



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

July 13, 2016

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 390/2016-005-01, Both Trains of Unit 1 Emergency Gas Treatment System Inoperable During Unit 2 Testing**

This submittal provides a supplement to Licensee Event Report (LER) 390/2016-005. This supplement provides details regarding the ability of the Unit 1 Emergency Gas Treatment System to perform its specified safety functions during the event described in LER 390/2016-005.

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', with a long horizontal flourish extending to the right.

Paul Simmons  
Site Vice President  
Watts Bar Nuclear Plant

Enclosure  
cc: See Page 2

U.S. Nuclear Regulatory Commission  
Page 2  
July 13, 2016

cc (Enclosure):

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



**LICENSEE EVENT REPORT (LER)**

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<b>1. FACILITY NAME</b> Watts Bar Nuclear Plant, Unit 1	<b>2. DOCKET NUMBER</b> 05000390	<b>3. PAGE</b> 1 OF 5
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**4. TITLE**  
Both Trains of Unit 1 Emergency Gas Treatment System Inoperable During Unit 2 Testing

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
10	22	2015	2016	005	01	07	13	2016		05000
									FACILITY NAME	DOCKET NUMBER
										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 type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
14	<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 checked="" 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 checked="" 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
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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

**14. SUPPLEMENTAL REPORT EXPECTED**      **15. EXPECTED SUBMISSION DATE**

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

MONTH	DAY	YEAR

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

On March 14, 2016, Watts Bar Nuclear Plant (WBN) Unit 1 determined through engineering analysis that both trains of emergency gas treatment system (EGTS) were inoperable for 8 minutes, 10 seconds during preoperational testing of Unit 2 EGTS. The inoperability of A and B trains of Unit 1 EGTS took place on October 22, 2015, while Unit 1 was in Mode 1 and two trains of EGTS were required to be operable in accordance with technical specification (TS) limiting condition for operation (LCO) 3.6.9, "Emergency Gas Treatment System (EGTS)." At the time of the event, Unit 2 was in "no Mode," prior to initial fuel loading. This condition is being reported pursuant to 10 CFR 50.73(a)(2)(v)(C) and 10 CFR 50.73(a)(2)(v)(D), "Event or Condition That Could Have Prevented Fulfilment of a Safety Function."



**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 1	05000390	2016	- 005	- 01

**NARRATIVE**

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

Watts Bar Nuclear Plant (WBN) Unit 1 was in Mode 1 at 14 percent rated thermal power (RTP). WBN Unit 2 was in "no Mode" prior to initial fuel loading.

**II. DESCRIPTION OF EVENT**

**A. Event**

On March 14, 2016, Watts Bar Nuclear Plant (WBN) Unit 1 determined through engineering analysis that both trains of emergency gas treatment system (EGTS) [EHS: BH] were inoperable for 8 minutes, 10 seconds during preoperational testing of Unit 2 EGTS. The inoperability of A and B trains of Unit 1 EGTS took place on October 22, 2015, while Unit 1 was in Mode 1 and two trains of EGTS were required to be operable in accordance with technical specification (TS) limiting condition for operation (LCO) 3.6.9, "Emergency Gas Treatment System (EGTS)." At the time of the event, Unit 2 was in "no Mode," prior to initial fuel loading. This condition is being reported pursuant to 10 CFR 50.73(a)(2)(v)(C) and 10 CFR 50.73(a)(2)(v)(D), "Event or Condition That Could Have Prevented Fulfilment of a Safety Function."

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

Train A and train B EGTS were concurrently inoperable for 8 minutes, 10 seconds on October 22, 2015.

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

Date	Time	Event
10/17/15	1007 EDT	WBN Unit 1 entered Mode 4 coming out of refueling outage 13
10/22/15	0118 EDT	Both trains Unit 1 EGTS inoperable due to Unit 2 test configuration
10/22/15	0126 EDT	Unit 2 EGTS train A suction dampers closed.

**D. Manufacturer and Model Number of Components that Failed**

There were no failed components associated with this event.

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

There were no systems or secondary functions affected by this event.

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

This issue was identified during the incorporation of Unit 2 EGTS system testing requirements into WBN engineering documents.

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

There were no component failures associated with this event.

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(11-2015)

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APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



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### NARRATIVE

#### H. Operator Actions

There was no actual event requiring operator actions.

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

There were no automatic or manual system responses associated with this event.

### III. CAUSE OF THE EVENT

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

There was no component or system failure associated with this event.

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

The cause of this event was that engineers were assigned tasks without the requisite knowledge and experience to fully understand all issues that needed to be addressed for a first of a kind testing on a complex shared system. This resulted in inadequate special requirements to maintain Unit 1 EGTS operable during the Unit 2 preoperational testing.

