

June 19, 1989

Docket Nos. 50-259, 50-260
and 50-296

Mr. Oliver D. Kingsley, Jr.
Senior Vice President, Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. Kingsley:

SUBJECT: CLOSURE OF NOTICE OF VIOLATION AND INSPECTION REPORT 50-259/86-35,
50-260/86-35 AND 50-296/86-35 DATED JANUARY 28, 1987

The purpose of this letter is to address the TVA responses submitted as a result of the Notice of Violation and inspection report findings (50-259/86-35, 50-260/86-35, and 50-296/86-35) which are applicable to the Browns Ferry Nuclear Plant.

Enclosure 1 provides a summary of the issues (violation and findings) identified as a result of the NRC inspection and the resolution of each of the issues based on TVA actions and NRC review.

Enclosure 2 provides a listing of the key documents relevant to these issues.

Based on our review of the TVA responses and actions, the issues raised as a result of the original special inspection are considered by the NRC staff to be resolved. This letter serves as the closure for the Browns Ferry Nuclear Plant on these issues.

If there are any questions, please contact this office.

Sincerely,

Original signed by

B. D. Liaw, Director
TVA Projects Division
Office of Nuclear Reactor Regulation

Enclosures:

1. Resolutions
2. Relevant Documents

cc w/enclosure:
See next page

*See Previous Sheet for Concurrence

QF01
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OFC	: TVA:EB	: TVA:EB/BC*	: TVA:AD/TP*	: TVA:AD/P*	: NRR:TVA/D	:
NAME	: RShewmaker	: DTerao	: RCPierson	: SBlack	: BDLiaw	:
DATE	: 6/19/89	: 5/8/89	: 5/11/89	: 6/1/89	: 6/19/89	:

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ENCLOSURE 1

RESOLUTIONS OF VIOLATIONS AND ISSUES

INSPECTION REPORT 50-259/86-35, 50-260/86-35, 50-296/86-35

1. VIOLATION, SAMPLE #39

Issue: On July 9, 1985, Nonconformance Report (NCR) BFNTDP7801 was closed by actions completed for Engineering Change Notice (ECN) L1845. The issue involved a failure to maintain separation between Safety Division I and Safety Division II circuits in that the recirculation pump flow monitoring circuits for each division were tied together on the same terminal block. Corrective action was defined and its completion was confirmed by the Browns Ferry Engineering Project Manager on August 15, 1985. However, it was found that the action had, in fact, not been completed and the records were in error. TVA was cited for failure to complete a corrective action as required under Criterion XVI of 10 CFR Part 50, Appendix B and the implementing document, the TVA Quality Assurance Program Report, Section 17.2.16.

Action: On March 23, 1987, TVA responded to the Notice of Violation, admitting the violation had occurred. The cause was attributed to inadequate review of the design documents during the closure of the NCR. A Significant Condition Report (SCR) was issued (SCR BFNEEB8635) to document the closure deficiency and to track a proper closure. TVA has also taken several actions to prevent this situation from arising in the future.

Closure on CAQs which is addressed in a new procedure that includes directions for processing SCRs and NCRs is now in place. A positive means of closure verification is now required. This requires the verification of physical changes to the plant that are necessary by the action required for resolving the SCR or NCR. This verification can be completed under the procedure using as-constructed drawings, documented physical walkdowns or using other QA-level issued documents. TVA has also issued a specific set of design criteria to address the subject of electrical separation. These criteria are known as BFN-50-794, "Physical Independence of Electrical Systems." Each ECN which must be resolved that deals with cables and requires consideration of divisional separation will have to consider these criteria.

Based on this information, the issues arising from this violation (Sample #39) have been properly addressed. This item is considered closed.

2. FINDING FROM SAMPLE #1

Issue: The effect of seismically-induced spray from Class II piping failures on Class I electrical components was identified at the Sequoyah Nuclear Plant as an outstanding NCR which had existed without resolution for a considerable time period. This issue was identified as potentially generic within TVA and as an issue to be addressed at the Browns Ferry facility.

Action: This issue was identified for the Browns Ferry Nuclear Plant (BFN) by SCR BFNMEB8605. The Browns Ferry Nuclear Performance Plan (BFNPP) (Volume 3)

stated that a program to address the seismic systems interaction issue would be developed before the restart of BFN Unit 2. TVA also submitted a program document entitled, "Seismic Class II Features Over Seismic Class I Features," dated March 29, 1988. Specifically, within the program scope TVA has a seismically-induced spray evaluation program which involves the walkdown screening of the plant, evaluation of outlies and any necessary modifications of the plant. This effort is to be completed prior to BFN Unit 2 restart. TVA has submitted, with the program document, a set of criteria for the consideration of seismically-induced spray hazards within the plant which is currently under NRC review.

