January 25, 2008

Dr. James Shuler, Manager
Packaging Certification Program
Safety Management and Operations
Office of Environmental Management
U.S. Department of Energy
Washington, DC 20585

SUBJECT: APPLICATION FOR APPROVAL OF THE MODEL NO. ATR FFSC PACKAGE – REQUEST FOR ADDITIONAL INFORMATION

Dear Dr. Shuler:

This refers to your application dated June 27, 2007, requesting approval of the Model No. ATR FFSC as a Type AF package.

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 April 1, 2008. If you are unable to provide a response by that date, our review may be delayed.

If you have any questions regarding this matter, we would be pleased to meet with you and your staff. I may be contacted at (301) 492-3326.

Sincerely,

/RA/
Nancy L. Osgood, Senior Project Manager
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9330
TAC No. L24105

Enclosure: Request for Additional Information

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NAME	NLOsgood		MRDeBose		JSIreland/CSBajwa		MACall		JMPiotter	
DATE	1 /10 /08		1/14/08		1/15/08		1/15 /08		1/17/08	
OFC	SFST		SFST		SFST		SFST		SFST	
NAME	REEinziger		LLCampbell		MDWaters		CMRegan		RANelson	
DATE	1/10/08		1/22/08		1/22/08		1/23/08		1/25/08	

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REQUEST FOR ADDITIONAL INFORMATION
Docket No. 71-9330
Model No. ATR FFSC Package

By application dated June 27, 2007, the Department of Energy requested approval of the Model No. ATR FFSC as a Type AF package. This request identifies additional information needed by the Nuclear Regulatory Commission staff in connection with its review of the application. The requested information is listed by chapter number and title in NUREG-1609, "Standard Review Plan for Transportation Packages," which was used by the staff in its review of the application. This request 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.

1. GENERAL INFORMATION

1-1 Revise Section 1.2 of the application to include a description of dunnage or spacers that may be used in the package.

Figure 1.2-6 shows that the loose plate payload includes dunnage. Include a description of the dunnage (including any restrictions in materials or mass). Clarify that the analyses in Sections 2-8 of the application include consideration of any dunnage, for example, dunnage that may affect criticality analyses. Note that Section 7 of the application should address loading of dunnage and any restrictions. This information is needed to show compliance with 10 CFR 71.33, 71.35, and 71.87.

1-2 Revise the packaging drawings and glossary in Appendix 1.3 to address the following items. This information is needed to show compliance with 10 CFR 71.33.

(a) On Dwg. No. 60501-10, Rev. 0, Sheet 1 of 5, Item No. 9, has a description of "Durablanket-S, ½ thk. 6 PCF," and a specification of "Unifrax or equivalent." Revise the application to include any other material properties of the Durablanket that are important to safety. Clarify the properties and criteria used to determine an equivalent product, and include this information in Section 8.1, "Acceptance Tests," if appropriate. See also Item No. 3-1, below.

(b) Define "SFHCS," as specified in Item No. 3, on Dwg. No. 60501-10, Rev. 0, Sheet 1 of 5.

(c) Dwg. No. 60501-10, Rev. 0, Sheet 1 of 5, includes a description of the package nameplate. Clarify whether the packaging may have any other permanently affixed markings, labels, or appurtenances.

(d) Items 20 and 21 on Dwg. No. 60501-10, Rev. 0, Sheet 1 of 5, are a compression spring and a roll pin. Clarify if these items have a safety function. If so, describe how product equivalency is determined, and include this information in Section 8.1, "Acceptance Tests," if appropriate.

(e) Item 1 on Dwg. No. 60501-10 is the tamper indicating device, which is a dowel pin. Provide additional detail that clearly shows how the dowel pin incorporates the tamper indicating device. Note that alternative or optional configurations may be used.

(f) Revise Dwg. Nos. 60501-10, and 60501-20 to remove the "proprietary data" clause. Alternatively provide an affidavit, in accordance with 10 CFR 2.390, that justifies withholding these drawings as commercial information.

