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APR 20 1992

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U.S. Nuclear Regulatory Commission
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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) - NRC INSPECTION REPORT NO. 390, 391/92-01
REPLY TO NOTICE OF VIOLATION

This letter responds to Inspection Report 390, 391/92-01 dated March 17, 1992, which identified three Severity Level IV violations. Violation 390/92-01-01 involves an error in the application of a code case for hydrostatic testing of American Society of Mechanical Engineers (ASME) components during rework. Violation 390/92-01-02 identifies a failure by TVA to properly document work and inspection activities in the proper sequence. Violation 390/92-01-03 identifies deficient design controls in place for the installation of electrical cables.

Enclosure 1 to this letter describes the interim actions initiated by TVA to increase management overview and to improve personnel awareness to attention to detail. Enclosure 2 addresses the specific conditions described in the subject inspection report for each violation and the corrective actions taken by TVA. Enclosure 3 contains the remaining commitments to resolve these violations.

The delay in submitting this letter to April 20, 1992, was discussed with Mr. Ken Barr, Region II, on April 13, 1992.

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

Sincerely,

JH Garrity
John H. Garrity

Enclosures
cc: See page 2

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U.S. Nuclear Regulatory Commission

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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO NRC'S MARCH 17, 1992 LETTER TO TVA

TVA INITIATIVES

Many of the quality indicators put in place to control the slow monitored restart show clear evidence that the new processes and procedures are working. The quality of the work being performed continues to be good. WBN is experiencing some implementation problems as evident by the violations in this report. TVA expects to encounter some problems until work processes have been fully challenged and the work forces are fully staffed and stabilized. The existing methods of verification coupled with adjustments made from lessons learned provide reasonable assurance that the quality of work will continue to remain high and that implementation will continue to improve.

Weekly reviews of the quality indicators are conducted by TVA management to identify areas requiring improvement. Adjustments continue to be made to enhance the ability to self-identify problems and to eliminate repeat occurrences. The slow monitored restart will continue until management is satisfied that consistent quality is achieved. The following interim actions have been taken to improve the restart program.

- The Modifications group has established a weekly interface meeting with the Quality Monitoring group to review problem areas. These problem areas are then monitored to identify the causes and to obtain resolution. These meetings are intended to increase the ability to self-identify deficiencies and establish recurrence controls.
- Modifications is disseminating information on identified problem areas and causes within the organization as lessons learned. This action is intended to help eliminate repeat occurrences.
- "Verification Guides" are being prepared by Modifications to perform in-process self-checks, and to provide periodic management oversight of work activities for procedural compliance.
- The Start-up and Test manager has been temporarily assigned to assist the Modification manager. This assignment is to assist in providing increased management attention to potential problem areas.

Additional changes will be made as necessary based on feedback from the various quality indicators in place.

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WATTS BAR NUCLEAR PLANT UNIT 1
REPLY TO NRC'S MARCH 17, 1992 LETTER TO TVA
VIOLATIONS 390/92-01-01, 390/92-01-02, 390/92-01-03

390/92-01-01**DESCRIPTION OF VIOLATION**

10 CFR 50.55a requires that, "Structures, systems, and components shall be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed." Paragraph NB-6000 of the ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition, Summer 1973 Addenda, has been identified as the appropriate code for hydrostatic testing and examination of ASME piping.

Paragraph NB-6111.1 of the ASME Section III code requires that all components and appurtenances constructed and/or installed under the rules of this section of the code shall be hydrostatically tested in the presence of the inspector.

Contrary to the above, on February 4, 1992, hydrostatic testing requirements had been deleted on Workplan D01278-01, fire protection piping. The workplan revision that deleted the hydrostatic testing and examination was approved for implementation with the required hydrostatic testing deleted.

REASON FOR THE VIOLATION

This violation resulted from a miscommunication between Modifications and Engineering personnel concerning the application of ASME Code Case N-240. Specifically, the miscommunication involved the nature of the installation. A revision to Modifications Workplan D-01278-01 failed to specify a hydrostatic test after installation of a check valve in the Fire Protection System by erroneously invoking the code case. The individual in Modifications, who was responsible for revising the workplan to include the code case, discussed its use with Engineering. Engineering did not understand (apparently because of insufficient details) Modification's intent to implement the subject code case to include the weld on both sides of check valves O-CKV-26-561 and O-CKV-26-563. However, because of the piping configuration the subject code case could only be applied to the piping on the outlet side of the check valves. The individual from Modifications, thinking he had received concurrence for use of the code case in the application he intended, erroneously invoked the code case for the entire check valve installation and deleted the hydrostatic testing requirement from the workplan. Subsequently the subject workplan was submitted to Quality Assurance (QA) and the Authorized Nuclear Inspector for review and approval. The misapplication of the code case was not identified when the workplan was approved for work February 3, 1992.

