



Tennessee Valley Authority Post Office Box 2000 Spring City Tennessee 37361

William J. Museler
Site Vice President
Watts Bar Nuclear Plant

JAN 15 1993

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN)- UNIT 1 - NRC INSPECTION REPORT NO. 390/92-201
REPLY TO NOTICE OF VIOLATION

Reference 1: NRC Inspection Report 50-390/92-201, September 21, 1992,
Integrated Design Inspection at Watts Bar Unit 1

Reference 2: TVA letter to NRC Document Control Desk, October 13, 1992 -
Response to NRC Civil Integrated Design Inspection (IDI)
Issues (50-390/92-201)

This letter responds to the NRC Notice of Violation (390/92-201) dated
November 30, 1992, which identified three Severity Level IV violations
related to the Watts Bar Civil Integrated Design Inspection (IDI). Open
items from the NRC IDI were originally documented in an inspection report
dated September 21, 1992, 50-390/92-201, (Reference 1). TVA subsequently
provided detailed technical responses to those identified open issues with
a submittal dated October 13, 1992 (Reference 2).

The enclosure to this letter addresses the specific conditions described in
the subject notice of violation and the corrective actions taken by TVA to
correct the specific deficiencies. While TVA accepts some of the cited
examples, specifically items 1a, 2a, 2d, and 3d, the others do not represent
evidence of regulatory or procedural noncompliance. Justification for our
position is provided within.

260050

9301270187 930115
PDR ADDOCK 05000390
G PDR

Handwritten signature/initials

JAN 15 1993

Based upon review of this response, NRC may wish to reexamine the number and severity level of violations assigned to the identified IDI deficiencies.

Violation one identified deficiencies in design control measures which 1) did not ensure the stability of pipe supports using U-Bolts in conjunction with pin connected standard components (struts and snubbers) and, 2) allowed the use of smaller values for seismic anchor point movements than were provided by the nuclear steam supply system vendor. The second violation involved the failure to ensure that the installations of pipe supports and conduit supports were in conformance with the design and construction documentation. The third violation involved the failure to include appropriate acceptance criteria in various calculations and design documents.

The due date for this submittal was coordinated with the Region II staff to be January 15, 1993.

Should there be any questions regarding this information, please telephone P. L. Pace at (615) 365-1824.

Very truly yours,



William J. Museler

Enclosure

cc: NRC Resident Inspector
Watts Bar Nuclear Plant
P.O. Box 700
Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. B. A. Wilson, Project Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO NRC'S NOVEMBER 30, 1992 LETTER TO TVA
NRC NOTICE OF VIOLATION 50-390/92-201

VIOLATION 1.a

Description of Violation - Example 1.a

10 CFR Part 50, Appendix B, Criterion III, states in part, "The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program."

Contrary to the above, as of August 7, 1992, the design control measures did not ensure the stability of pipe supports using U-bolts in conjunction with pin connected standard components (struts and snubbers). For example, the U-bolt associated with pipe support 63-1SIS-R109 rotated around the pipe when a minimal load was applied. The support calculation was in error in that it specified a U-bolt torque below the value which was necessary to prevent rotation.

Reason for the Violation Example - 1.a

Calculations did not provide sufficient margins to address the effects of potentially contributory parameters necessary to establish the required bolt tension and related installation torque values. In addition, installation procedures did not provide for correlation between applied torque and the desired bolt tension load.

Corrective Steps Taken and Results Achieved

As described in TVA's response of October 13, 1992 (Reference 1), the following corrective steps have been implemented.

<u>ACTION</u>	<u>RESULTS</u>
1. UPDATE DESIGN METHODOLOGY TO ADDRESS CONTROLLING PARAMETERS NEEDED TO DETERMINE THE PROPER U-BOLT PRELOAD FORCE FOR WBN APPLICATIONS.	METHODOLOGY COMPLETE
2. IDENTIFY THE AFFECTED PIPE SUPPORTS FOR EVALUATION PURPOSES.	335 SUPPORTS AFFECTED
3. DEVELOP DESIGN CALCULATIONS TO REEVALUATE THE AFFECTED POPULATION AND ESTABLISH THE U-BOLT PRELOADS FOR INSTALLATION.	U-BOLT PRELOADS ESTABLISHED
4. UPDATE INSTALLATION PROCEDURES TO INCLUDE THE BELLEVILLE WASHER DESIGN CONCEPT TO CONTROL AND STABILIZE TENSILE LOADS.	INSTALLATION PROCEDURES ISSUED
5. ISSUE DESIGN CHANGE NOTICES FOR REINSTALLATION OF U-BOLTS.	DCNs ISSUED
6. VERIFY ANALYTICAL AND INSTALLATION APPROACHES BY IN-PLACE TESTING OF REPRESENTATIVE CONFIGURATIONS AND EVALUATION OF TEST DATA.	IN PROGRESS
7. COMPLETE MODIFICATION OF THE AFFECTED SUPPORTS.	WORK PLANS IN DEVELOPMENT

Corrective Steps Required to Prevent Recurrence

The steps described above provide a complete baseline for the affected supports and the framework for future design adequacy.

