



## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)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-6 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 20503.

FACILITY NAME (1)

WATERFORD STEAM ELECTRIC STATION UNIT 3

DOCKET NUMBER (2)

05000382

PAGE (3)

1 OF 7

TITLE (4)

CONTROL ROOM EMERGENCY FILTRATION UNIT COMMON MODE FAILURE

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
05	15	97	97	017	00	06	19	97	N/A	05000
									N/A	05000
OPERATING MODE (9)		6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
POWER LEVEL (10)		000	20.2201(b)		20.2203(a)(2)(v)		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)		<input checked="" type="checkbox"/> 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

T.J. GAUDET, LICENSING MANAGER,

TELEPHONE NUMBER (Include A or Code)

(504) 739-6666

## 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

## SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 20, 1997, Waterford 3 discovered the possibility that both trains of Control Room Emergency Filtration Units (CREFU) would be rendered inoperable if either Emergency Filter Modulating Damper, HVC-213A(B), failed open. Both CREFUs were declared inoperable and Technical Specification 3.7.6.2b was entered. Operations and Systems Engineering performed Control Room pressure testing in accordance with OP-903-123, "Control Room Envelope Pressure Test," utilizing both trains of CREFUs and various Control Room Heating and Ventilation System (HVC) lineups. Results indicated that a single failure of HVC-213A(B) would prohibit either CREFU from pressurizing the Control Room envelope to 1/8 inch of water gauge with less than or equal to 200 cubic feet per minute of flow. As a corrective action, dampers were closed isolating the outside air intake paths for CREFU Train A. This effectively stopped the common suction path for both units allowing CREFU Train B to remain operable. CREFU Train A will remain available for recirculation only. This event did not compromise the health and safety of the public.

**REQUIRED NUMBER OF DIGITS/CHARACTERS  
FOR EACH BLOCK**

BLOCK NUMBER	NUMBER OF DIGITS/CHARACTERS	TITLE
1	UP TO 46	FACILITY NAME
2	8 TOTAL 3 IN ADDITION TO 05000	DOCKET NUMBER
3	VARIES	PAGE NUMBER
4	UP TO 76	TITLE
5	6 TOTAL 2 PER BLOCK	EVENT DATE
6	7 TOTAL 2 FOR YEAR 3 FOR SEQUENTIAL NUMBER 2 FOR REVISION NUMBER	LER NUMBER
7	6 TOTAL 2 PER BLOCK	REPORT DATE
8	UP TO 18 -- FACILITY NAME 8 TOTAL -- DOCKET NUMBER 3 IN ADDITION TO 05000	OTHER FACILITIES INVOLVED
9	1	OPERATING MODE
10	3	POWER LEVEL
11	1 CHECK BOX THAT APPLIES	REQUIREMENTS OF 10 CFR
12	UP TO 50 FOR NAME 14 FOR TELEPHONE	LICENSEE CONTACT
13	CAUSE VARIES 2 FOR SYSTEM 4 FOR COMPONENT 4 FOR MANUFACTURER NPRDS VARIES	EACH COMPONENT FAILURE
14	1 CHECK BOX THAT APPLIES	SUPPLEMENTAL REPORT EXPECTED
15	6 TOTAL 2 PER BLOCK	EXPECTED SUBMISSION DATE

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

## REPORTABLE OCCURRENCE

Pursuant to Technical Specification (TS) 3/4.7.6.2, "Control Room Emergency Air Filtration System [VI]," two Control Room Emergency Filtration Units (CREFUs) shall be Operable in operational modes 5 and 6. During the performance of a Control Room boundary pressurization test, it was discovered that the failure of either recirculation damper, Control Room Heating and Ventilation Control (HVC)-213A(B), could result in the inability to adequately maintain the required level of pressurization. This condition is being reported in accordance with 10CFR50.73(a)(2)(v)(D) as a condition that alone could prevent the fulfillment of the safety function of the CREFUs to mitigate the consequences of an accident. On May 2, 1997, Waterford 3 made a four hour notification to the Nuclear Regulatory Commission in accordance with 10CFR50.72(b)(2)(iii)(D).

