

LEUPA

Type B(U) Package to Contain Fissile Substances

TRANSPORT MANUAL

Made by

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1 PURPOSE

1. To establish the road transport procedure for Type B(U) RA/0103/B(U)F-96 package containing fissile substances LEUPA along public roads of the National territory.

2 DESCRIPTION

1. The person responsible for the compliance of transport procedures is the “**Transport Manager**”. The latter should verify and approve the vehicle and be held responsible for the compliance with everything that is established in this document.
2. Transport vehicle should be identified according with Argentine Standard AR 10.16.1. Rev. 2, which adopts all the criteria established in document “Rules for Safe Transport of Radioactive Material”. Requirements: Collection of Safety Standards N° TS-G-1.1 of IAEA (2009). Rules of Dangerous Materials Transport of the Public Services and Work Ministry (Resolutions Transport Secretariat 233/86, 720/87 and Annex 4/89).
3. Under no circumstances can the transporter modify identifications.

3 DISPATCH OF TRANSPORT

1. If transport is exclusive, this condition must be kept throughout transport.
2. Exclusive use is the use of only one sender or of one container (6 m length minimum) to which all initial, intermediate and final operations of loading and unloading will be made, following instructions of sender or addressee.
3. The transport vehicle must remain at the loading section until its dispatch by the Transport Manager.
4. With the Program Micro Shield, calculations of doses should be made, with a maximum dose rate at 1 m of 0.3 μ Sv/h, that is to say 0.0003 mSv/h.
5. According with paragraph 521 of Standard AR 10.16.1 Rev. 2, the TI should be of TI=0. This index should be verified with radiometer prior to transport.

4 TRANSPORT

1. The transportation should only take place during daylight.
2. Transport at night is not allowed.
3. Traffic Law N° 24.449 – Article 51 should be complied with, especially, item b), point 4 – “For the transport of Dangerous Substances: 70 km/h”.
4. Besides what has been mentioned above (Point 3), the following speed limit must be respected:

Table 1: Speed Limits

Place	Speed
Inside facilities	5 km/h
Streets in urban areas	20 km/h

5. These speeds should be respected in case of normal traffic and roads, otherwise special speed limits should be complied with.
6. Avoid driving in adverse weather conditions.

5 CONDITIONS OF TRANSPORT AND SUPPORT VEHICLES

1. Transport vehicle should comply with the following conditions:
 - a. Have Technical Inspection Certificate, in force, to transport dangerous substances.
 - b. Running gear: Tires in use and spare ones should not have any sign of wearing higher than 20%, measured by the depth of drawing, without retread to reach thickness. The number of spare wheels should not be less than two (2).
 - c. To have all necessary equipment to change tires (hydraulic or mechanical jack, wedges, etc.) in perfect condition.
 - d. The package/s should be fixed to the floor of the transport and should be conveniently tied to avoid sliding and bumps that may damage it/them (see Specification 0908-LE01-3BEIN-025).
 - e. They must have emergency flashers to show “stopped vehicle” to third parties, they have to be clearly seen at daylight and at night.
 - f. In the case of a night emergency flash, it must have enough batteries for 12 hours of uninterrupted lightening.
 - g. To have fire extinguishers in force. Two type ABC (two of 5 kg) must be taken in case of fire.
 - h. Brake system: the vehicle must reach complete stop as from a speed of 80 km/h over straight and dry pavement in not more than eighty (80) meters.
 - i. Other systems: All systems must be in perfect state: windscreen wipers, lights, heating, towing slings, etc.
2. The vehicle must have a first-aid kit containing:
 - a. 0.07 m x 4.40 m bandages (for cutting wounds).
 - b. 0.10 m x 2 m elastic bandages (for fractures).
 - c. Hard board (for fractures) 0.60 m x 0.07 m.
 - d. Disinfectant (H₂O₂, merthiolate) of 25 ml.
 - e. Cicatul Dressing (for burnings).
 - f. Aspirins.
 - g. Adhesive tape.
 - h. Activated carbon (universal antitoxic).

