June 11, 2001

John T. Larkins, Executive Director
Advisory Committee on Reactor Safeguards
United States Nuclear Regulatory Commission
Washington, D.C.20555-0001

SUBJECT: RESOLUTION OF GENERIC SAFETY ISSUE (GSI) 173A, "SPENT FUEL POOL COOLING FOR OPERATING PLANTS"

Dear Mr. Larkins:

In a May 2, 2000, letter, the NRC staff proposed that Generic Safety Issue 173A (GSI-173A), "Spent Fuel Pool Cooling for Operating Reactors," be resolved based on completion of the associated staff action plan. The supporting analyses utilized screening criteria consistent with the regulatory analysis guidelines (NUREG/BR-0058) to disposition various spent fuel pool (SFP) issues. In accordance with these criteria, issues having an estimated fuel uncovery frequency greater than 1 X1 0-5 /yr received additional regulatory analysis, and issues with a frequency of less than 1X10-'/yr received no additional action. In a June 20 letter to the Commission, the Advisory Committee on Reactor Safeguards (ACRS) raised concerns that the screening criteria may be inappropriate for SFP accidents because reactor accident source terms, which underlie the regulatory analysis guideline criteria, are driven by steam oxidation of the Zircaloy clad, whereas the source term for SFP accidents may be dominated by air oxidation of clad. The ACRS recommended that the staff defer closing out GSI-1 73A until the completion of the reevaluation of SFP accidents for decommissioning plants, and reassess the regulatory analysis screening criteria for application to SFP accidents at operating reactors. In a July 20, 2000, letter to the ACRS, we agreed with these recommendations.

We briefed the Committee on our reevaluation of SFP accidents for decommissioning plants during the 477th meeting of the ACRS, and subsequently published our findings in NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants" (February 2001). The study concludes that the risk at SFPs is low and is well within the Commission's quantitative health objectives (QHOs).

As part of the study, the staff reassessed the use of a $1x10^{-5}$ fuel uncovery frequency (also referred to as the Pool Performance Guideline) as a screening value for controlling the risk from a decommissioning plant SFP. This reassessment was undertaken to address concerns raised during review of the draft final report that large ruthenium releases from an SFP fire could substantially increase both early and latent health effects, and shift the controlling decision criteria from early fatalities to latent health effects because of the combined effect of longer times for evacuation and the longer Ruthenium half-life. The risk results, presented in Appendix 4C to NUREG-1738, indicate that at a screening value of 1 E-5 per year, the Commission's QHOs will continue to be met for even the most severe source term and

evacuation assumptions considered in the study, and for times as short as 30 days after shutdown. The margin to the QHOs is smallest for early fatality risk. Thus, similar to severe accidents in operating reactors, acceptable levels of risk for a SFP accident will be controlled by the early fatality risk measure.

In the proposed resolution of GSI-173A, the staff used a screening criteria equivalent to the criteria in the regulatory analysis guidelines; that is, the staff performed a further technical evaluation if the fuel uncovery frequency was 10^{-6} to 10^{-5} per year, and considered no further regulatory actions if the frequency was less than 1×10^{-6} per year. The latter frequency is one decade lower than the Pool Performance Guideline. Thus, operating reactor SFP issues for which no further actions were pursued under GSI-173A would have a risk level at least one order of magnitude lower than the QHOs. On this basis, we conclude that the screening criteria used in GSI-173A assure ample margin to the Commission's safety goals and are appropriate for SFP accidents at operating reactors.

We also reviewed the insights of NUREG-1353, "Regulatory Analysis for the Resolution of Generic Issue 82, Beyond Design Basis Accidents in Spent Fuel Pools," and NUREG/CR-4982, "Severe Accidents in Spent Fuel Pools in Support of Generic Safety Issue 82," to determine whether they call into question the staff's proposed no additional action for GSI-173A. These studies estimate the frequency of spent fuel uncovery at operating reactors to be on the order of 2×10^{-6} per year and conclude that the risk and consequences of an SFP accident at operating reactors meet the Commission's QHOs.

In view of the above results, we conclude that the screening criteria used in GSI-173A are appropriate for SFP accidents at operating reactors and further efforts to develop additional screening criteria are not warranted. Therefore, we recommend that GSI-173A be considered resolved.

Sincerely,

Gary M. Holahan, Director
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

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/RA by John Hannon/

Gary M. Holahan, Director
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

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