



UNIVERSITY OF MISSOURI

April 25, 1990

Research Reactor Facility

Research Park
Columbia, Missouri 65211
Telephone (314) 882-4211

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop P1-137
Washington, D. C. 20555

ATTENTION: Document Control Desk

REFERENCE: Docket 50-186
University of Missouri Research Reactor
License R-103

SUBJECT: Response to Nuclear Regulatory Commission
Request for Additional Information, 11/21/89

In your letter dated November 21, 1989 to Mr. J. Charlie McKibben, you requested additional information in support of your review of the University of Missouri-Columbia Research Reactor (MURR) application dated September 26, 1986, as supplemented, for amendment of the referenced license.

Our response to your request is attached. Also attached is a copy of all pages of the Technical Specifications which we propose be changed pursuant to the original application and all supplements. If there are any questions, please feel free to call Don Alger or me at 314-882-4211.

Sincerely,

Walt A. Meyer, Jr.

Walt A. Meyer, Jr.
Reactor Manager

ENDORSEMENT:
Reviewed and Approved

J. C. McKibben

J. C. McKibben
Associate Director

Attachments

xc: Regional Administrator, NRC Region III

Mr. Alexander Adams, Jr.
Project Manager
Standardization & Non-Power Project Directorate

Mary Martin

MARY MARTIN
NOTARY PUBLIC STATE OF MISSOURI
BOONE COUNTY
MY COMMISSION EXPIRES 1.1.1994

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
UNIVERSITY OF MISSOURI-COLUMBIA
DOCKET NO. 50-186, LICENSE R-103

REQUEST 1:

Please provide a safety analysis for your proposed change to Technical Specification 3.8.d concerning k_{eff} limits for fuel storage.

RESPONSE:

The use of ELAF fuel with its higher U-235 loading necessitates storage of fuel outside of the core with a k_{eff} in excess of the current Technical Specification 3.8.d. maximum of 0.8.

Storage of fuel allowed by the proposed Technical Specification 4.1.c. results in k_{eff} being less than 0.9 for all storage geometries and for all conditions of moderation and reflection.

The University of Missouri-Columbia requests that the attached proposed version of Technical Specification 3.8.d. be approved to allow a maximum k_{eff} of 0.9. This limit is consistent with the recommendation of the American National Standards Institute and the American Nuclear Society as published in American National Standard for the Development of Technical Specifications for Research Reactors, ANSI/ANS-15.1.

REQUEST 2:

Please explain the safety significance of adding limits on volume % of UAl_x powder for the fuel meat in Technical Specification 4.1.b.

RESPONSE:

Placing a limit on the maximum volume % of UAl_x powder in the fuel meat is essentially redundant with placing a maximum U-235 loading per fuel element. Since a maximum loading is now being requested (see item 4 below), we have eliminated the reference to a maximum volume % in the proposed Technical Specification 4.1.b. (see attachment).

REQUEST 3:

It appears that all reference to uranium-aluminum alloy fuel is being removed from the Technical Specifications. Is this correct?

RESPONSE:

There is no need to provide for uranium-aluminum alloy type fuel. This technology does not provide for sufficient U-235 loading.

REQUEST 4

Your proposed changes to Technical Specification 4.1.c. removes the limit on the maximum uranium-235 (U-235) per fuel element and adds boron carbide to the fuel as a burnable poison. However, our evaluation focused on ELAF with a maximum of 1270 grams U-235 and boron carbide in selected fuel plates. Please suggest wording for Technical Specification 4.1.c. that addresses these limits based upon ELAF.

RESPONSE:

Wording for Technical Specification 4.1.c. is suggested in the attached proposed specification. The specification for the ELAF has been changed to be consistent with the focus of the evaluation and establishes the criteria of a maximum of 1270 grams of U-235 and a maximum of 1.03 grams of natural boron in the form of boron carbide per element. The proposed specification retains the criteria for the present fuel elements which contain a maximum of 775 grams of U-235. These elements will continue to be used for several years. We have also proposed a specification which specifically covers the operation of the reactor with a mixture of the 775 gram and ELAF elements. The safety analysis shows that any mixed fuel combination of the 775 gram and 1270 gram elements can be safely operated within the existing Technical Specification safety limits for 10 MW operation.