



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

October 7, 2016

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 391/2016-006-00, Turbine Driven Auxiliary
Feedwater Pump Auto Start on Lo-Lo Steam Generator Level Following
Planned Unit Trip**

This submittal provides Licensee Event Report (LER) 391/2016-006-00. This LER provides details concerning a recent automatic start of the Turbine Driven Auxiliary Feedwater Pump after it had been manually secured by operations following a planned unit shutdown. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

Please direct any questions concerning this matter to Gordon Arent, WBN Licensing Director, at (423) 365-2004.

Respectfully,

A handwritten signature in black ink, appearing to read "Paul Simmons".

Paul Simmons
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 FOIA, Privacy and Information Collections Branch (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, NEOB-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.

1. FACILITY NAME

Watts Bar Nuclear Plant, Unit 2

2. DOCKET NUMBER

05000391

3. PAGE

1 OF 5

4. TITLE

Turbine Driven Auxiliary Feedwater Pump Auto Start on Lo-Lo Steam Generator Level Following Planned Unit Trip

5. EVENT DATE

MONTH	DAY	YEAR
08	13	2016

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2016	- 006	- 00

7. REPORT DATE

MONTH	DAY	YEAR
10	7	2016

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
N/A	N/A
FACILITY NAME	DOCKET NUMBER
N/A	N/A

9. OPERATING MODE

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

3

<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

0

<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)
<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 EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On August 13, 2016 Watts Bar Nuclear Plant Unit 2 (WBN2) was being stabilized following a pre-planned reactor trip. Both motor driven auxiliary feed water pumps and the turbine driven auxiliary feed water pump (TDAFW pump) were in operation maintaining steam generator (SG) water level between 6 - 50 percent in accordance with the Reactor Trip Response Procedure.

At 0333 Eastern Daylight Time (EDT) the TDAFW pump was secured by procedure and SG water level lowered to the Lo-Lo Alarm setpoint (17 percent). With the Unit at 0 percent power, a trip time delay of 3 minutes is present for auxiliary feedwater actuation. At 0337 EDT, the TDAFW pump automatically started with SG water levels less than the Lo-Lo alarm setpoint (lowest level reached was 15 percent).

The cause of the event was a failure to brief the auto start feature of the TDAFW pump at Lo-Lo SG water level of 17 percent when briefing the control band for the SGs is between 6 to 50 percent.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Watts Bar Nuclear Plant, Unit 2	05000391	2016	- 006	- 00

NARRATIVE

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

Watts Bar Nuclear Plant (WBN) Unit 2 was in Mode 3 at 0 percent rated thermal power (RTP).

II. DESCRIPTION OF EVENT

A. Event

On August 13, 2016 Watts Bar Nuclear Plant Unit 2 (WBN2) was being stabilized following a pre-planned reactor trip. Both motor driven auxiliary feed water (MDAFW) pumps and the turbine driven auxiliary feed water pump (TDAFW pump) {EIS:P} were in operation maintaining steam generator (SG) water level between 6 - 50 percent in accordance with the Reactor Trip Response Procedure.

At 0333 Eastern Daylight Time (EDT) the TDAFW pump was secured by procedure and SG water level lowered to the Lo-Lo Alarm setpoint (17 percent). With the Unit at 0 percent power, a trip time delay (TTD) of 3 minutes is present for auxiliary feedwater actuation. At 0337 EDT, the TDAFW pump automatically started with SG water levels less than the Lo-Lo alarm setpoint (lowest level reached was 15 percent).

The cause of the event was a failure to brief the auto start feature of the TDAFW pump at Lo-Lo SG water level of 17 percent when briefing the control band for the SGs is between 6 to 50 percent.

This event is being reported to the Nuclear Regulatory Commission (NRC) under 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in automatic actuation of the auxiliary feedwater system {EIS:BA}.