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CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

Workplan D-01278-01 was revised February 7, 1992, to reestablish the hydrostatic test requirements of ASME Section III, Subsection NB-6000. In addition, TVA conducted a review of work documents implemented since construction restart to determine if any additional applications of code cases were invoked. One additional application of Code Case N-240 was identified. This case was documented on Design Change Notice (DCN) Q-17878, and Engineering concurrence obtained for its application as originally indicated on the work document.

CORRECTIVE STEPS TAKEN TO AVOID FURTHER VIOLATIONS

To eliminate confusion through verbal communications, the Modifications manager has directed field engineers and shift engineering managers not to invoke a code case without appropriate coordination and approval from Nuclear Engineering. Subsequent to the issuance of this directive, Modifications management conducted a spot check of Modifications engineering personnel and determined that this directive was understood and being followed. In addition, since the workplan had received QA approval, a lessons-learned session on the application of code cases was conducted with the QA workplan reviewers. The circumstances of this violation, application of code cases, and actions to prevent recurrence were discussed.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

TVA is currently in full compliance.

390/92-01-02DESCRIPTION OF VIOLATION

10 CFR 50, Appendix B, Criterion V, "Instruction, Procedures, and Drawings," requires in part that activities affecting quality be prescribed by documented instructions or procedures and that such activities be accomplished in accordance with those instructions or procedures.

Tennessee Valley Authority Nuclear Quality Assurance Plan TVA-NQA-PLN89-A, Revision 2, Section 6.1, requires that quality-related activities be prescribed by documented procedures and instructions and that these activities be accomplished in accordance with these procedures and instructions. Site Standard Practice (SSP)-7.53, "Modifications Workplan Reviews," requires that once work activities are complete, data sheets and/or work steps cannot be signed prior to obtaining Quality Control (QC) signatures.

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Contrary to the above, on February 11, 1992, safety-related activities were not performed in accordance with documented procedures in that QC inspections associated with Workplan D-02249-03 were documented and dated prior to the date documented by the craftsmen for work completion.

REASON FOR THE VIOLATION

As a clarification, the last sentence in the second paragraph of the Description of Violation should read: "...work steps shall be signed (by craft, foreman, or responsible engineer) prior to obtaining Quality Control signatures."

The violation occurred as a result of inattention to detail and failure to fully follow administrative procedural requirements on the part of personnel performing activities associated with Workplan D-02249-03.

The workplan activity involved installing a safety-related recorder in the electrical board room of WBN Diesel Generator Building 2A-A. The work was actually performed by the responsible craftsman, foreman, and field engineer on January 29, 1992, concurrent with the QC inspector's observation of the work, as required by SSP-7.53. However, several work steps were not signed by these individuals until the next day - January 30. Although WBN procedure SSP-2.9, "Records Management," makes allowance for signoff sequence errors using the "late-entry" process, the "late-entry" signatures by the craftsman, foreman, and field engineer were not properly designated as "late-entry" as required by SSP-2.9. As noted in NRC's inspection report, there were other examples in Workplan D-02249-03 where the required signoffs by Modifications personnel were made after the QC inspector's signature and not designated as "late-entry" signatures. In each of these cases however, TVA determined the required work activity and/or inspection had been adequately performed in the proper sequence. Involved Modifications personnel failed to realize the importance of close attention to detail in documenting completion of the work activity. Further, as a result of inattention to detail, the QC inspector failed to recognize the problem of unsigned steps prior to making his signoff.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

Workplan D-02249-03 was thoroughly reviewed by TVA personnel for the presence of any other discrepancies. Each discrepancy (including those identified by the NRC) has been corrected. As mentioned above, the review found the work itself was satisfactorily accomplished.

