

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

83 DEC 14 ~~December~~ 13, 1983

WBRD-50-390/83-67
WBRD-50-391/83-62

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:

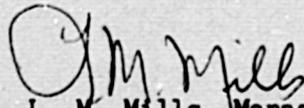
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - HYDROGEN COLLECTION DUCT NOT QUALIFIED
AS NOZZLE ATTACHMENT POINT WBRD-50-390/83-67, WBRD-50-391/83-62 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Linda Watson on November 10, 1983 in accordance with 10 CFR 50.55(e) as NCR
WBN WBP 8334. 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
HYDROGEN COLLECTION DUCT NOT QUALIFIED AS NOZZLE ATTACHMENT POINT
NCR WBN SWP 8334
WBRD-50-390/83-67, WBRD-50-391/83-62
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Four 8-inch diameter hydrogen collection ducts are connected to a common suctionside duct to each of the air return fans A and B in the reactor building lower compartment. This duct has been field-fabricated from 1/4-inch thick steel plate with maximum and minimum internal diameters of 54 inches and 42-1/4 inches respectively. This duct serves as a nozzle attachment point to terminate the 8-inch hydrogen collection ducts on the suctionside of the fans. No calculations exist for this duct to ensure its ability to act as a nozzle attachment point. This is in violation of TVA Division of Engineering Design Procedure (EN DES-EP) 3.03, "Design Calculations."

The design engineer responsible for designing supports for the suctionside duct overlooked the thermal effects on the hydrogen collection ducts and the resultant stresses imposed on the suctionside duct. This is a unique case since HVAC ductwork is generally not subjected to temperatures high enough to cause significant thermal loading. Therefore, all ducts outside containment are analyzed for seismic forces only. Ventilation ducts inside the containment are analyzed for seismic forces only since they are not required to maintain their pressure boundary. The only exception where pressure boundary retention is required is the air return system ductwork and the hydrogen collection ducts connected to it.

Safety Implications

The hydrogen collection ducts attached rigidly to the suctionside duct of the air return fans, could cause the air return ductwork to fail due to thermal expansion of the hydrogen duct during a LOCA. A structural degradation of the containment air return fan suctionside ducting could result in both a diminished capacity of the hydrogen collection system and a reduction in the air flow rate from the upper compartment to the lower compartment. This reduction in air flow could result in an unacceptable degradation of the containment heat removal system (i.e., reduced air flow through the ice condenser system) such that the containment design pressure might be exceeded.

Corrective Action

The suctionside duct connected to each of the air return fans A and B has been analyzed to qualify it as a nozzle attachment point for the four 8-inch hydrogen collection ducts. Analysis results indicated that a box-type anchor only on one of the four hydrogen ducts at the air return fan suction is required. This anchor will be located in accordance with Construction Specification G-43 tolerances to

compensate for the excessive bending and axial load from the suctionside duct, as deemed necessary by the analysis results. This work is being accomplished under engineering change notice (ECN) 4425. All drawings will be issued by January 2, 1984, and construction work will be completed by February 26, 1984.

All designers involved in the design of HVAC systems and duct supports have been informed to consider thermal loading in their analyses. Since this is an isolated incident, no further action is required.