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APR 29 1994

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Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 AND UNIT 2 - NRC INSPECTION REPORT
NOS. 390, 391/94-07 AND 390, 391/94-12 - REPLY TO NOTICE OF VIOLATION

The purpose of this letter is to provide a reply to Notice of Violation 390/94-07-02 cited in Inspection Report 390, 391/94-07 dated March 10, 1994. The notice of violation identifies that two preoperational test instructions were determined to be inadequate in the areas of methodology and calculations. In addition, this letter responds to Inspection Report 390, 391/94-12 dated April 1, 1994, which identified additional errors in preoperational test instructions, noting the errors are further examples of the violation issued in report 390, 391/94-07. Enclosure 1 provides TVA's response to this violation.

TVA recognizes the need to continuously assess and improve upon the technical quality of preoperational test instructions used in this important program. Although the quality of PTIs has continued to improve since the reorganization of the Startup and Test group in late 1993, additional adjustments are necessary and will be an ongoing part of the process. To this end, and as discussed with Region II personnel on April 21, 1994, TVA will take additional actions to assess and correct identified weaknesses in test procedure development. We will apprise the staff on the progress of this evaluation in our response to Inspection Report 390, 391/94-23.

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Enclosure 2 contains a list of commitments made in this letter. The delay in providing this response was discussed with Mr. C. Julian of the RII Staff.

If you should have any questions, contact P. L. Pace at (615)-365-1824.

Very truly yours,



William J. Museler

Enclosures

cc (Enclosures):

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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO NRC'S MARCH 10, 1994 LETTER TO TVA
NRC VIOLATION 390/94-07-02

DESCRIPTION OF VIOLATION

10 CFR 50 Appendix B, Criterion V as implemented by TVA Nuclear Quality Assurance (NQA) Plan, TVA-NQA-PLN 89-A (Revision 3), Section 6.1 requires that activities effecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstance 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.

Startup Manual Procedure (SMP-3.0), Joint Test Group Charter (Revision 8) section 2.2, JTG Responsibilities, specifies primary responsibilities to its members for verifying test objectives, acceptance criteria, testing methodology, and calculations comply with approved design output documents, license commitments, and the FSAR and have been adequately covered in the test instructions.

Contrary to the above, as of January 31, 1994 the following Preoperational Test Instructions (PTIs) were determine to be inadequate in the areas of methodology and calculations, which would have affected the accuracy of the PTI test results.

PTI-063.03 Charging, Safety Injection and Residual Heat Removal Flow Balance Test (Revision 1), Appendix 8.24, Background Calculations, Step 8.24.1 requires the calculation to convert inches of water column to an equivalent differential pressure in PSID. Licensee personnel used the incorrect fluid density value in the calculation. The Emergency Core Cooling system (ECCS) measured flow rate would have indicated higher than actual flow rates being supplied by the ECCS.

Step 8.24.2 of the calculation requires correcting the Emergency Core Cooling System (ECCS) design flowrate acceptance criteria for instrument inaccuracies and flow element orifice errors. The calculations contained in PTI-063.03 did not include the flow element installation error and incorrectly accounted for the flow element error.

PTI-064.01, Local Leak Rate Testing Table 8.2, for primary containment penetrations X-15, X-41, X-58A and X-91 incorrectly grouped the inboard and outboard isolation valves such that the corrected maximum path leakage rate for the penetration would not have been properly calculated.

ADMISSION OR DENIAL OF VIOLATION

TVA agrees with the violation with clarification. For the example related to PTI-63-03, the actual requirement violated is the more general requirement in SMP 3.0, Section 2.2.B.4, for JTG members (collectively) to ensure a thorough review of procedures. The cited requirement in SMP-3.0, Revision 8, pertaining to JTG verification of calculations was not in place at the time of the subject violation; it was added in a subsequent revision to SMP-3.0 in response to the violation.

REASON FOR THE VIOLATION

Preoperational Test Instruction PTI-63-03

The violation resulted from inexperience of Startup personnel in using a new, specialized methodology (i.e., QDCN 27624-A, discussed below) for performing detailed flow orifice inaccuracy calculations for PTIs. In addition, the review of PTI-63-03 performed by the Engineering department JTG member was not sufficiently rigorous to identify these types of errors in the accuracy calculations. Although an experienced I&C engineer was utilized to review portions of the test, the review should have involved I&C personnel who developed QDCN 27624, especially in view of the "first time" application of this new methodology by the Startup department.

As a result of the Startup reorganization in late 1993, Startup Desk Top Instruction DTI-4.0 (Preop Test Writer's Guide) had been revised to provide guidance for accounting for inaccuracies associated with test equipment and process measurements. The DTI, Attachment B, Section 5.5 refers the writer to a separate document (QDCN 27624-A)¹ for guidance in this area. In general, the QDCN provides excerpts from an engineering handbook which have to be applied to specific applications. Because the QDCN was not sufficiently detailed concerning the use of orifice specification sheets and the application of associated inaccuracies, limited experience on the part of the writer, peer reviewer, and JTG members in addressing the subtleties in this specialized area resulted in the errors being made and going undetected.

