



Alpha-Omega Services, Inc.

January 15, 2009

ATTN: Document Control Desk  
Director, Spent Fuel Project Office  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

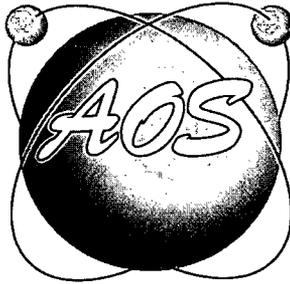
Subject: 10 CFR § 71.95 Report

A detailed and comprehensive inspection of all five (5) Model 5979 Packages was performed in conjunction with our extension request for continued, albeit limited, use of this package. Several discrepancies between the Certificate of Compliance drawings and the actual packages were identified. Therefore, in accordance with 10 CFR 71.95, we submit the attached report

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**10 CFR 71.95 Report  
AOS Model No. 5979, Type B Package, USA/5979B()  
15JAN09**

## **Introduction**

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## **§ 71.95 Reports**

*(a) The licensee, after requesting the certificate holder's input, shall submit a written report to the Commission of--*

*(1) Instances in which there is a significant reduction in the effectiveness of any NRC-approved Type B or Type AF packaging during use;*

Any time the AOS 5979 Package was conveyed for Type B quantity shipment.

*(2) Details of any defects with safety significance in any NRC-approved Type B or fissile material packaging, after first use.*

Drawing 0093, Note 2: "DETAILS – OVERPACK PALLET – SHIP/TRANS. CASK," requires that the laminated wood on the 5-side Overpack is not to be fixed to the steel skeleton, however the laminated wood is fixed to the outer sheath by thru bolting. In addition, the required 2" x 2" redwood crush strips are not all (10 places) installed.

Packaging IIA, IIB and IIIA do not have the required number of bolting to attach the Overpack to the Pallet. Drawing 0090, "GENERAL ARRANGEMENT – CONTAINER," requires a total of 40 bolts on this joint, however these packaging have 32, 36 and 38 respectively. The above variations could have reduced package effectiveness in some accidental scenarios.

*(3) Instances in which the conditions of approval in the Certificate of Compliance were not observed in making a shipment.*

It is difficult to determine the instances in which the conditions of approval in the Certificate of Compliance were not observed. AOS has found no record of when these modifications to the packages occurred. It could be assumed that some of the changes were made at the time of packaging fabrication and others resulting from operational activity changes. AOS purchased packages IIA, IIB, and IIA in 1974 from International Chemical and Nuclear Corporation (ICNC). ICNC designed, licensed, and operated these packages from the late 1950's/early 1960's until they were sold to AOS. Therefore, it may be possible that these changes were present at the time of purchase. AOSI and AOSII were fabricated in 1973/1974 by AOS. AOS can only assume that every shipment made by both AOS and all "Registered Users" of the package, from 1974 (or before) to the present, were made with the package out of compliance.

*(b) The licensee shall submit a written report to the Commission of instances in which the conditions in the certificate of compliance were not followed during a shipment.*

*(c) Each licensee shall submit, in accordance with § 71.1, a written report required by paragraph (a) or (b) of this section within 60 days of the event or discovery of the event. The licensee shall also provide a copy of each report submitted to the NRC to the applicable*

certificate holder. Written reports prepared under other regulations may be submitted to fulfill this requirement if the reports contain all the necessary information, and the appropriate distribution is made. Using an appropriate method listed in § 71.1(a), the licensee shall report to: ATTN: Document Control Desk, Director, Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards. These written reports must include the following:

(1) A brief abstract describing the major occurrences during the event, including all component or system failures that contributed to the event and significant corrective action taken or planned to prevent recurrence.

On November 11, 2008 during an inspection performed in preparation for using these packages under "Special Permit," AOS found that AOSII packaging did not conform to the drawings on file with the NRC. Further inspections performed on the IIB and IIIA on December 2 and 3 for these packages and on December 17, 2008 for the AOS I revealed similar problems. A review of the packages' records did not identify when these changes were made to the units.

AOS plans to bring 2 of the 5 packages into compliance, update the drawings and procedures, and make a submittal to the NRC for approval of any changes from the current design on file. The updates to the drawings and procedures will be such, as to provide the operator sufficient knowledge of requirements and package geometry to prevent future deviations.

(2) A clear, specific, narrative description of the event that occurred so that knowledgeable readers conversant with the requirements of part 71, but not familiar with the design of the packaging, can understand the complete event. The narrative description must include the following specific information as appropriate for the particular event.

(i) Status of components or systems that were inoperable at the start of the event and that contributed to the event;

AOS has placed all AOS 5979 packages in Quarantine, and is preparing to bring two (2) of the packages (AOSI and AOSII) into full compliance. The other packages (IIA, IIB and IIIA) will be stripped of their name plates and used for on-site storage only. Also, drawings will be updated to note any variation or changes that could not be corrected to conform to the present drawings. Operating and maintenance procedures of the AOS 5979 package will be edited, in format and content, to assure that the operating personnel understand compliance requirements. The new documentation, drawings and procedures, will be part of a submittal to the NRC for approval.

