

Westinghouse Electric Corporation Energy Systems

Box 355 Pittsburgh Pennsylvania 15230-0355

> NTD-NRC-94-4343 November 15, 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) - Closeout 94-002

- Reference 1) Westinghouse Letter NTD-NRC-94-4098, "Interim Report of an Evaluation of a Deviation or Failure to Comply Pursuant to 10 CFR21.21(a)(2)", April 14, 1994.
 - Westinghouse Letter NTD-NRC-94-4306, "Interim Report of an Evaluation of a Deviation or Failure to Comply Pursuant to 10 CFR 21.21(a)(2) - 94-002 Update," September 21, 1994.

The following information is provided to closeout the status of an evaluation of a deviation or failure to comply pursuant to the requirements of 10CFR Part 21.

One Closeout Report is being transmitted at this time.

1. SBLOCTA Axial Nodalization (94-002 Closeout)

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 Regulatory and Licensing Activities

/sa

Attachment

21003

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

Interim Report No. <u>94-002</u> Date: <u>November 11, 1994</u>

Subject: Closeout of an 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 has completed an evaluation of 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 nodalization, 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 indicated that the standard SBLOCTA 19 node model is not conservative. Nearly all cases examined 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:

Westinghouse has completed the generic technical evaluation of the fuel rod axial nodalization methodology. A revised standard for rod nodalization has been established which insures an adequate solution to the hot channel calculation by specifying a fine nodalization of 0.25 ft nodes for all elevations that are predicted to uncover during the transient. As an extension of this investigation, a related error of lesser magnitude was discovered regarding logic in the code which tracks the mixture level boundary in the core channel and ultimately affects the solution of the conservation and heat transfer equations. This error has been corrected and a new version of the code has been fully verified and configured. Also included in this new code

version is the revised rod internal pressure calculation methodology which was reported to the NRC in reference 1. All of these corrections and revisions have been implemented as standard procedures for ongoing and future analyses. A complete review of all existing licensing basis calculations has been completed using the updated code version.

Based on the results of the technical evaluation, it was concluded that the effects of this issue do not represent a defect creating a substantial safety hazard and will not result in a failure to comply with any applicable regulation relating to a substantial safety hazard. This conclusion 's based on the fact that all plant analyses have been shown to meet the 10CFR50.46 limit of 2200°F.

Westinghouse Nuclear Safety Advisory Letter (NSAL) 94-022, "SBLOCTA Axial Nodalization," dated October 25, 1994, was issued to notify the plant licensees of this potential issue and the resulting plant specific small break LOCA PCT changes.

Evaluation Completed: November 11, 1994

Reference 1) Westinghouse Letter ET-NRC-94-4253, "Revision to the Rod Internal Pressure Model in Westinghouse SBLOCTA Code."

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