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

U.S. Department of Transportation

Pipeline and Hazardous Materials Safety Administration

COMPETENT AUTHORITY CERTIFICATION FOR A TYPE B(U)F FISSILE RADIOACTIVE MATERIALS PACKAGE DESIGN CERTIFICATE USA/0492/B(U)F, REVISION 23

REVALIDATION OF FRENCH COMPETENT AUTHORITY CERTIFICATE F/313/B(U)F

The Competent Authority of the United States certifies that the radioactive material package design described in this certificate satisfies the regulatory requirements for a Type B(U)F package as prescribed in the regulations of the International Atomic Energy Agency[1] and the United States of America[2] The package design is approved for use within the United States for import and export shipments made in accordance with applicable international and domestic transport regulations.

1. Package Identification - TN-BGC1.

2. Package Description and Authorized Radioactive Contents - as described in French Certificate of Competent Authority F/313/B(U)F, Revision Mbs (attached). Contents are restricted to:

   a. Solid non-irradiated uranium bearing materials as described in French Certificate of Approval No. F/313/B(U)F(Mbs), Appendix 11 (attached).

   b. Non-irradiated TRIGA fuel elements from the F1, F2, F3, F4, Marvel or Miscellaneous categories as described in French Certificate of Approval No. F/313/B(U)F(Mbs), Appendix 26, (attached).

3. Criticality - The minimum criticality safety index is as stated in French Certificate. The maximum number of packages per conveyance is determined in accordance with Table 11 of the IAEA regulations cited in this certificate.

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[1] "Regulations for the Safe Transport of Radioactive Material, 2018 Edition, No. SSR-6 (Rev. 1)" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

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

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 Engineering and Research, (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.

   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 Management System activities required by Paragraph 306 of the IAEA regulations[1] 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. Special Conditions -

   a. To support the component fatigue evaluations for tie-down during road transport, a weld inspection, as identified in the Major Maintenance penetrant exam scope in chapter 8 of the TN-BGC-1 safety analysis report, should be performed prior to the first use of each package in the US. This inspection is not required prior to October 31, 2025. This inspection is also not required if the package is new or the package has undergone this type of inspection within five transports or one year of its first use in the US. If a package meeting the description above is then used exclusively in the US, resumption of the normal maintenance program is acceptable (see section 2.5 of this safety evaluation report).

b. If pyrophoric contents, including metal powders, are transported, inerting of the primary packaging boxes, internal fitting and the TN-BGC-1 cavity should be performed (see chapter 3 and chapter 16, section 5, of the safety analysis report).

c. For Content 11, no more than one gram of transuranic elements are authorized.

d. Mixing of different sub-contents within the same package is prohibited, see chapter 3, section 2.5.1, of safety analysis report.

e. As stated in section 3 of French certificate, the transport period between package closure and opening at the destination facility will not exceed one year.

f. The presence of polyethylene is not authorized for air transport. In surface transport, the presence of polyethylene is prohibited for contents No. 11b and 11d and shall not exceed 1000 grams in contents No. 11a and 11c.

g. The condition in chapter 3 section 2.5.1 for content 11 and section 2.10.1 for content 26 state that the time between closure of the internal fittings at the shipping facility and the opening of the package at the consignee facility must be less than 1 year when polymer materials are present during transport.

h. A package shipped in a CB9-type overpack shall be transported under exclusive use provisions.

i. For content 11, a minimum free volume of two liters in the cavity of the internal fitting is required and the storage time of the closed internal fitting shall not exceed 20 years if polymeric materials are present and if there is no Poral-type device, as described in chapter 3 of safety analysis report, on the lids of the internal fitting.

j. For Content 11, the transport of irradiated uranium is prohibited.

k. For Content 11, the transport of uranium carbides and uranium nitrides is prohibited.

l. For Content 11, the mass of water and the equivalent mass of other hydrogenous materials must not exceed 2000 grams per package.

m. For Content 11, the maximum allowable fissile mass is 5 kg when transported by air.

6. Marking and Labeling - The package shall bear the marking USA/0492/B(U)F in addition to other required markings and labeling.

