~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

December 12, 2017

Mr. Troy Hedger
President
Alpha-Omega Services, Inc.
9156 Rose Street
P.O. Box 789
Bellflower, CA 90706

SUBJECT: CERTIFICATE OF COMPLIANCE NO. 9316, REVISION NO. 8, FOR THE MODEL NOS. AOS-25A, AOS-50A, AOS-100A, AOS-100B, AND AOS-100A-S PACKAGES

Dear Mr. Hedger:

As requested by your application dated October 6, 2017, supplemented November 29, 2017, enclosed is Certificate of Compliance No. 9316, Revision No. 8, for the Model Nos. AOS-25A, AOS-50A, AOS-100A, AOS-100B, and AOS-100A-S packages. The staff's safety evaluation report is also enclosed.

The approval constitutes authority to use the package for shipment of radioactive material and for the package to be shipped in accordance with the provisions of Title 49 of the *Code of Federal Regulations* (49 CFR) 173.471. Those on the attached list have been registered as users of the package under the general license provisions of 10 CFR 71.17 or 49 CFR 173.471.

If you have any questions regarding this certificate, please contact Pierre Saverot of my staff at (301) 415-7505.

Sincerely,

/RA/

Meraj Rahimi, Acting Chief
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9316
EPID No. L-2017-LLA-0358

Upon removal of Enclosure 3, this document is uncontrolled

Enclosures: 1. Certificate of Compliance No. 9316, Rev. No. 8
2. Safety Evaluation Report
3. Registered Users

cc w/encls. 1&2: R. Boyle, Department of Transportation
J. Shuler, Department of Energy, c/o L. Gelder

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

SUBJECT: CERTIFICATE OF COMPLIANCE NO. 9316, REVISION NO. 8, FOR THE MODEL NOS. AOS-25A, AOS-50A, AOS-100A, AOS-100B, AND AOS-100A-S PACKAGES, DOCUMENT DATE: December 12, 2017

DISTRIBUTION: SFST r/f RPowell, RI SWalker, RII MKunowski, RIII RKellar, RIV

Closes EPID No. L-2017-LLA-0358

Filename: G:\SFST\PART 71 CASEWORK\Model AOS-025A AOS-050 & AOS-100A Docket 71-9316\ 9316.R8.doc; 9316.R8.LETTER&SER.doc

ADAMS PKG: ML17353A031 ADAMS P8 Letter No.: ML17353A032

E=With attachment/enclosure N=No copy C=Without attachment/enclosure

OFC	SFM	E	SFM	SFM	N	SFM	SFM	N
NAME	PSaverot		JWise	TAhn		SFigueroa	MRahimi	
DATE	12/07/17		12/08/17	12/08/17		12/12/17	12/12/17	

OFFICIAL RECORD COPY

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

SAFETY EVALUATION REPORT

Model Nos. AOS-025A, AOS-50A, AOS-100A, AOS-100B, and AOS-100A-S Packages
Certificate of Compliance No. 9316
Revision No. 8

SUMMARY

By application dated October 6, 2017, supplemented November 29, 2017, Alpha-Omega Services, Inc. (AOS) submitted an amendment request to add an option to the thread sealant used on the threaded pipe plugs. AOS is proposing to use the Loctite Thread Seal Tape No. 39904, rated for continuous service at a temperature of 500°F (260°C), as an option to the currently authorized Thread Sealant Loctite No. 5770.

AOS is also making several clarifications and corrections on the Licensing Drawings to allow for more material options during fabrication and also provide operational flexibility.

Based on the statements and representation in the application, as supplemented, and the conditions listed below, the staff concludes that the proposed changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

EVALUATION

The family of AOS transportation packages consists of the AOS-025A, AOS-050A, AOS-100A, AOS-100B, and AOS-100A-S. The “A” designation refers to a tungsten shield, and the “B” designation refers to a carbon steel shield. The “S” designation on the AOS-100A-S means that the cask is double ended and there is a lid on each end of the cask. All of the packages have the same geometric shape, with the AOS-025 and AOS-050 having all dimensions scaled down to 25% and 50% (respectively) of the dimensions of the AOS-100 package.

The general design of the packages was not modified.

The applicant made several minor revisions to the licensing drawings, such as expanding the choice of methods for maintaining surface finishes, including additional notes regarding the lubrication of threaded components, and clarifying material or dimension requirements. The staff reviewed the revisions to the licensing drawings and verified that the modifications will not adversely impact the use of the package.

