



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

**SAFETY EVALUATION REPORT**

**Docket No. 71-9337**  
**Model No. 3979A**  
**Certificate of Compliance No. 9337**  
**Revision No. 5**

**SUMMARY**

On November 9, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21314A014), as supplemented on November 22, 2021 (ADAMS Accession No. ML21326A260), Croft Associates Ltd. (Croft) submitted an amendment request to revise Certificate of Compliance No. 9337 for the Model No. 3979A package. The applicant proposed revisions to the acceptance tests for the O-ring seal.

The U.S. Nuclear Regulatory Commission's (NRC's) staff reviewed the application using the guidance in NUREG-2216, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities." Based on the statements and representations in the application, as supplemented, and the conditions listed in the certificate of compliance, the staff concludes that the package meets the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71.

**3.0 THERMAL**

The objective of the NRC's thermal evaluation is to ensure that the applicant has adequately evaluated the thermal performance of the transportation package design. Croft requested a change to the acceptance tests in Chapter 8, Acceptance Tests and Maintenance Programs," to revise the temperature for O-Ring seal test to ensure material performance at temperature.

In Section 3.2.2 of the safety analysis report (SAR), the applicant described a set of critical characteristic tests (discussed in Section 8.3.2 of the SAR) for the O-ring material to provide assurance that reducing the temperature from 150 °C to 130 °C for the 1000-hour temperature test was acceptable to continue to meet the acceptance criterion for the O-ring and maintain containment during normal conditions of transport (NCT).

The applicant also described in Section 3.2.2 of the SAR that the temperature reduction from 150 °C to 130 °C for the 1000-hour temperature test is justified in Croft Report No. CTR 2021/22, "3979A O-ring NCT Test Temperature Reduction - SARP Impact," with confirmatory testing reported from the testing conducted by Croft, described in Croft Report No. CTR 2021/24, "LS 3979A (3980) O-ring Seal Thermal Tests." The applicant described in Croft Report No. CTR 2021/22 that the maximum NCT O-ring temperature in the SAR was 116.4 °C, which is below the 130 °C test temperature. The staff confirmed that the maximum containment vessel cavity temperature for NCT with insolation was 116.4 °C, as described by the applicant in Table 3-2 of the SAR. The applicant also described in CTR 2021/24 that there is sufficient O-ring compression resilience after 1000 hours at 130 °C to remain leaktight ( $1 \times 10^{-7}$  reference cubic centimeter per second (ref-cm<sup>3</sup>/s)) acceptance criterion.

Based on the staff's review of the applicant's confirmatory testing, the applicant's justification for reducing the temperature on the O-ring NCT 1000-hour temperature test, and the contents of

Section 3.2.2 of the SAR, the staff finds the change in temperature for the O-ring NCT 1000 hour temperature test to be acceptable, and the Croft Model No. 3979A design continues to meet the requirements of 10 CFR 71.51(a)(1) and 71.71 for NCT.

#### **4.0 CONTAINMENT EVALUATION**

The objective of the review is to verify that the containment performance for the Croft Model No. 3979A package satisfies the containment requirements of 10 CFR Part 71. The applicant is proposing a temperature reduction for the NCT O-ring 1000-hour temperature test that is specified in Chapter 8 of the SAR from 150 °C to 130 °C while maintaining the American National Standards Institute (ANSI) N14.5, "American National Standard for Radioactive Materials – Leakage Tests on Packages for Shipment," leaktight acceptance criterion.

Since the applicant did not change the containment design/function of the package, which will still be tested to leaktight criteria, consistent with ANSI N14.5, the NRC staff finds that the safety and regulatory compliance conclusions remain unchanged, thus the 3979A package remains in compliance with 10 CFR Part 71 containment criteria.

#### **8.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM**

The objective of the NRC' review is to verify that the acceptance tests for the packaging, as documented in the application, meet the requirements of 10 CFR Part 71, to ensure that the package is fabricated in accordance with the design approved by the NRC.

In Section 8.1.5.2 of the SAR, the applicant stated that one inner and one outer O-ring shall be removed from each manufacturing batch and tested to ensure that the O-ring remain leaktight after 1000 hours at 130 °C. In addition, the applicant stated that after a set of the O-rings have been held at 130 °C for 1000 hours, the test rig would be cooled to room temperature, and helium leak tested to the leaktight acceptance criterion.

Based on the staff's review of the applicant's confirmatory testing and the contents of Section 8.1.5.2, the staff finds the change in temperature for the O-ring NCT 1000-hour temperature test to be acceptable, and the Croft Model No. 3979A design continues to meet the requirements of 10 CFR 71.51(a)(1) and 71.71 for NCT.

#### **CONDITIONS**

The CoC includes the following condition(s) of approval:

Condition 6 was revised to state that the package must meet the Acceptance Tests and Maintenance Program in Section 8.0 of the application, as supplemented.

Condition 9 was revised to authorize use of Revision No 4 of the certificate until December 31, 2022.

The References were updated to include the application and supplement for this amendment.

#### **CONCLUSIONS**

Based on the statements and representations contained in the application, as supplemented, and the conditions listed above, the staff concludes that the design has been adequately

described and evaluated, and the Model No. 3979A package meets the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9337, Revision No. 5.