7. Expiration Date - This certificate expires on March 1, 2029. Previous editions which have not reached their expiration date may continue to be used.

This certificate is issued in accordance with paragraph(s) 810 and 816 of the IAEA Regulations and Section 173.472 and 173.473 of Title 49 of the Code of Federal Regulations, in response to the June 12, 2025 petition by TN Americas LLC, Columbia, MD, and in consideration of other information on file in this Office.

Certified By:

William Quade
Acting Associate Administrator for
Hazardous Materials Safety

August 14, 2025
(DATE)

Revision 23 - Issued to extend validation of French Certificate of Competent Authority F/313/B(U)F-96, Revision Mbs, restricted to contents 11 and 26, subject to special conditions listed in paragraph 5, and to update Condition J of this paragraph from Revision 22.

AUTORITÉ DE SÛRETÉ NUCLÉAIRE
Direction du transport et des sources

English translation of F/313/B(U)F

APPROVAL CERTIFICATE FOR A PACKAGE MODEL

The Competent French Authority,

Having regard to Article L. 595-1 of the Environmental Code;

Having regard to the application submitted by the Commissariat à l'énergie atomique et aux énergies alternatives (Atomic energy and alternative energy commission - CEA) by letter DSSN DIR 2023-0062 dated 13 March 2023;

Having regard to Safety Analysis Report CEA/DES/DDSD/DTEL/SGPE/DS07600 Rev. C of 17 January 2024;

Having regard to the results of the public consultation conducted from 6 November 2023 to 20 November 2023,

Hereby certifies that the package model comprising the **TN-BGC 1** packaging described below in Appendix 0 and loaded with:

- rods or sections of rods or pellets of uranium oxide, as described in Appendix 7;
- solid uranium-bearing materials, as described in Appendix 11;
- TRIGA fuel, as described in Appendix 26;
- an aqueous solution of uranyl nitrate, as described in Appendix 40;
- U_3Si_2Al fuel elements or plates, as described in Appendix 50;
- FSV fuel, as described in Appendix 52;

is compliant, as a **type B(U) design loaded with fissile materials**, with the requirements of the regulations and agreements listed below:

- International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material, Safety Standards Series No. SSR-6, 2018 edition;
- Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);
- Amended French Government Order of 29 May 2009 on the carriage of dangerous goods by overland routes (the "TMD" order);
- Technical Instructions for the Safe Transport of Dangerous Goods by Air of the International Civil Aviation Organization (known as "ICAO TI");
- Instruction of 26 June 2008 on technical rules and administrative procedures applicable to commercial transportation by aeroplane and amended Commission Regulation (EU) No 965/2012 of 5 October 2012.

However, only contents 11, 26, 40 and 52 are permitted to be transported by aeroplane.

This certificate does not exempt the consignor from the obligation to comply with the requirements laid down by the authorities of the countries through or to which the package will be transported.

This certificate may be appealed to the competent court within two months of its signature.

This certificate expires on 1 March 2029.

Registration number: **CODEP-DTS-2024-004059**

Enacted at Montrouge, 23 February 2024

On behalf of the President of the French Nuclear Safety Authority
and, by delegation,

The Director of the Transport and Sources Department,

Fabien FÉRON

SUMMARY OF ISSUANCES OF THE CERTIFICATE

Issue date	Expiry date	Type of issue	Certificate number		Appendices															
				body	t	0	7	8	9	10	11	18	19	20	23	26	40	50	52	53	60
01/03/19	01/03/24	Renewal	F/313/B(U)F-96	Lbj	-	✓	✓	-	-	-	✓	-	-	-	-	✓	✓	✓	✓	-	-
01/03/19	01/03/24	Renewal	F/313/B(M)F-96 T	Lbk	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	-	-	-
01/03/19	01/03/24	Renewal	F/313/B(U)-96	Lbl	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
23/04/21	01/03/24	Extension	F/313/B(U)F-96	Lbm	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
29/12/21	01/03/24	Extension	F/313/B(U)F-96	Lbn	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
29/12/21	01/03/24	Extension	F/313/B(U)F-96	Lbo	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
16/02/23	01/03/24	Renewal	F/313/B(U)F	Lbp	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
23/02/24	01/03/29	Renewal	F/313/B(M)FT	Mbq	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-
23/02/24	01/03/29	Renewal	F/313/B(U)	Mbr	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
23/02/24	01/03/29	Renewal	F/313/B(U)F	Mbs	-	✓	✓	-	-	-	✓	-	-	-	-	✓	✓	✓	✓	-	✓

