



U.S. Department of
Transportation
**Pipeline and
Hazardous Materials
Safety Administration**

East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

August 22, 2019

Dr. James M. Shuler
Manager, Packaging Certification Program
Department of Energy
U.S. Department of Energy
1000 Independence Ave, SW
EM-60
Washington, DC, 20585
USA

Dear Dr. James M. Shuler,

As your July 29, 2019 letter requested, Department of Energy has been registered as a user of IAEA Certificate of Competent Authority USA/9342/AF-96 for the Versa-Pac VP-55 and VP-110. This certificate, which revalidates the American Certificate of Competent Authority No.9342 authorizes the transport of the package from the point of entry to final destination in the United States, from point of origin in the United States to point of exit, and through the United States.

A copy of the certificate is enclosed. All future revisions of the certificate will be forwarded to Department of Energy at James.Shuler@em.doe.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard W. Boyle".

Richard W. Boyle, Chief
Radioactive Materials Branch
Office of Engineering and Research



U.S. Department
of Transportation

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**COMPETENT AUTHORITY CERTIFICATION FOR A
TYPE FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/9342/AF-96, REVISION 3**

The Competent Authority of the United States certifies that the radioactive material package design described in this certificate satisfies the regulatory requirements for a Type AF package for fissile material as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America².

1. Package Identification - Versa-Pac VP-55 and VP-110.
2. Package Description and Authorized Radioactive Contents - as described in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9342, Revision 14 (attached).
3. Criticality - The minimum criticality safety index is as described in the NRC certificate. The maximum number of packages per conveyance is determined in accordance with Table 11 of the IAEA regulations cited in this certificate.
4. General Conditions -
 - a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
 - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Engineering and Research, (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.

¹ "Regulations for the Safe Transport of Radioactive Material, 2012 Edition, No. SSR-6" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

² Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

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- c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.
 - d. Records of Management System activities required by Paragraph 306 of the IAEA regulations¹ shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.
5. Marking and Labeling - The package shall bear the marking USA/9342/AF-96 in addition to other required markings and labeling.
6. Expiration Date - This certificate expires on May 31, 2024. Previous editions which have not reached their expiration date may continue to be used.

This certificate is issued in accordance with paragraph(s) 816 of the IAEA Regulations and Section 173.471 and 173.472 of Title 49 of the Code of Federal Regulations, in response to the June 10, 2019 petition by Transport Logistics International (DAHER - TLI), Fulton, MD, and in consideration of other information on file in this Office.

Certified By:



William Schoonover
Associate Administrator for Hazardous
Materials Safety

July 03, 2019
(DATE)

Revision 3 - Issued to endorse U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9342, Revision 14.

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

1.	a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
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2. PREAMBLE

- a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
- b. 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

- | | |
|---|---|
| a. ISSUED TO (<i>Name and Address</i>)
DAHER-TLI
8161 Maple Lawn Boulevard
Suite 450
Fulton, MD 20759 | b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION
Daher-TLI consolidated application dated
March 20, 2019. |
|---|---|

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.(a) Packaging

- (1) Model No.: Versa-Pac in two configurations: VP-55 and VP-110.
- (2) Description

The Model No. Versa-Pac is either a 55-gallon (Model No. VP-55) or a 110-gallon (Model No. VP-110) package for shipment of uranium oxides, uranium metal, uranyl nitrate crystals and other uranium compounds, e.g., uranium carbides, uranyl fluorides and uranyl carbonates, uranium hexafluoride in the 1S or 2S cylinders, and thorium-232 as TRISO fuel. The 1S and 2S cylinders are ANSI N14.1 Standard compliant, which means that each cylinder (which includes new or re-certified cylinders) must be fabricated, inspected, tested, and maintained in accordance with ANSI N14.1-2012 or earlier version of ANSI N14.1 at the time of fabrication.

The exterior skin of the packaging is a UN1A2/Y425/S minimum, carbon steel material for the Model No. VP-55 and a UN1A2/Y409/S minimum, carbon steel for the Model No. VP-110.

All models use a bolted closure ring, ASTM A429 bolts and nuts, a silicone gasket, a drum cover reinforced by a 10-gauge thick plate with four or eight bolts depending upon the Model No. VP-55 or VP-110, respectively.

