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

November 24, 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 – QUESTIONS RELATED TO THE MATERIALS EVALUATION

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 materials evaluation. The staff issued questions related to technical areas other than materials on a letter dated November 10, 2015. Additional information requested by this letter should be submitted in the form of revised application pages. Please provide your responses to these questions dated November 10, 2015, and these questions in the same correspondence. The applicant should notify the DOT when it can provide the requested information.

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

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.

M-1-1. Provide the following information for the materials related to the fabrication of the package's components:

a. For all licensing drawings, a complete bill of materials detailing all package components, their respective material specifications, drawing views, sections and details of all packaging component fit-up. For example:
   i. components' lengths and thicknesses, tolerances,
   ii. gaps,
   iii. weld locations,
   iv. weld processes,
   v. weld size,
   vi. weld filler material,
   vii. nondestructive testing methods/inspection techniques, and
   viii. sections and/or views showing the location of lids and canister walls.

b. Properties of the materials at temperature ranges from -40^{o}C up to the maximum temperature that will be observed by the package. For example:
   i. yield stress,
   ii. tensile rupture values,
   iii. Young's modulus,
   iv. yield strain,
   v. rupture strain, and
   vi. Poisson's ratio.

c. Translated versions of standards used to describe package materials.

The applicant should revise all the applicable documents in the application to incorporate the response to this question.

For example, Drawing No. 0908-LE01-3AEI004-A does not include a complete description of the materials and corresponding specifications for the components of the Model No. LEUPA package. Licensing drawings should include and

Enclosure

provide a bill of materials with details about all package components and their material specifications traceable to a national consensus standard such as the International Standards Organization (ISO),[1] American Society of Testing Materials (ASTM), or American Society of Mechanical Engineers (ASME).

Note: The drawing mentioned in this question is only an example.

This information is needed to confirm compliance with the requirements in paragraphs 807(b), 807(g), and 807(h) of TS-R-1.

M-1-2. Provide details about the processes used for "filtering" and pouring cadmium by gravity into the package. Include the following information in your response:

a. precautions when handling cadmium,

b. impact of cadmium on all closure welds, and

c. package maintenance.

In Section 1.2 of Document No. 908-LE00-3BEIN-023-A, the applicant briefly mentions that cadmium is poured by gravity, but does not include details about the technique or processes to ensure the safe handling of cadmium during the fabrication and operation of the package.

This information is needed to confirm compliance with the requirements in paragraphs 613 and 638 of TS-R-1

M-1-3. Explain the effects of the temperature requirements of hypothetical accident conditions (HAC) on the cadmium used in the Model No. LEUPA package. Also, discuss how the function of the cadmium remains unchanged during HAC.

The melting point of cadmium is approximately 610ºF (321.1ºC). Paragraph 728 of TS-R-1 specified that the average temperature of the thermal test at HAC is 800°C (an specimen fully engulfed in a fire for 30 minutes). The staff needs to ensure that the safety function of the cadmium is not affected during HAC.

This information is needed to confirm compliance with the requirements in paragraphs 613 and 638 of TS-R-1

M-1-4. Clarify how the applicant maintains and procures components with a specific safety function in order to ensure these are available to perform its intended safety function, when needed.

As part of verifying the adequacy of the materials used for the fabrication of the package (bill of materials), the staff needs to understand if the applicant has a process or program in place for identifying and classifying the components of the package according to importance to safety during transportation. If the applicant

[1] Also known as the International Organization For Standardization.

has that type of program, the applicant should describe this program of process in the application.

This information is needed to confirm compliance with the requirements in paragraphs 618 and 637 of TS-R-1.

M-1-5. Describe the "Quality Management Program" for the LEUPA package for the following:

a. Section 6.1.3, "Control of Nonconforming Products," and

b. Section 5.2.5.3, "Identification and Traceability," mentions an "Inspection and Testing Plan."