APPENDIX 0

TN-BGC 1 PACKAGING

1. DESCRIPTION OF THE PACKAGING

The TN-BGC 1 packaging is designed, manufactured, inspected, tested, maintained and used in compliance with Safety Analysis Report CEA/DES/DDSD/DTEL/SGPE/DSEM07600 Rev. C of 17 January 2024.

The packaging, comprising a parallelepiped cage inside which a cylindrical body fitted with a closure system and a cover is attached, is presented in Figure 0.1.

The design drawings of the packaging are as follows:

- design drawing of the assembly : TN 9990-65 (C);
- cage : TN 9990-118 (B);
- assembled plug : TN 9990-117 (B);
- cover : EMB TNBGC PBC PDC CA 010001 A.

The main dimensions of the packaging are as follows:

- cage cross-section : 600 × 600 mm;
- overall height of the cage : 1,821 mm;
- body diameter in interrupted section : 295 mm;
- cover diameter : 466 mm;
- overall height of body fitted with cover : 1,808 mm.

The maximum permissible mass of the loaded packaging during transport is 396 kg; its unladen mass is 280 kg.

The packaging comprises the main sub-assemblies described below:

1.1 Cage

The cage is a 30 × 30 mm and 2-mm-thick tubular aluminium structure.

Pockets reinforced by support brackets are provided at two levels in the cage to allow the forks of a forklift truck to pass through.

The inside of the cage contains frames to connect the cage to the body of the packaging. They are welded to the vertical uprights of the cage and screw holes are drilled to attach the legs of the body.

1.2 Packaging body

The cavity, with a nominal usable internal diameter of 178 mm and a nominal usable length of 1,475 mm, comprises a stainless steel shell and a bottom also made of stainless steel.

A second stainless steel shell, together with the first shell, defines a resin-filled space that acts as a neutron absorber and heat insulator.

The bottom is reinforced, from the inside of the packaging towards the outside, with a high-yield strength steel distribution plate, a layer of resin, an intermediate bottom, a wooden shock absorbing disk and stainless steel sheet metal.

At the top, a machined stainless steel flange is welded to the two shells to accommodate the closure system described below.

1.3 Closure system

The packaging is closed using a system consisting of three main parts: a plug, a clamping ring and a bayonet ring. The plug is held against the body using the clamping ring. The clamping ring is screwed into the bayonet ring, which rests against the body's flange.

At the centre of the plug, a hole fitted with a quick-connect coupling allows the packaging to be depressurised before shipment and then returned to atmospheric pressure before unloading at the place of destination. This orifice is closed off with a cap.

The plug on the body and the quick-connect coupling cap are sealed using an internal O-ring gasket made of VHT silicone or Viton grade 67GXX15 and an external O-ring gasket made of Viton of any grade. The spaces between the gaskets both communicate with a common test orifice for checking the tightness of the closure system.

The internal gasket of the cap has an internal diameter of 31.34 mm +/- 0.3 mm and a cross-sectional diameter of 3.53 mm +/- 0.1 mm.

1.4 Shock absorbing system

A shock-absorbing cover is placed over the top of the body. It comprises two stainless steel sheet metal casings; the one closest to the body is filled with resin and the second one is filled with wood (balsa and poplar).

The cover is fixed to the body by means of two bent rods, which sit in lugs that are integral with the body, and two draw-latches, the ends of which are screwed to the cover and welded to the body of the packaging.

1.5 Handling and tie-down items

The packaging is handled and tied down via the cage.

The packaging is tied down in accordance with the instructions specified in Chapter 7 of the Safety Analysis Report.

It is prohibited to tie down a TN-BGC 1 packaging fitted with the option 1 cage in an upright position using 2 straps.

