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NUCLEAR REGULATORY COMMISSION
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MEMORANDUM FOR: William J. Dircks
Executive Director for Operations

FROM: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

SUBJECT: RETROSPECTIVE LOOK AT NRR PROGRAMS AS A RESULT OF THE DAVIS BESSE EVENT

This memo is a follow-up to my memo to you on "NRR Initiatives Resulting from the Davis-Besse Event," dated August 19, 1985. In the memo, I discussed three items that I intended to move forward on, namely: (1) increased management and resource attention to B&W reactors as a class; (2) evaluation of performance indicators for licensing requirements; and (3) identification of licensees with less than desirable performance in licensing/management activities. In addition, I said that I had requested that NRR management reflect on the Davis-Besse event from the perspective of policy and procedures in order to identify additional potential areas for improvement. With respect to item (1),the commitment of resources to strengthen oversight of B&W facilities has been implemented in the establishment of a specific B&W Project Division in the reorganization of this Office and the assignment of two Project Managers to each B&W facility.

The purpose of this memo is to bring to your attention additional areas for improvement that have been identified as we have continued in our retrospective look at NRR programs in light of the Davis-Besse event. Items (2) and (3) above will be addressed in the context of these additional and broader subject areas. We have identified one specific issue (the requirements for emergency feedwater systems), and three general areas in which there is a need to improve our effectiveness. The three general areas are: (1) assessment of the safety of nuclear power plants, stressing operations and the interrelationship of operations and design; (2) integrated assessment of the reliability of systems important to safety (e.g., considering system interaction, and positive and negative impact changes); and (3) evaluation and use of PRA.

The specific issue mentioned above relates to a need to reassess the NRC's previous position that emergency (or auxiliary) feedwater systems on older plants do not need to be upgraded to safety-related systems. Prior to 1975, the staff, the Commission, the hearing boards and the Commission advisory groups accepted plant designs without safety-related emergency feedwater systems. The importance of these systems was not judged to be as great as that of the Emergency Core Cooling System, and therefore a lower safety classification was considered suitable.

Operating experience (including the TMI-2 accident), and risk and reliability analyses have come to increase our understanding of the importance of emergency feedwater systems. In response to the growing awareness of the importance of these systems, the staff initiated several programs to improve the reliability of emergency feedwater systems. These include: TMI Action Plan Items II.E.1.1 (Auxiliary Feedwater System Evaluation); II.E.1.2 (Auxiliary Feedwater System Automatic Initiation and Flow Indication); Multi-Plant Action C-14 (Seismic Qualification of Auxiliary Feedwater Systems); Generic Issue 37 (Steam Generator Overfill and Combined Primary and Secondary Blowdown); and the Environmental Qualification Program. As a result of the continuing experience with emergency feedwater systems, we have concluded that a reassessment of the need for a fully safety-related system is appropriate. This reassessment will include a consideration of the need for any rule changes.

The Division of Safety Review and Oversight has the responsibility for reassessing the NRC requirements for emergency feedwater systems and developing recommendations with respect to the need for changes in our ongoing study of decay heat removal (USI A-45) or in the need for initiating rulemaking (e.g., to amend GDC 34).

1. Assessment of the Safety of Plant Operation

The first general area relates to the assessment of the safety of plant operation. The fundamental program formulated by NRC to assess plant operations is the Systematic Assessment of Licensee Performance (SALP). SALP reports are relied upon as the best available assessment of licensee performance and, therefore, of overall safety. As the staff has become more experienced in the development and use of SALP reports, it has been recognized that the SALP effort can, and should, be strengthened. This includes the need for a set of performance indicators that more clearly ties licensee performance to safety.

In the current SALP process the rating can lag significantly in time after the beginning of performance problems. In addition, the problem indicators (such as notices of violations and deficiencies) that are monitored tend to be at least one step removed from the actual problems (i.e., the root problem is not addressed, only the fact that the root problem resulted in a violation or deficiency). Whether the SALP process is the most appropriate vehicle for a determination of plant safety or whether another system is needed is open to question. If the SALP is to provide both perspectives (licensee performance and plant safety), the present draft SALP manual chapter (NRC 0516) should be modified to include performance indicators with the purpose of determining plant safety.

In addition, we believe that the SALP categories are not focused. For example, the present structure gives the impression that all rated categories are given the same weight and attention. Certain items such as "refueling" should probably be deleted; others such as "operations", greatly strengthened. Finally, the staff needs to develop, with Commission concurrence, a deliberate consistent set of actions to be taken when a utility receives a "3" rating the first time, a second consecutive time, etc.

