

November 17, 2021  
TJT:21:025

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Director, Division of Fuel Management  
Office of Nuclear Material Safety and Safeguards  
Washington, D.C. 20555-001

**Subject: 10 CFR 71.95 – 60 Day Report – TN-B1 Certificate Not Followed**

References: (1) NRC Certificate of Compliance (CoC) USA/9372/B(U)F-96, Docket Number 71-9372.

Dear Sir or Madam,

This is a revised letter to remove a proprietary marking that was included on letter TJT:21:023. There are no other changes.

Pursuant to 10 CFR 71.95(a)(3), Framatome Inc. (Framatome) submits this report for self-identification of instances where Framatome made multiple shipments of unirradiated fuel assemblies which the conditions of approval in the Certificate of Compliance (CoC) were not observed in making a shipment for the NRC-approved Type B package. Framatome is the certificate holder for this packaging.

From January 5<sup>th</sup> through February 25<sup>th</sup>, 2021, a total of 12 trucks transporting 285 channeled 11x11 fuel assemblies in 143 TN-B1 packages (USA/9372/B(U)F-96) were transported between the Framatome facility in Richland, WA and Southport, North Carolina with a non-conforming fuel channel side thickness. Table 4 of the TN-B1 CoC requires, in part, that the fuel channel side thickness be less than or equal to 0.254 cm. On October 1<sup>st</sup>, 2021 Framatome identified a fabrication tolerance issue against the license and on October 9<sup>th</sup> confirmed the maximum channel side thickness as 0.260 cm (0.254+.006 cm). Through a sensitivity study with increased channel thickness, Framatome has confirmed there is no impact to the criticality safety basis for these shipments.

This nonconformance is only associated with the 11x11 fuel assembly and channel and Framatome has confirmed no issue exists with the other fuel designs (8x8, 9x9, and 10x10).

The attachment to this letter provides the required details for the report.

Please feel free to contact me at (509) 375-8550 or Bryan Flanagan of my staff at (509) 375-8537 if you have questions or need additional information.

Sincerely,

A handwritten signature in black ink that reads "T. J. Tate". The signature is written in a cursive style with a large initial "T" and a long horizontal line extending from the "T" across the "J." and "Tate".

Timothy J. Tate, Manager  
Environmental, Health, Safety and Licensing

TJT/rd

Attachments: 10 CFR 71.95 – Type B Transportation Package Report  
(USA/9372/B(U)F-96)

**Attachment**

**10 CFR 71.95 – Type B Transportation Package Report (USA/9372/B(U)F-96)**

**1. Brief abstract describing the major occurrences 71.95(c)(1)**

The TN-B1 package is used to transport unirradiated fresh fuel assemblies, both channeled and unchanneled, with a U-235 mass percentage not to exceed 5 weight percent.

The allowable contents of the Certificate of Compliance, USA/9372/B(U)F-96, Revision 2, specifies in section 5(b)(1), Table 4 for 11x11 fuel assemblies that:

Fuel Channel Side Thickness:  $\leq 0.254$  cm

The maximum fuel channel side thickness measurement confirmed in multiple channels at multiple locations is 0.260 cm, which exceeds the license by 0.006 cm.

There was no component or system failure that contributed to this event. A license amendment will be submitted to correct the allowable channel thickness.

**2. Narrative description of the event, 71.95(c)(2)**

*(i) Status of components or systems that were inoperable at the start of the event and that contributed to the event;*

The fuel channel is a zirconium alloy tube that encompasses four sides of the fuel assembly. There were no inoperable components or systems.

*(ii) Dates and approximate times of occurrences;*

Between January 5<sup>th</sup> (first truck left) and February 25<sup>th</sup>, 2021 (final truck arrived) a total of 12 trucks transporting 285 channeled 11x11 fuel assemblies in 143 TN-B1 packages (USA/9372/B(U)F-96) between the Framatome facility in Richland, Washington and Southport, North Carolina. The last truck was a return shipment to Richland, Washington.

*(iii) The cause of each component or system failure or personnel error, if known;*

The maximum fuel channel side thickness defined in the licensing documents did not align with the fabrication documents. The channel thickness nominal dimension, without tolerances, was used in the safety evaluations and carried over into the CoC. The nominal dimension plus the maximum tolerance

should have been used when performing the safety evaluations and listed in the CoC.

- (iv) *The failure mode, mechanism, and effect of each failed component, if known;*

The presence of the fuel channel on the fuel assembly slightly increases the reactivity with adjacent fuel assemblies. A sensitivity study was performed conservatively increasing the channel thickness to 0.315 cm (from 0.254 cm) and the results confirmed the change in  $k_{\text{eff}}$  was within uncertainty values (within  $2\sigma$ ) and remained well within the safety basis. With such a small change calculated there is essentially no effect on the safety basis.

- (v) *A list of systems or secondary functions that were also affected for failures of components with multiple functions;*

No systems or secondary functions were affected for failures.

- (vi) *The method of discovery of each component or system failure or procedural error;*

The non-conforming fuel channel side thickness was identified by Framatome during the review of fuel channel information.

- (vii) *For each human performance-related root cause, a discussion of the cause(s) and circumstances;*

The nominal dimension rather than the maximum dimension of the channel's side thickness was communicated for the criticality evaluation. This error was not caught by calculation reviewers or packaging compliance reviews.

- (viii) *The manufacturer and model number (or other identification) of each component that failed during the event;*

There were no component failures.

- (ix) *For events occurring during use of a packaging, the quantities and chemical and physical form(s) of the package contents.*

A total of 12 trucks transporting 285 channeled 11x11 fuel assemblies in 143 TN-B1 packages (USA/9372/B(U)F-96). Each of 12 trucks carried either 3, 5, 12, or 15 TN-B1 packages (USA/9372/B(U)F-96) each with 2 channeled 11x11 fuel assemblies. One truck carried three TN-B1 packages with a total of 5 channeled fuel assemblies.

The proper shipping name for each shipment was: UN3328, Radioactive Material, Type B (U) Package, Fissile, Class 7, (2.2). The contents were solid uranium dioxide in fuel assemblies, uranium enriched to 20% or less. The non-flammable gas subsidiary hazard was for the pressurized helium gas within the fuel rods.

**3. Assessment of Safety Consequences and Implications of the Event, 71.95(c)(3)**

There is no failure and no safety consequence to exceeding the fuel channel side thickness. A sensitivity evaluation was performed comparing the existing 0.254 cm and a bounding 0.315 cm thickness value. The results determined the change in  $k_{eff}$  was within uncertainty values (within  $2\sigma$ ) and remained well within the safety basis with the thicker channel dimension.

A license amendment will be submitted prior to future channeled 11x11 fuel assembly shipments for approval of a bounding channel thickness value.

**4. Corrective actions taken, 71.95(c)(4)**

The fuel channel thickness shall be confirmed for compliance prior to shipment. A license amendment will be submitted to correct the allowable fuel channel side thickness.

**5. Reference to any previous similar events, 71.95(c)(5)**

There are no previous or similar events identified with this non-conformance.

**6. Contact, 71.95(c)(6)**

Please contact Timothy Tate at (509) 375-8550 for any additional information regarding this report.

**7. Assessment of Safety Consequences and Implications of the Event, 71.95(c)(7)**

No individuals were exposed to radiation or radioactive material due to this event. There was no leakage of contents due to the non-conformance.