In the case of air transport, a wooden frame is placed on the upper part of the packages when they are stowed in the vertical position.

2. SAFETY FUNCTIONS

Containment is provided by the packaging containment comprising the inner shell, the bottom of the body and their circumferential welds, the plug and the quick-connect coupling cap.

Radiological protection is provided mainly by:

- the stainless steel lateral protective shielding of the inner and outer shells, which protects against gamma radiation, and by the resin, which protects against neutron radiation;
- the stainless steel bottom shielding of the bottom of the cavity and the two closure plates, as well as by the carbon steel of the distribution plate, which protect against gamma radiation, and by the resin and wood, which protect against neutron radiation;
- the stainless steel top shielding of the plug and the cover plates, which protect against gamma radiation, and by the resin and wood contained in the cover, which protect against neutron radiation.

Sub-criticality is maintained by the package isolation system described in the sub-criticality maintenance study section of the appendix to each content.

The **inner thermal power is dissipated** by:

- radiation between the radioactive materials and the inner shell of the body;
- conduction in the body;
- heat exchange between the body and the ambient air.

The shock-absorbing cover and the cage **protect against impacts**.

Fire protection is mainly provided by the body and the cover.

3. ACTIONS TO BE TAKEN BY THE SHIPPER PRIOR TO SHIPPING THE PACKAGE

The packaging is used in accordance with procedures that comply with the instructions for use in Chapter 7 of the Safety Analysis Report.

In addition, when leak-testing the closure system through the test orifice, the shipper shall ensure that the leak rate is less than $5x10^{-4}$ $Pa.m^3.s^{-1}$ SLR.

4. MAINTENANCE PROGRAMME

The packaging is maintained in accordance with procedures laid down in the instructions in Chapter 8 of the Safety Analysis Report.

5. NOTIFICATION

The ASN is notified of any packaging that is taken out of service or transferred to another owner at the following email address: dts-transport@asn.fr. For this purpose, any owner who transfers a packaging shall provide the name of the new owner.

6. QUALITY MANAGEMENT SYSTEM

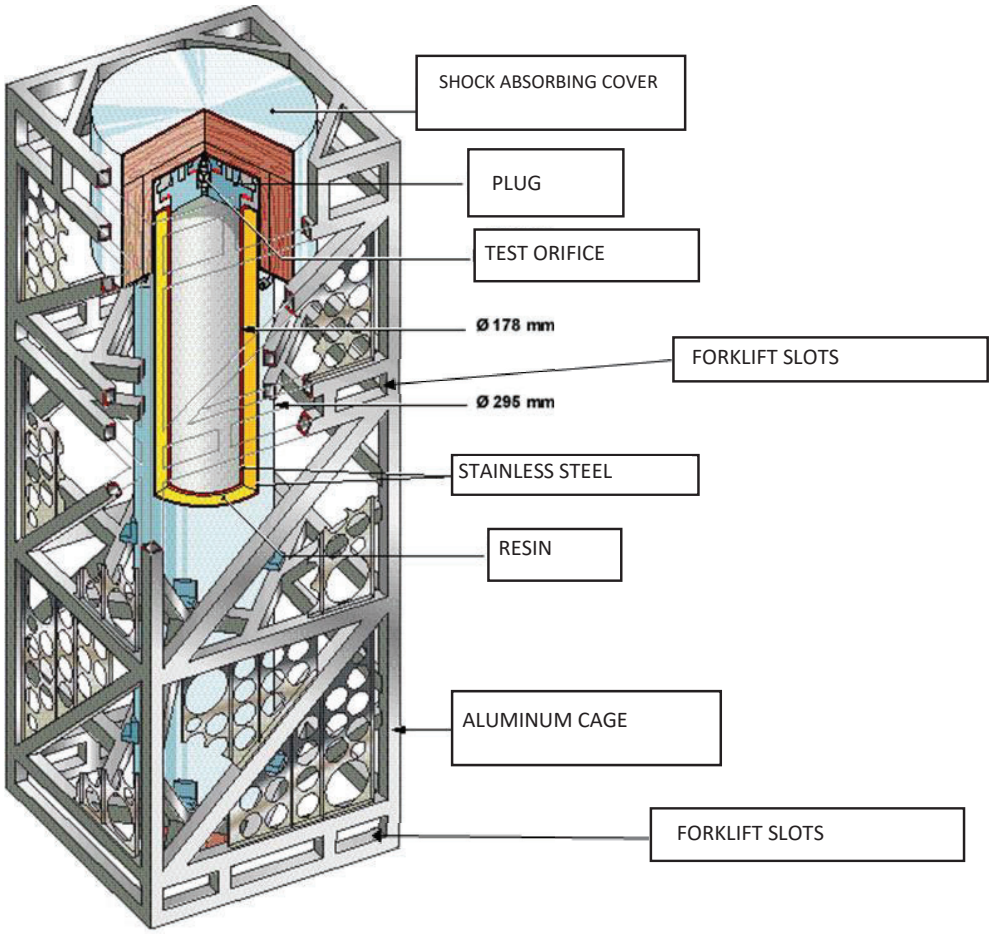
The quality management system principles applied during the design, manufacture, inspection, testing, maintenance and use of the package are consistent with those described in Chapter 9 of the Safety Analysis Report.

