TOLEDO EDISON

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Docket No. 50-346

License No. NPF-3

Serial No. 684

January 30, 1981


Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

RE: Letter from Harold R. Denton, Director, Office of Nuclear Reactor Regulation - Subject: Clarification of TMI Action Plan Requirements, "October 31, 1980, Item II.K.3.30

Dear Mr. Eisenhut:

We have reviewed the applicable NUREGs as requested in your letter. We believe the existing small break LOCA model, as approved by the NRC Staff, fully meets the requirements of 10CFR50, Appendix K. We plan, however, to make certain modifications to the existing model and to further justify certain parts of the model in response to your letter as summarized below:

1. Steam Generator Model

   Models will be provided in the CRAFT2 code to more phenomenologically account for the steam generator heat transfer due to the primary and secondary flow regimes, mixture levels and condensation in the presence of a non-condensible gas. This steam generator model, along with other models described below, will be used in a revised natural circulation model. These models will be compared against LOFT test results.

2. Pressurizer Model

   A 2-region, non-equilibrium pressurizer model will be put in the CRAFT2 code. The model will utilize fully-coupled conservation and state equations. The model will also provide for the pressurizer heater and spray actuation effects. The present surge line (no flooding) model will be justified. This model will be compared to Babcock and Wilcox plant transient data.

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3. Core Mixture Level and Heat Transfer Models

Previous studies will be used to justify the core mixture level calculation. The ORNL high pressure core boiloff experiments will be used to justify the present heat transfer model.

4. Emergency Core Cooling (ECC) Injection Model

The sensitivity of the Nuclear Steam Supply System to non-equilibrium ECC injection will be assessed. The enthalpy of the injected ECC fluid will be adjusted so that local condensation and depressurization are reduced if necessary. Compensation would then be included to to provide overall conservation of energy to account for the true injection enthalpy.

5. Noding Model

A noding sensitivity study for certain components of the Reactor Coolant System will be used in conjuction with previous experience in selecting a noding model for the entire system. This model will be checked sufficiently to ensure convergence and will also be compared against previous analyses.

6. Break Flow Model

A search of the literature will be performed to select a "Best Estimate" leak flow model. Analyses will then be performed to compare the present model with the "Best Estimate". The objective will be to show the present model to be adequate.

7. Non-Condensible Gas Model

All sources of non-condensible gases will be accounted for including the radiolytic component. The radiolytic component will be determined with a model which accounts for the boiling in the core region.

8. Two-Phase Flow Model

A drift flux model will be included in CRAFT2 as part of the L3-6 prediction. This model will be modified as necessary to permit simultaneous use of both drift flux and bubble rise models, with a junction between vertical and horizontal piping sections.

9. Reactor Coolant Pump Model

NUREG-0623 contains a concern for the two-phase reactor coolant pump models. This concern is acknowledged here, however, this concern will be addressed as part of our response to NUREG-0737, Item II. K.3.5.

In addition to the verification referred to above for individual models, overall verification of the total model including the ability to predict various modes of natural circulation will be accomplished through LOFT integral test predictions.

The above summary represents the present small break model development plan. It is possible that, during the course of the development and verification effort, additional model improvements will become necessary. These models would be included and documented in the final revised model submittal. It is also possible that verification studies may demonstrate that some of the above analytical improvements may not produce significantly different results from a simpler representation of the system in terms of analytical models or noding network. If this occurs, a decision to utilize simpler modelling techniques may be made. In this situation, we will provide adequate information and/or sensitivity studies to justify and defend the acceptability of the final models utilized.

The revised model documentation will be provided in a report to the NRC Staff by March 1, 1982.

Yours very truly,

R P Crouse

RPC:SCJ:cc

cc: NRC DB-1 Resident Inspector