



January 4, 2017  
TJT:17:001

U.S. Nuclear Regulatory Commission  
Director, Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

Attn: Document Control Desk  
11555 Rockville Pike  
One White Flint North  
Rockville, MD 20852

71-9309  
71-9372

Gentlemen:

**Subject: Report of Non-Compliance with Condition in Certificate of Compliance for the TNB-1; Failure to comply with license drawing 105E3740 Rev. 4.**

- a) Attached please find information as required by 10 CFR 71.95(c) pursuant to shipments of TNB-1 containers to some of AREVA's domestic customers during the period December, 2004 to September, 2016. Attached to the letter is a file that contains a listing of each non-compliant shipment that AREVA made during this time interval. The non-compliance deals with item 6 of drawing 105E3740 Revision 4 which is supposed to be fabricated out of 304 stainless steel.

During preparations for a shipment, AREVA noticed that some of the bushings on a shipping package had rust on them. Further investigations later determined that 38 containers of the first 100 containers fabricated for AREVA collectively had 113 bushings that were composed of carbon steel instead of the required 304 stainless steel. The 113 carbon steel bushings have since been replaced with compliant 304 stainless steel bushings.

In addition to the inspections of the first 100 containers fabricated for AREVA, 27 of the remaining 150 containers have been inspected and none of these containers had non-compliant bushings.

There is no safety significance related to this failure to comply with the license drawing in that the bushings are not a load bearing/safety component and being fabricated of carbon steel instead of 304 stainless steel will not impact the shipping package performance during hypothetical accident conditions.

**AREVA INC.**

2101 Horn Rapids Road, Richland WA 99354  
Tel.: 509 375 8100 - www.aveva.com

NM5501

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

Very truly yours,

A handwritten signature in black ink, appearing to read "T. J. Tate". The signature is written in a cursive style with a large initial "T" and a long horizontal stroke.

T. J. Tate, Manager  
Environmental, Health, Safety & Licensing

Document Control Desk  
January 4, 2017

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cc:

U.S. Nuclear Regulatory Commission, Region II  
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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.

*The model TN-B1 and RAJ-II outer container license drawing 105E3740 Revision 4 Item 6 Bushing (24 total bushings per packaging) is required to be made from 304 stainless steel. On November 16, 2016, AREVA Richland personnel noticed that two of the bushings in TN-B1 outer container RA-050 appeared to be rusty. Further examination revealed that the two rusty bushings were also magnetic. Based on the rusty appearance and the attraction to a magnet it was felt that the two bushings were carbon steel and not 304 stainless steel. A positive material identification analysis on one rusty bushings verified that it was carbon steel. A shiny non-magnetic bushing from RA-050 was also verified to be 304 stainless steel by the same instrument.*

*TN-B1 RA-050 was manufactured in 2004 as part of the first 100 RAJ-II Type B(U)F BWR packagings fabricated in the United States by CHT under NRC Certificate of Compliance (COC) 9309 for AREVA Richland. Inspections of the TN-B1 outer containers RA-001 to RA-100 revealed that 38 of the outer containers had at least one carbon steel bushing (see the attached list). A total of 113 carbon steel bushings were found in the 38 outer containers. The 113 bushings represent the amount of material present in one 12 foot long section of bar stock used to fabricate the bushings. All of the carbon steel bushings have been replaced with 304 stainless steel bushings. A total of 27 TN-B1 outer containers with serial numbers between RA-101 and RA-250 were inspected for carbon steel bushings, but none were found. AREVA believes that the condition was isolated to the first 100 RAJ-II/TN-B1 outer containers manufactured by CHT in 2004 and 2005.*

