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

SAFETY EVALUATION REPORT
Docket No. 71-9252
Model No. 51032-2 Package
Certificate of Compliance No. 9252
Revision No. 12

SUMMARY

By communication dated September 3, 2025 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML25246C203), as supplemented on March 16, 2026, June 23, 2026, and July 6, 2026 (ML26075E874, ML26174A438, and ML26187A370, respectively), Framatome Inc. (Framatome or the applicant) applied for an amendment to Certificate of Compliance (CoC) No. 9252 for the Model No. 51032-2 package. The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the amendment requests using guidance in NUREG-2216, "Standard Review Plan for Transportation Packages for Spent Fuel and Radioactive Material," dated August 2020 (ML20234A651).

Following the staff's review of the associated safety analysis reports (SAR), the staff finds that the requested changes do not affect the ability of the package to meet the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71, "Packaging and Transportation of Radioactive Material," and further concludes that the package, as modified, meets the applicable requirements of the International Atomic Energy Agency (IAEA) Safety Standards Series No. SSR-6, 2018 Edition. Therefore, consistent with prior revalidation reviews conducted in accordance with SSR-6 (2018), the staff recommends revalidation of the package for import and export use.

EVALUATION

1.0 GENERAL INFORMATION

1.1 Packaging Description

The 51032-2 package is a cylindrical shipping container designed to transport unirradiated pressurized water reactor (PWR) fuel assemblies. The package is constructed primarily from ASTM A36 carbon steel, with a strongback assembly and multiple internal supports to secure and protect the fuel assemblies during transport. The container is approximately 43 inches in diameter and 216 inches long, with an empty weight of about 4,100 pounds. It is fabricated in two main sections (base and cover), each reinforced with stiffening rings and equipped with shock mounts to minimize vibrational impacts.

Internally, the package features a strongback channel that holds two fuel assemblies, separated by steel blocks and secured with clamps and restraining bars. The design includes adjustable end thrust brackets to accommodate assemblies of varying lengths, and the entire assembly is protected from external impacts by the thick steel shell and internal shock-absorbing components. The containment boundary for radioactive material is the fuel rod cladding itself, which is certified leak-free before shipment. The package is designed to maintain a minimum 6-inch separation between fuel assemblies, even under severe accident conditions, and has been tested to withstand 30-foot drop scenarios without loss of containment or criticality safety.

Routine maintenance and inspection procedures were already in place, requiring visual checks for cracks, dents, corrosion, and hardware integrity before each use. The package was originally certified under earlier versions of 10 CFR Part 71 and met the regulatory requirements in effect at the time of its initial certification.

The 51032-2 SAR was updated primarily to support the package's transition from legacy "no-year" status to full compliance with the -96 requirements of 10 CFR Part 71 and the IAEA SSR-6 (2018 Edition). The applicant performed a regulatory gap analysis comparing the SAR to all changes in FR Vol. 60 and 69, concluding that the updated regulatory requirements are either not applicable to the 51032-2 package or already addressed in the existing SAR safety basis, with no changes to the package design or approved contents required. These updates ensured SAR alignment with revised terminology (e.g., CSI), updated QA expectations, and affirmation that containment, shielding, and criticality requirements remain bounded under the current regulatory framework. Importantly, the SAR now demonstrates compliance with Type A(F) criteria under both domestic and international regulations, supporting issuance of an AF-96 certificate designation.

A key technical update to the SAR involves resolving inconsistencies in fuel-rod cladding thickness assumptions used for structural and criticality evaluations. The original SAR relied on historical 30-ft drop tests performed with 0.0365-inch cladding, which did not bound the thinner 0.0205–0.0238-inch fuel rods specified in the contents. NRC reviewers identified this gap, prompting the applicant to conduct new 30-ft rod drop tests using fuel rods fabricated to match the limiting thickness defined in SAR table 6-1. These tests—four drops in multiple orientations—confirmed that the modern, thinner-walled rods maintain integrity under hypothetical accident conditions (HAC), thereby validating the structural assumptions supporting the criticality analysis. These results were incorporated into the SAR to close the structural–criticality consistency gap and formally document the test basis for maintaining fuel rod integrity under HAC conditions. The SAR-driven updates also resulted in new inspection criteria (rust, dents/scratches, 5-year inspections) in conformance documentation to match the updated safety basis.

2.0 STRUCTURAL EVALUATION

The applicant requested to amend CoC No. 9252 for the Model No. 51032-2 shipping package. The application did not propose any changes to the structural design, procedures, testing, or maintenance program of the package. Instead, it sought only to certify the package under the IAEA regulations for the Safe Transport of Radioactive Material, 1996 Edition (SSR-6, 1996 Edition), because the existing SAR already satisfied the requirements of 10 CFR Part 71.

The staff reviewed the structural aspects of the package and evaluated it in accordance with the requirements of 10 CFR Part 71. The main objective of the staff's evaluations is to verify that the structural performance of the Model No. 51032-2 shipping package meets the regulatory requirements of IAEA SSR-6, 1996 Edition.

2.1 General Requirements for All Packages

2.1.1 Minimum Package Size

The staff previously evaluated section 2.4, "General Standards for All Packages," of the SAR and confirmed that the package's overall outer diameter is 43 inches (109.2 cm), which exceeds the minimum required size of 4 inches (10.2 cm) as stipulated in 10 CFR 71.43(a). As a result, the staff concluded that the package complied with the minimum package size requirement set forth in 10 CFR 71.43(a).

Furthermore, this package size compared to the minimum package size requirement of 3.94 inches (10 cm) outlined in paragraph 634 of IAEA SSR-6, 1996 Edition, and it was found to surpass this requirement as well. Based on this evaluation, the staff concludes that the application meets the regulatory requirement specified in paragraph 634 of IAEA SSR-6, 1996 Edition.

2.1.2 Tamper-Indicating feature

The staff previously evaluated SAR section 2.4 and determined that the package is equipped with tamper-indicating seals. Each package utilizes two seals, which are designed to prevent unintentional or undetected opening. The presence of these security seals confirms there has been no unauthorized access to the package. As a result, the staff concluded that this tamper-indicating feature was compliant with the requirements of 10 CFR 71.43(b).

Furthermore, the staff reviewed this design feature against the tamper-indicating requirement specified in paragraph 635 of IAEA SSR-6, 1996 Edition, and found it satisfactory. Accordingly, the staff concludes that the package fulfills the tamper-indicating feature requirement outlined in paragraph 635 of IAEA SSR-6, 1996 Edition.