2. STRUCTURAL

2-1 Revise the application to provide the locations of appropriate centers of gravity for this package.

The maximum weight of the package is 290 lbs. Table 2.1-1 of the application summarizes weights of individual parts of the package, however, the centers of gravity are not included. The application indicates that due to package symmetry, the center of gravity of the package is located "essentially at the geometric center of the package". This information needs to be more explicit. For example, the center of gravity should be defined by a location from a reference point, for both the fuel element and fuel plate loadings. This information is needed according to 10 CFR 71.33.

2-2 Provide clarification on the packaging drawings and in Section 2.1.4 of the application regarding codes and standards that are applicable to the package.

The application states in Section 2.1.4 that no codes and standards were used, as the package performance was demonstrated by test, in lieu of such codes and standards. While the staff generally agrees that the ASME code does not apply to this package, as it is not a pressure vessel, the package is still subject to codes and standards such as the American Society for Testing and Materials (ASTM) standards for materials and the American Welding Society (AWS) standards for welding. The drawings note ASTM designations for materials, but do not indicate AWS procedures for welding and weld inspection. The text of the application, however, indicates that as a minimum, all welds are visually examined per AWS 1.6 (1999). This information is necessary to satisfy the requirements 10 CFR 71.31 (c) and 10 CFR 71.33 (a)(5). See also Item 2-3, below.

2-3 Provide the fabrication specifications that indicate how the packagings will be constructed as well as the examination procedures to be used.

Section 2.3.1 of the application indicates that the package is fabricated using conventional metal forming and welding techniques and all components are fabricated based on the requirements delineated on the package drawings. The application states that "each component is examined per approved fabrication drawings and fabrication specifications." The information that is presented is incomplete and unclear. This information is necessary to satisfy the requirements 10 CFR 71.31(c) and 71.33(a)(5). See also Item 2-2, above.

2-4 Revise the application to consider the ability of the closure handle to meet the requirements of 71.43 and 71.45.

It appears that the package could be lifted or tied down using the closure handle. However it does not appear that the application addresses the ability of the handle to meet the requirements of 71.43 and 71.45, including failure under excessive load. Revise the application to address these regulatory requirements, or justify that they are not applicable to the closure handle.

2-5 Demonstrate by way of calculation or other means, that the package is not affected by fatigue due to vibration or other mechanisms.

The evaluation for fatigue effects on the package was found to be inadequate (see also Item 2-6, below). The application states that the only fatigue of concern is that of the repeated opening and closing of the package lid which can readily be inspected to ensure integrity. The application also states that normal operating cycles on this robust package are not a concern and that fatigue associated with vibration due to transport is considered in Section 2.6.5. Section 2.6.5 does not provide a rigorous evaluation for the effects of vibration, and fatigue effects are not addressed. This information is necessary to satisfy the requirements 10 CFR 71.71(c)(5).

2-6 Demonstrate by way of calculation or other means, that the package is not affected by vibration.

Section 2.6.5 of the application does not discuss the ANSI N14.23 peak vibration standards applicable to light packages tied down to a trailer bed. The vibration load is not expected to cause structural damage to the package. However, a more rigorous (e.g., quantitative) treatment of vibration loads is needed to provide reasonable assurance that the package meets the performance requirements under normal conditions of transport. The applicant should demonstrate that the low mass to stiffness ratio is in fact sufficient to preclude such vibration damage to the package. This information is necessary to satisfy the requirements 10 CFR 71.71(c)(5).

THERMAL

3-1 Revise the application to provide additional detail regarding the thermal performance (thermal conductivity values) of the ceramic fiber insulation (see also Item 1-2(a), above).

Table 3.2-3, “Thermal Properties of Non-Metallic Materials” provides thermal conductivity values for the ceramic fiber insulation. Clarify whether these values are for compressed or uncompressed insulation, and provide additional information regarding porosity and thickness of the ceramic fiber insulation as delivered and when applied. Show that these values apply to the insulation as installed in the package, and how these values are affected if the insulation becomes compressed (e.g., under impact due to a 30-foot drop). This information is necessary to determine compliance with 10 CFR 71.33(a)(5)(v).

