

**NUCLEAR REACTOR LABORATORY**  
AN INTERDEPARTMENTAL CENTER OF  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY



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ATTN: Document Control Desk  
Director, Division of Spent Fuel Storage and Transportation  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-001

RE: Request for Extending the Use of an Expiring Type B Transportation Package

Dear Sir or Madam:

The MIT Nuclear Reactor Laboratory is requesting the extended use of the BMI-1 package on a limited basis. The supporting information for such a request, using the guidance provided in NRC Regulatory Issue Summary 2008-18, "Information on Requests for Extending Use of Expiring Transportation Packages," is included below

(1) Package Information

BMI-1 Package ID Number USA/5957/B(F); Certificate of Compliance Number 5957;  
Docket Number 71-5957.

(2) Identification of Shipments

MIT requests the limited use of this package for the period of October 1, 2008 to October 1, 2009, in order to perform a single spent fuel shipment from our research reactor. There would be one package per shipment. The BMI-1 package has a dedicated trailer that is designed specifically for shipping this package as an exclusive use, highway route controlled quantity shipment.

The proposed shipments using this package would originate from the Massachusetts Institute of Technology (MIT) Nuclear Reactor Laboratory, in Cambridge, Massachusetts. The destination for the shipment is the U.S. DOE Savannah River Site.

The mode of transportation for the BMI-1 package is by highway conveyance using a flatbed trailer specifically designed for this package. These shipments have strict security measures

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as required by NRC Orders regarding safeguards and security compensatory measures for the transportation of spent nuclear fuel.

The general timeframe for the shipment would be between October 1, 2008 and October 1, 2009

(3) Reasons for Requesting Extended Use

MIT requests the extended use of the BMI-1 package, in part, to assist DOE in meeting its mission with respect to the return of spent nuclear fuel from operating university research reactors. This is the package that the DOE has provided for these research reactors for the return of spent research reactor fuel for the past 15 years. It is imperative that spent fuel from these operating reactors be returned in a timely manner to DOE possession in order to minimize the spent fuel inventory at these university research reactors.

The U.S. DOE, the BMI-1 package owner, is making good faith efforts through their contractor at the Idaho National Laboratory (INL) to design and fabricate a package to replace the BMI-1 packaging. The procurement activity to design and fabricate a replacement package is now in place. However, the new packaging will not be approved and fabricated before the "sunset" date, which is October 1, 2008, for the use of the BMI-1 package.

The only alternative package capable of shipping spent research reactor fuel, the GE-2000 package, is not available for use by the DOE Research Reactor Infrastructure Program because this package is dedicated to programmatic requirements at the DOE National Laboratories. The transportation schedule for the return of spent research reactor fuel cannot be adjusted to allow these shipments to be made prior to October 1, 2008, because the spent research reactor fuel is generated over the ongoing period of reactor operation that both research reactors require to meet their mission.

The limited extended use of the BMI-1 package is necessary to allow the MIT reactor to maintain minimum inventory of spent fuel on site. This is consistent with recent NRC directives for enhanced security at these facilities. If the current schedule for the availability of the new package to replace the BMI-1 is delayed, the operating status of our research reactor could be seriously impaired. The MIT reactor operates a significant portion of the year in support of our research, education and service mission.

Although the MITR has the capability to store a number of spent fuel elements, the inability to ship would result in significant build up of fuel over time, which is contrary to the intent of NRC security requirements, as mentioned above. Over an extended period, inability to store fuel would adversely impact medical research and research in support of advanced reactor materials development.

(4) Safety Justification for Continued Use and Proposed Compensatory Measures

The BMI-1 package has had an impressive safety record and for the past 10 years has been the primary package used by DOE for the return of spent fuel from university-operated

research reactors to DOE as part of the University Reactor Fuel Assistance Program (now the Research Reactor Infrastructure Program). During this 15 year period the package has been used safely and securely to make approximately 50 shipments from university reactor facilities to the Savannah River Site.

The BMI-1 package appears to be a package design categorized in Federal Register/Vol. 69, No.16, January 26, 2004, page 3731, as one that may meet current safety designs but is impractical to recertify or one for which the safety performance of the package design under the new standards is not known. This package is the only one of its kind and has a limited, but very important use.

The NRC and DOT recognized in their responses to questions in the Final Rules implementing regulation to harmonize with International Atomic Energy Agency (IAEA) standards (Federal Register/Vol. 69, No. 16, dated January 26, 2004) that there were no imminent safety hazards posed by use of packages, like the BMI-1, that would preclude their safe use during the transition period unless a safety issue with the package was identified. In this case, no new safety issues with the use of the BMI-1 package have arisen.

The BMI-1 package has been well maintained under the NRC Quality Assurance Program Approval for Radioactive Packages, No. 0108, issued to the University of Missouri. This maintenance includes both annual and biennial inspections and testing to verify package integrity. These inspections include non-destructive testing of welds which must be sound for safe operation, leak tightness tests in accordance with ANSI N14.5 and the replacement of sealing gaskets at least every 12 months or if any evidence of deterioration is detected. The operational tests include temperature stabilization tests and leak tightness tests after loading for each use of the package.

The following compensatory measures will be implemented for the limited number of shipments specified if the request to extend the use of the BMI-1 package is approved:

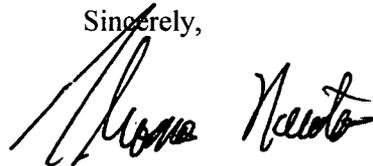
1. The shipments using this package are required to be exclusive use, highway route controlled quantity shipments. These shipments are coordinated with all relevant government entities in the package route so that if an emergency situation were to occur immediate response is available. This package is shipped using a trailer designed specifically for this package. Before each shipment a Level 6 Department of Transportation (DOT) inspection will be performed on the tractor and trailer.
2. Special package inspections will be incorporated before each use of the BMI-1 package. This will include:
  - a. Replacement of sealing gaskets prior to each shipment, rather than the current 12 month interval.
  - b. Comprehensive inspection of all sealing gasket seating surfaces.

(5) A Plan and Schedule to Acquire Replacement Packages or Complete Necessary Shipments

The DOE is replacing the BMI-1 package with a new package currently being procured by INL. This package will be designed and licensed for the shipment of MTR spent fuel [specifically the University of Missouri Research Reactor (MURR) and the Massachusetts Institute of Technology Reactor (MITR)], for various types of TRIGA spent fuel, and for Advanced Test Reactor (ATR) spent fuel types.

A competitive bid proposal process has been followed to procure the new package. On February 22, 2008, the contract was awarded to AREVA Federal Services (AFS). An internal design review was held on April 10, 2008, and the design team and INL project manager met with the NRC on May 7, 2008 to discuss the proposed design and schedule. Half-scale impact limiter testing is scheduled for completion in October 2008. The final design review meeting is scheduled for November 2008. The Safety Analysis Report (SAR) will be submitted to the NRC the first week of December. The duration of the NRC review is dependent upon work load and reviewer availability. Some package fabrication will proceed at risk during the NRC review period, including the procurement of long lead items. Dependent on the questions and comments received from the NRC, the decision will be made whether to proceed at risk with a completion of the fabrication of the package. It is anticipated that the package Certificate of Compliance (CoC) will be awarded in summer 2009, and the package will be then available to use for MITR spent fuel shipments.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas H. Newton". The signature is written in a cursive style with a large initial "T" and "N".

Thomas H. Newton, Ph.D.  
Associate Director for Engineering  
MIT Research Reactor