



Department of Energy

Washington, DC 20585

JUN 1 2011

MEMORANDUM FOR PAUL MANN

DEFENSE PROGRAM PACKAGING MANAGER FOR
NUCLEAR OPERATIONS DIVISION
NATIONAL NUCLEAR SECURITY ADMINISTRATION

FROM:

STEPHEN C. O'CONNOR
HEADQUARTERS CERTIFYING OFFICIAL
DIRECTOR FOR OFFICE OF PACKAGING AND
TRANSPORTATION

A handwritten signature in dark ink, appearing to read "Stephen O'Connor", written over the printed name.

SUBJECT:

Revision 13 to DOE CoC USA/9932/B(U)(DOE)

Revision 13 of the Department of Energy (DOE) Certificate of Compliance (CoC) USA/9932/B(U)(DOE) for the UC-609 and the Approval Record are being issued to add Condition 12 to limit the use of previous revisions of the CoC beyond May 31, 2012, and to correct typographical errors in Revision 12 of the CoC and the Approval Record.

The expiration date of Revision 13 is August 31, 2016.

If you have any questions, please call me at (301) 903-7854, or Dr. James M. Shuler of my staff at (301) 903-5513.

Attachment



Printed with soy ink on recycled paper

U.S. DEPARTMENT OF ENERGY
CERTIFICATE OF COMPLIANCE
For Radioactive Materials Packages

1a. Certificate Number	1b. Revision No	1c. Package Identification No.	1d. Page No.	1e. Total No. Pages
9932	13	USA/9932/B(U) (DOE)	1	5

2. PREAMBLE

- 2a. This certificate is issued under the authority of 49 CFR Part 173.7(d).
- 2b. The packaging and contents described in item 5 below meet the safety standards set forth in subpart E, "Package Approval Standards" and subpart F, "Package, Special Form, and LSA-III Tests" Title 10, Code of Federal Regulations, Part 71.
- 2c. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. This certificate is issued on the basis of a safety analysis report of the package design or application --

(1) Prepared by (Name and address)

U.S. Department of Energy, NNSA
Livermore Site Office
7000 East Avenue, B-311
Livermore, CA 94551-0808

(2) Title and Identification of report or application.

Safety Analysis Report for
Model UC-609 B(U) DOE Shipping
Package, UCRL-ID-111494, Revision 3

(3) Date:

March 2006

4. CONDITIONS

This certificate is conditional upon the fulfilling of the applicable Operational and Quality Assurance requirements of 49CFR parts 100-199 and 10CFR Part 71, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Transport Index, Other Conditions, and References.

(a) Packaging

(1) Model: UC-609

(2) Description:

The UC-609 package consists of a containment vessel centered by Celotex insulation inside a 100-gallon drum. The tritium contents are carried in a storage vessel inside the containment vessel. The package gross weight is 226.8 kg (500 lb).

The drum has a maximum diameter of 63.5 cm (25.0 in) and a total height of 138.4 cm (54.5 in). The drum is the open head type with a flat cover secured by eight J-shaped brackets rather than the locking ring typically used with open head drums. Rotation of the drum cover is prevented by means of a 10-32 UNF stainless steel set screw installed through a tapped hole on the underside of each bracket. The drum is fabricated of 14 gauge (0.19 cm) 304 stainless steel to Military Standard MS 27683. To vent the drum, no gasket is used between the cover and drum body and, in addition, there are four O 64-cm (0.25-in) holes evenly spaced around the drum body 5.1cm (2.0 in) below the cover. The vent holes are sealed weather tight by pressure-sensitive adhesive tape.

6a. Date of Issuance: JUN 1 2011

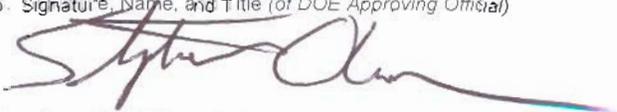
6b. Expiration Date: August 31, 2016

FOR THE U.S. DEPARTMENT OF ENERGY

7a. Address (of DOE Issuing Office)

U.S. Department of Energy
Office of Packaging and Transportation, EM-45
1000 Independence Avenue, SW
Washington, DC 20585

7b. Signature, Name, and Title (of DOE Approving Official)


Stephen C. O'Connor
Headquarters Certifying Official

1a. Certificate Number	1b. Revision No.	1c. Package Identification No.	1d. Page No.	1e. Total No. Pages
9932	13	USA/9932/B(U) (DOE)	2	5

The drum is lined with ASTM C 208 roof-grade Celotex insulation board. The minimum thickness of the lining is 7.2 cm (2.85 in). The insulation disks at the top of the drum are supported by a plywood disk that forms the top containment vessel cavity and rests on the annular disks lining the drum sides.

