

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

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June 28, 1984

WBRD-50-390/84-30  
WBRD-50-391/84-27

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 - ANTI-REVERSING RATCHET PINS DO NOT  
DISENGAGE ON ESSENTIAL RAW COOLING WATER PUMPS WBRD-50-390/84-30,  
WBRD-50-391/84-27 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector  
P. E. Fredrickson on May 30, 1984 in accordance with 10 CFR 50.55(e) as  
NCR W-174-P. Enclosed is our final report. We consider 10 CFR Part 21  
applicable to this deficiency.

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  
ANTI-REVERSING RATCHET PINS DO NOT DISENGAGE  
ON ESSENTIAL RAW COOLING WATER PUMPS  
WBRD-50-390/84-30 AND WBRD-50-391/84-27  
NCR W-174-P  
10 CFR 50.55(e)  
FINAL REPORT

Description of Deficiency

The essential raw cooling water (ERCW) pumps' anti-reversing mechanism was the subject of a previous nonconformance report (NCR), W-136-P (WBRD-50-390,391/83-54,51), which documented the failure of ratchet pins when the pump shaft attempted to turn backwards. The disposition of this NCR was to install larger ratchet pins and a harder ratchet plate.

W-174-P documents the failure of the anti-reversing mechanism to disengage at 97 rev/min as intended. At 97 rev/min, the ratchet pins should lift and no longer strike the ratchet plate ramp. However, due to the heavier pins installed to resolve NCR W-136-P and, according to Siemens-Allis (S-A), the pump manufacturer, the introduction of an oil mist from an adjacent bearing, the ratchet pins do not lift at 97 rev/min. Consequently, the pins bounce on the ratchet plate causing excessive pin and plate wear.

S-A has acknowledged that an inadequate failure modes and effects analysis (FMEA) resulted in the condition documented on this NCR.

Safety Implications

Should the anti-reverse mechanism fail, the ERCW pump shaft could become uncoupled, thus rendering the affected ERCW pump inoperable. Since the ERCW pumps are a primary safety-related component, the cited condition could be adverse to the safe operation of the plant.

Corrective Action

TVA has coordinated an investigation with S-A concerning the damage associated with the anti-reverse mechanism. S-A has recommended changes to the anti-reverse mechanism which include the installation of an oil baffle and seal to prevent oil migration up around the pins. This will eliminate the problem of the pins dropping down onto the ratchet plate after operating speed is reached and thus stop the excessive pin and plate wear. Inclusion of the baffle and seal should prevent future failures.

TVA has scheduled the rework of two pumps each on both trains A and B to support the operation of WBN unit 1. In order to assure that at least two pumps are operable in the event of a loss of offsite power, TVA has specified that pumps A or B, and C or D be reworked for train A.

For train B, pumps E or F, and G or H will be reworked. Rework of the pumps required to support unit 1 operation will be completed by July 6, 1984. Rework of the remaining four pumps will be completed by January 10, 1985.

S-A has initiated a department operating change to prevent future design problems. This change consists of an internal memorandum to all design engineers cautioning them of the need for complete and comprehensive FMEA. The FMEA of these motors was not adequately performed to prevent the recognition of various problems which could occur.