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Mr. Gary R. Quittschreiber
Senior Staff Engineer
Advisory Committee on Reactor Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Quittschreiber:

This is to submit my comments and observations on the Class 9 Subcommittee Meeting held on July 2, 1980 in Los Angeles, California. Many of my comments are essentially reiteration of the items I touched upon at the meeting in some form.

1. Monitoring and Control of Severe Accidents

Although the importance of diagnosis and control of severe accidents is perhaps well recognized, I would like to emphasize that a greater priority should be placed on developing the capability to monitor and contain severe accidents. The need for this emphasis perhaps stemmed from the discussion of recent industry reports including NSAC-2, Mitigation of Small-Break LOCAs in Pressurized Water Reactor Systems. It is my opinion that any study on mitigation of severe accidents should include evaluation of the performance and interpretation of various instrumentation systems during the course of severe accidents. One example in this regard is whether or not source-range neutron detectors can be used to monitor any core uncovery in an accident condition.

One should also explore the need for additional devices to diagnose the status of an ongoing Class 9 accident. A crucial decision one may have to make is whether to terminate efforts to maintain core cooling or not, in anticipation for complete core melting. Another example might be the need to initiate early venting of the containment. In addition to understanding the advisability of such decisions and developing the capability for implementing them, one should be able to initiate them, if necessary, timely and with confidence. In this regard the importance of providing sufficient operator training can not be overemphasized.

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Together with developing further capability for monitoring and diagnosis of severe accidents one should also put more emphasis on the methods for controlling and containing such accidents. They could include application of the flaring and fogging techniques for hydrogen control and alternate methods for in-vessel cooling.

2. Relative Risk Analysis

I believe the Indian Point/Zion risk assessment studies, reported both by the Offshore Power Systems and by the NRC Task Force on Interim Operation of Indian Point, represent a useful application of the probabilistic risk analysis technique. In my opinion, however, the Offshore Power Systems study should have put a greater emphasis on the relative or comparative risk evaluations. In particular, adjustments in either accident probabilities or consequences should properly reflect generic items, e.g., treatment of anticipated transients without scram or credits due to availability of shift technical advisors. Any adjustments in risk assessment due to generic items should be separated from those due to plant specific items.

3. Filtered-Vented Containment Systems

In recognition of the potential contributions the filtered-vented containment systems could make towards enhancing the safety of nuclear power plants, I would certainly recommend further studies on the concept. Based on the studies reported so far, however, such a vent-filter system could require a substantial addition of equipments and facilities on site, including possibly a large second containment. In addition, potential for aggravating an accident due to premature venting or malfunctioning of the filter-vent system cannot be apparently ruled out. Thus, alternative accident mitigation features, including hydrogen control methods and in-vessel cooling techniques, should be actively investigated in parallel with the filtered-vented containment study.

4. Bounding Calculations for Severe Accidents

It is perhaps well recognized that the attempts to determine the bounding envelope for energy release in hypothetical core disassembly accidents for fast reactors have been met with considerable difficulty. The recent Zion/Indian Point study by Sandia Laboratory (NUREG/CR-1410) concludes that similar attempts for core meltdown accidents in pressurized water reactors have not been particularly successful either. In spite of these experiences, one can easily appreciate the importance of such calculations and I would like to recommend some further investigations in this direction.

For the Class 9 accidents, one could perhaps try to obtain a number of envolopes, rather than a single bounding envelope, as a function of some sensitive parameters. For example, one could classify the assumed accidents according to whether accumulator water would be dumped on a molten core or not, and according to whether an early or late core melt could be assumed. In view of the significant undertainties inherent in these calculations, I would first suggest some simple calculations based on the first principles as much as possible. These calculations of course should be compared with more sophisticated computer calculations.

Sincerely yours,

John C. Lee
Associate Professor

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cc: W. Kerr