Protecting the Celotex disks next to the drum cover is a bottle-cap shaped heat shield of 304 stainless steel. The heat shield is cemented to the outer surface of the Celotex. Between the drum cover and the metal heat shield is a 1.3-cm (0.5-in) thick disk of Alumina-silica ceramic fiber (Cerafelt) produced by Thermal Ceramics Company

The containment boundary for the UC-609 Shipping Package is a cylindrical vessel with semi-elliptical dished heads. The containment vessel is made of 316 stainless steel. The containment vessel is 45.7 cm (18 in) in diameter, 111.9cm (44.06 in) long and is rated for service at 760 kPa gauge at 145°C(110 psig at 293°F). The containment vessel is fabricated, examined, and tested equivalent to Section III, Subsection NB of the ASME Boiler and Pressure Vessel Code.

Access into the containment vessel is through a flange that secures the top head to the vessel body. The flange is closed by eight 3/8-inbolts of A 286 alloy fabricated to the Aerospace Material Specification (AMS) 5726. Tightening these bolts to 45 foot-pounds torque drives opposing knife edges on the cover and vessel body flanges into a copper gasket forming a metal to-metal seal. The copper gasket is 0.20 cm (0.080 in) thick made to ASTM B 152 H01 temper (quarter hard). Outside the copper gasket is a silicone O-ring. A port to the space between the copper gasket and the silicone O-ring enables leak testing of the copper gasket.

Also providing access to the containment vessel is a NUPRO bellows valve that is part of the containment boundary. The valve is used to fill the containment vessel with helium for leak testing and to sample the containment vessel. This fill valve is of 316 stainless steel. The fill valve is located at the center of the removable top head and is welded to the top head and to a valve chamber that protects the fill valve. This protective valve chamber is a two-piece cylindrical enclosure. The lower half is welded to the top head and the valve. The upper half of the valve chamber is screwed to the lower half and sealed with an O-ring of ethylene propylene elastomer, ASTM D 2000 M3BA708A14B13F17. The protective valve chamber may be sampled through another NUPRO bellows valve that is welded to its lower half.

The internal cavity available for carrying the storage vessel is 25.4 cm (10 in) diameter by 78.7 cm (31 in) long. The internal cavity is lined by an aluminum tube. The annular space between the aluminum tube and the containment vessel wall is filled with 0.05 g/cc (3.4lb/ft³) aluminum honeycomb to absorb the impact of the storage vessel. The space between the ends of the internal cavity and both heads is also filled with 12.7 cm (5.0 in) thick cylindrical disks of aluminum honeycomb. Aluminum or stainless steel disks ~1.27 cm (~0.5 in) thick are required at both ends of the internal cavity to distribute an impact load over the entire surface of the cylindrical honeycomb disks.

(3) Drawings:

The UC-609 package is constructed in accordance with Lawrence Livermore National Laboratory Drawing Numbers:

AAA92-102223, Rev. OE - Shipping Container Assembly
AAA75-113083, Rev. OG - Containment Vessel Assembly
AAA91-109841, Rev. OB - Containment Vessel Cover Assembly
AAA77-104161, Rev. OC - Container Insulation Cover Assembly
AAA91-107485, Rev. OC - Drum Assembly
AAA91-109803, Rev. OA - Valve Assembly
AAA77-104603, Rev. OE -Identification Plate

1a. Certificate Number	1b. Revision No.	1c. Package Identification No.	1d. Page No.	1e. Total No. Pages
9932	13	USA/9932/B(U) (DOE)	3	5

(b) Contents:

(1) Type and Form of Radioactive Material:

Tritium in the form of gas, tritiated water, or metal tritides, contained in a storage vessel.

(2) Maximum Quantity of Material per Package:

Not more than 100 grams of tritium with the decay heat not to exceed 32 watts.

(c) Conditions:

(1) The UC-609 package shall be used and maintained to the requirements specified in Chapters 7, 8, and 9 of the SARP.

(2) Aluminum or stainless steel load distributing disks 25.08 ± 0.08 cm (9.875 ± 0.03 in) diameter and at least 1.27 cm (0.5 in) thick shall be fixed to either end of the contents.

(3) The maximum weight of the contents (storage vessel with its appurtenances and the load distributing disks) shall not exceed 54.4 kg (120 lb).

(4) The length of the contents and load distributing disks shall not be less than 0.48 cm (0.188 in) shorter than the nominal 79 cm (31 in) length of the cavity. The diameter of the contents shall not be more than the diameter of the load distributing disks nor less than 0.48 cm (0.188 in) smaller than the diameter of the load distributing disks.

