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

June 17, 2016

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: RESUBMITTAL OF REQUEST FOR ADDITIONAL INFORMATION FOR THE MODEL NO. LEUPA PACKAGE

Dear Mr. Boyle:

By letter dated July 9, 2015. Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML15222B182 and ADAMS Package Accession No. ML15222B189) and as supplemented on July 14, 2015 (ADAMS Accession No. ML15229A150), August 11 (ADAMS Accession No. ML15238B154 and ADAMS Package Accession No. ML15243A111), and September 22, 2015 (ADAMS Package Accession No. ML15267A048) 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 resubmitting some of the requests for additional information issued on November 10, 2015 (ADAMS Accession No. ML15317A403), since the responses received by letter dated March 17, 2016 (ADAMS Package Accession No. ML16097A051) were not adequate. 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:

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.

Please reference Docket No. 71-3090 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

Enclosure: Request for Additional Information

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Enclosure: Request for Additional Information

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OFC	DSFM	E	DSFM	E	DSFM	E	DSFM	E
NAME	NGarcia Santos		CHrabal		MCall		JBorowsky	
DATE	6/10/2016		6/14/2016		6/13/2016		6/13/2016	
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DATE	6/15/2016		6/15/2016		6/17/2016		6/17/2016	

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

These questions describe 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 Section 1.1.4 of 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:

Document No.	Example of Information Needing Correction(s)
0908-LE00-3BEIN-023-B, Revision B	Diagrams (translation and readability)
0908-LE01-3BEIN-024-B Revision: B	Table 3, "Contingencies and contention barriers to assure sub-criticality (as established in paragraph 671 of the Standard), " and Section 7.4, "Results."

Note: The examples provided in this questions do not include all the items that the applicant needs to revise in order for the staff to review the revalidation request for the Model No. LEUPA. The applicant should review and revise the application to ensure that the translated documents include the proper technical and non-technical terminology, the appropriate references (in English), and the diagrams and drawings are adequate for the review (proper translation and font\drawing size).

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. Note that the application and documents submitted as part of the revalidation process must be fully translated into English.

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 application submitted for the revalidation of the Model No. LEUPA package to include the applicable revision Nos. of the drawings and documents throughout the documents related to this application.

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.

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 k_{eff} 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. In response to the previous RAI, the applicant provided independent calculations using a different code and a different cross-section library to provide independent support for the MCNP results. However, these independent calculations do not meet the intent of a benchmarking analysis, namely since they do not establish a USL.

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. 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. In response to the previous RAI, the applicant provided quality control data sheets that are intended to show cadmium is adequately constructed and stated a procedure implicit in the drafting of these data sheets. However, this procedure is not in the SAR.

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

Cr-3. Provide a single package (i.e., isolated 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 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.

SHIELDING EVALUATION

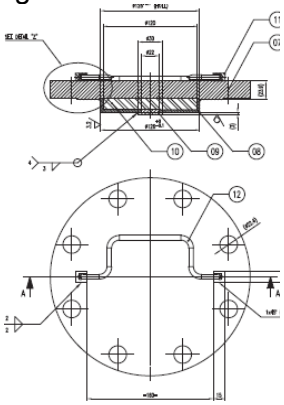
G-Sh-1. Revise the application's description of the "Primary Containment Lid/Flange."

The previous question regarding this item has not been adequately answered. The figure of concern is Picture 27 of the "Tests Final Report" document (shown here).

Picture 27: Primary containment flange after tests

The picture above (i.e., figure) does not appear to be of or about the primary containment flange per the discussions and per the figure submitted in the RAI responses. It is not clear what this component is. Based on the figure submitted in the RAI responses, the metal object shown in the foreground of the picture, is not part of the packaging since that figure does not include it. It is also not clear that the design drawings include this metal object either. If this metal object in Picture 27 is the primary containment flange, then the submitted figure and the English version of the figure that is on page 27 of 30 of the Safety Report (Document No. 002 0908-LE00-3BEIN-023-A) (see cut out of figure from Safety Report page 27 of 30 below) and the design drawings (see a cut out of Drawing No. 00B 0908-LE01-3AEIN-005-A below) are not correct and must be fixed because these show the primary containment flange as a solid lid with a handle and a cadmium component (whereas this Picture 27 has a large hole in the

middle of the flange). The object with a handle in Picture 27 appears to be the top most of the four inner cans that are loaded into the package.



Safety Report (page 27 of 30); Drawing No. 00B 0908-LE01-3AEIN-005-A

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

G-Sh-2. Modify Drawing No. 00A 0908-LE01-3AEIN-004-A to include the Packaging Main Body Design and Manufacture Plate in its Bill of Materials with the reference to 0908-LE01-3AEIN-019 in the Bill of Material's Notes for that item.

This change is needed to ensure the acceptance criteria for the package acceptance tests and maintenance programs are adequate, as modified in response to the previous question about acceptance criteria.

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

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

a. The dose rates calculated in the "Safety Report" are for gamma radiation and that neutron dose rates were not calculated, stating the basis for not calculating neutron dose rates.

b. The dose rates in the application for the package surface and 1 meter from the package surface; the package surface dose rates should be larger than the 1 meter dose rates.

c. Verification that dose rates for a loaded package meet all appropriate dose rate limits in TS-R-1.

For Sh-1.a, the "Safety Report" should clearly state what dose rates are calculated (i.e., should state that only gamma dose rates were calculated, which was done using MicroShield), and the "Safety Report" should also clearly state that neutron dose rates were not calculated and the reason for not calculating neutron dose rates. This information was given in the response to the question, but it should also be included in the "Safety Report."