2.1.3 Positive closure

The staff previously evaluated section 2.4 of the SAR and found that the two halves of the containment vessel are mated and sealed together with 58 closure bolts, which cannot be inadvertently opened. Therefore, the staff concluded that the package satisfied the regulatory requirement of 10 CFR 71.43(c).

Additionally, the staff reviewed this design feature against the positive closure requirement specified in paragraph 639 of IAEA SSR-6, 1996 Edition, and found it satisfactory. Therefore, the staff concludes that the package fulfills the positive closure requirement set forth in paragraph 639 of IAEA SSR-6, 1996 Edition.

2.2 Lifting and Tie-Down Standards for All Packages

2.2.1 Lifting devices

The staff previously evaluated SAR section 2.5, “Lifting and Tiedown Standards for All Packages.” The staff found that the lifting system, consisting of four steel lugs welded to the cover assembly stacking brackets, could handle an 8,300 pounds (3,765 kg) package without subjecting any packaging material to stress exceeding its yield strength. The analysis results demonstrated a minimum safety factor of 3.4, with comprehensive calculations provided in Appendix A of the SAR. Upon review, the staff concluded that the package satisfied the regulatory requirement outlined in 10 CFR 71.45(a).

The staff also reviewed the analysis results to the criteria specified in paragraph 607 of IAEA SSR-6, 1996 Edition, and deemed them satisfactory. Accordingly, the staff concludes that the package complies with the design requirement detailed in paragraph 607 of IAEA SSR-6, 1996 Edition.

2.2.2 Tie-down

The staff previously assessed the package's lifting devices in SAR section 2.5.

The staff found that there was no dedicated system of tie-down devices identified on the package. Instead, the packages were secured to transport vehicle through a combination of shoring, positioning studs, and axial and transverse chokers (chains or straps). The structural components available for tie-down included stacking brackets and stiffening rings. Appendix II in Appendix A of the SAR provided a detailed analysis demonstrating that at least two of these elements might be utilized in a "tie-down" configuration. The stiffening rings, which were robust components, were typically employed as tie-down points due to their capacity to easily withstand tie-down loads. The staff evaluated the descriptions of the package and statements and found them satisfactory. Based on the evaluations, the staff concluded that the package satisfied the regulatory requirement of 10 CFR 71.45(b).

Furthermore, the staff reviewed this tie-down design feature against the requirement specified in paragraph 636 of IAEA SSR-6, 1996 Edition, and found it satisfactory. Therefore, the staff concludes that the package fulfills the tie-down design requirement specified in paragraph 636 of IAEA SSR-6, 1996 Edition.

2.3 Normal Conditions of Transport

The applicant stated that the Model 51032-2 container has the same construction as the Model 51032-1 container. Therefore, no separate model tests were conducted on Model 51032-2; instead, test results from the previous tests on Model 51032-1 were used to evaluate Model 51032-2’s performance during normal transport conditions (NCT). The staff previously reviewed and accepted both models (Model 51032-1 and Model 51032-2) and issued safety evaluation reports (SERs) for their licensing.

2.3.1 Heat

The applicant stated that the evaluation for heat for this package (Model No. 51032-2) is not applicable since the materials of the packaging, the fuel cladding, and the fuel can be subjected to much more elevated temperatures without significant detrimental effects. The staff previously reviewed and accepted this statement. Consequently, the staff concluded that Model No. 51032-2 satisfied the requirement of 10 CFR 71.71(c)(1), which also satisfies the requirement specified in paragraphs 637 and 650 of IAEA SSR-6, 1996 Edition. The staff's detailed safety evaluations on the applicant's thermal analyses are provided in section 3.0, "THERMAL EVALUATIONS," of this SER.

2.3.2 Cold

The applicant stated that the evaluation for cold is not applicable since the materials of the packaging, the fuel cladding, and the fuel can be subjected to lower temperatures without significant detrimental effects. The staff previously reviewed and accepted this statement and concluded that the package (Model No. 51032-2) satisfied the requirement of 10 CFR 71.71(c)(2), which also satisfies the requirement specified in paragraphs 637 and 650 of IAEA SSR-6, 1996 Edition. The staff's detailed safety evaluations on the applicant's thermal analyses are provided in section 3.0, "THERMAL EVALUATIONS," of this SER.

2.3.3 Reduced External Pressure

The applicant stated that the reduced external pressure will not have a significant impact on the package because of its construction materials. The staff previously evaluated this statement and found it acceptable. The staff concluded that Model No. 51032-2 met the regulatory requirement of 10 CFR 71.71(c)(3), which also satisfies the requirement in paragraph 643 of IAEA SSR-6, 1996 Edition.

2.3.4 Vibration

The applicant previously conducted analysis and road tests on the Model 51032-1 package with vibration load, showing that it suffered no negative impacts and that vibration effects under NCT during transport are minimal. After reviewing these findings, the staff concluded that the package complied with the regulatory requirements of 10 CFR 71.71(c)(5), which also fulfills the requirement outlined in paragraph 612 of the IAEA SSR-6, 1996 Edition.

2.3.5 Water Spray

The applicant previously conducted a water spray test on the Model 51032-1 package and confirmed that no water leaked into the containment vessel. Since the package's materials were unaffected by water and water in-leakage was assumed for criticality analysis, the applicant concluded that the package complied with 10 CFR 71.71 (c)(6), which also satisfies paragraph 721 of IAEA SSR-6, 1996 Edition.

2.3.6 Free Drop

The applicant did not carry out NCT free drop tests on the Model 51032-2 package because previous tests on similar packages (i.e., Model 51032-1 and Model 927A), which were reviewed and accepted by the staff, showed that the effects on the packages were minimal during the NCT drop test. These packages only suffered minor damage that neither compromised their effectiveness nor resulted in any loss or dispersal of content. After reviewing the applicant's evaluations for the packages, the staff concluded that the Model 51032-2 package met the regulatory requirements of 10 CFR 71.71(c)(7). This conclusion fulfills the requirement specified in paragraph 722 of IAEA SSR-6, 1996 Edition.

