



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

WBL-19-012

February 11, 2019

10 CFR 50.73

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

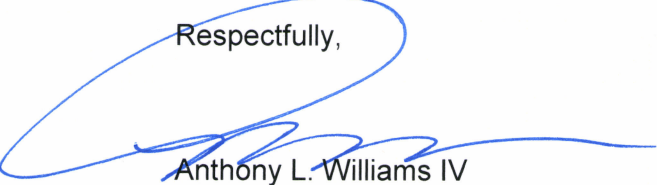
Watts Bar Nuclear Plant, Unit 1  
Facility Operating License No. NPF-90  
NRC Docket No. 50-390

Subject: **Licensee Event Report 390/2018-006-00, Containment Air Return Fan Inoperable for a Time Period Longer than Allowed by Technical Specifications Due to an Inadequate Post Maintenance Test**

This submittal provides Licensee Event Report (LER) 390/2018-006-00. This LER provides details concerning a condition where the 1B-B Containment Air Return Fan was found inoperable for a time period longer than allowed by Technical Specification. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specification, 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degrades plant safety, and 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented fulfillment of a safety function.

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

Respectfully,



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-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, NE08-10202, (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 1					2. Docket Number 05000390			3. Page 1 OF 5		
4. Title Containment Air Return Fan Inoperable for a Time Period Longer than Allowed by Technical Specifications due to an Inadequate Post Maintenance Test.										
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
12	11	2018	2018	006	00	2	11	2019	NA	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 checked="" 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)	
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 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 checked="" 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	
D	BK	UDMP	AWV	Y						
14. Supplemental Report Expected					15. Expected Submission Date			Month	Day	Year
<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No								N/A	N/A	N/A
Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)										
<p>At 1642 Eastern Standard Time (EST) on December 20, 2018, it was determined that both trains of Containment Air Return Fans (CARF) were simultaneously inoperable from 0817 EST to 1129 EST on November 20, 2018. This condition was reported as an unanalyzed condition that significantly degrades plant safety. It is also reportable as a condition prohibited by Technical Specifications and as a condition that could have prevented fulfillment of a safety function.</p> <p>During the Unit 1 outage in the Fall of 2018, maintenance to replace damper seals associated with the Containment Air Return Fan system was performed. During leak testing following this maintenance, it is likely that a counterweight associated with the 1B-B CARF backdraft dampers was inadvertently moved, which resulted in an opening force greater than allowed by the design. A damper push test was not performed following the leak test to confirm that proper operation of the 1B-B CARF backdraft damper was within acceptance limits. Between the time Unit 1 entered Mode 4 and the condition was discovered, the 1A-A CARF was removed from service for testing, resulting in both trains of CARF being inoperable. Corrective actions to prevent recurrence include revising the Preventative Maintenance activity for these damper replacements to require additional post maintenance testing related to the CARF backdraft damper operation.</p>										

**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	2018	- 006	- 00

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

Watts Bar Nuclear Plant (WBN), Unit 1, was in Mode 1 at 100 percent rated thermal power.

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

At 1642 Eastern Standard Time (EST) on December 20, 2018, it was determined that both trains of Containment Air Return Fans (CARF) {EIIIS:FAN} were simultaneously inoperable from 0817 EST to 1129 EST on November 20, 2018.

This event is reportable to the Nuclear Regulatory Commission (NRC) under 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications (TS), under 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degraded plant safety, and under 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented fulfillment of a safety function needed to mitigate the consequences of an accident.

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

No inoperable systems contributed to this event.

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

Times prior to November 4, 2018 are Eastern Daylight Time (EDT)

Date	Time	Event
10/17/18	0312 EDT	WO 119946773 is completed that performed a post maintenance smoke test following replacement of hydrogen collection backdraft damper seals.
10/22/18	0517 EDT	WBN Unit 1 enters Mode 4 following a refueling outage.
11/20/18	0817 EST	1A-A CARF removed from service to perform quarterly surveillance testing. Returned to service at 1129 EST
12/11/18	0808 EST	TS Limiting Condition for Operation (LCO) 3.6.10, Air Return System, Condition A entered to support performance of the CARF 1B-B quarterly operability test. The backdraft damper {EIIIS:UDMP} force-to-open (push test) was found to be 118 in-lbs, which is above the surveillance limit of $\leq 92.4$ in-lbs.
12/11/18	1745 EST	TS 3.6.10 exited after damper counterweight adjustments are performed resulting in acceptable as-left push test measurements.

