



UNIVERSITY OF MISSOURI

Research Reactor Facility

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

August 15, 1979

DOCKET NO 50-186

Mr. James R. Miller
Acting Assistant Director for
Site and Safeguards
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Jim:

The following is in response to your letter of July 30 requesting information about MURR related to the upgrade rule. Because of the short time between when we received your letter and when you need the response, some of our information will have to be estimates. We appreciate the time and effort the NRC Commissioners and the NRC staff are devoting to finding ways by which the research reactors can continue to operate while still being secure. Let me again state my position that it provides more protection to the health and safety of the public of the USA to have research reactors operate as compared to any protection of health and safety if the research reactors are shut down.

The MURR now meets Category II conditions and will continue to be Category II as long as the upgrade rule establishes 5Kg of unselfprotected highly enriched fuel as one limit and 100R/hr at 3 feet for self-protected as another limit. We do have a continuing concern that these limits will be ratcheted. Thus, in answer to your questions:

1. No. We anticipate constructing no additional features at MURR to maintain Category II status.

However, the change of another set of security rules has recently produced initial costs and continuing costs. The cost to meet additional security regulations for transporting spent fuel has cost us about \$25,000 to license a different cask and will cost about \$10,000 additional per year.

2. The cost to upgrade to the new Category II was born by MURR over the last six years. The costs amounted to about \$100K in equipment and manpower. We anticipate no additional expense as long as NRC doesn't change the rules and exemptions. One less tangible, but very real, cost of the upgrade rule is a decrease in capabilities. For example, with the increased rules and restrictions we are now more vulnerable to shutdowns caused by delays in fuel shipments.

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3. If the MURR had to be upgraded to Category I, we estimate the one time cost to be \$500,000-\$1,000,000 and the annual cost to be \$100,000/year.
4. We have not done any analysis of shutting down MURR. A rough guess would be about 1/2 year of direct operating cost or about \$1,000,000.
5. The annual cost of maintaining possession is a function of the security imposed and based on past history, this is likely to increase each year. Possession only would involve personnel for security, building maintenance, lab analysis inventory, paper work to verify that all pertinent government regulations are being complied with and periodic environmental impact statements to justify storage versus other alternatives that will arise in the future.
6. The effect of shut down of MURR and other research reactors in the USA is a difficult question to answer in a few sentences. I addressed this question at the Non-Power Reactor Meeting held at the University of Michigan September 1978 and again at the International Meeting of Research Reactor Fuel Designers, Developers, and Fabricators, Argonne National Laboratory, November 1978. A copy of my paper is attached. Briefly summarized, I concluded that the USA has gone in the last 10 years from preeminent in neutron research to a second class nation. The U.S. effort continues to shrink and miss opportunities while other countries expand and capture research and business opportunities. I believe this is completely contrary to President Carter's remarks about "Productivity".

We are now editing our 1978-1979 annual report but it will not be finished by the time this letter must be submitted to you. I will send you a final copy when it is done. A tentative summary of our education, research, and service accomplishments are given on the attached pages. Ninety percent of these activities would disappear if MURR were shut down. Note, a significant part is research for industry. The engineer-training program at UMC would also suffer. For example, many of our operators are working full time as licensed operators while going to school to get bachelors and masters degrees in Nuclear Engineering. We view these operators as prime candidates for the upgraded nuclear power plant operators and NRC inspection teams that are suggested as being needed by the TMI evaluation.

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One obvious USA industry that will suffer if MURR is shut down is the neutron transmutation doped silicon industry. The MURR irradiates about 4 tonnes/year of silicon or about 80%-90% of that done in the USA. If MURR were shut down, much of this effort would probably shift to Chalk River and Europe. MURR's NTD irradiations probably account for about 100 jobs in the St. Louis area. Many of these would become foreign jobs if MURR shuts down. In the mid 1970's, after European reactors were well into production of NTD silicon and while the USA had minimal effort, it was MURR that responded as rapidly as NRC regulations would allow to help U.S. industry get into this new market. If MURR shuts down there would be one fewer research reactor to meet the next need and try to keep the USA competitive with Europe and Japan.

7. The MURR makes about 30 different radioisotopes and about 125,000 Ci/year of radioisotopes used in nuclear medicine. If the MURR were shutdown, much of this load could be picked up by DOE reactors but probably at higher cost. However much would shift to Chalk River and to Europe.

