

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

June 28, 1983

WBRD-50-390/81-73

WBRD-50-391/81-69

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 PLANT UNITS 1 AND 2 - DIESEL GENERATOR ROOM EXHAUST FAN
MODIFICATION - WBRD-50-390/81-73, WBRD-50-391/81-69 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
R. V. Crlenjak on August 31, 1981 in accordance with 10 CFR 50.55(e)
as NCR W-51-P. Interim reports were submitted on September 30 and
December 2, 1981 and February 17, March 16, July 12, and November 29, 1982.
Our seventh interim report was submitted on February 23, 1983. 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

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
DIESEL GENERATOR ROOM EXHAUST FAN MODIFICATION
WBRD-50-390/81-73, WBRD-50-391/81-69
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

All eight fans in the diesel generator room exhaust system exhibited higher than specified vibration amplitudes at the initial startup. A test program was initiated to monitor the fans' performance and to determine the cause of the vibrations. An analysis of the test data indicated a lack of structural rigidity in all eight fans. In addition, an increase in the amplitude of the vibration of fan 2B1-B indicated additional problems unique to this one fan.

However, further tests were done and resulted in the conclusion that the fans were operating at a rotational speed approximately equal to the natural resonant frequency of the fan structure, thus amplifying the normally acceptable level of vibration to unacceptable levels. This condition came about because TVA specifications did not make an allowance for the resonant frequency of the fan when specifying the operational speed. Also, the subject fans were modified versions of a fan designed to operate at a lower speed which is out of range of the resonant natural frequency of the fan structure.

Safety Implications

A failure of the diesel generator room exhaust system could lead to overheating of the diesel generator system and loss of function. This could compromise the ability of the emergency electrical backup system to function properly during an accident in the event of a loss of off-site power.

Corrective Action

TVA has originally decided to install seismically qualified braces to the existing structures to decrease the vibration. However, after the additional tests were performed, TVA decided to increase the rotational speed of the subject fans by changing the pitch of the adjustable motor sheave in order to balance the fans to acceptable vibrational levels. The fans are now operating well above the natural resonant frequency of the fan structure and vibration has decreased to proper and acceptable levels. To prevent recurrence, TVA has issued specification MEB-SS23.1 section 7.3.1 that requires fans to be selected such that the first critical rotational speed exceeds the maximum specified operating revolutions per minute by a minimum of 25 percent. All action for this nonconformance is now complete.