



Canadian Certificate No. CDN/E232/-96 (Rev. 0)	Issue Date Jun-17-2009	Expiry Date Nov-30-2009	CNSC File 30-10-2-189
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Certificate
for
Endorsement of Transport Package Design
No. USA/9329/AF-96 (Rev. 2)

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 Section 7 of the *Packaging and Transport of Nuclear Substances Regulations*, and to the 1996 Edition (Revised) of the *IAEA 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: **Los Alamos National Laboratories**
Make/Model: **S-300**
Mode of Transport: **Road**

IDENTIFICATION MARK

The package shall bear the competent authority identification mark "USA/9329/AF-96".

PACKAGE DESCRIPTION

The package as further described in Certificate No. USA/9329/AF-96 (Rev. 1), consists of an overpack, pipe and shielding insert.

The overpack consists of a standard 55-gallon drum as an outer container. A bolted clamping ring secures the drum lid to the drum body and the lid is fitted with a filter vent. The outer container is lined with polyethylene liner (body and lid). Cane fiberboard dunnage is used within the polyethylene liner to hold the pipe component in an approximately central position and to absorb shock.

The pipe component consists of a cylindrical pipe welded to a flat cap at the bottom end and a pipe bolting flange at the other end. The pipe component is closed with a flat lid which is attached by 12, 7/8-9 UNC stainless steel bolts. A filter vent is installed in the lid. The lid/flange joint features a butyl or ethylene/propylene rubber O-ring dust seal.

The minimum thickness of the pipe wall is 5.6 mm and the minimum thickness of the bottom cap is 6.4 mm.



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The nominal thickness of the lid is 22.9 mm.

The neutron shielding insert is a two-part assembly consisting of a cylindrical body and stepped lid which nominally fills the cavity within the pipe component. The shielding lid is held in place by the bolted lid of the pipe component. The insert is made from solid high density polyethylene (HDPE) plastic, approximately 100 mm thick.

Containment is provided by the special form capsule.

An illustration of the package is shown on attached Figure 1-1 S300 Package Configuration.

The configuration of the package is as follows:

Shape: Cylinder	Shielding: Polyethylene
Mass: 217 kg	Outer Casing: Steel or Stainless Steel
Length: n/a	Height: 889 mm
Width: n/a	Diameter: 574 mm

AUTHORIZED RADIOACTIVE CONTENTS

This package is authorized to contain up to 152 GBq / 32 grams of mixture of isotopes as listed in the table attached as Appendix A, doubly encapsulated in a welded capsule and in a Model II special form capsule with certificate No. USA/0696/S-96 Rev. 4.

QUALITY ASSURANCE

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

- Foreign Certificate No. USA/9329/AF-96(Rev. 2)
- Canadian Packaging and Transport of Nuclear Substances Regulations
- IAEA Regulations

SHIPMENT

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

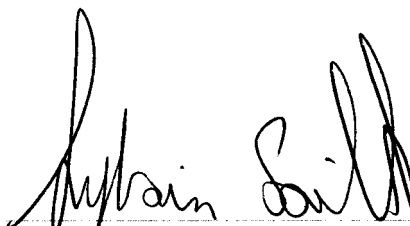
- Foreign Certificate No. USA/9329/AF-96(Rev. 2)

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- Canadian Packaging and Transport of Nuclear Substances Regulations
- IAEA Regulations

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

This certificate is valid only in Canada.



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



Numéro du certificat canadien
CDN/E232/-96 (Rév. 0)

Date d'émission
juin-17-2009

Date d'expiration
nov.-30-2009

Dossier de la CNSC
30-10-2-189

Certificat d'homologation
pour
Acceptation de la conception de colis de transport de l'étranger
n° USA/9329/AF-96 (Rév. 2)

La conception du modèle de colis ci-dessous est homologuée par la Commission canadienne de sûreté nucléaire en vertu de l'alinéa 21(1)(h) de la *Loi sur la sûreté et la réglementation nucléaires* et de l'article 7 du *Règlement sur l'emballage et le transport des substances nucléaires* du Canada et du *Règlement de l'AIEA, Édition de 1996, (Révisée), Règlement de transport des matières radioactives*.

INSCRIPTION DE L'USAGE DU COLIS

Toute personne qui utilise cette autorisation pour la première fois doit s'inscrire par écrit auprès de la Commission canadienne de sûreté nucléaire et attester qu'elle possède les instructions nécessaires pour préparer le colis à l'expédition.

IDENTIFICATION DU COLIS

Concepteur : **Los Alamos National Laboratories**
Marque/Modèle : **S-300**
Modes de transport : **Routier**

MARQUE D'IDENTIFICATION

Le colis porte la marque d'identification << **USA/9329/AF-96** >> de l'autorité compétente.

