

TESTIMONY OF COMMISSIONER FREDERICK M. BERNTHAL  
BEFORE THE  
SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION  
AND THE  
SUBCOMMITTEE ON ENERGY DEVELOPMENT  
AND APPLICATIONS  
OF THE  
HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY  
SEPTEMBER 25, 1984

My name is Frederick Bernthal. I am a Commissioner of the Nuclear Regulatory Commission. With me today is Commissioner Asselstine. Chairman Palladino and Commissioners Roberts and Zech regret that previous commitments preclude them from attending. I am pleased to appear before you in response to your request to testify concerning the conversion of domestic research and test reactors to low enriched uranium (LEU) fuel.

As you know, the Commission is considering amending its regulations to limit the use of highly enriched uranium (HEU) in domestic research and test reactors. The proposed rule has been published in the Federal Register to obtain public comments. For the purpose of this proceeding, we define highly

enriched uranium as fuel in which the weight percent of the U-235 isotope in the uranium fuel is 20 percent or greater. The significance of this type of fuel is that, in appropriate form and quantity, it can in principle be employed to construct a nuclear explosive device. While there is no firm dividing line between uranium enrichments that can be utilized in an explosive device and enrichments that cannot, 20 percent has been considered a reasonable dividing line between low enriched uranium and high enriched uranium. The rule would require reactor operators to use fuel that is less than 20 percent, or to come as close to that line as possible. It also reflects the fact that technological advances in fuels are making it possible to produce lower enrichment fuels for many reactors without significant reduction in performance.

The proposed rule is a consequence of a number of events that have occurred in the last several decades. Originally, only LEU fuel was meant to be exported for use in research reactors. In the late 1960's HEU became available and the fuel of choice in order to meet specific experimental needs. In the 1970's certain events heightened concern about nuclear proliferation, and U. S. nuclear export policy turned toward encouraging the reduction of U. S. supplied HEU inventories for fueling research and test reactors abroad. Against this background the Reduced Enrichment Research and Test Reactor (RERTR) program was established in 1978 by the Department of Energy.

In August, 1982, the Commission issued a policy statement related to its licensing responsibilities for the export of special nuclear material, including high enriched uranium. In this statement the Commission noted that

the widespread use of HEU fuel, which at that time involved a large number of domestic and international fuel shipments, increases the risks of proliferation through theft and diversion, and therefore efforts should be made to reduce HEU inventories. The assumption was that any reduction in the potential for access to these inventories would constitute a reduction in the proliferation risk. Based on the progress of the RERTR program, and as part of the policy to strongly encourage conversion by foreign operators, the Commission promised to take steps to encourage similar action by U. S. research reactor operators. The present proposal represents a step in that direction. Needless to say, one can never be certain that actions taken by us domestically will have the desired positive influence abroad, but the Commission continues to believe that the policy contained in the proposed rule is sound.

Another reason for considering this proposal is that as long as high enriched uranium exists at non-power reactors, some residual risk of malevolent use, or misguided attempt at such use, exists. Our pursuit of security improvements at non-power reactor facilities over the last several years has attempted to balance costs and risks. Currently available information contains no indication of a specific threat aimed at a domestic facility. However, acts by international terrorists have repeatedly shown that a threat can materialize without sufficient warning from intelligence sources. Therefore, it may be prudent to consider additional domestic security measures to increase protection of the HEU material still under NRC license. So, in conjunction with our consideration of the conversion issue, we are also considering increased security measures at non-power reactors. For example, the Commission has been considering for the past several months a proposal which would require

all fresh HEU fuel to be removed from those few sites which still have some small quantities stored on-site, and would tighten the accountability procedures for maintaining the required 100 rad/hour deterrence level of all stored fuel, as required by NRC regulations.

As to the potential impact of the proposed rule on operators of research and test reactors, let me address the issue in two parts. For those seeking a construction permit for a reactor requiring HEU fuel, the proposed rule would require that applicants demonstrate that the reactor would have a "unique purpose". Unique purpose is defined as a project or program which cannot reasonably be accomplished without the use of HEU fuel in the reactor.

As you can see, the rule does not prohibit the use of HEU fuel in new reactors, but is intended to permit only those activities which are well justified. Practically speaking, we do not see this aspect of the proposed rule affecting researchers since we do not anticipate any construction permit applications for non-power reactors at this time. Should there be any, we believe there is sufficient flexibility in the proposed rule to permit legitimate research using HEU fuel.

The other part of the proposed rule could have a greater impact on licensees. For existing reactors, unless the licensee can meet the "unique purpose" test, the proposed rule would prohibit the licensee from acquiring additional HEU fuel if LEU fuel is available and such fuel meets the Commission's health and safety criteria. In addition, the licensee would be required to replace all HEU fuel in his possession with available LEU fuel, in accordance with a

schedule based on availability of replacement fuel and consideration of other factors. These other factors include the availability of shipping casks, reactor usage, and financial support. A final schedule would be established by discussion with our licensing staff.

The process we envision for accomplishing conversion of existing reactors is that if the replacement of HEU fuel with LEU fuel does not change the technical specifications incorporated in the license or involve an unreviewed safety question as defined in our regulations, the licensee may replace HEU with LEU fuel without amendment to the license. Obviously, if there are changes to the technical specifications, the conversion would require the usual careful safety reviews. Information available to date indicates that conversion of a number of non-power reactors from HEU to LEU fuel is technically feasible, and if the goals of the RERTR program are successfully achieved over the next five years, conversion will be technically feasible for nearly all the remaining reactors.

Comments we have received indicate that academic institutions which operate most of the research reactors are particularly concerned about the cost of conversion. They are on tight budgets and maintain that they cannot afford to pay the costs of conversion. They are concerned about the cost of the new LEU fuel as well as the costs of removing, transporting, and reprocessing their present HEU cores. They are also concerned that it would be expensive and time consuming to meet NRC requirements for relicensing the reactors once they become subject to conversion, especially if the relicensing process were subject to public hearings.



The Commission intends to consider carefully public comments on its proposed rule, to proceed judiciously toward adopting whatever final rule is appropriate, and to implement any final rule in a careful manner. We believe that requiring new research reactors to use LEU fuel is desirable, provided that DOE funding for replacement fuel for current licensees is made available and our assumptions regarding the administration and licensing costs of conversion are correct. Should we decide to proceed with conversion, we will attempt to apply a generic licensing approach to conversion in order to minimize or eliminate licensee administrative costs and avoid disruption of ongoing research and educational programs. If the RERTR program succeeds in attaining its goals over the next few years, the likelihood of applying a generic approach for most reactors will no doubt increase and thus help reduce costs, and minimize the procedural steps that would be required to achieve conversion.

Only if the Federal Government, through the Department of Energy, continues to develop advanced fuel types and to fund fully the replacement of fuel will this program be able to progress. We continue to believe that such conversion is a worthwhile and significant long-term objective for all non-power reactor facilities. Continued support by the Congress of DOE's RERTR and university fuel assistance programs is essential, therefore, to achieving the goal of reducing HEU inventories at NRC-licensed facilities.