

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 25, 1992

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Serial No. 92-713
NL&P/CGL R1
Docket Nos. 50-280
50-281
50-338
50-339
License Nos. DPR-32
DPR-37
NFP-4
NFP-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
NORTH ANNA POWER STATION UNITS 1 AND 2
TOPICAL REPORT USE PURSUANT TO 10CFR50.59

Virginia Electric and Power Company has previously advised the NRC that (axially zoned hafnium) flux suppression inserts (FSIs) will be installed in Surry Unit 1 beginning in Cycle 13. The installation of FSIs in Surry Unit 1 is the major feature in our flux reduction program for the Surry Unit 1 reactor vessel. The FSIs decrease the relative power in key peripheral fuel assemblies and, thereby, reduce the fast neutron flux at associated reactor vessel weld locations. The planned insertion of FSIs requires three-dimensional (3-D) neutronics analysis for design and a multi-level 3-D power distribution analysis for core power distribution monitoring and surveillance.

3-D Neutronics Analysis

The currently used FLAME 3-D nodal model is inadequate for use with FSIs because of the lack of power distribution detail (1 mesh per assembly) and the inability to provide INCORE constants (no thimble fluxes), as well as the fact that it is not a stand alone model (requires normalization using other models).

Therefore, the PDQ Two Zone Model was developed to provide a 3-D neutronic analysis capability and to identify 3-D source terms for the reactor vessel fluence analysis. "PDQ Two Zone Model," Topical Report VEP-NAF-1, July 1990, was transmitted to the NRC for review on October 1, 1990 (Serial No. 90-562). The transmittal letter requested NRC approval by the end of the first quarter of 1991 to support planned FSI installation in Cycle 12. Subsequently, our planned FSI installation shifted to Cycle 13. To support the core design for Cycle 13, NRC approval of this topical report would be required by the end of the first quarter of 1993.

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It is also our intention to use the PDQ Two Zone Model for Surry Unit 2, as required, to assure consistency in the reload methodology applied to Surry Units 1 and 2.

Multi-Level 3-D Power Distribution Analysis

The currently used version of INCORE is inadequate to accurately analyze flux maps from Surry Unit 1 with FSIs installed. INCORE allows only three axial levels of detail. Studies of power distributions with FSIs installed have shown that a minimum of seven axial levels is required to accurately analyze flux maps and 22 axial levels is preferable.

Therefore, a multi-level 3-D power distribution analysis is required to assess flux maps obtained from Surry Unit 1 with the FSIs installed. The TIP/CECOR Computer Code Package, which provides the preferred axial level of detail, was developed to replace INCORE. "Reactor Power Distribution Analysis Using a Moveable In-core Detector System and the TIP/CECOR Computer Code Package," Topical Report VEP-NAF-2, November 1991, was transmitted to the NRC for review on December 20, 1991 (Serial No. 91-746). In order to support Surry Unit 1 operation beginning in Cycle 13, NRC approval of this topical report would be required by the end of 1993.

It is also our intention to use the TIP/CECOR Computer Code Package for Surry Unit 2 and North Anna Units 1 and 2 to assure consistency in core power distribution monitoring/surveillance and core follow.

Evaluation Summary

In response to recent inquiries, the NRC has advised us that review and approval of these topical reports are not high priority activities within the NRC because neither of these topical reports is associated with an item necessitating NRC review (i.e., a technical specification change request). Therefore, we have evaluated the use of the topical reports pursuant to the provisions of 10CFR50.59. We have concluded that use of the PDQ Two Zone Model for Surry Units 1 and 2, as well as TIP/CECOR for Surry Units 1 and 2 and North Anna Units 1 and 2, pursuant to 10CFR50.59 is acceptable for the following reasons:

1. No NRC regulations require topical report review.
2. The design analyses (including design methods) can be considered a component of "the facility as described in the SAR" and, therefore, changes can be evaluated pursuant to 10CFR50.59 to determine whether prior NRC approval is required.
3. The basis for approval of current design methods has been identified through a review of the SERs for the current Reload Design Methodology. The revised methods have been reviewed relative to this basis of approval, as well as Section 4.3 of the Standard Review Plan. It has been determined that the basis for approval and the applicable NRC criteria continue to be met.

4. These two topical reports are variations of previously NRC-approved topical reports. Specifically, the PDQ Two Zone Model is a variation of the PDQ One Zone Model. Comparison with experiments and development of uncertainties for the PDQ Two Zone Model are consistent with the PDQ One Zone Model and the Nuclear Design Reliability Factor Topical Reports (VEP-FRD-21A and VEP-FRD-45A, respectively), both of which have been approved by the NRC. In addition, the TIP/CECOR Computer Code Package is a variation of the CECOR Computer Code. Comparison with experiments and development of uncertainties for TIP/CECOR are consistent with CECOR and the Nuclear Design Reliability Factor Topical Reports (CENPD-153-P, Rev. 1-P-A and VEP-FRD-45A, respectively), both of which have been approved by the NRC.

Since the PDQ Two Zone Model and the TIP/CECOR Computer Code Package topical reports both satisfy the criteria for review of analytical methods described in Section 4.3 of the Standard Review Plan and are variations of previously NRC-approved topical reports, application of 10CFR50.59 to use the topical reports (without specific NRC approval) is a valid approach.

Since this approach is a departure from our normal practice of using only NRC approved topical reports, we discussed this approach with the NRC during conference calls on October 7 and 14, 1992. Although the NRC could not concur with the specific application without formal review, the staff agreed with the approach of using 10CFR50.59 evaluations where applicable. Therefore, because the NRC's review schedule does not support our needs for FSI procurement and core design for Surry Unit 1 Cycle 13, we plan to proceed with this approach of using the topical reports pursuant to the provisions of 10CFR50.59.

Request for NRC Review

Although we plan to proceed with this approach, the NRC is requested to continue their review and approval of these two topical reports. Based on our discussion with the NRC, it is anticipated that use of the PDQ Two Zone Model in core design for North Anna Units 1 and 2 will require NRC approval since North Anna is a Core Operating Limit Report (COLR) plant and references specific codes in its Technical Specifications.

If you have questions or need further information, please contact us.

Very truly yours,



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