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

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

C. Dates and Approximate Times of Occurrences

Date	Time (EDT)	Event
8/13/16	0230	Transitioned to 2-GO-5 Section 5.4, Shutdown by Pre-planned Manual Reactor Trip
8/13/16	0255	Started 2A-A and 2B-B MDAFW pumps
8/13/16	0306	Manually tripped the Unit 2 reactor
8/13/16	0311	Transitioned to 2-ES-0.1, Reactor Trip Response following immediate actions of 2-E-0, Reactor Trip or Safety Injection
8/13/16	0329	Transitioned to 2-GO-5, Reactor Shutdown from 30 percent Reactor Power to Hot Shutdown
8/13/16	0333	Shutdown U2 TDAFW pump.
8/13/16	0337	TDAFW Pump auto started on Lo-Lo- SG levels
8/13/16	0339	TDAFW Pump secured

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D. Manufacturer and Model Number of Components that Failed

Not applicable.

E. Other Systems or Secondary Functions Affected

None.

F. Method of discovery of each Component or System Failure or Procedural Error

The error became apparent after the automatic start of the TDAFW pump.

G. Failure Mode and Effect of Each Failed Component

Not applicable.

H. Operator Actions

Following automatic start of the TDAFW pump, SG levels were raised above the TTD setpoint of 17 percent. The TDAFW pump was then re-secured.

I. Automatically and Manually Initiated Safety System Responses

All automatic and manual safety systems responded as expected.

III. CAUSE OF THE EVENT

A. The cause of each component or system failure or personnel error, if known.

No component failures caused this event.

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

This event was the result of a human performance error. The cause of the event was a failure to brief the auto start feature of the TDAFW pump at Lo-Lo SG water level of 17 percent when briefing the control band for the SGs is between 6 to 50 percent.

IV. ANALYSIS OF THE EVENT

Watts Bar Unit 2 lowered power for a pre-planned reactor trip. With the TDAFW pump already in operation, the MDAFW pumps were manually started and the unit was tripped from about 25 percent reactor power. After the plant had stabilized, the TDAFW pump was secured. Steam generator levels lowered to the Lo-Lo alarm setpoint of 17 percent. The trip time delay at 0 percent power is three minutes, so the TDAFW pump automatically started on Lo-Lo level, with the lowest level reached being 15 percent. This event was a result of human error during the briefing for the event to insure that SG levels remained above the Lo-Lo start level.

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V. ASSESSMENT OF SAFETY CONSEQUENCES

WBN Unit 2 experienced an automatic start of the TDAFW pump after the plant had been shutdown. Steam generator levels were stable, but below the auto start level provided in the design. The safety significance of this event is considered to be low.

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

No equipment failures occurred during this event.

- 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

All equipment needed for this event was available.

- 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

This event was entered into the Tennessee Valley Authority Corrective Action Program and is being tracked under condition report 1202562.

- A. Immediate Corrective Actions

Steam Generator levels were increased above the Lo-Lo SG level alarm setpoint and the TDAFW pump was secured.

- B. Corrective Actions to Prevent Recurrence

Additional training will be performed related to this event. In addition the Auxiliary Feedwater System Operating Instruction was revised to include the trip time delay setpoints associated with operation of the TDAFW and MDAFW pumps.

VII. ADDITIONAL INFORMATION

- A. Previous similar events at the same plant

On December 21, 2015, TVA submitted LER 390-2015-006, "Source Range Level Trip Channels (N-31 and N-32) Inoperable During Plant Startup." This LER describes a condition prohibited by Technical Specifications where Watts Bar Unit 1 performed a reactor start-up with the source range (SR) reactor trip in the bypass position (SR trip inoperable). This bypass condition was not

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NARRATIVE

recognized until after the reactor startup was completed. The cause of this event was that operators failed to identify a bypassed safety function during reactor start-up due to inadequate tracking of essential information. While the event described in LER 2015-006 relates to a condition prohibited by TS, and has a human performance cause, the corrective actions taken for that event do not overlap the issue presented in LER 391-2016-006.

B. Additional Information

None.

C. Safety System Functional Failure Consideration

This condition did not result in a safety system functional failure.

D. Scrams with Complications Consideration

Not applicable.

VIII. COMMITMENTS

None.