7. ADDITIONAL REQUIREMENT RELATING TO TRANSPORT IN A CONFINED ENVIRONMENT

A package shipped in a CB9-type overpack is transported under exclusive use.

FIGURE 0.1

PACKAGING DIAGRAM



APPENDIX 11

SOLID URANIUM-BEARING MATERIALS

The Safety Analysis Report justifying the authorised content bears the reference number CEA/DES/DDSD/DTEL/SGPE/DSEM07600 Rev. C, dated 17 January 2024.

1. DESCRIPTION OF AUTHORISED CONTENT

The authorised radioactive content described in Chapter 3 of the Safety Analysis Report comprises non-irradiated uranium-bearing material in solid form.

The material is exclusively in one of the following chemical forms (or in the form of a mixture of these forms):

- uranium metal,
- uranium oxides: UO_2, UO_3, U_3O_8;
- uranium fluorides: UO_2F_2, UF_4;
- uranium nitrides: UN, U_2N_3, UN_2;
- uranium carbides: UC, UC_2 and U_2C_3;
- uranium alloys containing aluminium, molybdenum, silicon, zirconium.

The presence of hydrides is not permitted.

If the uranium is produced by the reprocessing of irradiated fuels, the material shall not have undergone irradiation subsequent to its reprocessing.

The presence of neutron absorbers (boron, gadolinium, erbium, europium, dysprosium, hafnium and cadmium) is authorised in any quantities.

The presence of transuranic elements up to a maximum of one gramme is permitted.

1.1. Masses and isotopic composition

1.1.1. Air transport

For transport by air, the maximum mass of uranium 235 transported in a TN-BGC 1 package as a function of the mass of water and polymeric materials present in the package is set out in the following table:

Maximum authorised mass of ^{235}U (kg)	Maximum authorised mass of water and polymeric materials (g)
7.7	0
5.4	500
3.2	1,000

1.1.2. Overland transport

For all overland transport, the maximum authorised masses as a function of the isotopic composition of the uranium are set out below.

The mixing of different sub-contents within the same package is prohibited.

a) Any level of uranium enrichment

Sub-content No.	Authorised presence of materials with a higher hydrogen content than water	Maximum mass of ^{235}U (kg)
11a	Yes	2 (*)
11b	No	8.5 (**)

(*) If there is aluminium, zirconium or thorium in any quantities, or if it is not possible to guarantee a single isotopic composition (+/-1%) of uranium per package, the mass of ^{235}U is limited to 1.6 kg.

(**) If it is not possible to guarantee a single isotopic composition (+/- 1%) of the uranium per package, the mass limit applies to all uranium isotopes (not just uranium 235).

b) Uranium enrichment in uranium 235 is less than or equal to 20%

Sub-content No.	Authorised presence of materials with a higher hydrogen content than water	Maximum mass of U (kg)
11c	Yes	40
11d	No	40

1.2. Special provisions for the transport of metal powders

If metal powders are transported, the powder packaging boxes, the internal fitting used and the TN-BGC 1 cavity are inerted.

