U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration

East Building, PHH-23
1200 New Jersey Ave., SE
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION
FOR A TYPE B(U)F FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0561/B(U)F, REVISION 2**

**REVALIDATION OF CANADIAN COMPETENT AUTHORITY
CERTIFICATE CDN/2048/B(U)F, REVISION 9**

This certifies that the radioactive material package design described below is hereby approved for use within the United States for import and export shipments only. Shipments must be made in accordance with the applicable regulations of the International Atomic Energy Agency[1] and the United States of America[2].

1. Package Identification - Model No. F-257, Serial No.2.

2. Package Description - as described in Canadian Competent Authority Certificate CDN/2048/B(U)F, Revision 9 (attached).

3. Authorized Radioactive Contents – as described in Canadian Competent Authority Certificate CDN/2048/B(U)F, Revision 9, consistent with the following specifications.

   The total package weight will not exceed 6,960 pounds.

   The SLOWPOKE-2 research reactor core at the University of Alberta is authorized by this certificate. This core shall be consistent with the following specifications:

Type of Nuclear Reactor Assemblies:	SLOWPOKE-2
Fuel Element Type:	Pin
Maximum mass of assembly:	5059.6 grams
Maximum number of fuel elements per package:	297 fuel pins
Maximum fuel element length:	22.83 cm
Maximum fuel element outer diameter:	0.61 cm
Maximum decay heat per package:	1 watt
Maximum initial enrichment, weight percent U-235:	93.19%
Maximum initial mass, U-235:	831.6 grams
Maximum initial mass, Uranium:	892 grams
Maximum burnup Kwh/fuel core:	122,000 Kwh
Minimum cooling time:	14 days

4. Criticality - The minimum criticality safety index is 100.

5. General Conditions -

   a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.

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[1] "Regulations for the Safe Transport of Radioactive Materials, 2012 Edition, No. SSR-6", published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

[2] Title 49, Code of Federal Regulations, Parts 100 - 199, United States of America.

b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Division of Engineering and Research, (PHH-20), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.

c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.

6. Special Conditions -

a. Periodic Leak Test: The package must have completed a periodic leakage test, in accordance with ANSI N14.5, to verify a leakage rate not to exceed 1 X 10^{-7} std-cm^3/s within one year prior to shipment.

b. Transport by air is not authorized.

7. Marking and Labeling - The package shall bear the marking USA/0561/B(U)F in addition to other required markings and labeling.

8. Expiration Date - This certificate expires on September 30, 2021.

This certificate is issued in accordance with paragraphs 816 and 820 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the August 29, 2016 petition by Secured Transportation Services, LLC, Buford, Georgia and in consideration of other information on file in this Office.

Certified by:

William Schoonover
Associate Administrator for Hazardous Materials Safety

JAN 18 2017
(DATE)

Revision 2 - Issued to endorse Canadian Competent Authority Certificate CDN/02048/B(U)F, Revision 9 with contents as given in paragraph 3, CSI as given in paragraph 4, and the special conditions of paragraph 6.

Canadian Certificate No.: **CDN/2048/B(U)F (Rev. 9)**
Issue Date: **Jul-29-2016**
Expiry Date: **Sep-30-2021**
CNSC File: **30-A2-214-0**

Certificate

CDN/2048/B(U)F (Rev. 9)

Transport Package Design

The transport package design identified below is certified by the Canadian Nuclear Safety Commission pursuant to paragraph 21(1)(h) of the *Nuclear Safety and Control Act* and Subsection 10(1) of the *Packaging and Transport of Nuclear Substances Regulations*, 2015 and to the 1973 Revised Edition (as amended) of the IAEA's *Regulations for the Safe Transport of Radioactive Material.*

REGISTRATION OF USE OF PACKAGES

All users of this authorization shall register their identity in writing with the Canadian Nuclear Safety Commission prior to the first use of this authorization and shall certify that they possess the instructions necessary for preparation of the package for shipment.

PACKAGE IDENTIFICATION

Designer:	**Atomic Energy of Canada Limited**
Make/Model:	**F-257 Shipping Package, Serial No. 002**
Mode of Transport:	**Rail, Road, Sea**

IDENTIFICATION MARK

The package shall bear the competent authority identification mark **"CDN/2048/B(U)F"**.

PACKAGE DESCRIPTION

The packaging, as shown on Nordion International Drawing No. F125701-001 (Rev. D), consists of an inner container and an impact limiting fire shield overpack. The container is a stainless steel encased lead cylinder, with a removable top plug attached by eight high strength 5/8 inch diameter bolts. Sealing is provided by a silicone "O" ring. Vent and drain lines are supplied to facilitate wet loading. The lines are safety plugged. The inner container is mounted onto the disk base of the overpack by four steel brackets and eight 3/4 inch diameter bolts.

The overpack consists of a double carbon steel wall, capped cylinder mounted on a disk base. The cylinder voids are filled with "Fibrefax" thermal insulation. "Transite" sheets protect the base. External fins are welded to the outer skin to provide heat transfer and impact absorption. Hoisting lugs are integral with four of these fins. The overpack cylinder is attached to the base by twelve 1 inch diameter bolts. Skids are provided for mechanical handling.

An illustration of the package is shown on attached Drawing No. SLWPK-F125701-4 (Rev. 0).

Any modification to the package design must be submitted to the Canadian Nuclear Safety Commission for approval prior to implementation.

The configuration of the package is as follows:

Shape:	**Cylinder**	Shielding:	**Lead**
Mass:	**3163 kg**	Outer Casing:	**Steel**
Length:	**n/a**	Height:	**1522 mm**
Width:	**n/a**	Diameter:	**1255 mm**

AUTHORIZED RADIOACTIVE CONTENTS

This package is authorized to contain one irradiated SLOWPOKE fuel core consisting of up to 342 uranium-aluminum alloy fuel rods, as described on AECL Drawing No. A10720 (Rev. E), contained within an aluminum alloy cage as shown on AECL Drawing No. A10721 (Rev. J). Each rod is 28% - 72% by weight uranium-aluminum with a maximum enrichment of 93.5% U-235. The maximum mass of U-235 is 2.8 g per rod before irradiation.

QUALITY ASSURANCE

Quality assurance for the design, manufacture, testing, documentation, use, maintenance and inspection of the package shall be in accordance with:

- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition

SHIPMENT

The preparation for shipment of the package shall be in accordance with:

- AECL Operating Procedure No. SLWPK-35000-PRO-001 (Rev. 1) "Preparation for Shipment of the F-257 Transport Package"
- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition

Shipment is authorized as fissile with a minimum Criticality Safety Index (CSI) of 50 for criticality control.

Post irradiation decay time shall not be less than 48 hours.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

S. Faille
Designated Officer pursuant to paragraph 37(2)(a) of the Nuclear Safety and Control Act

NOTES

Revision 8: December 18, 2012. Certificate issued.
Revision 9: July 29, 2016. Certificate issued.