



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

December 18, 2019

Mr. Don Shaw, Licensing Manager
TN Americas LLC
7135 Minstrel Way, Suite 300
Columbia, MD 21045

SUBJECT: REVISION NO. 10 OF CERTIFICATE OF COMPLIANCE NO. 9302 FOR THE
MODEL NO. NUHOMS®-MP197HB PACKAGE

Dear Mr. Shaw:

As requested by your application dated September 30, 2019 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML19273B555), as supplemented on November 13, 2019 (ADAMS Accession No. ML19319B038), enclosed is Certificate of Compliance No. 9302, Revision No. 10, for the Model No. NUHOMS®-MP197HB package. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The 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 49 of the *Code of Federal Regulations* 173.471 and Title 10 of the *Code of Federal Regulations* 71.17.

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

Sincerely,

/RA/

Daniel I. Doyle, Acting Chief
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9302
EPID No. L-2019-LRM-0059

Enclosures:

1. Certificate of Compliance
No. 9302, Rev. No. 10
2. Safety Evaluation Report
3. Registered User List

cc w/encls. R. Boyle, DOT
J. Shuler, DOE,
c/o L. F. Gelder

Documents transmitted herewith contain Security Related Information. When separated from the sensitive conditions in enclosure 3, this document is decontrolled.

D. Shaw

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Document Dated: December 18, 2019

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**ADAMS Package No.: ML19352D465 CoC Accession No. ML19352D678
Letter/SER Accession No. ML19352D555 Encl Accession No. ML19352D556**

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SAFETY EVALUATION REPORT
Docket No. 71-9302
Model No. NUHOMS® MP-197HB Package
Certificate of Compliance No. 9302
Revision No. 10

SUMMARY

As requested by your application dated September 30, 2019 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML19273B555), as supplemented on November 13, 2019 (ADAMS Accession No. ML19319B038), TN Americas LLC (TN, or the applicant) submitted an amendment request to revise the certificate of compliance (CoC) for the Model No. NUHOMS®-MP197HB package.

The applicant requested changes to add optional specifications to the package design for the impact limiter attachment bolts and changes to the heat shield when used with the radioactive waste canister (RWC).

For this amendment request, staff reviewed the application using the guidance in NUREG-1609, "Standard Review Plan for Transportation Packages for Radioactive Material" and associated Interim Staff Guidance.

STRUCTURAL EVALUATION

From a structural point of view, this amendment request addresses as-built impact limiters with an unspecified number of impact limiter bolts and/or accompanying bolt tunnels that are misaligned. Since the impact limiters need to remain attached to the rest of the package after any drop scenario, the applicant has provided updated calculations to support this requirement. In addition, the engagement length of these bolts is now less than what was previously called for on the licensing drawings.

Hypothetical Accident Conditions

Impact Limiter Bolt Engagement Length

The Drawing No. MP197HB-71-1008, Rev. 4 specified that the impact limiter bolts (item 19 of the licensing drawings) have a 3.75-inch thread length. The applicant provided an updated analysis contained in Appendix A.2.13.12, demonstrating that the impact limiter bolts need only be engaged 1.86 inches in order to keep the impact limiter bolts from failing (via pull out) during the 9 m drop. Drawing No. MP197HB-71-1008, Rev. 5 specifies a minimum thread and engagement length of 2 inches, which is conservative.

Misaligned Impact Limiter Bolts

The impact limiter bolts are housed in "tunnels" (Drawing No. MP197HB-71-1009, Rev. 5, Part 23V, inner tunnel) which are tubular and provide clearance between the impact limiter bolts and the inner tube. To accommodate misaligned impact limiter bolts and/or impact limiter bolt tunnels, which prevent proper installation of the impact limiter bolts, the applicant increased the

inner bolt tunnel diameter from 1.75 inches to 2 inches, for a length not to exceed 8 inches. This scenario assumes all impact limiter bolts come into direct contact with the inner tube (no clearance) rather than some clearance, and is therefore conservative, since not all impact limiter bolts and/or tunnels were misaligned during fabrication.

The applicant updated existing calculations in Appendix A.2.13.12 to demonstrate that peak accelerations relevant to the impact limiter bolts increased only marginally from 52.2g at a 10-degree slap down to 55.2g at a 20-degree slap down in this misaligned state. Using this information, the applicant updated analyses in Appendix A.2.13.16 and Appendix A.2.13.18 to demonstrate that enough impact limiter bolts remain intact after the 9 m slap down scenario, ensuring the impact limiters remain attached to the package. Specifically, Tables A.2.13.18-1 and Table A.2.13.18-2 compare maximum bolt stresses (via tension and shear interaction equations) to acceptance criteria.

The staff reviewed the structural performance of the packaging under the hypothetical accident condition free drop as required by Title 10 of the *Code of Federal Regulations* (10 CFR 71.73(c)(1)) and concludes that the packaging has adequate structural integrity to satisfy the subcriticality, containment, and shielding requirements of 10 CFR 71.51(a)(2) for a Type B package and 10 CFR 71.55(e) for a fissile material package.

Thermal Evaluation

The scope of this thermal review is limited to the request for adding a new thermal shield designed only for use with the RWC.

The thermal shield for the RWC has a similar design as the thermal shield for a standard dry shielded canister (DSC), which includes a ¼-inch-thick circular plate and 3 inch spacer blocks, that provide axial thermal shielding and axial standoff between the impact limiters and the package/DSC. Unlike the standard DSC thermal shield, the RWC thermal shield does not utilize a radial cylindrical skirt. The DSC radial skirt (shell) is 31 inches long and 3/16-inch-thick in the radial direction. The applicant asserted that this component is not necessary for the purposes of protecting the impact limiter wood adjacent to the location where the radial skirt would be positioned because the maximum decay heat for the RWCs is 5 kW, or less than approximately 19% of the design basis heat load of 26 kW, for the DSC.

The applicant's technical justification that the low heat load precludes the need for the radial skirt is based on presenting information for normal conditions of transport evaluations of a 22 kW and a 24 kW case, as well as the fire accident evaluation, including identified conservative assumptions in the numerical modeling, for the 26 kW heat load. Results presented by the applicant for 22 kW and 24 kW normal conditions of transport evaluations demonstrated that the component temperatures, specifically for the seal regions, decreased by approximately 6–8°F per 1 kW reduction of decay heat. Presuming that this relationship remains linear, a 5 kW heat load would have a temperature reduction of approximately 100°F in this location when compared with a 24 kW heat load. Review by the NRC of additional results presented by the applicant in the Final Safety Analysis Report (ADAMS Accession No. ML19112A243) for the 26 kW case illustrated a maximum temperature increase of approximately 115°F in the upper seal regions (78°F temperature increase in the lower seal regions) during the fire accident.

In considering what the applicant presented in their response to a request for additional information on November 13, 2019 (ADAMS Accession No. ML19319B038), on the effects of accident conditions near the seal regions and the NRC's review of supplemental information presented in the Final Safety Analysis Report, the NRC staff concludes that the reduction of decay heat for the RWCs nearly offsets the component temperature increases due to the fire accident. Thus, the staff agrees with the applicant's conclusion that the fire accident for the 26 kW case is bounding and that reasonable assurance of adequate protection is demonstrated for the addition of an alternate thermal shield design for the RWC.