



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

November 10, 2015

Mr. Richard W. Boyle, Chief
Sciences Branch
Division of Engineering and Research
Office of Hazardous Materials Safety
U.S. Department of Transportation
1200 New Jersey Ave., S.E.
Washington, D.C. 20590

**SUBJECT: STAGGERED REQUEST FOR ADDITIONAL INFORMATION FOR THE MODEL
NO. LEUPA PACKAGE**

Dear Mr. Boyle:

By e-mail dated July 14, 2015, the U.S. Department of Transportation (DOT) requested the NRC staff to perform a review of the Argentinian Certificate of Approval No. RA/0103/B(U)F-96, Revision 0, for the Model No. LEUPA package, and make a recommendation concerning the revalidation of the package for import and export use.

The staff is issuing a staggered request for additional information. In connection with our review, we need the information identified in the enclosure to this letter. The enclosure contains only questions related to the following areas of review:

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The enclosure contains all discipline questions with the exception of the materials questions. Materials questions will be transmitted by November 15, 2015. Additional information requested by this letter should be submitted in the form of revised application pages. Please provide your response within one month from the date of this letter. The applicant should notify the DOT when it can provide the requested information.

R. W. Boyle

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Please reference Docket No. 71-3090 and CAC No. L25036 in future correspondence related to this revalidation action. If you have any questions regarding this matter, you may contact me at (301) 415-6999.

Sincerely,

/RA/

Norma Garcia Santos, Project Manager
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-3090
CAC No. L25036

Enclosure: Request for Additional Information

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Enclosure: Request for Additional Information

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**Request for Additional Information
Revalidation Review
Docket No. 71-3090
Model No. LEUPA**

This request for additional information (RAI) describes information needed by the staff to complete its review of the application and to determine whether the applicant has demonstrated compliance with the regulatory requirements of TS-R-1, 2009 Edition.

GENERAL INFORMATION

G-1.¹ Revise Section 1.1.4, "Definitions," of Document No. 0908-LE00-3BEIN-023-A, "Safety Report," to include a brief description with the main materials of construction, sub-components, and safety function of the following components of the Model No. LEUPA:

- a. container of inner cans,
- b. containment system,
- c. external cover,
- d. inner can,
- e. inner cover,
- f. intermediate cover,
- g. thermal insulation,
- h. neutron absorber,
- i. elastomeric gaskets, and
- j. stainless steel-graphite spiral gasket.

The applicant provides high-level definitions of items a. and c. to f., but no definitions of items b. and g. to j. These components seem to comprise the main components of the Model No. LEUPA that the applicant is relying on for the safe transport of radioactive material. Therefore, these components should be clearly defined in the application.

The staff needs this information to evaluate the adequacy of the design of the Model No. LEUPA package.

This information is needed to confirm compliance with paragraph 807 of the TS-R-1.

¹ In general, the nomenclature used for identifying the RAIs is as follows: Topics: G – General Information; Co – Containment; Cr – Criticality; Sh – Shielding; and St – Structural.

G-2. Provide the translated versions of all the documents related to the application for the revalidation of the Model No. LEUPA package. (All documents should be entirely translated to the English language).

The staff noticed that some documents submitted as part of the application for the revalidation of the Model No. LEUPA contained information and text in Spanish without the proper translation. Some examples of these documents are as follows:

Drawing Identification No.	Drawing Brief Description
00A 0908-LE02-3ASIN-005-A	Plates For Test
00E 0908-LE01-3ASIN-010-C	Packaging Of Main Body
00F 0908-LE02-3ASIN-012-A	Quick Release Hook For Drop Test
00B 0908-LE01-3ASIN-017-B	Packaging – Main Body Warning Plate
00C 0908-LE01-3ASIN-018-B	Packaging – Main Body Nameplate
00D 0908-LE01-3ASIN-019-C	Packaging – Main Body Design And Manufacture Plate

Note: This list is not all inclusive. This request for additional information applies to all the documents submitted as part of the Model No. LEUPA application.

The staff needs this information to evaluate the adequacy of the design of the Model No. LEUPA package.

This information is needed to confirm compliance with paragraphs 807(b) and (c) of the TS-R-1.

G-3. Revise the English translation of the application to include the identification number and corresponding revision of the documents translated to English referenced in the application for the Model No. LEUPA.

In some instances, documents submitted as part of this application referenced the Spanish version of documents or drawings instead of the translated version of the documents.

For example, Section 3.2 of the safety report, “Description and Properties of Packaging Materials,” includes the following statement:

“1. See Doc. 0908-LE01-3BSIN-013 – MANUFACTURE SPECIFICATION according with attached document.”

