



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

January 25, 2018

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 391/2017-005-00, Unplanned Emergency Core Cooling System Injection into the Reactor Coolant System due to Personnel Error**

This submittal provides Licensee Event Report (LER) 391/2017-005-00. This LER provides details concerning an incident where an unplanned injection into the reactor coolant system occurred when the flow path from a centrifugal charging pump was not properly isolated. This condition is being reported as a system actuation 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 Kim Hulvey, WBN Licensing Manager, at (423) 365-7720.

Respectfully,

A handwritten signature in black ink, appearing to read "Paul Simmons", is written over the word "Respectfully,".

Paul Simmons  
Site Vice President  
Watts Bar Nuclear Plant

Enclosure  
cc: See Page 2

U.S. Nuclear Regulatory Commission  
Page 2  
January 25, 2018

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-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by 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

Unplanned Emergency Core Cooling System Injection into the Reactor Coolant System due to Personnel Error

| 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 |   |  |
| 11                       | 26  | 2017 | 2017  | - 005             | - 00    | 01  | 25  | 2018 | N/A  | N/A           |   |  |
| 9. OPERATING MODE        |     |      | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) |                   |         |   |     |      |  |               |   |  |
| 5                        |     |      | <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<br><br>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 | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | 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 November 26, 2017, at 1225 Eastern Standard Time (EST), the Watts Bar Nuclear Plant (WBN) Unit 2 experienced an unplanned Emergency Core Cooling System (ECCS) discharge to the Unit 2 Reactor Coolant System (RCS) while de-pressurized, in Mode 5, with the Pressurizer vented to the Pressurizer Relief Tank. ECCS injection via the Boron Injection flow path occurred during planned Safety Injection system Engineered Safety Features Actuation System (ESFAS) testing. The Boron Injection flow path should have been isolated and should not have resulted in any injection flow to the Unit 2 RCS. The condition was promptly corrected by operator actions based on observed plant conditions.

The cause of this event is that an Operator improperly used a Caution Order to determine the configuration of the breaker for the Boron Injection Tank outlet valve. Correct Component Verification was not utilized as required, and the current position of the breaker in the field was not validated to support testing. Corrective actions for this event include revising procedures to ensure the breakers associated with the boron injection flow path will be tagged open during ESFAS testing and that lessons learned related to this event are communicated to operating crews. An evaluation on the use of Caution Orders for off normal equipment positions will be performed.

**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-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by 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                | 2. DOCKET NUMBER | 3. LER NUMBER |                   |         |
|---------------------------------|------------------|---------------|-------------------|---------|
|                                 |                  | YEAR          | SEQUENTIAL NUMBER | REV NO. |
| Watts Bar Nuclear Plant, Unit 2 | 05000391         | 2017          | - 005             | - 00    |

**NARRATIVE****I. PLANT OPERATING CONDITIONS BEFORE THE EVENT**

Watts Bar Nuclear Plant (WBN) Unit 2 was in Mode 5.

**II. DESCRIPTION OF EVENT****A. Event Summary**

On November 26, 2017, at 1225 Eastern Standard Time (EST), the Watts Bar Nuclear Plant (WBN) Unit 2 experienced an unplanned Emergency Core Cooling System (ECCS) {EIS:BQ} discharge to the Unit 2 Reactor Coolant System (RCS) {EIS:AB} while de-pressurized, in Mode 5, with the Pressurizer vented to the Pressurizer Relief Tank {EIS:TK}. ECCS injection via the Boron Injection flow path occurred during planned Safety Injection system Engineered Safety Features Actuation System (ESFAS) testing. The Boron Injection flow path should have been isolated and should not have resulted in any injection flow to the Unit 2 RCS.

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.

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

No inoperable equipment contributed to this event.

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

| Date     | Time (EST) | Event   |
|----------|------------|---|
| 11/26/17 | 1224       | Initiated Unit 2 Safety Injection from the Main Control room (MCR) during performance of 0-SI-82-6, "18 Month Loss of Offsite Power With Safety Injection Test - DG 2B-B."  |
| 11/26/17 | 1225       | Unit 2 experienced unplanned ECCS discharge to RCS  |
| 11/26/17 | 1232       | Operator noted rapidly rising pressurizer level and lowering Volume Control Tank (VCT) level. Noted 2-FCV-63-25, Safety Injection System (SIS) Boron Injection Tank (BIT) Shutoff valve was open. Dispatched a unit operator to the 2B1 480V Reactor MOV Board to close 2-FCV-63-25 and open its associated breaker. Letdown was maximized and pressurizer level stopped rising. Peak pressurizer level was 79 percent. |
| 11/26/17 | 1616       | Operations made required four hour notification to the NRC for an unplanned ECCS Injection.   |

**D. Manufacturer and Model Number of Components that Failed During the Event**

There were no failed components that contributed to this event.

