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

Dear Dr. Palladino:

SUBJECT: ACRS COMMENTS ON NUREG-0956, "REASSESSMENT OF THE TECHNICAL  
BASES FOR ESTIMATING SOURCE TERMS" -- REVIEW COPY

During its 314th meeting, June 5-7, 1986, the Advisory Committee on Reactor Safeguards discussed NUREG-0956 with representatives of the NRC Staff. This report had previously been reviewed by a Subcommittee in a meeting on June 3, 1986. A draft copy of this report issued for public comment had been reviewed by the Committee during its 306th meeting, October 10-12, 1985, and an ACRS report was issued on December 12, 1985. We also had the benefit of the documents referenced.

In our letter of December 12, 1985, we made a number of comments on the draft report. Our review of the revised version, on which we report in this letter, indicates that a number of changes have been made. We consider this version to be superior to the one we reviewed earlier. We observe, however, that:

- (1) Although a variety of uncertainties are associated with both the physical phenomena and the calculational tools described in NUREG-0956, the description of the uncertainties given in the report is only qualitative. In order to use the material in this report, and to draw conclusions from the results, information on uncertainties must be available. We are told that proposed NUREG-1150, "Nuclear Power Plant Risk and Regulatory Applications," will contain whatever quantitative description of uncertainties can be developed with existing information.

Whether this information will be presented in a way which will make it possible to identify the uncertainties attributable to the Source Term Code Package (STCP) is not clear. If the information in NUREG-0956 is to be generally useful, this identification is essential. We recommend that specific attention be given to this identification, either in NUREG-0956 or in proposed NUREG-1150.

- (2) In view of the variety of earlier comments indicating that source term research would provide significant new information, surprisingly little is said in the report about the implications of the new information that has been developed. The report claims significant improvements in calculational methods compared to earlier work in WASH-1400, "Reactor Safety Study - An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants." But about all that is said concerning the results of the new methods is that one cannot generalize from them. Section 4.13 of NUREG-0956 does describe a comparison of iodine species. More of this kind of

information would make the report more useful. We note, however, that a recent NRC Report, NUREG-1171, "Draft Environmental Statement Related to the Operation of South Texas Project, Units 1 and 2," does directly compare both early and delayed fatalities as calculated by the "old" and the "new" source terms.

- (3) So far as we can determine, the use of the STCP requires that many decisions that have a significant influence on the calculated core melt progression must be made by the user. User decisions thus have a significant influence on sequence consequences. Experienced users are aware of this, but the report should point this out for the benefit of those less familiar with the package.
- (4) It would be helpful to identify the methodology of source term calculations independently of the particular codes that make up the current STCP. For example, an appendix describing the hand calculations that form the basis for the information in Table 3.4 of NUREG-0956 would be useful.
- (5) We reiterate the importance of complete and accurate documentation. This is especially critical in this report because of the many documents on which the report depends. The version of the report which we reviewed had a considerable number of errors and omissions. We assume these will be corrected.
- (6) There are still a number of obvious deficiencies in the physical modeling of the codes. For example, in-vessel circulation and ex-vessel time-dependent release of molten core material are not treated.
- (7) An early goal of the source term research program, and the subsequent recalculation of risks for several representative power plants, was the formulation of a generic source term that would permit an estimate of the risk produced by most of the reactors now operating. This report hints that the development of a generic source term may not be feasible. If a less ambiguous statement can be made. It could be useful to those responsible for future research and regulatory changes.
- (8) An important consideration in risk-impact studies is the biological significance of the nuclides that make up the source term. A table giving this information would be helpful to those attempting to understand the risk significance of the source term information reported.
- (9) The report refers in several places to hydrogen burns. The report does not make clear when a burn is assumed to happen. In many situations there is probably enough steam to inert the atmosphere. In addition, the core-concrete interaction produces more H<sub>2</sub>O and CO<sub>2</sub> than H<sub>2</sub> plus CO. While this would not create an inert atmosphere when injected into a large volume of clean air, it would become inert after one or more burns of 8% (H<sub>2</sub> + CO), with the resultant H<sub>2</sub>O and CO<sub>2</sub>. Whatever assumptions are used should be made clear.
- (10) We find it remarkable that no serious effort has yet been made to model the TMI-2 accident.

Sincerely,

David A. Ward  
Chairman

References:

1. U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, "Reassessment of the Technical Bases for Estimating Source Terms," Review Copy, USNRC Report NUREG-0956, dated May 23, 1986
2. U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Regulation, "Draft Environmental Statement Related to the Operation of South Texas Project, Units 1 and 2," USNRC Report NUREG-1171, dated March 1986
3. U.S. Nuclear Regulatory Commission, "Reactor Safety Study - An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants," USNRC Report WASH-1400 (NUREG-75/104), dated October 1975

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