



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 29, 2016

Mr. Norman A. Kent
Director of Licensing and Training
Daher-TLI, Inc.
8161 Maple Lawn Boulevard
Suite 450
Fulton, MD 20759

SUBJECT: REVISION NO. 11 OF CERTIFICATE OF COMPLIANCE NO. 9342 FOR THE
MODEL NO. VERSA-PAC TRANSPORTATION PACKAGE

Dear Mr. Kent:

As requested by your application dated October 22, 2015, as supplemented December 14, 2015, enclosed is Certificate of Compliance (CoC) No. 9342, Revision No. 11, for the Model No. Versa-Pac transportation package. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The staff's safety evaluation report is also enclosed.

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. This 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 49 CFR 173.471.

If you have any questions regarding this certificate, you may contact me or Huda Akhavannik of my staff at 301-415-5253.

Sincerely,

/RA/

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

Docket No. 71-9342
TAC No. L25063

Enclosures: 1. CoC No. 9342, Rev. No. 11
2. Safety Evaluation Report
3. Registered Users

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



UNITED STATES
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SAFETY EVALUATION REPORT
Docket No. 71-9342
Model No. Versa-Pac
Certificate of Compliance No. 9342
Revision No. 11

SUMMARY

By application dated October 22, 2015, as supplemented December 14, 2015, Daher-TLI, Inc. (Daher-TLI or, the applicant), requested amendment to Certificate of Compliance (CoC) No. 9342, for the Model No. Versa-Pac transportation package. Daher-TLI requested adding a new contents component, the Model No. VP-55HC (high capacity), in which to transport material enriched up to 100 wt% U-235. The material will be transported in a 5-inch steel pipe called the VP-55-2R. The safety analysis report (SAR) was updated to include a new drop test to support the addition of the VP-55-2R and its containment boundary and a new criticality analysis. Additionally, the SAR has been updated to include new operating procedures and inspection and maintenance guidance for the VP-55-2R.

Staff reviewed these changes and concludes that they do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

EVALUATION

By application dated October 22, 2015, as supplemented December 14, 2015, Daher-TLI requested amendment to Certificate of Compliance (CoC) No. 9342, for the Model No. Versa-Pac transportation package. Daher-TLI requested adding a new contents component, the Model No. VP-55HC, in which to transport material enriched up to 100 wt% U-235. The material will be transported in a 5-inch steel pipe called the VP-55-2R. As part of their analysis, the SAR was updated to include a new drop test to support the addition of the VP-55-2R and its new containment boundary and new criticality analysis. Additionally, the SAR has been updated to include new operating procedures and inspection and maintenance guidance for the VP-55-2R.

General Information

The applicant added a description of the Model No. VP-55HC. The Model No. VP-55HC 5-inch pipe container fits inside the Model No. VP-55 payload vessel. It is fabricated from Schedule-40 carbon steel. A carbon steel plate is welded to the bottom and the top is closed with a 5-inch threaded cap made from malleable iron. The VP-55-2R pipe container is held in place during normal conditions of transport (NCT) by a "birdcage" device that provides no structural support and is considered dunnage. No credit is taken for the pipe maintaining a specific position within the payload cavity under hypothetical accident conditions (HAC).

The VP-55-2R pipe container is the required content container for the Model No. VP-55HC configuration because it provides geometry control of the contents. The contents for the Model No. VP-55HC are identical to the Model No. Versa-Pac standard configuration, with the exception that material quantities may not exceed the U-235 limits established in Table 1-1A in any non-pyrophoric form.

Table 1-1A - Loading Table for the Model No. VP-55HC

Weight Percent U-235	U-235 Mass Limit (g)	Uranium Mass Limit (g)
100	695	695
20	1,215	6,075
10	1,605	16,050
5	1,065	21,300

The gross weight of the Model No. VP-55HC is identical to the Model No. VP-55 standard configuration. The inner container and dunnage to hold the container in place during routine transport are included in the maximum payload weight. The containment boundary for the Model No. VP-55HC is identical to that of the Model Nos. VP-55 and VP-110 configurations, with the addition of closure system for the 5-inch pipe, referred to as the inner containment vessel. Therefore, the containment boundary of the Model No. VP-55HC is defined as the inner containment vessel, payload vessel 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.