## INITIAL CONDITIONS

At the time this condition was discovered, Waterford 3 was in Operational Mode 6 (Refueling) while conducting Refueling Outage eight (RF08). Reactor Coolant System (RCS) [AB] temperature was approximately 100°F and the RCS was at atmospheric pressure. A Static Uninterruptible Power Supply (SUPS) [EF] Train A maintenance outage was in progress. Because of the loss of SUPS power, CREFU Train A recirculation damper, HVC-213A, and the CREFU Train A inlet damper, HVC-205A, were failed in the open position and CREFU Train A was inoperable.

## EVENT DESCRIPTION

The CREFUs are designed to maintain a positive pressure of 1/8 inch of water gauge (inwg) or greater with respect to outside air, with a makeup rate of 200 cfm or less, during the high radiation mode of operation.

On May 16, 1997, at approximately 0300 hours, the Control Room staff was attempting to pressurize the Control Room in accordance with Operations' Surveillance Procedure

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OP-903-123, "Control Room Envelope Pressure Test," to accommodate maintenance activities. With HVC-213A failed open due to a SUPS maintenance outage, the crew was unable to achieve Control Room pressurization. As a result of the crew's questioning attitude, it was determined that a design flaw existed which would render both CREFU trains inoperable. A review of computer trends revealed that CREFU Train B running alone could only draw in 48 cubic feet per minute (cfm) of air from the outside air intakes. The flow was inadequate to raise the Control Room pressure to the required 1/8 inch of water gauge (inwg).

A walkdown of the system ductwork was performed. Due to ducting transitions from a 30 inch round duct downstream of HVC-213A(B) to a 10 inch rectangular duct upstream of HVC-213A(B), Systems Engineering believed that a single failure of either HVC-213A or HVC-213B would render either CREFU inoperable. To confirm this, the following actions were performed (See Attachment):

- HVC-213A and HVC-205A were failed open. Next, Operations performed a Control Room pressurization test in accordance with OP-903-123 utilizing CREFU Train B. Initially, there was no emergency outside air flow. HVC-213B was adjusted closed and the maximum emergency outside air flow obtained was 104 cfm. The differential pressure for CREFU Train B was also significantly below design limits indicating that total fan flow was below the allowable limits and the Control Room never achieved a positive pressure.
- The north and south emergency outside air intake volume dampers for CREFU Train A, which are located just upstream of HVC-213A, were closed. This effectively isolated the air path established when HVC-213A was failed open. The result was an immediate increase in emergency outside air of well over 200 cfm. HVC-213B was throttled to obtain 200 cfm flow and a Control Room positive pressure in excess of 0.35 inwg was obtained. The two volume dampers were reopened and emergency outside air flow dropped to 0 cfm.

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- The HVC system was returned to normal operating status in accordance with Operations procedure OP-003-014, "Control Room Heating and Ventilation."
- The same test was performed using CREFU Train A with similar results.

Test results revealed a single failure of HVC-213A or HVC-213B results in the inability of either CREFU to pressurize the Control Room envelope to 1/8 inwg with less than or equal to 200 cfm flow.

## CAUSAL FACTORS

The apparent cause of this condition is inadequate design in that, with either HVC-213A or HVC-213B failed in the open position, a short circuit path is created from CREFU Train A to Train B via the emergency outside air intake duct. Recirculation air bypasses the failed damper and enters the emergency outside air intake path and effectively chokes the ability to draw outside air into the filter units. With limited outside air to provide makeup, the ability to pressurize the Control Room to the required 1/8 inwg is adversely affected.