While the routine production load for radiopharmaceuticals could be covered by DOE reactors, the response to special needs would be lost if MURR were shut down. For example, last year the University of Missouri Medical Center wanted a Sn-In generator. No supplier could be located so MURR stepped in, redeveloped the techniques and delivered. Next, the University of Kansas Medical Center heard of our ability and had a similar need; they came to us for help. We delivered a Sn-In generator to the University of Kansas Medical School last month.

8. I think this question is addressed above.
9. We intend to try and continue the operation of the MURR if physically and financially possible. We have not yet identified the straw that breaks our back but we feel we are already carrying a lot of bales of straw while trying to meet our purpose of education, research, and service.
10. Ninety percent of the educational, research, and service activities, like those identified as accomplishments for 1978-1979, would disappear if MURR shut down.
11. The MURR now supports about 80 staff and students (see attached directory). Ninety percent would be cut if MURR were shut down.

From another perspective, not only is our facility accomplishing basic research but unfortunately approximately 30% of our research is aimed at complying with government regulations. Due to the cooperative spirit in the educational community, our accomplishments are shared with other research reactors thereby reducing their involvement in meeting regulation hurdles. Therefore the closing of our facility would have a domino effect among the remaining

research reactors not operated by the federal government. This would have a tremendous effect on our society concept of nuclear power and research since once completely in the hands of our federal bureaucracy not only will the USA be importing oil but nuclear technology and radioisotopes as well. This road of good intentions has already been traveled much too often to everyone's amazement.

12 & 13. These questions are addressed in 11.

As seen from the attachments there are at least 71 graduate students supported by the facility. If the facility were shut down - a majority would not finish their programs.

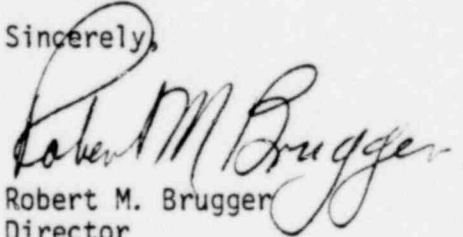
14. The MURR's 1978-1979 direct operating expenses were \$2.4 million.

15. With the MURR's present operating schedule of 150 hrs/wk and 10 MW, our exposed fuel far exceeds the 100 R/hr at 3 feet. Barring a major shutdown we will continue to meet this criteria. However we see no sense in the NRC ratcheting this limit to a higher level.

16. To get an idea about courses using the MURR, see the educational section of our 1977-1978 annual report. One is enclosed. The impact on student research will be greater than loss of courses.

Jim, I hope these comments meet your needs. If you have any questions, give me a call.

Sincerely,



Robert M. Brugger
Director

Encs.

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Tentative Summary of MURR Accomplishments 1978-1979

(complete MURR Annual Report scheduled for September 1979)
(see MURR Annual Report 1977-1978 for more details)

EDUCATION SUPPORTED BY MURR

- Tours for 2,075
- Speakers for 51 seminars, colloquia, and talks
- Lectures for 45 class hours
- 8 instructors for 21 credit hours of courses

RESEARCH SUPPORTED BY MURR

- Supported 135 different research projects
- Supported the research of 156 faculty and 71 graduate students from 31 departments of the University of Missouri, 21 other universities, 44 industries and other institutions
- Supported the research leading to 43 journals and proceedings publications from the University of Missouri and other universities
- Supported research leading to 37 papers presented at professional meetings
- Supported research leading to the granting of 5 Ph.D. degrees and 8 M.A.'s
- Provided the financial support for 14 faculty and 40 graduate and 21 undergraduate students
- Secured research equipment worth 638,000 by gifts, loans, and grants and worth 478,000 by purchases from MURR funds
- Supported 42 grants and contracts totaling 7,292,143
- Supplied 175 shipments of 36 isotopes
- Analyzed about 3,399 samples using neutron activation analysis
- Provided expert testimony in 58 criminal cases using NAA evidence. Many were rape cases.

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-Made 262 neutron radiographes for 3 students and faculty from 4 departments

SERVICES SUPPORTED BY MURR

-Provided service to 7 other universities within the state of Missouri
and 30 outside

-Provided service to 31 state and federal agencies

-Supported 12 research projects directly related to Missouri

-Supported 3 research projects directly related to energy conservation
and development

-Supported 46 industries

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