

July 23, 1997

Tennessee Valley Authority
ATTN: Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Dear Mr. Kingsley:

SUBJECT: NOTICE OF VIOLATION
NRC INSPECTION REPORT NOS. 50-327/97-03 AND 50-328/97-03

Thank you for your response of June 11, 1997, to our Notice of Violation issued on May 12, 1997, concerning activities conducted at your Sequoyah facility. In your response you stated that although design input Calculation TI-RPS-048 was revised, the design basis was maintained and a justification for continued operation (JCO) was established. You therefore denied that Violation G existed.

After careful consideration of the basis for your denial of Violation G, we have concluded, for the reasons presented in the enclosure to this letter, that the violation occurred as stated in the Notice of Violation with the exception of Example 1 of the Violation. Therefore in accordance with 10 CFR 2.201(a), please submit to this office within 30 days of the date of this letter a written statement describing steps which have been taken to correct Violation G, Examples 2 and 3 and the results achieved, corrective steps which will be taken to avoid further violations, and the date when full compliance will be achieved.

We appreciate your cooperation in this matter.

Sincerely,

Original signed by
Johns P. Jaudon

Johns P. Jaudon, Director
Division of Reactor Safety

Docket Nos. 50-327, 50-328
License Nos. DPR-77, DPR-79

Enclosure: Evaluations and Conclusions

cc w/encl: (See page 2)

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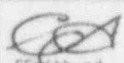
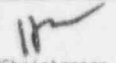

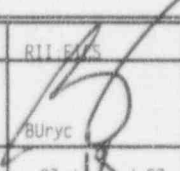
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COPY?	YES NO	<input checked="" type="checkbox"/> YES NO	YES NO	<input checked="" type="checkbox"/> YES NO	YES NO	YES NO

EVALUATIONS AND CONCLUSIONS

On May 12, 1997, A Notice of Violation (Notice) was issued for a violation identified during a routine NRC inspection. TVA responded to the Notice on June 11, 1997. In the response, TVA denied that the violation occurred as stated in the NOV. The NRC's evaluation and conclusion regarding the licensee's responses are as follows:

Restatement of Violation

- G. 10 CFR 50, Appendix B, Criterion III, Design Control, requires in part that measures be established to assure that applicable regulatory requirements are correctly translated into drawings and procedures. The measures shall include provisions to assure that appropriate quality standards are specified and included in design documents. The design control measures shall also provide for verifying or checking the adequacy of design.

Tennessee Valley Authority Nuclear Quality Assurance Plan TVA-NQA-PLN89-A, Revision 6, Section 7.0, Design Control, requires that measures be established to ensure that the performance of design analysis shall be planned and controlled. Additionally, it requires that measures to control plant configuration and ensure that the actual plant configuration is accurately depicted on drawings and other appropriate design output documents and reconciled with the applicable design basis shall be established, documented, and implemented.

TVA-NQA-PLN89-A, through Section 7.0 and Appendix B, endorses the requirements of ANSI N45.2.11-1974, Quality Assurance Requirements for the Design of Nuclear Power Plants. Section 4.0 of this standard requires that design analyses shall be performed in a planned, controlled, and correct manner. Design analyses shall also be in a form suitable for reproduction, filing and retrieving.

Contrary to the above the established design control measures were deficient in that the following deficiencies were identified:

1. As of July 30, 1990, radiation dose values contained in design basis Calculation TI-RPS-48, Integrated Accident Dose Inside Primary Containment and Annulus, Revision 3, were never incorporated in Calculation TI-ECS-55, Summary of Harsh Environment Conditions for Sequoyah Nuclear plant, to ensure revision of environmental data drawing series number 47E235. Additionally, FSAR Figures 3.11.2-1, and 3.11.2-2 were never revised to reflect the new 100-day integrated accident doses based on a source term of 1000 EFPD. This failure to control plant configuration and ensure that actual plant configuration was

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accurately depicted on drawings resulted in discrepancies in design basis information listed in FSAR Table 15.1.7-1 and FSAR Figures 3.11.2-1 and 3.11.2-2.

2. On December 12, 1991, TVA management approved design basis Calculation TI-RPS-48, Revision 5, "Integrated Accident Dose Inside of Primary Containment and Annulus," to document the 100-day integrated beta and gamma radiation doses based on a source term of 650 EFPD. Radiation dose values contained in this calculation were incorporated into Calculation TI-ECS-55, "Summary of Harsh Environment Conditions for Sequoyah Nuclear Plant. Additionally, plant modification DCN No. 508114A, Revision 16, revised Environmental Drawings Number 1.2-47E235 Sheets 45, 47, and 48 to replace radiation values that were no longer conservative. These drawing revisions did not accurately depict actual plant configuration in that on the following dates listed the core average exposure for both units exceeded 650 EFPD operation.

<u>Unit No.</u>	<u>Cycle No.</u>	<u>Date EFPD Exceeded</u>
1	4	12-29-89
1	5	06-09-91
2	3	12-30-88
2	4	05-24-90
2	5	09-28-91

This failure to control plant configuration and ensure that actual plant configuration was accurately depicted on drawings resulted in discrepancies between the units' current licensing basis of 1000 EFPD burnup criterion and approved design basis information depicted on the environmental drawings.

3. From February 11, 1994, to November 15, 1996, the licensee failed to perform a calculation to determine the integrated maximum hypothetical accident gamma and beta doses inside the primary containment to support a justification for continued operation for SQ PER-900372 PER.

