



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

September 21, 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 391/2018-004-00, Failure to Implement  
Annunciator Response Process Results in a Condition Prohibited by  
Technical Specifications**

This submittal provides Licensee Event Report (LER) 391/2018-004-00. This LER provides details concerning a failure by operations personnel to recognize an equipment alarm, resulting in a condition prohibited by Technical Specifications. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications.

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,

A handwritten signature in black ink, appearing to read 'Paul Simmons', written over a white background.

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 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.

<b>1. Facility Name</b> Watts Bar Nuclear Plant, Unit 2	<b>2. Docket Number</b> 05000391	<b>3. Page</b> 1 OF 6
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**4. Title**  
Failure to Implement Annunciator Response Process Results in a Condition Prohibited by Technical Specifications

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
07	27	2018	2018	004	00	09	21	2018	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 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)
<b>10. Power Level</b>	<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 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
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**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	IL	JX	G063	No					

<b>14. Supplemental Report Expected</b> <input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No	<b>15. Expected Submission Date</b>	Month	Day	Year
		N/A	N/A	N/A

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

On July 27, 2018, at 1040 Eastern Daylight Time (EDT), it was discovered that one of two purge air exhaust radiation monitors was inoperable. Technical Specification (TS) Limiting Conditions for Operation (LCO) 3.3.6, Containment Vent Isolation Instrumentation, Condition B, and TS LCO 3.6.3, Containment Isolation Valves, Condition A were entered. A review of plant data revealed that on July 26, 2018, at 1007 EDT, an unrecognized instrument malfunction alarm for Train A, Purge Air Exhaust Radiation Monitor (RM) was received in the main control room. Consequently, operations personnel did not comply with TS 3.3.6 Required Action B.1 or TS 3.6.3 Required Action A.1, resulting in a condition prohibited by TS.

This event was the result of Human Performance errors in implementing the annunciator response process. Corrective actions to address these human performance errors include the implementation of shift orders focused on operator standards for annunciator response and the logging of active annunciators for shift turnover. Personnel accountability actions related to this event have also been taken.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's TS.



**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  Watts Bar Nuclear Plant, Unit 2	2. DOCKET NUMBER  05000391	3. LER NUMBER		
		YEAR 2018	SEQUENTIAL NUMBER - 004	REV NO. - 00

**NARRATIVE**

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

At the time of discovery, Watts Bar Nuclear Plant (WBN), Unit 2, was in Mode 1 at approximately 100 percent rated thermal power.

**II. Description of Event**

**A. Event Summary**

At 1040 Eastern Daylight Time (EDT) on July 27, 2018, while preparing to place Unit 2 Purge in service, notification was received locally that Train A, Containment Purge Air Exhaust Radiation Monitor (RM) (2-RM-90-130) {EIS:RM} would not source check, and the green "operate" light was not illuminated. Efforts to restore the light were unsuccessful. At this time, it was also noted that instrument malfunction annunciator (ANN) 193-D, "CNTMT PURGE EXH, 2-RM-130/131, INSTR MALF" was illuminated. Unit 2 entered Technical Specification (TS) Limiting Conditions for Operation (LCO) 3.3.6, Containment Vent Isolation Instrumentation, Condition B, and TS LCO 3.6.3, Containment Isolation Valves, Condition A.

TS LCO 3.3.6 Condition B, Action B.1 requires immediate entry into applicable conditions and required actions of TS LCO 3.6.3 for containment purge valves made inoperable by declaring 2-RM-90-130 inoperable. TS LCO 3.6.3 Condition A, Action A.1 requires isolation of the affected flow path by use of a least one closed and deactivated automatic valve, closed manual valve, blind flange or check valve with flow through the valve secured within 4 hours. Action A.2 requires verification that the penetration flow path is isolated once per 31 days thereafter.

To comply with LCO 3.6.3 Condition A, Action A.1, a dedicated operator was assigned to close lower compartment purge valves 2-FCV-30-37 and 2-FCV-30-40 in the event of a Containment Ventilation Isolation (CVI) signal.

A review of plant data revealed that the instrument malfunction ANN 193-D alarmed in the main control room (MCR) at 1007 on July 26, 2018. 2-RM-90-130 was inoperable at this time, but was not recognized by licensed control room operators until 1040 on July 27, 2018.

Tennessee Valley Authority (TVA) is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's TS.



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Watts Bar Nuclear Plant, Unit 2	05000391	2018	- 004	- 00

**NARRATIVE**

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

Train A, Containment Purge Air Exhaust RM (2-RM-90-130) was inoperable at 1007 on July 26, 2018, but was not recognized until 1040 on July 27, 2018.

Train B, Containment Purge Air Exhaust RM (2-RM-90-131), remained operable to continuously monitor the radioactivity in the exhaust air from the containment atmosphere.

