



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

February 13, 2019

Mr. W. Scott Edwards  
Director of Transportation  
TN Americas LLC  
7135 Minstrel Way  
Columbia, MD 21045

SUBJECT: AMENDMENT AND RENEWAL OF CERTIFICATE OF COMPLIANCE NO. 9291  
FOR THE MODEL NO. LIQUI-RAD (LR) TRANSPORT UNIT PACKAGE

Dear Mr. Edwards:

By Columbiana Hi-Tech LLC (Columbiana) letter dated May 30, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18156A428), as supplemented by TN Americas LLC., on October 26, 2018 (ADAMS Accession No. ML18310A366), and January 10, 2019 (ADAMS Accession No. ML19015A373). Columbiana, the previous certificate holder, requested a revision to Certificate of Compliance No. 9291 for the Model No. Liqui-Rad (LR) Transport Unit Package. By letter dated September 24, 2018 (ADAMS Accession No. ML18269A273), the NRC approved Columbiana's September 7, 2018, request to change the certificate holder to TN Americas LLC (ADAMS Accession No. ML18264A002). In its October 26, 2018, supplement, TN Americas also requested renewal of the certificate. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The NRC staff's safety evaluation report is also enclosed.

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 Title 10 of the *Code of Federal Regulations* (10 CFR) 71.17, "General license: NRC-approved package," and 49 CFR 173.471, "Requirements for U.S. Nuclear Regulatory Commission approved packages."

Enclosure transmitted herewith contains SUNSI. When separated from Enclosure 3, this transmittal document is uncontrolled.

S. Edwards

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If you have any questions regarding this certificate, please contact Bernard White of my staff at (301) 415-6577.

Sincerely,

/RA/

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

Docket No. 71-9291

EPID Nos, L-2018-LLA-0160 and L-2018-RNW-0027

Enclosures:

1. Certificate of Compliance  
No. 9291, Rev. No. 11
2. Safety Evaluation Report
3. Registered Users List

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

S. Edwards

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FOR THE MODEL NO. LIQUI-RAD (LR) TRANSPORT UNIT PACKAGE,  
DOCUMENT DATE: February 13, 2019

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Closes EPID Nos. L-2018-LLA-0160 and L-2018-RNW-0027

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ADAMS Package No.: ML18317A352 Letter and SER Accession No.: ML18317A355

CoC Accession No. ML18317A353

<b>OFC:</b>	DSFM	DSFM	DSFM	DSFM
<b>NAME:</b>	BWhite	SFigueroa Via email	JIreland Via email	JPiotter Via email
<b>DATE:</b>	1/18/19	1/22/19	1/18/19	1/22/19
<b>OFC:</b>	DSFM	DSFM	DSFM	DSFM
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<b>DATE:</b>	1/21/19	2/8/19	2/8/19	2/13/19

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**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
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**SAFETY EVALUATION REPORT**

Docket No. 71-9291  
Model No. Liqui-Rad (LR) Transport Unit Package  
Certificate of Compliance No. 9291  
Revision No. 11

**SUMMARY**

By Columbiana Hi-Tech LLC (the previous certificate holder) and TN Americas, LLC applications dated May 30, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18156A428), and October 26, 2018 (ADAMS Accession No. ML18310A366), respectively, requested revision and renewal to Certificate of Compliance No. 9291, for its Model No. Liqui-Rad (LR) Transport Unit package. TN Americas supplemented the amendment request on January 10, 2019 (ADAMS Accession No. ML19015A373). By letter dated September 24, 2018, the U.S. Nuclear Regulatory Commission (NRC) approved Columbiana's September 7, 2018, request to name TN Americas, LLC as the new certificate holder. Hereafter in this safety evaluation report, the certificate holder is identified as either Columbiana or TN Americas, depending on which entity requested the specific change evaluated. TN America's submittal on January 10, 2019, was a consolidated application.

Columbiana requested the following: change the requirements for tightening the outer lid fasteners; allow formulations of primer and top coat equivalent to those previously specified; and to clarify the intent of American National Standards Institute (ANSI) N14.5-1997, "American National Standard for Radioactive Materials—Leakage Tests on Packages for Shipment," with respect to demonstrating no detected containment boundary leakage after performing the pre-shipment leakage rate test.

The staff used the guidance in NUREG-1609, "Standard Review Plan for Transportation Packages for Radioactive Material" to perform the review of the proposed packaging changes. Based on the statements and representations in the application, as supplemented, and the conditions listed in the following chapters, the staff concludes that the package meets the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71.

**EVALUATION OF COLUMBIANA'S REQUESTS**

*Clarification of Outer Lid Function and Torque Requirements*

The NRC staff evaluated Columbiana's request to revise the LR certificate of compliance to clarify the function of the outer lid and to clarify the torque requirements for the primary lid, secondary lid, and outer lid. The primary and secondary lids are containment closures. The function of the outer lid is thermal insulation and impact absorption and it is not a containment closure. Columbiana explained in Enclosure 1, "Summary of page changes for Revision 9 of Liqui-Rad (LR) Transportation Unit Package SAR [LR-SAR or SAR]," of its May 30, 2018, letter, that the current torque requirements on bolt fasteners for all three lids – primary, secondary, and outer lids – is 75 [+10 -0] ft. lbs. (Columbiana 2018a). However, as shown in photographs provided by Columbiana, applying 75 [+10 -0] ft. lbs. of torque on the outer lid nut fasteners results in damage to the outer lid gasket and deformation of the metal flange on the outer lid.