6 CLAMPING METHOD

1. See last version of document 0908-LE00-3BEIN-017.

7 STAFF

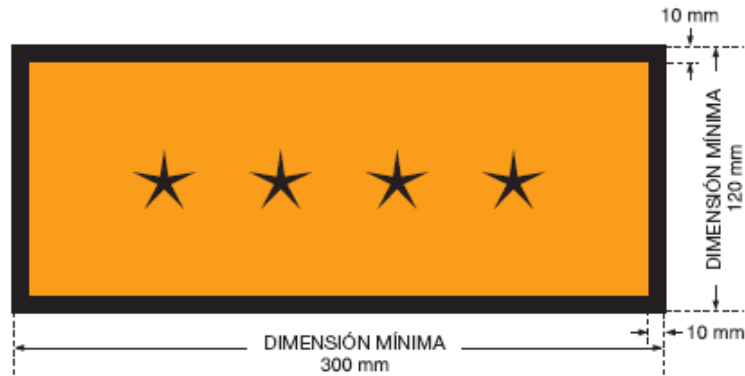
1. Two certified drivers must be present at least an hour before starting journey.
2. Drivers must have rested before the start of transport operations.
3. Alcoholic beverages are strictly forbidden as from six (6) hours before driving, and during journey.
4. Both, the driver and the co-driver must have certified driving license for the transport of Dangerous Materials.
5. The use of stimulants (amphetamine, benzedrine, etc.) and/or sedatives is strictly forbidden twenty four (24) hours prior to driving, and during journey.

- Those persons under treatment due to heart disease or having antihistamine cannot form part of the staff.

8 VEHICLE IDENTIFICATION

- The transporting vehicle must be identified on its sides, at the back and at the front with the Number of United Nations (see Picture 1:).

Picture 1: United Nations Identification



- The stars mark where the number of United Nations, in black, must be placed (in this case 3328).
- The back ground colour is orange and borders are black.
- The label of radioactive risk must also be placed as in Picture 2:.

Picture 2: Radioactive Risk Label



9 TRANSPORT OF EMPTY PACKAGE

1. When transporting empty packages, they are taken as Exempted Package.
2. The level of radiation must not exceed $5 \mu\text{Sv/h}$ at any point, following regulations of paragraph 515 of Standard AR 10.16.1 Rev.2.
3. The empty package must have the following marks in their outside:
 - a. Identification of sender and addressee.
 - b. Number of United Nations, after the acronym UN(in this case UN2908).
4. The empty package must not have any label of radioactive symbol, in case there were any, they must be removed or covered.

10 STOPPING OF VEHICLES

1. There are stopping periods for the staff and for possible problems (change of tires, filling in gasoline, etc.)
2. Special care must be taken not to park vehicle in places that may increase its potential risk. Therefore, it cannot be parked next to vehicles transporting gasoline or dangerous substances that may affect the transported equipment. The minimum distance with a risky vehicle must be of a hundred (100) meters.
3. The staff must always be at a distance where the vehicle be on sight.
4. In a matter of force case stop (e.g. changing tires), a safe place must be looked for before stop and verify the state of side roads.

11 ROAD ACCIDENTS

11.1 Cordon-off

1. In case the vehicle overturns or loaded packages fall off, vehicles must have at least six (6) flashing hazard cones and not less than eight (8) brackets with a base of at least one (1) meter to place a rope or elastic chain which withholds the proximity of non-authorized persons.

2. The fencing, in case of partial or total loss of sealing, is set at such a distance that the exposure rate does not go over 2.5 $\mu\text{Sv/h}$.
3. In case the fallen package were on the road, flashing hazards and cones and any other support vehicle must be set across the road to avoid the crashing of other vehicles into the package/s.

12 PHYSICAL SECURITY

1. The Basic Standard of Physical Protection of Nuclear Materials and Facilities, Standard AR 10.13.1Rev. 1 must be applied. There, the levels of surveillance and communication with response force are established.
2. What is implemented in each transport must be communicated to ARN.

13 SENDER'S OBLIGATIONS

1. The sender must comply, in each dispatch, with the "Details of Dispatch" form, together with the report form of Annex A.

Picture 1: Consignments Details

CONSIGNMENTS DETAILS		
Correct name of Dispatch:	(AR 10.16.1 Rev. 2 – Table 1)	
“7”		
Sender: (Name and Address)		
Addressee: (Name and Address)		
UN	Number of United Nations allocated to Material (AR 10.16.1 Rev. 2 – Table 1)	
Name or Symbol of Transported Radionuclides:	URANIUM 235 (%)	
Physical and Chemical Description:		
Total Mass in grams (Fissile Substance)	grams	Fuel Elements/Plates (Quantity of Plate Carriers)
Category of Package	I – WHITE	
	II – YELLOW	
	III – YELLOW	
Transport Index (ΣTI):		
Index of Safety as regards Criticality (ΣSCI):		
Applicable Identification Mark from Competent Authority: B(U)F – RA/0103/B(U)F-96 Package Others:		
Dispatch on exclusive use mode	YES	NO
<p>“I hereby state that the content of this consignment is wholly and fully described above under the correct name dispatch; and that it has been classified, packed, marked and labelled, and it is by all means in appropriate conditions for its transport, in accordance with international and national regulations in force”.</p>		
Signature	Print Full Name	Date

14 DOCUMENTATION

1. The staff must have the following documentation prior to departure with loaded packages:
 - a. This transport methodology.
 - b. Instructions in case of emergencies (Form 127 ARN Annex B).
 - c. The convention of release of superficial contamination.
 - d. Details of consignment.
 - e. Receipt of transfer of material securely kept.
 - f. The packing slip of the material to be transported.
 - g. Certified license for the transport of dangerous substances and documents of vehicle, with its corresponding certificate to transport dangerous substances.

