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

Dear Chairman Zech:

SUBJECT: EFFECTIVENESS OF PROGRAMS RELATING TO GENERIC AND UNRESOLVED SAFETY ISSUES - ACRS COMMENTS

In your memorandum of September 18, 1986, to then ACRS Chairman Ward, you requested that the ACRS advise the Commission on the effectiveness of programs that address unresolved safety issues (USIs) and generic issues (GIs). During a meeting of the ACRS with the Commission on December 11, 1986, we reviewed some of our activities in this area and asked whether your concern was with the effectiveness of the overall process for dealing with these issues or with the extent to which the implementation of the resolution of GIs and USIs has increased safety. In response, you said that advice on both aspects was desired. The ACRS Subcommittee on Generic Items was assigned the task of developing information on this subject.

The Subcommittee has held several meetings with representatives of the Office of Nuclear Regulatory Research (RES) and the Office of Nuclear Reactor Regulation (NRR) to review this matter. Items discussed by the Subcommittee during its review included:

~ Description of the entire process dealing with GIs and USIs, including identification, prioritization, resolution, imposition, implementation, and verification.

~ Ranges of time involved for completion of each step in the process.

~ Scopes of various issues and the way in which the scopes of individual issues were defined in relation to other issues and to the broader issue of prevention of core damage or mitigation of its consequences.

~ Role of the NRR project managers in the imposition, implementation, and verification stages.

~ Resolution process for four specific case histories. These included two USIs, A-46, Seismic Qualification of Equipment in Operating Plants, and A-49, Pressurized Thermal Shock, which required five to six years for resolution and resulted in requirements for significant hardware backfits to the affected plants, and two GIs, No. 20, Effects of Electromagnetic Pulse on Nuclear Power Plants, and No. 61, SRV Line Break Inside the BWR Wetwell Airspace of Mark I and II

Containments, whose resolution required 13 to 33 months and resulted in no new requirements on operating plants.

~ Description of the Safety Issues Management System (SIMS).

In addition, the Subcommittee met with representatives from the Duke Power Company to learn and understand the process of implementation from the licensee's viewpoint, the role of the NRC Staff in this process, and the reasons for delays in implementation. Specific case histories discussed were: USI A-24, Qualification of Class 1E Safety-Related Equipment, USI A-44, Station Blackout, and USI A-46, Seismic Qualification of Equipment in Operating Plants.

During our 336th meeting, April 7-9, 1988, we discussed the information gathered by the Subcommittee. Our specific comments are presented below for each phase of the process.

Identification

The identification of GIs is completely open to anyone: NRC staff, industry, ACRS, or members of the public. This is as it should be. However, since every issue identified must proceed at least through the prioritization step, identification must be subject to some discipline. The procedures for identification provided in Attachment 1 to RES Office Letter No. 1 dated December 3, 1987, are appropriate for use by the NRC Staff and the ACRS. We believe it especially important that these guidelines be observed by task forces investigating operational incidents. We note, for example, that the feedwater failure event at the Davis-Besse Nuclear Power Station engendered 34 new GIs. The fact that only 7 of these eventually were judged of High or Medium priority suggests a lack of suitable discipline in evaluating the significant issues relating to this event.

Prioritization

Each identified GI is assessed and assigned a priority by the NRC Staff. This is an essential step. Since fewer than half of the issues identified are subsequently deemed worthy of resolution (assigned priorities of High or Medium), it is important that issues of low or negligible safety significance be weeded out in order that the limited resources can be applied to the more important issues. It is worth noting that priorities are based primarily on safety significance; the cost-benefit ratio is a clearly secondary consideration at this stage.

We review and comment periodically on the priorities assigned to the various issues. Although occasionally we disagree with the Staff's ranking, we believe that overall the priorities have been appropriate.

The average time required to assign a priority to a GI is about six months. We do not consider this unreasonable in view of the importance of this step and in view of the fact that a significant portion of this time is required for peer review. If you wish to reduce the backlog of issues waiting to have priorities assigned, it is necessary only to provide additional resources.

Resolution

We have reviewed the resolution of essentially all of the USIs and some, but by no means all, of the GIs. We have provided you with letters indicating our agreement or disagreement with the resolution of each issue we have reviewed. Where we have disagreed, the Staff has, in most cases, attempted and sometimes succeeded in resolving our concern. In general, we believe that the resolution of GIs and USIs has been carried out by the Staff in a professional and effective manner.

The Staff in its briefing of the Commission on October 21, 1987 proposed various means to reduce the time required for resolution of an issue. Some of these were managerial or procedural but others were technical. The Staff proposed to explore whether some issues could be combined and resolved as a package or via the Individual Plant Examination (IPE) portion of the Severe Accident Policy. Whether this will accelerate resolution we do not know, but it addresses some of our concerns about the definition of scope for issues that will be elaborated on below. We are not sure that the technical resolution of complex safety issues can or should be accomplished much more rapidly than is now the case. Better management may provide greater continuity to the effort and may reduce the time for review and concurrence. As in the case of priorities, the backlog can be reduced by assigning more resources.

Imposition, Implementation, Verification

The decision to impose the resolution of an issue on a particular plant is made by NRR, the licensee is responsible for its implementation, and either NRR or Regional Staff verify its implementation.

The Staff in its briefing of the Commission has recognized that there frequently has been poor definition of what the licensees are expected to do and on what schedule, and has proposed improvements in the resolution and imposition packages to remedy this situation. We recommend that every effort be made to make such improvements. Moreover, we believe that greater involvement of the affected licensees, through Owners Groups or other means, at the resolution stage, would contribute greatly to improved understanding by the licensees of what is expected or required.