DESCRIPTION DU COLIS

Le colis est décrit dans le certificat n° USA/9329/AF-96 (Rév. 1) et comprend un suremballage, un tuyau et une pièce amovible pour le blindage.

Le suremballage comprend un fût standard de 55 gallons qui sert de contenant extérieur. Un collier de serrage boulonné maintient en place le couvercle sur le fût et le couvercle comporte un orifice d'aération avec filtre. Le contenant extérieur est revêtu d'une couche de polyéthylène (corps et couvercle). Un élément d'arrimage en panneaux à fibres est utilisé dans le revêtement de polyéthylène pour maintenir en place le tuyau à peu près au centre et pour amortir les chocs.

Le tuyau comprend une conduite cylindrique soudée à un couvercle plat à l'extrémité du fond, ainsi qu'une bride boulonnée à l'autre extrémité. Le tuyau est fermé par un couvercle plat qui est fixé à l'aide de 12 boulons en acier inoxydable 7/8-9 UNC. Un orifice d'aération avec filtre est installé sur le couvercle. Le joint couvercle/bride comprend un joint d'étanchéité torique contre les poussières, constitué de caoutchouc butyle ou de caoutchouc éthylène propylène.



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L'épaisseur minimale de la paroi du tuyau est de 5,6 mm et l'épaisseur minimale du couvercle du fond est de 6,4 mm. L'épaisseur nominale du couvercle est de 22,9 mm.

La pièce amovible servant de blindage contre les neutrons est un assemblage de deux composantes comportant un corps cylindrique et un couvercle à gradins qui remplit la cavité à l'intérieur du tuyau. Le couvercle de blindage est maintenu en place par le couvercle boulonné du tuyau. La pièce amovible est constituée de polyéthylène haute densité (PEHD) dont l'épaisseur est d'environ 100 mm.

Le confinement est assuré par une capsule pour matière sous forme spéciale.

Une illustration du colis est indiquée sur la figure 1-1 S300, Configuration du colis.

La configuration du colis est la suivante :

Forme : **Cylindre**
Masse : **217 kg**
Longueur : **n/a**
Largeur : **n/a**

Blindage : **Polyéthylène**
Enveloppe extérieure : **Acier ou Acier inoxydable**
Hauteur : **889 mm**
Diamètre : **574 mm**

CONTENU RADIOACTIF AUTORISÉ

Ce colis est autorisé à contenir jusqu'à 152 GBq ou 32 grammes de mélange d'isotopes, tel qu'indiqué dans le tableau Annexe A ci-joint étant contenu dans des capsules doubles soudées pour matières sous forme spéciale de Modèle II, tel que décrit dans le certificat n° USA/0696/S-96, (Rév. 4).

ASSURANCE DE LA QUALITÉ

L'assurance de la qualité pour la conception, la fabrication, les épreuves, l'établissement des documents, l'utilisation, l'entretien et l'inspection du colis est conforme aux :

- Certificat de l'étranger n° USA/9329/AF-96(Rév. 2)
- Règlement sur l'emballage et le transport des substances nucléaires du Canada
- Règlement de l'AIEA

EXPÉDITION

La préparation du colis pour l'expédition est conforme aux :

- Certificat de l'étranger n° USA/9329/AF-96(Rév. 2)



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- Règlement sur l'emballage et le transport des substances nucléaires du Canada
- Règlement de l'AIEA

L'expédition est autorisée comme matière fissile avec un indice de sûreté-criticité (ISC) minimum de 0.0 pour le contrôle des risques de criticité.

Ce certificat n'est valide qu'au Canada.

