



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

July 19, 2004

Mr. Luis A. Reyes
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

SUBJECT: PROPOSED DRAFT FINAL GENERIC LETTER ON POTENTIAL IMPACT OF
DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN
BASIS ACCIDENTS AT PWRs

Dear Mr. Reyes:

During the 514th meeting of the Advisory Committee on Reactor Safeguards on July 7-9, 2004, we reviewed the staff's proposed draft final generic letter (GL) on the potential impact of debris blockage on emergency recirculation during design basis accidents at pressurized water reactors (PWRs). Our Subcommittee on Thermal-Hydraulic Phenomena reviewed this matter during a meeting held on June 22-23, 2004. During these reviews, we had the benefit of discussions with the NRC staff and its contractors, industry representatives, and members of the public. We also had the benefit of the documents referenced.

RECOMMENDATIONS

1. A generic letter should be issued for implementation.
2. The staff should continue confirmatory research in areas where the technical basis of the guidance is uncertain, and on issues such as chemical and downstream effects that are not directly addressed by the guidance proposed by the Nuclear Energy Institute (NEI).

DISCUSSION

In our letter of February 20, 2003, we recommended issuance of the draft GL for public comment in order to initiate the process of gathering plant-specific information and requiring licensees to develop plans for resolving issues associated with potential sump screen blockage following a loss-of-coolant accident (LOCA).

We believe that a final GL should be issued to provide a consistent regulatory basis for action by the nuclear industry to ensure effective long-term reactor core cooling, in light of recent developments in the mechanistic understanding of the important phenomena.

We have not seen a final version of the GL. We understand that the staff is working on the details of the appropriate regulatory process, without changing the intent to resolve the technical issues expeditiously and practically.

The responses of licensees are likely to follow the guidance prepared by NEI and currently under review by the staff. We debated whether it was appropriate to issue a GL prior to completing the final NEI guidance document and the associated Safety Evaluation Report. We

have concluded that issuing a GL now will enable licensees to start the process of gathering information, planning activities, and performing preliminary analysis in anticipation of more complete analysis when guidance is available. It is important that the guidance be available in a timely fashion. We understand that it will be presented to our Thermal-Hydraulic Phenomena Subcommittee in August and to the full Committee in September 2004. At that time, the issue of chemical effects on screen blockage, which is not addressed in the NEI guidance, will not be resolved. We expect that the description of the risk-informed options in this guidance will be complete, including a clear description of what is meant by "mitigation capability" for breaks above a risk-justified transition break size. We look forward to discussing these issues with NEI and the staff.

The staff and the industry are also pursuing procedural approaches to make use of the robustness and adaptability of the installed systems to help ensure long-term cooling in the event of diminished recirculation pump capability. Such approaches, as suggested in our report of September 30, 2003, are an important aspect of risk-informing the sump blockage issue. They may significantly reduce the risk associated with sump screen blockage, an effect which should be expressed in terms of quantitative measures so that its effectiveness can be assessed.

Some technical issues raised by us previously have not yet been fully resolved. Research, such as the currently ongoing investigation of chemical effects and studies of downstream effects, is needed for the final resolution of the sump blockage issue. The staff should also initiate any research necessary to confirm that the guidance used by the licensees is adequate. For example, there are still several different models for the "zone of influence." We have questioned the technical basis for these models. Coupling an existing computational fluid dynamic code, such as FLUENT, to the steam-water properties available as a subprogram, would make it possible to model the homogeneous supersonic jets issuing from various break geometries. This work would show the shock wave patterns and mechanisms for energy dissipation and would be very helpful in evaluating the simplified zone of influence models.

Sincerely,

/RA/

Mario V. Bonaca
Chairman

References:

1. Proposed revised draft Generic Letter provided to ACRS on July 7, 2004 (Predecisional).
2. NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors", June 9, 2003.
3. Proposed Generic Communication: "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors", 69 Fed. Reg 16,980, March 31, 2004.
4. Proposed revised draft Generic Letter provided to ACRS on June 15, 2004 (Predecisional).
5. Public Comment received from the Westinghouse Owners Group, May 27, 2004.
6. Public Comment received from Winston & Strawn (NUBARG), June 1, 2004.
7. Public Comment received from NEI, June 1, 2004.
8. Public Comment received from TVA, May 28, 2004.
9. Public Comment received from FPL, June 1, 2004.
10. Public Comment received from Duke Power, June 1, 2004.
11. Public Comment received from Westinghouse, May 27, 2004.
12. Public Comment received from UCS, May 20, 2004.
13. Public Comment received from Progress Energy, June 1, 2004.
14. Public Comment received from Lanson R. Rogers, March 31, 2004.
15. Public Comment received from Dominion, June 1, 2004.
16. Public Comment received from STARS, June 2, 2004.