

LICENSEE EVENT REPORT (LER)

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-8 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20803.

FACILITY NAME (1)

Watts Bar Nuclear Plant - Unit 1

DOCKET NUMBER (2)

05000390

PAGE (3)

1 OF 9

TITLE (4)

Divider barrier hatch found open in a mode where it was required to be closed.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	23	96	96	007	00	03	25	96		05000
									FACILITY NAME	DOCKET NUMBER
									FACILITY NAME	DOCKET NUMBER
										05000
										05000

OPERATING MODE (9) 4

POWER LEVEL (10) 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)

20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)	50.73(a)(2)(viii)
20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)
20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)	73.71
20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER
20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (include Area Code)
Jerry Bushnell, Compliance Licensing Engineer	(423)-365-8048

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
A	BC	DR	X999	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On February 23, 1996, at 1624 (EST), Maintenance personnel found the divider barrier personnel hatch number 2 open. The hatch being open had the potential to degrade the functionality of the ice condenser system (EIS BC). At 1629 (EST), an action was entered for LCO 3.6.13 to restore the hatch to an operable status, the closed position. In order to verify the operability of the hatch, Maintenance personnel performed a visual inspection of the divider barrier to ensure all access points were closed and inspected the seals of personnel hatch number 2. Upon completion of these inspections, the action for LCO 3.6.13 was exited at 1711 (EST). The cause of the failure was that self-checking practices were not properly applied. Corrective measures include; revision of the plant instruction which controls containment access to document whether personnel going into containment will be entering the personnel hatches, issuance and implementation of a design change to delete unnecessary windows from status panel 1-XA-55-23A, revision of a surveillance instruction to require main control room confirmation when closing the divider barrier hatch from upper containment, issuance of a memorandum from the Plant Manager to site organizations which requires performance of roll-down meetings regarding this event, and issuance of a design change to identify required administrative controls for the four polar crane wall doors and the ice condenser equipment access doors.

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LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000	96	007	00	2 OF 9
	05000390				

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. PLANT CONDITIONS:

At approximately 1624 hours (EST) on February 23, 1996, Maintenance personnel observed that the divider barrier personnel hatch number 2 (Energy Industry Identification System (EIIS) code DR) was open. At this time, Watts Bar Nuclear Plant Unit 1 was in Mode 4 for the modification of condenser level instrumentation. Plant parameters at this time were; reactor coolant system (RCS) (EIIS AB), temperature - 230 degrees F, boron concentration - 1232 ppm.

II. DESCRIPTION OF EVENT

A. Event

On February 23, 1996, at approximately 0925 (EST), indication was provided in the main control room (MCR) by the annunciator logger printer that the divider barrier personnel hatch number 2 was closed. At 0926 (EST), maintenance and radiation control personnel passed through the hatch to perform Surveillance Instruction (SI) 1-SI-61-5, "18 Month Ice Condenser Lower Inlet Doors Inspection." The printer in the MCR indicated that hatch number 2 was opened and closed correctly. Between 0931 and 0953 (EST), the MCR printer indicated that the lower ice deck doors opened and closed. The MCR printer further indicated that personnel hatch number 2 opened at 1008 (EST) and remained open until 1624 (EST). At this time, Maintenance personnel found the hatch in a partially open state. The Maintenance personnel notified Operations personnel in the MCR. At approximately 1629 (EST), an action was entered for LCO 3.6.13. The LCO action required that the hatch be restored to an operable status within one hour. In order to verify the operability of the hatch, Maintenance personnel performed Surveillance Instruction (SI) 1-SI-88-24, "Containment Divider Barrier Personnel Access Hatches and Equipment Hatches." This instruction verified by visual inspection that there were no open personnel hatches or equipment hatches penetrating the divider barrier. In addition, 1-SI-304-1, "Divider Barrier Personnel Access and Equipment Hatch Inspection," was performed. This instruction inspected the seals and sealing surfaces of the hatch. Upon notification of the completion of the two SI's, the action for LCO 3.6.13 was exited at approximately 1711 (EST).

Incident Investigation (II) W-96-007 was initiated to document this event in the TVA Corrective Action Program.

