UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

December 16, 1976

The Honorable Morris K. Udall, Chairman
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, DC 20515

Dear Congressman Udall:

At its 200th meeting, December 9-11, 1976, the Advisory Committee on Reactor Safeguards (ACRS) continued its consideration of the points raised in your June 14, 1976, letter on the Reactor Safety Study (RSS, WASH-1400, NUREG 75/014). The ACRS had previously considered these matters at its 196th and 199th meetings and had responded to issues 1, 3, 4, 6, 8, 9 and 10 in its letter to you dated July 14, 1976. In its further consideration of the remaining four issues, the Committee had the benefit of meetings of its Reactor Safety Study Working Group with the Nuclear Regulatory Commission Staff in Washington, DC, on October 12, 1976, and November 10, 1976.

The ACRS is continuing to evaluate the considerable body of information presented in the RSS report, its appendices, and the comments received on it, giving primary attention to the potential implications of the report for the reactor licensing process. This letter provides the Committee on Interior and Insular Affairs a brief resume of current ACRS thought on issues 2, 5, 7 and 11.

"2. Adequacy and appropriateness of analysis used in NUREG 75/014 for purposes of estimating the likelihood of low probability, high consequence events."

The ACRS believes that the methodology of NUREG 75/014 is useful for purposes of identifying important accident sequences and for attempting to develop comparative and quantitative risk assessments for low probability, high-consequence accidents. However, the ACRS believes that considerable effort by more than a single group over an extended period of time will be required to evaluate the validity of the results in NUREG 75/014 in absolute terms. Among the matters which will warrant emphasis in such an evaluation are the following: improved quantification of accident initiators; the identification and evaluation of atypical reactors; the influence of design errors; improved quantification of the role of operator errors; improved quantification of consequence modeling; and the development of improved data for systems, components and instruments under normal and accident-related environmental conditions in a nuclear reactor.

The ACRS believes that NUREG 75/014 represents a very considerable contribution to the understanding of reactor safety and provides a point of departure for quantitative assessment.

"5. Adequacy of NUREG 75/014 methodology to take account of multiple, correlated errors in procedures, design, judgment, and construction such as those leading to the Browns Ferry fire."

The ACRS believes that the methodology of NUREG 75/014 is useful in accounting for that portion of the risk resulting from identifiable potential common mode or dependent failures, and can be used to search out the possibility of multiple correlated errors. However, the methodology cannot guarantee that all major contributors to risk will be identified, and a considerable element of subjective judgment is involved in assigning many of the quantitative input parameters. Both for nuclear and non-nuclear applications, for complex systems, where multiple, correlated failures or common cause failures may be significant, the record shows that investigators working independently will frequently make estimates of system unreliability which differ from one another by a large factor. At this stage of its review, the ACRS believes that a substantial effort may be required to develop and apply dependable methods for quantitatively accounting for the very large number of multiple correlated or dependent failure paths and to obtain the necessary failure rate data bases.

Whether multiple, correlated errors will dominate the overall risk, however, is subject to question, particularly if simpler postulated accident sequences are generally the dominant contributors to the likelihood of system failure.

"7. Extent to which the final version of NUREG 75/014 takes into account comments on the draft version."

The ACRS is in the process of reviewing the disposition of selected comments received by the Reactor Safety Study Group, particularly as they have implications for short or long-term improvements in reactor safety. The ACRS plans to continue this type of activity; however, it is beyond the scope or available working time of the ACRS to review in detail the extent to which the final version of NUREG 75/014 takes into account the comments received.

"11. Validity of NUREG 75/014 conclusions regarding accident consequences."

As stated in its report to you of July 14, 1976 and as indicated in its response to other questions in this group, the ACRS believes that considerably more effort on the part of various contributors is needed to

evaluate the quantitative validity of NUREG 75/014 conclusions regarding accident consequences. Based on information currently available, the ACRS would assign a greater uncertainty to the results than that given in NUREG 75/014.

The ACRS believes that the past and current practice of trying both to make accidents very improbable and to provide means to cope with or ameliorate the effects of accidents has been the correct approach to nuclear reactor safety.

The ACRS review of the Reactor Safety Study has not caused the ACRS to alter its judgment that operation of reactors now under construction or in operation does not represent an undue risk to the health and safety of the public. The ACRS believes that NUREG 75/014 has suggested many fruitful areas for study and evaluation for potential improvements in light water power reactor safety. The ACRS also believes that the extension of such risk assessment methodology to the total spectrum of activities involved in the production of nuclear power and in the production of electric power by other means, as well as to other technological aspects of society, could add significantly to our overall understanding of risk.

Sincerely yours,

Dade W. Moeller

Dade W. Moeller
Chairman