

D870715

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

Dear Chairman Zech:

SUBJECT: ACRS COMMENTS ON DRAFT NUREG-1150, "REACTOR RISK REFERENCE
DOCUMENT"

During the 327th meeting of the ACRS, July 9-11, 1987, we discussed the draft report NUREG-1150, "Reactor Risk Reference Document," which was issued for comment in February 1987. The ACRS Subcommittee on Severe Accidents considered this report during meetings on January 29 and May 1, 1986 and the ACRS Subcommittees on Severe Accidents and Probabilistic Risk Assessment continued the review on June 3 and July 8, 1987. In our review we had the benefit of discussions with the NRC Staff and its consultants from Sandia National Laboratory (SNL). We also had the benefit of the documents referenced.

NUREG-1150 describes probabilistic risk analyses (PRAs) of several operating nuclear power plants. Results of PRAs for two of these were previously reported in WASH-1400. The plants analyzed had different containment types and included both PWRs and BWRs. The analyses are said to be "risk re-baselining"; i.e., the methods used are current, the data used in the analyses include both generic and plant-specific information, the computations make use of codes that have been developed since the publication of WASH-1400, and the risk calculations make use of the so-called Source Term Code Package (STCP) that includes much of the information developed by the NRC research program on severe accidents (although what was used was a slightly modified version of the published STCP). Containment performance is treated in much more detail in NUREG-1150 than it was in WASH-1400.

In addition to calculations of risk attributed to internal initiators, this report describes the results of studies which attempted to predict the uncertainties in the predictions of a number of relevant quantities, including core melt frequency and the probabilities of early and delayed fatalities.

In assessing public risk, the current version of NUREG-1150 is incomplete, since external accident initiators are not treated and, based on results from other PRAs, these may produce significant contributions to risk. Work has begun on external initiators, and later versions of the report will contain the results.

The report and its supporting documents are voluminous, and the amount of information reported is almost overwhelming. However, we believe the significance of the results and the anticipated use of the information in the regulatory process should be made explicit.

Among the conclusions reported, the following appear to be significant:

- (1) The report concludes that, for the plants examined, the risk contributors are sufficiently disparate that no general conclusions can be drawn concerning the risk of plants not examined.
- (2) The calculated risk of each plant analyzed was less than the quantitative health effects objectives in the Safety Goal Policy Statement. However, as mentioned above, the calculated risk did not include contributions from external initiators.
- (3) The calculated risks for Surry, Unit 1, and Peach Bottom, Unit 2, were not markedly different from those reported in WASH-1400. We were told that a number of risk-reducing improvements had been made for these plants since the original analysis, but that these were somewhat offset by newly discovered risk contributors.

One of the original aims of the work reported in NUREG-1150 was to determine if an analysis of these selected plants would permit conclusions to be drawn concerning the risks of other operating plants not analyzed. So far as we can determine from the report and from discussions with the Staff, their conclusion is that these plants (and other plants that have been the subject of PRAs) are sufficiently different, and the risk contributors are sufficiently diverse, that little can be learned about one plant from the analysis of another plant, even when they are of the same general type.

This conclusion is both surprising and disturbing. If correct, it raises serious doubts about the breadth of application of these efforts. The Staff has not provided convincing reasons for this conclusion. More effort is needed to determine why this conclusion should be accepted, because such a conclusion would have far-reaching consequences for several Commission policies.

We have the following additional comments:

- (1) We are skeptical of the method by which expert opinion was used in predicting uncertainties. Explanation of and justification for the method are obscure. There is also reason to believe that the way in which the method is used can have a significant influence on the uncertainties predicted. It is thus almost impossible to interpret the significance of the reported uncertainties or to subject them to peer review.
- (2) Many of the codes used in the calculation are relatively new. The validity of several of the codes is not well established. Furthermore, many of them have not been published and are not yet available to people outside the national laboratories. Serious peer review of the results reported is thus almost impossible.
- (3) It was emphasized by the Staff that a major contribution of the report was the "insights" provided. We recommend that these insights be better identified and that their significance for those who are not PRA practitioners be made more clear.
- (4) Human performance contributions to risk (both positive and nega-

tive) are not well described by PRAs. This report does not correct that deficiency.

- (5) We were told by the Staff that, in light of insights developed during the work reported, resolutions or proposed resolutions of a number of Unresolved Safety Issues are to be revisited. We recommend that, as an aid to understanding the report, these instances be identified. We recommend also that the interaction between those responsible for the resolution of Safety Issues and those responsible for this report be improved.

One might conclude, both from the report and from comments made by the Staff, that the NRC regulations are inadequate to determine plant equipment and procedures necessary to protect public health and safety. If this is the Staff's conclusion, it is a dramatic finding and should be emphasized, and the position developed more effectively than it is in the present draft. If, however, regulations can be used as a mechanism to protect public health and safety, and we believe they can, we recommend that the Office of Nuclear Reactor Regulation begin early examination of this report, both to apply its insights and to guide its further development.

Sincerely,

William Kerr
Chairman

References:

1. U.S. Nuclear Regulatory Commission, NUREG-1150, Reactor Risk Reference Document," Volumes 1, 2 and 3, Draft issued for comment, dated February 1987
2. U.S. Nuclear Regulatory Commission, NUREG-75/104, "Reactor Safety Study - An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants," dated October 1975 (formerly issued as AEC report WASH-1400).
3. U.S. Nuclear Regulatory Commission, NUREG/CR-4587, "Source Term Code Package: A User's Guide (MOD1)," Battelle Columbus Laboratory, dated July 1986.

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