### IV. ANALYSIS OF THE EVENT

On October 22, 2015, both trains of Unit 1 EGTS were inoperable for 8 minutes, 10 seconds due to inadequate special requirements to maintain Unit 1 EGTS operable during Unit 2 EGTS testing. The specified safety functions of EGTS are:

1. To keep the air pressure within each Shield Building annulus below atmospheric pressure at all times in which the integrity of that particular containment is required.
2. To reduce the concentration of radioactive nuclides in annulus air that is released to the environs during a loss of coolant accident (LOCA) in either reactor unit to levels sufficiently low to keep the site boundary and low population zone (LPZ) dose rates below the 10 CFR 100 values.
3. To withstand the safe shutdown earthquake.
4. To provide for initial and periodic testing of the system capability to function as designed.

EGTS is a dual unit system. TS LCO 3.6.9 requires both trains of EGTS be Operable in Modes 1, 2, 3, and 4 and TS 3.6.15 requires that the Shield Building shall be Operable in Modes 1, 2, 3, and 4. The EGTS must be capable of producing the correct flow and pressure requirements relative to the annulus, which ensures that the EGTS is capable of performing Specified Safety Function 2 described above to keep annulus releases below the 10 CFR 100 limits. A single train of EGTS is capable of drawing suction on the annulus of the unit undergoing a LOCA such that the specified safety functions of EGTS are met. Annulus in-leakage for the suction path in service is assumed to meet surveillance requirement (SR) 3.6.15.4 in-leakage limit of  $\leq 250$  scfm.

Because in-leakage from the Unit 2 annulus was unknown, and both EGTS trains were aligned to the Unit 2 annulus for 8 minutes, 10 seconds, both trains should have been declared inoperable on Unit 1 which would have required that Unit 1 enter TS LCO 3.0.3.

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A demand for EGTS did not exist during this timeframe. During times where individual trains of EGTS were inoperable, the conditions existed for less than the TS LCO 3.6.9 required action completion times. In addition, LCO 3.0.3 required action completion times were not exceeded when both trains of EGTS were inoperable.

#### 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

The WBN probabilistic risk model does not consider EGTS in core damage and large early release frequencies. As a result, any risk increase associated with a short-duration misalignment of EGTS is considered to be very small. In addition, special requirements were imposed during the Unit 2 EGTS test for operators to close dampers to isolate Unit 2 from the suction path of EGTS, should it become necessary to prevent Unit 2 testing from adversely impacting Unit 1 operation.

See discussion below regarding safety system functional failure reporting in accordance with NEI 99-02.

- 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. Watts Bar Unit 1 was in Mode 1 at the time of this event.

- 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

There was not an actual failure associated with this event. In the engineering evaluation performed subsequent to the event, WBN demonstrated that both trains of Unit 1 EGTS were inoperable for 8 minutes, 10 seconds.

#### VI. CORRECTIVE ACTIONS

This event was entered into the Tennessee Valley Authority Corrective Action Program and is being tracked under condition report 1143076.

- A. Immediate Corrective Actions

This issue was identified subsequent to the inoperability of both trains of Unit 1 EGTS. Condition report 1143076 was initiated, and a past operability evaluation performed.

- B. Corrective Actions to Prevent Recurrence

Watts Bar Unit 2 EGTS has been turned over to plant operations, and is controlled under the WBN Unit 2 TS. Testing requirements for EGTS were revised to support dual unit operation, including appropriate controls to ensure that EGTS on the unit not undergoing testing will remain operable.

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**NARRATIVE**

VII. ADDITIONAL INFORMATION

A. Previous similar events at the same plant

None.

B. Additional Information

None.

C. Safety System Functional Failure Consideration

This event is considered a safety system functional failure in accordance with NEI 99-02.

The Emergency Gas Treatment System (EGTS) is a common system capable of drawing suction from the containment annulus of either Unit 1 or Unit 2 following an accident. While the system is capable of responding to an accident while testing the other unit, annulus in-leakage is assumed to meet Technical Specification 3.6.15, "Shield Building," requirements for both units.

During preoperational testing of the Unit 2 EGTS, Unit 2 annulus in-leakage did not meet Technical Specifications requirements during times when EGTS was required to be operable for Unit 1. Unit 2 EGTS was not required to be operable during this time. In order to compensate for the Unit 2 annulus in-leakage during Unit 2 preoperational testing, specific operator actions were developed to isolate the Unit 2 annulus and place the EGTS system into an alignment which would support the response to an accident on Unit 1.

In the 10 CFR 50.59 evaluation to support the Unit 2 EGTS testing, TVA concluded that the actions required to isolate Unit 2 EGTS in the event of a Unit 1 accident were reliable and achievable and could be implemented without prior NRC approval assuming only one train was tested at a time. For the period of concern, however, both trains of EGTS had been placed in the test configuration and were inoperable, and therefore outside the scope of the 10 CFR 50.59 evaluation. The actions required in the event of a Unit 1 loss of coolant accident were the closure of open Unit 2 EGTS dampers by a dedicated operator. The dampers met stroke time testing prior to the event described in LER 390/2016005 and were demonstrated to function properly from the main control room. In addition, TVA confirmed through review of testing documents and operator logs that the operator actions were in place during this event. Given the above, there is high confidence that the EGTS safety functions were maintained.

D. Scrams with Complications Consideration

None.

VIII. COMMITMENTS

None.