The criticality safety index (CSI) for the Model No. VP-55HC is also different than the Model Nos. VP-55 and VP-110. The CSI for those models is 1.0. For the Model No. VP-55HC the CSI is 0.7 for material enriched up to 10 wt%, and 1.0 for material enriched greater than 10 wt% and up to 100 wt%.

Staff reviewed the changes made to the general description of the package to include the Model No. VP-55HC configuration and concludes they are adequately described.

Structural

The objective of the structural evaluation is to verify that the structural performance of the package is adequately demonstrated to meet the requirements of 10 CFR Part 71.

Description of Structural Design

Previously in 2009, the applicant submitted a SAR for the Model No. Versa-Pac standard configuration shipping packages (Model Nos. VP-55 and VP-110), where the packages were designed to transport Type A fissile materials limited to U-235 masses. In 2010, staff issued the SER for the Model Nos. VP-55 and VP-110.

In this submittal, the applicant has submitted a revised SAR for a new configuration, the Model No. VP-55HC. The Model No. VP-55HC design is identical to the Model No. VP-55 design with an exception that the Model No. VP-55HC has a 5-inch steel pipe inner container (VP-55-2R), which is located in the payload cavity that provides criticality control of the fissile contents. The Model No. VP-55HC configuration is able to transport significantly larger quantities of fissile material than the standard Model Nos. VP-55 and VP-110 configurations.

The applicant indicated that the 5-inch pipe is secured for routine transport with a birdcage-type device which offers no structural support to the packaging. The 5-inch pipe inner container is made up of three parts with the following dimensions and materials:

- Pipe – 5 inch Schedule 40 ASTM A53 Steel Pipe
- Bottom Plate – ¼ inch Thick ASTM A36 Steel Plate
- Top Cap – 5 inch Threaded Malleable Iron - ASME B16.3.150

A detailed drawing of the container is provided in Appendix 1.4.5 of the SAR.

Since the design of Model No. VP-55HC is identical to the design of Model No. VP-55 with an exception of containing a 5-inch inner pipe (VP-55-2R) in the payload cavity, the applicant performed only a HAC drop test series on the VP-55-2R to verify its ability to maintain structural integrity and preserve the containment of the Model No. VP-55HC. The applicant indicated that the justifications for not performing the NCT test were: (i) NCT and HAC drop test series on the VP-55 were performed, and the staff reviewed and accepted them in 2010, and (ii) the applicant only needs to demonstrate structural integrity of VP-55 with VP-55-2R for HAC this time. A new HAC drop test report for VP-55 with VP-55-2R is included in Appendix 2.13.6 of the SAR.

Free Drop Tests for Hypothetical Accident Conditions

The applicant performed three full scale free drop tests on VP-55-2R: (i) 30-Foot Slap Down Drop, (ii) 30-Foot End Drop on the Pipe Cap, and (iii) 30-Foot Center of Gravity (CG) over Corner Drop. Tests were videotaped and photographed, and post-drop damage measurements were recorded after each drop. The following test results were observed:

- From the slap down drop test, it was observed that there was a 1-3/16 inch X 3/16 inch dent to the container cap and a 1-3/8 inch X 1/16 inch dent to the bottom plate. However, there was no appreciable damage to the container. The gross weight of the specimen after the test was measured, and it was found that there was no loss of contents.
- From the end drop test on the pipe cap, it was observed that there was no measureable damage to the container. Also, the gross weight of the specimen after the test was measured, and it was found that there was no loss of contents.
- From the CG over corner drop test, it was observed that there was a small dent on the pipe cap measuring about 1-1/2 inch X 3/8 inch with no measureable damage on the rest of the container. The gross weight of the specimen after the test was also measured, and it was found that there was no loss of contents.