15 INFORMATION GIVEN TO TRANSPORTERS

1. The sender should give the transporter the following documentation:
 - a. Adequate measures to be followed in emergency cases (see Annex B, "Intervention Form N° 127" ARN).
 - b. Supplementary practical requirements related to loading-unloading and handling of package (see "Operation Manual of LEUPA Package" 0908-LE00-3BEIN-017).
 - c. Packing slip of material to be transported.
 - d. Details of consignment.

16 NOTICE TO COMPETENT AUTHORITIES

1. Paragraphs 554, 555, 556, 557 and 558 of the Standard of "Transport of Radioactive Materials" AR 10.16.1 Rev. 2 should be complied with; the latter adopts all criteria established in the document "Regulations for the Safe Transport of Radioactive Material", Collection of Safety Standards N° TS-G-1.1 (ST-2) of OIEA, Edition 2008.

17 ANNEX A

FAX	F-TMR-09 Rev. 2
For: NUCLEAR REGULATORY AUTHORITY (ARN)	
Radiological Safety, Security and Safeguards Manager	
Telephone Numbers: (011) 6323-1722/1708	Fax: (011) 6323-1771/1798

NOTICE OF TRANSPORT OF RADIOACTIVE MATERIAL

Sender: _____ Addressee: _____

Origin of Dispatch: _____

Destination of Dispatch: _____ Final Destination*: _____

Company / Person Responsible for transport: _____

Radioactive Material/s to be Transported: _____

Physical and /or Chemical Form(s): _____

Activity and/ or Mass of each Radionuclide: _____

Fissile Substance: YES NO Radioactive Material in Special Form: YES NO

Certificate(s) and Model(s) of Sealed Source(s):

Quantity of Packages of Dispatch (N°) and Sum of Transport Indexes (TI) plus Safety Index of Criticality (SIC) for Type of Package:

TYPE OF PACKAGE	N°	TI	TYPE OF PACKAGE	N°	TI	TYPE OF PACKAGE	N°	TI	SIC
EXCEMPTED			TYPE A			TYPE AF			
TYPE B(U)			TYPE B(M)			TYPE B(U)F			
INDUSTRIAL TYPE 1			INDUSTRIAL TYPE 2			TYPE B(M)F			
INDUSTRIAL TYPE 3			TYPE C			INDUSTRIAL TYPE IF			
TRANSPORT SPECIAL ARRANGEMENT			SIC:			TYPE CF			

Certificate(s) and Model(s) of Package(s):

Number(s) of Series:

Overpack: Quantity: TI: SIC:

Package: Quantity: TI: SIC:

Road:

Quantity of Vehicles to be Used:

Transport: Escort for Radioactive Protection:

Starting date of transport: / / Time estimation: .

Date of arrival at destination: / / Time estimation: .

In the name of the Sender: Contact Telephone:

Name and Last name: Post:

