TENNESSEE VALLEY AUTHORITY

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

WBL-25-037

September 11, 2025

10 CFR 50.73

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

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Licensee Event Report 391/2025-002-00, Automatic Reactor Trip Due to a Main Turbine Trip**

Pursuant to the reporting requirements of 10 CFR 50.73, attached is the subject Licensee Event Report (LER) concerning the automatic reactor trip due to a main turbine trip for Watts Bar Nuclear Plant, Unit 2, which occurred on July 13, 2025.

There are no new regulatory commitments contained in this letter. Please direct any questions concerning this matter to Jonathan Johnson, WBN Site Regulatory Compliance Manager, at jtjohnson0@tva.gov.

Respectfully,

William C. Reneau
Site Vice President
Watts Bar Nuclear Plant

Enclosure: LER 391/2025-002-00, Automatic Reactor Trip Due to a Main Turbine Trip

cc (w/Enclosure):

NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Watts Bar Nuclear Plant
NRC Project Manager – Region II

ENCLOSURE
Tennessee Valley Authority
Watts Bar Nuclear Plant
Unit 2

LER 391/2025-002-00, Automatic Reactor Trip Due to a Main Turbine Trip

NRC FORM 366 (04-02-2024) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 04/30/2027

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, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by email to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)
(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. Facility Name		2. Docket Number	3. Page
Watts Bar Nuclear Plant, Unit 2	☒ 050 ☐ 052	00391	1 OF 6

4. Title
Automatic Reactor Trip Due to a Main Turbine Trip

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved		
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name		Docket Number
07	13	2025	2025	- 002 -	00	09	11	2025	N/A	☐ 050	
									Facility Name: N/A	☐ 052	Docket Number

9. Operating Mode	10. Power Level
1	100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

10 CFR Part 20	☐ 20.2203(a)(2)(vi)	**10 CFR Part 50**	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.1200(a)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	☐ 73.1200(b)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	☐ 73.1200(c)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.36(c)(2)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)	☐ 73.1200(d)
☐ 20.2203(a)(2)(i)	**10 CFR Part 21**	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	**10 CFR Part 73**	☐ 73.1200(e)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.77(a)(1)	☐ 73.1200(f)
☐ 20.2203(a)(2)(iii)		☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(2)(i)	☐ 73.1200(g)
☐ 20.2203(a)(2)(iv)		☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)	☐ 73.1200(h)
☐ 20.2203(a)(2)(v)		☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)		

☐ **OTHER** (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
K.R. Skubisz	423-365-1771

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
A	WK	DRN	N/A	Y	N/A	N/A	N/A	N/A	N/A

14. Supplemental Report Expected		15. Expected Submission Date	Month	Day	Year
☒ No	☐ Yes (If yes, complete 15. Expected Submission Date)		N/A	N/A	N/A

16. Abstract (Limit to 1326 spaces, i.e., approximately 13 single-spaced typewritten lines)

At 1418 Eastern Daylight Time (EDT) on 7/13/2025, with Unit 2 in MODE 1 at 100 % power, the reactor automatically tripped due to a main turbine trip. The trip was not complicated and all systems responded normally post trip.

Operators responded and stabilized the plant. Decay heat was removed by discharging steam to the main condenser using the steam dump system and the Auxiliary Feedwater (AFW) System. Unit 1 was not affected.

Due to the Reactor Protection System actuation while critical, this event was reported as a four-hour, non-emergency notification per 10 CFR 50.72 (b)(2)(iv)(B). The expected actuation of the AFW system (an Engineered Safety Feature) was reported as an eight-hour report under 10 CFR 50.72 (b)(3)(iv)(A).

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME		2. DOCKET NUMBER	3. LER NUMBER		
			YEAR	SEQUENTIAL NUMBER	REV NO.
Watts Bar Nuclear Plant, Unit 2	☒ 050 ☐ 052	00391	2025	- 002	- 0

NARRATIVE

I. Plant Operating Conditions before the Event

Watts Bar Unit 2 was at 100 percent Rated Thermal Power (RTP).

II. Description of Event

A. Event Summary

At 1418 Eastern Daylight Time (EDT) on 7/13/2025, with Unit 2 in MODE 1 at 100 % power, the reactor automatically tripped due to a main turbine trip. The trip was not complicated and all systems responded normally post trip.

Operators responded and stabilized the plant. Decay heat was removed by discharging steam to the main condenser using the steam dump system and the Auxiliary Feedwater (AFW) System {EIIS:BA}. Unit 1 was not affected.

Due to the Reactor Protection System {EIIS:JC} actuation while critical, this event was reported as a four-hour, non-emergency notification per 10 CFR 50.72 (b)(2)(iv)(B). The expected actuation of the AFW system (an Engineered Safety Feature) was reported as an eight-hour report under 10 CFR 50.72 (b)(3)(iv)(A).

B. Status of structures, components, or systems that were inoperable at the start of the event and that contributed to the event

There were no safety related inoperable structures, components, or systems that contributed to this event.