2. INTERNAL FITTINGS AND PACKAGING

The material may be placed in a primary packaging consisting of metal cans, flasks or polymer wrappings. The whole packaging is placed in a stainless steel internal fitting with silicone gaskets.

If the mass of the content is greater than or equal to 30 kg, the content is wedged inside its internal fitting.

The authorised polymeric materials are polyethylene, polyurethane, polyvinyl chloride and tetra-fluoroethylene.

For overland transport, the presence of polyethylene:

- is not authorised for sub-contents 11b and 11d,
- is authorised up to a maximum of 1,000 g in sub-contents 11a and 11c.

For transport by air, the presence of polyethylene is not authorised, regardless of the sub-content.

The internal fittings that can be used are TN90, AA41, AA203, AA203c or AA204.

The spacers used to position the internal fitting in the packaging cavity depend on the internal fitting used as per the table below:

Internal fitting	Spacers
TN90	E1 + E2
1 AA41	E1 + E11
2 AA41	E1 + E12 + E13
3 AA41	E1 + E9 + 2E13
AA203 – AA203c	E1 + E8
AA204	E1+ E10 or E6

The total mass of the entire consignment of internal fittings (material + primary packaging) does not exceed 60 kg.

3. DURATION OF TRANSPORT

If polymeric materials are present:

- and if there is no Poral-type device described in Chapter 3 of the Safety Analysis Report on the lids of the internal fitting, a minimum free volume of 2 litres in the cavity of the internal fitting is required and the storage time of the closed internal fitting does not exceed 20 years;
- transport operations are planned and carried out so that the time between closing the packaging at the dispatching facility and opening it at the destination facility does not exceed one year.

4. SUB-CRITICALITY MAINTENANCE STUDY

The sub-criticality maintenance study is covered in Chapter 15 of Safety Analysis Report CEA/DES/DDSD/DTEL/SGPE/DSEM07600 Rev. C of 17 January 2024.

For transport other than air transport, the isolation system used to guarantee that the sub-criticality of the package is maintained comprises:

- the packaging: its geometry, its materials, the composition and thickness of the neutron-absorbing borated resin,
- the maximum internal diameter and the minimum thickness of the walls of the internal fittings,
- the wedging system that defines the radial position occupied by the fissile material,
- the packaging cage that maintains the array spacing in the 5N package configuration under NTC (contents 11a and 11c),
- the fissile material: limitation of the mass (contents 11a and 11b) and the isotopic composition of the fissile medium (contents 11c and 11d),
- the absence of hydrogenated materials with a hydrogen concentration greater than that of water (contents 11b and 11d).

For air transport, the isolation system used to guarantee that the sub-criticality of the package is maintained comprises:

- the packaging: maximum mass of steel, maximum mass of water and maximum mass of carbon,
- limitation of the mass of fissile material,
- the absence of hydrogenated materials with a hydrogen concentration greater than that of water,
- the presence of a limited amount of hydrogenated materials with a hydrogen concentration less than or equal to that of water.

Criticality Safety Index (CSI):

Content	CSI	N
11a	5	10
11b	0	Infinite
11c	5	10
11d	0	Infinite

APPENDIX 26

TRIGA FUEL

The Safety Analysis Report justifying the authorised content bears the reference number CEA/DES/DDSD/DTEL/SGPE/DSEM07600 Rev. C, dated 17 January 2024.

1. DESCRIPTION OF AUTHORISED CONTENT

The authorised content described in Chapter 3 of the Safety Analysis Report comprises cylindrical, stainless steel-clad bars of non-irradiated TRIGA fuel elements from the F1, F2, F3, F4, Marvel or Miscellaneous categories, which may have been assembled into a fuel element.

The use of boron carbide bars is authorised.

The fuel elements may be instrumented (with a thermocouple protected by a PVC sheath).

The maximum uranium 235 enrichment is 20%.

The uranium does not come from reprocessing.