Signature

18 ANNEX B

INTERVENTION FORM NO 127	
CLASS 7 RADIOACTIVE MATERIALS	
2908	RADIOACTIVE MATERIALS, EXCEPTED PACKAGES –EMPTY PACKAGING
2909	RADIOACTIVE MATERIALS, EXCEPTED PACKAGES – ARTICLES MANUFACTURED OF NATURAL URANIUM, DEPLETED URANIUM or NATURAL TORIUM
2910	RADIOACTIVE MATERIALS, EXCEPTED PACKAGES – LIMITED QUANTITY OF MATERIALS
2911	RADIOACTIVE MATERIALS, EXCEPTED PACKAGES – INSTRUMENTS or ARTICLES
2912	RADIOACTIVE MATERIALS, LOW SPECIFIC ACTIVITY (LSAE-I) non-fissile or fissile excepted
3321	RADIOACTIVE MATERIALS, LOW SPECIFIC ACTIVITY (LSAE-II) non-fissile or fissile excepted
3322	RADIOACTIVE MATERIALS, LOW SPECIFIC ACTIVITY (LSAE -III) non-fissile or fissile excepted
3324	RADIOACTIVE MATERIALS, LOW SPECIFIC ACTIVITY (LSAE -II), FISSILE
3325	RADIOACTIVE MATERIALS, LOW SPECIFIC ACTIVITY (LSAE -III), FISSILE
2913	RADIOACTIVE MATERIALS, SURFACE CONTAMINATED OBJECTS (SCO-I orSCO-II) non-fissile or fissile excepted
3326	RADIOACTIVE MATERIALS, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II) FISSILE
2915	RADIOACTIVE MATERIALS, TYPE A PACKAGE, not in special form, non-fissile or fissile excepted
3327	RADIOACTIVE MATERIALS, TYPE A PACKAGE,FISSILE, no special form
3332	RADIOACTIVE MATERIALS, TYPE A PACKAGE, SPECIAL FORM, non-fissile or fissile excepted
3333	RADIOACTIVE MATERIALS, TYPE A PACKAGE, SPECIAL FORM, FISSILE
2916	RADIOACTIVE MATERIALS, TYPE B(U) PACKAGE, non-fissile or fissile excepted
3328	RADIOACTIVE MATERIALS, TYPE B(U) PACKAGE , FISSILE
2917	RADIOACTIVE MATERIALS, TYPE B(M) PACKAGE, non-fissile or fissile excepted
3329	RADIOACTIVE MATERIALS, TYPE B(M) PACKAGE , FISSILE
3323	RADIOACTIVE MATERIALS, TYPE C PACKAGE, non-fissile or fissile excepted
3330	RADIOACTIVE MATERIALS, TYPE C PACKAGE , FISSILE
2919	RADIOACTIVE MATERIALS, TRANSPORTED DUE TO SPECIAL AGREEMENTS, non-fissile or fissile excepted
3331	RADIOACTIVE MATERIALS, TRANSPORTED DUE TO SPECIAL AGREEMENTS, FISSILE
SOME CAN BE OXIDICING OR CORROSIVE SOME CAN JOIN IN EXPLOSIVE MIXTURES	

1. DANGEROUS CHARACTERISTICS

- a. Some can produce combustion or ignite inflammable materials (wood, paper, oil, clothes, etc.).
- b. Some vapors can produce explosive mixtures in contact with air.
- c. Some containers can explode when heated.
- d. Thorium nitrate and uranyl nitrate can ignite fuel and can explode when mixed with fuel.
- e. The radiological risk will vary in a very wide range depending on type, quantity and physical and chemical forms of the radioactive materials.
- f. There can be an important external irradiation when there is not enough shielding of the radioactive material.
- g. There can be contamination or internal irradiation due to inhaling, intake or absorption through the skin when gases or particles in the air are inhaled, or by contact with radioactive material.
- h. In some cases, a prolonged exposure can cause severe damages or death.
- i. A fire can produce irritating, toxic or corrosive gases.
- j. A spilling of radioactive material can produce contamination in the environment and in objects.

2. INSTRUCTIONS FOR EMERGENCY CASES

2.1 GENERAL RECOMMENDATIONS

- a. Isolate risk area.
- b. Do not touch packages or transport vehicles, and prevent other people from doing so.
- c. Do not smoke, drink, eat or touch anything without having previously washed hands carefully.
- d. Do not stay unnecessarily at the immediate site of incident, accident, spilling or leakage.
- e. Report to rescue personnel that persons, transport vehicles, the nearby area to the incident, accident, spilling or leakage can be contaminated with Radioactive Materials.
- f. In case of spilling or leakage, and/or fire, use special emergency equipment: body protection clothes, and positive pressure respiratory protection equipment.
- g. Do not clean the place until the arrival of specialized personnel.
- h. Do not continue with transport until specialized personnel indicate it.

2.2 INCIDENTS/ACCIDENTS: CASE OF CRASH WITHOUT FIRE

- a. If necessary practice first aids to injured persons.
- b. Try to keep people away from the crashed vehicles, if possible, upwind and at a distance of not less than 50 m away from said vehicles.
- c. Notify the police, if necessary asking for an ambulance or fire fighters. Tell the police that vehicles contain radioactive material.
- d. Try to visually establish the state of packages and if there is leakage or spilling or important damages. If there is detection equipment, try to evaluate the loss of radioactive material or the shielding capacity of package.
- e. Notify the **Nuclear Regulatory Authority (ARN)**, Avenida del Libertador 8250 – (C1429BNP) Ciudad Autónoma de Buenos Aires.
 - i. Communicate 24 hours a day to the “**Intervention Systems in Radiological Emergencies**” telephone SKYTEL (011) **4597-9000**.
 - ii. Leave a message to the **PIN code 1110886**.

iii. Text of message: “**ATTENTION ARN, COMMUNICATE TO TELEPHONE**(complete number, stating the name of the person calling and the organization, and the place on the road)”.

iv. *If no answer is received in 10 minutes, repeat what is stated in i, ii and iii.*

f. Notify the nearest office of the transport Company.