Date When Full Compliance Will Be Achieved

Implementation of field modifications will be completed on a system release to Startup basis.

VIOLATION 1.b

Description of Violation - Example 1.b

Criterion III states in part, "Measures shall be established for the identification and control of design interfaces and for coordination among participating design organizations."

Contrary to the above, as of August 7, 1992, the use of smaller values for seismic anchor point movements for the reactor coolant loop in calculation 0600200-03-01, Revision 17, was not coordinated or reconciled with the higher values provided by the nuclear steam supply system vendor.

Discussion of Violation Example - 1.b

Prior to the Integrated Design Inspection, TVA recognized the existence of the pertinent design interfaces and obtained the necessary design inputs as follows:

- a. Reanalysis of the Reactor Coolant Loop (RCL) Piping was performed in order to develop updated response spectra for use in the qualification of the piping attached to the RCL. This prerequisite was in accordance with commitments made as part of the Hanger and Analysis Update Program (HAAUP) and Seismic Corrective Action Programs (CAPs) which required a complete reanalysis of the piping using the updated spectra.

This reanalysis coupled the RCL piping with the building model and was reviewed and documented in NRC Inspection Report Numbers 50-390/89-21 and 50-391/89-21. The use of the Westinghouse models for the RCL are noted in this report.

- b. As part of the design interface process, Westinghouse was requested to review the results of the reanalysis to judge the adequacy of the work relative to the original qualification of NSSS components.

The results of this assessment are documented in Westinghouse's letter report of June 20, 1991 (WAT-D-8581), which confirmed the adequacy of the reactor coolant loop piping with the updated spectra to satisfy the design requirements. This also demonstrates that the appropriate interfaces were coordinated and integrated.

Summary

The necessary qualifications have been properly accomplished by:

- Examination of NSSS features by Westinghouse to the updated spectra requirements and,
- requalification of the piping attached to the RCL based on a totally integrated and compatible seismic analysis and,
- the necessary inputs and coordination of design interfaces have been accomplished.

VIOLATION 2

Description of Violation

10 CFR Part 50, Appendix B, Criterion V, states in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

10 CFR 50, Appendix B, Criterion X requires in part, "A program of inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity."

Contrary to the above, as of August 7, 1992, the licensee failed to ensure that the installation of pipe supports and conduit supports was in conformance with the design and construction documentation. The following deficiencies in the installation of safety-related pipe supports and conduit supports were identified.

Violation Example 2.a

Conduit support 1-CSP-290-N0582 was not installed even though Design Change Notice P-05916-A and Workplan KP05955A-1 required that the conduit support be installed.

Reason for the Violation Example 2.a

As described in Reference 1, the scope of conduit installations potentially affected by this condition is limited to those associated with Control Room Design Review (CRDR) modifications implemented in 1989.

While support substitution, relocation and deletion were permitted as part of this workplan, the field engineer involved with this particular support failed to follow procedures which require the processing of a field change (DCN) to document and obtain approval for the support deletion. This personnel error was judged an oversight.

Corrective Steps Taken and Results Achieved

ACTION	RESULTS
1. CONDUIT INSTALLATIONS DURING THE 1989 PERIOD WERE EXAMINED TO ESTABLISH CAUSE AND THE EXTENT OF CONDITION.	CRDR MODIFICATIONS WERE WORKED BY A GROUP INDEPENDENT OF THE SPECIAL GROUP HANDLING OTHER CONDUIT WORK.
2. WORKPLANS WRITTEN OR WORKED BY THE SAME RESPONSIBLE ENGINEER WERE EXAMINED TO DETERMINE IF THE CONDITION EXISTED ELSEWHERE.	WORKPLAN K-P03089A-1 INCLUDED 4 SUPPORTS WITH QUESTIONABLE DISPOSITION. 22 OTHER CRDR WORKPLANS REVIEWED AND WERE FOUND TO BE ACCEPTABLE.
3. DCN'S P-05955-A, P-05916-A, AND P-03268-A WERE REOPENED TO REQUIRE REINSTALLATION OF SUPPORT 1-CSP-290-N0582 AND VERIFICATION OF ADEQUACY OF OTHER SUPPORTS ASSOCIATED WITHIN WORKPLAN K-P03089-A-1 and K-P05955-A-1.	WORK IN PROGRESS WITH COMPLETION TIED TO SYSTEM 290 (CONTROL BUILDING CONDUIT AND CABLE TRAYS) RELEASE TO STARTUP

