September 13, 2007

Mr. Anthony Patko
Director, Licensing
Engineering
NAC International
3930 East Jones Bridge Road, Suite 200
Norcross, GA 30092

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF THE CERTIFICATE OF COMPLIANCE NO. 9225, REVISION 45, FOR THE MODEL NO. NAC-LWT PACKAGE

Dear Mr. Patko:

By letter dated May 1, 2007, as supplemented on May 22 and July 23, 2007, NAC International submitted an amendment request to the U.S. Nuclear Regulatory Commission for Certificate of Compliance No. 9225. You requested various changes to the authorized Metal Test Reactor (MTR) fuel contents.

In connection with our review, we need the information identified in the enclosure to this letter. Additional information requested by this letter should be submitted in the form of revised pages. To assist us in scheduling staff review of your response, we request that you provide this information by September 28, 2007. If you are unable to provide a response by that date, our review may be delayed.

Please reference Docket No. 71-9225 and TAC No. L24083 in future correspondence related to this request. The staff is available to meet to discuss your proposed responses. If you have any questions regarding this matter, I may be contacted at (301) 492-3339.

Sincerely,

/RA/

Kimberly J. Hardin, Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9225
TAC No. L24083

Enclosure: Request for Additional Information

Mr. Anthony Patko
Director, Licensing
Engineering
NAC International
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Request for Additional Information
NAC International
Docket No. 71-9225
Certificate of Compliance No. 9225
Model No. NAC-LWT Package

By application dated May 1, 2007, as supplemented on May 22 and July 23, 2007, NAC International (the applicant) requested an amendment to Certificate of Compliance No. 9225 for the Model No. NAC-LWT package. The applicant requested a revision to the Low Enriched Uranium (LEU) Metal Test Reactor (MTR) fuel description. This request for additional information (RAI) identifies information needed by the U.S. Nuclear Regulatory Commission staff in connection with its review of the application. The requested information is listed by chapter number and title in the applicant's safety analysis report (SAR). NUREG-1617, "Standard Review Plan for Transportation Packages for Spent Nuclear Fuel," was used by the staff in its review of the application.

Each individual RAI describes information needed by the staff for it to complete its review of the application and to determine whether the applicant has demonstrated compliance with regulatory requirements.

Chapter 1 General Description

1-1 Provide evaluations of the structural, thermal, and containment effects on the packages due to the increased U-235 content and addition of axial and cell spacers.

The change of package contents and the addition of spacers will alter the package design. Reevaluations of the structural, thermal, containment, shielding, and criticality safety, as well as operating procedures must be included in the SAR, though some of the effects might be limited. A complete SAR is the basis for the staff to evaluate if the packages meet the safety regulatory requirements.

This information is needed for the staff to perform confirmatory analyses for the structural, thermal, shielding, and criticality safety requirements pursuant to 10 CFR 71.31, 71.33, 71.43, 71.47, 71.51, 71.55, 71.59, 71.71, and 71.73.

1-2 Provide licensing drawings to capture the design details, such as the dimensions and material compositions of the various spacers that are to be used in different MTR fuel package loading configurations.

On page 1.2-34 of the application, in Figure 1.2-18, the applicant provides only a schematic drawing of the spacers, which lacks necessary details for a safety evaluation of the package.

This information is needed for the staff to perform confirmatory analyses for the structure, thermal, shielding, and criticality safety requirements pursuant to 10 CFR 71.31, 71.33, 71.43, 71.47, 71.51, 71.55, 71.59, 71.71, and 71.73.

1-3 Provide information on the locations where the axial spacers are to be used.

On page 1.2-11 of the application, the applicant states: “Axial spacers and plates may be used to properly position the MTR elements axially in the basket to facilitate fuel loading and handling, and to meet [the] minimum nonfuel hardware specifications.” Provide any detailed information on the use of the axial spacers in the application.

No axial spacers were shown in figure 6.3.3-5, which shows how the cask will be loaded. Cell spacers are used only in MTR fuel canister cells 1, 2, and 3 to prevent an accidental loading of these cells for criticality safety.

This information is needed for the staff to perform confirmatory analyses for the package safety requirements pursuant to 10 CFR 71.31, 71.33, 71.43, 71.47, 71.51, 71.55, 71.59, 71.71, and 71.73.

Chapter 5 Shielding

5-1 Clarify if the source terms of the 100 gram cadmium wires vary from fuel element to fuel element or they all have the same source and energy strengths. If the source terms are variable, explain how these various source terms are modeled in the shielding calculations.