Document No. 0908-LE01-3BSIN-013 corresponds to the Spanish version of the “Manufacture Specification.” Document No. 0908-LE01-3BEIN-013-A corresponds to the English version for the “Manufacture Specification.” Therefore, the English translation of the application should reference Document No. 0908-LE01-3BEIN-013-A, which corresponds to the English translation of Document No. 0908-LE01-3BSIN-013. The table below includes some examples.

Document Title and ID No.	Section No.	Reference Spanish Identification No.	Reference English Identification No.	Reference Title (Translation)
Safety Report..., 0908-LE00-3BEIN-023-A, Revision A	3.2, 1.; 3.3, 1.	0908-LE01-3BSIN-013-D	0908-LE01-3BEIN-013-A	Manufacture Specification
	3.6.1; 9.	0908-LE01-3BSIN-012 – E	0908-LE01-3BEIN-012 – A	Verification Of Lifting Points
	3.6.1; 10.	0908-LE01-3BSIN-025-B	LE01-3BEIN-025-A	Clamping Analysis For Transport

Note: This list is not all inclusive. This request for additional information applies to all the documents submitted as part of the Model No. LEUPA application.

The staff needs this information to evaluate the adequacy of the design of the Model No. LEUPA package.

This information is needed to confirm compliance with paragraphs 807(b) and (c) of the TS-R-1.

G-4. Revise the English translation of the Competent Authority Approval Certificate to include:

a. the following statement (as required in paragraph 832(f) of the TS-R-1):

“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.” , and

b. consistent wording between the Spanish and English versions of the Competent Authority Approval Certificate.

The Competent Authority Approval Certificate submitted as part of the revalidation request of the Model No. LEUPA package includes the following wording:

English Translation

10. This certificate does not exempt the sender from complying with any requirement set forth by the Government of any country through/whereto the package is transported. -----

Spanish Version

9. El presente certificado no exime al remitente ni al transportista del cumplimiento de cualquier otro requisito impuesto por el Gobierno de cualquier país a través del cual o al cual se transporte el bulto.

The statement provided by the applicant in item No. 10 of the English translation of the Competent Authority Approval Certificate should:

- i) be in alignment with paragraph 832(f) of the TS-R-1, since the word “consignor” has a contractual meaning in the context of transportation of materials or goods; and
- ii) clearly reflect the intent of the document in its original language.

This information is needed to confirm compliance with paragraph 832(f) of the TS-R-1.

- G-5.** Revise the English translation of the application submitted for the revalidation of the Model No. LEUPA package to include the applicable revision Nos. of the drawings and documents through out the documents related to this application.

For example, the following documents include a list of documents and/or drawings without the most recent or applicable revision No.:

- i) Section 11.2, “Added Documents,” of Document No. 0908-LE00-3BEIN-023-A, “Safety Report;”
- ii) Section 8, “Applicable Drawings,” of Document No. 0908-LE020-3BEIN-008-A , “Tests Carried Out on Specimens of the Design of Type B(U) Package to Transport Radioactive Materials – Final Report;” and
- iii) Section 11, “Appendix 1 - List of Valid Drawings,” of Document No. 0908-LE01-3BEIN-013-A, “Manufacture Specifications.”

The references to engineering drawings in the application should include the corresponding revision No. to ensure that the packaging is designed, fabricated, and tested as approved for transporting the authorized radioactive material. The same principle applies to documents that constitute the licensing basis to the Model No. LEUPA package.

The staff needs this information to evaluate the adequacy of the design of the Model No. LEUPA package.

This information is needed to confirm compliance with paragraphs 807(b) and (c) of the TS-R-1.

- G-Sh-1.** Clarify and revise, as needed, in the application the description of the Primary Containment Lid/Flange.

Based on Drawing No. 0908-LE01-3ASIN-005, this component is a solid lid with a solid section of cadmium in its center on the bottom side. However, Picture 27 of the “Tests Final Report” document identifies a steel disc with a large central hole as the primary containment lid/flange. This is not consistent with the design shown in the technical drawings.

This information is needed to confirm compliance with paragraphs 807(a) and (b) of the TS-R-1.

G-Sh-2. Clarify and revise, as needed, in the application the description of the contents' form that is currently specified as "Other."

The application should clearly describe the contents' form. In particular, the form referred to as 'Other', in the certificate of the competent authority, should be clarified. The description of the contents, including the form, should be specific so as to enable an appropriate evaluation of the package and its contents.

This information is needed to confirm compliance with paragraph 807(a) of the TS-R-1.

CRITICALITY SAFETY

Cr-1. Provide a benchmarking analysis of the MCNP5 program with the selected cross section library as well as the area of applicability of the selected benchmark experiments and an upper subcriticality limit (USL). The benchmarking analysis should include the following:

- a. the resulting bias and bias uncertainties, and
- b. corresponding corrections to the calculated keff values.