This is a Severity Level IV Violation (Supplement I).

Summary of Licensee's Violation Response

The licensee denied that a violation of 10 CFR 50 Appendix B, Criterion III existed.

The licensee considered that design control was maintained following issuance of Calculation TI-RPS-48, Integrated Accident Dose Inside Containment and Annulus. The licensee did not identify, however, the revision level of the calculation for which they were taking credit. The licensee stated that plant

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design basis was controlled by design output documents such as drawings, setpoint and scaling documents, and general construction specifications. The licensee also stated that calculations and design input documents such as design criteria and design standards support the design output documents. The licensee believed that design basis changes did not occur until the design output documents are changed, regardless of changes to design input documents or calculations. It is the licensee's position that although the design input document (Calculation TI-RPS-48) was revised, the design basis was maintained and a justification for continued operation (JCO) was established.

The licensee provided background information concerning reduction of fifty percent in the free field beta dose. The licensee considered the action of not incorporating the results of calculation TI-RPS-48, Revision 3, into the design basis as prudent and within NRC regulations. The licensee's rationale for preparing Revision 5 of Calculation TI-RPS-48 was to ensure consistency between the design basis of 650 Effective Full Power Day (EFPD) average core exposure and approved design output documents. The licensee discussed the circumstances surrounding preparation of the JCO using TID-14844 methodology and stated that the calculation to support the JCO was performed using a QA controlled computer program. The licensee took credit for the revised JCO which was submitted to the NRC on March 4, 1994, and which was approved by the NRC in their letter to TVA dated April 8, 1994.

NRC Evaluation

The NRC staff has carefully reviewed the licensee's response and has concluded that the licensee did not provide any additional information that was not already considered in determining the significance of the violation.

10 CFR 50.2 defines "Design Bases" to mean that information which identifies the specific functions to be performed by a structure, system or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be (1) restraints derived from generally accepted "state of the art" practices for achieving functional goals, or (2) requirements derived from analysis (based on calculations and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goal. The licensee's Nuclear Quality Assurance Plan, TVA-NQA-PLN89-A, Revision 6, requires design controls to be established and implemented to ensure that applicable specified design requirements, such as design bases, are correctly translated into design output drawings. Additionally, the design change process requires that actual plant configuration shall be accurately depicted on drawings and shall be reconciled with the applicable design bases.

The concept of configuration management and adequate design controls involve first establishing a baseline where plant design output documents are consistent with well defined design bases and where design output documents represent actual as-built plant configuration. Having established that

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baseline, the design change process shall assure consistency between design bases, design output documents, and as-built plant configuration for all plant modifications.

On September 12, 1990, the licensee discovered that nuclear fuel related design changes had been made which had not been reconciled with nor reflected in Nuclear Engineering design basis documents. Calculation TI-RPS-48, Revision 3, calculated the integrated maximum hypothetical accident gamma and beta doses inside the primary containment based on average core exposure of 1000 EFPD. The licensee stated that the result of this calculation was unrealistic and was never incorporated into the design output documents. The licensee's concern was that the calculation did not account for a reduction of fifty percent in the free field beta dose. This concern was reviewed by NRR, and it was determined that a reduction of fifty percent in the free field beta dose was technically acceptable. On this basis we agree with the licensee's actions of not incorporating Revision 3 of the calculation within the design basis, and Example 1 of the Violation is withdrawn.

Calculation TI-RPS-48, Revision 5, was issued on December 6, 1991, to return the calculation to the original design basis condition of 650 EFPD average core exposure. Prior to this Unit 1, cycles 4 and 5, and Unit 2, cycles 3, 4, and 5 had already exceeded the licensing basis of 650 EFPD and the approved design output documents no longer accurately reflected as-built plant configuration. On September 6, 1991, a JCO was prepared to document the effects of an increase in fuel burnup which had not been addressed in the EQ program. This JCO was determined to be technically inadequate by the NRC and was revised based on NRC's review and comments. From September 12, 1990, until April 8, 1994, the licensee's configuration control of the Environmental Qualification program failed to meet the requirements of their Nuclear Quality Assurance Plan. Additionally, during this time a technically adequate JCO was not in effect, and this was contrary to the guidelines of Generic Letter 91-18.

The licensee's statement that design basis changes do not occur until the design output documents are changed, regardless of changes to design input documents or calculations, is incorrect. The definition of design basis in 10 CFR 50.2 does not support this argument. Additionally, the concept of good configuration management and adequate design controls was not evident from the licensee's actions for the Violation, Example 2. The licensee is required to implement adequate design controls for plant modifications which ensure that actual plant configuration is accurately depicted on drawings and is reconciled with design basis information as defined in 10 CFR 50.2.

The licensee stated that calculations to support the JCO were performed using a QA controlled computer program. The licensee was unable, however, to present objective evidence which corroborated this claim and which demonstrated that the analysis had been performed in accordance with the requirements of ANSI N45.2.11-1974. On November 22, 1996, Calculation SQNSQS2-0163 was prepared with the specific purpose of validating the JCO that was submitted to the NRC on March 4, 1994. This action was taken when

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computer runs performed by the licensee did not provide useful data in support of the radiation values delineated in this JCO.

NRC Conclusion

For the above stated reasons for Examples 2 and 3 the NRC staff concludes that the Violation occurred as stated, and Violation Example 1 is withdrawn.

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