2.3.7 Corner Drop

The applicant stated that it did not perform a corner drop test on the package since the package was not fabricated from fiberboard or wood and its weight is more than 220 pounds (100 kg). As a result, the applicant determined that 10 CFR 71.71(c)(8) is not applicable. The staff found the applicant's statement acceptable and concluded that the regulatory requirement of 10 CFR 71.71(c)(8) was not applicable to the package. This conclusion also fulfills the requirement specified in paragraph 722(c) of IAEA SSR-6, 1996 Edition.

2.3.8 Compression

The applicant stated that it did not perform a compression (stacking) test on the package because an analysis for the Model 51032-1 previously showed the maximum induced stress on the package under a load equivalent to five times the weight of the package is less than the yield stress of the packaging material. The staff previously found the applicant's statement acceptable and concluded that the regulatory requirement of 10 CFR 71.71(c)(9) was not applicable to the package. This conclusion also fulfills the requirement specified in paragraph 723 of IAEA SSR-6, 1996 Edition.

2.3.9 Penetration Test

The applicant did not conduct a penetration test on the Model 51032-2 package, relying instead on prior tests carried out on similar packages (i.e., Model 927-A and Model UNC-2800) that had already been reviewed and accepted by the staff. These earlier results of the tests indicated that the effects of the penetration test were insignificant. Following its assessment of the applicant's documentation, the staff concluded that the application satisfied the regulatory requirements of 10 CFR 71.71(c)(10), which also fulfills the requirements specified in paragraph 724 of IAEA SSR-6, 1996 Edition.

2.4 Hypothetical Accident Conditions

The applicant stated that the Model 51032-2 container is identical in construction to the Model 51032-1 container. Because of this, no testing has been done specifically on the Model 51032-2 package; instead, results from the earlier tests performed on Model 51032-1 were used to assess the performance of Model 51032-2 under HAC. The staff previously reviewed and accepted the applicant's test results and its evaluations on both 51032-1 and 51032-2 models and issued the SERs for their licensing.

2.4.1 Free Drop

The applicant previously performed free drop model tests (horizontal, end and corner drops) on Model 927A, Model UNC-2800 and Model 51032-1 packages. A description of the drop tests on the Model 51032-1 package was provided in Appendix A of the SAR. The applicant provided a summary of those tests as follows:

- Horizontal drop – (i) the clamp cross members were deformed but not failed, with only one loosening from the strongback flange; (ii) simulated fuel elements stayed in the strongback; and (iii) cover and base assemblies remained secured at the flange connection.

- End drop: (i) the package stayed upright; (ii) damage was limited to flange deformation, minor puncture from the strongback, and crumpling of the strongback's forward end to the thrust plate edges; (iii) thrust plate bolts, side plates, and the plate itself showed no visible damage; and (iv) simulated fuel elements and cover and base assemblies remained secure except for three closure bolts at the forward end.

- Corner drop: (i) the base and cover assemblies remained firmly secured, with only one closure bolt exhibiting failure; (ii) upon package inspection, it was noted that the strongback had detached from the base assembly; and (iii) the aft end thrust bracket continued to be affixed to the strongback, and the simulated fuel elements were properly retained within the strongback.

Based on the results of the free drop tests, the applicant concluded that the package body maintained structural integrity during the free drops under HAC. The staff previously reviewed the applicant's evaluations and concluded that the package satisfied the requirements of 10 CFR 71.73(c)(1), which also satisfies the requirement specified in paragraph 727(a) of IAEA SSR-6, 1996 Edition.

2.4.2 Puncture

The applicant did not conduct a puncture test on the 51032-2 container under HAC. Instead, the applicant referenced puncture test results from two similar packages under HAC (CoC No. 5419 for Model UNC-2800 and CoC No. 6078 for Models 927A, 9278, and 927C), which demonstrated compliance with the requirements of 10 CFR 71.73 (c)(2) and had previously been reviewed and accepted by the staff. The test outcomes were: (i) no damage observed to the external birdcage structure of the container, (ii) inspection of the container's interior showed no damage to the simulated fuel assemblies and no displacement of the assemblies, and (iii) the welded joint exhibited no evidence of damage. Based on these results, the applicant determined that the package body maintained structural integrity under HAC. The staff previously evaluated the applicant's assessments and concluded that the package meets the requirements of 10 CFR 71.73(c)(2), which also satisfies the regulatory requirement in paragraph 727(b) of IAEA SSR-6, 1996 Edition.

2.4.3 Thermal

The applicant previously performed a thermal test on the Model 51032-1 package. The results of the test indicated that the container maintained its structural integrity under HAC, leading to the conclusion that the package complied with the regulatory requirement specified in 10 CFR 71.73(c)(4), which also satisfies the regulatory requirement in paragraph 728 of IAEA SSR-6, 1996 Edition. Further safety evaluations by the staff regarding the package's performance under thermal load are detailed in section 3.0 of this SER.

2.4.4 Immersion – Fissile Material

According to 10 CFR 71.73(c)(5), packages containing fissile material must be tested for water immersion unless water entry has already been considered in the criticality analysis. For this package, the applicant stated that water filling was assumed during its criticality analysis in chapter 6 of the SAR, making 10 CFR 71.73(c)(5) not required for the package. The staff found the statement acceptable and concluded that the package did not need to comply with the requirement, which also fulfills paragraph 731 of IAEA SSR-6, 1996 Edition. Further safety evaluations by the staff regarding the criticality analysis are detailed in section 6.0 of this SER.

2.4.5 Fuel Rods

The applicant performed three drop tests on the fuel rods, which are described in Appendix VI of Appendix A of the SAR. Inspections after the tests found no cracks or breaches in the cladding, only slightly warping and bending. Alpha detector surveys verified that no radioactive material was released. The applicant determined the rods retained their structural integrity under HAC. After reviewing the test results and the applicant’s assessments, the staff concluded the package met the requirements of 10 CFR 71.75.

However, the staff identified an inconsistency in the SAR. It reported a cladding thickness of 0.0365 inch (0.93 mm) for fuel rods used in model tests, yet these test results were later applied to a criticality calculation assuming a cladding thickness of approximately 0.021 inch (0.53 mm). To resolve this, the staff issued a request for additional information (RAI), asking either (1) clarification on how results from the fuel rod tests with 0.0365 inch (0.93 mm) cladding are applicable to calculations based on 0.021 inch (0.53 mm) cladding while maintaining rod integrity, or (2) results of a 30 ft (9 m) drop model test or structural analysis conducted on fuel rods with a cladding thickness of 0.021 inch (0.53 mm).