S. Faille
Fonctionnaire désigné en vertu de l'alinéa 37(2)(a)
de la *Loi sur la sûreté et la réglementation nucléaires*

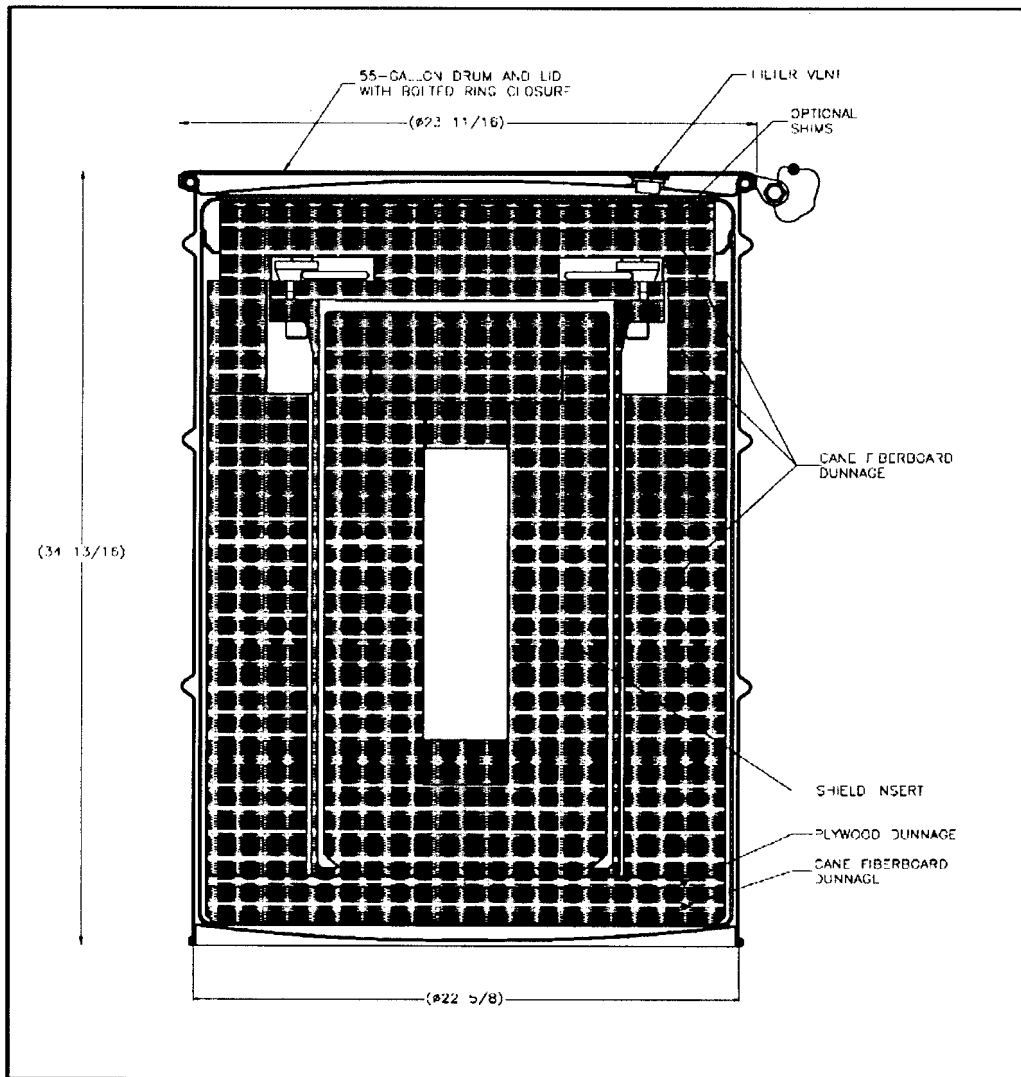


Figure 1-1 – S300 Package Configuration

Appendix A

The authorized radioactive content for the S-300 Transport Package is listed in the following table:

Nuclide	Content (Grams)	Activity (GBq)
Pu 238	0.004	3
Pu 239	29.641	69
Pu 240	2.122	18
Am 241	0.150	19
Pu 241	0.011	43
Pu 242	0.015	0
Totals	31.943	152



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration

**COMPETENT AUTHORITY CERTIFICATION
FOR A TYPE FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/9329/AF-96, REVISION 2**

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

This certifies that the radioactive material package design described has been certified by the Competent Authority of the United States as meeting the regulatory requirements for a Type AF packaging for fissile radioactive material as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America².

1. Package Identification - Model No. S300.
2. Package Description and Authorized Radioactive Contents - as described in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9329, Revision 2 (attached). Contents are limited to a single PuBe special form capsule meeting either USA/0696/S-96, Revision 4 or USA/0695/S-96, Revision 4.
3. Criticality - The minimum criticality safety index is 0. There is no restriction on the number of packages per conveyance.
4. 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.
 - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology, (PHH-23), 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.

¹ "Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), No. TS-R-1 (ST-1, Revised)," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

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

CERTIFICATE USA/9329/AF-96, REVISION 2

- d. This certificate provides no relief from the limitations for transportation of plutonium by air in the United States as cited in the regulations of the U.S. Nuclear Regulatory Commission 10 CFR 71.88.
 - e. Records of Quality Assurance activities required by Paragraph 310 of the IAEA regulations¹ shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.
- 5. Marking and Labeling - The package shall bear the marking USA/9329/AF-96 in addition to other required markings and labeling.
 - 6. Expiration Date - This certificate expires on November 30, 2011. On February 14, 2009, this certificate supersedes all previous revisions of USA/9329/AF-96.

This certificate is issued in accordance with paragraph 814 of the IAEA Regulations and Section 173.471 and 173.472 of Title 49 of the Code of Federal Regulations, in response to the February 11, 2009 petition by Department of Energy, Washington, DC, and in consideration of other information on file in this Office.