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Watts Bar Nuclear Plant, Unit 1

**2. DOCKET NUMBER**

05000390

**3. LER NUMBER**

YEAR

SEQUENTIAL  
NUMBERREV  
NO.

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**NARRATIVE**

Date	Time	Event
12/20/18	1642 EST	Past Operability Evaluation (POE) associated with Condition Report 1474341 determines the 1B-B CARF was inoperable from 10/22/18 to 12/22/18.
12/21/18	0002 EST	Event Notification 53801 made to NRC.

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

The backdraft damper for the 1B-B CARF was provided by American Warming and Ventilating, Part number DAA-P-7900.

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

No secondary systems functions were impacted.

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

The failure of the 1B-B CARF backdraft damper was discovered during required periodic testing.

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

A mis-positioned counter weight associated with the 1B-B CARF backdraft damper was the cause of the failed damper push test.

**H. Operator actions**

Operations personnel remained in the TS Action statement until an acceptable push test was completed.

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

There were no automatic or manually initiated safety system responses associated with this event.

**III. Cause of the Event****A. Cause of each component or system failure or personnel error**

The smoke test performed following replacement of damper seals required the 1B-B CARF back draft damper to be blocked closed. It was determined that work to block the damper closed was the most likely cause of the damper counter weight being inadvertently moved. A post maintenance testing (PMT) activity to perform a push test on

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**NARRATIVE**

the 1B-B CARF backdraft damper following the smoke test would have identified this issue.

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

No specific human performance error has been determined. A PMT to perform a damper push test following the smoke test on the hydrogen collector backdraft dampers would have prevented this event.

**IV. Analysis of the Event**

The safety function of Containment Air Return Fans (CARF) {EIIIS:BK} is to enhance the ice condenser and containment spray heat removal operation by circulating air from the upper compartment to the lower compartment, through the ice condenser, and then back to the upper compartment. A secondary function of the CARF is to limit hydrogen concentration in potentially stagnant regions of containment by ensuring a flow of air to these regions. Two CARF trains are provided with a design flow rate of 40,000 cubic feet per minute. The containment air return fans automatically start 9 +/- 1 minutes after a Phase B containment isolation signal.

During the Fall 2018 refueling outage on Unit 1, the hydrogen collector back draft damper seals were replaced under a preventative maintenance activity. The hydrogen collector lines are routed to the suction of the containment air return fans. To test the adequacy of the damper seals, a smoke test was performed following the blade seal replacement. This test required the CARF backdraft dampers to be blocked closed with wooden wedges. It was determined that either during the installation or removal of these wedges that a counter weight of the 1B-B CARF backdraft damper was inadvertently moved. The 1B-B CARF backdraft damper has a required opening force of  $\leq 92.4$  in-lbs to allow for design flow of the containment air return fan. The as found test performed on December 11, 2018 measured an opening force of 118 in-lbs.

**V. Assessment of Safety Consequences**

A probabilistic risk assessment for this event determined the incremental increase in early containment failure to be 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**

The 1A-A CARF was available except for a period of 3 hours and 12 minutes on November 20, 2018.

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

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**NARRATIVE**

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

The failure was found on December 11, 2018 and corrected in less than 9 hours and 37 minutes.

VI. Corrective Actions

This condition was entered into the TVA Corrective Action Program (CAP) and is being tracked under Condition Report (CR) 1474341.

A. Immediate Corrective Actions

The cause of the failed push test was determined to be a counterweight out of position. The counterweight was adjusted and a successful push test of the damper was completed.

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

Corrective actions to prevent recurrence include revising the Preventative Maintenance activity for these damper replacements to require additional post maintenance testing related to the CARF backdraft damper operation.

VII. Previous Similar Events at the Same Site

On March 9, 2016, Licensee Event Report 390/2016-001-00 reported a condition prohibited by TS associated with a repositioned mode selector switch for the lower containment atmosphere particulate radioactivity monitor. The corrective actions for the previous event were specific to the event and would not have prevented the event described in this LER.

VIII. Additional Information

There is no additional information.

IX. Commitments

There are no new commitments.