With sufficient training, test engineers can successfully perform the calculations. Startup only began performing these calculations in the timeframe in which PTI 63-03 was prepared, and therefore some initial difficulties in application could have been expected but should have been identified through reviews. Based on the errors in the preop test, the combination of guidance and experience was unsatisfactory.

¹ A QDCN provides a formal, approved answer (or in this case, an approved "methodology") from the Engineering department in response to a formal inquiry from another organization.

Preoperational Test Instruction PTI-64-01

1. Penetration X-15

The error concerning incorrect grouping of one of the six containment isolation valves (inboard relief valve 1-RFV-62-662) associated with penetration X-15 occurred due to an over-reliance by the test author and peer/JTG reviewers on an out-dated plant surveillance instruction (SI) SI-6.33 (Containment Isolation Valve Local Leak Rate Test).

Preop test instruction PTI-64-01 is a "shell"² procedure in which the leakage rates for listed penetrations are tested in separate plant surveillance instructions (SIs). Because the SIs have been inactive for several years, they must each be upgraded to reflect current design and procedure format prior to their use during testing. Once approved and performed, the SI test results data are transferred and recorded on data sheets within PTI-64-01 and combined to determine the acceptability of the overall leakage rate. The PTI data sheets reflect the intended grouping of inboard and outboard isolation valves based upon valve groupings established in the SIs. Both the PTI and the SI must receive review and concurrence by the Joint Test Group prior to test performance. However, to facilitate the PTI review process, only a few typical examples of SIs were approved and made available for JTG review in conjunction with approval and issuance of PTI-64-01. For penetration X-15, SI-6.33 had not yet been upgraded when used as a source for PTI-64-01. This SI incorrectly grouped valve 1-RFV-62-662 with outboard isolation valve 1-FCV-62-77 and the error propagated to the PTI. Although final review and approval of the upgraded procedure (SI-62-701, issued March 11, 1994) may have detected and corrected the improper grouping, the error should have been identified during preparation and review of the preop test.

2. Penetrations X-41, X-58A, and X-91

The errors in the PTI 64-01 data sheet for three of the four penetrations (X-41, X-58A, and X-91) were administrative/editorial errors due to failure to implement adequate self checking by the writer and reviewers. For these three penetrations, the errors consisted of incorrectly placed dividing lines on the data sheet. The dividing lines distinguish the inboard isolation valves from the outboard valves. Although the PTI data sheets were in error, the SIs grouped the valves correctly and would result in only one leak rate value per valve group. During test conduct, a change to the incorrect preop test data sheet would be necessitated to allow proper transposition of the this leak rate data to the preop test data sheet. Accordingly, the preop test could not have been completed without detection and correction of these errors. This condition is considered an isolated case of not performing a thorough review of the data sheet, to see that it matched the surveillance procedure steps from which the data was taken.

² In this case, a procedure which collects and analyzes data based on testing performed in another procedure.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

PTI-63-03

TVA reperformed the calculations in Appendix 8.24 of PTI-63-03 under Revision 2 of that procedure and reviewed these corrections with the NRC Inspector who had provided the comments. TVA notes the worst total error introduced into the PTI by the deficiencies would have been 2.9%, or 12.8 gpm on the 440 gpm flow acceptance criteria. Specifically:

- a. The calculations for differential pressure in Appendix 8.24, Step 8.24.1 were reperformed using Standard Conditions for calculation of fluid density. The error introduced by using the density at 180 degrees, in lieu of standard conditions introduced an actual error of 1.1%.
- b. Values for installation inaccuracy were obtained from engineering, and added to the inaccuracies of Appendix 8.24, Step 8.24.2. The "Accuracy for K" value (flow coefficient accuracy) was applied to the Overall Orifice Coefficient, rather than to the delta P value. The error introduced by the misapplication of the correction to K, and the omission of any correction for installation inaccuracy together could have introduced an additional error of 1.8%, if they were additive, and at the maximum value.

Startup has reviewed the list of other PTIs provided to the NRC and considers that instrument and process flow inaccuracies are being adequately addressed.

PTI-64-01

As noted in the inspection report, the division lines on the data sheet of Table 8.2 were corrected to show proper grouping of isolation valves for penetrations X-15, X-41, X-58A, and X-91 under change notice number CN-064-01-01, approved on January 31, 1994. The correct grouping of isolation valves for penetration X-15 has also been reflected in SI-62-701, Revision 0, issued March 11, 1994.

A review of the valve groupings in PTI-64-01 was performed to confirm whether the three data sheet administrative errors and the technical error associated with penetration X-15 were isolated. No other grouping errors were identified.

CORRECTIVE STEPS TAKEN OR PLANNED TO AVOID FURTHER VIOLATION

PTI 63-03:

1. SMP 3.0 was revised by CN-3 to reinforce that the Startup and Engineering representatives on the JTG are responsible for verifying correct test calculations.
2. Under QDCN-29470-A, Engineering has provided additional guidance for the Startup organization in the preparation of flow accuracy calculations for instrument loops with orifice plates. This QDCN develops a generic orifice plate "K" accuracy based on analysis of WBN safety-related calculations involving orifice plates and provides sample worksheets to enable Startup to consistently perform the calculations.

