

WPI

Financial Services

100 Institute Road
Worcester, MA 01609-2280, USA
508-831-5754, Fax 508-831-5064
www.wpi.edu

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

Date: May 13, 2010

Subject: Request for limited use of BMI-1 Package, Certificate No.: 5957

A limited use of the Radioactive Material Package BMI-1 USA/597/B()F, Certificate No.: 5957 is requested for use in a single transport campaign. The use of the BMI-1 in a transfer of slightly irradiated and fresh MTR type fuel from the Worcester Polytechnic Institute Training Reactor to the University of Massachusetts, Lowell Research Reactor is requested.

This document is prepared in accordance with the Nuclear Regulatory Commission, Regulatory Issue Summary (RIS) 2008-18, dated August 14, 2008 and does not seek a certificate renewal for the BMI-1 package.

As required by the RIS the following five (5) elements of the request are outlined as follows:

(1) Package Information

- a. **Model No.** BMI-1
- b. **Package Identification Number:** USA/5957/B()F
- c. **NRC Certificate No.:** 5957, Revision 28, Docket Number 71-5957

(2) Identification of Shipments

- a. **Number of Shipments** - Three (3)
- b. **Number of Packages per Shipment** - one (1)
- c. **Packaging Serial Numbers** - All shipments will utilize the BMI-1 package, Serial No. 1
- d. **Package Contents:**

N 45524

- i. The total quantity of material transported is twenty-seven (27) intact MTR assemblies. Twenty-two of these assemblies are slightly irradiated and five (5) are considered fresh (un-irradiated), three (3) MTR plates will be assembled into a single removable plate element which is one of the twenty-two slightly irradiated assemblies.
- ii. Each shipment will consist of up to twelve (12) slightly irradiated MTR fuel elements meeting the maximum quantity of material as specified in Certificate of Compliance No. 5957.
- iii. The fuel is MTR plate type fuel with the following particulars:
 - 1) Fuel Drawings (**Attachment A**)
 - WPI Fuel Element Assembly - Drawing No. 422857, Rev. B
 - Removable Plate Assembly - Drawing No. 422967, Rev. B
 - 2) 18 Plate Assembly
 - 3) Pre-Irradiation U_{235} - 167 grams (maximum value)
 - 4) Pre Irradiation Total U - 846 grams (maximum value)
 - 5) Post Irradiation Details Included in (**Attachment B**)
 - 6) Contents bounded by 5.(b)(1)(xv) of the BMI-1 Certificate of Compliance, 5957, Rev. 28 and will be transported in 5.(a)(4)(v) Basket Assembly defined by BMI Drawing No. BCL-00-500, Rev. A as modified by BMI Drawing Nos. 00-000-236, Rev. c, and BCL-00-502, Rev. B
 - 7) All elements are intact
- e. **End Use of Radioactive Material** - The material will be utilized as additional LEU fuel for continuing operations at UMass Lowell Radiation Laboratory Research Reactor (UMLRR)
- f. **Shipment Origin and Destination:**
 - i. Origin: Worcester Polytechnic Institute, Research Reactor Facility
100 Institute Road
Worcester, MA 01609-2280
 - ii. Destination: UMass Lowell Research Reactor
One University Avenue
Lowell, MA 01854
- g. **Mode**- The shipments will occur by Exclusive Use Vehicle (Heavy Haul Tractor and BMI-1 dedicated trailer) using a dedicated transport route
- h. **General Timeframe** - It is requested that use of the package be authorized to support a mid to late June, 2010 timeframe. It is proposed that all transports will take place in a single calendar week once started.
- i. **Date of Last Shipment** - All shipments will be completed by the end of June, 2010

(3) Reason for Requesting Extended Use

- a. USE of the BMI-1 transport package is requested due to the availability, small scale, and size of the package. These factors lead to a safe and efficient operation of material packaging and off-load for the origin and receipt facilities. The operational footprint of larger commercially available transport packages provides exceedingly difficult challenges in both the loading and preparation of the material for transport. Use of the BMI-1 package will allow for a more secure and less obtrusive operation, which will minimize total accumulated dose and exposure / visibility of the operation to the public at both the origin and receipt facilities.
- b. Both facilities are located at operational campuses and the use of the BMI-1 package will eliminate the requirement for large scale equipment, cranes and industrial processes in areas where the general campus population frequent and thereby mitigate the potential for any industrial hazards to be presented unnecessarily. The external operational area available to the WPI facility is severely restricted and limited to a small loading dock area for practical purposes. Given these constraints, it is prudent to use a small-scale lightweight package that requires minimal heavy equipment and a small operational footprint. Currently there is no US transport package with a similar operational footprint available. The BMI-1 is currently under special use at the MIT and MURR reactors.
- c. The U.S. Department of Energy has developed a new Research Reactor shipping package, the BRR-1, but the package will not be available in the timeframe necessary for this transport evolution. However, in the interim, DOE is assisting in the coordination of this request for the use of the BMI-1 cask in the WPI to UMass Lowell fuel transfer.
- d. Use of the BMI-1 cask is required within this timeframe to support the planned decommissioning of the WPI reactor facility. Removal of the material to an operational reactor will aid in the protection and consolidation of the material and reduce the overall number of domestic sites possessing nuclear materials. Failure to remove the material will have significant adverse impacts to the WPI decommissioning schedule.

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

The BMI-1 package has been maintained under NRC Quality Assurance Program Approval for Radioactive Packages No. 0108. In addition to annual inspections and testing WPI will follow the MURR lead to replace the package sealing gaskets prior to the use of the package with a comprehensive inspection of all sealing gasket seating surfaces prior to each shipment.

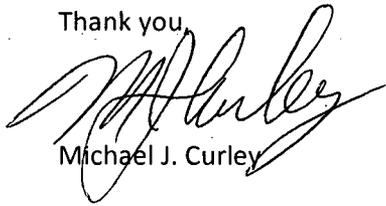
The material proposed for shipment is slightly irradiated and bounded by the BMI-1 authorized contents. The BMI-1 provides shielding to reduce package external radiation levels close to that of background when used for the WPI proposed contents. This material does not meet the definition of Spent Nuclear Fuel however, it is proposed that this material will be packaged IAW with the BMI Certificate of Compliance and escorted by armed guard for all transports using similar methodologies applied to spent fuel transports.

The WPI reactor has been issued a Quality Assurance Program Approval for Radioactive Material Packages No.: 0946, under the provisions of 10 CFR Part 71.

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

As stated, this is a single use request to support the full decommissioning of the WPI reactor facility. No additional use of this or any transport package will be required upon removal of the current fuel inventory from the facility.

Thank you,

A handwritten signature in black ink, appearing to read "M. Curley", written over the printed name "Michael J. Curley".

Michael J. Curley

Director of Risk, Compliance and Nuclear Reactor

Cc: Departments of Energy and Transportation