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The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED RESOLUTION OF GENERIC ISSUE 99, "IMPROVED RELIABILITY OF RHR CAPABILITY IN PWRs"

During the 341st meeting of the Advisory Committee on Reactor Safeguards, September 8-10, 1988, we considered a proposal by the NRC staff that would serve as part of the resolution of Generic Issue 99, "Improved Reliability of RHR Capability in PWRs." Our subcommittee on Decay Heat Removal Systems previously discussed this issue during a meeting on July 27, 1988. We also had the benefit of presentations by the NRC staff and of the documents referenced.

Generic Issue 99, as originally posed, addressed concerns about the possible failure of core cooling that could result during shutdown operations of PWR plants from the inadvertent closing of suction valves for residual heat removal (RHR) pumps. Later, the issue was broadened to consider the possible loss of core heat removal during periods of so-called "mid-loop" operation. In the latter status, inventory of coolant in the reactor primary system is purposely reduced, for example to permit steam generator maintenance. In such circumstances there have been incidents in a number of PWR plants in which lapses in control of water level have caused loss of suction head and simultaneous failure of pumping from all RHR pumps. In some of these incidents reactor coolant has heated to boiling. Boiling for relatively brief periods, tens of minutes to hours, could cause enough loss of coolant inventory to uncover part of the core and overheat the fuel.

Risk analyses indicate the probability of core damage from loss of RHR during shutdown to be of about the same magnitude as the probability of core damage from all causes during power operation. However, the risk to public health would seem to be substantially smaller during shutdown. Core decay power would be quite low because shutdown operations of such nature as to put the core at risk are normally conducted no sooner than about two days after shutdown. Also, the temperature and pressure of reactor coolant would be low.

Guidance to PWR licensees from the NRC staff in the form of a generic letter issued in 1987 seems to have accomplished little in terms of reducing the rate of occurrence of such events. As a result of this unsatisfactory experience, the staff has proposed new guidance in a draft of another Generic Letter. This letter makes a number of recommendations and requests that PWR licensees inform the staff of their action in response to each recommendation.

Most of the recommendations concern improvements in procedures and instrumentation designed to make it less likely that RHR flow will be

interrupted during mid-loop operations. We are in agreement with these recommendations. Another proposes procedures to insure that the containment will be closed in the event there is a threat of core damage caused by loss of RHR cooling during mid-loop operation. We have some concerns about this recommendation.

Most occasions for mid-loop operation will occur during periods of reactor shutdown when the containment building is open for maintenance activities. The staff proposal calls for licensees to maintain equipment in readiness and have procedures and personnel available so that hatch covers and seals can be quickly installed if there is a threatened loss of RHR cooling. The proposal would not require containment to be sealed as in normal operation; the argument is that with the depressurized condition of the reactor coolant system in any such circumstance, there is little source of energy to pressurize the containment. The NRC staff has judged that even partially bolted containment closures would successfully contain fission products released from a damaged core and mitigate consequences of such an accident.

We recognize that, in the circumstances envisioned, decay power and the quantities of short-lived and volatile fission products in the core will be small. We also recognize that the other steps recommended by the staff can be expected to reduce the likelihood of a core damage incident to a very small value. Therefore, the proposed method of containment closure may be a sufficient measure of protection. However, we question whether the proposal has been sufficiently analyzed in light of the many varieties of containments and containment closures in service. We believe further study of the practicality and efficacy of the closure proposal is needed.

If it cannot be shown that the proposed method is adequate, then consideration should be given to a requirement that would prohibit mid-loop operation except when the containment is fully closed.

Sincerely,

William Kerr
Chairman

References:

1. Memorandum dated August 10, 1988 from J. Sniezek, Office of Nuclear Reactor Regulation, NRC, to E. Jordan, Office for Analysis and Evaluation of Operational Data, transmitting proposed Generic Letter, "Loss of Decay Heat Removal"
2. U.S. Nuclear Regulatory Commission, NUREG/CR-5015, "Improved Reliability of Residual Heat Removal Capability in PWRs as Related to Resolution of Generic Issue 99," dated May 1988
3. U.S. Nuclear Regulatory Commission Generic Letter dated July 9, 1987, "Loss of Residual Heat Removal (RHR) While the Reactor Coolant System (RCS) is Partially Filled (Generic Letter 87-12)"

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