(5) The storage vessel shall be in a form to allow evacuation of the containment vessel to 21 kPa (3 psia).

(6) The storage vessel shall be in a form to allow pressurization of the containment vessel to 760 kPa (110 psig).

(7) The O₂ content shall be less than 5% by volume of the gas in the containment vessel.

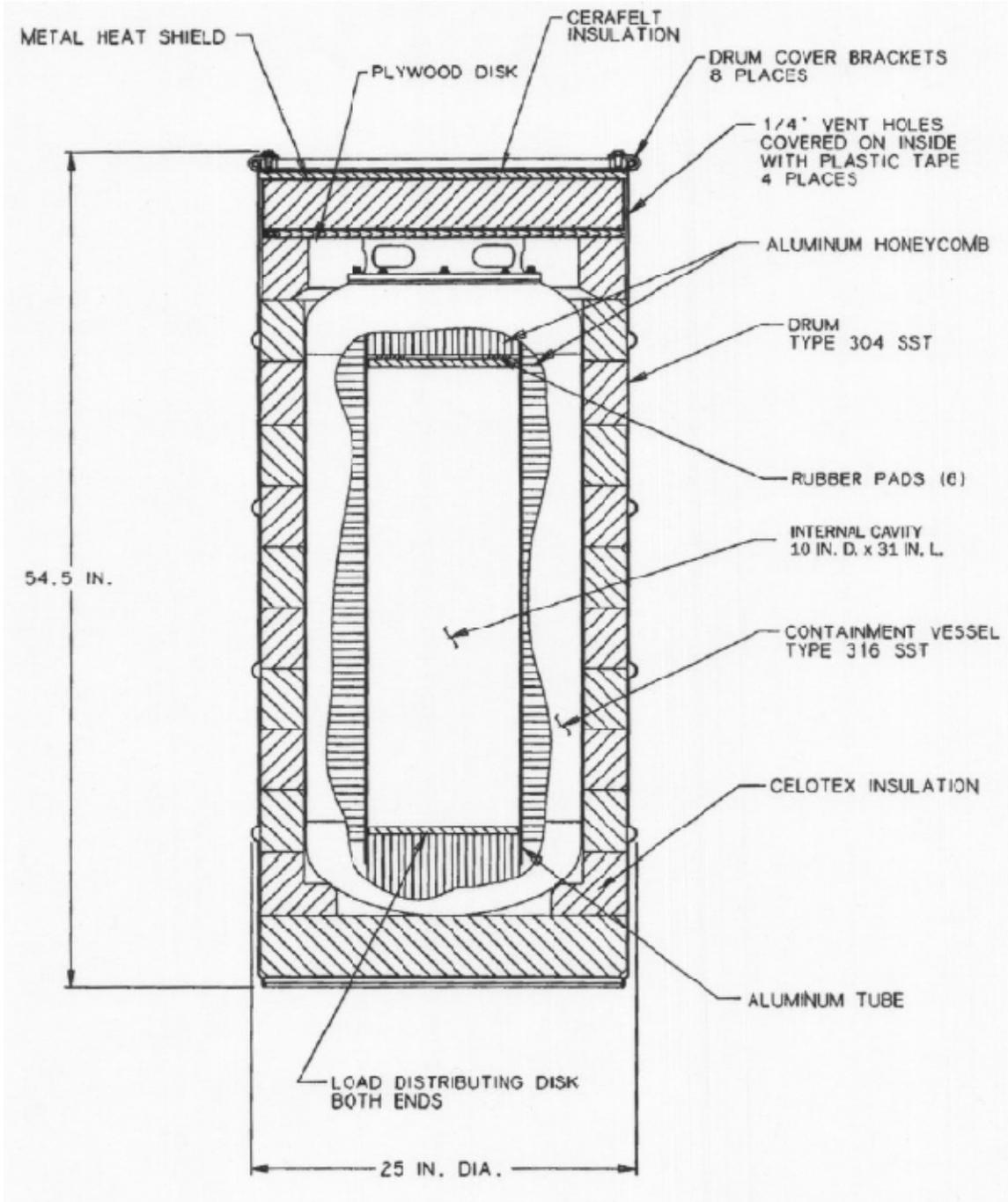
(8) Contents that can cause chemical or galvanic reactions with the containment boundary are not allowed.

(9) The maximum internal pressure of the containment vessel shall not exceed 760 kPa gauge at 145°C (110 psig at 293°F) including the contributions of any tritium chemical form that vaporizes or solid carrier that generates a vapor pressure as well as the fixed gases in the containment and storage vessels.