3-2 Revise section 3.2.1 to provide a sample calculation for the density of air using the ideal gas law stated in Table 3.2-4.

The application should include the values used for pressure and the ideal gas constant. The application does not include sufficient information to confirm the values in Table 3.2-4. This information is necessary to determine compliance with 10 CFR 71.35.

3-3 Revise the application to clarify or justify the apparent discrepancies in the equation for C_t^V in Section 3.5.2.3, in the reference, and in the SINDA analysis.

In Section 3.5.2.3, the equation for C_t^V includes a factor of 0.78. However, the quoted reference, Rohsenow, Hartnett, and Choi, *Handbook of Heat Transfer*, 3rd edition, has the same factor as 0.078. In addition, the SINDA file frcvv.f file for this equation does not include the term shown in brackets in Section 3.5.2.3. This information is needed to show compliance with 10 CFR 71.35.

3-4 Revise the application to describe why certain nodes in the Thermal Desktop ATR_NCT_Rev0.dwg, ATR_ HAC_Rev0.dwg, and TR_LoosePlate_HAC.dwg AIRO (air overpack) submodel have increased X and Y Keff for conduction.

In the Thermal Desktop ATR_NCT_Rev0.dwg, ATR_ HAC_Rev0.dwg, and ATR_LoosePlate_HAC.dwg AIRO (air overpack) submodel, the X conductivity and Y conductivity for certain nodes have been multiplied by 2. This information is necessary to determine compliance with 10 CFR 71.35.

3-5 Revise the application to clarify or justify the apparent discrepancy between the package outer surface absorptivity value specified in Table 3.2-6 and the values used in the SINDA thermal analysis.

The value for absorptivity is given as SOLARABS = 0.52 on line 22 of the SINDA input files ATR_HAC_Rev0.inp and ATR_LoosePlate_HAC_Rev0.inp. However, Table 3.2-6 “HAC Thermal Radiative Properties” states that the Outer Shell, Exterior Surfaces (Type 304 Stainless Steel) absorptivity is 0.90. This information is necessary to determine compliance with 10 CFR 71.73(c)(4).

3-6 Revise the application to clarify or justify the following apparent discrepancies between the equations for in Section 3.5.2.3 of the application and those in the SINDA analysis. This information is needed to show compliance with 10 CFR 71.35.

(a) For convection from a vertical surface, for Nu_L the equation in Section 3.5.2.3, page 3-36, uses a value of 2.0 in both the numerator and denominator, whereas frcvv.f, line 70, apparently uses 2.8 (NUL = 2.8/(LOG(1. + 2.8/NUT)).

(b) For convection from a vertical surface, for N_t, the equation in Section 3.5.2.3, page 3-36, includes a bracketed factor in the denominator that is not included in the analysis, where line 71 reads NUT = CTURB * RA**.3333333.

3-7 Revise the application to clarify or justify the following apparent discrepancy between the equation for Nu_L for convection from horizontal surfaces in Section 3.5.2.3 and in the SINDA analysis. This information is needed to show compliance with 10 CFR 71.35.

In the SINDA equation (in frcvhd.f on line 82 and in frcvhu.f on line 70) 1.677 is multiplied by RA**0.25, whereas the equation in Section 3.5.2.3 shows that 1.677 should be divided by RA**0.25.

3-8 Provide further description of the thermal decomposition of the neoprene rubber and polyethylene plastic material under accident conditions.

In section 3.1.3 it is stated, "While the neoprene rubber and polyethylene plastic material used to protect the ATR fuel element from damage are expected to reach a sufficient temperature level during the HAC fire event to induce thermal decomposition the loss of these components is not critical to the safety of the package." The meaning of the phrase "thermal decomposition" is not clear. Note that the presence and form of the decomposed material could affect the criticality analysis for the package (see Item 6-1, below). This information is needed to ensure compliance with 10 CFR 71.33(a)(5)(iii).

CRITICALITY

6-1 Revise the application to address the possible effects of neoprene in the criticality analysis for the package.

