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MAY 17 1993

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

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

Reference: TVA letter to NRC Document Control Desk, January 15, 1993 - Reply to Notice of Violation (NOV) for NRC Inspection Report No. 390/92-201.

On March 26, 1993, a meeting was held at Watts Bar Nuclear Plant to discuss the TVA response (Reference 1) to the NRC NOV 390/92-201 dated November 30, 1992. This NOV identified thirteen examples of three Severity Level IV violations related to the Watts Bar Civil Integrated Design Inspection (IDI). As a result of this discussion, the NRC requested a supplemental violation response from TVA.

The enclosure to this letter addresses the specific items described in the NOV for which supplemental information was requested.

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If any questions exist relative to the enclosed, please contact P. L. Pace at (615)-365-1824.

Very truly yours,

W. J. Museler

William J. Museler

Enclosure
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ENCLOSURE

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.

TVA Response:

TVA does not agree with the violation example.

Discussion of the Issue:

In 1985, TVA purchased the reactor coolant loop (RCL) system lumped mass and stiffness matrix mathematical model from Westinghouse.

In March 1989, as part of the Seismic Analysis Corrective Action Program (CAP) plan (Reference 1), the RCL system mathematical model was used to generate Set B and Set C acceleration response spectra and structural responses. The results of this analysis were used to provide appropriate seismic design input to the auxiliary branch lines which were reanalyzed in 1989 and 1990. The forces and moments on nozzles attached to the RCL as a result of the reanalysis were coordinated with Westinghouse in 1991 and documented by Westinghouse letter (Reference 2).

In June 1991, Westinghouse, upon a request from TVA, performed a study to assess the impact of Set B seismic spectra on the RCL piping and associated equipment. As a result of this study, Westinghouse concluded that the new spectra had no adverse impact on the original design basis stress analysis of the RCL piping and associated equipment. This study is documented in a report issued by Westinghouse on June 20, 1991 (Reference 3).

In March of 1992, TVA transmitted the new Set B spectra for all buildings to Westinghouse with the instructions that the new data be used for any evaluation that Westinghouse may be requested to perform for WBN in the future (Reference 4).

On August 13, 1992, Westinghouse issued a letter (Reference 5) to TVA in response to NRC IDI issue 92-201-07. The purpose of the letter was to show that Westinghouse was aware of the seismic reanalysis program at WBN and an interface between TVA and Westinghouse took place during and after the completion of the seismic analysis program.

Summary

As evidenced above, TVA has coordinated the changes of seismic response spectra, generated as part of the Seismic CAP, with Westinghouse prior to the IDI audit. The Westinghouse letter dated August 13, 1992 was confirmatory in nature and was a result of a specific request by the staff reviewer. Therefore, TVA does not believe this issue should be considered an example of the cited violation.

References:

1. Seismic Analysis Corrective Action Plan, Revision 2 dated May 9, 1990 (L44 900509 802)

2. Westinghouse letter WAT-D-8664 dated October 22, 1991 (T33 911127 802)

3. Westinghouse letter WAT-D-8581 dated June 20, 1991 (B26 910701 301)

4. TVA letter to Westinghouse dated March 27, 1992 (T33 920327 816)

5. Westinghouse letter WAT-D-8971 dated August 13, 1992 (T33 920813 971)

Violation: 2.b.1

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:

Certain dimensions of installed support 63-1SIS-R120 were found to be outside the tolerance limits specified in the applicable drawings or installation instructions.

Supt. 63-1SIS-R120 - 3/16" gap between the washer and the spherical bearing in the pipe clamp.

TVA's Response:

TVA agrees with the violation example.

Discussion of the Issue:

The issue concerns an excessive gap between the washer and the spherical bearing in the pipe clamp. Section 4.2.4 of General Engineering Specification G-43 limits the allowable gap to 1/16". Section 5.3.14 of Walkdown Procedure (WP)-32 required missing or dislodged spherical bearings and washers on sway struts to be recorded (i.e., gap was not a specific attribute although it indirectly was checked as a result of the above). Nonconformance Report (NCR) 5276 addressed this problem in 1984 and the corrective action resulted in the inspection requirements which are still in place today. As stated in our previous response, the cause of this condition appears to be personnel error.