Because the outer lid provides only thermal and impact protection, and is not part of the containment boundary, Columbiana requested approval to reduce the required torque for outer lid nuts to 30 [+10 -0] ft. lbs. Columbiana stated that tests had been performed to demonstrate that a torque of 30 [+10 -0] ft. lbs. applied to the outer lid nuts is sufficient to compress the outer lid environmental seal and ensure the outer lid nuts will not loosen under normal conditions of transport.

Because the functional aspects are unchanged for the outer lid and the applicant provided an evaluation which demonstrated that the revised torque values are sufficient to achieve their intended purpose, the NRC staff finds that changing the torque values for the outer lid bolts is acceptable.

#### *Change of the Primer and Top Coat Specifications*

The NRC staff evaluated Columbiana's request to revise the drawings referenced in the certificate for the LR to authorize equivalent primers and top coat on external surfaces. Specifically, Columbiana proposed to revise Drawing LR-SAR, Revision 9, Note 4, to include the phrase "(OR EQUIVALENT)" after the detailed specifications. The applicant's note 4 specifies use of a catalyzed epoxy primer (or equivalent) on all external surfaces or only carbon steel external surfaces and all surfaces in contact with foam per the manufacturer's specifications, written procedures and requirements.

Section 1.2 of the SAR provides a package description. The LR is fabricated from stainless steel, ceramic fiber, phenolic foam, epoxy primer, and carbon steel. The primary structural components of the LR packaging consist of a stainless steel containment vessel, a carbon steel outer vessel and a carbon steel framing system. The applicant states that the LR uses only a plastic plug, pressure relief device, designed to melt away between 300 °F and 400°F during a fire event to release any gases generated. This device vents the annulus between the containment vessel and outer shell only and does not penetrate the containment boundary. Pressure relief of the containment vessel is unnecessary, since the contents do not present a pressure buildup during normal conditions of transport or hypothetical accident conditions.

The NRC staff finds that the components required to be painted are for corrosion resistance and not important to safety. The packaging is visually inspected during loading and off-loading procedures for indications of corrosion. The package has been previously reviewed and approved by NRC staff in which accelerated corrosion tests, equivalent to a 20-year service life, were performed on samples representing a cross-section of the LR and the results indicated there are no chemical, galvanic, or other corrosion reactions among or between these interfacing components and that the requirements of 10 CFR 71.43(d) are satisfied.

Based on the statements and representations contained in the application and the conditions listed above, the NRC staff concludes that the materials used in the transportation package design have been adequately described and evaluated and the Model Liqui-Rad Transport Unit Package meets the requirements of 10 CFR Part 71.

#### *Clarify the Intent of ANSI N14.5-1997, and Use of Primary Lid Tamper Indicating Seals*

The NRC staff evaluated Columbiana's request to revise LR-SAR Section 7.1.2, "Loading the Contents and Securing the Package for Shipment," to clarify that the intent of ANSI N14.5-1997 is to confirm that the containment system is properly assembled for each shipment by performing a leak test of the primary and secondary lid seals to show no detected leakage when

tested to a sensitivity of  $1 \times 10^{-3}$  ref-cm<sup>3</sup>/s. The staff reviewed the changes in LR-SAR Section 7.1.2 and finds that the description provided of the preshipment leakage rate test is in agreement with the ANSI N14.5-1997 pre-shipment leakage rate test purpose and acceptance criterion.

The NRC staff verified Drawing No. LR-SAR, sheet 4, note 11, specified the containment boundary primary lid and secondary lid closure bolts/nuts shall be torqued to 75 [+10 -0] ft. lbs. The NRC staff also verified that LR-SAR Sections 7.1.2 and 8.2(h) described the positive closure of the containment boundary primary lid as indicated by the presence of tamper indicating seals. The NRC staff also verified that LR-SAR section 7.1.2(d) described the primary lid would be leak tested as described in LR-SAR Section 8.2(h) in the event the primary lid has been opened within the 12 months since the last periodic leakage rate test as indicated if tamper indicating seals are not present. The NRC staff finds based on the statements above that the containment requirements for Type B packages in 10 CFR 71.51 would continue to be met.

## **EVALUATION OF TN AMERICAS' OCTOBER 2018 RENEWAL REQUEST**

TN Americas submitted a consolidated LR-SAR as part of this renewal. Other than to incorporate specific changes described above, TN Americas proposed no administrative or editorial changes to the consolidated LR-SAR. TN Americas also did not request changes to the CoC, other than to revise the expiration date. TN Americas has an NRC-approved quality assurance program (Docket No. 71-0250).

The NRC staff reviewed the renewal request and verified that previous changes to the LR-SAR were incorporated into the consolidated LR-SAR. The NRC staff verified that LR-SAR drawings are available and listed in the CoC and that the TN Americas consolidated LR-SAR is available and listed in Condition 3.b. of the CoC. The NRC staff deleted all previous revision bars, revised the CoC, and updated the revision date.

## **CONDITIONS**

The following changes were made to the certificate:

1. Condition No. 1.b. is revised to Revision Number 11.
2. Condition No. 3.b. is revised to cite the updated consolidated LR-SAR.
3. Condition No. 5.(a)(3), "Drawings" is revised to refer to Drawing No. LR-SAR, sheets 1 through 4, Rev. 10.
4. Condition No. 10., expiration date is revised to July 31, 2024.
5. The references are revised to include the consolidated LR-SAR submitted on January 10, 2019.

## **CONCLUSION**

Based on the statements and representations contained in the application, as supplemented, and the conditions listed above, the NRC staff concludes that the design has been adequately described and evaluated, and the Model No. Liqui-Rad Transport Unit Package meets the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9291 for the Model No. Liqui-Rad Transport Unit Package, Revision No. 11.