## CORRECTIVE MEASURES

- Upon discovery of this condition, both CREFU trains were declared inoperable and Technical Specification 3.7.6.2 was entered.
- Systems Engineering initiated a Work Authorization to isolate the emergency outside air flow intake volume dampers. This effectively eliminates the common suction path for both units, maintains CREFU Train B operable, and allows CREFU Train A to remain available for recirculation only. The Control Room staff entered TS Limiting Condition for Operation 3/4.7.6.2a and maintained CREFU Train B running to meet the action requirements.

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- A design change package has been initiated, and is being implemented during the current RF08 outage, to install backdraft dampers in the emergency outside air intake paths. These dampers will ensure that, in the event of a failed open recirculation damper, the recirculation air flow will not enter the emergency outside air intake path and prevent the flow of outside air to the filter units. The installation of backdraft dampers in the emergency outside air intake ducts will not change the design bases of the HVC system.
- Waterford 3 evaluated other ventilation systems to determine if similar conditions existed. Two systems were identified:
  1. In the switchgear ventilation system, one exhaust duct leading from each battery room splits into two separate ducts immediately preceding the two redundant exhaust fans [FAN]. Each fan has a manually operated and normally open inlet damper [DMP]. If the exhaust damper for the secured fan sticks open, the operating fan could draw air through the secured fan rather than from the battery room, thus affecting the removal of hydrogen gas. Operations has implemented actions to inspect an exhaust fan and its associated discharge damper each time the fan is secured. With these actions in place, Waterford 3 is not susceptible to a single failure preventing adequate battery room exhaust flow. A special test is being developed to determine if design flow can be achieved with one discharge damper failed open.
  2. Two 100% room exhaust fans (E-21) are provided to ventilate the room in which the Fuel Handling Building (FHB), [ND] Emergency Ventilation units are located. Each fan discharges through its own gravity damper to a common discharge duct. If the gravity discharge damper for the secured fan sticks open, the operating fan could draw air through the secured fan rather than from the room. A Control Room annunciator, FUEL HANDLING BLDG HVAC EQUIPMENT ROOM TEMP HI, alarms when room temperature reaches 110° Fahrenheit. This annunciator will allow the operating crew to

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manually start the standby E-21 fan and re-establish normal air flow. Therefore, the single failure of an E-21 fan exhaust damper will not affect the operability of the FHB ventilation system. As with the battery room exhaust fans, a special test is being developed to determine if design flow can be achieved with one discharge damper failed open.

## SAFETY SIGNIFICANCE

Following the receipt of a Safety Injection Actuation Signal or the detection of a high radiation at the outside air intake, the CREFU system is designed to attain a positive pressure of 1/8 inwg with less than or equal to 200 cfm of outside air following a design basis event.

This condition involved no actual safety significance. Since the CREFUs were not called upon in an accident condition with the recirculation dampers failed open, there was never a loss of the ability of the system to perform its safety function.

With both CREFU trains rendered inoperable due to the recirculation dampers being open, it is likely that the ability to maintain the Control Room positively pressurized would be lost. In the event of a High Radiation/SIAS signal, actuation of the CREFU system will close the normal outside air intakes, and align the system for recirculation of Control Room air through the redundant CREFU trains. The operator manually initiates outside air intake which is filtered and added to the air being recirculated from the Control Room. Pressurization of the Control Room prevents infiltration of unfiltered air from the surrounding areas of the building.

Operations' off-normal procedure OP-901-401, "High Airborne Activity in Control Room," directs the Control Room staff to obtain approximately 200 cfm outside air intake flow by adjusting the CREFU recirculation damper (HVC-213A(B)) controller while observing emergency intake air flow indication. Waterford 3 is confident that by following directions given in the off-normal procedure, the Control Room staff would be alerted to the failure and appropriate compensatory actions could be taken. This would

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allow the Control Room to be pressurized from the desired outside air intake path in accordance with the off-normal procedure. This event did not compromise the health and safety of the public.

## SIMILAR EVENTS

None

## ADDITIONAL INFORMATION

Energy Industry Identification System (EIIIS) codes are identified in the text within brackets [ ].