3. Appropriate Startup procedures will be revised to reference these improved methods for determining orifice accuracy corrections by May 6, 1994. In the interim, a high degree of emphasis is being placed on the subject of PTI accuracy corrections both in general and on a specific test basis. A number of discussions have been held between Startup and Engineering personnel, using the guidance of QDCN-29470-A to ensure that accuracy corrections are understood and appropriately addressed for PTIs under development.
4. Training sessions were conducted for the Startup Procedure Preparation and Review Group on application of instrument inaccuracies including the use of QDCN-29470-A for orifice plate accuracies.

PTI 64-01:

Since surveillance instructions have not been issued for all penetrations for which data is collected under PTI-64-01, the Startup peer reviewers for these SIs, as well as the JTG, were briefed on the potential for discrepancies due to differences between the original SI data sheets and the as-issued SIs. This action should ensure that any further differences are captured in the SI review cycle and evaluated for effect on PTI-64-01.

This violation was reviewed with the Startup Procedure Group to demonstrate the necessity to continually implement self checking.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

TVA will be in full compliance by May 9, 1994.

ADDITIONAL INFORMATION RELATED TO INSPECTION REPORT 390, 391/94-12

Inspection Report 50-93/94-12 identified additional examples of PTI preparation and review errors, and requested that the response to Violation 390/94-07-02 address these items. The procedures commented on were PTI-81-01, 68-09, 68-04, 63-01, 68-10, 68-01, 30J-01, 30J-02, and 68-07.

Although a number of the comments were satisfactorily resolved through discussions with the inspectors, with no changes being made to the procedures, TVA is not completely satisfied with the quality of the PTIs, given the number of errors noted. We have performed a preliminary examination of our program to identify the need for programmatic adjustments. A few areas have been identified where specialized training and additional guidance, such as that for instrument inaccuracy, is required. However, the main contributor to the errors was an inconsistent level of self checking within the Startup Procedure Group. Through meetings conducted several times each week with the procedures group, the Programs and Procedures Test Group supervisor has emphasized the seriousness of these errors. These meetings are also used to provide frequent feedback on test procedure issues which might impact other in-process procedures.

In addition, TVA will develop actions under WBN Problem Evaluation Report (PER) 940226 to assess and correct identified weaknesses in the test procedure development process. The PER will address the extent of condition and corrective actions for examples of PTI errors discussed in NRC Inspection Reports 390,

391/94-07, 94-12, and 94-23. In particular, the PER will evaluate the adequacy of JTG reviews performed for preop test procedures. TVA will apprise the staff on the progress of this evaluation in our response to Inspection Report 390, 391/94-23. In the interim, the Startup manager will discuss the significance of the PTI errors documented in these inspection reports with the Startup Procedure Preparation and Review Group and JTG members. This action will be completed by May 9, 1994.

Corrective actions for the procedure errors were accomplished by the following documents:

PTI 81-01	Revision 2, and CN-1
PTI 68-09	Revision 1, and CN-3
PTI 68-04	CN-1
PTI 68-10	Revision 1, CNs 2, 3
PTI 68-10	Revision 1
PTI 30J-01	Revision 1
PTI 30J-02	CN-1
PTI 68-07	CNs-1, 2, 3

Because PTI 63-01, Revision 2 will require changes based on the test results from PTI 63-03, the identified errors will be corrected in the next revision in accordance with the Startup preop test development schedule.

The following additional recurrence actions are being taken:

1. Based on inconsistencies in the use of "acceptable as-found" versus "acceptable as-left" for defining acceptance criteria values in PTI-68-10, the Startup Writers Guide, DTI #4 will be revised by May 6, 1994, to provide additional instructions on selection of appropriate values.
2. In light of the error related to PTI 68-10 test objectives, DTI #4 will be revised by May 6, 1994, to include a checklist which includes more specific directions for addressing FSAR Chapter 14 Test Objectives.

ENCLOSURE 2

LIST OF COMMITMENTS

1. Appropriate Startup procedures will be revised to reference these improved methods (i.e., QDCN-29470) for determining orifice accuracy corrections by May 6, 1994.
2. The identified errors for PTI-63-01 will be corrected in the next revision in accordance with the Startup preop test development schedule.
3. DTI #4 will be revised by May 6, 1994, to provide additional instructions on selection of appropriate acceptance criteria for "acceptable as-left" and "acceptable as-found" values.
4. DTI #4 will be revised by May 6, 1994, to include a checklist which includes more specific directions for addressing FSAR Chapter 14 Test Objectives.
5. TVA will develop actions under WBN PER 940226 to assess and correct identified weaknesses in test procedure development. TVA will apprise the staff on the progress of this evaluation in our response to Inspection Report 390, 391/94-23.
6. In the interim, the Startup manager will discuss the significance of the PTI errors documented in NRC inspection reports 94-07, 94-12, and 94-23 with the Startup Procedure Preparation and Review Group and JTG members. This action will be completed by May 9, 1994.