Drawing No. 60501-30 for the Fuel Handling Enclosure shows that the assembly is lined with neoprene. As a hydrocarbon material, neoprene can act as a neutron moderator. The impact of the neoprene should be addressed in the criticality analysis, including possible affects of accident conditions on the neoprene (e.g., melting or decomposition). Clarify whether neoprene or other hydrogenous material is used in the Loose Plate Basket. See also Item 3-9, above. This information is needed to confirm compliance with 10 CFR 71.55(b), 71.55(d), and 71.59(a).

6-2 Revise Section 6.1.2 of the application to clarify the results of analyses that are directly applicable to 71.55(b), i.e., a single package optimally flooded, with the fissile material in its most reactive configuration, and with close full reflection of the containment system by water, or such greater reflection of the containment system as may additionally be provided by the surrounding material of the packaging.

The application provides results of criticality analyses for a single package, but does not clearly identify that these results satisfy the requirements of 10 CFR 71.55(b).

6-3 Revise Section 6.3.1 of the application to clarify the basis of the assumption that water inleakage does not occur under normal conditions of transport.

For normal conditions, it is assumed that no water enters the containment system. The basis for this assumption is not clear, since the water spray test was not performed and the closure has no gasket or seal. This information is needed to show compliance with 71.55(d) and 71.59(a). See also Item 6-4, below.

6-4 Provide an analysis of an array of 5N packages subjected to the tests specified in 10 CFR 71.71 with moderation present to the extent that causes maximum reactivity consistent with the chemical and physical form of the package and its contents. Alternatively, demonstrate that there would be no leakage of water into the containment system under the normal conditions of transport tests.

The provisions of 10 CFR 71.55(d)(3) require the package to be designed so that there would be no leakage of water into the containment system of a package subjected to the tests in 10 CFR 71.71 unless the package array evaluation for 10 CFR 71.59(a)(1) assumes the package is moderated so that reactivity is maximized. The currently proposed criticality analysis for an array of packages under normal conditions of transport assumes no water leakage. However, the application indicates that there was no test performed to demonstrate that water would not leak into a package subjected to the normal conditions tests; the packaging closure system contains no gaskets or seals that would prevent water in-leakage; and the application states (Section 3.1.1) that any outgassing from hydrogenous materials within the package will readily vent through the closure. Thus, the criticality analysis for the package array (for both contents types) for 10 CFR 71.59(a)(1) should assume optimum moderation of the packages, or it should be demonstrated that water will not leak into a package subjected to the normal conditions tests. For the analysis with the loose fuel plate contents, the assumed pitch becomes important under flooded conditions; therefore, the basis for the selected pitch should be provided and justified.

6-5 Revise the application to consider the axial rotation of packages in the analysis of arrays of undamaged packages.

The analysis in Section 6.5 assumes that the fuel element orientation is the same in all packages under normal conditions of transport. However, there is no technical basis or justification given for this assumption. Consideration should be given for the possibility of axial rotation of packages when evaluating package arrays. This information is needed to confirm compliance with 10 CFR 71.59(a).

6-6 Revise the criticality evaluation to consider dimensional tolerances for the packaging and contents that result in the most reactive configuration.

The current criticality analysis is based upon nominal dimensions for both the packaging and the proposed contents. The impact of tolerances, both of the packaging and the proposed contents, upon reactivity needs to be considered in the analysis. Staff calculations indicate that the affect on reactivity may be significant, especially considering the margin between the applicant's most reactive model and the upper subcritical limit (USL), sensitive to these tolerances. This information is needed to confirm compliance with 10 CFR 71.55(b) and 71.59(a).

6-7 Justify the use of code input files in the benchmark analysis that were developed by analysts other than the analyst performing the criticality analysis for the ATR FFSC.

