

January 13, 1997.

Stephen M. Sohinki, Director
Office of Commercial Light
Water Reactor Production
Defense Programs
Department of Energy
Washington, DC 20585

SUBJECT: SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION REGARDING TOPICAL
REPORT ON THE TRITIUM-PRODUCING BURNABLE ABSORBER ROD LEAD TEST
ASSEMBLY

Dear Mr. Sohinki:

The staff is reviewing your topical report PNNL-11419, "Report on the Evaluation of the Tritium Producing Burnable Absorber Rod Lead Test Assembly," submitted by letter dated December 4, 1996. By letter dated January 3, 1997, the staff transmitted its initial request for additional information. The staff has identified an additional issue as a result of experience with iridium capsule irradiation at the Oak Ridge HFIR reactor that should be considered in the lead test assembly topical report.

You are requested to provide a response to the enclosed request for additional information within 30 days of the date of this letter.

If you have any questions regarding this request, please contact the project manager, J. H. Wilson, at (301) 415-1108.

Sincerely,
David B. Matthews/for
Thomas T. Martin, Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Project No. 697

Enclosure: as stated

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NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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for 

Thomas T. Martin, Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Project No. 697

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OFFICE OF NUCLEAR REACTOR REGULATION
SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION REGARDING
"REPORT ON THE EVALUATION OF THE TRITIUM PRODUCING
BURNABLE ABSORBER ROD LEAD TEST ASSEMBLY"
PROJECT NO. 597

Reactor Systems

- 10) Section 2.2.6.3 - The staff has identified an additional type of accident that should be considered in the TPBAR LTA topical report.

A weld in an iridium capsule failed during irradiation at the Oak Ridge HFIR reactor, allowing water to enter the capsule. As long as the capsule was in the spent fuel pool, the heat removal was adequate to keep the water in the capsule in liquid form. However, when the capsule was withdrawn from the pool and placed in a dry shipping cask, the water boiled and the resulting pressure increase ruptured the capsule.

Although Section 2.2.6.3 mentions a water-logged TPBAR, the increase and rate of change of temperature due to dry shipping have not been analyzed and the resulting maximum pin temperature and pin internal pressure have not been calculated. The heat generation of the TPBAR at 150 hours after irradiation, given in Section 6.2.1.2, is 0.024 kW per LTA, or 3 watts per pin. At this power level, it seems unlikely that the pin temperature would ever exceed the boiling point. However, a simple assertion is not adequate to make the case.

Provide an analysis of the increase and rate of change of temperature in a water-logged TPBAR pin due to dry shipping and calculate the resulting maximum pin temperature and pin internal pressure. The analyses should consider the dry conditions during dry shipping that result in a low heat removal rate in spite of the enhanced heat transfer provided by the water in the interior of the pin. The analysis should also consider the effect on tube failure pressure (normally 3000 psi) because of the assumed failed weld or clad.