All models are strengthened with vertical stiffeners, two inner liners insulated by a ceramic fiber blanket and a ¼" carbon steel reinforcing plate on the bottom. The packaging's interior is completely insulated with layers of a ceramic fiber blanket around the containment cavity with rigid polyurethane foam disks on the top and bottom of the cavity.

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5.(a)(2) Description (continued)

A ½" thick fiberglass ring is used as a thermal break at the payload cavity flange. The cavity blind flange is secured to the flange with twelve bolts.

The primary containment boundary for the Model Nos. VP-55 and VP-110 is defined as the payload cavity with its associated welds, the containment end plate, the inner flange ring, the silicone-coated fiberglass gasket, the cavity blind flange, and the bolts.

When utilizing the 5-inch steel pipe inner container in the Model No. VP-55, (5-inch pipe with the threaded cap), the containment boundary is defined as the payload cavity with its associated welds, the containment end plate, the inner flange ring, the silicone-coated fiberglass gasket, the payload vessel blind flange, and the bolts.

When transporting 1S and 2S cylinders in the VP-55, a 9 lbs/ft³ polyethylene foam liner is inserted into the package cavity, with a minimum thickness of 2 inches.

The approximate dimensions and weights of the packaging are as follows:

Table 1 - Weight and Dimensions

Model No.	Packaging OD (in.)	Packaging Height (in.)	Payload Containment Cavity ID (in.)	Payload Containment Cavity Height (in.)	Packaging Tare Weight (lbs.)	Maximum gross weight (lbs.)
VP-55	23-3/16	34-3/4	15	25-7/8	390	750
VP-110	30-7/16	42-3/4	21	29-3/4	705	965

(3) Drawings

The packaging is constructed and assembled in accordance with DAHER-TLI Drawing Nos.:

VP-55-LD, Rev. 3 (sheets 1 and 2) 55 Gallon Versa-Pac Shipping Container

VP-110-LD, Rev. 3 (sheets 1 and 2) 110 Gallon Versa-Pac Shipping Container

The 5-inch steel pipe inner container is constructed and assembled in accordance with Daher-TLI Drawing No. VP-55-2R Rev. 0, sheet 1 of 1.

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5.(b) Contents

(1) Type and form of material

- (i) Solid, homogeneous (powder or crystalline), or non-homogeneous, uranium materials with no free-standing liquids. Materials shall be stable and in a non-pyrophoric form. Density is not limited.
- (ii) Natural thorium in any form.

Contents are limited to:

- (i)
 - A. Uranium oxides (U_xO_y).
 - B. Uranyl nitrate crystals in the form of uranyl nitrate hexahydrate, trihydrate or dihydrate.
 - C. Other uranium compounds, e.g., uranyl fluorides and uranyl carbonates. Uranium compounds may also contain carbon or be mixed with carbon or graphite. Uranium carbide is authorized for shipment. However, uranium hydrides are not authorized for shipment.
 - D. Uranium metal or uranium alloys.
- (ii) TRISO fuel as C/SIC/C coated $ThUC_2$ particles pressed with a carbon matrix to form rods.
- (iii) Uranium Hexafluoride is authorized for shipment when loaded into 1S or 2S cylinders, utilizing a 9 PCF polyethylene foam liner with a thickness of at least 2 inches.

Contents may be pre-packaged in polyethylene, polytetrafluoroethylene, aluminum, and carbon steel, Aluminum Trihydrate, Sodium Borate (Borax, fused), perlite, paper labels, plastic tape, plastic bags, plastic bottles and desiccant such as "Quik-Solid" are also authorized as packing materials. Materials with a hydrogen density greater than 0.141 g/cm^3 are not authorized.

Radioactive contents shall have an auto-ignition temperature and melting point greater than 600°F .

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5.(b) Contents (continued)

(2) Maximum quantity of material per package:

The U-235 and uranium mass limits are determined by enrichment and are not to exceed the limits established below:

Table 2 - Loading Table for Model Nos. VP-55 and VP-110

Weight Percent U-235	U-235 Mass Limit (g)	
	Ground/Vessel	Air
≤ 100%	350	350
≤ 20%	410	410
≤ 10%	470	470
≤ 5%	580	580
≤ 1.25%	2,000	--

For contents restricted by Table 3, all fissile contents shall be loaded into a single 5-inch pipe.