Based on these facts, as outlined in the TVA letter of July 29, 1987, it is evident that this problem is in fact an item for consideration at Browns Ferry and is being addressed with the completion being required prior to restart. This issue is closed.

3. FINDING FROM SAMPLE #5

Issue: The problem of motor overvoltage in the 460V systems identified at the Sequoyah Nuclear Plant was noted as potentially generic within TVA and no review of this issue was available from TVA for the Browns Ferry Nuclear Plant.

Action: TVA responded in a letter dated July 29, 1987 that the electrical recalculation effort for Browns Ferry would include the voltage drop studies that would analytically determine the operating voltages at the terminals of the safety-related motors. Thus, the problem type identified at Sequoyah would be encompassed in the recalculation effort and any safety-related motor determined to be operating outside of its rating range will be identified as a deficiency with the corrective action being initiated to achieve compliance. An additional NRC follow-up inspection has been completed in conjunction with the Design Baseline and Verification Program (DBVP) in the area of electrical calculations. As documented in Inspection Report 50-259,260,290/88-07 dated September 8, 1988, the staff included a review of calculation ED-Q2000-87027, "460V ac Class 1E Motor Voltages." No unfavorable situations related to this issue were identified.

As a result of these efforts, the staff concludes that TVA has taken appropriate action to address this issue at the Browns Ferry facility.

This issue is considered closed.

4. FINDING FROM SAMPLE #6

Issue: Reanalysis by TVA of piping at the Sequoyah Nuclear Plant resulted in a change of high stress locations in the lines with a corresponding change in the locations of postulated high energy line breaks. This posed a potential Browns Ferry Final Safety Analysis Report (FSAR) discrepancy since the FSAR described postulated high energy line breaks based on the previous piping analysis high stress locations. While similar piping stress reanalysis is being done at the Browns Ferry plant there was no documentation to address this same issue at Browns Ferry.

Action: TVA has determined that there is no conflict at Browns Ferry Nuclear Plant with regard to the reanalyzed piping conditions and the FSAR document. TVA is in the process of reviewing the plant against the NRC regulatory relaxation criteria which were outlined in Generic Letter 87-11. Any changes which

result from the possible use of these criteria will be documented in the FSAR if they are implemented prior to the restart of Unit 2. This action was outlined in a letter from TVA dated July 29, 1987.

This issue is considered closed.

5. FINDING FROM SAMPLE #10

Issue: At Sequoyah, the qualification of seal material (caulking) was questioned based on revisions to the accident temperatures causing higher temperatures to which the material would be subjected. The design criteria were also found to be deficient in that the caulking compounds were only required to remain functional under normal conditions. TVA was requested to address this issue at Browns Ferry.

Action: TVA in response to this issue for the Browns Ferry plant, as documented in a letter dated July 29, 1987, indicated this was not an issue for Browns Ferry since the materials at issue were not used at Browns Ferry. The use of the caulking material at Sequoyah was dictated by the special requirements of the ice condenser and containment which did not exist at Browns Ferry.

A review of this issue has concluded that this issue is closed.

6. FINDING FROM SAMPLE #13

Issue: At the Sequoyah Nuclear Plant, the seismic design accelerations for certain cable tray supports in the diesel generator and the additional diesel generator buildings were found to be inconsistent with the building accelerations at the same elevation. No information was available to establish whether the same conditions existed or not at the Browns Ferry Nuclear Plant.

Action: TVA found that similar situations existed at the Browns Ferry Nuclear Plant and as a result generated a specific SCR identified as SCR BFNCEB8518. This specific SCR will be addressed and completed prior to BFN Unit 2 restart. Additionally, the overall seismic adequacy of the cable trays and cable tray supports at Browns Ferry is included within the Seismic Design Program which is addressed in the BFNPP (Volume 3). This information was provided by TVA in a letter dated July 29, 1987 and the Browns Ferry Nuclear Performance Plan, dated August 28, 1986.

Based on the inclusion of this one aspect into the larger effort which is being completed, the item is considered closed.

7. FINDING FROM SAMPLE #37

Issue: The failure to account for short circuits in the design of power circuits as required in the TVA electrical design standard, DS-E12.1, was identified by TVA in SCR BFNEEB8524 as a result of findings by TVA on the Watts Bar plant. TVA identified the original (circa 1965) design standards as being deficient in sizing cables for only 125 percent of the motor current and voltage drop considerations. The requirements to consider short circuit current was added to the TVA requirements in 1976 and 1977.

