic analysis for the proposed TVA Clinch River site, topographical areas upstream of the Watts Bar Dam were identified that are potential overflow/rim leakage areas during a PMF event. This resulted in issuance of an updated calculation titled "PMF Determination for Tennessee River Watershed."

**F. Operator Actions**

WBN operations procedures were revised to incorporate contingency measures to protect ERCW and HPFP equipment located on Elevation 722 ft of the IPS.

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**NARRATIVE**

G. Safety System Responses  
No safety system activation occurred.

III. CAUSE OF EVENT

The apparent cause for the PMF flood level increasing to Elevation 739.2 ft is due to the use of geographical information system (GIS) technology to more accurately map topographical areas upstream of Watts Bar dam, as well as the use of updated hydrological modeling software. These technological advances in geographical mapping and computer modeling provide a more conservative determination of flood levels and were not available during the original licensing of WBN Unit 1.

IV. ANALYSIS OF THE EVENT

On June 29, 2012, TVA approved an updated calculation titled "PMF Determination for Tennessee Valley Watershed" that increased the WBN design basis PMF level to Elevation 739.2 ft MSL. WBN is required to be able to place and maintain the plant in a safe shutdown condition up to the design basis flood level. Earlier preliminary calculations had indicated an increase in PMF elevation, and contingency measures to protect the TBBP motors, and ERCW and HPFP equipment located in the IPS had already been put in place. No actual flooding occurred; however, because of the unanalyzed condition, the potential existed for WBN to exceed its design basis PMF and adversely affect plant safety.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Based on the above "Analysis of the Event," this event did not adversely affect the health and safety of plant personnel or the general public.

VI. CORRECTIVE ACTIONS

A. Immediate and Interim Actions

WBN entered the information into the Corrective Action Program as Problem Evaluation Report 573093. Prior to official issue of the updated PMF calculation, sandbags were staged at the IPS to protect ERCW and HPFP equipment during a PMF event.

Procedures for flood mode preparation were revised to include contingency measures for protection of ERCW and HPFP equipment located on Elevation 722 ft of the IPS.

B. Corrective Actions

The corrective actions are being managed by the WBN Corrective Action Program.

Corrective actions include issuance of a procedure to inspect compensatory measures for flood protection semiannually until permanent plant modifications are installed. The TBBP temporary flood barrier will be installed around the TBBPs. Permanent plant modifications will be installed to provide a flood protection barrier for the TBBPs and affected IPS equipment.

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**NARRATIVE**

**VII. ADDITIONAL INFORMATION**

**A. Failed Components**

No failed components have been identified.

**B. Previous LERs on Similar Events**

A review of reportable events within the last three years did not identify any previous similar events.

**C. Additional Information**

No additional information available.

**D. Safety System Functional Failure**

This event did not result in a safety system functional failure in accordance with 10 CFR 50.73(a)(2)(v) and NEI 99-02.

**E. Loss of Normal Heat Removal Consideration**

None

**VIII. COMMITMENTS**

None.