The staff needs detailed information about the actions related to nonconforming products and identification and traceability of package components, including replacing components exhibiting signs of degradation. It is not clear if the applicant is referring to a process in which items commercially available (non nuclear-grade items) are tested and "validated" to meet the specifications of the components needed for fabricating, operating, or maintaining the package. If this is the case, the staff needs a description of the steps that the applicant would follow to ensure that a non nuclear-grade item would meet the regulatory requirements of TS-R-1.

This information is needed to confirm compliance with the requirements in paragraphs 618 and 637 of TS-R-1.

M-1-6. Define dimensional units of each component of the Model No. LEUPA package.

In the "Safety Report," Document No. 0908-LE00-3BEIN-023-A, page 11 of 29, Table 2, the applicant provides the diameter and height dimensions of each component (subset) listed as (mil). The staff needs clarification about the definitions of the units used in Table 2.

This information is needed to confirm compliance with the requirements in paragraphs 618 and 637 of TS-R-1.

M-1-7. Describe the following for Kaolite:

a. precautions, handling, installation, and drying in order to ensure that the material meets its intended function;

b. for "Package General Assembly" drawing, the relationship between the purpose of gaps/holes in steel plates and Kaolite;

c. how the appropriate mechanical properties are maintained during the drying process; and

d. susceptibility to galvanic corrosion with structural components of the transport package due to expected heat and moisture conditions.

In the "Safety Report," Document No. 0908-LE00-3BEIN-023-A, Section 2, item No. 12, the applicant mentions the process for adding Kaolite in the package. The applicant uses Kaolite as a thermal insulator. The application does not include a description of the process or testing to ensure that the properties of Kaolite are consistent, homogenous distribution after pouring into the package, proper precautions when handling Kaolite, and details about possible reactions between Kaolite and the package's materials.

This information is needed to confirm compliance with the requirements in paragraphs 618, 637, and 651(c) of TS-R-1.

M-1-8. Provide the materials' specifications for all gaskets, bolts, and washers used in the Model No. LEUPA package as well as precautions to ensure these components do not adversely react with other materials in the package.

Safety Report Section or Number	Page No.	Reference from the Application
Numbers 8 and 9,	7 of 29	Use of the term "elastomeric gasket."
Section 3.1, Number 2.e.	10 of 29	"Several elastomeric and metallic gaskets…" (without mentioning material specifications in the documents in licensing drawings).
Table 2	11 of 29	"Several gasket" material listed with the general term "Nitrile." (Rubber)

The response should include reference or information from a reliable source such as the manufacturer's specifications sheet, a technical handbook, etc. If not available in English, the applicant should submit a translated version (English) of the document(s) supporting the response to this question.

This information is needed to confirm compliance with the requirements in paragraphs 618 and 637 of TS-R-1.

M-1-9. Provide the specific ASME Code and material requirements applicable to the components important to safety of the Model No. LEUPA package.

In Section 1.2 of Document No. 908-LE00-3BEIN-023-A, the applicant mentions the following:

> "Fissile substances are placed in steel non airtight vessels called –in the project context–inner cans. Each of them has an inner volume of 1.56 dm^3. LEUPA can load as much as four of these cans, which are in turn, housed in the hereby named container. This is designed in accordance with code ASME Section III, Division 1, Sub-section NB, with a useable inner volume of around 8.25 dm^3."

The applicant should provide specific information related to the ASME Codes used for all the components important to safety for the Model No. LEUPA package.

This information is needed to confirm compliance with the requirements in paragraph 638 of TS-R-1.

M-1-10. Demonstrate that the package will meet the solar insolation conditions as specified in TS-R-1, 2009 Edition, Table 13, “Insolation Data.”

In the “Safety Report,” Document No. 0908-LE00-3BEIN-023-A, Section 5.1.4, item No. 6, the applicant states the following:

> “The values of solar radiation of charter 13 of the Standard in Doc. 0908-LE00-3DEIN-018 attached, shall be taken into account.”

The staff is not able to find the insolation data in the document referenced by the applicant.

This information is needed to confirm compliance with the requirements in paragraph 655 of TS-R-1.