



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

April 17, 2020  
WBL-20-009

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 390/2020-001-00, Manual Reactor Trip Due to Lowering Steam Generator Level Caused by a Hand Station Failure**

This submittal provides Licensee Event Report (LER) 390/2020-001-00. This LER provides details concerning a manual plant trip as a result of lowering level in steam generator number 3. This condition is being reported as a safety system actuation of the reactor protection system and the auxiliary feedwater system in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There are no regulatory commitments contained in this letter. Please direct any questions concerning this matter to Tony Brown, WBN Licensing Manager, at (423) 365-7720.

Respectfully,

A handwritten signature in blue ink, appearing to read "Anthony L. Williams IV", written over a blue circular stamp.

Anthony L. Williams IV  
Site Vice President  
Watts Bar Nuclear Plant

Enclosure  
cc: See Page 2

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cc (Enclosure):

NRC Regional Administrator - Region II  
NRC Senior Resident Inspector - Watts Bar Nuclear Plant



## LICENSEE EVENT REPORT (LER)

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 Information Services Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail 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; e-mail: oira\_submission@omb.eop.gov. 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.

## 1. Facility Name

Watts Bar Nuclear Plant, Unit 1

## 2. Docket Number

05000390

## 3. Page

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## 4. Title

Manual Reactor Trip Due to Lowering Steam Generator Level Caused by a Hand Station Failure

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
02	19	2020	2020	- 001	- 00	04	17	2020	N/A	05000
9. Operating Mode			11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)							
1			<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)		
			<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)		
			<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)		
			<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)		
10. Power Level			<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)	
100			<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)		
			<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> 73.77(a)(1)		
			<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)(D)		<input type="checkbox"/> 73.77(a)(2)(i)		
			<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(vii)		<input type="checkbox"/> 73.77(a)(2)(ii)		
			<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> OTHER		Specify in Abstract below or in NRC Form 366A			

## 12. Licensee Contact for this LER

Licensee Contact

Dean Baker, Licensing Engineer

Telephone Number (Include Area Code)

(423) 452-4589

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

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
X	JB	FIC	FOX	Y					

## 14. Supplemental Report Expected

☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No

## 15. Expected Submission Date

Month	Day	Year
N/A	N/A	N/A

**Abstract** (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On February 19, 2020, at 0936 Eastern Standard Time (EST), the Watts Bar Nuclear Plant (WBN) Unit 1 reactor was manually tripped due to a loss of control of Steam Generator (SG) number 3 level. Concurrent with the reactor trip, the Auxiliary Feedwater system actuated as designed. All Control and Shutdown rods inserted properly. All safety systems responded as designed.

The direct cause of the event was a stuck pushbutton on the main feedwater regulating valve (MFRV) controller/hand station which provided a closing signal when an open signal was demanded. This occurred when performing a maintenance activity that placed the hand station in manual. This hand station was replaced following this event. In addition, a cause analysis has determined that manual control for automatic functions is not recognized as risk significant, therefore appropriate elimination/mitigation strategies are not utilized under controllable circumstances. Corrective actions include revising plant procedures to classify activities that replace automatic control availability with manual control action as risk significant and require risk evaluation and mitigation strategies.

This condition is being reported as a safety system actuation in accordance with 10 CFR 50.73(a)(2)(iv)(A).

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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 Information Services Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto: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; e-mail: [oira\\_submission@omb.eop.gov](mailto:oira_submission@omb.eop.gov). 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.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Watts Bar Nuclear Plant, Unit 1	05000390	2020	- 001	- 00

**NARRATIVE****I. Plant Operating Conditions Before the Event**

Watts Bar Nuclear Plant (WBN) Unit 1 was at 100 percent rated thermal power (RTP). Unit 2 was unaffected by this event.

**II. Description of Event****A. Event Summary**

On February 19, 2020, at 0936 Eastern Standard Time (EST), the Watts Bar Nuclear Plant Unit 1 reactor was manually tripped due to the inability to manually control Steam Generator (SG) number 3 level. Concurrent with the reactor trip, the Auxiliary Feedwater (AFW) system {EIS:BA} actuated as designed. All Control and Shutdown rods inserted properly. All safety systems responded as designed.

This event is being reported to the Nuclear Regulatory Commission (NRC) under 10 CFR 50.73(a)(2)(iv)(A) as a safety system actuation of the Reactor Protection System (RPS) and the AFW system.

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

No inoperable structures, systems, or components contributed to this condition.