NRR is actively increasing its involvement in the SALP process by broadening the scope of our input and increasing our participation in the board meetings. The Project Director for each plant has been assigned the responsibility for representing NRR at all SALP meetings.

In addition to the above, the Division of Human Factors Technology has ongoing programs to look at training and maintenance performance indicators. A part of those programs is to review the maintenance performance indicators suggested by INPO. The INPO performance indicators go beyond the scope of the SALP process, but there is still some question about the extrapolation from the maintenance performance indicators to assurance of safety.

Even with the best performance indicators and the appropriate vehicle to identify good and bad performers (more safe and less safe plants), the exercise will not be productive without a means of inducing poor performers to change their ways. We need to identify means of effectively changing licensee attitude and performance. Some suggestions include: implementing a stronger enforcement policy, requiring plant shutdowns when certain thresholds are reached (e.g., complete loss of a safety system function as originally suggested in the TMI-2 Lessons Learned Report); and requiring remedial programs for licensees who need to improve performance.

The NRR Operating Reactors Assessment Staff has responsibility to coordinate this activity within NRR, with special attention to the use of information stemming from the Human Factors Program Plan (e.g., maintenance indicators). The coordinated activities will include: developing performance indicators from which an assessment of safety can be determined; identifying the appropriate vehicle for management to use in determining whether plants are safe; and developing mechanisms for inducing positive changes in licensee performance and, hence, safety.

2. Integrated Assessment of Reliability of Systems

This general area addresses improvements in the way we perform our safety reviews and in our ability to assure plant safety. We will develop procedures to consider the plant as an integrated set of systems. The subsets are individual systems, which are in turn a set of components. In reviewing systems intended for mitigating the low probability events, we will consider how the design may affect "normal operation" or the mitigation of other events. In the past, only rarely have we examined systematically the integrated whole - it is difficult to do. However, the new organization of NRR provides the opportunity for successfully implementing an integrated approach. In integrated assessments, we will consider the positive and potentially negative effects of design requirements. In addition, these integrated assessments will address balance-of-plant systems and other non-safety-related systems since challenge rates and mitigation system reliability are related issues.

PRA was designed in part to provide a more fully integrated treatment of complex safety issues, and it will continue to be considered as a factor in conjunction with engineering judgment in the development of an "integrated" approach to safety reviews (further discussion of the use of PRA is reserved for item 3). In attempting to develop an "integrated" approach, we will look beyond the Agency into other areas where such an approach may be used (for instance, the weapons or space program). NRR's ongoing programs to improve generic issues tracking will also help to address this concern in that the status of related issues will be better understood than in the past. NRR will continue to stress prioritization as the mechanism for promoting timely resolution of high priority generic issues.

The Division of Safety Review and Oversight has the lead in researching other areas where such an approach has been successful and in developing the tools and criteria for undertaking this change in the way we think about safety.

3. Evaluation and Use of PRA

Probabilistic Risk Assessment's (PRA) main strength lies in its systematic and integral approach to safety and risk evaluations of nuclear power plants. PRA is designed to integrate into a uniform methodology the relevant information about plant design, operational practices, operating history, hardware and human reliabilities, the physical progression of accidents, and potential environmental and health effects. However, effective use of PRA requires a clear understanding of not only the strengths but the weaknesses of the analyses with respect to the decision being made. In assuring appropriate PRA quality we will assess: the data base (applicability, completeness, etc.); uncertainties; and applicability of generic models. In addition, we will identify those issues which lend themselves to PRA and those which do not. Out of this evaluation will come a recognition of any changes that need to be made in the way we do PRAs and the way we apply PRAs. Such clarification will assure us that we are making regulatory decisions based on sound data and operational experience, and would also assure that such decisions are made on a timely basis.

The Division of Safety Review and Oversight, which has the lead responsibility for risk and reliability assessment and for management of generic safety issues related to reactor and plant systems design and operation, will review the issues discussed here and coordinate with other NRC offices to improve PRA methods and the data base, and to reduce uncertainties especially in those areas that require increased responsiveness to regulatory needs.

To improve NRC's effectiveness in these areas, staff effort will be spent on defining the scope of the issues, exploring the ramifications, and developing implementation plans. NRR is committed to make improvements in these areas and I have encouraged the NRR staff to seek useful perspectives from wherever they may be available (inside and outside the Agency, and from organizations and individuals with missions similar to the NRC's, such as assurance of safe operation of other complicated machines). In addition, the views of our critics, the industry, Congress, and the individual Commissioners, among others, may be helpful in this process. Gary Holahan, Director, Operating Reactors Assessment Staff, will coordinate this effort among the NRR Divisions.

(S)

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

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