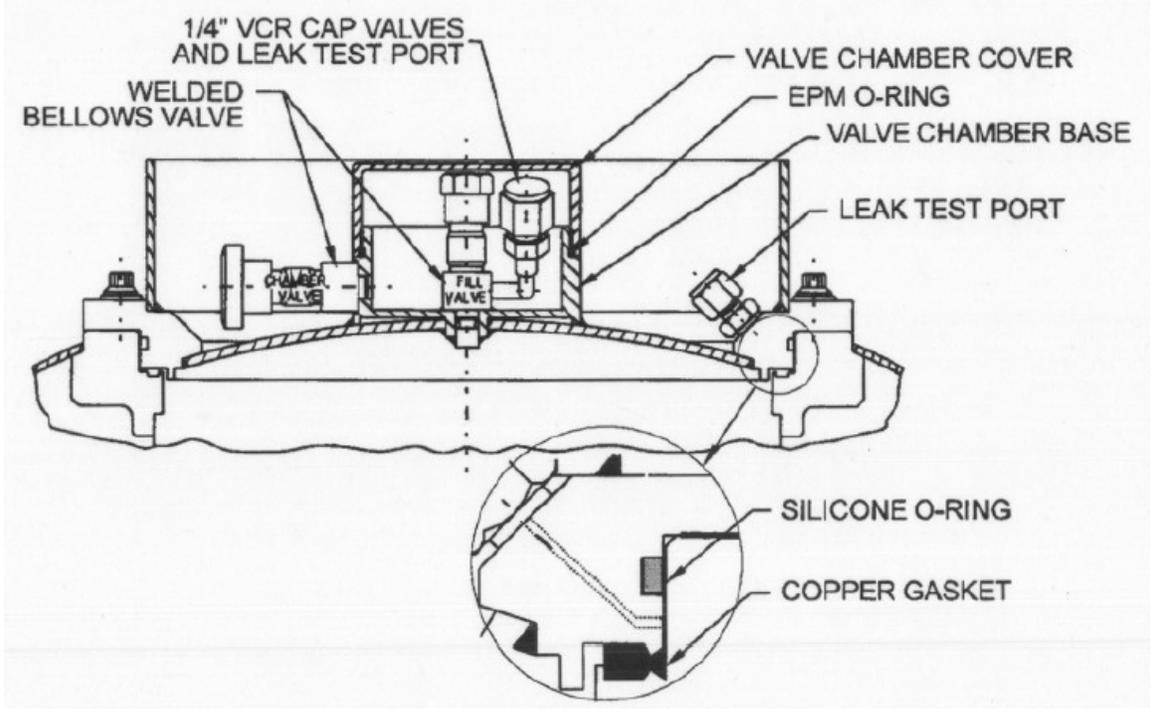
(10) If the package is not shipped within one year of loading, the internal pressure of the containment vessel shall be redetermined to account for the decay of tritium into helium.

(11) The UC-609 package containing tritium in storage vessels may be shipped non-exclusive use by all modes of transportation.

(12) Previous revisions of this certificate may be used until May 31, 2012.



Model No. UC-609 Shipping Package



Containment Vessel Cover

PACKAGE CERTIFICATION APPROVAL RECORD
Certificate of Compliance USA/9932/B(U) (DOE), Revision 13
UC-609

Docket 11-38-9932

Revision 13 of the Department of Energy (DOE) Certificate of Compliance (CoC) USA/9932/B(U) (DOE) for the UC-609 and this Approval Record are being issued to add Condition 12 to limit the use of previous revisions of this CoC beyond about one year from the approval date, and to correct typographical errors in Revision 12 of the CoC and its Approval Record. The DOE Packaging Certification Program is adding Condition 12 on the attached CoC and to all DOE CoCs when they are revised to conform to a similar process used by the Nuclear Regulatory Commission. The delay in time for full implementation allows for the new revision to the CoC to be incorporated into operational procedures and allows shipments to be made under previous revisions to the certificate. In addition, Revision 12 of the CoC and its Approval Record in some places incorrectly listed the CoC number as a B(U)F approved design for fissile material. The UC-609 is a B(U) approved design and is not approved for fissile material.

The expiration date for Revision 13 is August 31, 2016.

This certificate constitutes authority for the DOE to use the UC-609 package for shipment of the authorized contents under 49 CFR 173.7(d).



Stephen C. O'Connor
Headquarters Certifying Official
Director
Office of Packaging and Transportation
Office of Environmental Management
Date: 06/01/11