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

July 13, 1983

Mr. William J. Dircks
Executive Director for Operations
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Dircks:

SUBJECT: ACRS COMMENTS ON THE NRC STAFF PROPOSAL FOR RESOLUTION OF USI A-44, "STATION BLACKOUT"

During its 279th meeting, July 7-9, 1983, the Advisory Committee on Reactor Safeguards discussed the NRC Staff's proposal for the resolution of USI A-44, "Station Blackout." The NRC Staff's recent activities in this area were also discussed during Subcommittee meetings held on March 30, May 10, and September 8, 1982 and during the 264th ACRS meeting, April 1-2, 1982 and 270th ACRS meeting, October 7-9, 1982.

The proposed NRC Staff position has been developed over the past three years and has the benefit of studies which were performed at Oak Ridge National Laboratory and Sandia National Laboratory (References 1 and 2). A recommendation as to the acceptability of this proposal has not yet been made by the Committee to Review Generic Requirements.

The NRC work has identified five plant- and site-related characteristics as the main contributors to risk from station blackout. These are: (1) the number and the capacity of the diesel generators, (2) the diesel generator reliability, (3) the number of AC-independent decay heat removal systems, (4) the frequency of loss of offsite power, and (5) the duration of loss of offsite power.

Under the NRC Staff's proposal for the resolution of USI A-44, a plant should be able to withstand a station blackout for a length of time that depends on the configuration of the plant with respect to the five plant- and site-related characteristics listed above. Plants having the most favorable configuration in this respect would be required to be capable of withstanding a station blackout for at least 4 hours, and plants with less favorable configurations, for 8 hours. For only a few plants, a period of 16 hours may be required. The plant's ability to withstand station blackout would typically be established by analysis supported by component, subsystem, and system testing. The implementation of the NRC Staff recommendations would be via a rulemaking action.

The approach proposed by the NRC Staff is to establish performance criteria based on an evaluation of individual plant risk. This approach allows the licensees to use a variety of design, test, and procedural methods to meet the specified performance criteria and, when backfitting is necessary, to use the most cost-effective methods which they are able to devise.

We believe that this proposal for the resolution of USI A-44 would result in significant improvements only for those plants that have an unusual vulnerability to station blackout. We believe that the approach will result in a cost-effective upgrading of the higher risk plants and believe this is a necessary and worthwhile interim goal. We note, however, that many foreign LWR plants, which are generally quite similar to those used in the United States, either have features or are planning backfit features which may markedly reduce plant vulnerability to station blackout beyond the measures which would be required by the proposed resolution of USI A-44.

The NRC Staff has performed a value/impact analysis for operating plants to determine that cost-effective fixes could reduce the probability of core melt below 10^{-4} per reactor year and is proposing that all fixes with a value/impact ratio less than $1000 per man-rem should be implemented as backfits. However, the Committee disagrees with the probabilistic acceptance criteria proposed by the NRC Staff in the draft analysis of USI A-44. In particular, the Staff recommended: (1) that the maximum estimated probability of core melt from station blackout for plants currently in operation or under construction should be 10^{-4} per reactor year (for a best estimate value), and (2) that the maximum estimated probability for new plants should be 10^{-5} per reactor year. Since extended station blackout can result in core melt and a loss of containment integrity, without the benefit of having mitigation features such as containment spray in operation, a large release of radioactive material may be associated with such an event. In our view, acceptance criteria for this single source should be smaller than the probabilities mentioned above (10^{-4} or 10^{-5} per reactor year) by at least a factor of ten.

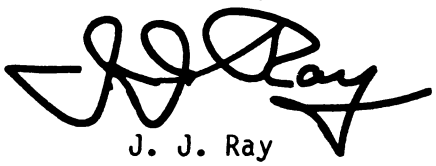
For these reasons, though the Committee believes that the changes which may be required to meet the proposed resolution of USI A-44 are desirable, the NRC position should be that, on a long-term basis and with the probabilistic criteria referred to above, those changes do not provide an acceptable ultimate solution and further improvements may be required in a subsequent phase. In such a subsequent phase, actions considered should be closely coordinated with recommendations which may emerge from the ongoing work on resolving USI A-45, "Shutdown Decay Heat Removal Requirements," and consideration should also be given to actions taken in this area by foreign regulatory authorities.

We understand that the NRC Staff is generally inclined to delay requiring major, expensive backfits (such as additional diesel generators) to resolve station blackout concerns for plants for which resolution of USI A-45 would also reduce risk of core melt due to station blackout. With the understanding that exceptions may be needed for plants subject to an unacceptably high likelihood of core melt due to station blackout, we endorse this policy. Further, we urge that the resolution of USI A-45 be accelerated.

In addition to USI A-45, the NRC Staff is currently developing resolutions to Generic Safety Issues B-56, "Diesel Reliability," and A-30, "Adequacy of Safety-Related DC Power Supplies," both of which deal with issues closely related to those being considered in USI A-44. The ACRS recommends that the work in these areas be closely coordinated so as to assure the most effective combined resolution of these safety issues.

In summary, subject to the comments made above, the Advisory Committee on Reactor Safeguards supports the proposed approach for the resolution of USI A-44 on an interim basis.

Sincerely,



J. J. Ray
Chairman

References:

1. "Reliability of Emergency AC Power Supplies at Nuclear Power Plants," NUREG/CR-2981, undated draft (currently in publication).
2. "Station Blackout Accident Analysis," NUREG/CR-3226, dated May 1983.