



March 1, 2016  
TJT:16:010

US Nuclear Regulatory Commission  
Attn: Document Control Desk  
Director, Division of Spent Fuel Mgmt.  
11555 Rockville Pike  
One White Flint North  
Rockville, MD 20852

71-9309  
71-9372

Gentlemen:

**Subject: Report of Non-Compliance with Condition in Certificates of Compliance 9309 and 9372 for the Model RAJ-II and TN-B1 Containers, Respectively; Loose/Disengaged Inner Container Clamp Bolts**

Attached please find information as required by 10 CFR 71.95(c) relative to one RAJ-II container and two TN-B1 containers that arrived at an AREVA customer facility with a loose and fully disengaged bolt on one end of one of the four inner container restraining clamps. In each case the bolt on the other end of the restraining clamp was fully engaged as were the bolts on both ends of the other three inner container clamps.

The pertinent licensing drawing shared in common by the RAJ-II and TN-B1 containers shows the four inner container clamps screwed in place with all eight bolts fully engaged. Both container Safety Analysis Reports (SARs) call for the clamps to be in-place with the bolts tightened. The failure of the bolts to remain tightened and in-place over the course of the shipments is judged to be in non-compliance with the respective Certificates of Compliance for the RAJ-II and TN-B1 containers and as such reportable under 10 CFR 71.95(a)(3).

As discussed in the attachment, there were no safety consequences related to these events. In all cases the inner container remained effectively restrained via the other three clamps that were fully engaged. As also discussed, AREVA has revised its operational procedures to impose a torque requirement on the affected bolts that is consistent with that applied to other similar bolts in the container and that is judged to be sufficient to prevent recurrence of this condition.

If you have questions, please feel free to contact me at 509-375-8550.

Very truly yours,

A handwritten signature in black ink that reads 'T. J. Tate'.

T. J. Tate, Manager  
Environmental, Health, Safety, & Licensing  
**AREVA INC.**

NM5520

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/mah

Event Information Required by 10 CFR 71.95(c)

(1) A brief abstract describing the major occurrences during the event, including all component or system failures that contributed to the event and significant corrective action taken or planned to prevent recurrence.

*On October 30, 2013, AREVA personnel loaded RAJ-II (now TN-B1) container RA-181 with two BWR fuel assemblies. During the loading process, the AREVA personnel installed the four inner container clamps and tightened the 8 clamp bolts wrench tight; an independent inspector verified that the clamp bolts were at least hand tight.*

*On December 9, 2013, Brunswick Unit 1 personnel reported that RAJ-II (now TN-B1) container RA-181, received from AREVA Richland, was found to have one of the inner container clamps loose and that one of the two clamp bolts was all the way out and loose in the outer container. As a result of this incident, a Condition Report (CR) was written and based on the issue evaluation the AREVA loading procedure was revised to improve the technique for tightening the inner container clamp bolts to prevent a recurrence of the event. (Note: The CR written was a Problem and Concern CR, but no corresponding EHS&L or Component CR was written, so the reportability of the issue under 10 CFR 71.95 was never evaluated. This 2013 event was discovered as part of the "extent of condition" review conducted relative to the two recent recurrences of this condition, as reported below. The 2013 event is reported herein for the sake of completeness with respect to this issue.)*

*On September 24, 2015, AREVA personnel loaded TN-B1 container RA-015 with two fuel assemblies. During the loading process, the AREVA personnel installed the four inner container clamps and tightened the 8 clamp bolts wrench tight using the technique that had been developed as a result of the 2013 CR; an independent inspector verified that the clamp bolts were at least hand tight.*

*On September 30, 2015, AREVA personnel loaded TN-B1 container RA-185 with two fuel assemblies. During the loading process, the AREVA personnel installed the four inner container clamps and tightened the 8 clamp bolts wrench tight using the technique that had been developed as a result of the 2013 CR; an independent inspector verified that the clamp bolts were at least hand tight.*

*On January 6, 2016, Brunswick Unit 1 personnel reported that TN-B1 container RA-185 (on Truck #1 of the reload) had one of the four inner container clamps loose and that (as with RA-181 above) the loose clamp had one of the two fastening bolts completely out of the socket and loose in the outer container.*

*On January 13, 2016, Brunswick Unit 1 personnel reported that TN-B1 container RA-015 (on Truck #5 of the reload) had one of the four inner container clamps loose and that (as with RA-181 and RA-185) the loose clamp had one of the two fastening bolts completely out of the socket and loose in the outer container.*

*RAJ-II and TN-B1 license drawing 105E3739 R4 shows the four inner container clamps screwed in place with all 8 of the bolts in place. Both the RAJ-II and TN-B1 Safety Analysis Reports Chapter 7, Section 7.1.2.3, Step 11 state: put on hold down clamps and tighten bolts.*

*The intent of the license drawing and the Chapter 7 SAR requirement is that the 8 inner container clamp bolts remain in place throughout the entire shipment. Therefore, the first shipment described above from 2013 was not made in conformance with NRC Certificate of Compliance (COC) 9309 for the Model RAJ-II and the second and third shipments described above from 2016 were made in nonconformance with COC 9372 for the Model TN-B1. A nonconformance with a condition of the Certificate of Compliance in making a shipment is reportable under 10 CFR 71.95(a)(3).*

*For discussion of corrective actions resulting from this event, see discussion under (4), below.*

(2) A clear, specific, narrative description of the event that occurred so that knowledgeable readers conversant with the requirements of Part 71, but not familiar with the design of the packaging, can understand the complete event. The narrative description must include the following specific information as appropriate for the particular event.

