

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

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October 13, 1983

WBRD-50-390/83-17
WBRD-50-391/83-16

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 PLANT UNITS 1 AND 2 - LOOSE MATERIAL IN STEAM GENERATOR -
WBRD-50-390/83-17, WBRD-50-391/83-16 - FINAL REPORT FOR UNIT 1 AND THIRD
INTERIM REPORT FOR UNIT 2

The subject deficiency was initially reported to NRC-OIE Inspector L. Watson on March 25, 1983 in accordance with 10 CFR 50.55(e) as NCR 4715. Interim reports were submitted on April 25, and August 5, 1983. Enclosed is our final report for unit 1 and our third interim report for unit 2. We expect to submit our next report for unit 2 on or about July 6, 1984. We consider 10 CFR Part 21 applicable to this deficiency.

By NRC-OIE Region II Inspection Report 50-390/83-08, 50-391/83-07, TVA was cited with a severity level IV violation (violation No. 390/83-08-01) for the subject condition. TVA's response to this violation was submitted on May 13, 1983.

NRC-OIE Inspectors P. E. Fredrickson and Linda Watson were notified on September 30, and October 12, 1983 respectively, that this report was in the final review process and that additional information was being collected for incorporation into the report. An extension to October 14, 1983 for submittal of this report was established.

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U.S. Nuclear Regulatory Commission

October 13, 1983

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 (Enclosure):

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

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

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
LOOSE MATERIAL IN STEAM GENERATOR
NCR 4715
WBRD-50-390/83-17, WBRD-50-391/83-16
10 CFR 50.55(e)
FINAL REPORT FOR UNIT 1 AND
THIRD INTERIM REPORT FOR UNIT 2

Description of Deficiency

The Watts Bar Nuclear Plant (WBN) unit 1 steam generators were inspected for loose material based on information contained in the Institute of Nuclear Power Operations (INPO) Significant Operating Experience Report 82-12 dated November 23, 1982, which described steam generator tube ruptures at two non-TVA units. Loose material found on the secondary side of the steam generators was determined to be the cause of the ruptures. The INPO report also described the discovery of loose material in the secondary side of steam generators at four other non-TVA units.

During inspection of the WBN unit 1 steam generators before closure for filling operations, loose material of various sizes, shapes, and types were observed inside the steam generators. This inspection was performed with the aid of fiberoptics through the four 2-inch sludge lancing ports.

The root cause of this deficiency was apparently due to the lack of work controls imposed by Westinghouse (W) during the fabrication process and W /TVA while performing on-site modifications to adequately identify the loss of materials in the steam generators.

Safety Implications

The INPO SOER 82-12 report described steam tube ruptures which resulted in rapid primary system depressurization, reactor trip, safety initiation, and minor radiological releases. If these circumstances occurred at Watts Bar as a result of the loose material on the secondary side, they would present unnecessary challenges to the safety systems and, thereby, jeopardize the safe operations of the plant.

Corrective Action - Unit 1

All accessible areas in each of the Watts Bar Nuclear Plant unit 1 steam generators have been inspected for loose parts. Cleaning and retrieval of loose parts have been completed with very satisfactory results. All loose items and materials readily determined to be detrimental were removed from the unit 1 steam generators. An analysis of the items removed and representative samples of remaining material was performed by W to determine the potential detrimental effects of the remaining materials. The W analysis and subsequent TVA evaluation of the analysis concluded that the remaining materials would not produce any detrimental effects. Also, postcleaning inspections of the unit 1 steam generators were performed.

A detailed report of the inspections, inspection methods, and materials found in the generators has been prepared by TVA and is available for NRC review.

Site procedure WBN-QCT-4.36, "General Procedure for Preoperational Cleaning and Flushing of Fluid Handling Systems and Components," was issued February 15, 1981. This procedure includes provisions in subsection 6.2.1.3 to install strainers around any low velocity regions to prevent debris from being flushed into these regions, or if strainers cannot be installed, that such regions be inspected and manually cleaned after the flush.

All future entries by TVA's Division of Construction (CONST) personnel into the secondary side of both units 1 and 2 steam generators will be controlled using an engineer's system material log book to ensure that all materials and tools are accounted for. Controls have been formalized by memorandum from the unit supervisor to system engineers within the mechanical engineering unit responsible for steam generators, and to appropriate craft supervisors.

TVA's Division of Nuclear Power (NUC PR) WBN Procedure MI-68.9, "Steam Generator Secondary Side Inspection," has been revised to include an inspection for loose parts before closure and revised to establish controls for work being performed on the steam generator secondary side. These controls require that a material and equipment accountability log be maintained to inventory all parts, tools, and equipment brought into the area.

A monitor will be placed in or near the area during periods when maintenance is being performed, consistent with ALARA considerations, for continuous monitoring of activities which may result in a foreign object being introduced into the steam generator secondary side. Also, after maintenance outages a loose parts inspection will be performed on areas necessary to detect any foreign objects located in the steam generator secondary side as a result of the maintenance involved.

Interim Progress - Unit 2

Unit 2 steam generators, which are currently in dry storage and have not yet been chemically cleaned or flushed, will be flushed per OCT 4.36 and inspected for foreign material before closure of the secondary side. The same nonconforming condition is expected to exist for the unit 2 steam generators.

Additional information will be provided in our next submittal on unit 2.