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Watts Bar Nuclear Plant, Unit 2	☒ 050 ☐ 052	00391	2025	- 002	- 0

NARRATIVE

C. Dates and approximate times of occurrences

Dates and Approximate Times	Occurrence
07/13/25 14:14 EDT	The 6.9kV Unit board 2C is de-energized. The following Unit 2 secondary pumps are lost: #7 heater drain tank pump B, condensate booster pump C, hotwell pump B and condenser circulating water pump C.
07/13/25 14:18 EDT	The Unit 2 A and B turbine driven main feedwater pumps (TDMFWP) trip on low condenser vacuum. As a result, both the Unit 2 main turbine and reactor trip.
07/13/25 14:40 EDT	Unit 2 is stabilized in MODE 3. The operating crew exits the emergency operating procedures.

D. Manufacturer and model number of each component that failed during the event

Not applicable

E. Other systems or secondary functions affected

None

F. Method of discovery of each component or system failure or procedural error

After the trip, a 6.9kV Unit Board 2C Differential Protective Relay (872CA) was found to be actuated. Investigation identified that alternate feeder circuit breaker for the 6.9kV Unit Board 2C suffered moisture intrusion. A station roof drain line is located overhead of the particular Unit Board. When the drain line's insulation was removed, corrosion and a visible hole was discovered. The hole provided a path for drainage water to drip onto the cubicle for the 6.9kV Unit Board 2C alternate feeder breaker.

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Watts Bar Nuclear Plant, Unit 2	☒ 050 ☐ 052	00391	2025	- 002	- 0

NARRATIVE

G. The failure mode, mechanism, and effect of each failed component

General corrosion produced the hole in the station roof drain line which is located overhead of the 6.9kV Unit Board 2C. The hole allowed moisture to intrude into the top of the board and thus, into the cubicle for the alternate feeder circuit breaker to the 6.9kV Unit Board 2C. The moisture intrusion resulted in an electrical fault producing a differential relay actuation. The differential relay resulted in the de-energization of the 6.9kV Unit Board 2C. The loss of the Unit Board produced resulted in the loss of several secondary plant pumps. When the secondary plant pumps were lost, overall condensate flow dropped. Because the TDMFWPs' condensers are cooled by condensate flow, their vacuum was impacted. Both TDMFWPs subsequently tripped on a loss of condenser vacuum; as a result, both the Unit 2 main turbine and reactor tripped.

H. Operator actions

Operations personnel promptly stabilized the plant following the reactor trip.

I. Automatically and manually initiated safety system responses

After both of the Unit 2 TDMFWPs tripped, both the Unit 2 main turbine and reactor tripped.

III. Cause of the event

A. Cause of each component or system failure or personnel error

General corrosion produced the hole in the station roof drain line which is located overhead of the 6.9kV Unit Board 2C. The hole allowed moisture to intrude into the top of the board and thus, into the cubicle for the alternate feeder circuit breaker to the 6.9kV Unit Board 2C. The moisture intrusion resulted in an electrical fault producing a differential relay actuation. The differential relay resulted in the de-energization of the 6.9kV Unit Board 2C.

B. Cause(s) and circumstances for each human performance related root cause

Not applicable

IV. Analysis of the event

This event was compared with previous WBN plant trips and was also compared with applicable Final Safety Analysis Report (UFSAR) transients/accidents. The sequence of events associated with the trip were bounded by the FSAR Safety Analysis assumptions. The parameter response for the reactor trip is bounded by the FSAR analyses in UFSAR Section 15.2.8, "Loss of Normal

NARRATIVE

Feedwater." The plant response post-trip was uncomplicated and the plant responded as designed. Operations entered E-0, "Reactor Trip or Safety Injection," and subsequently transitioned to ES-0.1, "Reactor Trip Response," and 2-GO-5, "Unit Shutdown from 30 percent Reactor Power to Hot Standby."

V. Assessment of Safety Consequences

A. Availability of systems or components that could have performed the same function as the components and systems that failed during the event

Not applicable

B. For events that occurred when the reactor was shut down, availability of systems or components needed to shutdown the reactor and maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident

Not applicable

C. For failure that rendered a train of a safety system inoperable, estimate of the elapsed time from discovery of the failure until the train was returned to service

Not applicable

VI. Corrective Actions

This event was entered into the TVA issue resolution program and is being tracked under condition report 2025847.

A. Immediate Corrective Actions

Operations personnel responded to the plant trip and stabilized the unit in hot standby.

Work Order 125481593 was created and worked to facilitate a comprehensive inspection of Unit 2 roof drains and their potential equipment interactions.

Work Order 125474990 was created and worked to repair the failed branch of drain piping.

NARRATIVE

B. Corrective Actions to Prevent Recurrence or to reduce the probability of similar events occurring in the future

Work Order 125481593 was created and worked to facilitate a comprehensive inspection of Unit 2 roof drains and their potential equipment interactions. Degraded drains have repairs scheduled during upcoming unit outages.

VII. Previous Similar Events at the Same Site

None

VIII. Additional Information

None

IX. Commitments

None