

**LEUPA**

**Type B(U) Package for Fissile Materials**

# **RADIATION PROTECTION PROGRAM**

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## **1 PURPOSE**

1. The purpose of this document is to establish a radiation protection program for the operation of LEUPA package for the transport of low enriched uranium, non-irradiated.

## **2 SCOPE**

1. This document applies to all operations performed with the loaded package.

## **3 REFERENCE**

- [1] ARN. *Transport of Radioactive Material*. Standard AR 10.16.1. Rev. 2. Argentina: ARN (Nuclear Regulatory Authority), 2011.
- [2] 0908-LE00-3BSIN-023 "LEUPA Safety Report" ("Informe de Seguridad LEUPA").
- [3] 0908-LE00-EDSIN-019 "Quality Management Program for the LEUPA Project" ("Programa para la Gestión de Calidad del Proyecto LEUPA").

## **4 DEVELOPMENT**

### **4.1 Introduction**

1. The LEUPA package is designed to transport non-irradiated low enriched uranium in granulated metal form or the most common compounds for the manufacture of fuel elements  $U_3O_8$ ,  $UO_2$ ,  $U_xAl_y$ ,  $U_3Si_2$ , UN. It is classified as a type B(U) package.
2. Non-irradiated low enriched uranium is not a radioactive source producing external irradiation doses. Likewise, the physical form of the material to be transported in the LEUPA is not associated to incorporation risk.
3. Pursuant to the Standard for the Transport of Radioactive Materials, AR.10.16.1, the A1 and A2 levels for low-enriched uranium (20% or less) are "unlimited".

### **4.2 Doses affecting the Operator and the Public**

1. Uranium is mainly an alpha emitter. It also decays by issuing low energy gamma radiation (soft). Uranium does not pose a radiological risk due to external exposure. The effective occupational dose will be below 1 mSv/year, and therefore it will not be necessary to implement an individual or workplace radiation monitoring system (Paragraph 303, AR 10.16.1).
2. No dose affecting the public will be generated as a result of the operation of the LEUPA package, and therefore it is not necessary to set any related actions.

### **4.3 Emergency**

1. Even in the event of an emergency, the contents of the LEUPA package do not pose a risk for the public or those performing mitigation maneuvers. The package will be qualified for the transport conditions, including potential accident scenarios set forth in standard AR 10.16.1 - Rev. 2. An emergency plan will be drafted in accordance with paragraph 304 of the Standard AR 10.16.1 – Rev. 2 in accordance with the risk of this package.
2. The uranium compounds to be transported in the LEUPA package will not form hazardous compounds upon contact with the environment.

#### **4.4 Duties and Responsibilities**

1. Pursuant to Standard AR 10.16.1, the person or organization in charge of activities related to the use of the LEUPA package shall implement this Radiation Protection Program.

#### **4.5 Training**

1. As established by Standard AR 10.16.1, workers shall receive appropriate training concerning radiation protection, including the necessary precautions that must be observed to limit their occupational exposure and exposure of other people that may be affected by these activities.
2. Individuals involved in the transport of radioactive materials shall receive training as required by their duties.
3. Individuals classifying radioactive materials, packaging radioactive materials, marking and labeling radioactive materials, preparing transport documents for radioactive materials, offering or accepting radioactive materials for transport, carrying radioactive materials or manipulating them during transport, transport vehicles, packaging for bulk or containers, or otherwise directly involved in the transport of radioactive materials as determined by the competent authority, shall receive the following training:
  - a. General training/introduction to the LEUPA package.
  - b. Training on specific functions: Each individual shall receive detailed training concerning the specific requirements for the transport of radioactive materials applicable to that individual's duties.
  - c. Safety training.
4. The employer shall keep records of all safety training activities carried out and shall make them available to employees upon request.
5. The training shall be provided or verified upon assigning a person to a position involving the transport of radioactive materials, and will be supplemented regularly to include any additional training deemed appropriate by the competent authority.

#### **4.6 Quality Management Program**

1. In compliance with Standard AR 10.16.1, the design, manufacture of prototypes for tests, and planning of tests was carried out in accordance with the quality system of the company complying with Standards ISO 9001:2008 and ISO 14001:2004 Environmental (see Ref. [3]).