Corrective Steps Taken to Prevent Recurrence

Work performed under the subject workplans was performed under the work control process in place prior to the construction work stoppage in December 1990.

Changes to the work control process implemented for construction restart in November 1991 provide the necessary steps to prevent recurrence.

Date When Full Compliance Will Be Achieved

Field activities will be completed as part of System 290 release to Startup.

Violation Example 2.b:

Certain dimensions of installed supports 63-1SIS-R120, 74-1RHR-R213, 74-1RHR-R215, and 1-03B-8 were outside the tolerance limits specified in the applicable drawings or installation instructions.

Discussion of Violation Example 2.b

The identified NRC issues are as defined below:

Item No.	Problem Definition
2.b.1 63-1SIS-R120	3/16" GAP BETWEEN THE WASHER AND THE SPHERICAL BEARING IN THE PIPE CLAMP.
2.b.2 74-1RHR-R213	SPHERICAL BEARING DISLODGED BY 1/16" AT THE PADDLE OF TOP SWAY STRUT.
2.b.3 74-1RHR-R215	BASEPLATE THICKNESS 5/8" VERSUS 3/4" IN DRAWING.
2.b.4 1-03B-8	1/8" GAP BETWEEN PIPE AND SUPPORT STEEL.

Item 2.b.1 relates to a deviation of 1/8" from the G-43, "Installation, Modification, and Maintenance of Pipe Support and Pipe Rupture Mitigation Devices," specification requirements. The cause of this condition appears to be personnel error during the support installation process. Work Request 115553 (completed December 7, 1992) was written to ensure this specific problem is addressed. Changes to the work control process were implemented for construction restart in November 1991, providing the necessary steps to prevent recurrence.

Item 2.b.2 represents a deviation of 1/32" from the G43 specification requirements. A deviation of this small magnitude will not adversely effect the qualification evaluation for this support. Nevertheless, Work Request 100951 (completed November 25, 1992) was written to ensure that this specific problem is addressed. Further verification as part of MAI-1.9, "Damaged, Loose, or Missing Hardware," implementation provides additional confidence that other similar conditions, should they exist, will be corrected.

Because of the efforts associated with the WP32, "Walkdown of As Built Piping Systems Under the Scope of HAAUP," pipe support walkdowns which identified and corrected similar conditions, TVA has concluded that these are isolated occurrences which would not have affected the hardware functionality.

As it relates to Item 2.b.3, nondestructive examination of the baseplate during the integrated design inspection confirms that its thickness is 11/16". The plate is acceptable based on this thickness. This variation of a 1/16" from the drawing requirements was an acceptable tolerance as part of the WP32 pipe support walkdowns. However, since the anchor bolts for the support were already being upgraded, the plate will be replaced with a 3/4" plate.

Item 2.b.4 represents conditions which are acceptable since the overall support gap provisions are met, and the provisions for no gap at the bottom of the pipe were checked during initial installation and verified as acceptable during the WP32 walkdowns. Movement of the piping is to be expected, and the provisions of MAI-1.9 provide for review to ensure sufficient vertical support is provided by looking at sequential supports.

Violation Example 2.c:

Weld sizes, weld symbols, and dimensions for installed supports 47A435-3-2, 1-03B-11, and 63-ISIS-V163 were inconsistent with their associated drawings.

Discussion of Violation Example - 2.c

The identified NRC issues are as defined below:

ITEM NO.	PROBLEM DEFINITION
2.c.1 47A435-3-2	FIELD DIMENSIONS 1" X 14" X 2'-0" WERE NOT IN ACCORDANCE WITH THE BILL OF MATERIALS.
2.c.2 1-03B-11	WELD BETWEEN SUPPORT AND EMBEDDED PLATE IS 1/4" VS 5/16" SHOWN ON THE SUPPORT DRAWING.
2.c.3 63-ISIS-V163	WELD SIZE INADVERTENTLY LEFT OFF DCN.

