

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

JUL 22 1988

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of)
Tennessee Valley Authority) Docket Nos. 50-390
50-391

**WATTS BAR NUCLEAR PLANT (WBN) - REVIEW OF SEQUOYAH NUCLEAR PLANT (SQN) NRC
INSPECTION REPORT NOS. 50-327/86-27 AND 50-328/86-27 - DEFICIENCIES FOR
APPLICABILITY TO WBN - SUPPLEMENTAL RESPONSE**

In TVA's letter to NRC dated November 3, 1986, we committed to provide additional information to NRC to address the potentially generic design control findings noted in NRC Inspection Report Nos. 50-327/86-27 and 50-328/86-27 and their applicability to WBN.

This is a supplemental response to items D3.2-4 and U5.3-5. Enclosure 1 provides the original SQN deficiency followed by the WBN supplemental response. Enclosure 2 contains a list of commitments made by TVA in this response.

If there are any questions, please telephone G. R. Ashley at (615) 365-8527.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. H. Shell
R. Gridley, Director
Nuclear Licensing and
Regulatory Affairs

Enclosures
cc: See page 2

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U.S. Nuclear Regulatory Commission

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cc (Enclosures):

Ms. S. C. Black, Assistant Director
for Projects
TVA Projects Division
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. F. R. McCoy, Assistant Director
for Inspection Programs
TVA Projects Division
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

U.S. Nuclear Regulatory Commission
Watts Bar Resident Inspector
P.O. Box 700
Spring City, Tennessee 37381

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN)
SUPPLEMENTAL RESPONSE TO SEQUOYAH NUCLEAR PLANT
NRC INSPECTION REPORT
NOS. 50-327/86-27 AND 50-328/86-27
DEFICIENCIES FOR APPLICABILITY TO WBN

D3.2-4 (Deficiency) Sample Connection Support

DESCRIPTION:

TVA Engineering Change Notice (ECN) L6462 authorized the installation of a support for a 3/4-inch sample connection coming off the downstream piping of the Chemical and Volume Control System (CVCS) letdown heat exchanger. The support, designed to seismic Category I criteria, is being added to reduce vibration in the 3/4-inch sampling line connected to the 3-inch process line. The support was designed to a minimum frequency of 50 hertz. The details for the clamped connection of the support to the 3-inch process line are derived from a standard support detail sheet (reference 1) and are enclosed to the ECN. The support detail is based on TVA Civil Engineering Branch (CEB) Report No. 77-42 (reference 2), which originally specified two heavy Bergen-Patterson clamps with four 7/8-inch diameter bolts torqued to 100 foot-pounds. However, the standard support detail now specified Basic Engineers's heavy duty pipe clamp BE-122, which uses 3/4-inch bolts instead of 7/8-inch bolts for the 3-inch clamps. In addition, split washers or lock nuts were not specified for the installation in order to maintain the bolt design torque under vibratory loads. The team notes that the support detail specified in the TVA Civil Engineering Branch report is based on static and not dynamic loads.

BASIS:

The basis for this deficiency is the use of smaller diameter bolts than called for in the standard support detail. In addition, the 100 foot-pounds originally specified for the 7/8-inch bolts and specified in the ECN to be used for the 3/4-inch bolts may overstress the 3/4-inch bolts.

REFERENCES:

1. TVA SQN Drawing No. 47A406-2-4, "Mechanical-Unit/2 Category Support for Support Detail 2-4," revision 1, dated August 2, 1985.
2. TVA CEB Report No. 77-42, "Static Pipe Support Tests and Development-Sequoyah Nuclear Plants 1 and 2," dated October 25, 1977.

SQM ITEM: D3.2-4 (Deficiency) Sample Connection Support

I. APPLICABLE TO WBN: YES X NO _____

II. ANALYSIS OF APPLICABILITY

CEB Reports 75-18 and 77-42 document static pipe support tests which provide the basis and background for the WBN sample connection supports. The components and installation requirements to be used for these supports are delineated on the 47B001 and 47A050 drawing series. Upon review, concerns existed about the design requirements specified by the 47B001 drawing series, especially in the area of bolt torquing for the attachment to the run pipe.