2.3 INCIDENTS / ACCIDENTS: IN CASE OF FIRE OR CRASH AND FIRE

a. First aids to injured persons if necessary. Try to keep people away from the crashed vehicles, upwind, if possible, and at a distance not less than 50 m away.

b. Notify the police, if necessary asking for an ambulance or firefighters. Tell the police that vehicles contain radioactive material.

c. **FIRES**

Small fires can be extinguished with dry chemical products (CO₂, carbon anhydride).

Big fires can be extinguished with water, potassium powder, foam or any appropriate extinguisher for that type of fire on the area surrounding packages or containers. This kind of fires should be controlled by firefighters, who are trained and qualified for these situations.

Do not move damaged packages or containers.

If there is no risk, move the packages or containers away from the fire.

In both cases, fire should be extinguished upwind from the maximum possible distance and should be treated as cases which involve toxic smoke.

Cool the packages or containers with a great amount of water, for a long time after fire has been extinguished.

d. Try to visually establish the state of packages and if there is leakage or spilling or important damages. If there is detection equipment, try to evaluate the loss of radioactive material or the shielding capacity of package.

e. Notify the **Nuclear Regulatory Authority (ARN)**, Avenida del Libertador 8250 – (C1429BNP) Ciudad Autónoma de Buenos Aires.

i. Communicate 24 hours a day to the “**Intervention Systems in Radiological Emergencies**” telephone SKYTEL (011) **4597-9000**.

ii. Leave a message to the **PIN code 1110886**.

iii. Text of message: “**ATTENTION ARN, COMMUNICATE TO TELEPHONE** (complete number, stating the name of the person calling and the organization, and the place on the road)”.

iv. *If no answer is received in 10 minutes, repeat what is stated in i, ii and iii.*

f. Notify the nearest office of the transport Company.

2.4 SPILLING OR LEAKAGE OF RADIOACTIVE MATERIAL FROM PACKAGES

a. Try to keep people away from the vehicles or the area where the spilling or leakage of radioactive material occurred, if possible, upwind and at a distance of not less than 50 m away from said vehicles.

b. Eliminate possible sources of ignition.

c. Avoid contact of leakage material with inflammable objects (Wood, paper, oil, etc.).

d. Contain the leakage material, avoiding its entrance in water pipes, sewages, basements or confined areas.

e. Notify the police. Tell the police that vehicles contain radioactive material.

f. Notify the **Nuclear Regulatory Authority (ARN)**, Avenida del Libertador 8250 – (C1429BNP) Ciudad Autónoma de Buenos Aires.

- i. Communicate 24 hours a day to the “**Intervention Systems in Radiological Emergencies**” telephone SKYTEL (011) **4597-9000**.
 - ii. Leave a message to the **PIN code 1110886**.
 - iii. Text of message: “**ATTENTION ARN, COMMUNICATE TO TELEPHONE** (complete number, stating the name of the person calling and the organization, and the place on the road)”.
 - iv. *If no answer is received in 10 minutes, repeat what is stated in i, ii and iii.*
- g. Notify the nearest office of the transport Company.

2.5 LOSS, ROBBERY STEALING OF RADIOACTIVE MATERIAL

- a. Notify the police. Tell them what was lost or stolen contains radioactive material.
- b. Notify the **Nuclear Regulatory Authority (ARN)**, Avenida del Libertador 8250 – (C1429BNP) Ciudad Autónoma de Buenos Aires.
 - i. Communicate 24 hours a day to the “**Intervention Systems in Radiological Emergencies**” telephone SKYTEL (011) **4597-9000**.
 - ii. Leave a message to the **PIN code 1110886**.
 - iii. Text of message: “**ATTENTION ARN, COMMUNICATE TO TELEPHONE** (complete number, stating the name of the person calling and the organization, and the place on the road)”.
 - iv. *If no answer is received in 10 minutes, repeat what is stated in i, ii and iii.*
- c. Notify the nearest office of the transport Company.

2.6 FIRST AIDS

- a. Take the victim to fresh air.
- b. Take off clothes and shoes and isolate them, in case they are contaminated.
- c. In case of contact with the material, immediately wash eyes with water for at least 15 minutes.
- d. Have a shower and clean with water and soap.
- e. Go to medical attention as soon as possible.
- f. Make sure physicians attending injured persons know about the products involved in said incident, accident, spilling or leakage.