Characteristics of the bar categories

Name of the bar category	Characteristics		
	U content (u) (%)	ZrHn content (%)	Maximum density of U-Zr (g/cm^3)
F1	≤ 8.5	≥ 91.5	6.9
F2	8.6 < u < 12.5	87.5 < u < 91.4	7.1
F3	12.6 < u < 31	69 < u < 87.4	8.2
F4	8.5 < u < 47	53 < u < 91.5	9.4
Marvel	≤ 30	≥ 70	7.14
Miscellaneous	≤ 47	≥ 53	9.4
Note: impurities or alloy elements excluding Zr, U and H are not taken into account			

Maximum transportable quantities

The maximum transportable quantities are specified by mode of transport in the tables below.

For transport by air, the maximum mass of uranium transported in a TN-BGC 1 package is set out in the table below for each bar category:

Air transport	
Name of the bar category	**Maximum mass of U (kg)**
F1	2.2
F2	2.25
F3	2.2
F4	1.45
Marvel	2.05
Miscellaneous	1.45

For overland transport, the maximum mass of uranium transported in a TN-BGC 1 package is set out in the table below for each bar category:

Overland transport	
Name of the bar category	**Maximum mass of U (kg)**
F1	Any
F2	
F3	9.2
F4	2.65
Marvel	Any
Miscellaneous	2.65

2. INTERNAL FITTINGS AND PACKAGING

The bars may be placed in cardboard, polyvinyl chloride or polyurethane protective cases and then placed in a stainless steel internal fitting equipped with silicone gaskets.

The bars may be placed in cardboard, polyvinyl chloride or polyurethane primary containers and then placed in an internal fitting equipped with silicone gaskets.

In the case of air transport, the mass of the primary containers shall not exceed:

- 1,200 g for the elements in categories F1 to F3 and Marvel,
- 2,000 g for the elements in categories F4 and Miscellaneous.

If the mass of the content is greater than or equal to 30 kg, the content is wedged inside its internal fitting.

The internal fittings that can be used are TN90, AA203, AA203c or AA204.

The spacers used to position the internal fitting in the packaging cavity depend on the internal fitting used as per the table below:

Internal fitting	Spacers
TN90	E1 + E2
AA203 – AA203c	E1 + E8
AA204	E1+ E10 or E6

The total mass of the entire consignment of internal fittings does not exceed 60 kg.

3. DURATION OF TRANSPORT

If polymeric materials are present, transport operations are planned and carried out so that the time between closing the packaging at the dispatching facility and opening it at the destination facility does not exceed one year.

4. SUB-CRITICALITY MAINTENANCE STUDY

The sub-criticality maintenance study is covered in Chapter 15 of Safety Analysis Report CEA/DES/DDSD/DTEL/SGPE/DSEM07600 Rev. C of 17 January 2024.

For transport other than air transport, the isolation system used to guarantee that the sub-criticality of the package is maintained comprises:

- the packaging: its geometry, its materials, the composition and thickness of the neutron-absorbing borated resin,
- the maximum internal diameter and the minimum thickness of the walls of the internal fittings,
- the wedging system that defines the radial position occupied by the fissile material,
- the fissile material: limitation of the mass, the physical and chemical nature and the isotopic composition of the fissile medium,
- the absence of hydrogenated materials with a hydrogen concentration greater than that of water.

For air transport, the isolation system used to guarantee that the sub-criticality of the package is maintained comprises:

- the packaging: maximum mass of steel, maximum mass of water and maximum mass of carbon,
- the fissile material: limitation of the mass, the physical and chemical nature and the isotopic composition of the fissile medium,
- the absence of hydrogenated materials with a hydrogen concentration greater than that of water,
- the presence of a limited amount of hydrogenated materials with a hydrogen concentration less than or equal to that of water.

Criticality Safety Index (CSI):

CSI = 0 (with infinite N)

U.S. Department of
Transportation

**Pipeline and
Hazardous Materials
Safety Administration**

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

CERTIFICATE NUMBER: USA/0492/B(U)F-96

ORIGINAL REGISTRANT(S):

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Areva - TN International
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