In response to the RAI, the applicant conducted additional fuel rod model tests using cladding with a thickness of 0.021 inch (0.53 mm). The test methods and procedures used were consistent with those previously reviewed and accepted by the staff for earlier fuel rod model tests. The results of these supplementary tests confirmed that there was no loss or breach of the fuel rod cladding in any case. Verification was carried out through both visual inspection for cracks or breaches and the release of helium pressure within each fuel rod several hours after the drop events. Based on these results, the applicant concluded that fuel rods with a cladding thickness of 0.021 inch (0.53 mm) maintained their structural integrity under HAC. The staff reviewed the test results and the applicant’s assessments and determined that the package satisfies the requirements of 10 CFR 71.75, which also fulfills the regulatory requirement specified in paragraph 679 of IAEA SSR-6, 1996 Edition. Detailed staff’s safety evaluations for the applicant’s criticality analyses are presented in section 6.0, “CRITICALITY EVALUATIONS,” of this SER.

2.5 Evaluation Findings

The staff previously reviewed and evaluated the structural performance of the Model No. 51032-2 shipping package under NTC and HAC. Based on its evaluations, the staff concluded that the Model No. 51032-2 package was adequately described, analyzed, tested, and evaluated to demonstrate its structural capability and integrity, and the package met the regulatory requirements of 10 CFR Part 71.

In this section of the SER, the staff assessed how the Model No. 51032-2 shipping package performs structurally during both normal and accidental transport conditions, following the regulatory requirements outlined in the IAEA SSR-6, 1996 Edition. After completing its review, the staff finds that the Model No. 51032-2 shipping package complies with the requirements of the IAEA SSR-6, 1996 Edition.

3.0 THERMAL EVALUATION

The objective of the NRC staff review of Framatome 51032-2 fresh fuel shipping package is to verify that the thermal performance of the package has been adequately evaluated for the tests specified under NCT and HAC, in accordance with 10 CFR Part 71.

3.1 Description of the Thermal Design

The Framatome 51032-2 packaging does not include components dedicated to thermal protection. Nevertheless, the design incorporates features that maintain fuel rod cladding temperatures below critical thresholds during a hypothetical 30-minute fire scenario. The external shell serves to protect the fuel assemblies from direct exposure to flames, while the cladding ensures containment of fissile material and structural integrity, even under elevated pressure conditions.

Summary tables presenting maximum and average temperatures can be found in SAR tables 3-9 and 3-10. SAR section 3.4.3 details the highest determined HAC (fire) temperature for rod cladding. The pressure analysis contained within the SAR confirms that the licensed fuel rod design remains intact and will not rupture at the calculated peak HAC temperature.

3.2 Material Properties and Component Specifications

SAR table 3-1 identifies the materials evaluated during the HAC fire analysis for the Framatome 51032-2 package, with detailed thermal properties presented in subsequent tables. SAR section 1.2 describes the specifications of the packaging components. The design does not include components intended specifically for thermal protection; only the fuel rod cladding is recognized for its ability to withstand the maximum fire event pressures without rupture.

3.3 Thermal Evaluation for Normal Conditions of Transport

The Framatome 51032-2 package ships fresh fuel assemblies with negligible heat output. Package temperatures are expected to remain near ambient, and the packaging materials are not sensitive to typical transport temperatures. As noted in SAR section 2.6.4, the packaging, fuel cladding, and fuel can withstand pressures far above normal conditions without significant damage.

The staff has reviewed the applicant's assessment of the Framatome 51032-2 shipping package under NCT and finds that the NCT analysis is acceptable. This conclusion is based on the analysis and results meeting the criteria outlined in NUREG-2216, thereby fulfilling the requirements of 10 CFR Part 71.

3.4 Thermal Evaluation for Hypothetical Accident Conditions

3.4.1 HAC Thermal Model

The applicant performed a transient thermal analysis on the Framatome 51032-2 shipping package under HAC conditions. The analysis included two load cases. The first load case (LC #1) simulated a 30-minute fire event. The second load case (LC #2) involved a 10-hour cool-down period after the fire to monitor peak temperatures in the fuel cladding. A three-dimensional (3-D) slice model was developed to represent the package and its contents. This model incorporated internal radiation and external heat dissipation through convection and radiation. The unstructured hexahedral mesh for the package was generated using ANSYS

Fluent Meshing. The same process was applied to the CE16x16 fuel assemblies. The 3-D slice in the model is 10 inches thick. Adiabatic boundaries were set on the front and back faces, meaning these surfaces do not allow heat to transfer, restricting heat flow to only the external radial boundary. The model includes several key components: the steel shell, steel strongback, zircaloy cladding, uranium dioxide (UO_2) fuel assembly, and air filling the remaining spaces. Only heat convection and radiation were considered in this simulation. Air was treated as a solid to allow only radiation-based heat transfer. The thermal model does not include fluid flow, so it solves only energy equations and discrete ordinate equations. "Discrete ordinate equations" are mathematical methods used to model how radiation travels through different materials and directions within the system. The initial conditions for the fire evaluation set the entire model at a uniform temperature of 100°F (37.8°C).

3.4.2 HAC Analysis

During the 30-minute fire test (LC#1), the exterior radial surface of the Framatome 51032-2 PWR fuel shipping package loses heat to the environment through radiation and free convection, with a fixed fire temperature of 1475°F, fire emissivity of 1, external surface emissivity of 0.8, and a forced convection coefficient of 4.5 Btu/hr-ft^2-°F. For cooldown, the package's exterior dissipates heat through radiation and free convection and absorbs solar insolation on its upper half, which has a solar absorptivity of 1.0 and a solar flux prescribed in 10 CFR Part 71. Both halves have an emissivity of 0.8 and a fixed ambient temperature of 100°F. Both LC #1 and LC #2 use second order upwind schemes for energy and discrete ordinate equations and a second order implicit method for transients, with default under-relaxation factors.

3.4.3 Maximum Temperatures and Pressure

SAR tables 3-9 and 3-10 provide the maximum and average temperatures for the fuel cladding and other major components of the Framatome 51032-2 PWR fuel shipping package, while figures 3-2 through 3-4 illustrate temperature data and contours. After a 30-minute fire, the fuel cladding peaked before cooling over 10 hours, as expected due to low thermal mass. The applicant confirmed that licensed fuel rod design will not rupture at the calculated peak cladding temperature.

