

April 21, 2004

Mr. David Modeen, Vice President
Nuclear Power Sector
Electric Power Research Institute
P.O. Box 217097
Charlotte, NC 28221

Dear Mr. Modeen:

In 1998, EPRI and NRC signed the Addendum on Testing High Burnup Fuel to the current Memorandum of Understanding on Cooperative Nuclear Safety Research Between EPRI and NRC. According to that addendum, NRC would conduct testing at Argonne National Laboratory at NRC's expense and EPRI would provide high-burnup fuel rods that were ready for the testing program at EPRI's expense.

Testing of Zircaloy-clad fuel rods, which EPRI provided, is well advanced and the Argonne program is producing important results. In our planning, however, attention has turned to the more advanced cladding alloys, ZIRLO and M5. Discussions have been on-going between NRC, Westinghouse, and Areva concerning the testing of high-burnup rods with these advanced cladding alloys.

There are several pressing reasons to initiate testing on high-burnup rods as soon as possible. Proposed revisions to the current regulatory criteria for the loss-of-coolant accident (LOCA) will be based on data from Zircaloy-clad fuel that is in the laboratory now. In the absence of high burnup data from other alloys, performance of ZIRLO and M5 under LOCA conditions will be based on data from Zircaloy. However, parallel testing at Argonne on unirradiated ZIRLO and M5 tubing has shown significant differences compared with Zircaloy. NRC's high burnup planning document highlights these differences and describes the need to confirm high-burnup behavior with tests on the alloys in question.¹

Industry and NRC share the desire to use pre-hydrated material for future testing in lieu of the more expensive testing of irradiated material. The NRC/EPRI program at Argonne will address this issue; however, the use of pre-hydrated material as a surrogate must be demonstrated for an appropriate range of alloying elements. This development is extremely important in order to simplify testing with even newer alloys.

¹Memorandum from W. Travers to the Commission, "Updated Program Plan for High-Burnup Light-Water Reactor Fuel," August 21, 2003, Adams ML031810103.

Mr. David Modeen

A recent user need memorandum from the Office of Nuclear Material Safety and Safeguards requested additional testing on high-burnup spent fuel cladding.² Testing with irradiated ZIRLO and M5 was specifically requested in that memorandum because the data are needed for cask licensing.

Timeliness in addressing the above issues is important. The work on Zircaloy-clad fuel rods at Argonne should be completed in late 2005, and testing on the irradiation behavior of advanced alloys should begin at that time. Considering that it has taken approximately one year to make arrangements to obtain rods, to prepare specimens, and to ship them to Argonne, plans for shipping irradiated ZIRLO-clad and M5-clad fuel rods should be made now.

The program at Argonne has been a model of cooperation and productivity. We would like very much to continue in that spirit, and I request your support to ensure timely availability of irradiated ZIRLO and M5 cladding.

Sincerely,

/RA/

Ashok C. Thadani, Director
Office of Nuclear Regulatory Research

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Jack Stronider concurred on 04/21/04*

²M. Virgilio memorandum to A. Thadani, "User Need Memorandum — Assessment of High Burnup Fuel Cladding Integrity Performance Under Accident Conditions," March 5, 2004, Adams 040650621.