*The first shipments of the 38 non-conforming packagings occurred in December 2004 from AREVA Richland to Browns Ferry Unit 2. The attached Table 1 lists the serial number of each non-conforming packaging, the number of carbon steel bushings found in each packaging, the total number of non-conforming shipments for each packaging, the number of non-conforming shipments of each packaging as a RAJ-II, the range of RAJ-II shipment dates for each packaging, the number of non-conforming shipments of each packaging as a TN-B1, and the range of TN-B1 shipment dates for each packaging. All of the RAJ-II (COC 9309) shipments were made to one of the following units: Browns Ferry Units 1, 2, and 3; Brunswick Units 1 and 2; and the Columbia Generating Station. All of the TN-B1 (COC 9372) shipments were made to one of the following units: Browns Ferry Units 1, 2, and 3; and Brunswick Unit 1. Normally each packaging contains two BWR fuel assemblies during each shipment:*

*The AREVA Richland shipments of RAJ-II and TN-B1 packagings with carbon steel bushings are a violation of SAR drawing 105E3740 Revision 4 for both NRC COC 9309 for the Model RAJ-II and NRC 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).*

*Note: AREVA Richland informed the following parties of the condition: TN Americas, LLC the owner of the packagings; CHT the manufacturer of the packagings; and Global Nuclear Fuel – Americas, LLC the RAJ-II (COC 9309) certificate owner.*

*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 Certificate of Compliance (COC) 9309 Revision 10 for the Model RAJ-II, Condition 5(a)(3), requires that the packagings be constructed in accordance with license drawing 105E3740 Revision 4. NRC COC 9372 Revision 0 for the Model TN-B1 Condition 5(a)(3), also requires that the packagings be constructed in accordance with license drawing 105E3740 Revision 4. Each non-conforming packaging was shipped from AREVA Richland to a customer's site between 11 to 20 times with two BWR fuel assemblies with an outer packaging having carbon steel bushings in violation of COC 9309 or COC 9372.*

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

*There were no components that were inoperable that contributed to the event.*

(ii) Dates and approximate times of occurrences;

*See the attached table for the list of shipments for the 38 non-conforming packages.*

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

*It appears that during the manufacture of the outer packaging bushings for the first 100 RAJ-II/TN-B1 packagings by CHT's vendor in 2004, that a 12 foot long bar of 25 mm diameter carbon steel was used in place of a bar of 304 stainless steel. The error was not caught until on November 16, 2016 when an AREVA Richland employee noticed that two of the bushings in outer packaging RA-050 appeared to be rusty.*

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

*There were no failed components. The effect of using carbon steel in place of 304 stainless steel had no adverse effects on safety since the bushings are only act as a spacer in a vibration damping device. Carbon steel bushings are just as effective as 304 stainless steel bushings for the intended use.*

(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.

*As stated above, an AREVA Richland employee noticed rusty looking bushings on RA-050 while performing visual inspection of the packaging during the routine refurbishment process.*

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

*See Section iii above.*

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

*There were no failed components associated with the events.*

(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 about 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 no safety consequences as a result of this event. The license drawing requires the use of 304 stainless steel bushings but carbon steel bushings can perform the task as a spacer just as well as a 304 stainless steel bushing.*

(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;

*All of the 113 carbon steel bushings in 38 non-conforming outer packagings have been replaced with conforming 304 stainless steel bushings. No other carbon steel components in the packagings have been found. During routine TN-B1 refurbishment inspections, the outer packaging bushings will be visually inspected to assure that they are not carbon steel.*

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

*AREVA (the certificate holder for COC 9372) is aware of two previous events that occurred when the packagings were licensed under COC 9309. In 2005, CHT reported that certain welds on the rope slings of the RAJ-II outer packagings were undersize. (The license drawing was revised to allow the undersize weld.) In 2006 GNF reported receiving new RAJ-II packagings from CHT with four inner clamp assemblies missing the four clamp blocks required to be welded to the clamp assemblies. (No RAJ-II packagings received by AREVA from CHT had the reported condition.) In 2015 (as a TN-B1) AREVA found a 1-5/8" long section of fillet weld missing on the inner packaging*

*lid of S/N RAVRB-190. (The missing section of weld was completed on the lid of inner packaging RB-190. No other TN-B1 packagings were found to have a section of missing weld.)*

(6) The name and telephone number of the person with 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.*