Based on the information provided in the application the staff concludes that the HAC analysis of the Framatome 51032-2 shipping package is acceptable because the analysis and results satisfy NUREG-2216 and subsequently meets the requirements of 10 CFR Part 71.

3.5 Evaluation Findings

The staff reviewed the Framatome 51032-2 package description and evaluation and found reasonable assurance that they satisfy the thermal requirements of 10 CFR Part 71; reviewed the material properties and component specifications used in the thermal evaluation and found reasonable assurance that they are sufficient to support evaluation of the package against those requirements; reviewed the methods used in the thermal evaluation and found reasonable assurance that they are described in sufficient detail to permit an independent review with confirmatory calculations; and reviewed the package design, construction, and preparations for shipment and found reasonable assurance that the package material and component temperatures will remain within allowable limits during NCT, consistent with the tests specified in 10 CFR 71.71.

4.0 CONTAINMENT EVALUATION

4.1 Review Scope and Objective

The 51032-2 is a Type A(F) package designed to transport CoC-specified unirradiated commercial uranium fresh fuel assemblies. The package was previously reviewed and its CoC was renewed in January 2024. The objective of this review was to confirm that the containment-related aspects of the existing package and content meet current -96 regulations in order to update the certificate designation to “AF-96”.

The application letter’s table 1 and table 2 enclosures (submitted September 3, 2025), listed a summary of 10 CFR Part 71 changes found in *Federal Register* (FR) volumes 60 and 69 as well as their relevance to the information presented in the existing 51032-2 SAR. The tables indicated that the listed containment-related regulation (i.e., 10 CFR 71.43(c)) was satisfied because the containment boundary’s sealed fuel rods cannot be unintentionally opened by the expected pressure during transport.

4.2 Description of Containment System and Content

According to SAR section 1.2.1.1, section 1.2.1.2, table 1-1, and drawing number 1215929 (Rev. 003), the 51032-2 package, which is made of steel, is cylindrical in shape and consists of a shock-mounted internal steel strong-back (0.25 inch thickness) that supports and protects up to two fuel assemblies. The fuel assemblies are positioned and fixed to the strongback by clamps, separator blocks, and end thrust support plates to prevent lateral and vertical movement of the fuel elements. An outer container (i.e., cylindrical outer steel shell cover) envelopes the fuel assemblies. Continuous closure flanges are welded to the base and cover assemblies with a rubber/neoprene seal positioned between the mating flanges that are closed by bolts. SAR section 2.4.4 noted that there would be no significant chemical or galvanic reactions associated with the package’s materials.

SAR section 4.1 and table 6-1 noted that the package containment boundary consists of the fuel rod’s zirconium alloy cladding and welded end caps. SAR section 4.2.3 stated that each fuel rod is certified to be leak free before shipment.

SAR section 6.0 noted that the 51032-2 is a Type A fissile package and, as stated in the CoC, the maximum quantity of radioactive material within the package may not exceed a Type A quantity. SAR table 6-1 and section 5(b)(1) of the CoC provided details of the five fuel assembly types, including number of fuel rods, maximum enrichment, and minimum clad wall thickness. Fuel assembly type and array included the MkB HTP 15x15, Adv W HTP 15x15, Adv W HTP 17x17, MKC 17x17, and CE 16 Long 16x16. Section 5.(b) of the CoC stated that the total weight of the two fuel assemblies was not to exceed 3300 pounds.

4.3 Description of Containment System Performance

SAR section 2.6 indicated that the 51032-1 package and the Model 927A package were similar to the 51032-2 package and, therefore, NCT tests results were based on the test programs of those two packages. The results of the NCT tests showed that there would not be detrimental effects on the package. For example, section 2.6.7 noted that there were negligible effects on the Model 927A package from the NCT free drop test. Therefore, the package would remain closed such that there would not be dispersal of content, which is consistent with 10 CFR 71.43(f). In addition to the fuel rods being seal welded, SAR section 2.4.3 noted that the package’s mating closure flanges welded to the package base and cover are bolted closed with

58 closure bolts, which indicates there would not be unintentional opening of the package and is consistent with 10 CFR 71.43(c).

SAR section 2.7 indicated that the HAC physical drop test results from the Model 51032-1 test program, in which packages were loaded with two simulated fuel assemblies, were applicable to the Model 51032-2 packages. The Model 51032-1 30 ft drop test results showed that the fuel assemblies remained secured and, although a few closure bolts were sheared off (e.g., three bolts for the end drop test), the bottom base and top cover remained secured together. Similarly, SAR section 2.7.2 noted that results from puncture tests of a similar 972A container and UNC-2800 container showed no damage to the simulated fuel assemblies and no release of the fuel assemblies. Finally, drawings 1215929 (Rev. 003) and 1215935 (Rev. 003) as well as SAR figures 6-1 and 6-2 show that the fuel assemblies are positioned in the interior of the two end thrust plates and U-shaped strongback (i.e., nearer to the package's center) and, therefore, are largely shielded from the package's outer surfaces that directly receive the thermal effects from the regulatory HAC's 30-minute 1475°F (800°C) fire. SAR section 2.7.3 and section 3.0 indicated that the packaging materials and fuel assemblies would not undergo significant detrimental effects due to those thermal conditions. For example, SAR section 3.4.3 noted that calculations showed that fuel rod integrity would be maintained during the HAC fire.

4.4 Evaluation Findings

This licensing action was to confirm that the existing 51032-2 package and content meet current -96 regulations in order to update the package's certificate designation to "AF-96". Based on a review of the containment-related representations in the application, including the current SAR as well as tables 1 and 2 enclosures (submitted September 2025), the staff has reasonable assurance that the 51032-2 package transporting the content specified in the revised CoC (revision 12) meets the containment requirements of current 10 CFR Part 71 regulations and the 2018 edition of IAEA SSR-6.

5.0 SHIELDING EVALUATION

The staff performed a thorough evaluation of Model No. 51032-2 packaging to assess its alignment with the shielding requirements 10 CFR Part 71 and IAEA SSR-6, 2018 Edition. According to the applicant, the package satisfies all criteria set forth by the IAEA 1996 standard, as the current SAR adheres to the requirements specified in 10 CFR Part 71.