As stated in NUREG/CR-5661, "Recommendations for Preparing the Criticality Safety Evaluation of Transportation Packages," the particular analyst and calculation models are a source of uncertainty that should be considered in a benchmark analysis. Different analysts use different modeling techniques that may impact the calculation results. When a benchmark is performed with input files developed by different analysts, this

uncertainty cannot be properly captured. The use of others' code input files may be justified by a demonstration that the modeling techniques used by the ATR FFSC criticality analyst are the same as those used by the analysts who created the benchmark files and/or that any differences do not result in statistically significant impacts on the reactivity calculations for the ATR FFSC package. This information is needed to confirm compliance with 10 CFR 71.55 and 71.59.

6-8 Confirm that the benchmark analysis includes the preliminary ENDF/B-VII cross section libraries that are used in the ATR FFSC analysis.

The package analysis uses ENDF/B-VII libraries for the uranium isotopes (Section 6.3.3 of the application). The benchmark analysis section (Section 6.8) only discusses ENDF/B-V and ENDF/B-VI cross section libraries. Thus it is not clear that the ENDF/B-VII libraries used in the package analysis are properly benchmarked. A proper benchmark analysis includes all cross section libraries used in the package analysis. This information is needed to confirm compliance with 10 CFR 71.55 and 71.59.

6-9 Provide additional justification of the applicability of the selected critical experiments as benchmarks for the ATR FFSC criticality analysis.

The application states that selection criteria only included that the experiments be of plate-type high-enriched uranium fuel with a thermal spectrum. While the selected experiments meet these criteria, inspection of the experiments revealed that some of the experiments have features that are quite different from those of a loaded ATR FFSC which would seem to make these experiments not applicable to the current package analysis. These features include different fuel form (oxide fuel versus metal fuel), the presence of strong neutron absorbers in solid form or solution, solid reflecting materials, and fissile material in solution with the moderator. Staff also noticed in the *International Handbook of Evaluated Criticality Safety Benchmark Experiments* an additional set of experiments for high-enriched plate-type fuel, HEU-MET-THERM-011. Discuss why this set of experiments was not considered in the benchmark analysis. The benchmark analysis should use a set of critical experiments that have, to the maximum extent practical, characteristics that are the same as those of the loaded ATR FFSC with any differences identified and properly considered. This information is needed to confirm compliance with 10 CFR 71.55 and 71.59.

6-10 Revise the evaluation of the upper subcritical limit (USL) in Section 6.8.2 to consider parameters not addressed, and to analyze for trends in subsets of the benchmark data.

The current benchmark analysis considers only the energy of the average neutron lethargy causing fission (EALF) and the U-235 number density in determining the USL. The applicant should also consider other important parameters such as the Hydrogen/U-235 atom ratio, moderator channel thickness, and plate pitch. Consideration of these parameters will ensure calculation of an appropriate USL. Consideration of these parameters as well as the EALF and U-235 number density should also include analysis of subsets of the critical experiments with similar characteristics to identify any trends in the data that may not be discernable in an analysis of the entire experiment set. For example, staff calculations indicate differences in trends, and hence the USL, when only experiments with metal alloy fuels and pure water moderator where included in the USL determination. This information is needed to confirm compliance with 10 CFR 71.55 and 71.59.

6-11 Demonstrate that the package analysis is within the ranges of the benchmark analysis's applicability.

The application provides the ranges of applicability of the benchmark analysis but does not show that the ATR FFSC analysis falls within the applicability ranges of the considered parameter values. In addition to providing the ranges of applicability for all considered package parameters (see also Items 6-9 and 6-10, above), the application should include information indicating the ATR FFSC analysis falls within those ranges. For those parameters where the package analysis is not captured by the applicability range of a parameter, extension/extrapolation to capture the package analysis may be acceptable as long as the extension is not large and the extension accounts for trends in the bias and the bias uncertainty with respect to the parameter and uncertainty due to lack of benchmark data in the area where the trend is extended. This information is needed to confirm compliance with 10 CFR 71.55 and 71.59.

6-12 Provide a copy of Drawing 405400, Revision 19.

