

May 13, 2010

Dr. James M. Shuler  
Manager, Packaging Certification Program  
U.S. Department of Energy  
Office of Safety Management and Operations, EM-45  
1000 Independence Avenue, S.W.  
Washington, DC 20585

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - MODEL NO. S300 FISSILE  
MATERIAL TRANSPORT PACKAGE

Dear Dr. Shuler:

Multiple foreign competent authorities identified multiple concerns regarding the safe use of the S-300 transportation package and the NRC subsequently validated these concerns. Specifically, the German Competent Authority raised concerns regarding the criticality analysis and the French Competent Authority subsequently identified concerns related to the structural and thermal analyses. Once the German Competent Authority identified concerns, the NRC requested and DOE subsequently halted shipments using the S-300 transportation package.

The NRC performed its own safety assessment of the package and validated the identified concerns, performed its own thorough review of previous safety findings, and has identified additional issues, which are included in the enclosed Request for Additional Information (RAI).

DOE is requested to perform a broad review of the Safety Analysis Report to ensure that no other related quality concerns exist with the S-300 package. This review must be completed before the staff will issue a Certificate of Compliance for use of the S-300.

In order for us to complete our review on a schedule necessary to support your needs, you should provide the results of your broad review and your response to the enclosed RAIs by May 21, 2010. Inform us at your earliest convenience if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay. Additionally, DOE is requested to perform a review of similar DOE packages for which NRC certificates have been issued by reviewing the original analyses performed to determine whether similar issues exist by August 13, 2010. Should you have any questions, please do not hesitate to contact me at (301) 415-3294.

Sincerely,

**/RA/**

Eric Benner, Chief  
Licensing Branch  
Division of Spent Fuel Storage and Transportation  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 71-9329  
Enclosure: Request for Additional Information

Dr. James M. Shuler  
 Manager, Packaging Certification Program  
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DATE	5/10/10		5/10/10		5/10/10		5/10/10	5/10/10

  

OFC	SEST		SEST		SEST		SEST	
NAME	LCambell		MRahimi		CRegan		MDeRose	EBenner
DATE	5/10/10		5/10/10		5/10/10		5/11/10	05/13/2010

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Request for Additional Information  
U.S. Department of Energy (DOE)  
(Los Alamos National Laboratory)  
Docket No. 71-9329  
Model S300 Fissile Material Transport Package

Chapter 2. Structural Evaluation

1. Justify the assumption that the maximum interface pressure imparted to the Special Form Capsule (SFC) body is equal to the flow stress of polyethylene when the pipe component is subjected to the forces from a dynamic crush test.

The staff does not have reasonable assurance that the maximum stress on the SFC body due to an 1100 lb plate striking the pipe component is less than the maximum stress imposed on the 30 lb SFC body during a 30 foot free drop of the SFC alone.

This information is necessary to determine compliance with 10 CFR 71.73 (c) (2)

2. Evaluate effects of the special form contents on the material of the special form capsule (SFC) during the hypothetical fire accident.

SAR section 3.4 provides a thermal analysis which states that the SFC will attain a temperature of 1425 degrees F during a hypothetical fire accident. This is well above the melting point for plutonium metal (1184 degrees F) and plutonium alloys. Molten plutonium and its alloys are known to corrode type 304 stainless steel, which is the material of the SFC. SAR section 2.2.2 does not address this potentially adverse chemical reaction and its effect on the integrity of the SFC. (See Thermal RAI 1a)

This information is required for compliance with 10 CFR 71.43(d).

3. Evaluate the consequence of having air instead of an inert atmosphere inside the SFC during the hypothetical fire accident. Specifically address the pyrophoric nature of the plutonium-bearing contents.

SAR section 2.2.2 does not address this potentially adverse chemical reaction.

This information is required for compliance with 10 CFR 71.43(d).

4. Evaluate whether or not melted/gaseous HDPE or the combustion products of burning HDPE would have a deleterious effect on the SFC or the pipe component ("confinement" vessel).

SAR section 3.4 provides a thermal analysis which states that the SFC will attain a temperature of 1425 degrees F during a hypothetical fire accident. This is well above the ignition temperature and melting and boiling points for HDPE, the shield insert material. Although the thermal analysis is intended to be bounding and not realistic, it may be reasonably expected that the pipe component and contents will at least reach the melting point (210 degrees F) of the shield insert material (HDPE) during a hypothetical fire accident when it is considered that the pipe component is not assumed to remain inside

the shipping drum after a hypothetical drop accident.

SAR section 2.2.2 does not address this potentially adverse chemical reaction.

This information is required for compliance with 10 CFR 71.43(d).

### Chapter 3. Thermal Evaluation

1. Justify that the contents in the Special Form Capsule (SFC) will not result in adverse conditions to the SFC during the 30 minute hypothetical accident conditions test.
  - a) The thermal evaluation under hypothetical accident conditions assumes that the SFC is ejected from the S300 packaging. Although the SFC has been designed and DOT approved for a 10 minute heat test at 1475 degrees F, once it is ejected from the package during the hypothetical accident condition scenario, it becomes necessary for the SFC to satisfy the 30 minute, 1475 degrees F fire test and post-fire analysis requirements of 10 CFR 71.73. (See Structural RAI 2)
  - b) Per 10 CFR 71.73, evaluation for hypothetical accident conditions is for a particular package. Since there are two SFC designs, evaluation should be performed for each unless clear, technical reasons are provided to indicate that a single design is bounding.

This information is needed to determine compliance with 10 CFR 71 (71.43(d), 71.63, 71.73).

2. Provide a calculation showing that the surface temperature of the package does not exceed non-exclusive use temperature requirements.

The calculations show that the NCT maximum temperature is 165 degrees F. Page 1-5 of the SAR indicates that both exclusive and non-exclusive use will apply to the S300 package. Per 10 CFR 71.43 (g), no accessible surface of a package should have a temperature exceeding 122 degrees F in a non-exclusive use shipment.

This information is needed to determine compliance with 10 CFR 71 (71.43(g)).

3. Provide the calculation that shows the convection coefficient used in the HAC analysis is "conservatively high".

Page 3-9 states that the HAC convection coefficient is "conservatively high". A basis for this statement should be provided.

This information is needed to determine compliance with 10 CFR 71 (71.73).