UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

October 1, 1970

Docket No. 50-289

POOR ORIGINAL

Metropolitan Edison Company
Attn: Mr. J. G. Miller
Vice President & Chief Engineer
P.O. Box 542
Reading, Pennsylvania 19603

Gentlemen:

Your Final Safety Analysis Report for the Three Mile Island Nuclear Station - Unit 1, which was submitted on March 2, 1970, contains an analysis of the consequences of major piping failures in the primary coolant system. That analysis uses a computer code, which is called a modified version of FLASH-I, in the computation of thermal-hydraulic phenomena during blowdown of the primary coolant. As we have discussed with your representatives, the results of recent analyses of ECCS performance using a multi-node computer code have raised several questions regarding the thermal-hydraulic response of the core during a postulated loss-of-coolant accident. We have concluded that a more detailed analysis of the blowdown phenomena using suitable multi-node techniques is needed for our evaluation of your application. We are enclosing a request for additional information which will provide guidance on the scope and detail required.

Although some of the information requested may be available in the public record in the context of our review of another facility, it would be helpful in this instance if your reply could be made as complete and self-sufficient as possible. If your response to the enclosure takes the form of a topical report which contains information considered proprietary by you or your vendors, please provide a nonproprietary summary of that report.

Please contact us if you desire any discussion or clarification of the material requested in this letter.

Sincerely,

Original Signed by
Peter A. Morris

Peter A. Morris, Director
Division of Reactor Licensing

Enclosure: Addnl Inf Requested

cc: See page 2

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October 1, 1970

ADDITIONAL INFORMATION REQUESTED
FOR
THREE MILE ISLAND UNIT 1

14.1. Provide an evaluation of the Loss-of-Coolant Accident which makes use of a multi-node computer code for the description of the core and primary coolant system. This evaluation should include the following:

a. A description of the models and equations that were used, and the bases for their selection.

b. The empirical correlations assumed, the experimental bases for them, their ranges of applicability, and the ranges for which these correlations were used in the analyses. Specify the methods used to permit transitions between two empirical correlations for heat transfer.

c. A description of those other codes, such as a core thermal response code, used in the calculation and an indication of how the codes are coupled in the calculation.

d. An estimate of the uncertainty involved in the calculation of peak clad temperature. This estimate preferably will be in the form of a probabilistic assessment of the likelihood of exceeding the calculated range of clad temperatures.

e. A summary of any experimental results which provide verification of your multi-node code.

14.2. Provide the results of the analyses for a spectrum of breaks in the inlet and outlet piping, including the following details:

a. Core average and hot-channel flow rates vs time; if there are several core flow paths, provide the flow rate in each.

b. Flow rate at the flow paths immediately above and below the core.

c. Core pressure drop vs time, and system pressure vs time.

d. Flow rates in the outlet piping, broken and unbroken loops, and in the inlet piping, broken and unbroken loops.

e. Heat transfer coefficient vs time at the hot-spot in the core.

f. Peak clad temperature vs time.

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g. A discussion of the importance of variations in assumed phenomena in the core or primary coolant system on the peak clad temperature. For example, if the continued performance of one or more primary coolant pumps is a key factor in the limiting of peak clad temperature, then the effect of variations in pump performance on peak clad temperature should be investigated.

14.3. Discuss the margin available in the ECCS design in terms of:

a. Selection of the design criterion for peak clad temperature.

b. Conservatism in heat transfer correlations.

c. Conservatism in treating core flow rates.

d. Conservatism in the treatment of the primary coolant pump performance.

e. Conservatism in the heat transfer assumed during the portion of the blowdown where the core flow rate oscillates about zero. Consider the likelihood and consequences of other than fully-developed flow during the oscillatory period.

f. Conservatism in the choice of other parameters, including steam generator performance, bubble rise model, two-phase friction multipliers, fuel-clad gap resistance, and physical properties of UO_2.

g. Conservatism in the use of heat transfer correlations derived from steady-state data in the prediction of transient heat transfer coefficients.

h. Conservatism in the method of selecting the nodes for the core and primary system.

14.4. Provide an analysis for core performance in what is generally referred to as the reflooding stage to demonstrate that:

a. The reflooding rate is sufficient, assuming that only one chain (of two) of the ECCS pumps is available. Consider the results of recently-developed experimental information from the FLECHT program in your response.

b. The pressure drop caused by the effluent two-phase mixture does not excessively retard the reflooding.

14.5. Provide a summary of the number of fuel rods that will reach or exceed a given clad temperature as a function of clad temperature.

14.6. Discuss the applicability of the assumption that flow from the loops to the vessel is distributed uniformly across the fuel assemblies.

14.7. What additional analysis or experimentation do you plan relevant to the prediction of events following a postulated piping failure?

14.8. Describe the effect of the positive mcderator coefficient on the calculated peak clad temperature.

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