



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

October 31, 2016

MEMORANDUM TO: Anthony Hsia, Deputy Director
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: Norma Garcia Santos, Project Manager **/RA/**
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: SUMMARY OF SEPTEMBER 21, 2016, PRE-APPLICATION MEETING
WITH AREVA-TN AMERICAS TO DISCUSS CHANGES ASSOCIATED
WITH THE MODEL NO. TN-B1 PACKAGE AMENDMENT REQUEST

Background

On September 21, 2016, United States (U.S.) Nuclear Regulatory Commission (NRC) staff met in Rockville, Maryland, at the request of the AREVA TN Americas (AREVA TN or the applicant) to discuss the upcoming application to add ATRIUM-11 as authorized contents for the Model No. TN-B1 transport package.

The meeting notice was added in the Agencywide Document Access and Management System (ADAMS) on September 9, 2016 (ADAMS Accession No. ML16253A220). Enclosure 1 includes a summary of the technical discussion. Enclosures 2 and 3 include the meeting attendees' list and agenda, respectively. The presentation slides are located in ADAMS Accession No. ML16261A002.

Several representatives from AREVA attended and participated during the meeting. Staff from headquarters also attended the meeting. No regulatory decisions were made at this meeting.

Docket No. 71-9372
CAC No. L25143

Enclosures:

1. Technical Discussion Summary
2. Meeting Attendees
3. Meeting Agenda

CONTACT: Norma Garcia Santos, NMSS/DSFM
(301) 415-6999

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Distribution:

NRC Attendees RPowell, RI SWalker, RII MKunowski, RIII JWhitten, RIV
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Closes CAC No. L25143.

ADAMS P8 Package No.: ML16305A113 Cover Letter ADAMS P8 Accession No.: ML16305A115

OFC	DSFM	DSFM	DSFM	DSFM	
NAME	NGarcia-Santos	HAKhavannik by e-mail	S. Figueroa by e-mail	J. McKirgan	
DATE	10/14/2016	10/17/2016	10/27/2016	10/31/16	

OFFICIAL AGENCY RECORD

MEETING SUMMARY

On September 21, 2016, AREVA-TN Americas (the applicant) and NRC staff (the staff) met to discuss details related to the upcoming licensing action request to revise the certificate of compliance of Model No. TN-B1 to add ATRIUM-11 fuel as authorized contents. The Model No. TN-B1 is a Type B (fissile) package.

I. Background

In March 2014, the applicant requested a letter authorization for using the Model No. TN-B1 to ship ATRIUM-11 lead test assemblies. The letter authorization had several restrictions such as a maximum number of packages per conveyor, shipping a single-unchanneled assembly per container, etc. The staff issued the letter authorization on July 9, 2014 (ADAMS Accession No. ML14190A743). The Model No. TN-B1 is an identical packaging design to the Model No. RAJ-II.

II. Technical Discussion

The ATRIUM 10, which is an approved content for transport in the Model No. TN-B1, is a current generation fuel with a 10×10 fuel array. The ATRIUM 11 is an 11×11 array. The applicant proposes:

1. making a minimum number of changes to the safety analysis report for incorporating the information related to the ATRIUM-11,
2. using information submitted as part of the application for a letter authorization as part of the application for adding ATRIUM-11 fuel, and
3. revising Chapter 1 from the SAR to include ATRIUM-11 fuel.

The applicant pointed out that the ATRIUM-11 and the ATRIUM-10 fuels are similar. Therefore, it may require similar restrictions such as the number of containers per shipment and a criticality safety index equal to one. The applicant noted that it plans to submit an application during the week of November 7, 2016, and gain approval for transporting two ATRIUM-11 fuel assemblies by the end of 2019. The following sections include a summary of the topics discussed at this meeting.

A. STRUCTURAL EVALUATION

The applicant completed the structural analysis in July 2016. The applicant pointed out that it would improve the structural analysis to justify some assumptions in the criticality analysis for the new content. The purpose of the structural analysis in this application is to ensure that the fuel does not suffer

damage during normal conditions of transport and hypothetical accident conditions. The applicant also plans to demonstrate that the inner and outer containers of the package maintain their integrity by providing a standalone analysis for the ATRIUM-11 fuel.

The applicant will continue relying on the nuclear fuel as the primary containment structure. The staff asked if the applicant would provide a structural analysis comparing the performance of the package with ATRIUM-10 versus with ATRIUM-11. The applicant noted that any plastic deformation was considered in the criticality analysis. The staff noted that the applicant should demonstrate compliance with 10 CFR 71.55(d)(2). The applicant also mentioned that it demonstrated the performance of the fuel due to deformation by analysis and validated the analysis with the results of the drop test for the ATRIUM-10.

