



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

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October 23, 1996

MEMORANDUM TO: Frank J. Miraglia, Acting Director  
Office of Nuclear Reactor Regulation

FROM: *[Signature]*  
Edward L. Jordan, Director  
Office for Analysis and Evaluation  
of Operational Data

SUBJECT: ASSESSMENT OF SPENT FUEL COOLING

On February 10, 1996, James M. Taylor, Executive Director for Operations, directed AEOD to perform an independent study of the likelihood and consequences of an extended loss of spent fuel pool (SFP) cooling. The completed study is attached. The study evaluated the SFP issues generically and consisted of six major tasks: (1) assessment of SFP configuration, (2) review of operating experience, (3) observations from site visits and interviews, (4) review of regulatory requirements and guidance, (5) performance of engineering assessments, and (6) assessment of risk.

The assessment found large variations in the designs and capabilities of SFPs and systems at individual nuclear plants. The operating experience review determined that loss of SFP cooling events are infrequent and the consequences of actual events have been small. The risk assessment indicates that the SFP events are not a dominant contributor to overall plant risk. However, because human error initiators and operator action required to detect and correct an error are subject to large uncertainties and because of the large variation in design vulnerabilities, further plant-specific actions may be warranted.

We believe that most of our findings and conclusions are compatible with those presented by NRR in the Spent Fuel Storage Pool Action Plan. However, based on operating experience, two factors are noted in the report which might require a change in emphasis in current NRC plans: (1) the frequency of loss of inventory events was relatively high compared to loss of cooling events, and (2) prompt core off-load leading to potential reduced time to boiling and more rapid boil-off of inventory if cooling is lost. The AEOD conclusions which focus on operator response to potential events are based on these two factors — both factors contribute to less time available for operator response. Thus, our emphasis is on instrumentation to quickly alert operators, and effective procedures and training to facilitate prompt operator actions.

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We believe a prompt information notice should be issued informing industry of:

1. The importance of procedures and training to detect and respond to SFP loss of inventory and loss of cooling events, including those caused by loss of offsite power. The procedures and training need to address configuration controls which can prevent and/or mitigate such events. The procedures and training should be consistent with the time frames over which SFP events can proceed at the specific plant, recognizing the plant specific heat load and the possibility of loss of inventory due to cavity seal or gate failures.
2. The importance of having reliable instrumentation to monitor SFP temperature and level and SFP area radiation, including during periods when offsite power has been lost, in order to detect SFP loss of coolant inventory and loss of cooling events in a timely manner.
3. The importance of testing, maintenance, and configuration control of plant features such as reactor cavity seal or gate seals, or antisiphon devices for those plants where failures could potentially cause loss of SFP coolant inventory sufficient to uncover the fuel or endangerer makeup capability.

The issues in the attached report should be integrated into the ongoing efforts by NRR to address spent fuel pool issues in the formal regulatory process. In particular, the lessons of operating experience related to operator actions may need to be incorporated into the NRC inspection program. I am available to discuss with you issues raised by our report prior to our scheduled Commission briefing on November 14, 1996.

Attachment: As stated

cc w/att.:

V.K. Chexal, EPRI

Pat Lewis, INPO

Debbie W. Queener, NOAC

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