The applicant's criticality safety analysis does not include a discussion about the benchmarking of the MCNP5 program in order to calculate an appropriate USL for the criticality analyses.

This information is needed to confirm compliance with paragraphs 671(a), 677, 678, 679, 680, 681, and 682 of the TS-R-1.

Cr-2. Confirm that packages transported by air would not have moderating material, such as plastic wrap or polyethylene bags, or provide a mass limit for this material.

The calculation for air transportation does not consider the presence of moderating materials. However, the applicant describes in the criticality analysis the use of polyethylene bags or similar material surrounding the fissile contents. Therefore, the staff requests a statement be added to the Competent Authority Certificate to convey that the presence of moderating materials for the purpose of wrapping the contents in the package for air transport of the package is not allowed. Otherwise, provide a mass limit for the amount of moderating material that is supported by a criticality safety analysis.

This information is needed to confirm compliance with paragraph 680 of the TS-R-1.

Cr-3. Describe the acceptance tests conducted to verify the presence and distribution of neutron poisons during and after the fabrication of the package.

The application does not include information explaining how the applicant ensures that cadmium is present, uniform, and free from voids in order to perform its safety function.

This information is needed to confirm compliance with paragraph 501 of the TS-R-1.

Cr-4. Explain how the array analysis bounds a single package evaluation.

In the criticality analysis, the applicant considers an array of packages under normal conditions of transportation (NCT) and hypothetical accident conditions (HAC). However, in Section 7.1 of the criticality analysis, the applicant notes that the TS-R-1 standard requires the assurance of subcriticality for an isolated package, but the application does not include:

- i) a statement explaining that the analysis for an isolated package is bounded by the array analysis, nor
- ii) an analysis of an isolated package.

This information is needed to confirm compliance with paragraphs 677, 678, 679, and 680 of the TS-R-1.

Cr-5. Provide a representative sample of input files, including those considered to be most limiting, used in performing the criticality safety evaluation for the Model No. LEUPA package. This sample should include the:

- a. representative modeling samples of each geometry configuration, and
- b. modeling samples of the bounding or most reactive configurations.

The applicant did not provide a sample of input files used to perform the criticality safety evaluation. These computer input files should provide additional assurance regarding the criticality safety evaluation of the package. Since the demonstration of criticality safety of the Model No. LEUPA package relies on the calculated results, the staff needs additional assurance that the content and methodology of the computer models is adequate to ensure that the package meets the fissile material safety standards.

This information is needed to confirm compliance with paragraphs 671(a), 677, 678, 679, 680, 681, and 682 of the TS-R-1.

SHIELDING EVALUATION

Sh-1. Clarify and revise, as needed, the following information in the application:

- a. **The method used to calculate neutron dose rates.** The applicant discussed the use of MicroShield in the application section related to neutron dose rates. However, MicroShield does not have the capability to calculate neutron dose rates.
- b. **Dose rates reported in Sections 2.6, 3.4, and 3.5 of the “Safety Report.”** The dose rates at the package surface should be larger than the dose rates at 1 meter from the package surface.

- c. **Verification that contamination levels of an empty package meet all appropriate limits.** “Operation Manual,” Section 7.2.9, paragraph 1, only lists one contamination limit; there are two limits. Paragraph 1 should include verification that inner contamination levels do not exceed one hundred times either limit in paragraph 507 of TS-R-1.
- d. **Verification that dose rates for a loaded package meet all appropriate dose rate limits.** “Operation Manual,” Section 7.2.6, should include verification that all regulatory dose rate limits in TS-R-1 are met, including the limits for the package surface and the limits at the prescribed distance(s) from the package surface.
- e. **The applicable drawings in Appendix 1 of the “Manufacture Specifications” document.** The list of applicable drawings in Appendix 1 of the “Manufacture Specifications” document should include Drawing No. 0908-LE01-3ASIN-020, “Low Enriched Uranium Package (LEUPA) – Gasket Set and Rubber Supplements.”

This information is needed to confirm compliance with paragraphs 425(c), 501, 502(a), 521, 524, and 525 of the TS-R-1.

- Sh-2.** Revise the “Safety Report” to provide information, including analyses as needed, to demonstrate compliance with the TS-R-1 dose rate limits for packages that have experienced the accident conditions tests and changes in dose rates due to the normal condition tests.

