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Peter A. Morris, Director
Division of Reactor Licensing

INDIAN POINT II - DOCKET NO. 50-247

The attached list of questions is suggested for the purpose of obtaining additional information on the ECCS analysis of the Indian Point II reactor plant. The attached questions are an edited version of a list originally prepared by Karl Kniel.

Original signed by
E. G. Case

E. G. Case, Director
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Request for Additional
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INDIAN POINT II

SUGGESTED QUESTIONS FOR ECCS ANALYSIS

Your evaluation of the core performance associated with a loss-of-coolant accident, documented in your Final Facility Description and Safety Analysis Report, is based on the FLASH-R computer code which represents a simplified analysis of the core thermal-hydraulics. We understand that a significant improvement in the ability to evaluate the core performance during this postulated accident has been developed recently in the multi-node SATAN-V computer code. Please submit a complete re-evaluation of the LOCA for the Indian Point II Reactor Plant based on the latest available analytical methods and techniques including the SATAN-V analysis. This re-evaluation should be presented in a report and should include but not be limited to the following information:

1. The results of your evaluation of the LOCA using the SATAN-V multi-node analysis for the full spectrum of pipe breaks. In addition to providing the usual information on clad temperature, system pressure, etc., provide core flow details to fully characterize the core hydraulics during blowdown; that is to say, core pressure drop, core quality, fluid velocity in the core, the upper plenum, and the lower plenum. In addition, provide the calculated flow out of the cold leg, the hot leg, as well as through the core. Specifically,

identify the heat transfer correlations used for the various phases of the blowdown and refill period. Specify the range of applicability of the correlations and justify their use explicitly in terms of the core hydraulic parameters. Justify the use of homogenized core flow wherever applicable. Specify the accumulator delivery rate and identify the flow by-pass as a function of time.

2. Identify the limitations of the SATAN-V multi-node analysis and provide your assessment of the adequacy of this code to predict core hydraulic behavior. Include an estimate of the uncertainty or "confidence band" on the calculated core hydraulic parameters in view of the one-dimensional character of the code as well as the potential flow stagnation in the core during blowdown. Provide suitable bounding calculations for the appropriate regions of uncertainty.

3. Provide a sensitivity analysis to illustrate the effect of relative system impedances or resistances on the calculated core flow. That is, evaluate the influence of changes in resistances in the steam generator, hot legs, pumps, etc., on the core flow and justify the specific impedances chosen for the final analysis. Include an assessment of the use of steady-state resistances under single-phase flow for transient two-phase flow conditions during the blowdown.

4. A summary of the additional analytical and experimental work which you contemplate in order to provide sufficient assurances of your ability to predict the complex core blowdown thermal-hydraulics definitively and with confidence.

5. Using your latest available information and analytical techniques provide the following information for the loss-of-coolant accident:

   a. The largest loss-of-coolant break size for which assured core cooling is predicted with minimal calculational uncertainty.

   b. The highest core power level for which assured core cooling is predicted with minimal calculational uncertainty.

   c. An assessment of potential flow instability or "chugging" in the core or between the parallel intact loops and its effect on the ability to cool the core.

   d. An estimate of the effect of the break location on the foregoing.