Engineering personnel in WBN's Modifications department sampled additional work documents (workplans and work orders) and found similar deficiencies to those in Workplan D-02249-03 indicating the condition was not isolated. Therefore, as of February 11, 1992, 100 percent (approximately 200) of the work documents having some or all work performed since "Restart" of WBN work activities (November 1991) were reviewed for similar problems. Of these documents, approximately 90 were found to contain a number of similar

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discrepancies. Examples of these (in addition to out-of-sequence signoffs) included improper use of "N/As," signatures without dates, "yes/no" and "acceptable" blocks not checked at the time of inspection, missing page numbers, etc. TVA has corrected the discrepancies in these work documents and determined that (as with Workplan D-02249-03) the problems were administrative in nature and did not adversely affect hardware.

As a result of these weaknesses, training was provided on the "lessons-learned" from this event for personnel involved with preparation, performance, or closure of work documents controlled by the Modifications department. Additionally, field engineers have been directed to discuss these lessons-learned in pre-work briefings until improvement occurs as monitored primarily by WBN's Quality Review Pipeline (QRP) (discussed further below).

CORRECTIVE STEPS TAKEN TO AVOID FURTHER VIOLATIONS

WBN procedure SSP-2.09 has been revised to clarify the guidance for use of late entries. SSP-2.09 continues to emphasize that the use of late entries is the exception, not the rule. The training discussed above also emphasized that in-process signoffs are intended to be signed as the work progresses and not at a later time.

To provide added assurance that work document discrepancies are identified prior to closure, checklists used in WBN's Quality Review Pipeline were revised to include additional review attributes. [The QRP was established under WBN's "Management Objectives for Restart" (of construction) in 1991. As previously discussed with NRC (reference NRC Inspection Reports 50-390, 391/91-29, and 91-13), the process provides for monitoring, trending, and reporting of key attributes of work activities both in-process and at completion of the work]. These attributes include considerations for the sequence of work and signoffs, late entries, use of blanks and "N/As," etc. This revised checklist was placed in service in draft form on February 28, 1992 and approved on March 2, 1992. Closure of Modifications work documents between February 11, 1992 (cutoff date for the document review) and February 28, 1992, was administratively stopped until the revised pipeline checklist was placed in service.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

As discussed in the response, discrepant work document records were corrected and are in compliance with WBN procedural requirements. With regard to future work activities, TVA considers that current verification and monitoring controls (some of which are discussed herein) are sufficient to ensure that final closure documentation for work activities will comply with WBN procedural requirements.

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390/92-01-03**DESCRIPTION OF VIOLATION**

10 CFR 50, Appendix B, Criterion III, "Design Control," requires in part that design control measures be established to assure that regulatory requirements are correctly translated into specifications and procedures and that quality standards be specified and included in design documents. It further requires that measures provide for verifying the adequacy of design by individuals other than those who performed the original design.

Tennessee Valley Authority Nuclear Quality Assurance Plan TVA-NQA-PLN89-A, Revision 2, Section 7.0, Design Control, requires that measures be established to ensure that applicable design requirements are correctly translated into specifications, procedures, or instructions. It also requires that measures be established to control the preparation, review, and approval of design output documents to ensure that technical and quality requirements are incorporated prior to issuance.

Contrary to the above, on February 7, 1992, the TVA approved electrical design output cable pull calculations associated with Workplan D-08413-01, Rework Cable/Conduit, Remove and Reinstall Cable, were inadequate in that the following deficiencies were identified:

EXAMPLES 1 THROUGH 3

1. Cable pull calculations dated February 3, 1992, associated with the workplan omitted two of three single conductor cables for calculating pull tension limits. Therefore, the design output calculations failed to reflect scheduled cable installations.
2. Cable pull calculations failed to address possible cable jamming during cable installations by using nominal average outside cable diameters instead of actual field measurements of cable outside diameter as required by design specifications and procedures.
3. Cable pull tension calculations were incorrectly determined to be adequate by both the preparer and a reviewer even though two cables were omitted from all but one of the referenced calculations.