B. THERMAL EVALUATION

The applicant pointed out that it did not make changes to the thermal analysis because the packaging design remained unchanged. The applicant made changes to Table 3-5, "Maximum Pressure," to include 11 × 11 fuel.

C. CONTAINMENT

As previously mentioned, the applicant would continue relying on the nuclear fuel cladding (ceramic sintered pellets) as the primary containment structure (the fuel rod is considered the containment system). The focus of the containment analysis is on the impact of the fuel assembly fittings on the fuel and to demonstrate that the fuel rod, assembly, and hardware (e.g., end caps) maintain their integrity. The staff asked if the applicant performed a leak test on the fuel after the regulatory drop test. The applicant pointed out that it performed a test before and after test and noted that the pitch expansion is different for the ATRIUM-11.

D. CRITICALITY EVALUATION

The applicant used SCALE 6.1.3 to perform the criticality analysis for the ATRIUM-11, including benchmarking analysis and to determine the upper safety limit (USL) for the k_{eff} . Some of the parameters assumed in the criticality analysis for the new content were:

Maximum uranium-235 (²³⁵U) enrichment	5.00 weight percent (wt. %)
Fuel Type	Uranium Dioxide (UO ₂)
Square Lattice Array	11 × 11 fuel rods (3 × 3 water channel at the center)

The applicant also mentioned that it varied parameters to obtain the most reactive configuration of the ATRIUM-11.

The applicant is not making changes to the shielding analysis, operations, and acceptance and maintenance test of the safety analysis report for the Model No. TN-B1.

III. Upcoming Licensing Action

A. The applicant needs to:

- a. show that the end caps maintain their integrity and that there is margin in its calculations.
- b. Provide a clear description of all changes to the safety analysis report. (Also, the cover letter of the application should include a brief description of the type of licensing action requested by the applicant. (For example: Revise CoC No. 1234 to add X-20 as authorized contents ...))
- c. Provide all the information related to the fuel design (the staff will make a proprietary determination, if the applicant submits such information as proprietary)

B. The applicant should ensure that the application includes the following information:

- a. A description of the approach for comparing ATRIUM-10 with ATRIUM-11 is clear in its application.
- b. A demonstration of compliance with 10 CFR 71.55(d)(2).
- c. Mechanical properties of the fuel assembly hardware.
- d. Material specifications for some materials including sensitivity analyses at low temperatures.
- e. A discussion of the safety margins, uncertainties, and benchmarking analyses.

The staff mentioned that the applicant should consider providing a draft certificate of compliance with the upcoming application (licensing action). The applicant mentioned that it plans on having a meeting with the staff after submitting the upcoming application. The staff suggested to include a detailed discussion of calculations and analysis at that meeting.

MEETING ATTENDEES

September 21, 2016
TWFN-6-WFN D44
1:30 p.m. – 3:00 p.m.

Name	Organization
<i>Glenn Mathues</i>	AREVA-TN
<i>Larry Tupper</i>	AREVA, Inc.
<i>Jim Davis</i>	AREVA-TN
<i>Kevin Elliot</i>	AREVA-TN
<i>Dave McDaniel</i>	Atkins Nuclear Solutions (ANS)
<i>Bruce DeWald</i>	Atkins Nuclear Solutions (ANS)
<i>Meraj Rahimi</i>	NRC
<i>Norma Garcia Santos</i>	NRC
<i>Huda Akhavannik</i>	NRC
<i>David Tang</i>	NRC
<i>John Wise</i>	NRC
<i>Tae Ahn</i>	NRC
<i>Shadi Ghrayeb</i>	NRC
<i>Jimmy Chang</i>	NRC
<i>Joseph Borowsky</i>	NRC
<i>Yong Kim</i>	NRC

Revision Request of Certificate of Compliance for the Model No. TN-B1 Transportation Package

Agenda

September 21, 2016
TWFN-6-D44
1:30 P.M. – 3:00 P.M.

Purpose:

Discuss the upcoming licensing action request for revising certificate of compliance No. 9372, Model No. TN-B1, to add the ATRIUM 11 fuel assembly as a new fuel content.

Process:

- | | |
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| 1. Opening Remarks | NRC/AREVA |
| 2. Introductions | All |
| 3. Project Goals and Schedule | AREVA |
| 4. Discussion of proposed changes to each applicable chapter of the safety analysis report (SAR) | AREVA |
| a. General Information | |
| b. Structural Evaluation | |
| c. Thermal and Containment Evaluations | |
| d. Criticality Safety Evaluation | |
| 5. Questions | AREVA |
| 6. Closing Remarks | NRC/AREVA |
| 7. Adjourn | NRC |