Table 3 - Loading Table for Model No. VP-55 with 5-inch pipe

Weight Percent U-235	U-235 Mass Limit (g)	
	Ground/Vessel	Air
≤ 100%	695	395
≤ 20%	1,215	495
≤ 10%	1,605	590
≤ 5%	1,065	790

For contents restricted by Tables 4 and 5, all fissile material shall be uranium hexafluoride loaded into 1S or 2S cylinders.

If both 1S and 2S cylinders are transported in the same package and/or the number of cylinders exceeds the allowed quantity in Table 4, follow the mass limits of Table 2.

If a package containing 1S/2S cylinders is transported by air, follow the mass limits of Table 2.

For 1S or 2S cylinders with material exceeding 20 wt% U-235, each 1S or 2S cylinder shall be loaded into an individual 5-inch pipe.

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5(b)(2) Maximum quantity of material per package (continued)

Table 4: 1S/2S Cylinder Limits for the VP-55 (up to 20wt.% U-235)

Cylinder Type	Mass UF ₆ per VP-55 (lb/g)	Weight percent U-235	Number of Cylinders	U-235 Mass Limit per VP-55 (g)
1S	7.0 / 3,175	≤ 20	7	429.8
2S	9.8 / 4,445	≤ 20	2	600.8

Table 5: 1S/2S Cylinder Limits for the VP-55 with 5-inch Pipe (up to 100wt.% U-235)

Cylinder Type	Mass UF ₆ per VP-55 (lb/g)	Weight percent U-235 (e is enrichment)	Number of Cylinders	U-235 Mass Limit per VP-55 (g)
1S	1.0 / 454	20 < e ≤ 100	1	306
2S	4.9 / 2,223	20 < e ≤ 100	1	1497

The net weight of the authorized contents shall not exceed 350 lbs for the Model Nos. VP-55 and 260 lbs for the Model No. VP-110, including cribbing and dunnage.

- (3) Contents are limited to normal form material. The radionuclide inventory of the loaded contents, including U-234 and U-236, shall be less than the calculated mixture A₂ value.
- (4) Decay heat is limited to 11.4 W.

5.(c) Criticality Safety Index (CSI)

- (1) Contents Limited by Table 2 (VP-55 or VP-110): 1.0
- (2) Contents Limited by Table 3 (VP-55): 0.7 for material up to 10 wt% and 1.0 for material greater than 10 wt% and up to 100 wt%.
- (3) Contents Limited by Table 4 (only VP-55): 1.0
- (4) Contents Limited by Table 5 (only VP-55 with 5-inch pipe): 1.0

6. In addition to the requirements of Subpart G of 10 CFR Part 71:

- (a) The package shall be prepared for shipment and operated in accordance with the Operating Procedures in Section No. 7 of the application.
- (b) Each packaging must meet the Acceptance Tests and Maintenance Program of Section No. 8 of the application.

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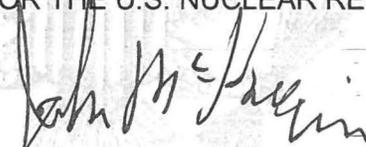
7. Transport by air of fissile material is authorized, as limited by the 'Air' quantities in Table 2 and Table 3.
8. Transport of plutonium above minimum detectable quantities is not authorized.
9. Packages must be marked with the appropriate model number, i.e., VP-55 or VP-110, as applicable. The neoprene 1/8 inch bottom pad and 3/8 inch top pad are optional for packages that are not intended to be reused.
10. Content forms may not be mixed in a single package.
11. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.
12. Expiration date: May 31, 2024.

REFERENCES

Daher-TLI application, "Application for Certificate of Compliance for the Versa-Pac Shipping Package," Revision No.10, March 16, 2018.

Daher-TLI application for amendment and renewal, March 20, 2019.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


John McKirgan, Chief
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date: 5/28/19



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East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

CERTIFICATE NUMBER: USA/9342/AF-96

ORIGINAL REGISTRANT(S) :

Transport Logistics International (DAHER - TLI)
8161 Maple Lawn Boulevard
Suite 480
Fulton, MD, 20759
USA

REGISTERED USERS:

Department of Energy
U.S. Department of Energy
1000 Independence Ave, SW
EM-60
Washington, DC, 20585
USA