The Staff said also that they would explore whether it would be beneficial to combine the implementation of various GI resolution packages. We endorse this concept as one that might contribute not only to more timely implementation but also to improved safety. Each issue is now prioritized and resolved as if it were the only one outstanding. As a result, the improvement in safety provided by implementation of issue C after issues A and B have been implemented may be less than would have been the case if issue C had been implemented alone. Considering these three issues together might lead to an entirely different, faster, and more effective fix. In other words, application of the principles and procedures proposed for the Integrated Safety Assessment Program (ISAP) II becomes more and more desirable.

The representatives from Duke Power Company offered several suggestions to improve the implementation of resolved generic issues. Some of these are mentioned below.

It seems that a major reason for delays in implementation is ineffective communication between the Staff and the licensees. The resolution of an

issue is so worded that the licensee frequently does not know what the Staff wants or will accept. In some cases, because of change of reviewers or simply the passage of time, the Staff's requirements change. Attempts by licensees to act quickly, or even to anticipate the requirements, most frequently have been unsuccessful, requiring redesign or rework to satisfy the Staff's ultimate requirements. Some experience suggests that implementation has been achieved more easily and more rapidly when the industry has been involved with the resolution, and thus understands more clearly what is required for implementation. It is equally important to note that implementation will never be accomplished "overnight." Even if only a Technical Specification or procedure change is needed, time is required to write and review the procedure, to obtain approval internally and from the NRC Staff (for a Technical Specification change), to incorporate it into the operator training programs, and to train the operators in its use. A substantial portion of the time required to implement a change, either hardware or procedural, is that required for the NRC Staff to review and respond to the licensee's proposal. In the examples looked at by the Subcommittee, it was not unusual to find a turnaround time of as much as one year.

Scope of Issues

On several occasions, we have raised questions about the scope of individual GIs and USIs; some too narrow, some too broad. The Staff has been concerned that if an issue is defined broadly, such as systems interactions, it may not be resolved within a reasonable time. Although this position is understandable, we are concerned that it represents a reaction by the Staff to pressures from the Commission and the Congress for timely resolution of issues rather than the ultimate objective of improving safety. We do not believe that broadly defined issues are inherently undesirable. Nor do we believe that such issues are unmanageable. We see no reason why broad issues cannot be subdivided for resolution without losing sight of the ultimate objective. For example, USI A-47, Safety Implications of Control Systems, is clearly a subset of USI A-17, Systems Interactions, although it was not identified as such. In an even broader view, USI A-17 can be considered a subset of the issues involved in the Severe Accident Policy. We note, however, that the USIs and unresolved GIs have been singled out in the Severe Accident Policy Statement as separate requirements.

We believe that achievement of improved safety, defined as reducing the probability of severe core damage and release of radioactive materials to the environment, is not well served by the compartmentalization that we now see. The identification and definition of a collection of USIs and GIs, all subject to outside pressures for speed of resolution, may be a way to show progress, but there is little assurance that cost-effective and needed improvements will be achieved. We believe that the Staff understands this, but is so committed to refining the existing process that it has no incentive to undertake the larger and more formidable task of developing and implementing a more comprehensive and more holistic approach.

Increased Safety

Has the implementation of the resolution of USIs and GIs reduced risk? We cannot answer this question on the basis of facts. We did not determine the extent to which all of the resolved issues have been

implemented for all of the operating plants. We have seen no probabilistic safety assessments that compare risks before and after the implementation of resolved issues. Although the assignment of priorities and the regulatory analyses accompanying the resolutions include estimates of risk reduction, these are calculated for each issue separately and do not consider the combined or cumulative effects of all issues. Nor do these analyses necessarily consider possible effects adverse to safety.

Lacking hard data, the answer to this question is a matter of judgment. The Staff believes that their efforts have reduced risk. We must agree, since in most cases we have endorsed the resolution reached by the Staff. The representatives of Duke Power Company were asked to comment on this question. They thought that the following had contributed to safety: standby shutdown facilities resulting from Appendix R requirements, provisions to avoid failure of low-pressure systems connected to high-pressure systems (Event V), improvements in reactor trip switchgear reliability, improved training, and improved emergency operating procedures. On the other hand, they thought that only questionable improvement to safety had resulted from: ATWS requirements, reactor vessel water level instrumentation, portions of Regulatory Guide 1.97, and portions of the requirements for equipment qualification.

Overall, we believe that most of the USIs have improved safety where they have been implemented and that many of the GIs have also. We believe that a more comprehensive approach to resolution and a more integrated approach to implementation, both based on probabilistic safety assessments, would make it much easier to determine that risk had been reduced in a cost-beneficial manner. This suggests the desirability of implementing the Severe Accident Policy in a more integrated manner, rather than dealing separately with USIs, GIs, and IPE results. It also emphasizes the benefits that might be obtained from implementing plant fixes in accordance with the principles of ISAP II.

Additional remarks by ACRS Member Harold W. Lewis are presented below.

Sincerely,

W. Kerr
Chairman

Additional Remarks By ACRS Member Harold W. Lewis

The Committee is comfortable with the six months necessary to set priorities (there is no such word as prioritize), and accepts the position that the only solution to the backlog question is the assignment of additional resources. This glosses over the fact that most of the time is spent in interoffice coordination and peer review and that it is not uncommon for additional resources (see the works of L. Peter or F. Brooks) to slow down a process. I do not propose a global solution, but note only that this appears to be one of the many NRC activities that suffer in the effort to forge an agency out of semi-

autonomous units.
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