TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

October 17, 1983

83 OCT 19 A9:13

WBRD-50-390/83-05
WBRD-50-391/83-05

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 - INCORRECT USE OF CATEGORY I(L) SUPPORTS ON PIPES NEAR WATER CHILLERS - WBRD-50-390/83-05, WBRD-50-391/83-05 - FINAL REPORT FOR UNIT 1 AND FOURTH INTERIM REPORT FOR UNIT 2

The subject deficiency was initially reported to NRC-OIE Inspector A. K. Hardin on January 17, 1983 in accordance with 10 CFR 50.55(e) as NCR WBN SWP 8265. Interim reports were submitted on February 16 and May 9, 1983. Enclosed is our final report for unit 1 and fourth interim report for unit 2. We expect to submit our next report for unit 2 on or about July 1, 1984.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

D S 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

OFFICIAL COPY

IE 27

1/1

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
INCORRECT USE OF CATEGORY I(L) SUPPORTS ON PIPES
NEAR WATER CHILLERS
NCR WBN SWP 8265
WBRD-50-390/83-05, WBRD-50-391/83-05
10 CFR 50.55(e)
FINAL REPORT FOR UNIT 1 AND FOURTH INTERIM REPORT FOR UNIT 2

Description of Deficiency

Piping for the primary water makeup, high pressure fire protection, and demineralized water systems, shown on TVA drawing 47W491-6, in the vicinity of main control room water chillers A-A and B-B and shutdown board room water chillers A-A and B-B have been supported by Category I(L) supports for position retention. The piping in the vicinity of this equipment should have been supported by Category I(L) supports for pressure boundary integrity and position retention. These water chillers are safety-related equipment. TVA Electrical Design Standard DS-E1.3.1, "Protection of Electrical Equipment that is Susceptible to Failure from Fluid Spray and Condensation," requires that water lines not be routed over safety-related electrical equipment or that measures be taken to prevent damages to safety-related electrical equipment where water lines are routed above.

TVA has determined that the cause of this deficiency involves three areas:

1. Lack of Guidance - No procedures or guidelines were established to aid the piping system designer in properly identifying the noncritical piping systems'(piping which must be supported for pressure boundary integrity) to protect safety-related electrical equipment from water spray in the event of an earthquake.

2. Incorrect or Out-of-Date Drawings - The fire suppression study drawings (SK1200 series), and the 47W491 and 47W492 series physical piping drawings did not identify the noncritical piping around the chillers as requiring seismic supports or the equipment as requiring shielding from water spray. Also, the fire suppression study drawings were not updated for several years to reflect additional class 1E equipment.

3. Lack of Knowledge of Existing Design Criteria - Design project personnel were unfamiliar with the following design criteria: WB-DC-40-31.3, "Assignment of Responsibility for Analyses, Support, and Fabrication of Piping Systems," and WB-C-40-31.7, "Design Criteria for Analysis of Category I and I(L) Piping Systems." Supplemental procedures do not exist for implementing the requirements of these criteria.

Safety Implications

During a seismic event, category I(L) supports, which are not qualified as pressure boundary supports, could break or rupture and the resulting water spray could damage safety-related equipment near the pipes and, thereby, jeopardize safety operation of the plant.

Corrective Action for Unit 1 and Areas Common to Units 1 and 2

TVA has designed spray shields, per engineering change notice (ECN) 3837, to be installed above and around the main control room water chillers A-A and B-B, the shutdown board room water chillers A-A and B-B, and all of the chilled water circulating pumps associated with these chillers. The spray shields are designed to provide protection against possible water spray from any piping in the vicinity of the chillers and circulating pumps which is supported for position retention only.

TVA also organized a task force comprised of a field evaluation team and representatives of various Division of Engineering Design (EN DES) support branches and Watts Bar Design Project design groups. This task force has completed a walk-through inspection and the results of which are available in TVA Pipe Rupture Evaluation Final Report. This document contains a listing of all IEEE class 1E electrical equipment which is located in areas where piping has been supported for position retention only. All affected class 1E equipment which has been identified by the task force will be sealed or shielded against water spray from broken, nonsafety-related piping. For equipment which cannot be shielded or sealed, the nonsafety-related piping has been analyzed and qualified supports will be designed and installed to ensure the pressure boundary integrity of the piping.

To prevent recurrence of this deficiency, additional sheets to the TVA 47W200 series equipment drawings will be issued, beginning with sheet No. 100, to identify all areas of the category I structures containing nonsafety-related piping which is not supported for pressure boundary integrity. All class 1E equipment and components located in these areas will be indicated on the drawings, and drawing notes will be added to indicate what action is required to protect the equipment and components against water spray.

Also, special engineering procedures (SEPs) will be issued to (1) provide guidance to design personnel for the proper use of the equipment drawings, (2) provide a method of continuously updating the equipment drawings, (3) list all of the design criteria associated with identifying which nonsafety-related systems are required to be analyzed and supported for pressure boundary retention, and (4) identify which design organizations are responsible for performing the piping analysis and support design. Upon issue, these SEPs will be included under the engineering procedures training and utilization program which was initiated by TVA's Manager of EN DES in a memorandum dated February 26, 1982. This training program along with the corrective actions outlined above should prevent recurrence of this deficiency.

All remaining unit 1 design work, including piping supports, equipment sealing and shielding, and all drawings to be issued or revised, will be completed by November 30, 1983, per ECN 4282. The SEPs will be issued by December 30, 1983. All necessary construction work will be completed by February 1, 1984.

Interim Progress for Unit 2

All of the above mentioned corrective actions will apply, as necessary, to the protection of all class 1E electrical equipment and components for unit 2. However, the review and identification of unit 2 equipment which is located in areas with nonsafety-related piping, which has been supported for position retention only, is not complete. A separate ECN will be issued to accomplish any additional unit 2 design work which may be required after completion of the equipment review.

This condition is being investigated for Bellefonte Nuclear Plant and an NCR will be issued if a deficiency is identified. This item will be forwarded to EN DES's Deferred Nuclear Plant Project for reference on any future TVA nuclear plants.