The application only reports a single package surface dose rate value and a single dose rate value at 1 meter from the package surface. For a Type B package, the application must show that the impacts of the tests described in TS-R-1, paragraphs 719 through 724, do not result in more than a 20% increase in the maximum radiation level at the external surface of the package. This should include the results of a normal condition free drop test on the package side with the point of impact being on the part of the package identified as item No. 30 in Drawing No. 0908-LE01-3ASIN-010. The current analyses and tests should include a normal condition free drop test with this configuration. Also, the applicant must demonstrate that the package does not exceed the dose rate limits in paragraph 657 in its condition after the accident conditions tests listed in TS-R-1, paragraph 657.

This information is needed to confirm compliance with paragraphs 646(b) and 657 of the TS-R-1.

STRUCTURAL EVALUATION

- St-1.** Provide the following information regarding the four attachments welded on the outside of the outer “shell” of the Model No. LEUPA package:
 - a. design details in order to identify the function of these components of the package,

- b. if these are structural elements, provide the purpose of these attachments,
- c. provide the details such as the extent and nature of any damages observed on these attachments and the body of the package (at the locations of these attachments) subsequent to the required regulatory drops, and
- d. provide justification demonstrating the adequacy of their performance subsequent to the required regulatory drops.

The applicant describes these components in Document Nos. 0908-LE01-3ASIN-004A and 0908-LE01-3ASIN-010 without providing further details about their dimensions and functionality.

This information is needed to confirm compliance with paragraphs 608 and 715 of the TS-R-1.

- St-2.** Provide justification for the applicant’s statement that the Model No. LEUPA package will prevent the entry of a 10-centimeter (cm) cube after being subjected to tests specified in paragraphs 719 to 724.

The applicant does not provide (in Document Nos. 0908-LE00-3BSIN-023A and 0908-LE02-3BSIN-002A) information such as: observed and documented verification that the package after being subjected to the tests specified in paragraphs 719 to 724, will preserve the minimum overall outside dimensions to at least 10cm, and that the package will prevent the entry of a 10cm cube.²

This information is needed to confirm compliance with paragraph 675 of the TS-R-1.

- St-3.** Clarify and revise, as needed, in the application the load used for the stacking test described in Section 6.2.2 of the “Tests Final Report” Document No. 0908-LE02-3BSIN-008A.

Section 6.2.2, paragraph 2, indicates that a 2,399 kg load was used, while Section 6.2.2, paragraph 3, appears to indicate a 473 kg load (i.e., a load equal to the package’s mass) was used. Also, on page 43 of the same report it is indicated that 2,399kg load was stacked on the specimen for 43 hours. Therefore, it is unclear that the test described by the applicant in Section 6.2.2 meets the requirement in TS-R-1 paragraph 723.

This information is needed to confirm compliance with paragraph 723 of the TS-R-1.

- St-4.** Provide documentation to confirm that the package (e.g., the spiral gasket seal) is designed and evaluated to the following conditions:

² Note that paragraph 675 refers to the acceptable outcome of the tests specified in paragraphs 719 to 724.

- a. at temperatures between -40°C and 70°C,
- b. for pressures as low as those resulting from a 60 kilopascals (kPa) ambient pressure, and
- c. if there is an internal pressure that produces a pressure differential of not less than the maximum normal operating pressure plus 95 kPa.

Although the spiral gasket seals the content's inner containers, the application did not include documentation to support the performance of the containment boundary nor the spiral gasket.

This information is needed to confirm compliance with paragraphs 619, 637, and 643 of the TS-R-1.

OPERATING PROCEDURES

- OP-Sh-4.** Revise the "Operation Manual" document to include a description of the package unloading operations.

The "Operation Manual" should include procedures for unloading the package, including receipt inspections and actions to take if the package is damaged. These kinds of operations descriptions are missing but should be provided to ensure the package is operated in accordance with its approved design.

This information is needed to confirm compliance with paragraphs 509 and 510 of the TS-R-1.

ACCEPTANCE AND MAINTENANCE TESTS

- AT-Sh-1.** Provide acceptance criteria for the acceptance tests and maintenance programs/tests that include the package component specifications (material and dimension specifications) in all the provided technical drawings, as discussed below.

While the "Manufacture Specifications" document lists all of the package drawings in an appendix, the acceptance tests and criteria only refer to a few of these drawings. Some components' material specifications and dimensions are not part of the limited number of drawings referenced in the acceptance tests as acceptance criteria. Therefore, the applicant should provide acceptance tests and criteria that address all of the package's components in all the drawings listed in the appendix to the "Manufacture Specifications" document. The acceptance criteria should include all the specifications in all the package drawings. Furthermore, the applicant should describe the acceptance criteria in the "Inspection and Maintenance Manual" for maintenance of the package. The criteria should be like those in the "Manufacture Specifications" document.

This information is needed to confirm compliance with paragraph 501 of the TS-R-1.