The application references Drawing 405400, Revision 19, as the source of the dimensions of an ATR fuel element. However, this drawing is not provided. This drawing is needed to verify the dimensions of a fuel element and to examine the dimension tolerances to ensure the most reactive conditions are evaluated. This information is needed to confirm compliance with 10 CFR 71.33(b), 71.55 and 71.59.

6-13 Revise Section 6.3.1.1 of the application to justify neglecting the Fuel Handling Enclosure (FHE) in the criticality analysis.

The presence of the FHE in the package creates the possibility for preferential flooding in the package. Neglecting the FHE ignores this possibility. Preferential flooding due to the presence of the FHE should be addressed in the criticality analysis to ensure the most reactive package conditions (whether the FHE is included or not included) are evaluated. This information is needed to confirm compliance with 10 CFR 71.55(b) and 71.59.

6-14 Clarify that while no damaged plate models were developed for the loose plate contents, any effects of such damage would be bounded by consideration of optimum pitch in the damaged package analysis.

The last paragraph on page 6-10 of the application notes that no damaged plate models were developed for the criticality analysis involving loose plate contents. The basis for this determination is also provided. Staff notes, however, that the accident conditions analysis does appear to bound any kind of reactivity effects that would be introduced by damage to the plates. The accident conditions analysis examines various uniform and non-uniform pitch values, selecting the pitch condition that maximizes reactivity. A statement concerning this aspect of the analysis should be added to the referenced application paragraph. This information is needed to confirm compliance with 10 CFR 71.35 (a).

7. PACKAGE OPERATIONS

7-1 Revise the application to address the following items with respect to the Package Operations. This information is needed to ensure compliance with 10 CFR 71.87 and 71.35.

(a) Specify that the maximum payload weight does not exceed 20 pounds for the Loose Fuel Plate Basket (LFPB). Section 3.1.1.4 states that the maximum payload weight for the LFPB is limited to 20 lbs, but in Section 7 there is no operational step to make sure this weight limit is not exceeded.

(b) Include an operational step that verifies the physical condition of the Fuel Handling Enclosure (FHE) or the LFPB, as appropriate, including fastening devices. The currently proposed operations in Section 7.1.1 of the application, "Preparation for Loading," do not include a check of the condition of the contents holders (i.e., the FHE and LFPB) and their fasteners.

(c) Include an operational step in Section 7.1.3 that specifies that curved and flat fuel plates will not be loaded in the same package. The application stated in Section 6.6.1.2 of the application that curved and flat plates will not be loaded together in the same package.

(d) Include an operation step in Section 7.1.3 that confirms the fissile mass of the contents does not exceed the allowable fissile mass limit. The criticality analysis relies upon a mass limit of 600 g uranium-235 for criticality safety for the loose plate contents. Section 6.6.1.2 indicates that the loose fuel plate contents may contain a mixture of different plate types, each type having a different fissile mass.

(e) Clarify Section 7.1.1 that package loading and unloading is performed using detailed written procedures. Section 7.1.1 references user written procedures, however, it should be clear that loading and unloading activities (in addition to those addressed in Section 7.1.1) should be performed in accordance with these detailed procedures.

(f) Revise Sections 7.1.2 and 7.1.3 to provide more detail with respect to the visual check that confirms that the spring-loaded pins are properly engaged. It is not clear what indicates that the pins are properly engaged.

(g) Include operational considerations regarding dunnage within the package (see Item 1-1, above).

(h) Revise Section 7.1.4 to clarify that the external surfaces of each package must be monitored for removable surface contamination, not just accessible surfaces after they are racked.

(i) Revise the application to describe how the package operations in Section 7 meet the requirements of 10 CFR 71.87(j), which specifies that, prior to each shipment, the shipper must determine that the external radiation levels around the package will not exceed the limits specified in 10 CFR 71.47 at any time during transportation. Alternatively, revise Sections 7.1.4 and 7.2.1 to include external

radiation surveys. Note that Section 5.0 of the application states that gamma and neutron radiation surveys will be performed prior to transport to demonstrate compliance with 10 CFR 71.47.

(j) Revise Sections 7.1.2 and 7.1.3 to include additional details with respect to loading and closure of the fuel plate basket and the fuel handling enclosure. It is not clear how these components are opened, loaded, then properly closed.

8. ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8-1 Revise Section 8.1 of the application to clarify that each packaging, including assembly, dimensions, tolerances, etc., must meet the drawings in Appendix 1.3.2, to assure compliance with 10 CFR 71.85(c). Section 8.1.1 specifies that (only) materials of construction need to be examined for compliance with the drawings.

8-2 Revise Section 8.2 of the application to clarify the periodic maintenance that is performed for this package.

Section 8.2 states that it provides the maintenance program for the package, however, no specific maintenance items are specified. Note that Section 8.2.3 states that there are no threaded fasteners that would be expected to wear or become damaged; however, it appears that the LFPB includes a number of threaded fasteners that serve a safety function in transport. This information is needed to provide assurance that the package will meet the performance standards in 10 CFR 71, Subpart E, throughout its service life.

9. QUALITY ASSURANCE

9-1 Revise the application to address the quality assurance requirements in 10 CFR Part 71.

A description of the applicable quality assurance program should be included as specified in 10 CFR 71.31(a)(3), and 71.37(a) and (b). The program should address the 18 criteria specified in Subpart H of 10 CFR Part 71. Note that information provided in NRC Regulatory Guide 7.10 and the Department of Energy's application for the Model No. S300 package (Docket No. 71-9329) may be useful.

EDITORIAL

E-1 The following editorial comments are noted for information and should be corrected. However, these items do not need to be addressed in an RAI response.

(a) Section 2.3.1 includes an incorrect reference to the section that contains the packaging drawings (Section 1.3.2 or Appendix 1.3). Section 2.3.1 states, "All components are fabricated in accordance with the requirements delineated on the drawings in Appendix 1.3.1, *Packaging General Arrangement Drawings*" but section 1.3.1 is the Glossary of Terms.

(b) Sections 1.2.1.1.2 and 3.1.1.2 have different weights for the closure. Section 1.2.1.1.2 states the closure weighs approximately 9 lbs whereas section 3.1.1.2 states the closure weighs approximately 10 lbs.

(c) In Figure 3.3-1 “ATR FFSC Package Heat-up, NCT Hot Conditions”, the data for “Outer Shell – Max.” appears to be hidden by the “Insulation Jacket – Max.” on this figure.

(d) In Section 3.4.1 the superscript “Error! Bookmark not defined.” should be removed.

(e) Provide units in the columns for “Plate Thickness” and “UAl_x Thickness” in Table 3.5-1 – Composite Fuel Plate Thermal Properties.”

(f) Clarify the column labeled, “Thickness, in” in Table 3.5-1 – Composite Fuel Plate Thermal Properties.”

(g) Clarify the column labeled, “Radial conductivity (W/m-K)” in Table 3.5-1 – Composite Fuel Plate Thermal Properties.” “Radial conductivity (W/m-K)” is labeled in Table 3.5-1, but in section 3.5.2-4 a general equation is given for circumferential and axial conductivity.

(h) Clarify or justify the apparent discrepancy between the value of Lc (height of the package sides) specified in the ATR_Rev2.inc code comments (lines 105 and 111) and in that used in the analysis (lines 106 and 112). The comments specify that Lc = 8”=0.67’, however, the value used in the analysis appears to be 0.25.

In ATR_Rev2.inc, line 105 (comment) reads:
C Ambient_To_Package Vertical Sides, Lc = height of sides = 8"= 0.67'
However, in ATR_Rev2.inc, line 106 specifies Lc = 0.25:
CALL FOREXCV (HCVERT, OUTTUBE.T77, AMBNT.T1, 1., 0.25, GCONST,

In ATR_Rev2.inc, line 111 (comment) reads:
C Ambient_To_Package End, Vertical Surface, Lc = height of sides = 8"= 0.67'
However, in ATR_Rev2.inc, line 112 specifies Lc = 0.25:
CALL FOREXCV (HCEND, PLUG.T80, AMBNT.T1, 1., 0.25, GCONST,