Action: TVA in the course of examining the electrical engineering design relative to the Browns Ferry plant identified additional items which were written up as SCR's. Consequently, in the derivation of the DBVP for Browns Ferry, TVA included a program to regenerate a minimum set of the essential electrical design calculations. The DBVP scope encompassed the ac and dc power and control system short circuit analysis and included the ac and dc auxiliary power and control power loading and voltage regulation analysis for normal operating and offsite power conditions, verification of electrical analysis computer codes, analysis of short circuit and overload protection for containment electrical penetrations, the analysis of loads on standby diesel generators and the identification of Appendix R associated circuits of concern. The end goal of the DBVP effort is to have in place a complete set of technically adequate essential electrical calculations. TVA outlined these actions in a letter dated July 29, 1987.

Based on the specific SCR written on the issue and the scope of the electrical calculations program, the staff finds this issue is being addressed within the electrical calculation program. This specific item is closed.

8. FINDING FROM SAMPLE #38

Issue: The remaining issue from this sample dealt with the seismic qualification of the cable tray systems.

Action: TVA addresses this subject programatically for the Browns Ferry plant in the Nuclear Performance Plan (BFNPP), Volume 3 in Section 3.3, Cable Tray Supports, as noted in a letter dated July 29, 1987. The staff's evaluation of that program relative to the interim acceptance criteria used for the restart of BFN Unit 2 is documented in a letter from D. Muller (NRC) to S. White (TVA) dated February 5, 1987. The long-term evaluation of the Browns Ferry cable tray systems will be reviewed in conjunction with the staff's generic review of the resolution of Unresolved Safety Issue A-46 and its implementation as covered by Generic Letter 87-02.

Based on the actions taken by TVA, the issue has been adequately identified and addressed. The matter is considered to be closed contingent upon any action which might be taken during the review and evaluation of the USI A-46 implementation or other specific reviews in this subject area by the NRC staff.

9. FINDING FROM SAMPLE #41

Issue: TVA, in the course of the development of re-evaluation criteria for LOCA, Safety and Relief Valve (S/RV) hydrodynamic loads and the core spray condensate fill and vent system found discrepancies between the as-built and the design documentation. An SCR was written and corrective action taken; however, in the course of the resolution the fact that there were no defined limits for pipe support deflections or frequency limits to utilize within the design and analysis procedures was overlooked. TVA was to correct these omissions within the criteria or procedures so that future reanalysis or additional analysis would properly address these issues.

Action: TVA has revised the applicable criteria which include those for the Long-Term Torus Integrity Program now identified as Attachment A of design criteria document BFN-50-C-7100. BFN-50-724 was replaced by BFN-50-C-7104, which

itself during Revision 2 was subdivided, with the piping and tubing supported criteria for seismic Category I systems being incorporated into BFN-50-C-7107.

As an example, BFN-50-C-7107 in Section 1.4.2.13 specifically addresses the question of the rigidity of pipe supports. A deflection limit of 1/8" for pipe supports not adjacent to equipment has been established. Alternatively, a frequency of 20Hz has been established to define the lower rigid range limit in the support.

Based on the TVA actions, as outlined in a letter dated July 29, 1987, the issues arising from this sample have been addressed. This issue is considered closed.

10. FINDING FROM SAMPLE #42

Issue: In addition to the issues from Sample #41, this sample resulted in the identification of the fact that piping supports were not evaluated for the friction loads arising from the dead loads and thermal loads.

Action: TVA has revised the piping criteria to include the consideration of friction loads as reflected in Section 3.1.3 of the design criteria document BFN-50-724 issued in September 1986. This was later superseded by BFN-50-C-7104 which itself was revised to separate the piping and tubing support criteria for seismic Category I systems being incorporated into BFN-50-C-7107.

Based on the TVA actions as described in a letter dated July 29, 1987, the issues arising from this sample have been adequately addressed. This issue is considered closed.

11. FINDING FROM SAMPLE #43

Issue: Based on this sample it was determined that for a specific piping analysis problem, the thermal range stress evaluation had not been performed and in fact the design guidance of the Rigorous Analysis Handbook did not address this aspect of design.

Action: TVA committed to revise the Rigorous Analysis Handbook to incorporate addressing the thermal stress range in the analysis. BFN-RAH-210, "Piping Analysis Load Case Description from the Rigorous Analysis Handbook," was issued on June 21, 1987. Section 3.8 of that document addresses the topic of thermal stress range. Additionally, CAQR's have been written for each unit which supersede the original SCR. The corrective action to be completed now requires that all piping analyses outside the scope of the IE Bulletin 79-14 program be reviewed for thermal stress range evaluations and where deficiencies are identified the calculations are to be corrected and completed.