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

Date	Time (EDT)	Event
07/26/18	1007	Instrument malfunction ANN 193-D alarmed in MCR. 2-RM-90-130 inoperable.
07/27/18	1040	While preparing to place Unit 2 Purge in service, notification was received 2-RM-90-130 would not source check, and the green "operate" light was not illuminated. At this time, it was also noted that instrument malfunction ANN 193-D was illuminated.
07/27/18	1158	Unit 2 entered TS LCO 3.3.6 Condition B, and TS LCO 3.6.3 Condition A. A review of plant data revealed that the instrument malfunction ANN 193-D alarmed in the MCR at 1007 on July 26, 2018.
07/27/18	1251	Annunciator Verification procedure, 2-PI-OPS-ANN, was initiated to account for all annunciators. To comply with TS LCO 3.6.3, Condition A, a dedicated operator was assigned to close lower compartment purge valves 2-FCV-30-37 and 2-FCV-30-40 in the event of a CVI signal.
08/02/18	2300	2-RM-90-130 returned to service. Unit 2 exited TS LCO 3.3.6 Conditions A and B, and TS LCO 3.6.3 Condition A.

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

The malfunction of 2-RM-90-130 was due to a failed high voltage power supply {EIS: JX} associated with the instrument's ratemeter. General Atomics part number 02810443-001 was replaced.



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

There were no other systems or secondary functions affected by this condition.

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

The failure of 2-RM-90-130 was identified while preparing to place Unit 2 Purge in service.

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

A failed high voltage power supply was the cause of 2-RM-90-130 being inoperable.

**H. Operator actions**

Upon determining that 2-RM-90-130 was inoperable, Unit 2 entered TS LCO 3.3.6 Condition B, and TS LCO 3.6.3 Condition A. To comply with LCO 3.6.3 Condition A, a dedicated operator was assigned to close lower compartment purge valves 2-FCV-30-37 and 2-FCV-30-40 in the event of a CVI signal. Additionally, Annunciator Verification procedure, 2-PI-OPS-ANN, was initiated to account for all annunciators.

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

There were no safety system responses initiated as a result of this condition.

**III. Cause of the Event**

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

It was determined that the malfunction of 2-RM-90-130 was due to a failed high voltage power supply associated with the instrument's ratemeter.

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

During dayshift on July 26, 2018, work was being performed to support replacement of the Containment Upper Compartment Monitor (1-RM-90-112). This work was being performed in panel 0-M-12, and resulted in several spurious alarms for the Waste Disposal System Gas Effluent Monitor (0-RM-90-118). The Unit Supervisor (US) directed the craft to stop work until a plan could be put in place to minimize the impact to other RMs in panel 0-M-12. The instrument malfunction ANN 193-D alarm associated with 2-RM-90-130 was received in the MCR at the same time the spurious alarms on 0-RM-90-118 were received. This contributed to the failure to promptly identify the failure of 2-RM-90-130.



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**NARRATIVE**

The cause evaluation for this event, determined that TVA's annunciator response process was not being properly implemented. Annunciator Verification procedure, 2-PI-OPS-ANN, was not being performed as designed. Per procedure, annunciator verification is performed once per shift while in Mode 1. However, two shifts of licensed operators did not properly implement the guidance for annunciator response.

**IV. Analysis of the Event**

The containment purge air exhaust monitors are gaseous effluent monitors which continuously monitor the radioactivity in the exhaust air from the containment atmosphere. The primary safety function is the mitigation of the off-site dose consequences for the small loss of coolant accident. Since these are redundant safety-related monitors, there was no loss of safety function, as 2-RM-90-131 remained operable for the duration of the LCO applicability.

**V. Assessment of Safety Consequences**

There was no loss of safety function, as redundant monitor, 2-RM-90-131, remained operable for the duration of the LCO applicability. Therefore, there was no significant impact to the health and safety of the public from this event.

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

Redundant monitor, 2-RM-90-131, remained operable for the duration of the LCO applicability.

**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**

Systems and components required to maintain safe shutdown conditions were available during the 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**

2-RM-90-130 remained inoperable from 1007 on June 26, 2018 until Unit 2 exited TS LCO 3.3.6 Conditions A and B, and TS LCO 3.6.3 Condition A at 2300 on August 2, 2018.



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**VI. Corrective Actions**

This condition was entered into the TVA Corrective Action Program (CAP) and is being tracked under CR 1434751.

**A. Immediate Corrective Actions**

Upon discovery, immediate corrective actions included Unit 2 entering TS LCO 3.3.6 Condition B, and TS LCO 3.6.3 Condition A. A review of plant data was conducted to determine when the instrument malfunction ANN 193-D alarmed in the MCR. Additionally, Annunciator Verification procedure, 2-PI-OPS-ANN, was initiated to account for all annunciators.

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

Shift orders have been issued with temporary actions to reinforce expectations regarding standards. Additionally, for the applicable operations crews' personnel accountability actions have been taken for lack of performance regarding MCR Board walk down standards, annunciator verification, and response.

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

A review of recent WBN Licensee Event Reports (LER) found one applicable LER, 2015-006-00, Source Range Level Trip Channels (N-31 and N-32) Inoperable During Plant Startup. This LER details a human performance error which resulted in a condition prohibited by the plant's TS. The corrective actions for this event included implementing an annunciator verification process, which if followed appropriately, would have prevented the subject event from extending through multiple shifts of plant operation.

**VIII. Additional Information**

There is no additional information.

**IX. Commitments**

There are no new commitments.