(ii) Dates and approximate times of occurrences;

It is difficult to determine the approximate time of occurrences. AOS can only assume that every shipment made by both AOS and all "Registered Users" of the package, from 1974 to the present, were out of compliance. AOS has found no record of when these modifications to the packages occurred. It could be assumed that some of the changes were made at the time of package fabrication and others perhaps resulting from operational activity changes.

*(iii) The cause of each component or system failure or personnel error, if known;*

The use of these packages with non-conforming features is the result of minimum understanding of the compliance requirements and of the package design represented by the drawings. AOS personnel assumed that the package hardware was in compliance with the drawings, since the drawing represented a "General Arrangement".

*(iv) The failure mode, mechanism, and effect of each failed component, if known;*

The failure described in the AOS 5979 package occurrences herein refers to the failure of operating personnel to identify that the packaging did not conform to the drawing rather than the mechanical failure of any of the packaging components. The mechanism of such failure is the result of minimum understanding of the compliance requirements and of the packaging design represented by the drawings. The major effect of these package changes relative to the "Hypothetical Accident Condition" requirement, may result in the Overpack/Pallet structural combination not performing as designed during the drop and fire conditions.

*(v) A list of systems or secondary functions that were also affected for failures of components with multiple functions;*

Based on the failure described above, if the Overpack/Pallet were to be affected during the accident conditions, it may be possible for the cask component to lose its ability to provide shielding and containment to the special form payload.

*(vi) The method of discovery of each component or system failure or procedural error;*

The non-conforming features on the AOS 5979 packages were found during an engineering inspection performed in preparation for these packages to be used under Special Permit.

*(vii) For each human performance-related root cause, a discussion of the cause(s) and circumstances;*

The Root-Cause analysis addresses four categories, two primaries, Fabrication and Operational Change, and two secondary, Procedure and Training:

Fabrication causes are lack of controls and lack of follow-up. Evidence of lack of control is reflected by the fact that the fabrication process did not produce what the drawing specified and that in some cases, a package component was fabricated in two different ways, e.g. tie-down bracket AOSI vs. AOSII. Lack of follow-up is evident by the lack of documented changes in the "As-Built" drawings.

In the Operational Change category, causes are ease of operation (bolting the wood the Overpack skin) and operational change (use of lead a shoring device in the End Cap).

The secondary categories, Procedure and Training, causes are in the Procedure category, lack of detail and not specific on requirement. The current procedure does not relate to hardware configuration. Training category causes are limited understanding of requirement and packaging design and incomplete or inadequate training. An example of this is the current operating procedure requires the installation of 36 bolts to join the Overpack to the Pallet component, however the packages have 32, 36, 38 and 40, and the drawing calls for 40 bolts. However, no personnel ever identified this discrepancy.

*(viii) The manufacturer and model number (or other identification) of each component that failed during the event; and*

The manufacturer of the AOS 5979 packages IIA, IIB, and IIA was International Chemical and Nuclear Corporation (ICN) of Irvine, California, former US Nuclear, of Burbank, California. AOSI and AOSII were fabricated in 1973/1974 by AOS.

*(ix) For events occurring during use of a packaging, the quantities and chemical and physical form(s) of the package contents.*

AOS is presently gathering all shipping records since 1974 to identify the quantities and chemical form(s) of the package contents during these shipments to be submitted at a later date.

*(3) An assessment of the safety consequences and implications of the event. This assessment must include the availability of other systems or components that could have performed the same function as the components and systems that failed during the event.*

The major effect of these package changes relative to the "Hypothetical Accident Condition" requirement, may result in the Overpack/Pallet structural combination not performing as designed during the drop and fire conditions. If the Overpack/Pallet were to be affected during the accident conditions, it may be possible for the cask component to lose its ability to provide shielding and containment to the special form payload. There are no others systems that could perform the same function as the Overpack/Pallet, that being protection of the Cask component during accidental events.

*(4) A description of any corrective actions planned as a result of the event, including the means employed to repair any defects, and actions taken to reduce the probability of similar events occurring in the future.*

AOS plans to bring 2 of the 5 packages into compliance, update the drawings and procedures, and make a submittal to the NRC to get approval of any changes from the current design on file. The updates to the drawings and procedures will be such, as to provide the operator sufficient knowledge of requirements and package geometry to prevent future deviations.

*(5) Reference to any previous similar events involving the same packaging that are known to the licensee or certificate holder.*

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*(6) The name and telephone number of a person within the licensee's organization who is knowledgeable about the event and can provide additional information.*

Troy Hedger, CEO, (562) 804-0604 ext.24.

*(7) The extent of exposure of individuals to radiation or to radioactive materials without identification of individuals by name.*

The occurrences listed herein did not cause any additional radiation exposure to operating personnel or the public.



Troy Hedger  
CEO, President, RSO