Corrective Action:

Work Request 115553 was written to correct this problem (completed December 7, 1992). This attribute is also captured in the Damaged, Loose, or Missing Hardware walkthrough, MAI-1.9.

Recurrence Control:

The personnel error occurred prior to construction restart in November 1991. Since restart, changes to the work control process have been implemented, thus providing the necessary steps to prevent recurrence. In addition, G-43 provides the specific gap tolerance for installation and verification.

References:

1. General Engineering Specification G-43, "Installation, Modification, and Maintenance of Pipe Supports and Pipe Rupture Mitigation Devices," Revision 12

2. Work Request 115553 dated July 30, 1992

3. MAI-1.9, "Damaged, Loose, or Missing Hardware Instruction," Revision 1

Violation Example: 2.b.2

Certain dimensions of installed support 74-1RHR-R213 were outside the tolerance limits specified in the applicable drawings or installation instructions.

Supt. 74-1RHR-R213 - Spherical bearing dislodged by 1/16" at the paddle of top sway strut.

TVA's Response:

Although the specific installation tolerance was not met, TVA does not consider that it is appropriate to cite this issue as an example of a violation because scheduled TVA activities for this support had not yet been completed, as discussed below.

Discussion of the Issue:

This issue concerns dislodging of the spherical bearing in the paddle of a sway strut. Section 5.3.14 of Walkdown Procedure (WP)-32 required missing or dislodged spherical bearings and washers on sway struts be recorded. This item was not noted during the walkdown although similar conditions were identified for other supports during the same walkdown program. Tolerance on installations of this type are provided on TVA drawing 1-48A200-12 (Note 150.c) which requires the bushing be centered in the paddle within ± 1/32". The deviation is therefore only 1/32" from the tolerance allowed and will not affect the supports ability to function.

The "Damaged, Loose, or Missing Hardware Program," (Reference 2) was developed to ensure hardware on safety-related systems is reinspected prior to release for Startup testing. The MAI has a specific inspection attribute to identify this type of deviation. Appendix C requires the inspector to note missing or dislodged support components. The Residual Heat Removal System (System 074) for which this support is part of, had not yet been walked down in accordance with this program.

Summary:

Due to the attribute listed under MAI-1.9, TVA does not believe this to be an appropriate violation example.

References:

1. Walkdown Procedure WP-32 "Walkdown of As Built Piping Systems Under the Scope of HAAUP," Revision 5

2. MAI-1.9, "Damaged, Loose, or Missing Hardware," Revision 1

Violation Example: 2.b.3

Certain dimensions of installed support 74-1RHR-R215 were outside the tolerance limits specified in the applicable drawings or installation instructions.

Supt. 74-1RHR-R215 - Baseplate thickness 5/8" versus 3/4" in drawing.

TVA's Response:

TVA disagrees with the violation example.

Discussion of the Issue:

The "AS CONSTRUCTED" drawing for the subject hanger specified a 5/8" thick baseplate. The Walkdown Procedure (WP)-32 walkdown conducted as part of the HAAUP program identified the plate thickness as 3/4". During the IDI review, the plate was measured as 11/16" thick. Section 5.3.9 of the WP-32 walkdown procedure required baseplate thickness be measured to within ± 1/16". Since 5/8" and 3/4" are both within ± 1/16" of 11/16", no violation of procedure has occurred. Additionally, General Engineering Specification G-43 specifies an installation tolerance of + 1/4" and - 0" and since plates are specified in 1/8" thickness increments, the walkdown team identified the plate exceeded 5/8" and therefore went to the next 1/8" (i.e., 3/4").

Since the initial HAAUP review specified a modification to upgrade the concrete anchor bolts, DCN F-19943 was written to upgrade the plate to 3/4" also.

Summary:

The walkdown sketch and configuration in the field were within procedural tolerances and therefore, TVA believes no violation example occurred.

References:

1. Walkdown Procedure WP-32 "Walkdown of As-Built Piping Systems Under the Scope of HAAUP," Revision 5

2. General Engineering Specification G-43, "Installation, Modification, and Maintenance of Pipe Supports and Pipe Rupture Mitigation Devices," Revision 12.

Violation Example: 2.b.4

Certain dimensions of installed support 1-03B-8 were outside the tolerance limits specified in the applicable drawings or installation instructions.

Supt. 1-03B-8 - 1/8" gap between pipe bottom and support steel.