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TVA RESPONSE EXAMPLES 1 THROUGH 3REASON FOR THE VIOLATION

Prior to pulling cable in the field, Revision 3 of site procedure Modification/Addition Instruction (MAI)-3.2, "Cable Pulling For Insulated Cables Rated Up to 15,000 Volts," required that cable pull tension calculations based on conductor strength and sidewall pressure limits be performed using computer program CBLPUL in order to identify the proper pulling mechanism and to prevent cable damage. These violation examples occurred because the procedure failed to clearly identify the need to treat cables consisting of multiple single conductors in a special manner and because the procedure called for the field cable OD to be entered in the wrong field of the program. The particular calculations identified by the violation involve a cable consisting of three individual conductors. The computer program, CBLPUL, has provisions to address this case, in that, the three conductors are to be entered into the program as three separate cables. The responsible engineer entered the data for the cable only once and thought that the program accounted for the other two conductors. The engineer also inserted the measured outside cable diameter (OD) in the CBLPUL maximum OD field instead of the average OD field. Because the program uses the average OD field for the calculation, this action resulted in the program defaulting to the nominal average outside cable diameter inherently contained in the computer program. Had the data for the other conductors been entered, and in the correct fields, cable jamming would have been adequately addressed. Both the responsible engineer and the reviewer failed to identify the faulty data entry for the cable and failed to question a computer error message indicating a pullby condition limit had been exceeded when the cables being installed were to be pulled into an empty conduit. MAI-3.2 included detailed steps to utilize the CBLPUL program. Although the responsible engineer and the peer reviewer had been trained to the requirements of MAI-3.2, neither had been specifically trained in the use of the computer program CBLPUL version 3.2.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

TVA has placed interim administrative controls on cable pull calculations. These controls require second-party verification by Nuclear Engineering on pull tension calculations performed by the field. This action was taken at the time that the condition was identified and remains in affect until CBLPUL program version 4.0 is issued, applicable site procedures are updated, and users are trained. The calculations referenced in this violation that were in error have been redone under these interim administrative controls.

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CORRECTIVE STEPS TO BE TAKEN TO AVOID FURTHER VIOLATIONS

TVA has revised the CBLPUL software/user manual to add instructions to enter each conductor of cables composed of individual conductors and to add training information enhancements that emphasize clearly the requirement for use of the program.

TVA has revised MAI-3.2 to delete information in Appendix E pertaining to making data entries in CBLPUL. This revision provides reference to CBLPUL users manual and clarifies requirements relative to the "review" functions involved in cable pull calculations. This revision also adds the option to perform pull calculations manually for simple cable pulls.

TVA has identified the workplans involving cables which were issued after MAI-3.2 was issued requiring the use of CBLPUL for calculating cable pull tensions. TVA has evaluated and dispositioned an error message found in a calculation for one of these workplans.

Initial training for CBLPUL version 4.0 is being conducted for the designated program users and software/user manuals assigned. Training has been provided for Modifications field engineers which emphasized the role of the checker in evaluating error messages. TVA has also established and conducted sessions on self-checking for Modifications field engineers.

TVA will review site procedures to ensure that engineering requirements involving field calculations are properly conveyed in site procedures.

This calculation issue discussed here and in the following sections are documented and tracked by Problem Evaluation Report (PER) WBPER920031 and Incident Investigation II-W-92-001.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

TVA expects to be in full compliance by August 15, 1992.

EXAMPLE 4

The CBLPUL computer program used to calculate pull tension limits was inaccurate in that it was missing a multiplication safety factor for calculating the maximum sidewall pressure pulling tension.

TVA RESPONSE EXAMPLE 4REASON FOR THE VIOLATION

The reason for the violation was that TVA issued a revision to Construction Specification G-38, "Installation, Modifications, and Maintenance of Insulated

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Cables Rated Up to 15,000 Volts," for use at the sites without a corresponding update to the computer program used to implement G-38 requirements. TVA committed by letter dated October 11, 1990, to have additional engineering participation when the expected sidewall bearing pressures for new cable installations approach the maximum allowable limits. G-38, Revision 10, was issued to add a 0.8 factor to the equations for sidewall pressure pulling tension (Tswp) to reflect a 20 percent engineering evaluation margin. This 0.8 factor was selected as a threshold for engineering participation. The 0.8 factor was not incorporated in the computer software for CBLPUL when Revision 10 of G-38 was issued.

At the time that Revision 10 to G-38 was being issued, a revision to the CBLPUL computer software was also being planned by TVA to incorporate the G-38 changes. The issuance of the CBLPUL revision was delayed due to other enhancements being made. TVA failed to recognize the significance of this inconsistency between the specification and the computer software program.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

TVA has issued computer software program CBLPUL, version 4.0, to add the 0.8 factor in the equations for sidewall pressure pulling tension (Tswp) to reflect the 20 percent engineering evaluation margin.

In addition, TVA is reviewing workplans involving cable installation issued after November 30, 1990 (date of issue of G-38 Revision 10), to identify those cables in which CBLPUL was used to calculate pull tensions and Tswp was the limiting factor. For those cables identified, TVA will determine those for which permission was granted to exceed Tswp limits; if not installed, new cable pull tension calculations will be generated. Where cable installation has already occurred, TVA will evaluate and disposition those cables.