**C. Dates and approximate times of occurrences**

<u>Date</u>	<u>Time (EST)</u>	<u>Event</u>
2/19/20	0919	Operations placed hand station 1-FIC-003-0090 {EIS:FIC} in manual as instructed by Work Order 120464335.
2/19/20	0927	Operator manipulated hand station 1-FIC-003-0090 in the decrease direction to reduce feedwater flow to SG number 3. Controller decrease pushbutton stuck.
2/19/20	0932	Operator manipulated 1-FIC-003-090 in the increase direction to raise feed flow to SG number 3. Feedwater flow reduces further.
2/19/20	0935	Hand station 1-FIC-003-090 returned to automatic and feedwater flow started to rise.
2/19/20	0936	Manual reactor trip on Unit 1, entered 1-E-0, Reactor Trip or Safety Injection. The feedwater regulating valve (FRV) for the number 3 steam generator (SG) was being controlled in manual to support maintenance. Attempts to control SG level manually failed.
2/19/20	0938	Transitioned to 1-ES-0.1, Reactor Trip Response.
2/19/20	1006	Transitioned to 1-GO-5, Unit Shutdown from 30 percent Reactor Power to Hot Standby





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### NARRATIVE

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

The component that failed was a hand station (1-FIC-003-0090) provided by Foxboro. The pushbutton in the hand station was a Honeywell, AML 21 Series CQA938E.

#### E. Other systems or secondary functions affected

No other systems or secondary functions were affected.

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

The component failure was discovered during post trip troubleshooting.

#### G. Failure mode, mechanism, and effect of each failed component

While in manual SG level control, hand station (1-FIC-003-090) pushbutton stuck on the Loop 3 controller which provided a closing signal when open was demanded.

#### H. Operator actions

When operators attempted to increase feed flow to raise level in SG number 3, level continued to lower. Prior to reaching the automatic reactor trip criteria on SG level, operators manually tripped the reactor.

#### I. Automatically and manually initiated safety system responses

The plant was manually tripped when the SG 3 level could not be maintained. All Control and Shutdown rods inserted properly and the AFW system actuated as designed.

### III. Cause of the Event

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

This event was caused when, while in manual SG level control, hand station (1-FIC-003-090) pushbutton stuck on the Loop 3 controller which provided a closing signal when open was demanded, which resulted in the SG number 3 MFRV closing.

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

A human performance root cause was not identified for this event. A cause analysis has determined that manual control for automatic functions is not recognized as risk significant, therefore appropriate elimination/mitigation strategies are not utilized under controllable circumstances.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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**1. FACILITY NAME**

Watts Bar Nuclear Plant, Unit 1

**2. DOCKET NUMBER**

05000390

**3. LER NUMBER****YEAR**

2020

**SEQUENTIAL  
NUMBER**

- 001

**REV  
NO.**

- 00

**NARRATIVE****IV. Analysis of the Event**

The SG MFRVs control flow to the steam generators to maintain level within a desired operating band when operating in automatic. The isolation of a single MFRV causes the level in the associated SG to rapidly lower.

While performing a maintenance activity, 1-FIC-003-0090 was placed in manual. When operators manipulated the hand station to reduce feedwater flow to SG number 3, the decrease pushbutton became stuck. Subsequent attempts by the operators to raise feed flow resulted in the MFRV for SG number 3 going closed and the need to manually trip the unit.

**V. Assessment of Safety Consequences**

This event closely matches and is bounded by the Loss of Normal Feedwater event described in the Updated Final Safety Analysis Report (UFSAR). A probabilistic risk review of this event shows the risk from this trip is very small.

- 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, an estimate of the elapsed time from the discovery of the failure until the train was returned to service

Not applicable.

**VI. Corrective Actions**

These events were entered into the Tennessee Valley Authority (TVA) Corrective Action Program and are being tracked under Condition Report (CR) 1587975.

- A. Immediate Corrective Actions

The valve hand station was replaced.



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## NARRATIVE

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

Corrective actions include revising plant procedures to classify activities that replace automatic control availability with manual control action as risk significant and require risk evaluation and mitigation strategies.

### VII. Previous Similar Events at the Same Site

LER 390/2019-003-00 submitted on October 21, 2019 documents an event where the reactor was manually tripped as a result of a MFRV failing closed as a result of a failed diaphragm. While the October 2019 event is similar to this event, the causes are different.

### VIII. Additional Information

There is no additional information.

### IX. Commitments

There are no new commitments.