

February 16, 1988

Docket No. 50-150

Dr. Robert F. Redmond
Executive Director
Engineering Experiment Station
Ohio State University
142 Hitchcock Hall
Columbus, Ohio 43210

Dear Dr. Redmond:

SUBJECT: QUESTIONS REGARDING HEU/LEU CONVERSION AT OHIO STATE UNIVERSITY

We have reviewed the Safety Analysis Report (SAR) for the Ohio State University Research Reactor submitted by your letter of October 7, 1987, and have decided that your application for HEU to LEU conversion and change in operating power should be handled as a two step process. The first step will be a review of your HEU to LEU conversion and issuance of an order to convert with a license amendment. The second step will be a review of your proposed change in operating power and issuance of a license amendment.

Enclosed is a set of questions which apply to the HEU to LEU conversion. Please respond to these questions within 30 days of the date of this letter. If you have any questions, please call me at (301) 492-1102.

Sincerely,

original signed by

Theodore S. Michaels, Project Manager
Standardization and Non-Power Reactor
Project Directorate
Division of Reactor Projects III, IV,
V and Special Projects
Office of Nuclear Reactor Regulation

Enclosure: As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Sincerely,

A handwritten signature in cursive script that reads "Theodore S. Michaels".

Theodore S. Michaels, Project Manager
Standardization and Non-Power Reactor
Project Directorate
Division of Reactor Projects III, IV,
V and Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
As stated

CC: See next page

Ohio State University

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cc: Ohio Department of Health
ATTN: Radiological Health
Program Director
P. O. Box 118
Columbus, Ohio 43216

Ohio Environmental Protection Agency
Division of Planning
Environmental Assessment Section
P. O. Box 1049
Columbus, Ohio 43216

Mr. Richard D. Myser
Reactor Operations Manager
Engineering Experiment Station
Ohio State University
142 Hitchcock Hall
Columbus, Ohio 43210

HEU-LEU QUESTIONS

OHIO STATE

- (1) During the conversion from HEU to LEU is there a time period when the fuel inventory of both cores will be at the OSURR?

If So:

- (a) Have the fuel storage facilities at OSURR been analyzed for safe storage for criticality concerns?
- (b) Is the total fuel inventory of both cores allowed by the current OSURR license?
- (2) What facility hardware modifications are being made for the LEU core i.e., core support, control rods, control rod drives, experiment facilities, or any other hardware changes necessary to accommodate the new core.
- (3) What changes are being made in the instrumentation system for the LEU core? Is there new instrumentation not previously discussed in the HEU SAR?

- (4) Page 1

It is suggested that you refer to the fuel enrichment as "less than 20%", which qualifies it as LEU fuel, somewhere early in your discussion. It is further suggested that when you refer to the actual enrichment, you precede the enrichment value with the word nominal i.e., "enriched to a nominal 19.5%."

(5) Page 25

The developer of the fuel is mentioned. Please give specific references to publications you have used to support your analysis throughout this SAR.

(6) Page 31

Partial fuel elements are mentioned. Are these all fabricated as partial elements or is it planned that plates are removable (or additive) by the Licensee. A picture or drawing of a fuel assembly is requested.

(7) Page 95

It is indicated that a single standard fuel element contains eight fueled plates. Please explain.

(8) Page 105

Please furnish a reference for the VIM code.

(9) Page 106, Section 4.5

- (a) In paragraph 2 you discuss the temperature coefficient of reactivity but do not distinguish between fuel-related and moderator-related coefficients. Please discuss.
- (b) In paragraph 3 you mention the THOR reactor, without providing a description, or even a reference. Please discuss the relevance of the THOR reactor to the OSURR.

(10) Page 156

In Section 6.4 please refer explicitly to your agreement with DOE to accept irradiated LEU U_3Si_2 -Al fuel elements. What are the details of this agreement?

(11) What are your calculated maximum, axial, and radial thermal flux peaking factors? What are your calculated maximum, axial, and radial power peaking factors?

(12) For the Reactivity Insertion Accident:

- (a) Is the 0.7% $\Delta k/k$ step reactivity insertion the same as analyzed for the HEU core?
- (b) Please compare the consequence parameters for the HEU analysis and LEU analysis, i.e., peak power, energy release, maximum fuel, clad, and moderator temperature, and, if applicable, any fission product release.
- (c) On page 108 you discuss the measured reactivity effects of different beam port configurations for the HEU core. What are these effects for the LEU core?
- (d) On page 200 you discuss the reactivity effects of flooding either of the beam ports or the rabbit (0.5% $\Delta k/k$ each) for the HEU core. What do you estimate this effect is for the LEU core?
- (c) What is the estimated reactivity effect of voiding the Central Irradiation Position?