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

WBN Unit 1 has an ice condenser system (EIIS BC) which is designed to limit the containment pressure below the design pressure during a loss of coolant accident (LOCA). The divider barrier separates the containment into lower and upper compartments. Steam generated during an accident raises the pressure in the lower compartment and forces steam into the ice condenser.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION		
Watts Bar Nuclear Plant, Unit 1	05000				3	OF 9
	05000390	96	007	00		

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

II. DESCRIPTION OF EVENT (continued)

The divider barrier provides a reasonably tight seal against leakage of steam into the upper compartment, which would reduce the steam flow into the ice condenser. The effects of the divider barrier personnel hatch being open while the plant was in Mode 4 is detailed in Section IV, Analysis of Event - Assessment of Safety Consequences. No other structures, components, or systems were inoperable at the start of the event that contributed to the event.

C. Dates and Approximate Times of Major Occurrences

February 23, 1996, at approximately 0925 (EST) - indication was provided in the main control room (MCR) by the annunciator logger printer that the divider barrier personnel hatch number 2 was closed.

February 23, 1996, at approximately 0926 (EST) - Maintenance and Radiation Control personnel passed through the hatch to perform Surveillance Instruction (SI) 1-SI-61-5, "18 Month Ice Condenser Lower Inlet Doors Inspection." The printer in the MCR indicated that hatch number 2 was opened and closed correctly.

February 23, 1996, at approximately 1008 (EST) - the MCR printer indicated that personnel hatch number 2 opened at 1008 (EST) and remained open until 1624 (EST).

February 23, 1996, at approximately 1624 (EST) - Maintenance personnel found the hatch in a partially open state and notified operations personnel in the MCR.

February 23, 1996, at approximately 1629 (EST) - an action was entered for LCO 3.6.13. The LCO action required that the hatch be restored to an operable status within one hour. In order to verify the operability of the hatch, Maintenance personnel performed Surveillance Instruction (SI) 1-SI-88-24, "Containment Divider Barrier Personnel Access Hatches and Equipment Hatches." This instruction verified by visual inspection that there were no open personnel hatches or equipment hatches penetrating the divider barrier. In addition, 1-SI-304-1, "Divider Barrier Personnel Access and Equipment Hatch Inspection," was performed. This instruction inspected the seals and sealing surfaces of the hatch.

February 23, 1996, at approximately 1711 (EST) - the action for LCO 3.6.13 was exited upon notification of the successful completion of 1-SI-88-24 and 1-SI-304-1.

D. Other Systems or Secondary Functions Affected

No other systems or secondary functions were affected by this event.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
Watts Bar Nuclear Plant, Unit 1	05000	YEAR	SEQUENTIAL NUMBER	REVISION	4 OF 9
	05000390	96	-- 007	-- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

II. DESCRIPTION OF EVENT (continued)

E. Method of Discovery

Maintenance personnel working in containment found the hatch partially open.

F. Operator Actions

The actions taken by Operations personnel related to this event are discussed in Section V, Corrective Actions, Item 1, Immediate Corrective Actions.

G. Automatic and manual safety system responses

There were no automatic or manual safety system responses and none were necessary.

III. CAUSE OF EVENT

A. Immediate Cause

Three issues contributed to the cause of this event. First, the status panel in the main control room (MCR) that displays that the hatch is open was inadequate. The identifier for this display is 1-XA-55-23A. This display contains approximately 48 status windows that have "light only" indication. A problem associated with the congestion of this panel had been previously identified and a design change had been requested to correct the congestion. Secondly, the status light in the MCR was found to be burnt out during the investigation of this event. At this time the bulb was replaced and it operated correctly when tested. Operations personnel test the annunciator bulbs once a shift. It is postulated that the bulb burnt out during the shift on February 23, 1996, and therefore, did not provide indication that the hatch was open for the extended period. The third factor that contributed to this event was an inadequacy associated with Appendix A of Plant Administrative Instruction (PAI) 2.03, "Containment Access." This procedure is used for the control of access to containment. Approval for access is provided on Appendix A of PAI-2.03 by the reactor operator. This form did not provide a means to document approval for access to all doors and hatches which may be used by personnel while in containment. Nor did it refer to surveillance requirements which are required to be performed if access is granted to certain doors and hatches.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)	
Watts Bar Nuclear Plant, Unit 1	05000	YEAR	SEQUENTIAL NUMBER	REVISION	5	OF 9
	05000390	96	-- 007	-- 00		

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

III. CAUSE OF EVENT (continued)

B. Root Cause

For this event the root cause was determined to be that the proper self-checking practice was not applied. The employee that closed the divider barrier hatch at approximately 1009 (EST) on February 23, 1996, performed a self-check of pulling up on the hatch. However, it is possible to close this hatch incorrectly and not be able to pull the hatch loose with hand pressure.