These concerns were investigated under Problem Identification Report (PIR) WBN CEB 8693 (unit 1) and PIR WBN CEB 8698 (unit 2). As a result, the following were identified:

1. A note on drawing 47B001-10 requires the bolts on all clamps for attachment to the run line be torqued to 100-foot-pounds minimum. CEB Report 75-18 contains a table which specifies preload values for the various bolt sizes to be used with the clamps and states these values must not be exceeded. These preloads result in torques lower than the 100-foot-pounds requirements on the drawing.
2. CEB Report 75-18 requires the bolts to be A193 GR B7 or equal. This is not specified on drawing 47B001-10, and, as a result, A307 bolts could be used. This could lead to an overstressed condition in the smaller diameter bolts if the 100-foot-pounds torque specified by the drawing was used in the installation.
3. When the 100-foot-pounds torque specified by the drawing is applied to bolts on the smaller pipe clamps, there is the possibility the ears on the clamp could yield because of excessive bending stress created.
4. The coefficient of friction of 0.74 between the pipe and the clamp used in the calculations for CEB Report 75-18 may be unconservative and may result in bolt preload values too small for the design conditions.

III. EXTENT TO WHICH THE CONDITION COULD EXIST

The number of tieback supports that were installed using the clamp-type option shown on drawing 47B001-10 has not been determined. It is estimated that this option was used on a very small percentage of the supports installed using the 47B001 series drawings. Unit 1 supports of this type will be included in the WBN Hanger Analysis and Update Program walkdowns to the extent outlined below in Section IV.

IV. CORRECTIVE ACTION REQUIRED

Watts Bar Engineering Project (WBEP) is taking the following measures to address these concerns:

1. CEB Report 75-18 will be reevaluated to determine if the preload values for the bolts are adequate to prevent slip between the clamp and pipe under design conditions, yet not overstress the bolts and clamp. This will include testing of the support assemblies if necessary.
2. Drawing 47B001-10 will be revised to reflect the preload values as determined from part 1. The drawing series will also be revised to meet the requirements of CEB 75-18, including the specifications of A193 GR B7 bolts.
3. All supports of this type used on ASME III large bore rigorously analyzed piping will be included in the WBN Hanger and Analysis Update Program walkdowns. Deviations will be evaluated and corrected, as required.

For remaining safety-related piping, a selected portion of this support type will be walked down. Deviations will be evaluated and corrected, as required. In addition, the results of the evaluation for the selected supports will be reviewed to determine if further corrective action is warranted for remaining supports of this type.

V. ACTION TO PREVENT RECURRENCE

The reevaluation of CEB Report 75-18 and subsequent revision to drawing 47B001-10 will prevent installation of other tieback supports with the deficiencies listed in part II. Nuclear Engineering Procedure (NEP) 5.1 will ensure design input and design output documents are consistent.

VI. RESOURCE REQUIREMENT AND SCHEDULE

This problem is being tracked by PIR WBN CEB 8693 (unit 1) and PIR WBN CEB 8698 (unit 2). A final response will be provided to NRC before fuel load for unit 1 based on the findings of the unit 1 walkdowns. The findings from unit 1 walkdowns will be considered typical for unit 2.

U5.3-5 (Unresolved Item) Loss of Control Power Annunciation

DESCRIPTION:

The team reviewed TVA drawings (references 1 and 2) for the 6.9-kV breaker control circuit for the Auxiliary Feedwater System (AFW) pump motor and noticed that the breaker control circuit does not have a provision to detect and annunciate the loss of control power. In the event of loss of control power, the circuit breaker will not be able to close when required. This will prevent automatic operation of the AFW pump, a required function important to the safety of the plant. TVA informed the team that the control room operators monitor the breaker status indicator lights. The "off" status of these lights (neither open nor closed indication) can be taken as an indication of the loss of control power. TVA further informed the team that at the end of each shift, a documented record is prepared by the operator for those lights which have changed their status (from "ON" to "OFF" or from "OFF" to "ON"). The team acknowledged these comments, however, noted that it is possible that a change in status lights could go unnoticed by the operators for some time.

Regulatory Guide (RG)-1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems," states that, "A practical indicating system covering a wide range of commonly expected conditions, however, could be designed if it included provisions for automatic indication of each bypass or deliberately induced inoperable condition that meets all three of the following guidelines.