The applicant revised the material specifications for several components to allow ASTM standard “equivalents” to the ASME Boiler and Pressure Vessel Code (ASME Code) grades that were previously approved for the package. The staff notes that these specification’s revisions were limited to components that do not have a containment function (e.g., shipping cage, pallet, cradle). The applicant stated that the option of using ASTM grades was added to improve the availability of materials.

The staff verified that, for each proposed ASTM specification, the requirements for chemical composition, heat treatment, and mechanical properties are identical to the requirements for the corresponding ASME Code grade that is already approved for use. Therefore, because the use of the ASTM specifications assures that the mechanical properties of materials will be identical to those currently used in the package, and because of the fact that non-Code materials are not

proposed for containment boundary components, the staff finds the optional use of ASTM grades to be acceptable.
The applicant revised the licensing drawing notes associated with the cask port plugs to allow the use of polytetrafluoroethylene (PTFE) thread tape as an alternative to the currently used liquid thread sealant. The applicant stated that the PTFE tape provides an alternative method of lubricating the plug threads. The staff notes that the use of a lubricant for stainless steel pipe threads is common to reduce friction and prevent thread galling, i.e., wear and seizing. The port plugs comprise the primary containment for the vent and drain ports, and a redundant seal is provided by a port cover and O-ring.

The staff reviewed the material properties and leakage test results to ensure that the plugs with PTFE tape can support the package containment function under normal conditions of transport and hypothetical accident conditions. The staff notes that the manufacturer data sheet for the PTFE tape states that it can operate at temperatures up to 260°C (500°F)(Henkel, 2006), and this limit is also cited in the DuPont Teflon® PTFE Properties Handbook as the maximum continuous service temperature (DuPont, 1996). In comparison, Table 3-4 of the application states that the maximum hypothetical accident temperature of the threaded port plugs for all variants of the package is 227°C (441°F). To demonstrate the ability of the plugs to maintain containment with the PTFE tape as a lubricant, the applicant provided helium leakage testing data showing that the drain port plug and vent port plug wrapped with three full turns of the PTFE tape had a leakage rate less than $1x10^{-7}$ atm-cm^3/s (Leak Testing Specialists, 2016). The staff confirmed that the operating procedures describe complete removal of any previously used Loctite PTFE thread seal tape and the application of three full turns of Loctite PTFE thread seal tape to the vent and drain port threaded plugs prior to leakage rate testing.

The staff finds the use of PTFE tape acceptable because the leakage testing demonstrated its performance in the plug threads and the PTFE maximum continuous service temperature exceeds the temperatures in a fire event. The staff notes that additional assurance of containment performance is provided by the redundant sealing of the port plugs by the port cover and O-ring, as well as the CoC condition that describes that the package is leakage rate tested to the leaktight containment acceptance criterion prior to each use; this ensures the vent and drain port threaded plugs with the application of three full turns of Loctite PTFE thread seal tape continue to meet the leaktight containment acceptance criterion.

The staff reviewed the changes requested by the applicant, and finds that they do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

References

DuPont Fluoroproducts, Teflon® PTFE Properties Handbook, July, 1996.

Henkel Technologies, Loctite PTFE Thread Sealing Tape, Technical Data Sheet, December, 2006.

Leak Testing Specialists, Helium Leak Test Reports 5980-16-027-8837-06-23-2016-02 and 5980-16-027-8837-06-23-2016-03, June, 2016.

CONDITIONS

The conditions specified in the Certificate of Compliance No. 9316 have been revised as indicated below:

Item No. 3(b) was revised to include the latest Revision H-4 of the application.

Condition No. 5(a)(3) was revised to update the revisions of the licensing drawings.

Condition No. 16 extends the use of revision 7 of the certificate for approximately one year.

The expiration date of the certificate was not modified.

The References section of the certificate was updated to include Revision H-4 of the application, dated, November 29, 2017.

CONCLUSION

Based on the statements and representations contained in the application, as supplemented, and the conditions listed above, the staff concludes that the design of the Model Nos. AOS-25A, AOS-50A, AOS-100A, AOS-100B, and AOS-100A-S packages has been adequately described and evaluated.

The staff concludes that the changes indicated do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9316, Revision No. 8,
on December 12, 2017