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES

The divider barrier between the upper and lower compartments of the containment consists of the operating deck and associated seals, personnel access doors, and equipment hatches. The barrier serves to minimize steam/air mixture bypass of the ice condenser (EIS BC) during design basis mass and energy release to the lower containment. The divider barrier is an integral part of the ice condenser pressure suppression containment design. Operability of the divider barrier is required in Modes 1, 2, 3, and 4 where the design basis accident release of the energy contained in the primary system could require the use of the ice bed to mitigate the containment pressure and temperature increase.

The design and licensing basis assume an ice condenser deck bypass area of 5 feet². This bypass area is comprised of known leakage area through the cavity drain lines of 2.2 feet² and known leakage paths for the remainder of the total area. As part of the design basis, sensitivity studies and tests were performed to determine the impact of increasing the deck bypass area. Both the short-term peak compression pressure (due to initial energy release) and the long-term peak containment pressure (due to continued energy release during and after ice melt) were evaluated for impact. These results are presented in Final Safety Analysis Report (FSAR) Section 6.2.1.3.5. The FSAR states that the affect of deck leakage on upper-containment pressure was verified by four special full scale ice condenser section tests. Deck bypass leakages as large as 55 feet² were tested. Analyses simulating deck bypasses over 50 feet² were also performed for various break sizes to determine the impact on peak containment pressure. In both cases substantial margins were demonstrated against the design basis bypass area of 5 feet². For example, the results demonstrated that with one containment spray pump operating and a deck bypass of 50 feet², the containment pressure remained below the design basis.

The above design basis evaluation applies to an event occurring at full power reactor coolant system (EIS AB) conditions. The open hatch discussed in this LER is considerably less safety significant because it occurred during Mode 4. The reactor coolant system mass and energy releases during this mode would more closely approximate the smaller break sizes studied in the reported sensitivity analyses. These break sizes had minimal impact on the containment peak pressure. It is therefore judged that one round hatch (less than 5 feet²) not being properly secured in Mode 4 is not safety significant for peak containment pressure.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				6 OF 9
	05000390	96	007	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES (continued)

In order to determine the total scope of doors or hatches which may require the addition of administrative controls, critical plant areas were reviewed. Based on this review, it was established that only the containment doors and hatches required additional review for controls. Safety-related boundaries in other areas of the plant are controlled and surveilled as required by other programs such as fire boundary doors and hatches by plant fire protection programs, security boundaries by the site safeguards program, and heating ventilation and air conditioning (HVAC) pressure boundaries utilizing fire and security boundaries by those programs, and by the Auxiliary Building Secondary Containment Enclosure (ABSCE) features. Typically, all of these doors and hatches are appropriately labeled for added control, and most have automatic closure mechanisms, which the divider barrier hatch did not have. Additionally, there was no similar or identical incident of breached doors or hatches in the areas reviewed prior to the occurrence of this event in containment.

Based on the review of the containment doors, two ice condenser equipment access doors were identified as not having appropriate design output or instructions for administrative control. Four polar crane wall doors were identified as not having appropriate design output. These additional doors were factored into the development of the corrective actions for this event and this will assure that doors and hatches are appropriately controlled to maintain the plant design basis.

One of the causes that contributed to this event was that the bulb for the status light was burnt out. This was found by the personnel investigating the event. Routinely, the bulbs are checked at operations shift turnover in accordance with Plant Administrative Instruction (PAI) 2.11, "Shift Relief and Turnover." Therefore, even if the hatch had not been found open by the maintenance personnel, or the problem with the bulb had not been immediately corrected, the bulb would have been changed at the next shift turnover. Once the bulb was replaced and the status of the hatch was indicated, operations personnel would have initiated action to close the hatch and comply with Technical Specification requirements.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Indication from the annunciator logger printer in the main control room (MCR) shows that personnel hatch number 2 opened at 1008 (EST) and remained open until 1624 (EST). At this time, Maintenance personnel found the hatch in a partially open state and notified Operations personnel in the MCR. At approximately 1629 (EST), an action was entered for LCO 3.6.13. The LCO action required that the hatch be restored to an operable status within one hour. In order to verify the operability of the hatch, Maintenance personnel perform Surveillance Instruction (SI) 1-SI-88-24, "Containment Divider Barrier Personnel Access Hatches and Equipment Hatches."

