TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

April 30, 1986

WBRD-50-390/86-45
WBRD-50-391/86-43

U.S. Nuclear Regulatory Commission
Region II
Attention: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - DEFICIENCIES IN SAMPLING AND CONTROL OF CONCRETE - WBRD-50-390/86-45, WBRD-50-391/86-43 - INTERIM REPORT

The subject deficiency was initially reported to NRC-Region II Inspector Steve Weise on April 2, 1986 in accordance with 10 CFR 50.55(e) as NCRs WBN 6719, 6720, and 6721. Enclosed is our interim report. We expect to submit our next report on or about August 18, 1986.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. L. Gridley, Director
Nuclear Safety and Licensing

Enclosure
cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
DEFICIENCIES IN SAMPLING AND CONTROL OF CONCRETE
WBRD-50-390/86-45, WBRD-50-391/86-43
NCRs 6719, 6720, AND 6721
10 CFR 50.55(e)
INTERIM REPORT

Description of Deficiency

In evaluating Quality Technology Company's investigation of employee concern IN-85-995-002, TVA determined that conditions adverse to quality (CAQs) existed in three areas: compliance with specification requirements for concrete compressive strength, use and testing of bedding mortar in structural concrete placements, and the sampling frequency for concrete. To document these CAQs, TVA wrote nonconformance reports (NCRs) 6719, 6720 and 6721, which are summarized as follows:

NRC 6719 - Concrete Compressive Strength

TVA General Construction Specification No. G-2 for plain and reinforced concrete specifies that compressive strength of the concrete be monitored and controlled. The average strength of the concrete is to be maintained such that no more than 10 percent of the compressive strength test results are less than the specified compressive strength (20 percent of concrete with specified strengths less than 3000 lb/in^2). During some periods of time, the percentage of tests with results less than the specified compressive strength exceeded the allowable.

NCR 6720 - Sampling and Control of Bedding Mortar in Concrete Placements

Bedding mortar was used in concrete placements for congested areas joint preparation. While the use of bedding mortar was permitted by ACI 318-71, no procedures were in place to sample and control the use of bedding mortar. Therefore, during initial construction (December 1973 to July 1975), sufficient strength tests were not performed on the bedding mortar and, when performed after 1975, low strength test results were encountered.

NCR 6721 - Sampling Frequency for Concrete

TVA General Construction Specification No. G-2 for plain and reinforced concrete specifies the frequency for in-process testing of concrete during production. On some occasions, the frequency of sampling was less than specified.

The deficiencies related to implementation of General Construction Specification No. G-2 are not generic to other TVA nuclear plants. The deficiency related to the use of bedding mortar could exist at other TVA plants since G-2 did not address the use of bedding mortar.

Safety Implications

Because concrete and grout have not been tested as required or did not meet established compressive strength requirements, there is a potential that structural members may not be acceptable. While no concrete or grout failures have been identified, it is assumed that failure of safety-related structural members could occur and safe operation of the plant could be affected.

Interim Progress

A review of the concrete production and testing records is underway. The following actions are being taken:

1. Review concrete strength test results.

   a. Identify all periods of time when the compressive strength test results did not meet the requirements of General Construction Specification G-2.

   b. For the time periods identified in item a, determine an equivalent compressive strength for use in design evaluations.

   c. Identify all concrete placements represented by concrete with equivalent specified strengths less than used for design.

   d. Perform structural evaluations on all concrete members which include concrete placements with equivalent specified strengths less than the strength used for design.

2. Review concrete production records to determine locations and volumes of bedding mortar in structural concrete placements.

   a. Identify concrete placements which include significant volumes of bedding mortar.

   b. For placements with significant mortar quantities, determine the equivalent compressive strength and include the results in the structural evaluation detailed in item 1.

3. Review concrete production records to determine when the sampling frequency was less than specified in General Construction Specification G-2.

   a. Determine if any mixes appear to have not received random sampling.

   b. Identify concrete placements that are not adequately represented by test results.

   c. Develop appropriate corrective actions (in place strength evaluations or engineering evaluations).

TVA is investigating the causes of these deficiencies and, with respect to the use of bedding mortar, is investigating its applicability to other TVA plants.

We plan to submit our next report for these deficiencies on or about August 18, 1986.