TVA's Response:

TVA disagrees with the violation example.

Discussion of the Issue:

The issue concerns a gap between a horizontal pipe and support steel (i.e., lack of dead weight support). Section 5.3.7 of the WP-32 walkdown procedure required rigid supports to be measured for as-built gaps with a tolerance of ± 1/32". At the time of walkdown, the gap was between the top of the pipe and support steel as noted on the walkdown sketch. This is substantiated by the fact that the walkdown identified a 1/16" thick shim plate between the bottom of the pipe and support steel. Since the total gap criteria of 5/32" (Reference G-43) was not exceeded as noted by the walkdown or during the IDI review, no violation of procedure occurred.

It should be noted that various attributes can cause a pipe to move after a hanger is installed. Events such as hydrostatic testing, hot functional testing or even differential ambient temperatures are just a few examples. Section 4.3.2.6 of G-43 requires the pipe to be in contact with all vertical supports upon initial installation. However, once a support has passed initial inspection, due to the phenomena described above, only total gap requirements are imposed.

Summary:

The walkdown package and configuration in the field are within procedural tolerances and therefore, TVA believes no violation example exists.

References:

1. Walkdown Procedure WP-32, "Walkdown of As-Built Piping Systems Under the Scope of HAAUP," Revision 5

2. General Engineering Specification G-43, "Installation, Modification, and Maintenance of Pipe Supports and Pipe Rupture Mitigative Devices," Revision 12

Violation: 2.c.2

Description of Violation:

Weld sizes, weld symbols, and dimensions for installed support 1-03B-11 were inconsistent with their associated drawings.

Discussion of Violation Example:

The identified NRC issue is as defined below:

Supt. 1-03B-11 - Weld between support and embedded plate is 1/4" vs. 5/16" shown on the support drawing.

TVA's Response:

TVA agrees with the violation example.

Discussion of the Issue:

This is a unique case in the fact the support was disassembled (i.e., not completely removed) at the time of the Bechtel walkdown. Open item number 1-03-HAAUP-010-001 was identified against this support with a description of "Construction Hold: Disassembled" (i.e., none of the support was "as-built" since it was disassembled). Construction was notified to reinstall the support in accordance with the latest drawing. Based on the aforementioned, the support was qualified in accordance with the existing "AS CONSTRUCTED" drawing. Due to the configuration of the support (i.e., the cross members are bolted) only the portion reinstalled was reinspected. The entire support should have been reinspected to the "AS CONSTRUCTED" drawing.

The support designer was aware the weld in question had substantial safety margin as noted on sheets 23 and 24 of Attachment C in calculation 103B011 which was issued in December 1989. It should be noted that this calculation reflects only a 1/8" fillet is required for strength; however, a 3/16" is required to meet minimum AISC specifications. Since the "as-built" weld is 1/4", the support meets design requirements.

Corrective Action:

The deviation from the 5/16" fillet specified on the 'AS CONSTRUCTED" drawing to the 1/4" fillet "as-built" weld was documented on DCN S-19940-A which was issued during the IDI review to document this administrative change.

Recurrence Control:

TVA believes this to be a unique condition, as the support was disassembled at the time of the walkdown. The corrective actions taken during the IDI review should resolve this issue.

Violation: 2.e

Description of Violation:

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

TVA's Response:

TVA does not consider it appropriate to include this issue as a violation example because scheduled TVA activities for this support had not yet been completed, as discussed below.

Discussion of the Issue:

The missing clamp issue is part of an ongoing Modifications activity to walkdown and repair clamp installation problems (i.e., loose, missing hardware, spring nut orientation, etc.). This activity was initiated to resolve CAQ WBP890248 (Reference 1) in 1989. As part of the corrective action for WBP890248, Modifications "shall perform the corrective action on workplans M-5695-1 through M-5695-16." Clamp presence is part of scope of these workplans. (Workplan M-5695-8, Page III-3, Step 2.00 requires "the craftsmen to walk down each conduit and document, . . (3) clamp tightness or non presence . . . as an example of this). These workplans were written as generic maintenance workplans. However, under the new Modifications work rules, origination maintenance workplans are no longer used. Since these sixteen workplans were not closed, each have Modifications Remaining Work Lists (RWL). These sixteen remaining work documents are being tracked in the Master Tracking System (MTS) by the document number. The work scope in these workplans is being implemented by Work Request and Work Order (clamp presence is part of the Work Order).

