



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

July 3, 1986

TO: ALL NON-POWER REACTOR LICENSEES AUTHORIZED TO USE HEU FUEL

SUBJECT: CRITERIA FOR UNIQUE PURPOSE EXEMPTION FROM CONVERSION FROM THE USE OF HEU FUEL (GENERIC LETTER 86-12)

10 CFR 50.64 (51 FR 6514) provides for a "unique purpose" exemption from the requirement to convert from the use of high enriched uranium (HEU) fuel, provided the licensee presents a justification that is accepted by the Commission. Amended 10 CFR 50.2 gives broad definitions for acceptable unique purposes. This letter provides more specific guidance for those licensees who believe they might qualify for such an exemption.

The definition states that a unique purpose means a project, program, or commercial activity that cannot be reasonably accomplished without the use of HEU fuel, and may include one or more of the following four purposes:

- 1) A specific experiment, program, or commercial activity (typically long-term) that significantly serves the U.S. national interest and cannot be accomplished without the use of HEU fuel;
- 2) Reactor physics or reactor development based explicitly on the use of HEU fuels;
- 3) Research projects based on neutron flux levels or spectra attainable only with HEU fuel; or
- 4) A reactor core of special design that could not perform its intended function without using HEU fuel.

The definition provides guidance to licensees who believe they might qualify for a unique purpose exemption to develop a basis for exemption that best fits each unique situation, and which would provide a justification that the Commission could find acceptable. These four purposes are not necessarily the only ones that might form the basis for a unique purpose exemption. However, the following discussion relates to the four given in the 10 CFR 50.2 definition.

Purpose number 1 is intended to relate primarily to technical activities closely coupled to the national interest, which might include preeminence in a specific field of research or assurance of a domestic supply of some essential product of reactor operation. This was included in the definition of "unique purpose" to help provide the Nuclear Regulatory Commission (NRC) wide latitude of discretion like the standards in 10 CFR 50.41.

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Of the four purposes identified, it is intended that numbers (2) and (4) provide opportunity to perform new reactor projects whose objectives were to learn about or develop reactor concepts for which parameters of HEU were a necessary component. Examples might be a unique compact reactor heat source, a compact pulsing reactor with minimal distortion of fast neutron spectra, or a comparison of HEU and low enriched uranium (LEU) operating cores for assessing the potential for conversions of non-power reactor cores.

Purpose number 3 is intended to provide the opportunity to continue using HEU fuel if converting to available LEU fuel would change neutron flux densities or spectra, or other essential radiation parameters, so that the fundamental reason for conducting the reactor-based program would be lost, or irreparably compromised.

Purpose number 4 might also pertain to a non-power reactor that was designed and is operated to take maximum advantage of the unique characteristics of HEU fuel and where the substitution of any available LEU fuel could not be made without major facility modification to accommodate such things as a larger core, different coolant systems, or major changes in its primary mode of operation. An example would be a core with specific physical size limits that currently uses near-maximum uranium density in its fuel.

An application for exemption from conversion from HEU fuel must be submitted to the Director, Office of Nuclear Reactor Regulation, in accordance with the schedule given in the published regulation. The application should specify the date when acceptable LEU or medium enriched uranium (MEU) fuel is expected to be available, and a conversion schedule provided where appropriate. The NRC expects that only very few licensees will qualify for exemption. The following are examples of items which should be considered and developed in detail, as appropriate, in any application for exemption:

- (1) Identification and outline of the program
- (2) Explanation of the value of the program and any special experiments to the U.S. national interests
- (3) Discussion of how the achievement of significant and competitive results is dependent on such factors as the following:
  - (a) neutron fluence (e.g., power level and operating schedule)
  - (b) neutron flux density (e.g., power level, core size)
  - (c) neutron spectra
  - (d) signal-to-noise ratio in the experimental results
  - (e) operating and refueling schedule for the reactor
  - (f) operating costs
  - (g) waste management
- (4) Discussion of program accomplishment with available LEU fuels, and specification of LEU fuel characteristics required to permit continuation of the programs with no significant decrement in accomplishment.

This letter is for guidance only in interpreting 10 CFR 50.64. No response or action is necessary other than that required by the regulation to apply for a unique purpose exemption.

Questions should be addressed to Mr. Robert E. Carter at (301) 492-8206.

Original signed by  
Frank J. Miraglia

Frank J. Miraglia, Director  
Division of PWR Licensing-B

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