

January 12, 2010

MEMORANDUM TO: Doug Weaver, Deputy Director  
Licensing and Inspection Directorate  
Division of Spent Fuel Storage and Transportation, NMSS

FROM: Pierre Saverot, Project Manager **/RA/**  
Licensing Branch  
Division of Spent Fuel Storage and Transportation, NMSS

SUBJECT: SUMMARY OF DECEMBER 22, 2009, MEETING WITH AOS

#### PURPOSE

On September 14, 2009, Alpha-Omega Services, Inc. (AOS) submitted an application for approval of the Model Nos. AOS-025, AOS-050, and AOS-100 packages, after responding to a Request for Supplemental Information (RSI) dated July 31, 2009. On October 28, 2009, Management approved a staggered Request for Additional Information (RAI) process for this high priority application. This meeting was set up to provide AOS the opportunity to request clarification on the RAIs.

#### MEETING SUMMARY

AOS expressed its "surprise" on the number of RAIs received in November and December 2009, and said that it will be working diligently on the responses. Staff mentioned its disappointment regarding the lack of quality, e.g., inconsistent values and parameters, of the application even after being revised in September in response to the RSIs.

Staff indicated that (i) the structural RAI to determine if the package meets the requirements for "special form" material was being rewritten, (ii) there were numerous mistakes in the tables, including incorrect weight values for the AOS packages, leading to a question on crush test requirements, (iii) in many instances, the text of the application refers to pictures and figures that no longer exist and staff cannot correlate the analyses with the text, (iv) since the applicant calculates doses at the personnel barrier, staff needed to have details on the deformed shape of the barrier during an NCT event. On this particular point, AOS answered that there is a deformation of about 1/10" and that it will include an analysis of the loading conditions. Staff replied that such information is missing and needs to be included in the application.

Regarding the RAI on the justification of the impact limiter deformation values when the density of the foam material for the AOS-050 and AOS-100 packages is one half of the density of the foam for the AOS-165 model that was tested, staff said that this is a cross-cutting issue with the thermal evaluation of the package and that it needs to see an argument on how the applicant scales the test results to check if they are conservative. AOS answered that there is very little change in the deformation of each package when making an adjustment in the density, and staff concluded that this type of argument should be clearly stated and justified in the application.

Staff asked if the formula used to perform the buckling analysis was appropriate for this application and AOS said that it is and that it is using a very conservative coefficient of 1.82. Staff requested the chart comparisons between the finite element model and the actual material stress-strain properties. AOS answered that:

- (i) It will provide both the input file and the materials data,
- (ii) It will provide the numerical values for the total impact force and the pressure load, and
- (iii) It will include 2 tables for each configuration that will show all applied loads for the head-on, side, and corner drops.

Staff requested AOS to include the location of the nodes on the model and to show the magnitude of the force at each node.

Regarding the comparison of the maximum analysis displacement to the post-test deformation, as reported in Chapter 8 of the application, AOS acknowledged that the foam may have some "restitution capability" after the rebound but said that the manufacturer indicated that the 3-ft rebound from a 30-ft drop is due to the steel shell, not to the foam itself. Staff said that (i) it was not privy to any conversation between AOS and the manufacturer, (ii) it cannot approve what it does not know, and (iii) AOS must show why this approach is conservative.

Regarding the containment RAIs, staff said that (i) it appears that the containment boundary goes right through the seal and the blow-up of detail A in Figure 4-1 is not correct, and (ii) the actual containment lines must be indicated. AOS agreed with staff's position.

Regarding Appendix 4.5 of the application, AOS said that:

- (i) The appendix was included to show that materials are qualified at higher temperatures than the manufacturer's rated maximum temperatures.
- (ii) It understood staff's position on the impossibility to "qualify" materials for package certification, e.g., seals, if they are not exposed to regulatory tests such as a 30 minute fire, etc.
- (iii) It acknowledged that Section No. 7.3.3 of the application did not include a necessary review of the maintenance records.

Regarding the shielding RAIs, AOS stated that:

- (i) It will address staff's concerns that the gamma source term was non-conservative for certain nuclides.
- (ii) It will capture all issues raised by staff in RAIs 5.1 and 5.4 by submitting new calculations using ORIGEN-S to cover all potential energy gammas.
- (iii) It will change the Zr/Nb-95 source so that it is at peak reactivity rather than justifying the transient conditions for Zr/Nb-95.
- (iv) It believes that the point source approximation (rather than a linear source) is conservative and confirmatory runs will be performed to justify this approach.
- (v) It intends to use axial shielding plates regardless of the sources being transported.
- (vi) It will rewrite the analysis presented in the shielding section and modify the text in Table 1-6 of the application.

- (vii) Credit is taken for the distance to the personnel barrier and AOS will provide to staff the requested information demonstrating that the minimum distance to the personnel barrier is preserved during NCT.

