UNITED STATES
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MEMORANDUM FOR: Zoltan R. Rosztoczy, Chief, Analysis Branch, DSS

FROM: Brian W. Sheron, Analysis Branch, DSS

SUBJECT: SUMMARY OF MEETING WITH CE AND CE OWNERS GROUP ON 7/24/79

Enclosure (1) provides a summary of a meeting held at CE on 7/24/79 among NRC, CE and the CE Owner's Group to discuss a number of items regarding the results of their small break analysis report, including information to date on the effect of running the reactor coolant pumps during a small break. Handouts from the meeting are provided as Enclosure (2), including a list of meeting attendees.

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Enclosures:
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Enclosure (1)

Meeting Summary with CE - 7/24/79

1. Effect of Pump Operation

1.1) For hot leg break, with the break location in the bottom of the pipe, the HEM model is used since it is a "better estimate" model and the break flow remained low quality, 2-Ø for a long period of time.

1.2) CE has looked at 8 cases regarding reactor coolant pumps on versus pumps off. They have run only one case in which the pumps were tripped 10 minutes after an SIAS was received. All cases were run with 1 HPI pump on and 200 psi SIT pressure. No calculations with 600 psi SIT's were performed with the pumps running. The calculations were "best estimate" (with the exception of 1.2 x ANS decay heat) and were done with a version of the CEFLASH code which was not the approved evaluation model. Pump heat addition during 2-Ø flow was included, but is considered negligible. The preliminary results showed that the hot leg break of 0.1 ft^2 with 4 pumps continuously running led to the maximum core uncovery (7.6 feet uncovered for 1050 seconds). No temperature calculations were performed however. One case was run with pump trip 10 minutes after SIAS and the results showed a core uncovery of 5.3 ft for 1000 seconds.

1.3) CE's results are still considered preliminary and must undergo normal QA reviews. CE intends to conclude their analyses and determine if a safety issue exists. If so, it will be presented to their Safety Review Committee for appropriate action. CE has not estimated a schedule for completing their analyses.

2. Small Break Behavior

2.1) Small breaks which depressurize the system to below 1000 psi are in the range of 0.1 to 0.02 square ft. Breaks which remain at intermediate pressures are in the range of 0.02 square ft. Breaks which repressurize are smaller breaks from 0.0005 square ft. The repressurization, however, is due to HPSI recovery of the system inventory and not disruption of decay heat removal.

2.2) For small breaks with loss-of-feedwater, the steam generators are required to remove decay heat within about 1 hour after the LOCA for breaks less than 0.02 square ft.

2.3) CE examined the case of LOFW in which operator action opens 2 PORVs in 10 minutes. The purpose of this analysis was to evaluate if this action produced any beneficial effects. The results showed that the time available to initiate auxiliary feedwater was extended from about 1 hour to 3 hours. This is because (1) the system depressurized and there was some safety injection, (2) the break can remove more latent heat at a lower pressure (h_{fg} is higher) and (3) at lower pressure, the mass depletion (integral) is less than the high pressure case. It was noted that this must be done early in the event in order to achieve this benefit, and no recommendation regarding this action as desirable was made by CE at this time.

2.4) CE examined the case of a 0.02 ft^2 break in which LOFW was assumed initially, then auxiliary feedwater restored at 30 minutes. The 0.02 ft^2 break was chosen since it was the largest break which still required steam generators for decay heat removal. For all cases which require steam generators for decay heat removal, recovering auxiliary feedwater within 30 minutes does not result in core uncovery.

3.0 Summary

3.1) The preliminary evaluations have shown that the case of pumps running may produce the most adverse consequences of a small break. Unless the design can assure that the pumps can always be tripped, the case of pumps running will need further evaluation, particularly from the standpoint of licensing submittals. CE proposed to run an Appendix K calculation with the pumps running for a 0.1 ft^2 break (hot leg) to show that if the pumps are shut off within a certain time period, the previous pumps-off case would remain the bounding calculation. CE will continue their evaluation of the longer term solution to the pumps-on problem. (On July 25, 1979 CE advised the staff that the Appendix K calculation would be submitted with the scheduled July 30th submittal. The entire submittal however, may be delayed to August 3rd.