D850415

The Honorable Nunzio J. Palladino
Chairman
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Palladino:

SUBJECT: SEVERE ACCIDENT POLICY - SYSTEMATIC REVIEW OF NUCLEAR POWER PLANTS

During a meeting on November 2, 1984, the Commissioners requested that the ACRS provide a description of the specific elements for a systematic approach to examination of each nuclear plant now under construction or in operation. In response to this request, we make the following suggestions for a systematic review of operating nuclear plants that have not already been reviewed in some similar fashion:

1. Obtain a probabilistic risk assessment •(PRA) of a surrogate plant as similar to the plant to be reviewed as feasible. Consideration should be given to representation of both the NSSS and the balance of plant. The choice of PRA should be made with particular attention being given to completeness in the prediction of core melt probability and of containment performance in a severe accident situation. For plants not having a full-fledged PRA, considerable useful information can be obtained from plant analyses conducted in support of Unresolved Safety Issue A-45.

2. Review the surrogate PRA in enough detail to become familiar with the way in which fault trees and event trees are constructed. Give special attention to the treatment of common mode failures and to treatment of systems interactions.

3. Define in detail the important design characteristics of the power plant
being reviewed. Include safety systems and other systems the normal or abnormal operation of which are likely to initiate or to aggravate a sequence leading to core melt. Examine environmental qualification, seismic design basis, flood design basis, and any other relevant design characteristics.

4. Identify the dominant sequences in the surrogate PRA. Determine whether
these have counterparts in the plant being reviewed. Examine the appropriate systems and procedures in the plant being reviewed to determine if their contributions to core melt depart markedly from that of the surrogate plant. If there is a significant difference, identify its source.

5. Examine the plant being reviewed to determine if systems or procedures exist for this plant that have not been treated adequately in the PRA for the surrogate plant. Give special attention to:

a. systems or procedures associated with decay heat removal from the core and from the containment.

b. electrical energy supplies. Look carefully at the reliability of offsite supplies. Give special attention to reliability of the emergency AC supply. For example: make certain that switching systems required to make emergency power available to safety systems do not require offsite power to operate; look for the possibility that battery charger power may be lost in the switch-over from normal to emergency AC supplies; make certain that reliability and capacity of DC supplies are adequate, etc.

c. examination of both safety and nonsafety (e.g., main feedwater) systems for contribution to core melt frequency.

d. identification of possible sources of common mode failures.

e. whether the systems in the plant being analyzed are adequately represented by the fault trees and event trees in the plant being used as a model. Look with special care for systems interactions that may have been missed in the surrogate plant analysis or that may not exist because of a different design or arrangement in the plant being analyzed.

f. the configuration and role of support systems in determining the applicability of the surrogate PRA.

g. environmental qualification, capabilities, and needs in a plant-specific manner.

6. Give particular attention to containment analysis. Include a careful search for any failure modes that may lead to early failure or to early release of fission products. Look for any special features that might produce molten core dispersal, molten core cooling, or abnormal contain-ment system (e.g., filter system) behavior under core melt conditions. Search for any possibilities of containment bypass. Look with care at possibilities of hydrogen generation and ignition. Is the equipment that is needed to cope with an accident qualified to deal with the environment that might exist during and following a core melt or a hydrogen burn?

7. Calculate the frequencies for a representative set of releases.

8. Review the plant in terms of seismic deficiency insights gained from existing PRAs.

9. Perform a plant walkdown to look for troublesome seismic deficiencies.

10. Identify the minimum set of systems needed to shut down the reactor and remove decay heat in the event of a large earthquake. Evaluate the behavior of this set of equipment for an earthquake.

11. If an appropriate PRA is not available, a plant-unique PRA covering the usual accident initiators (both internal and external), and carried out to the point that frequency of radioactive release categories is calculated, may be necessary.

While PRA is a useful analytical tool for examining the contribution to risk of the various elements of a plant's physical design, it is widely accepted that the effectiveness of human performance, including that of management, has a substantial influence on risk. PRA is less successful in examining this.

Therefore, to supplement the use of PRA methods in system evaluation of individual plants, we believe it will be necessary to develop methods of analysis and associated data bases which can properly account for both positive and negative human performance.

As we noted in our letter of November 6, 1984 to Commissioner Asselstine,

> "The quality of operation is not the same at all plants. The ability of operators, the quality of equipment maintentance and testing programs, the comprehensiveness of technical support, and the overall ability of plant management are important considerations in operation. There does not exist, at present, satisfactory means for fully evaluating these factors. . . . Development of an effective and practical approach should be a high-priority matter for the NRC."

We hope this responds appropriately to the Commission request.

Sincerely,

David A. Ward
Chairman

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