Summary:

The missing clamp attribute was known by TVA and a corrective action plan developed under WBP890248 prior to the IDI audit. This plan, as discussed above, provides evidence that the items were scheduled for work and not appropriate to be cited as a violation example.

References:

1. WBP890248, Revision 3

2. Master Tracking System

Violation: 3.a

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 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:

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.

TVA's Response:

TVA does not agree that this issue should be considered a violation example.

Discussion of the Issue:

The Weld CAP concluded that existing welds for all structural features were of adequate quality, satisfied strength requirements, and recommended that weld size, length and location be obtained where significant load increases occurred.

Based on the Weld CAP conclusions, this recommendation was implemented in the Cable Tray CAP as follows:

Initial Walkthrough/Evaluations:

The initial walkthroughs and critical case evaluations (Reference 1) consisted of verification of the corrective actions for NCR 5737 R1 which dealt with support deviations from the design output documents.

These walkthrough overinspections and critical case evaluations considered weld size, length, and location as a critical evaluation attribute for the initial population of 451 supports. Based on the results of this work, the following weld related areas were targeted for further review.

1. The welded connection between the cable tray supports and the cable trays required review for the total population. This is being implemented to ensure that proper weldments exist under DCN M-10471-B.

2. Weld presence and configuration was included as walkthrough attributes for the remainder of the population.

Subsequent Walkthroughs & Evaluations:

In addition, since bounding and worse case supports represent those which could have realized load increases, all bounding and worse case support welds were as-built. This amounted to approximately 20% of the total cable tray support population.

Evaluation of this data concluded that the 1/16" undersize penalty as noted on the cable tray support drawings is conservative. Therefore, evaluations based on as-designed data include this penalty for evaluation purposes.

Data Utilization for Bounding Case Evaluation

During the process of utilizing the data that was obtained from the walkthroughs, the requirement for the trending process was identified as follows:

- Bounding cases which utilized Work Requests (WRs) to upgrade welds to the drawing requirements were trended to identify any additional areas for rework. Approximately 200 supports are affected by bounding cases with WRs.

Trending Process:

Prior to the Integrated Design Inspection (IDI) audit, TVA began assessing weld profiles for the cable tray support population. This is documented in the design control summary (Reference 2), and an activity was scheduled in P/2 under project work list (PWL) WF, activity EXWFC05240.

This trending assessment has been completed. The assessment of the cable tray support population for the effects of modifications relating to as-built welds is documented in calculation WCG-1-1516 (Reference 3). This assessment resulted in additional WRs and ensures that all cable tray support welds are structurally adequate under the as-built condition. This calculation was recently reviewed by the NRR staff.

After the review of calculation WCG-1-1516, the staff verbally requested that TVA demonstrate its effectiveness by walking down the weld sizes for a group of trapeze supports. This is documented in a Walkdown Package (Reference 4). This walkdown verified that the bounded supports are acceptable. This was also reviewed by the NRR reviewer.

Summary:

As a result of the weld assessment and additional requested walkdowns, no change in the bounding/ranking occurred. Therefore, TVA believes this was not an appropriate violation example.

References:

1. Cable Tray and Cable Tray Support CAP Interim Report (T30 920710 858)

2. Design Control Summary WCG-WB-CT-00 (B18 920711 291)

3. Calculation WCG-1-1516 (B18 930105 753)

4. Walkdown Package (B18 930225 752)

Violation: 3.b

Violation Example:

Four tray 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-L4-035B, 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.

TVA's Response:

TVA agrees with the violation example for Calculation WCG-AB-1296-2208, as discussed below.

Discussion of the Issue:

Supports attached to concrete are designed to satisfy the requirements of TVA's Civil Design Standard DS-C1.7.1 (Reference 1). DS-C1.7.1 Revision 5, Section 7.3.1 states "when the minimum spacings given in this section are used, the full allowable tensile load on the anchor may be used without calculation of the pullout capacity of the concrete anchors."

HVAC Supports:

Many HVAC typical support designs have limited load capacities because the anchor spacings on the baseplates resulted in overlapping cones that necessitated the use of reduced anchor allowables. Therefore, G-32 anchor spacings were considered a critical attribute for support evaluations. This is evident from the requirements to check G-32 violations during the HVAC support walkdowns per the Appendix B checklist of TI-2012 (Reference 4).

