BOARD QUESTIONS

QUESTION #1 - To what extent has the staff checked the input numbers and the calculations that Westinghouse made to be sure there are no errors in the calculation which would lead to temperatures higher than 2300 degrees?

ANSWER - The computer codes SATAN and LOCTA, currently used by Westinghouse for evaluation of loss-of-coolant accidents require in excess of 2000 input values before a calculation can be performed. The majority of these values represent details of geometry and fluid conditions for the reactor coolant system. The staff does not verify each input parameter necessary to perform the calculation. Instead, we perform independent calculations of accident consequences with Commission-developed computer codes using the geometric, thermal, and hydraulic details of the primary and secondary cooling system. As part of this calculation, significant input parameters such as fuel and clad thermal properties, core heat flux distribution, primary system flow resistances, and break location and character are verified.

QUESTION #2 - Has an independent calculation been performed to determine the consequences of rupturing the largest pipe for the Indian Point 2 plant?

ANSWER - Yes, this analysis was performed by our consultants, the Aerojet Nuclear Corporation (ANC), during August and September 1970. The results of this calculation were in agreement with the analysis submitted by the applicant in Supplement 12 of the FSAR. We have also done other checks of analysis techniques of the NSSS vendor, Westinghouse. A more recent check of these techniques has been performed for the Turkey Point Reactor, a 3-loop pressurized water reactor designed by Westinghouse. The results of these studies show that the Westinghouse analytical techniques using the SATAN and LOCTA codes predict clad temperatures at end of blowdown approximately 100 degrees higher than our calculation, using the AEC developed codes RELAP and THETA. We would anticipate similar results for the Indian Point 2 plant.

QUESTION #3 - If the LOCA analysis was performed with the RELAP Code and by staff personnel, are all of the plant characteristics known so accurately, and are the bases for the program so similar that the calculated maximum temperatures would be identical? If not, would it be expected that the RELAP code would calculate higher or lower temperatures?

ANSWER - The nuclear, thermal, hydraulic, and ECCS characteristics, are supplied by the applicant, and are verified during pre-operational and startup tests where possible. Certain parameters such as the nuclear peaking factors are restricted by the Technical Specifications. The staff in all of its independent analyses obtains detailed data concerning the primary system from the reactor manufacturer. Comparisons between the SATAN and RELAP code calculated results of important variables such as core flow and core quality do result in a similar trend behavior but different detailed results. This is to be expected since the code and its user options permit variations such as the primary system modelling which is different in terms of the number of control volumes used to represent the primary system, and the numerical techniques used to solve the equations which also differ and could result in small differences in calculated results.

The best comparative example to date was performed for a 3-loop plant similar to the Turkey Point plant. Westinghouse, using its approved evaluation model (Appendix A, Part 3) published in the Commissions Interim Acceptance Criteria, predicted a peak clad temperature at the end of blowdown of about 1550°F. We predicted a peak clad temperature of 1450°F at the end of the blowdown using the AEC evaluation model published in the same Commission statement.