Westinghouse Electric Corporation
Energy Systems

NTD-NRC-94-4098

Nuclear Technology Division
Box 355
Pittsburgh Pennsylvania 15230-0355

April 14, 1994

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Interim Report of an Evaluation of a Deviation or Failure to Comply Pursuant to 10CFR21.21(a)(2)

The following information is provided pursuant to the requirements of 10CFR Part 21 to submit an Interim Report on issues that will not be completed within 60 days from the discovery of the deviation or failure to comply.

One Interim Report is being transmitted at this time.

1. SBLOCTA Axial Nodalization (94-002)

If you have any questions regarding this matter, please contact Mr. H. A. Sepp of my staff at 412/374-5282, or myself.

Sincerely,

N. J. Liparulo, Manager
Nuclear Safety and Regulatory Activities

Attachment

Westinghouse Electric Corporation
Energy Systems
P.O. Box 355
Pittsburgh, Pa. 15230

Interim Report No. 94-002
Date: April 15, 1994

Subject: Interim Report of Evaluation of a Deviation or Failure to Comply Pursuant to 10CFR21.21(a)(2)

Title: Small Break LOCTA Code Axial Nodalization

Identification of Basic Component or Activity: ECCS LOCA Analysis

Basic Component Supplied by: Westinghouse Electric Corporation

Nature of Deviation:

Westinghouse is currently evaluating a concern regarding the adequacy of the standard axial nodalization used in the Small Break LOCTA (SBLOCTA) code for licensing basis analyses. The standard hot rod model developed in the 1970's for large break LOCA analyses had 19 axial nodes, and sensitivity studies exist to justify the number and distribution of these nodes. The standard hot rod model used in performing SBLOCTA calculations also has 19 axial nodes but with a different axial distribution. No documented SBLOCTA calculations exist to justify the standard SBLOCTA noding, but the use of detailed (0.25ft) nodes at the top of the rod is consistent with the expectation that Peak Clad Temperature (PCT) will occur high in the core due to the nature of a SBLOCA transient. A series of calculations using finer axial nodalization than prescribed for the 19 node model have indicated that the standard SBLOCTA 19 node model is not conservative. Nearly all cases demonstrated a significantly non-conservative behavior with respect to PCT. The penalty is attributed to a net increase in single-phase steam enthalpy rise as these nodes uncover sooner and heat up more than coarser nodes partially covered by the mixture level.

Opening Date: February 21, 1994

Corrective Actions to Date:

Westinghouse is currently performing sensitivity studies to determine an appropriate nodalization scheme to be used for future SBLOCA licensing analyses. An initial recommendation has been made that a much finer axial nodalization be used, specifically 0.25 ft nodes for all elevations uncovered during the course of a transient. Also, Westinghouse is evaluating a possible revision to the small break rod internal pressure model that may result in a benefit with regard to burst and blockage penalties. Based on limited analysis, the revised internal pressure model has indicated that the benefit is significant for plants with high PCT due to burst and blockage. The results for a plant specific case have shown that synergistically these two model changes resulted in a predicted PCT with substantial margin to the 10CFR50.46 limit of 2200 F.

Evaluation Completion Schedule Date: September 21, 1994