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The Honorable Ivan Selin
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

SUBJECT: DEFINITION OF A LARGE RELEASE FOR USE WITH THE SAFETY GOAL POLICY

During the 385th meeting of the Advisory Committee on Reactor Safeguards, May 6-9, 1992, we reviewed a staff proposal for the definition of the term a "large release" to be used in conjunction with the Safety Goal Policy. During this meeting, we had the benefit of discussions with representatives of the NRC staff and of the documents referenced.

As a part of a program to implement the Safety Goal Policy, the staff was directed by the Commission to develop a definition for a parameter to be termed a "large release." This would be a major release of fission products to the environment from a severe accident which is coupled with containment failure. Such a large, but exceedingly rare, event would be a surrogate definition for the major accident which would create a public health threat equivalent to the Quantitative Health Objectives (QHOs) in the Commission's Safety Goal Policy. The intent would be that a release of this magnitude or greater would occur with a frequency of less than once in a million reactor-years of operation.

Development of a practical definition has proven to be difficult. The staff has completed a comprehensive analysis and has done an excellent job in illuminating the many facets of the issue. The ACRS has previously recommended, and the Commission has endorsed, a position that surrogates for the QHOs should be simple and not be so conservative as to create a de facto new policy. In addition, the Commission had recommended to the staff that the large release definition should be related to a dose outside the plant boundary which would cause one hypothetical death per accident.

The staff has found that these boundary conditions have been impossible to satisfy. Using risk analysis information for a number of plants, and the MELCOR Accident Consequence Code System (MACCS) code to calculate the health consequences of radioisotope releases, staff calculations have shown that releases sufficient to cause one fatality would be equivalent to health objective values far less than the QHOs. In addition, calculated health impacts were shown to be very complex functions of the details of the particular plant and of the accident sequence. The goals that the surrogate would be simple, but not excessively conservative, have been elusive.

The staff has proposed that, rather than a quantitative definition of a large release in terms of a number of curies or a fraction of

core inventory as ACRS has previously suggested, a qualitative definition should be used. The definition proposed by the staff is as follows:

> "A large release is any release from an event involving severe core damage, reactor coolant system pressure boundary failure, and early failure or significant bypass of the containment."

We agree with the staff proposal to use this qualitative definition on a trial basis.

Sincerely,

David A. Ward
Chairman

References:

1. Memorandum dated April 3, 1992 from Warren Minners, NRC, RES, to Raymond F. Fraley, ACRS, transmitting Draft SECY dated April 2, 1992, Subject: Formulation of a Large Release Magnitude (Draft Predecisional)
2. ACRS reports on Implementation of the Safety Goal Policy dated May 13, 1987; April 12, 1988; and February 16, 1989