Number of Shipments for Each Non-Conforming TN-B1

Container #	NC	Replaced Quantity	Total Number of Non-Conforming Shipments	Number of Non-Conforming Shipments as a RAJ-II	Range of RAJ-II Shipment Dates	Number of Non-Conforming Shipments as a TN-B1	Range of TN-B1 Shipment Dates
RA-011	NC	3	17	13	12/2004 - 5/2014	4	10/2014 - 9/2016
RA-012	NC	5	18	15	12/2004 - 6/2014	3	11/2014 - 9/2016
RA-013	NC	6	15	14	12/2004 - 8/2014	1	7/2015
RA-014	NC	1	15	12	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-017	NC	2	19	15	12/2004 - 5/2014	4	10/2014 - 9/2016
RA-018	NC	3	15	14	12/2004 - 7/2014	1	9/2016
RA-019	NC	2	18	15	12/2004 - 5/2014	3	11/2014 - 1/2016
RA-024	NC	5	14	13	12/2004 - 6/2014	1	10/2014
RA-029	NC	1	13	12	12/2004 - 10/2013	1	9/2016
RA-030	NC	2	18	15	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-035	NC	11	17	13	12/2004 - 5/2014	4	10/2014 - 9/2016
RA-036	NC	6	16	13	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-037	NC	3	14	13	12/2004 - 7/2014	1	7/2015
RA-039	NC	2	14	12	12/2004 - 4/2014	2	11/2014 - 9/2016
RA-042	NC	1	15	14	12/2004 - 8/2014	1	9/2016
RA-044	NC	6	18	15	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-045	NC	6	20	16	12/2004 - 5/2014	4	11/2014 - 9/2016
RA-046	NC	1	16	14	12/2004 - 8/2014	2	1/2016 - 9/2016
RA-047	NC	11	14	12	12/2004 - 4/2014	2	10/2014 - 9/2016
RA-050	NC	2	14	13	12/2004 - 8/2014	1	9/2016
RA-051	NC	2	14	12	12/2004 - 5/2014	2	10/2014 - 9/2016
RA-052	NC	1	11	10	12/2004 - 7/2014	1	9/2016
RA-053	NC	5	18	15	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-054	NC	3	18	15	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-055	NC	2	15	13	12/2004 - 4/2014	2	11/2014 - 9/2016
RA-056	NC	3	17	14	12/2004 - 1/2014	3	10/2014 - 1/2016
RA-057	NC	1	13	12	12/2004 - 5/2014	1	7/2015
RA-059	NC	3	17	13	12/2004 - 5/2014	4	10/2014 - 9/2016
RA-063	NC	2	18	15	12/2004 - 5/2014	3	10/2014 - 1/2016
RA-064	NC	2	17	13	12/2004 - 5/2014	4	10/2014 - 9/2016

Table 1 Non-Conforming Shipments

Number of Shipments for Each Non-Conforming TN-B1

Container #	NC	Replaced Quantity	Total Number of Non-Conforming Shipments	Number of Non-Conforming Shipments as a RAJ-II	Range of RAJ-II Shipment Dates	Number of Non-Conforming Shipments as a TN-B1	Range of TN-B1 Shipment Dates
RA-066	NC	2	15	14	12/2004 - 7/2014	1	9/2016
RA-069	NC	1	11	10	12/2004 - 7/2014	1	7/2015
RA-070	NC	2	17	15	12/2004 - 4/2014	2	11/2014 - 7/2015
RA-071	NC	1	18	14	12/2004 - 5/2014	4	10/2014 - 9/2016
RA-072	NC	1	15	13	12/2004 - 7/2014	2	1/2016 - 9/2016
RA-074	NC	1	17	14	1/2006 - 5/2014	3	11/2014 - 9/2016
RA-084	NC	1	15	12	1/2006 - 5/2014	3	10/2014 - 1/2016
RA-091	NC	1	13	12	1/2006 - 7/2014	1	9/2016
<b>Total</b>	<b>39</b>	<b>113</b>					

Table 1 Non-Conforming Shipments (Continued)