Commonwealth Edison Company
Dresden Generating Station
6500 North Dresden Road
Morris, IL 60450
Tel 815-942-2920

ComEd

January 30, 1995

TPJLTR 95-0013

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Licensee Event Report 95-001, Docket 50-237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10CFR50.73(a)(2)(v).

Sincerely,

Thomas P. Joyce
Site Vice President

TPJ/SR:pt

Enclosure

cc: J. Martin, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical

070000

TPJ95\0013.95

IE22
1/1

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 2/3	05000237	1 OF 5

TITLE (4) Inoperable Control Room HVAC Booster Fans, due to improperly sized thermal overload heater devices.

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
01	07	95	95	-- 001 --	0	01	30	95	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N (N)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
POWER LEVEL (10)	98% (97%)	20.2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(iii)	73.71(b)		
		20.2203(a)(1)	20.2203(a)(3)(ii)	50.73(a)(2)(iv)	73.71(c)		
		20.2203(a)(2)(i)	20.2203(a)(4)	X 50.73(a)(2)(v)	OTHER		
		20.2203(a)(2)(ii)	50.36(c)(1)	50.73(a)(2)(vii)	(Specify in Abstract below and in Text, NRC Form 366A)		
		20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(viii)(A)			
		20.2203(a)(2)(iv)	50.73(a)(2)(i)	50.73(a)(2)(viii)(B)			
		20.2203(a)(2)(v)	50.73(a)(2)(ii)	50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Sang J. Rhee, Systems Engineer Ext. 2371	(815) 942-2920

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
N/A										

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

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

On January 3, 1995, at 2300 hours, with Unit 2 at 98% rated core thermal power and Unit 3 at 97% rated core thermal power, during a Dresden Operating Surveillance (DOS) 5750-01 on the Control Room heating, ventilation, and air conditioning (HVAC) system, the booster fan A tripped. The surveillance was continued by operating the booster fan B. The booster fan B operated successfully. An engineering evaluation was performed to determine the cause of the booster fan A trip. That evaluation, delivered to Station Operations on January 7, 1995, stated that the thermal overload (TOL) devices for the booster fans of both A and B of the Control Room HVAC system were set at a level that would not prevent spurious trips during normal plant conditions (including degraded voltage conditions). Both booster fans of Control Room HVAC were declared inoperable, effective the date of the trip of the booster fan A. The booster fan A TOL device was replaced at 2128 hours on January 7, 1995, and the Control Room HVAC System was declared operable at that time. The booster fan B TOL device was replaced at 2233 hours on January 10, 1995. The safety significance of this event is considered minimal because a means was readily available for the operator to manually restart the booster fans within a reasonable time period, and because only one of the fans would be needed at a time to support the operation of the Control Room HVAC System.

EVENT IDENTIFICATION:

Inoperable Control Room HVAC Booster Fans, due to improperly sized thermal overload heater devices.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2/3 Event Date: January 7, 1995 Event Time: 0930 hours

Reactor Mode: N (N) Mode Name: Run (Run) Power Level: 97% (91%)

Reactor Coolant System Pressure: 999 psig (996 psig)

B. DESCRIPTION OF EVENT:

On January 3, 1995, at 2300 hours, with Unit 2 at 98% rated core thermal power and Unit 3 at 97% rated core thermal power, during a Dresden Operating Surveillance (DOS) 5750-01 on the Control Room heating, ventilation, and air conditioning (HVAC) system, the booster fan A tripped. The surveillance was continued by operating the booster fan B. The booster fan B operated successfully. An engineering evaluation was performed to determine the cause of the booster fan A trip. That evaluation, delivered to Station Operations on January 7, 1995, stated that the thermal overload (TOL) devices for the booster fans of both A and B of the Control Room HVAC system were set at a level that would not prevent spurious trips during normal plant conditions (including during degraded voltage conditions). Both booster fans of Control Room HVAC were declared inoperable, effective the date of the trip of the booster fan A.

The booster fan A TOL device was replaced at 2128 hours on January 7, 1995, and the Control Room HVAC System was declared operable at that time. The booster fan B TOL device was replaced at 2233 hours on January 10, 1995. The safety significance of this event is considered minimal because a means was readily available for the operator to manually restart the booster fans within a reasonable time period, and because only one of the fans would be needed at a time to support the operation of the Control Room HVAC System.

C. CAUSE OF EVENT:

This event is being submitted in accordance with 10CFR50.73(a)(2)(v) which requires the reporting of any event or condition that could have prevented the fulfillment of the safety functions of systems that are needed to mitigate the consequences of an accident. The immediate cause of the fan trip was determined to be that the thermal overload (TOL) heater devices for the booster fans of both A and B of Control Room HVAC were incorrectly selected and sized.

The root cause of the fan trip was determined to be inadequately sized thermal overload heater to account for all conceivable operating conditions. Examples of individual components for which the component's design margin may have been a contributed factor includes the following:

- The TOL devices selected were the smallest (of all available sizes) that would marginally serve the application. Selection of the next larger TOL would have provided more margin.

- The TOL devices were set near to the middle of their adjustable ranges. A maximum setting (i.e. of 115%) would have provided more margin.

- The TOL devices have some variability and tolerances in their tripping characteristics. An internal ComEd technical procedure (that was written well after this modification was installed) now requires the designer to account for these tolerances in selecting and sizing a TOL. This too, would have provided more margin.

- The fan motor is rated for 480 VAC. It is a more common practice to select a motor with a rating based on 460 VAC. One result of the higher voltage rating is that the motor will draw more current. If the motor had been specified for 460 VAC, it would have provided more margin.