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

No other systems or secondary functions were affected.



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

The issue was identified by operations personnel as a result of increasing pressurizer level.

**G. Failure Mode and Effect of Each Failed Component**

There was no equipment failure associated with this event.

**H. Operator Actions**

Upon identifying rising pressurizer level, the BIT outlet valve 2-FCV-63-25 was closed and its associated breaker was opened.

**I. Automatically and Manually Initiated Safety System Responses**

Upon identifying that flow was being injected into the RCS, the operator isolated the flow path to the RCS.

**III. CAUSE OF THE EVENT****A. The cause of each component or system failure or personnel error, if known.**

The cause of this issue is that an Operator improperly used a Caution Order (CO) to determine the configuration of the breaker for the BIT outlet valve.

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

The cause of this issue is that an Operator improperly used a CO to determine the configuration of the breaker for the BIT outlet valve. This is a personal accountability issue for not properly using the human performance tool Correct Component Verification to validate the current position of the breaker in the field.

**IV. ANALYSIS OF THE EVENT**

During preparation for the performance of 0-SI-82-6, "18 Month Loss of Offsite Power With Safety Injection Test - DG 2B-B," it is intended that the BIT outlet valve is closed with power removed by opening its associated breaker. During the pre-test lineups in advance of performance, an Operator improperly used a Caution Order to determine the configuration of the breaker for the BIT outlet valve. A CO tag is provided to identify that a component is in an off normal configuration but does not control configuration. The breaker had actually been repositioned to closed to support previous plant testing with no reconfiguration required following that testing based on plant conditions. The Operator relied solely on the information present on the CO tag to determine breaker position and did not validate the position in the field.

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**NARRATIVE****V. ASSESSMENT OF SAFETY CONSEQUENCES**

The event resulted in an unplanned injection into the RCS which was promptly identified and corrected by operations personnel. All other systems responded as expected and ECCS flow was isolated. Unit 2 Pressurizer level and pressure remained below limits. With the Unit in Mode 5 following refueling, the plant operating crew were able to stop the increase in pressurizer level well in advance of overfilling the pressurizer, therefore there was no safety consequence.

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

If the BIT outlet valve was unable to be closed, the affected charging pump could have been secured.

- 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

This event involved a single component during testing. Other means were available to secure ECCS injection.

- 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 (TVA) Corrective Action Program and is being tracked under Condition Report (CR) 1362001.

- A. Immediate Corrective Actions

Upon identifying rising pressurizer level, the BIT outlet valve 2-FCV-63-25 was closed and its associated breaker was opened.

- B. Corrective Actions to Prevent Recurrence or to Reduce Probability of Similar Events Occurring in the Future

Corrective actions for this event include revising procedures to ensure the breakers associated with the boron injection flow path will be tagged open during ESFAS testing and that lessons learned related to this event are communicated to operating crews. An evaluation on the use of Caution Orders for off normal equipment positions will be performed .

**VII. PREVIOUS SIMILAR EVENTS AT THE SAME SITE**

On May 10, 2017 the 1B-B Safety Injection (SI) pump discharge isolation valve was discovered closed during operator rounds as described in LER 390-2017-005. The cause of the mispositioned valve was the

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**NARRATIVE**

result of an individual failing to follow procedure use and adherence requirements related to the application of Not Applicable during the performance of Emergency Diesel Generator (EDG) Blackout testing. The safety injection pump discharge valve was closed to support the test but was not reopened following the testing. Corrective actions for this event Includes personal accountability actions, revision of the EDG blackout procedures to ensure the SI pump discharge valves are reopened, and additional station focus on procedure use.

This event is similar to the event described in this report. WBN continues to focus on operator human performance as a result of this and prior events.

**VIII. ADDITIONAL INFORMATION**

None.

**IX. COMMITMENTS**

None.