

November 14, 2000

Dr. Edwin S. Lyman, PhD  
Scientific Director  
Nuclear Control Institute  
1000 Connecticut Ave, Suite 804  
Washington, D.C. 20036

Dear Dr. Lyman:

I am responding to your October 19, 2000, letter to Chairman Richard A. Meserve, concerning the susceptibility of ice condenser containments (ICCs) to early failure from hydrogen combustion during a severe accident. I want to emphasize that plants with ICCs meet NRC design-basis requirements. Severe accident studies evaluate low probability hypothetical accidents beyond the design basis to gain additional insights into a specific plant's design features. In your letter you discussed a severe accident study released by Sandia National Laboratories, "Assessment of the DCH [Direct Containment Heating] Issue for Plants with Ice Condenser Containments" (NUREG/CR-6427). The study was performed, as part of the Office of Nuclear Regulatory Research's program, to resolve certain severe accident phenomena that were identified in risk analyses as potentially significant. The study concluded that ICC plants are more vulnerable to early containment failure than large dry containments, but that this vulnerability is not due to DCH; rather, it is attributable to hydrogen combustion phenomena during station blackout events.

Even though the vulnerability of ICC plants was judged to be higher for particular severe accident sequences, the overall safety of the plants remains adequate considering the probabilities of these events in the context of the Commission's safety goals. The key finding of the report was that early containment failure in ICC plants is dominated by hydrogen combustion which largely depends on plant-specific probabilities for station blackout. As you stated, ICC plants have igniter systems for hydrogen control and these systems are not operable during station blackout events. The NRC staff shares your thoughts regarding the need to evaluate the functionality of hydrogen igniters during station blackout at ICC plants through the generic safety issue program. The NRC staff informed the Commission of our intention to perform such an evaluation consistent with the policy discussion on backfit considerations in SECY-00-0198, dated September 14, 2000.

Your letter also discussed the use of nuclear power plants with ICCs in the Department of Energy's (DOE's) Material Disposition Program for excess weapons-grade plutonium. In public interviews, the NRC staff reviewing the Sandia report has stated that an accident in a plant using mixed plutonium-uranium oxide (MOX) fuel would not challenge the containment significantly more than an accident in a plant using conventional fuel. But this is only a preliminary conclusion, and we have begun a research program to corroborate it and prepare a technical basis for reviewing license amendments associated with the use of MOX fuel. The research program is described in a February 11, 2000, memorandum from the Executive Director for Operations to Chairman Meserve and the Commissioners (enclosed). The research program

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plans to obtain international fission product release data through the NRC's cooperative severe accident research program to confirm the similarity of MOX and uranium-based fuel with regard to source terms.

At this time, the NRC staff cannot respond to the technical issues you raise about MOX fuels because those parties developing plant-specific designs and analyses, including plant-specific consequence analyses, have not finished their work. In fact, it is our understanding that the industry is not likely to submit the application for lead test assemblies to the NRC before August 2001 and the application for batch irradiation of MOX fuel before late 2003. Issues, such as you have raised, will be considered when we review the issue of using ICC plants to irradiate MOX fuel.

You note in your letter that you have asked the Department of Energy (DOE) to consider the findings of NUREG/CR-6427 in its November 1999 Surplus Plutonium Disposition Final Environmental Impact Statement. We have no comment on your request to DOE at this time.

Sincerely,

*/RA/*

Samuel J. Collins, Director  
Office of Nuclear Reactor Regulation

Enclosure: As stated

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Samuel J. Collins, Director  
Office of Nuclear Reactor Regulation

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