- 2.c.1 The baseplate size had been previously identified on DCN F-11136-D in October 1990. Later, DCN F-13215-A was issued to modify the support. The changes in F-11136-D were incorporated into F-13215-A except for the dimension of the baseplate in the bill of materials. The baseplate qualification properly considered the as-built field dimensions in the support calculations. DCN F-19944-A was subsequently issued to revise the bill of materials drawing for clarification.
- 2.c.2 The size of the weld in the field is acceptable based on calculations which require the size to be a minimum of 3/16". Design Change Notice S-19940 was issued August 1, 1992, to change the drawing to agree with the as built condition.
- 2.c.3 The omission of the weld size on the subject DCN had been corrected by TVA via the issuance of DCN F-17541 in December 1991. During the IDI inspection, this FDCN was inadvertently not provided to the staff.

Violation Example 2.d:

Hardware on supports 74-1RHR-R6 and 74-1RHR-V2 was not tightened per TVA specification G-43 and a support for conduit P4081 was found loose.

Discussion of Violation Example - 2.d

The identified NRC issues are as defined below:

<u>SUPPORT</u>		<u>PROBLEM DEFINITION</u>
2.d.1	74-1RHR-R6	JAM NUT ON STRUT IS LOOSE.
2.d.2	74-1RHR-V2	LOOSE LOCKNUT ON BOTTOM SPRING.
2.d.3	CONDUIT P4081	LOOSE ONE HOLE STRAP.

- 2.d.1 These problems are captured under the scope of the Damaged, Loose, and Missing Hardware (DLMH) program (Procedure MAI-1.9), to be completed prior to system release to Startup. NRC has previously accepted the DLMH program in the WBN Nuclear Performance Plan Vol. 4. Work request 100952 was written to ensure that this problem is explicitly identified for correction.
- 2.d.2 This item is captured by an existing Design Change Notice (M-11561) dated July 26, 1990, to reset the spring can.
- 2.d.3 This item was apparently caused by ongoing work in the vicinity of this support. While this problem is of the type which would be addressed by ongoing modification activity under DCN 15665 (one hole strap spacing verification), and Work Request C149983 was written to ensure that this problem was explicitly identified for correction, WBP920185 was written to investigate and resolve this condition.

The evaluation and investigations associated with the resolution of WBP920185 have been completed and conclude that this was an isolated case in the work area. Discussions have been held by craft foremen to provide additional emphasis on work control procedures for future activities.

Violation Example - 2.e:

Conduit FE2638 was not attached to its support (CSAB-11220) as required in conduit support package B10-134.

Discussion of Violation Example - 2.e

This issue is recognized by TVA as a missing clamp which is to be replaced as part of the implementation of ongoing Modification Activity MD-M-05695 to repair loose and missing clamps. This activity was developed to resolve CAQ WBP890248, which was written in 1989. In addition, Work Request C115663 has been issued to ensure that this problem is explicitly identified for correction.

VIOLATION 3

Description of Violation

10 CFR Part 50, Appendix B, Criterion V, states, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Contrary to the above, as of August 7, 1992, the licensee failed to include appropriate acceptance criteria in the following calculations and design documents:

Violation Example - 3.a:

As-built weld sizes of the commodity supports were not considered in the ranking process for identification of critical cases for bounding calculations. As a result, less severely loaded supports with smaller as-built welds which could be more critical than the critical cases were not considered.

Discussion of Violation Example - 3.a

As described in Reference 1 (Item 92-201-16), as built weld size has been appropriately considered in the evaluation of commodity supports. In addition, for the scope of cable tray supports which resulted in weld modifications, a trending of the data was in progress at the time of the audit which provides for additional reviews addressing the adequacy of the process. This trending of data was discussed in detail in Reference 2.

Violation Example - 3.b:

Four tray support calculations (WCG-AB-1298-0442, Rev. 1; WCG-CB-1337-0509, Rev. 1; WCG-AB-1296-2208, Rev. 1; and WCG-AB-1296-2291, Rev. 1) and eight conduit support calculations (WCG-WB-CS-08, Rev. 0; WCG-AB-B2-017B, Rev. 0; WCG-AG-C50-077B, Rev. 0; WCG-AB-C27-066B, Rev. 0; WCG-AB-C9-156, Rev. 0; WCG-AB-C58-063, Rev. 0; WCG-AB-C19-030, Rev. 0; and WCG-DGB-C4-035B, Rev. 0) did not evaluate the concrete capacity for anchor bolt pullout as required by TVA civil design standard DS-C1.7.1, Revision 5.