Based on these TVA actions as described in a letter dated July 29, 1987, the issue arising from this sample is considered to be closed.

12. FINDING FROM SAMPLE #45

Issue: A determination on the reportability of deficiencies identified by TVA in 1980 which resulted in an NCR was not known to have been made. Additionally, physical modifications resulting from the deficiencies in order to assure that

the various masonry walls would meet the necessary loading conditions had not yet been made.

Action: TVA has indicated in a letter dated July 29, 1987 the reporting of an LER in a letter dated December 17, 1984 constituted the required reporting by TVA of the issues relative to masonry walls.

The Browns Ferry Nuclear Performance Plan (BFNPP) Volume 3 in Attachment IV-3 lists the regulatory modifications which TVA has agreed to complete prior to the restart of BFN Unit 2. Item 7 on the list addresses the issue of masonry walls. TVA has agreed to complete the necessary modifications to the masonry walls found to be deficient with regard to meeting the seismic loadings as addressed in NRC Bulletin 80-11.

This is acceptable to the staff for resolution of this issue and it is, therefore, considered to be closed.

13. FINDING FROM SAMPLE #46

Issue: Based on temperature effects, the concrete anchors for the supports of the main steam/feedwater containment penetration flued heads required re-evaluation. This issue was to be completed before restart.

Action: TVA has completed the related calculations on this issue as indicated in a letter dated July 29, 1987 and has issued a drawing for the necessary physical changes. The physical modifications are to be completed by TVA prior to restart of BFN Unit 2. The BFNPP in Appendix D lists this NCR as an item to be completed prior to Unit 2 restart.

Based on these actions, this issue is closed.

14. FINDING FROM SAMPLE #48

Issue: The re-evaluation of the assumption of structural rigidity in the vertical direction for certain structures at Browns Ferry resulted in determining that the chimney had a fundamental frequency less than 20 hertz which had been set as the limiting value. No calculations were available to substantiate that the resulting stresses would not exceed the allowables for the amplified response.

Action: TVA has completed the reanalysis based on the vertical seismic loads with the chimney treated as a flexible structure in the vertical direction. The calculations have been completed and substantiate that the stresses are within the allowables.

Based on these actions as outlined in the TVA letter dated July 29, 1987 the NRC staff considers this item to be closed.

15. FINDING FROM SAMPLE #49

Issue: The lack of adequate design control in the analysis, design and construction of cable tray supports was defined by TVA as a result of a series of deficiencies found in this area at Brown Ferry Unit 2. The extent of the

problem was to be determined under a programmatic effort by a TVA contractor. The effort was to include engineering reviews as well as field walkdowns.

Action: See Action for 8. above (finding from Sample #38).

16. FINDING FROM SAMPLE #50

Issue: TVA identified safety-related instrument lines which were deformed as a result of settlement of a tunnel floor slab and the attached line supports. Apparently, no field corrective action was completed.

Action: TVA has indicated in a letter dated July 29, 1987 that this issue has been included in the small bore piping scope under the Seismic Design Program and will be addressed under that effort.

Based on this action the NRC staff considers this issue closed contingent upon acceptable findings by the staff in its review of the small bore piping program.

17. FINDING FROM SAMPLE #61

Issue: It was identified at the Bellefonte Nuclear Plant that there were various situations which resulted in the misuse of design change reports. No generic consideration of this issue had been made at the Browns Ferry Nuclear Plant.

Action: TVA evaluated this issue at Browns Ferry and found the condition did not exist. This was noted in a TVA letter dated July 29, 1987.

Based on this TVA conclusion this issue is closed.

ENCLOSURE 2

RELEVANT DOCUMENTS

1. January 28, 1987, letter from J. Taylor (NRC) to S. White (TVA) including Inspection Reports 50-259,260,296/86-35.
2. February 27, 1987, letter from R. Gridley (TVA) to J. Taylor (NRC) requesting time extension to reply to January 28, 1987 report.
3. March 11, 1987, NRC response to February 27, 1987 letter granting time extension.
4. March 23, 1987, letter from R. Gridley (TVA) to S. Ebnetter (NRC) responding to January 28, 1987 report.
5. July 29, 1987, TVA response for Inspection Report 50-259,260,296/86-35 for follow-up action items.
6. March 7, 1988, TVA response update for Inspection Report 50-259,260,296/86-35 on Samples 1, 41 and 42.
7. March 29, 1988 letter from R. Gridley (TVA) to NRC regarding Seismic Class II features over Class I features.
8. September 8, 1988, Inspection Report 50-259,260,296/88-07.

Mr. Oliver D. Kingsley, Jr.

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~~DCS~~ (Docket Nos. 50-259, 260, 296)

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