Staff stated that the safety categories of the components of the package must be indicated on the Bill of Materials and that AOS shall make sure that the lid seal temperature limits are appropriate for each package, e.g., 572°F applies to the AOS-100 package and 536°F applies to both the AOS-025 and 050 packages. AOS said that it will clarify those issues as well as the dimensions of the seals for each package. AOS also concurred on staff's observations that:

- (i) Procedures specific to the AOS-100B package need to be included in the application,
- (ii) Marking and labeling of the package should be described as part of the operating procedures,
- (iii) Maximum component temperatures should be properly reported in Table No. 3-4 of the application,
- (iv) Two tables, one for NCT, the other one for HAC, will show the name of the component vs. the maximum temperature limit for that component,
- (v) Clarification is needed on how the decay heat and solar insolation were modeled using convection elements,
- (vi) The same gaps shall be used throughout the analysis and a sensitivity study of the gaps must be performed to prove that closing the gaps is not an issue,
- (vii) It will explain in the application why it takes credit for the gap.

Staff stated that most applicants replace the foam with air during the post-fire cooldown because it provides a slower cool-down process, thus a more conservative and easier approach. Staff indicated that the other approach, i.e., argue and quantify what happens to the material in a fire test and explain how the foam behaves, is more challenging because the foam will not behave the same way during different tests.

At the end of the meeting, AOS made it known that it will request a schedule extension for responding to all RAIs. Materials have already been ordered for two AOS-100 packages and it should take no more than 10 weeks after CoC issuance to complete the fabrication of one package.

The enclosure is the list of meeting attendees. The staff did not make any regulatory commitments at the meeting.

Docket No. 71-9316  
TAC No. L24353

Enclosure: List of Meeting Attendees

- (viii) Credit is taken for the distance to the personnel barrier and AOS will provide to staff the requested information demonstrating that the minimum distance to the personnel barrier is preserved during NCT.

Staff stated that the safety categories of the components of the package must be indicated on the Bill of Materials and that AOS shall make sure that the lid seal temperature limits are appropriate for each package, e.g., 572°F applies to the AOS-100 package and 536°F applies to both the AOS-025 and 050 packages. AOS said that it will clarify those issues as well as the dimensions of the seals for each package. AOS also concurred on staff's observations that:

- (i) Procedures specific to the AOS-100B package need to be included in the application,
- (ii) Marking and labeling of the package should be described as part of the operating procedures,
- (iii) Maximum component temperatures should be properly reported in Table No. 3-4 of the application,
- (iv) Two tables, one for NCT, the other one for HAC, will show the name of the component vs. the maximum temperature limit for that component,
- (v) Clarification is needed on how the decay heat and solar insolation were modeled using convection elements,
- (vi) The same gaps shall be used throughout the analysis and a sensitivity study of the gaps must be performed to prove that closing the gaps is not an issue,
- (vii) It will explain in the application why it takes credit for the gap.

Staff stated that most applicants replace the foam with air during the post-fire cooldown because it provides a slower cool-down process, thus a more conservative and easier approach. Staff indicated that the other approach, i.e., argue and quantify what happens to the material in a fire test and explain how the foam behaves, is more challenging because the foam will not behave the same way during different tests.

At the end of the meeting, AOS made it known that it will request a schedule extension for responding to all RAIs. Materials have already been ordered for two AOS-100 packages and it should take no more than 10 weeks after CoC issuance to complete the fabrication of one package.

The enclosure is the list of meeting attendees. The staff did not make any regulatory commitments at the meeting.

Docket No. 71-9316  
TAC No. L24353

Enclosure: List of Meeting Attendees

Distribution: SFST r/f NMSS r/f NRC Attendees  
G:/SFST/Saverot/71-9316 AOS/AOS Meeting December 22, 2009doc.

<b>OFC</b>	SFST	E	SFST	C	SFST			
<b>NAME</b>	PSaverot		MDeBose		EJBenner			
<b>DATE</b>	12/28/2009		1/12/2010		1/12/2010			

C=Without attachment/enclosure E=With attachment/enclosure N=No copy **OFFICIAL RECORD COPY**

**Meeting Between Alpha-Omega Services, Inc.  
And The  
Nuclear Regulatory Commission  
December 22, 2009  
Meeting Attendees**

**NRC/NMSS/SFST**

Chris Bajwa	301-492-3333
Eric Benner	301-492-3294
Chris Cook	301-492-3327
Bob Einziger	301-492-3281
JoAnn Ireland	301-492-3309
Haile Lindsay	301-492-3280
Ray Lorson	301-492-3310
Meraj Rahimi	301-492-3338
Pierre Saverot	301-492-3408
Bob Tripathi	301-492-3282
Mike Waters	301-492-3297
Veronica Wilson	301-492-3278

**RJP & Associates**

Raul Pomares	925-980-9892
--------------	--------------

**AOS**

Troy Hedger	562-804-0604
Bob Robnett	

**GE**

Harold Durllofsky  
David Turner  
Mike Schrag  
Jerry Ushiyama  
Erik Kirstein