In addition, provide information on the source strength of the cadmium wire(s). Explain why the same amount (100 grams) of cadmium have different source strengths if the statement “a maximum source magnitude at any energy line of less than 0.1% of the corresponding fuel source line” is true. These statements appear to conflict because one is an absolute limit, while the other is a proportional limit.

On page 1.2-1 of the application for request for amendment LWT-07B, the applicant states that MTR elements/plates may contain cadmium wires and a maximum 100 gram cadmium source is addressed in the shielding evaluations documented in Chapter 5. However, the only place in Chapter 5 that discusses the cadmium wire source term is in a note to Table 5.1-3 on page 5.1-14. In the note, the applicant states that activated cadmium wires may be included as part of the MTR fuel element or plate construction. A 100 gram Cadmium light element source was evaluated. The Cadmium inclusion resulted in a maximum source magnitude at any energy line of less than 0.1% of the corresponding fuel source line. The source is, therefore, not significant for further shielding analysis consideration.

This information is needed for the staff to perform confirmatory analyses of the shielding safety requirements pursuant to 10 CFR 71.47, 71.71, and 71.73.

Chapter 6 Criticality

6-1 Provide the CSI values for the MTR spent fuel transportation packages that contain increased U-235 content and aluminum spacers.

The application for request for amendment does not provide the CSI values for the MTR spent fuel transportation packages that contain various increased U-235 content and aluminum spacers.

This information is needed for the staff to perform confirmatory analyses for the package safety requirements pursuant to 10 CFR 71.59, 71.71, and 71.73.

6-2 Provide an engineering drawing for the various spacers that are to be used in different MTR fuel package loading configurations.

On page 1.2-34 of the application, in Figure 1.2-18, the applicant provides a schematic drawing of the spacers. The figure, however, does not provide sufficient information for structural analysis, i.e., if the spacers have sufficient strength to prevent space reduction between fuel canisters in both radial and axial directions during Hypothetical Accident Condition events.

This information is needed for the staff to perform confirmatory analyses for the structure, thermal, shielding and criticality safety requirements pursuant to 10 CFR 71.31, 71.33, 71.43, 71.47, 71.51, 71.55, 71.59, 71.71, and 71.73.

6-3 Provide clarification on the maximum U-235 content on page 6.2-7 of the application.

In the application, on page 6.2-7 of LWT-07B, the applicant states: "… and LEU specific loads up to 736 grams ^{235}U (32 grams per plate in 23 plates)." This number for the maximum U-235 content is in conflict with that in the rest of the application.

This information is needed for the staff to perform part confirmatory analyses of the criticality safety requirements pursuant to 10 CFR 71.

6-4 (a) Provide discussion on the fundamental assumptions of the Dancoff correction for rod shadowing effect and its relevance to the plate fuel basket configurations.

(b) Provide a discussion on the applicability of the Dancoff factor to array of slabs such as the MTR fuel baskets.

(c) Provide a discussion on the applicability of the Dancoff factors extracted from LATTICECELL calculations to the MTR fuel baskets given the fuel loading pattern and geometry.

(d) Provide a discussion on whether the use of Dancoff correction factor will result in a more or less conservative K_{eff} result for the sandwich plate MTR fuels in the baskets of the MTR fuel transport packages, in particularly. Please reference, in the discussion, the NRC Information Notice 2005-31.

In the application for request for amendment LWT-07B, on page 6.3-12, the applicant states: "For baskets containing multiple fuel types, the SCALE material information processor input DAN and RES variables are provided for the fuel material not included in the LATTICECELL description. The Dancoff factors are extracted from LATTICECELL calculations of the single fuel type runs." A detailed explanation of the applicability of the Dancoff correction for this type of fuel load configuration is needed to justify the applicant's position.

This information is needed for the staff to perform confirmatory analyses of the criticality safety requirements pursuant to 10 CFR 71.55, 71.59, 71.71, and 71.73.

Chapter 7 Operating Procedures

7-1 Provide justification on the adequacy of the administrative procedures for preventing misloading of cells 1, 2, and 3 for the 640 gram U-235 MTR spent fuel cells.

In Sections 7.1.5.1, 7.1.5.2, and 7.1.5.3, of the application, the applicant provided specific loading procedures to prevent misloading of the higher mass U-235 baskets into cells 1, 2, and 3. However, misloading may still occur even if the procedure is clear because of operational error or an overlook. An engineered safety feature seems to be necessary to physically prevent cells 1, 2, and 3 from being inadvertently loaded. The combination of engineered safety features and procedures will provide assurance that cell misloading will not be possible.

This information is needed for the staff to perform confirmatory analyses of the criticality safety requirements pursuant to 10 CFR 71.55, 71.59, 71.71, and 71.73.