

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

May 2, 1984

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WBRD-50-390/84-16
WBRD-50-391/84-16

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

WATTS BAR NUCLEAR PLANTS UNITS 1 AND 2 - UNDERSIZED 125V DC ASCO EMERGENCY
LIGHTING CONTACTORS - WBRD-50-390/84-16, WBRD-50-391/84-16 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Bob Carroll on April 3, 1984 in accordance with 10 CFR 50.55(e) as
NCR WBN EEB 8409. 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

DS Kammer

for 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

ENCLOSURE

WATTS BAR NUCLEAR PLANTS UNITS 1 AND 2
UNDERSIZED 125V DC ASCO EMERGENCY LIGHTING CONTACTORS
NCR WBN EEB 8409
WBRD-50-390/84-16 AND WBRD-50-391/84-16
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

During a review of preop test data, TVA determined that the contactor in lighting cabinet LD-1 (rated for 100 amps) was receiving current slightly higher than 100 amps. This contactor is one of four associated with the 125V-dc emergency lighting system. It is used to automatically transfer the power source for the main control room (MCR) emergency lighting from ac to 125V dc upon loss of ac power to the contactor. Upon restoration of ac power, the contactor opens and removes dc power from the lighting cabinet. A second contactor in cabinet LD-2 also services the emergency lights in the MCR and current measured through it during the preop test was slightly less than the contactor's rating of 100 amps. Both these contactors were tested at the emergency battery voltage of 125V dc during the preops, but normal testing of the contactors is done at battery charger voltages (approximately 133V dc to 140V dc) which would cause higher current flow.

After the high currents were noted for the contactor in LD-1, the contact surfaces were visually inspected and found to be heavily pitted. It should be noted that this pitting has not caused the contactors to fail. TVA believes this pitting was caused by a combination of high currents and the large amount of cycling the contactor has seen during construction of the plant. The high current load was caused by TVA's failure to have a design control in effect to limit the addition of loads to the emergency lighting system contactors.

Safety Implications

Excessive current through the MCR 125V-dc emergency lighting contactors or excessive pitting of their contact surfaces could cause the contactors to fail. This failure could be in either the contact-open or contact-closed mode. The contact-open mode would mean partial or total loss to the MCR of dc emergency lighting. If either or both of the contactors failed in the closed mode, then upon return of ac power, the MCR emergency lighting would continue to load the vital batteries and could interfere with the battery charger's ability to power normal dc loads and keep the batteries charged to required voltage. TVA considers both these situations unnecessary challenges to plant safety systems.

Corrective Action

TVA is relocating two of four circuits supplying power to the MCR lighting from cabinets LD-1 and LD-2 to cabinets LD-3 and LD-4 (which had lesser loads) per ECN 4766. This transfer will reduce the load on LD-1 and LD-2 and will keep current levels on all four contactors to less than the rated 100 amps. Also, TVA will inspect the LD-1 and LD-2 contactors for damage due to overcurrent conditions and all four contactors for excessive contact pitting and will perform any repairs or contact replacement as needed. This activity will be completed by June 14, 1984.

To prevent a recurrence of overloading, TVA has added a note to all four LD circuit schedule design drawings prohibiting future additions of loads to the 125V-dc emergency lighting system unless approved by the Division of Engineering Design (EN DES) Electrical Engineering Support Branch's Control Power Systems Section.

Concerning excessive pitting, TVA believes that the reduced cycling of these contactors, which will occur as construction is finalized, combined with the corrected loading is sufficient to prevent any significant pitting problem from recurring.