The applicant has clarified the relevance of 10 CFR 71.47(c) and 10 CFR 71.47(d) in relation to the 51032-2 SAR. Specifically, these sections pertain to special provisions and instructions for shipments conducted under exclusive use, as outlined in paragraph (b). According to the applicant, these additional requirements are not applicable to the 51032-2 SAR, as the package is designed to meet the dose rate limits specified in §71.47(a). As a result, the supplementary provisions of §71.47(b) do not pertain to this packaging, and compliance is assured based on adherence to §71.47(a).

Upon review, the staff determined that the 51032-2 SAR demonstrates compliance with shielding capabilities required for foreign applications under the IAEA SSR-6. Further examination of supplemental SAR materials confirmed clear adherence to each SSR-6 requirement.

Based on the review of statements and representations contained in application, as discussed above, the staff has reasonable assurance that Model No. 51032-2 complies with the IAEA SSR-6, 2018 Edition (IAEA, 2018). The staff therefore recommends updating CoC No. 9252 to reflect IAEA 1996 standards.

5.1 Evaluation Findings

The staff has reviewed the application and finds that it adequately describes the package contents and design features affecting shielding in compliance with 10 CFR 71.31(a)(1), 71.33(a), and 71.33(b), and that it provides an appropriate and bounding evaluation of shielding performance consistent with 10 CFR 71.31(a)(2), 71.31(b), 71.35(a), and 71.41(a). The application demonstrates that under the NCT specified in 10 CFR 71.71, and in accordance with 10 CFR 71.43(f) and 71.51(a)(1), external radiation levels do not significantly increase, and that these levels remain within the limits of 10 CFR 71.47(a) for nonexclusive-use shipments or 10 CFR 71.47(b) for exclusive-use shipments, as applicable. Additionally, the application includes operations descriptions, acceptance tests, and maintenance programs that ensure the package will be fabricated, operated, and maintained in a manner consistent with the shielding requirements of 10 CFR Part 71.

Based on its review of the information and representations provided in the application, the staff has reasonable assurance that the proposed package design and contents satisfy the shielding requirements and the radiation level limits in 10 CFR Part 71. The staff also considered the regulation itself, appropriate regulatory guides, applicable codes and standards, and accepted engineering practices in reaching this finding.

6.0 CRITICALITY EVALUATION

The objective of the criticality review is to verify that the 51032-2 package design meets the nuclear criticality safety requirements in 10 CFR Part 71 and to recommend revalidation of the package for international shipping via the requirements of the IAEA regulations SSR-6.

6.1 Package Contents

The 51032-2 package is designed to ship five different PWR fuel assembly designs: Mk-B HTP (15x15), Advance W HTP (15x15 and 17 x17), Mk-C (17x17), and the CE16 Long (16x16). Each fuel assembly has a maximum enrichment of 4.8 wt% ^{235}U, except for the CE 16x16 assembly, which has a maximum enrichment of 5.0 wt% ^{235}U. Each fuel assembly is composed of UO2 pellets clad in zirconium alloy tubing. Gadolinium rods can be transported within the assemblies. Each parameter, including bounding values for fuel rod pitch, clad thickness, pellet diameter, and maximum active fuel length, are provided in SAR table 6-1.

6.2 Calculation Model

The applicant created a distinct model for each of the contents described above. These models were used to determine the most reactive (bounding) assembly. The differences in modeling parameters between each fuel assembly is described in SAR table 6-1. The package can carry two fuel assemblies at once, separated by the strongback, a structural support system that provides separation between the fissile material. The performance of the strongback was analyzed under HAC, with deformation being considered for the damaged container model. Uranium dioxide density was calculated at 97.5% of theoretical. NRC staff reviewed the modeling assumptions, including densities and carbon-steel composition and found them to be of acceptable values.

6.3 Codes and Cross-Sections

The applicant uses KENOV.a for k_{eff} calculations along with the CSAS25 sequence to process the 44-group ENDF/B-V 238 group-cross section set. The applicant employs a technique of 1000 generations of 1000 neutrons until convergence, which in some cases took up to 2,000,000 histories. Although there are more modern KENO and CSAS sequences available, the applicant applies thorough calculation techniques and conservative methodologies for accurate K_{eff} calculation.

6.4 Demonstration of Maximum Package Reactivity

Framatome’s evaluation of subcriticality determines the most reactive fuel assembly type, then performs sensitivity studies on moderating characteristics. Each assembly type was modeled under HAC which includes flooding of the package and shifting of the fuel assemblies within their steel constraints. Flooding of the pellet/clad gap was investigated, and studies of the decrease in pellet diameter on reactivity were conducted. An array calculation was performed in which sets of four (2x2) damaged packages were aligned in which the fissile material was arranged as close as possible. Infinite arrays of this configuration did not meet the USL limit set later by the applicant. The applicant used the infinite array to perform a sensitivity study of interspersed moderation between the packages. The results showed the maximum reactivity of the system to be greater than the USL. Framatome decreased the array to a finite number (12x12x2), and the reactivity of the system decreased below the USL. Each model discussed adds a 12” water reflector around the boundaries that do not have a reflected boundary condition. Polyethylene content was also studied and was found to not have an impact on reactivity of the package when 10% of the moderator was replaced by polyethylene outside of the fuel assembly envelope.

NRC staff reviewed each sensitivity study configuration and determined that Framatome identified reasonable bounding conditions to demonstrate maximum reactivity of the package.

6.4.1 Single Package Evaluation

Using the model assumptions and the sensitivity studies described in sections 6.2 and 6.3 of this SER, Framatome demonstrated that every fuel assembly type is adequately subcritical. Each assembly's k_{eff} and total uncertainty are underneath their prescribed USL. SAR table 6-2 summarizes the calculation results for damaged packages. SAR table 6-8 summarizes the calculation results for undamaged packages.

6.4.2 Package Array Evaluation

Calculations were performed on an array of model 51032 shipping containers under NCT and HAC for all approved fuel assembly types. A 12x12x2 array was used to justify a CSI of 0.4. The applicant modeled optimum interstitial moderation and container shifting to determine the maximum reactivity of the array. NRC staff reviewed the model and CSI calculation and determined them to be acceptable.

6.5 Code Validation and USL Calculation

The applicant followed the principles described in NUREG/CR-6698 when validating the nuclear code described in chapter 6.3 of this SER. When benchmarking, the applicant used 82 critical experiments of heterogenous UO_x without Gd_2O_3. Using the Shapiro-Wilk test for a normal distribution of data outlined in NUREG/CR-6698, the applicant showed the data is normally distributed. Using the resulting bias, pooled uncertainty, and 95/95 One-Sided Tolerance Limit Multiplier for a normal distribution, the USL was calculated to be 0.9332. NRC staff reviewed the area of applicability of the benchmarks, statistical technique, and calculation of the USL and determined them to be acceptable.