Various third party (independent) reviews of HVAC support calculations have been performed by R. L. Cloud and Associates and NRC, and no problems have been identified with anchor pullout evaluations. Most recently, 45 support calculations were reviewed by the NRC during the Civil IDI audit, and no problems were identified pertaining to this issue. It is evident that the NRC was attentive to G-32 concerns because of the questions raised on IDI Item 073 for a possible G-32 free edge violation. (NOTE: IDI item 073 was resolved to NRC's satisfaction during the audit because it was shown that there was no free edge at the support anchorage in question.)

Therefore, TVA does not believe this issue exists for HVAC supports.

Conduit and Cable Tray Supports:

A reexamination of the calculations reviewed by the staff during the IDI shows the following:

> Calculations WCG-AB-1298-0442, WCG-CB-1337-0509, and WCG-AB-C27-066B address supports that are attached to embedded plates. Embedded plates are programmatically qualified, and the concrete pullout capacity is checked in calculation WCG-1-1310 (Reference 2). Therefore, no violation exists.

Calculations WCG-WB-CS-08, WCG-AB-B2-017B, WCG-AG-C50-077B, WCG-AB-C9-156, WCG-AB-C58-063, WCG-AB-C19-030, and WCG-DGB-L4-035B address surface mounted attachment plates which meet the qualified internal anchor spacing requirements (i.e., anchor spacing is greater than or equal to the minimum spacing in DS-C1.7.1). Therefore, concrete pullout capacity complies with the requirements of DS-C1.7.1. Therefore, no violation exists.

Calculation WCG-AB-1296-2291 contains a surface mounted attachment plate which was not explicitly evaluated for as-built anchor spacing. However, the qualification utilized a very conservative hand calculation method to evaluate the support considering only 3 of the 8 anchors for pullout. This methodology was confirmed by analysis during the audit to demonstrate that this was an acceptable method of qualification. Therefore, TVA believes no violation exists.

Calculation WCG-AB-1296-2208 qualified the surface plate attachments without explicitly documenting a minor as-built anchor spacing discrepancy. After the IDI, this calculation was revised (Reference 3) to confirm that the anchor bolt capacity is acceptable in the as-built condition. Therefore, TVA agrees to the violation example for this calculation.

Corrective Action:

TVA performed a review of a sample of conduit and cable tray support calculations for this discrepancy. The review showed that this problem does not exist for conduit supports. However, one additional cable tray support calculation was identified which required revision for minor internal spacing discrepancies.

Therefore, a complete 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 internal spacing issues (experienced engineers in determining anchor bolt capacities did not explicitly document these minor internal spacing issues). These five calculations resulted in no hardware impacts and the anchors were determined to be acceptable as designed.

Recurrence Control:

All calculations associated with these commodity corrective action plans have been completed and were within the scope of the above reviews. Additional emphasis has been placed upon documenting judgment/internal anchor spacing dispositions, even when very minor.

Summary:

TVA agrees that a calculation violation exists. These discrepancies have been corrected and no hardware has been impacted. The above discussion and calculation packages have served to resolve this issue with the NRR staff reviewer.

References:

1. Civil Design Standard DS-C1.7.1, Revision 5
2. Calculation WCG-1-1310 (B18 920712 295)
3. Calculation WCG-AB-1296-2208, Revision 2 (B18 921016 261)
4. TI-2012, HVAC Walkdown Procedure

Violation: 3.e

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 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:

TVA's Response:

TVA disagrees that this issue should be considered a violation example.

Discussion of the Issue:

Section 3.7.3.3.1.2 of the FSAR governing equipment modeling states that "The modes are considered as potentially significant if the corresponding natural frequencies are less than 33 Hz. For modes greater than 33 Hz, the rigid response contribution is considered."