Certified By:



Robert A. Richard
Deputy Associate Administrator for Hazardous Materials Safety

Feb 12 2009
(DATE)

Revision 2 - Issued to endorse U.S. NRC Certificate USA/9329/AF-96 Revision 2.

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

¹ a. CERTIFICATE NUMBER 9329	b. REVISION NUMBER 2	c. DOCKET NUMBER 71-9329	d. PACKAGE IDENTIFICATION NUMBER USA/9329/AF-96	PAGE 1	PAGES OF 4
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2. PREAMBLE

- a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
- b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country, through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

- a. ISSUED TO (Name and Address)
U.S. Department of Energy
Washington, D.C. 20585
- b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION
U.S. Department of Energy
application dated August 23, 2006,
as supplemented.

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below:

5

- a. Packaging
 - (1) Model No.: S300
 - (2) Description

The Model No. S300 package is a cylindrical container that is approximately 89 centimeters (35 inches) in overall height and 60 centimeters (23 inches) in overall diameter. The Model No. S300 is comprised of an overpack, pipe component, and a shielding insert. The Model No. S300 is designed to transport a single plutonium-beryllium (PuBe) special form capsule (SFC). The maximum gross weight of the package is 217.7 kilograms (480 lbs).

The overpack design utilizes a standard 55-gallon drum as the outer container. A standard bolted clamping ring secures the drum lid to the drum body. Within the drum body is a rigid polyethylene liner (body and lid). Lid liner and lid are pierced and the drum lid is fitted with a filter vent. Within the liner is cane fiberboard dunnage and a sheet of plywood to provide shock absorption for the pipe component.

The pipe component consists of a stainless steel cylindrical pipe welded to a stainless steel flat cap at the bottom end and a bolted pipe flange at the other end. The pipe component is closed with a stainless steel flat lid attached to the flange with 12 stainless steel bolts. A filter vent is installed in the lid. The flange-to-lid seal is either a butyl or ethylene propylene elastomeric o-ring.

**CERTIFICATE OF COMPLIANCE
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5. a. Packaging (continued)

(2) Description (continued)

The shielding insert is located within the pipe component. The shielding insert is made from solid high density polyethylene plastic. Within the shielding insert is a cylindrical opening sized to accommodate the SFC.

(3) Drawings

The packaging is constructed in accordance with Areva drawing No. 60999-SAR, sheets 1 through 3, Revision 0, S300 Packaging SAR Drawing.

b. Contents

(1) Type and form material

Plutonium and its decay products in the form of PuBe sources meeting the requirements of special form sources and limited to:

- (a) The Model II source capsule - IAEA Certificate of Competent Authority Special Form Radioactive Materials Certificate Number USA/0696/S-96, Revision 4, issued by the U.S. Department of Transportation (DOT).
- (b) The Model III source capsule - IAEA Certificate of Competent Authority Special Form Radioactive Materials Certificate Number USA/0695/S-96, Revision 4, issued by the DOT.

(2) Maximum quantity of material per package:

One source capsule, containing a maximum quantity of fissile plutonium (Pu-239 plus Pu-241) as shown below.

Non-Exclusive Use Shipment		Exclusive Use Shipment	
Model II	Model III	Model II	Model III
206 grams fissile plutonium	160 grams fissile plutonium	350 grams fissile plutonium	160 grams fissile plutonium

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5. b. Contents (continued)

(2) Maximum quantity of material per package: (continued)

Source capsule may contain radionuclides listed below within the ranges shown.

Radionuclide	Percentage of total plutonium mass
Pu-238	0 - 0.5%
Pu-239	73 - 97%
Pu-240	3 - 21%
Pu-241	0 - 3%
Pu-242	0 - 2%
Am-241	0 - 2.5%

Total quantity of radioactive material within a package may not exceed a Type A quantity.

c. Criticality Safety Index 0.0

6. Transport by air is not authorized.

7. In addition to the requirements of Subpart G of 10 CFR Part 71:

a. Each package shall be prepared for shipment and operated in accordance with the "Package Operations," in Chapter 7 of the application.

b. Each package shall be tested and maintained in accordance with the "Acceptance Tests and Maintenance Program," in Chapter 8 of the application.

8. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.

9. Expiration date: November 30, 2011.

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

1	a CERTIFICATE NUMBER 9329	b REVISION NUMBER 2	c DOCKET NUMBER 71-9329	d PACKAGE IDENTIFICATION NUMBER USA/9329/AF-96	PAGE 4	PAGES OF 4
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REFERENCES

U.S. Department of Energy application dated August 23, 2006.

Supplement dated: November 8, 2006, April 19, 2007, and February 9 and 10, 2009.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION



Eric Benner, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Date: February 11, 2009