6.6 Evaluation Findings

NRC staff concludes that the 51032-2 package meets the applicable criticality safety regulations of 10 CFR Part 71, along with the requirements that the package maintain subcriticality during routine, normal, and accident conditions of transport as required by the IAEA SSR-6 (2018 Edition), paragraphs 673(a) and 682.

7.0 MATERIALS EVALUATION

The staff reviewed and evaluated the information provided by the applicant for the 51032-2 PWR fuel shipping package. The specific changes evaluated in this section include:

1) Gap Analysis of Compliance with Changes to 10 CFR Part 71
2) Aging Management Engineering Study

7.1 Review Guidance

The 51032-2 shipping package is designed to transport Type A fissile material in the form of unirradiated nuclear fuel assemblies containing sintered uranium dioxide fuel pellets enriched up to 5.0 weight percent U235. The staff conducted a domestic transport review to bring the CoC up to "-96" under the current 10 CFR Part 71 framework and a revalidation review for the USA/9252/AF, Revision 5, 51032-2 PWR Fuel Shipping Package, per the requirements in section VI of the IAEA SSR-6, 2018.

7.1.1 10 CFR Part 71 Review

The areas of review covered in this SER section are described in NUREG-2216, section 7.2, and included system design, engineering drawings, material selection and material properties, environmental conditions and material compatibility, cladding integrity and fuel condition. The staff also evaluated the changes in the application with respect to the 10 CFR Part 71 regulatory requirements identified in NUREG-2216, section 7.3, and the review procedures and acceptance criteria identified in section 7.4 of NUREG-2216.

In addition to the guidance in NUREG-2216, the staff evaluated the engineered drawings and the description of the structures systems and components included in the application using the information provided in NUREG/CR-5502 Engineering Drawings for 10 CFR Part 71 Package Approval, and NUREG/CR-6407 Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety.

The staff reviewed 10 CFR Part 71 requirements applicable to Type AF which included: 71.43, 71.45, 71.47, 71.55, 71.59, 71.71, and 71.73.

7.1.2 Revalidation Review

The pertinent IAEA SSR-6 requirement is paragraph 613A. The design of the package shall take into account aging mechanisms. The staff reviewed the information provided by the applicant per the requirements of IAEA SSR-6, 2018.

7.2 Gap Analysis of Compliance with Changes to 10 CFR Part 71

The applicant provided a summary of compliance for the 51032-2 package with applicable changes to 10 CFR Part 71 in Attachment A to the SAR. This includes the basis for updating from an AF package to an AF-96 package.

In table 1, the applicant provided the summary of 19 changes considered in FR Volume 69. This provided the basis for updating from “-85” to “-96” based on all changes to the regulations in this FR volume. Additionally, the applicant stated that the table demonstrated that the regulatory changes for all 19 issues are either not applicable to the 51032-2 package or are addressed in the 51032-2 safety basis as documented in the SAR.

In table 2, the applicant provided the changes to both FR Volumes 60 and 69 that were applicable to the 51032-2 package. The applicant noted that the table only included the requirements applicable to Type AF packages, and those 10 CFR Part 71 sections included: 71.43, 71.45, 71.47, 71.55, 71.59, 71.71, and 71.73.

The staff reviewed table 1 and found that the applicant properly addressed all changes to update from "-85" to "-96;" thus, the 51032-2 package meets the regulations in FR Volume 69.

The staff reviewed table 2 and found that the applicant properly addressed all changes to both FR Vol. 60 and Vol. 69 in relation to 10 CFR Part 71, and thus the 51032-2 package is in compliance with 10 CFR Part 71.

7.3 Aging Management Engineering Study

The guidance in IAEA SSG-26, Paragraph 613A.1 states that:

> "The designer of a package should evaluate the potential degradation phenomena over time, such as corrosion, abrasion, fatigue, crack propagation, changes of material compositions or mechanical properties due to thermal loadings or radiation, generation of decomposition gases and the impact of these phenomena on performance of safety functions."

The applicant provided their evaluation and management of aging in the following documents:

- 51032-2 Ageing Management Summary
- SOP-40072, "Standard Operating Procedure, Transportation & Logistics – Container Maintenance, Shipping Container Maintenance and Rework
- SOP-40668, "Visual Inspection of Shipping Container Welds
- SOP-40940, "Preparing, Shipping and Receiving of 51032-2 Shipping Containers
- FRM-40940-A, "51032-2 Shipping Container Re-Use Conformance Report," and
- SAR section 7.1.1, "Package Operations – Preparation for Loading."

The applicant described in "51032-2 Ageing Management Summary" the evaluation of ageing mechanisms to support DOT approval under IAEA SSR-6.

In SOP-40072, "Standard Operating Procedure, Transportation & Logistics – Container Maintenance, Shipping Container Maintenance and Rework", the applicant described routine inspection, testing, maintenance, and rework for the 51032-2 containers. In Matrix A, the applicant described the unacceptable conditions and rework for the 51032-2 containers; in Matrix B, the applicant described the unacceptable conditions and rework for the strongback support equipment for the 51032-2 containers.

In SOP-40668, "Visual Inspection of Shipping Container Welds," the applicant documents the weld repair inspections of shipping containers conducted by certified technicians and the procedures utilized.

The applicant stated that for carbon steel welds the visual inspections are performed to AWS D1.1/D1.1M:2020, Structural Welding Code – Steel, sections 5.23 and 6.9. For stainless steel welds, they are performed to AWS D1.6/D1.6M:2017, Structural Welding Code Stainless Steel, section 5.11 and 6.28.

The applicant described in SOP-40940, “Preparing, Shipping and Receiving of 51032-2 Shipping Containers” the operational steps taken to assure the safe and effective refurbishment, shipping, and receiving of PWR fuel assemblies in 51032-2 shipping containers. This includes the inspections prior to each shipment in addition to the five year aging inspections.

The applicant described in FRM-40940-A, “51032-2 Shipping Container Re-Use Conformance Report” the weld inspections and visual inspections that examine for rust and corrosion anywhere on the 51032-2 shipping container.

In SAR section 7.1.1, the applicant described package preparation for loading. This includes inspections prior to each shipment, in addition to 5 year specific inspections to address aging of the package.