As acknowledged in Reference 1 (Item 92-210-03), the design criteria permitted equipment with frequencies less than 33 Hz to be considered rigid depending on the rigid range of the response spectra curves. The intent of the statement was to allow the piping analyst to input a response spectra curve which would account for rigid response values corresponding to the equipment fundamental frequencies. This would be accomplished by applying a constant acceleration from the equipment fundamental frequency through the rigid range. The piping would then be decoupled from the equipment and a response spectra input which would account for equipment frequencies less than 33 Hz. Thus, the consideration of potentially significant modes less than 33 Hz would have been considered. The FSAR and design criteria are therefore in agreement. However, at the IDI inspectors' request, TVA agreed to revise the criteria to clarify its intent and to ensure approval on a case by case basis with adequate documentation.

During TVA's review for this criteria change, two items were discovered:

1. This modeling technique was not used during the reanalysis of piping systems under the HAAUP CAP; and

2. Twelve calculations were identified which considered equipment with frequencies less than 33 Hz as rigid.

A detailed review of these 12 calculations revealed that the justification for considering the equipment rigid within the model was that the piping attached to the equipment was located close to an equipment support, therefore making the equipment rigid for the purposes of the piping analysis. In each case, technical documentation was provided to document modeling the equipment as rigid. TVA reviewed each of these calculations to ensure the justifications used were sufficiently adequate. As a result of this review, two calculations were revised

to strengthen the original justifications, but the conclusions originally made remained valid.

Summary:

In conclusion, since the design criteria and FSAR are in agreement, and technical justification was documented in each calculation, TVA believes that this condition does not represent an example of the violation.

References:

1. Response to NRC Integrated Design Inspection Issues dated October 13, 1992 (T04 921013 496)

2. Design Criteria WB-DS-C-40-31.7, Rev. 17

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.

TVA's Response:

TVA disagrees with the violation example.

Discussion of the Issue:

The piping design stresses were not compromised by the use of Certified Mill Test Reports (CMTRs). Allowable stress values specified in the ASME code were utilized for the design and analysis of the piping.

The ASME code does not provide specific rules and stress limits for postulating pipe ruptures. NRC's pipe rupture position for postulating ruptures has changed considerably over the years through various documents (e.g., 1972-1973 letters, Regulatory Guide 1.46, various versions of Standard Review Plan Section 3.6, and associated revisions to Auxiliary System Branch Technical Position ASB 3-1 and Mechanical Engineering Branch Technical Position MEB 3-1). The use of Certified Mill Test Reports (CMTRs) by TVA was a rational approach used to perform a more detailed evaluation and to obtain more realistic and credible postulated rupture locations. This CMTR process was prescribed by TVA Engineering Administrative Instruction EAI-8.08, revision 0, entitled "Documentation and Analysis Procedure for Evaluating the Effects of Postulated Pipe Ruptures."

It is recognized that this refinement of using CMTRs for postulating ruptures was not specifically delineated in the FSAR, but it was not a violation of the ASME code. Conservative stresses are utilized in the pipe rupture evaluation to postulate rupture locations. The use of yield strengths and ultimate strengths from CMTRs is a practical method to calculate a more accurate allowable pipe rupture stress and is compatible with industry practice. CMTRs are used in Leak Before Break applications (per proposed SRP 3.6.3, published in the Federal Register, Volume 52, No. 167, August 28, 1987).

The use of the CMTRs on six affected piping analysis problems, during the final design process, resulted in the deletion of only three through-wall leakage cracks in moderate energy piping, and only six breaks in 2-inch high energy piping. The influence of these cracks and breaks is not significant, (e.g., these deleted breaks were often in the same vicinity as existing breaks, and breaks were in small lines). The piping design stresses were not compromised by the use of specific actual tested strengths from CMTRs (using specific heat numbers for specific sections of pipe), since allowable stress values specified in the ASME code were still utilized for the design and stress analysis of the piping.

The intent of the NRC position on pipe rupture was met, and therefore there is no violation to the WBNP design basis commitments. However, per the agreement between TVA and the NRC staff during the Civil IDI audit of July-August 1992, TVA has revised the six pipe rupture calculations to eliminate the use of CMTRs; and has revised design documents to delete the use of CMTRs and require a case by case documentation and an FSAR change where CMTRs are considered for future use in pipe rupture evaluations.

Summary:

The use of CMTRs is a recognized industry practice and was captured in TVA procedure EAI-8.08, Rev. 0. TVA has agreed to change this procedure and use a more conservative allowable stress in the determination of potential pipe breaks. Since the ASME does not address rupture postulation, TVA does not consider that it appropriate to include this issue as an example of a violation.