- At the time of the modification that installed the B Train of Control Room HVAC, ComEd's modification design process did not include consideration of the "degraded grid voltage" issue. If the possibility of a degraded voltage level had been considered when the booster fans were selected and sized, it would have provided more margin.

- The fan motor was selected with a "service factor" of "1.0." This factor affects the amount to which a motor can be overloaded, without it draw excessive current and without resulting in the motor overheating. Selection of a fan motor with a service factor of "1.15" would have provided more margin.

- There are some indications (though not yet conclusive) that the booster fans were selected on the basis of the flow and pressure characteristics of dry air at standard temperature and pressure (STP), a common design basis for commercial HVAC systems. The January 3, 1995 surveillance was conducted with cold, wet, dense, outside air of a winter environment. The denser air caused the booster fan to work harder and to draw higher current. A fan sized for a lower outside air temperature would have provided more margin.

NOTE: It should be emphasized that the "potential contributing factors" described above do not point to a "design error" per Site Engineering Department. For example, selecting a larger motor, or a motor with a higher service factor, raises a concern about possible overloading of the supply bus, excessive voltage drops, and excessive fault currents. The design must remain balanced between conflicting constraints. Rather, the factors described above indicate that there were "missed opportunities" for building in design margins that could have improved the system's performance. Furthermore, it is likely that adding a small factor to one or more of the component's design margins might have prevented the event described in this LER.

D. SAFETY ANALYSIS:

The safety function of the Control Room HVAC System is to maintain the habitability of the Control Room, such that the plant can be safely shutdown under all design basis conditions. The function of the Booster Fans is to provide filtered air to the Control Room. If both Booster Fans were to fail during a design basis event, it would have two undesirable results. First, the Control Room HVAC System would not be able to maintain a positive pressure relative to the adjacent area in the Control Room. A positive pressure is designed to ensure that any airborne contamination (that might result from the event) does not enter the Control Room. Secondly, the Control Room HVAC System would not be able to filter contaminated outside air through a charcoal filter, a process that would remove any airborne contamination that may have entered the Control Room. Upon the Station's notification by engineering that the TOL devices for both A and B trains were incorrectly set, the Control Room HVAC System was administratively declared inoperable.

The Control Room HVAC System is manually operated, and has no automatic start feature. It is required to be manually started within 40 minutes of the onset of the event. In the surveillance of January 3, 1995, the booster fan A operated for over four hours, out of a surveillance requirement of five hours, before tripping. The booster fan B ran successfully throughout its five hour surveillance period. Although the system is fundamentally a single train, with many of its components lacking a redundant or diverse backup component, the two booster fans are redundant to each other: either fan alone could support the safety function of the Control Room HVAC System. If one or the other booster fan tripped (i.e. due to the improper setting of its TOL device), the TOL device could be manually reset within a matter of minutes. By that time, they would have cooled, thus allowing the system to be manually restarted. The worst resulting circumstance would have been that the operators may have had to alternate operation of the booster fan A with the booster fan B, switching the fans every few hours, and if necessary, occasionally resetting the TOL device. This is considered to have a minimal impact on the ability to safely shutdown the plant. Therefore, the safety significance of this event is considered to be minimal.

E. CORRECTIVE ACTIONS:

Nuclear Tracking System (NTS) tracking code numbers are identified in the text as (XXX-XXX-XX-XXXXX).

Immediate corrective action was to initiate Work Requests D29206 (Train A) and D29207 (Train B) to replace the TOL devices. The new TOL model numbers and settings were provided by Plant Support Engineering. The TOL devices for both Booster Fans were replaced, set properly, and tested. The Control Room HVAC System was declared operable at 2128 hours on January 7, 1995.

In view of this event, a second review was conducted of an internal ComEd "Control Room Habitability Assessment" that had been performed in 1993. That assessment had concluded that the system, as installed, was consistent with its design basis and its licensing basis. It provided eighteen recommendations that could enhance the performance of the system. Of these eighteen recommendations, 13 have been performed. However, the second review of the assessment concluded that none of the recommendations had any relationship to any component's design margin, as described above. Therefore, none of the eighteen would have affected the root cause of this event.

In view of the root cause determined for this event, Dresden Station has performed a complete review of the modification that installed the B Train of Control Room HVAC (modification M12-2/3-82-1). That review uncovered no reason to call into question the operability of the Control Room HVAC System. However, it is clear that a number of potential alternative actions are available, actions that could enhance the performance of the system. Dresden Station will take each of the alternatives into consideration, in accordance with Station procedures for identifying problems, for revising operating procedures, and for installing design modifications. (NTS# 237-180-95-00101).

F. PREVIOUS OCCURRENCES:

LER/Docket Numbers	Title
92-032/050237	Inadequate 4KV Degraded Voltage Setting Resulting in Control Room Air Filtration Unit Booster Fans Inoperable due to Inaccurate Calculational Assumption. The Nuclear Engineering Department notified Dresden Station that a calculation of the "Second Level Undervoltage Setpoint" revealed an inadequate voltage supply to the A and B Train Booster Fans. Replacement of control power transformers resolved the situation, and the system was declared operable.
94-007/050237	Potentially Unanalyzed Control Room Habitability Condition due to Purge Mode. A Systems Engineer noted that the Control Room HVAC System was operating in the "outside purge" mode. This mode provided for a supply of outside make-up air at a rate in excess of the analyzed value of 2000 scfm. Administrative controls were put in place to assure the system remains in the normal mode of operation.

G. COMPONENT FAILURE DATA:

Manufacturer	Nomenclature	Model Number	Mfg. Part Number
N/A	N/A	N/A	N/A

This event is not the result of a failed component, but rather an improper setpoint. The TOL device did its job, by tripping the motor on what it observed to be a slightly excessive current for a prolonged time.