Prior to each shipment, the applicant specified that the shell and strongback will be checked for cracks and dents, hardware checked for bent, broken, or damaged members, nuts and bolts for grade and function, and checks for degradation or rust or corrosion pitting that could affect performance of the package. Additionally, the applicant stated that all maintenance items such as rubber seals, pads, shock mounts, fasteners, pressure relief valves, etc. will be inspected for wear, rust or damage and/or degradation. The package would also be visually inspected for any degradation from moisture or UV exposure and protective coatings would be applied as necessary. Any severe abrasion or rust or corrosion damage would be inspected to verify it meets minimum stock material thickness and would be verified by ultrasonic gauge or similar instrument.

The applicant specified for the five year aging inspections, liquid penetrant (PT) examinations of all continuous structural welds on the container base, lid, and strongback greater than or equal to 3/16 inch, with the acceptance criteria meeting AWS D1.1. The applicant also specified an inspection of all areas for severe abrasion or rust or corrosion with inspections to verify minimum stock material thickness is adhered to, with verification by ultrasonic gauge or similar instrument.

The applicant stated the primary effects of aging are limited to mechanical loadings applied by packaging components (e.g. bolt torquing) and general external conditions (e.g. ambient environmental conditions such as moisture and UV exposure, or operational damage from loading/unloading and handling). The applicant also stated that due to being a Type AF package with no shielding features, radioactive contents are limited and therefore decay heat and irradiation of the packaging are negligible and as such, thermal and irradiation effects on the packaging are negligible.

The staff reviewed the “51032-2 Ageing Management Summary,” SOP-40072, “Standard Operating Procedure, Transportation & Logistics – Container Maintenance, Shipping Container Maintenance and Rework,” SOP-40668, “Visual Inspection of Shipping Container Welds,” SOP-40940, “Preparing, Shipping and Receiving of 51032-2 Shipping Containers”, FRM-40940-A, “51032-2 Shipping Container Re-Use Conformance Report”, and SAR chapter 7, “Package Loading.” The staff found that the applicant assessed the aging effects from environmental exposure by inspecting the packaging for degradation from moisture and UV exposure. The staff also found that the applicant addressed corrosion and abrasion as aging effects by utilizing appropriate NDE and acceptance criteria to evaluate the condition of the package. The staff also found that the applicant appropriately addressed fatigue and crack propagation by assessing the mechanical loadings and operating conditions of the package. The staff found that the applicant also assessed changes to material characteristics and mechanical properties due to thermal loadings or radiation. The applicant applied appropriate inspection criteria and flaw evaluation methods to address the effects of aging necessary to maintain package performance.

Therefore, staff found that the applicant properly evaluated potential degradation phenomena over time, including corrosion, abrasion, fatigue, crack propagation, changes to material characteristics and mechanical properties due to thermal loadings or radiation, and the impact of these phenomena on performance of safety functions. The staff also found that the applicant has adequately implemented an inspection and maintenance program that addresses aging effects, including prevention, mitigation, condition monitoring and performance monitoring.

7.4 Evaluation Findings

Based on review of the statements and representations in the application, the NRC staff concludes that the materials used in the 51032-2 transportation package design have been adequately described and evaluated and that the package meets the requirements of 10 CFR Part 71 and IAEA SSR-6, 2018.

8.0 OPERATIONS EVALUATION

The staff reviewed the operational changes introduced for the 51032-2 package. These changes include new inspection criteria for rust, corrosion, dents, scratches, and other signs of degradation. These new inspection criteria strengthen compliance with the performance-based requirements of 10 CFR Part 71, which mandate that a package must be capable of withstanding NCT without loss of safety function. The visual and mechanical inspections that have been added include five-year ageing inspections and ensure that degradation mechanisms are identified and mitigated before they challenge the package's structural integrity or containment performance. These updates show the package remains able to satisfy the containment, shielding, and subcriticality expectations of Part 71 across all transport cycles.

Similarly, the procedural refinements in SOP-40940 V6 (included with RSI response, ML26075E874) support compliance with both SSR-6 paragraphs 604 - 606 (operational controls) and SSC-level performance criteria. These refinements include expanded pre-shipment over-checks, explicit requirements to identify "other signs of degradation," updated handling instructions, and refined terminology. SSR-6 (2018 Edition) emphasizes that users must apply operating procedures that appropriately account for package condition, maintenance, and handling to preserve the safety basis demonstrated in the SAR. By strengthening inspection rigor, clarifying personnel responsibilities, and enhancing refurbishment steps, these operational changes ensure that the package continues to perform as analyzed in the SAR under routine transport conditions and remains aligned with the current international regulatory framework.

Finally, the incorporation of SAR-driven inspection requirements into operations (specifically the ageing-related inspections tied to SSR-6 Paragraph 613A) demonstrates that the licensee has effectively integrated ageing management considerations into routine use of the 51032-2. SSR-6 (2018) requires that ageing mechanisms be addressed to ensure long-term package performance, and the new operational requirements create a direct, traceable method for verifying that structural components, seals, lifting features, and shock-mitigating parts continue to function as intended. Together, these operational enhancements maintain a strong linkage between the package's analyzed safety functions and its field implementation, ensuring continued compliance with both 10 CFR Part 71 and the 2018 SSR-6 international transport regulations.

CONDITIONS

In addition to editorial changes throughout, the following changes were made to the CoC for this revision:

Condition No. 1(d) was revised to reflect a new package identification number that includes the "-96" as the applicant has shown compliance with the current requirements of 10 CFR Part 71.

Condition No. 3(b) has been revised to reflect the correct name of the CoC holder and to reflect a fully consolidated SAR submitted at the end of the review.

Condition No. 5(a)(3) has been adjusted to reference the correct CoC holder name of Framatome, Inc.

The REFERENCES section was revised to reflect the date of the consolidated SAR submitted on July 6, 2026 and the correct CoC holder name of Framatome, Inc.

CONCLUSION

Based on the statements and representations in the application, as supplemented, and the conditions listed above, the staff concludes that the Model No. 51032-2 package design has been adequately described and evaluated, that the requested changes do not affect the package's ability to meet the requirements of 10 CFR Part 71, and that the package, as modified, meets the applicable requirements of the IAEA SSR-6, 2018 Edition. Accordingly, the staff recommends revalidation of the package consistent with these regulatory findings.

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