Discussion of Violation Example - 3.b

As described in Reference 2 (Item 92-201-17), the anchor bolt pullout capacity need not be explicitly checked when the required anchor spacing is satisfied.

In addition, Reference 2 details TVA's review of conduit supports which did not find any anchor spacing violations and for cable tray supports which identified one calculation that required revision for internal spacing violations.

Subsequent to the issuance of Reference 2, an additional review was performed to encompass the total population of cable tray supports. Based on the results of this review, five calculations required additional documentation for minor (as a rule, less than 1") internal anchor spacing issues. Evaluation of these deficiencies resulted in no hardware impacts and the anchors were determined to be acceptable as designed.

Violation Example - 3.c:

Calculation 48W0930A107 did not address the interaction load among the anchors in each embedded plate and applied a factor of safety lower than that specified in the TVA Civil Design Standard DS-C1.7.1, Revision 5, to accept the anchors.

Discussion of Violation Example - 3.c

As described in detail in Reference 2 (Item 92-201-22), the analysis approach as well as the factors of safety utilized are in compliance with Design Standard DS C1.7-1.

Violation Example - 3.d

Calculation 48N091305A022 used factors of safety lower than that specified in DS-C1.7.1, Revision 5, to qualify a surface mounted plate.

Reason for the Violation Example - 3.d

The calculation in question addresses the pullout capacity of both embedded plate studs as well as an A36 grouted anchor bolt.

The problem arose because in the calculation, the factor of safety used for the anchor bolt was compared to the required factor of safety for the embedded plate stud (1.94) instead of the required factor of safety for the anchor bolt (2.5).

Corrective Steps Taken and Results Achieved

Problem Evaluation Report WBP920186 was written to document this problem. Calculation 48N091305A022 has been revised (B18920806251) to provide comparison of the anchor bolt factor of safety to the correct requirements of Design Standard DS-C1.7.1. The existing anchor bolt was determined to meet design requirements.

The other anchorage calculations performed under this task were reviewed to ensure the problem did not exist elsewhere. There were no other whip restraint anchorages which combined embedded plates and A36 anchor bolts.

Corrective Steps Required to Prevent Recurrence

While this is an isolated occurrence, the preparer and checker of this calculation received counseling regarding the appropriate design requirements to be utilized.

Date When Full Compliance Will Be Achieved

As described in Reference 1 (Item 92-201-23), full compliance was achieved on August 6, 1992. Closure of WBP920186 was completed on August 20, 1992.

Violation Example - 3.e:

Design Criteria WB-DC-40-31.7, Revision 16, specified that equipment be considered rigid if all modal frequencies are greater than or equal to 33Hz. However, the criteria also allowed equipment with frequencies less than 33Hz to be considered rigid without proper justification.

Discussion of Violation Example - 3.e

As acknowledged in Reference 1 (Item 92-201-03), the design criteria permitted consideration of equipment with frequencies less than 33Hz depending on the rigid range of the applicable response spectra.

The design criteria was revised during the inspection to clarify this provision. The use of this application must now be reviewed on a case-by-case basis. The calculations which utilize this provision of the criteria were reviewed to ensure the technical justifications provided were sufficient. Two of the twelve calculations reviewed were revised to strengthen the justifications provided. However, the conclusions originally made remain valid.

Violation Example - 3.f

In calculation 0600200-05-01, Revision 13, higher allowable stress values based on certified material test reports were utilized for determining pipe rupture locations instead of applying the lower stress values specified in the ASME, Section III Code, 1971 Edition up to and including Summer 1973 Edition, as committed to by TVA.

Discussion of Violation Example - 3.f

The ASME code provisions delineate allowable stresses based on the properties of materials in question. Certified Material Test Reports (CMTRs) provide pertinent information on material properties at the specific locations in question. The use of CMTRs on a limited basis is compatible with industry practice and was prescribed in design document, Engineering Administrative Instruction 8.08.

In order to address NRC concerns beyond the scope of both the FSAR and ASME Code provisions, and because of the small number of applications where CMTRs had been utilized, TVA agreed to delete their use from design documents and require a case-by-case documentation and FSAR change where CMTRs are considered for future use in pipe rupture evaluations.

As described in Reference 1 (Item 92-201-06), these activities were completed on September 15, 1992.