The review of the results shows that the package can withstand impacts with only minor damage to the exterior surfaces in all drop configurations. Based on the applicant's test results, the staff concludes that the package will not suffer deformations that allow breach of the containment under HAC-30 foot drop conditions, and has adequate structural integrity to satisfy the requirements of 10 CFR Part 71.73(c)(1).

Evaluation Findings

Based on review of the statements and presentations in the application, the staff concludes that the structural design has been adequately described and evaluated, and that the package has adequate structural integrity to meet the requirements of 10 CFR Part 71.

Containment

The primary containment boundary of the Model No. VP-55HC is defined as the inner containment vessel (5" pipe with the threaded cap), payload vessel with its associated welds, the containment end plate, the inner flange ring, the silicone-coated fiberglass gasket, the payload vessel blind flange, and the closure bolts.

The Model No. VP-55HC is designed to transport Type A fissile materials. No leakage tests are necessary to ensure continued performance of the VP-55HC.

Criticality

The objective of this review is to verify the Versa-Pac transportation package design meets the criticality safety requirements of 10 CFR Part 71.

The applicant requests to introduce a new Versa-Pac configuration for the VP-55 only, called the VP-55HC. The VP-55HC includes a new content component, a 5-inch diameter steel pipe, in which to transport greater quantities of material enriched up to 100 wt.% U-235 than those previously allowed for the VP-55.

The applicant performed analyses for a single package as well as arrays of packages under conditions of 10 CFR 71.55(b), (d), and (e), and 10 CFR 71.59(a)(1) and (2). The results of these analyses are presented in Section 6.4 through 6.6 of the SAR. The SAR contains tables that show the calculated k-effectives and their corresponding standard deviation. The staff reviewed these tables and found that the most reactive cases are clearly identified and are demonstrated to be less than the upper subcritical limit of 0.94 as determined by the applicant. Confirmatory calculations by the staff were in close agreement with the applicant's calculations. The CSI of the VP-55HC is 0.7 for material up to 10 wt.% U-235, and 1.0 for material greater than 10 wt.% U-235 up to 100 wt.% U-235.

The staff reviewed the criticality safety analysis provided in the SAR. The staff followed the guidance of NUREG-1617, "Standard Review Plan for Transportation Packages for Radioactive Material," during the criticality safety review of the proposed revision to the Versa-Pac fuel package. Based on the statements and representations contained in the SAR, the staff concludes that the Versa-Pac transportation package continues to meet the criticality safety requirements of 10 CFR Part 71.

CONDITIONS

Condition No. 3.b., "Title and Identification of Report or Application," has been updated to reflect the consolidated application submitted by Daher-TLI.

Condition No. 5(a)(1), "Model No.," has been updated to include the Model No. VP-55HC configuration.

Condition No. 5(a)(2), "Description," has been updated to reflect the addition of the Model No. VP-55HC and to highlight the new containment boundary.

Condition No. 5(a)(3), "Drawings," has been updated to include reference to the drawings for the VP-55-2R 5-inch steel pipe.

Condition No. 5(b)(2), "Maximum quantity of material per package," has been updated to include loading table and net weight limits for the Model No. VP-55HC.

Condition No. 5(c), "CSI," has been updated to include the CSI limits for the Model No. VP-55HC.

The references section has been updated to include this request.

CONCLUSION

Based on the statements contained in the application, and the conditions listed above, 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. 9342, Revision No. 11,
on 01-29-2016.

OFFICIAL USE ONLY – SECURITY RELATED INFORMATION

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Sincerely,

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Steve Ruffin, Acting Chief
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Division of Spent Fuel Management
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Docket No. 71-9342
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cc w/encls. 1 & 2: R. Boyle, Department of Transportation
J. Shuler, Department of Energy, c/o L. F. Gelder
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