UNIVERSITY OF VIRGINIA
DEPARTMENT OF NUCLEAR ENGINEERING AND ENGINEERING PHYSICS
NUCLEAR REACTOR FACILITY
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
CHARLOTTESVILLE, VA 22901

Telephone: 804-924-7136

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Secretary
U. S. Nuclear Regulatory Commission
Attention: Docketing and Service Branch
Washington, DC 20555

Subject: Comments by University of Virginia Management on a Petition for Rulemaking filed by the University of Missouri, for changes to 10 CFR, regarding a new definition for "research reactor" and a re-definition of the term "testing facility" (Docket No. PRM-50-48).

Gentlemen:

General Comments on Regulation of Research Reactors

We are in agreement with the University of Missouri's position that excessive and unnecessary regulation of research reactors is contrary to the intent of Congress when it established the Atomic Energy Act. It is indeed remarkable and revealing that, notwithstanding the great number of NRC regulations and definitions in existence, there has until now not been a definition for "research reactor"! This is perhaps symptomatic of a lack of appreciation of the nature of the community being regulated.

The proposed addition to 10 CFR of a definition for "research reactor" consistent with that used by the American Nuclear Society, and modification of the present definition of "testing facility" (in 10 CFR parts 50.2 and 170.3), might appear to satisfy the intent of Congress. Unfortunately, while we support the Missouri petition with some minor changes, we believe that this rulemaking does not go far enough to relieve the research reactor community from excessive and unnecessary regulation.

Current regulations contain mostly requirements developed for power reactors. This poses compliance problems for research reactors. For example, small reactor staffs have a difficult time keeping track of the many regulations and changes thereto, and have to make a special effort to distinguish between those that apply to their reactors and those applying to power plants. Power reactor regulations may be applied to research reactors, even when that was not the original intent at the time the regulation was adopted, and, in some instances, when there is no valid basis for the regulation to apply to research reactors. True to their background and



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experience, NRC inspectors at research reactors are inclined to review research reactor operations in light of their experience at power plants.

Clearly, power reactors are operated for commercial reasons. It is accepted, as a matter of fact, that the cost of regulatory compliance associated with the hiring of specialized personnel and the payment of fines imposed by the NRC is to be passed on to the stock holders or the power consumers. More staff can always be hired, if needed, and the job of providing electricity gets done, albeit at greater expense. While fines applied by the NRC are probably conducive to improved power plant operations, they are applied with such frequency that there is now little shock value or public stigma. Worthy of note, when necessary, power reactors can avail themselves of numerous trade organizations and lobbies to balance the regulatory power. Finally, there is an appreciation by a significant fraction of the public and Congress that nuclear power is needed.

On the other hand, the few existing research reactors are operated by and for scientists. No political power is held or exercised. No direct commercial product is produced. Few public personalities champion their cause. Furthermore, research reactor operation is not an end unto itself, but is the first of many requirements for the conductance of research. And research is demanding of personnel-time and funding resources. Staffs are typically very small, varying between two and a dozen or so personnel. Salaries come from university and/or service income sources, and are usually below the levels found in the commercial sector. At research reactors, increased costs associated with regulatory compliance cannot be passed on. Instead, they are absorbed by not replacing obsolete equipment as needed. Not surprisingly, a small research reactor staff limited in size can not reasonably be expected keep up with an ever greater number of regulations, inspections, record keeping requirements, etc... without a decrease in research productivity.

Unfortunately, the excellent operating history of research reactors during the last two decades has not deterred recent increases in regulatory oversight of research reactors. For example, the inspection frequency of research reactors is somewhat capricious since it is based on an apparently arbitrary power level. Two $MW_{th}$ and higher power reactors are inspected more frequently than say, one $MW_{th}$ reactors. Surely there is no great difference between one and two to warrant this!

Emergency planning is another example of potential regulatory excess. In the past several years, research reactors have been asked to develop and maintain detailed emergency plans and implementing procedures. As part of the emergency plan, entire city and county police, fire and rescue squad departments have to receive on-site training at the research reactor facilities. Since only a small fraction of the public forces can be made available at any one time for this, the orientation sessions have to be repeated many times, which is a logistical nightmare. Emergency training is a constant effort for the staff, since periodic retraining is required. While some contingency plan for emergencies is certainly called for, the degree of detail can be questioned in light of there not having been a prior evaluation of the research reactor source term. Certainly, the individual operators of research reactors bear some responsibility for the plan specifics, but many requirements are imposed by the NRC as a result of its review prior to approval. Unfortunately, the plans are reviewed against the power reactor model and experience.