*A narrative of the event was provided under (1), above. NRC COC 9309 Revision 9 for the Model RAJ-II, Condition 5(a)(3), requires that the packaging be constructed in accordance with license drawing 105E3739 Rev. 4. NRC COC 9372 Revision 0 for the Model TN-B1, Condition 5(a)(3), also requires that the packaging be constructed in accordance with license drawing 105E3739 Rev. 4. Both COCs require that the packages be used in accordance with the Package Operations of Chapter 7 of the applications. As stated above, one shipment with packaging RA181 was made in nonconformance to COC 9309 and two shipments, one with RA185 and one with RA-015, were made in nonconformance to COC 9372.*

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

*As described above, all three packages had all 8 of the inner container clamp bolts installed at the start of the shipment; but by the time the packages arrived at the customer's site, each had one inner container clamp bolt that had come loose and was out of the attachment socket.*

(ii) Dates and approximate times of occurrences;

*November 29, 2013, AREVA ships RAJ-II RA-181 containing two BWR fuel assemblies enriched up to 5 wt% with 12 other RAJ-II packages to Brunswick Unit 1, Southport, NC; received December 3, 2013.*

*December 31, 2015, AREVA ships TN-B1 RA-185 containing two BWR fuel assemblies enriched up to 5 wt% with 12 other RAJ-II packages to Brunswick Unit 1, Southport, NC; received January 5, 2016.*

*January 3, 2016, AREVA ships TN-B1 RA-015 containing two fuel assemblies enriched up to 5 wt% with 13 other RAJ-II packages to Brunswick Unit 1, Southport, NC; received January 8, 2016.*

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

*For each of the affected shipments, inner container clamp bolts were tightened and inspected to the operating procedures in effect at the time the packages were loaded. In these three instances, the tightening of the inner clamp bolts did not prevent one bolt in each case from coming loose.*

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

*No component actually failed, but in each case one of the 8 inner container clamp bolts became loose during the shipment.*

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

*There were no secondary failures associated with this event.*

(vi) The method of discovery of each component failure or procedural error.

*The receiver discovered the one loose inner container clamp bolt during receipt inspection of the three packages.*

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

*The 8 inner container clamp bolts (SUS 304 M14 x 35 mm long) are the same bolts used to secure the inner container lid and end cap and the outer container lid. The AREVA Engineering Specification requires the inner container lid and end cap bolts and the outer container bolts be torqued to  $20 \pm 5$  ft-lbs. There is no specified torque requirement for the inner container clamp bolts. It is believed that using the same  $20 \pm 5$  ft-lbs torque value on the inner container clamp bolts that is used on the other similar bolts will prevent the bolts from working loose during transportation.*

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

*The SUS 304 M14 x 35 mm long bolts did not fail, they only became loose.*

(ix) For events during the use of a packaging, the quantities and chemical and physical forms(s) of the package contents;

*The content of each package during each shipment was two BWR fuel assemblies with each assembly containing 181 kg U (362 kg U total) of solid UO<sub>2</sub> pellets enriched to a maximum of 5.0 weight % U-235.*

(3) An assessment of the safety consequences and implications of the event. This assessment must include the availability of other systems or components that could have performed the same function as the components and systems that failed during the event.

*There were minor safety implications but no actual safety consequences as a result of this event. The other three inner container clamps were fully in place and the matching bolt was in-place and engaged on the other end of each container clamp that had a loose bolt on one end. The inner container was fully restrained inside the outer container during each shipment by the inner container clamps.*

(4) A description of any corrective actions planned as a result of the event, including the means employed to repair any defects, actions taken to reduce the probability of similar events occurring in the future;

*As described above, the AREVA TN-B1 loading procedure has been revised to require that the inner container clamp bolts be torqued to 20 ± 5 ft-lbs as the same bolt is in all other applications in the package.*

(5) Reference to any previous similar events involving the same packaging that are known to the licensee or certificate holder.

*The three events listed in this report are the only times a customer has reported a loose inner clamp bolt.*

(6) The name and telephone number of the person within the licensee's organization who is knowledgeable about the event and can provide additional information.

*Timothy J. Tate, Manager  
Environmental, Health, Safety, & Licensing  
AREVA Richland Fuel Fabrication Plant  
(509) 375-8550*

(7) The extent of exposure to individuals to radiation or radioactive materials without identification of individuals by name.

*This event did not involve the exposure of individuals to radiation or radioactive materials.*