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				7 OF 9
	05000390	96	007	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

V. CORRECTIVE ACTIONS (continued)

This instruction verified by visual inspection that there were no open personnel hatches or equipment hatches penetrating the divider barrier. In addition, 1-SI-304-1, "Divider Barrier Personnel Access and Equipment Hatch Inspection," was performed. This instruction inspected the seals and sealing surfaces of the hatch. Upon notification of the completion of the two SI's, the action for LCO 3.6.13 was exited at approximately 1711 (EST).

B. Corrective Actions to Prevent Recurrence

1. Revision of Appendix A of PAI-2.03 to document whether personnel will be entering personnel hatch number 1 or personnel hatch number 2. If entering either hatch, the PAI directs the personnel to the requirements of 1-SI-88-24, "Containment Divider Barrier Personnel Access Hatches and Equipment Hatches," for verification by visual inspection that there are no open personnel hatches or equipment hatches penetrating the divider barrier.
Date Completed: March 22, 1996
2. Issuance of a design change notice DCN to delete all unnecessary windows from status panel 1-XA-55-23A. Date Completed: March 21, 1996
3. Implementation of the DCN referred to in Corrective Action number 2.
Completion Date: April 26, 1996
4. Revision of 1-SI-88-24 to require confirmation, using the status light in the main control room, when closing the divided barrier hatch from upper containment.
Date Completed: March 22, 1996
5. Issuance of a memorandum from the Plant Manager to site organizations which requires performance of roll-down meetings with all employees to reinforce the importance of attention to detail as it relates to this event. Date Completed: March 4, 1996
6. Issuance of a DCN to identify required administrative controls for the four polar crane wall doors and the ice condenser equipment access doors. Date Completed: March 12, 1996
7. Revision of PAI-2.03 to incorporate the requirements of the DCN referred to in Corrective Action number 6. Date Completed: March 22, 1996

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				8 OF 9
	05000390	96	007	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

VI. ADDITIONAL INFORMATION

A. Failed Components

1. Safety Train Inoperability

WBN Unit 1 has an ice condenser system (EIS BC) which is designed to limit the containment pressure below the design pressure during a loss of coolant accident (LOCA). The divider barrier separates the containment into lower and upper compartments. Steam generated during an accident raises the pressure in the lower compartment and forces steam into the ice condenser. The divider barrier provides a reasonably tight seal against leakage of steam into the upper compartment, which would reduce the steam flow into the ice condenser. The effects of the divider barrier personnel hatch being open while the plant was in Mode 4 is detailed in Section IV, Analysis of Event - Assessment of Safety Consequences.

2. Component/System Failure Information

a. Method of Discovery of Each Component or System Failure:

The discovery of the divider barrier personnel hatch being in an open position was made by maintenance personnel which were working in the area.

b. Failure Mode, Mechanism, and Effect of Each Failed Component:

The effects of the divider barrier personnel hatch being open while the plant was in Mode 4 is detailed in Section IV, Analysis of Event - Assessment of Safety Consequences.

c. Root Cause of Failure:

For this event the root cause was determined to be that self-checking practices were not properly applied. The employee that closed the divider barrier hatch at approximately 1009 (EST) on February 23, 1996, performed a self-check of pulling up on the hatch. However, it is possible to close this hatch incorrectly and not be able to pull the hatch loose with hand pressure. The only positive way to verify correct closure from upper containment is through the status light in the MCR.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)	
Watts Bar Nuclear Plant, Unit 1	05000	YEAR	SEQUENTIAL NUMBER	REVISION	9	OF 9
	05000390	96	-- 006	-- 00		

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

VI. ADDITIONAL INFORMATION (continued)

d. For Failed Components With Multiple Functions, List of Systems or Secondary Functions Affected:

The divider barrier personnel hatch has no secondary functions. With the hatch in an open position there was a potential for impact on functionality of the ice condenser (EIS BC) system. However, the discussion in Section IV, Analysis of Event - Assessment of Safety Consequences establishes that one round hatch (less than 5 feet²) not being properly secured in Mode 4 is not safety significant for peak containment pressure.

e. Manufacturer and Model Number of Each Failed Component:

Divider barrier personnel hatch number 2:
 Manufacturer: Julius Mock and Son
 Model Number: None assigned
 Shop Order Number: 4065

B. Previous Similar Events

For Watts Bar Nuclear Plant, no events similar to the events described in this report have been previously reported under 10 CFR 50.72 or 10 CFR 50.73.

VII. COMMITMENTS

The actions committed to be implemented in response to this event are tabulated in Section V, Corrective Actions.