1. The bypass or inoperable condition affects a system that is designed to perform automatically a function that is important to the safety of the public,
2. The bypass will be utilized by plant personnel or the inoperable condition can reasonably be expected to occur more frequently than once per year, and
3. The bypass or inoperable condition is expected to occur when the affected system is normally required to be operable."

The team believes that the AFW system meets the three conditions stated above. The AFW system is important to the safety of the public; plant operators use removal of control power to maintain equipment; and the inoperable condition is expected to occur when the AFW system is required, such as during accident conditions. In addition, it is possible that loss of control power may occur because of blown fuses, short circuits, and open circuits.

RG-1.47 further states that, "Bypass indication should aid the operator in recognizing the effects on plant safety of seemingly unrelated or insignificant events. Therefore, the indication of bypass conditions should be at the system level, whether or not it is also at the component or channel level. For example, in a design which utilizes a dc power system to control circuit breakers, de-energizing during maintenance should result in an indication for each safety system whose operation is dependent on that power system that the safety system is inoperable." The team believes that the above guidance also applies when deenergizing of dc control power occurs automatically because of system fault.

BASIS:

TVA has committed to implement the guidance of RG-1.47 (reference 3). Loss of control power for the breaker control circuit will prevent the AFW pump from being able to respond to system demand, yet this condition is not indicated as an inoperability at the system level.

REFERENCES:

1. TVA Drawing No. 45N-724, sheets 1 through 4, 6.9 kV, "Single Line Diagram."
2. TVA Drawing No. 45N-765, sheets 1 through 18, 6.9 kV, "Shutdown Aux Power Schematic Diagram."
3. U.S. NRC RG-1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems."

SQN ITEM: U5.3-5 (Unresolved Item) Loss of Control Power Annunciation

I. APPLICABLE TO WBN: YES X NO _____

II. ANALYSIS OF APPLICABILITY

This item addresses TVA's compliance with RG-1.47. Final Safety Analysis Report (FSAR), section 7.7.1.3.6, table 7.1-1, and section 8.1.5.3, commit WBN to be in compliance with RG-1.47.

III. EXTENT TO WHICH THE CONDITION COULD OR DOES EXIST

TVA is meeting this commitment by installing the Bypassed and Inoperable Status Indication (BISI) System which is intended to be installed as part of the Emergency Response Facility Data System. TVA has submitted the Functional Requirements Documents (FRDs) to NRC which detail conceptually the requirements to be met. The FRD provides for the continuous monitoring of the availability of control power and the position of circuit breaker (rack in or out) of automatically actuated systems. WBN believes this adequately addresses the potential design finding.

IV. CORRECTIVE ACTION REQUIRED

N/A

V. ACTION TO PREVENT RECURRENCE

N/A

VI. RESOURCE REQUIREMENT AND SCHEDULE

N/A

ENCLOSURE 2

LIST OF COMMITMENTS

D3.2-4 (Deficiency) Sample Connection Support

1. CEB Report 75-18 will be reevaluated to determine if the preload values for the bolts are adequate to prevent slip between the clamp and pipe under design conditions, yet not overstress the bolts and clamp. This will include testing of the support assemblies if necessary.
2. Drawing 47B001-10 will be revised to reflect the preload values as determined from part 1. The drawing series will also be revised to meet the requirements of CEB 75-18, including the specifications of A193 GR B7 bolts.
3. All supports of this type used on ASME III large bore rigorously analyzed piping will be included in the WBN Hanger and Analysis Update Program walkdowns. Deviations will be evaluated and corrected, as required.

For remaining safety-related piping, a selected portion of this support type will be walked down. Deviations will be evaluated and corrected, as required. In addition, the results of the evaluation for the selected supports will be reviewed to determine if further corrective action is warranted for remaining supports of this type.

4. A final response will be provided to NRC before fuel load for unit 1 based on the findings of the unit 1 walkdowns, which will be considered typical for unit 2.

U5.3-5 (Unresolved Item) Loss of Control Power Annunciation

The Bypassed and Inoperable Status Indication System is intended to be installed as part of the Emergency Response Facility Data System.