For Sh-1.b, the response to the previous question on this item was not adequate. The “Safety Report” is still in error. The “Transport Manual” may also be in error. Section 2.6 of the “Safety Report” states that the dose rate at 1 meter from the package is 0.3 μSv/hr but the dose rate at the package surface is 6.89E-4 μSv/hr. This does not make sense. The dose rate at the package surface should be higher than the dose rate at 1 meter from the package. Thus the dose rates in the “Safety Report” need to be corrected. The dose rates should also be corrected in the other documents where they are described.

For Sh-1.c, the response to the previous question on this item was not adequate. Section 7.2.6 of the “Operation Manual” should include verification that ALL regulatory dose rate limits are met. This includes the surface dose rates as well as the 1 meter dose rates for calculating the Transport Index and ensuring it is less than 10. Section 7.2.6 needs to include verification of compliance with package surface dose rate limits.

This information is needed to confirm compliance with paragraphs 521, 524, and 525 of 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 accident conditions tests and limits for increases in package dose rates due to normal conditions tests.

This question has two parts. The first relates to changes to dose rates as a result of the impacts of the normal conditions of transport tests (TS-R-1, 2009 revision, paragraphs 719 through 724). The dose rates in the application are for the package as designed. The dose rates, per Paragraph 646(b) of TS-R-1 for a package that has been tested per Paragraphs 719 through 724, may not be more than 20% higher than the as-designed package dose rates.

To demonstrate this, the applicant should describe the damage to the package in writing, including any dimensional changes to the package at the impact location for the normal conditions tests (Paragraphs 719 through 724) and calculate dose rates for a package with those dimensional changes. For example, if the greatest damage is indentation or crumpling of the package by 2 cm in the test impact area, then a MicroShield model that reduces the package dimensions and material by 2 cm in the highest dose rate orientation, or location, should be used to calculate dose rates in MicroShield. The resulting dose rates (surface and at distance) should not exceed 1.2 times the value of the dose rates for the as-designed package. If the damage to the package from these tests is limited to only superficial nicks and scratches, then the application should state that. In that case, a new dose rate calculation for normal condition test impacts is not necessary. Note, the test orientations should include those that would result in the greatest damage to the package’s shielding.

The second part of the question deals with the accident conditions dose rates. In the meeting on 04/27/2016, the NRC staff stated that the application did not include a Type B puncture test (Paragraph 727(b)), but only a Type C puncture test (Paragraph 735). A second look at the application documents indicates the NRC staff was in error. However, the documentation indicates that the Type B

package thermal test was not done. Instead, a Type C thermal test was done after the Type C puncture test was performed. In analyzing the dose rates from a Type B package for accident conditions, the dose rates should be calculated for a package that has experienced all of the Type B package accident conditions tests. Since there is no information about the package response to a Type B thermal test (Paragraph 728) after the Paragraph 727 drop tests, the NRC staff had to consider the configuration of the package after the Type C drop and thermal tests. This is a basis for the question about HAC dose rates. Since the configuration for the package as a result of these tests has a puncture in it, the applicant should calculate the accident conditions dose rates with a model to account for this package condition. Since the applicant uses MicroShield for dose rate analysis, an acceptable and bounding calculation would be to use a model that removes all of the package material that is external to the cadmium lined portion of the package (which has a 216 mm outer diameter per Drawing No. 00E 0908-LE01-3ASIN-010-C) and its associated lid. The accident dose rates would then be calculated at 1 meter from the external surface of this part of the package. This would also bound any damage from the Type B accident conditions tests.

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

Sh-St-1. Modify the information in "Tests Final Report," Section 6.2.2, paragraph 3, to state the correct top load mass.

The response to the previous question about the load mass included changes to the language of this paragraph. However, the changed language includes an error. Section 6.2.2, paragraph 3 of "Tests Final Report" currently reads as "top load is 2933 Kg." It should be changed to read as "top load is 2399 kg."

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

CONTAINMENT EVALUATION

Co-St-4 Provide documentation (in English) to confirm certain aspects of the containment boundary. The application should include explicit discussion and documentation that explain how item a and item b are satisfied.

a. The metal containment boundary AND the spiral gasket seal is designed and evaluated under a reduction of ambient pressure to 60 kilopascals (kPa), per IAEA paragraph 643.

b. The spiral gasket and its corresponding gasket groove is designed and evaluated for an internal pressure that produces a differential pressure of not less than the maximum normal operating pressure plus 95 kPa, per IAEA paragraph 619. The response should also explicitly state the maximum normal operating pressure.

c. Specify whether a complete LEUPA containment boundary, including spiral gasket seal, successfully passed a hydraulic pressure test (per Table 1 of document No. 0908-LE01-3BEIN-011-A).

Note: These questions are asked because the focus of the finite element analysis in document No. 0908-LE01-3BEIN-011-A (for example, Figure 2) was on the vessel, with no mention that the spiral gasket seal could satisfy the pressure differentials.

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

PACKAGE OPERATIONS

OP-Sh-1. Provide a more complete description of unloading operations in the Operations Manual.

The unloading operations, added in response to a previous question, appear to be incomplete. The unloading procedures should include receipt inspections. These inspection steps would include a check for damage to the package and descriptions of actions to take if the package is damaged. The unloading steps should include removal of the different package lids and covers as well as the different sets of bolts.

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