CORRECTIVE STEPS TO BE TAKEN TO AVOID FURTHER VIOLATIONS

TVA has revised G-38 by Specification Revision Notice (SRN)-G-38-132 to endorse version 4.0 of CBLPUL. Changes to G-38 affecting CBLPUL require a new version to be developed prior to issuance of the G-38 revision, thus ensuring adequate maintenance of CBLPUL.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

TVA expects to be in full compliance by May 15, 1992.

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EXAMPLE 5

The CBLPUL computer program used to calculate pull tension limits was not verified and validated to limit the maximum allowed conductor pull tension when basket-weave grips are used to pull shielded and unshielded cables.

TVA RESPONSE EXAMPLE 5REASON FOR THE VIOLATION

The reason for the violation was that the CBLPUL computer program was not completely verified and validated in accordance with Nuclear Engineering Procedure 3.8. Construction Specification G-38, Revision 10, requires that when basket-weave grips are used to pull cable that the maximum allowed conductor pull tension (Tc) be limited to 1000 pounds/grip for shielded cables and 2000 pounds/grip for unshielded cables. A review of the validation calculations for computer program CBLPUL has determined that the validation of the software program did not include measures to ensure the maximum allowable pull tension limit was not exceeded when basket weave grips are used to pull shielded and unshielded cables.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

TVA has performed verification calculations of the subroutines in version 3.2 of the program and determined that the subroutines were technically correct. TVA has performed and documented validation/verification of calculation parameters in version 4.0 of computer program CBLPUL in accordance with NEP 3.8.

CORRECTIVE STEPS TO BE TAKEN TO AVOID FURTHER VIOLATIONS

Personnel involved will be trained on this violation with emphasis on compliance with NEP 3.8 verification and validation requirements.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

TVA expects to be in full compliance by July 15, 1992.

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ADDITIONAL INFORMATION

TVA has revised MAI-3.2 to reflect the requirement added to G-38 on SRN-G-38-132 which will require that the method of attachment for cable pulls be stated in the work implementing document and that any changes in the attachment method require recalculation of pull tension limits.

EXAMPLE 6

Electrical Design Standard DS-E12.1.13, "Class 1E Cable ODs and Weights," was used as a design input document when performing pull tension calculations but had not been designated as a design input document, and the document also contained inaccurate computer program input information with regard to whether cables are shielded or unshielded.

TVA RESPONSE EXAMPLE 6REASON FOR THE VIOLATION

This violation occurred because the responsible engineer performing the calculation identified in the violation relied upon Electrical Design Standard DS-E12.1.13, "Class 1E Cable ODs and Weights," for information concerning whether the cable was shielded or unshielded.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

Computer software CBLPUL, version 4.0, and the user manual have been enhanced to indicate sources for obtaining shielding information on cables. Furthermore, these changes are being stressed in the training for CBLPUL.

CORRECTIVE STEPS TO BE TAKEN TO AVOID FURTHER VIOLATIONS

Electrical Design Standard DS-E12.1.13 will be enhanced to clarify the sources for obtaining design input information on cables (shielded and unshielded).

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

TVA expects to be in full compliance by August 1, 1992.

ENCLOSURE 3

LIST OF COMMITMENTS

390/92-01-03

1. Initial training for CBLPUL version 4.0 is being conducted for the designated program users and software/user manuals assigned. This commitment will be implemented by August 15, 1992.
2. TVA will review site procedures to ensure that engineering requirements involving field calculations are properly conveyed in site procedures. This commitment will be implemented by August 15, 1992.
3. TVA is reviewing workplans involving cable installation issued after November 30, 1990 (date of issue of G-38 Revision 10), to identify those cables in which CBLPUL was used to calculate pull tensions and Tswp was the limiting factor. For those cables identified, TVA will determine those for which permission was granted to exceed Tswp limits; if not installed, new cable pull tension calculations will be generated. Where cable installation has already occurred, TVA will evaluate and disposition those cables. This commitment will be implemented by May 15, 1992.
4. Personnel involved will be trained on this violation with emphasis on compliance with NEP 3.8 verification and validation requirements. This commitment will be implemented by July 15, 1992.
5. Electrical Design Standard DS-E12.1.13 will be enhanced to clarify the sources for obtaining design input information on cables (shielded and unshielded). This commitment will be implemented by August 1, 1992.