Universities are responding to this situation by shutting down their reactors, because they have become too expensive to operate, and are a potential source of embarrassment when public regulatory enforcement actions are taken. The reduction in the number of operating U.S. research reactors is the unfolding of a national tragedy. This can not be explained by "survival of the fittest" nor by their supposed obsolescence. Rather, fundamental action at the regulatory level is urgently needed.

NRC personnel cite existing regulations to explain the increased attention given to research reactors. In our opinion, reasonable and non-excessive regulation of research reactors by the NRC will depend on an early development of regulations specific to research reactors. Hopefully, this need is slowly becoming understood by the research reactor community and its regulatory agency. An abbreviated and down-scaled code of regulations specific to research reactors would do much to establish reasonable regulation where both the survival of research reactors and the health and safety of the public could be assured. These regulations should be tailored to both safety and the requirements of research reactor operations, which demand flexibility. A different approach to enforcement action should be also be found, as monetary fines are not called for in a non-commercial environment. Concurrent with this, the NRC should establish one centralized office for research reactor regulation, staffed by individuals who understand the operation and mission of research reactor facilities.

Members of the research reactor community have on past occasions inquired into NRC receptiveness to a petition for rulemaking specific to research reactors. So far the response has not been encouraging, but it is hoped that the NRC will reevaluate and change its position.

Comments on the Missouri Petition

As regards the new definition for research reactor proposed by the U. of Missouri, we agree that the power of a research reactor should be a lesser consideration for its categorization than its purpose. In general, we support the proposed new definition, which states that:

> "Research reactor" means a nuclear reactor which is of a type described in &50.21(c) of this part and for which an application has been filed for a license authorizing operation for research, developmental, educational, training, or experimental purposes, and which may have provisions for the production of non-fissile radioisotopes.

However, we would suggest that the word non-fissile, to describe the type of radioisotopes that would be allowed to be produced in a research reactor, be dropped from the definition. There are some situations, such as with the irradiation of ore material, in which minute amounts of a fissile isotope could be produced. For instance, Pu-239 could be produced on irradiating a soil sample containing U-238. It should not be forgotten that the use of low-enriched uranium fuel leads to the production of Pu-239 within the reactor fuel. The word non-fissile is not really needed in the definition.

We also agree that a qualifying phrase should be added to the present definition for "testing facility". The U. of Missouri proposes adding the underlined phrase:

"Testing reactor" means a nuclear reactor which is of a type described in &50.21(c) of this chapter to be used for testing reactor components and designs at reduced or uncertain safety margins, ....."

We are not sure what is meant by a reactor design as related to testing it in a testing reactor, and believe that the definition would be clearer and lose no significance were the words " and designs " to be dropped.

Although not mentioned in the Missouri petition, we strongly suggest that the NRC avail itself of the opportunity to consider a revision to the clause (2)(iii) of the present definition of a "testing reactor", which currently states:

> Testing facility means a nuclear reactor ..... at:
> (1) .....,
> (2) A thermal power level in excess of 1 megawatt, if the reactor is to contain:
> (i) .....; or
> (ii) ....; or
> (iii) An experimental facility in the core in excess of 16 square inches in cross-section.

We are not aware that a basis exists for limiting an in-core research reactor experimental facility to 16 square inches in cross-section. It would seem more reasonable to consider a limit on the reactivity worth of such facilities. The use of the term "in the core" could also pose a problem of interpretation, since a position on a reactor core grid plate, against an external reactor face, could be considered to be an in-core position, as opposed to a "central core position" which is a position surrounded by fuel elements. If a reasonable basis for this clause is not available, we suggest that it be dropped entirely. If a reasonable basis is available, we would be interested in hearing of it.

Sincerely,

Robert U. Mulder, Director
U. Va. Reactor Facility

Thomas G. Williamson, Chairman
Department of Nuclear Engineering
and Engineering Physics,
University of Virginia

Sworn to and subscribed before me this 21st day of March, 1988.
Witness my hand and official seal.
Delores E. Van Notary Public

My Commission Expires 9/17/89.