

TENNESSEE VALLEY AUTHORITY

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CHATTANOOGA, TENNESSEE 37401  
400 Chestnut Street Tower II

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October 3, 1984 / : 06

WBRD-50-390/84-35  
WBRD-50-391/84-31

U.S. Nuclear Regulatory Commission  
Region II  
Attn: Mr. James P. O'Reilly, Regional Administrator  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

Dear Mr. O'Reilly:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - DEFICIENCY IN THERMAL OVERLOAD RELAY  
HEATER ELEMENTS FOR FAN MOTORS - WBRD-50-390/84-35, WBRD-50-391/84-31 - FINAL  
REPORT

The subject deficiency was initially reported to NRC-OIE Inspector  
P. E. Fredrickson on June 22, 1984 in accordance with 10 CFR 50.55(e) as  
NCR WBN NEB 8408. Our first interim report was submitted on July 20, 1984.  
Enclosed is our final report.

If you have any questions, please get in touch with R. H. Shell at  
FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



L. M. Mills, Manager  
Nuclear Licensing

Enclosure

cc: Mr. Richard C. DeYoung, Director (Enclosure)  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Records Center (Enclosure)  
Institute of Nuclear Power Operations  
1100 Circle 75 Parkway, Suite 1500  
Atlanta, Georgia 30339

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## ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
DEFICIENCY IN THERMAL OVERLOAD RELAY HEATER ELEMENTS FOR FAN MOTORS  
NCR WBN NEB 8408  
WBRD-50-390/84-35, WBRD-50-391/84-31  
10 CFR 50.55(e)  
FINAL REPORT

### Description of Deficiency

During preoperational test W-3.1F, (integrated safety injection (SI) and station blackout), three emergency safety feature (ESF) cooler fans failed to start. These motors were then checked and, while they were found to be drawing just under their rated currents, the in-line thermal overload relays were found to have tripped. Further investigation determined that this type situation also occurred during preoperational test TVA-9C with the Auxiliary Building 480V board room pressurizer supply fans. (The board room supply fan problem was identified in preoperational test deficiency, PT-462, and the thermal overloads were replaced with ones rated at the next highest current rating.)

Because this problem has occurred more than once, it is possible that there may be other fans not identified in preoperational tests which could have thermal overload heater elements sized too low to allow the fans to operate under full load conditions. Because of this, TVA has issued this nonconformance (NCR) to identify the potential for a plant-wide problem.

The assignable cause of this deficiency is indeterminate. However, based upon available information, TVA believes that the probable cause is that during preop test W-3.1F, the heating, ventilating, and air-conditioning (HVAC) motors were operating at full load conditions. At the blackout signal (SI initiated), the HVAC motors were sequenced off, then sequenced back on. During normal operation, the thermal overload heaters are producing some heat, but not of sufficient amount to actuate the internal bi-metallic elements. When the motor was restarted, the higher inrush current produced sufficient heat which, in conjunction with the heater not having sufficient time to return to ambient temperature, resulted in the bi-metallic element receiving enough heat to trip the motor.

### Safety Implications

Failure of safety-related HVAC motors to operate because of improperly sized thermal overload heater elements could allow safety-related equipment to overheat. This overheating, in turn, could cause subsequent equipment performance degradation or failure which could adversely affect safe operations of the plant.

### Corrective Action

The heater elements for the three identified fan motors have been replaced with the next larger size under field change request (FCR) A-862. TVA has completed a design study, Division of Engineering Design (EN DES) Calculation DS0784E2, which identified and evaluated overload heater sizing in HVAC circuits. Based

on the data obtained from the design study and TVA Design Guide DG E2.3.5, it was determined that if the heater size was increased one size above vendor recommendations adequate overload protection would still exist and adequate assurance would be given that the affected safety-related loads would operate during design basis accident conditions. Engineering change notice (ECN) 5025 was issued to implement these increased heater values. The scope of ECN 5025 identified 34 safety-related HVAC fan motors for which the thermal overload relay heater elements are to be replaced.

TVA believes that this corrective action will prevent recurrence of this deficiency, and no further actions to prevent recurrence are required.

All design work, construction, and drawing revisions required per ECN 5025 have been completed.