



Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Fabrication Facility
5801 Bluff Road
Hopkins, South Carolina 29061
USA

ATTN: Document Control Desk
Director, Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Direct tel: +1.301.931.5301
Direct fax: +1.803.695.4164
e-mail: sloma1t@westinghouse.com

Your ref: Docket No. 71-9297
Our ref: LTR-LCPT-17-03 Rev 1

March 20, 2017

Subject: Amendment Request Application USA/9297/AF-96 for Model No. Traveller STD, XL, and VVER Packages (Revision to enclosures)

References: (1) Docket 71-9297
(2) Certificate of Compliance USA/9297/AF-96, Revs. 7 and 9

Dear Director,

An application is hereby submitted to amend the license USA/9297/AF-96 for Model No. Traveller STD, XL, and VVER Packages. This amendment is submitted to amend the license with a new, criticality safety analysis (CSA) method for determining applicable fuel assembly contents for the Traveller. In September 2016, this new CSA method, defined by Categorized Fuel Assemblies (CFAs), was presented to the NRC staff to provide a preliminary understanding of the design, analyses, and importance of the project. This amendment also includes the addition of uranium silicide (U_3Si_2) fuel rods to be included in the Rod Pipe as a separate content configuration. The changes to the license application are documented in Revision 13 of the Safety Analysis Report (SAR), which is enclosed in this letter. Revision 1 of this letter revises enclosures to identify non-proprietary, redacted documents and proprietary documents. In conformance with the requirements of 10 CFR Section 2.390, as amended, of the Nuclear Regulatory Commission's ("Commission's") regulations, we are enclosing with this submittal an Application for Withholding Proprietary Information from Public Disclosure and an Affidavit, AW-17-4547 (Enclosed as non-proprietary enclosure 3).

Background

Based on legacy criticality requests for additional information (RAIs) from international competent authorities, a CSA revision was implemented as a long-term project to improve the method and update the computation code version for future flexibility. The new CSA methodology utilizes Categorized Fuel Assemblies (CFAs) to group and evaluate like fuel assemblies. Each CFA listed in the proposed CoC represents the bounding parameters analyzed in the criticality safety analysis. This method was implemented to: (1) simplify the listing of allowable fuel assembly contents in the Traveller Certificate of Compliance (CoC), (2) remove proprietary information from the Traveller CoC, and (3) allow for a degree of robustness in the CoC in accommodating minor, future changes to established fuel assemblies without amending the license.

In the new CSA methodology, each CFA listed in the proposed CoC represents the bounding parameters analyzed in the criticality safety analysis. All CFAs are organized into three groups based on Criticality

Safety Index (CSI) and Traveller package variants. For any fuel assembly shipped matching the allowable parameters of the draft CoC, then the fuel assembly is bounded by the representative CFA analyzed in the safety case.

The U_3Si_2 fuel rods are a content to be shipped in the Rod Pipe and are similar to UO_2 fuel rods in several ways, including the same maximum U-235 enrichment of 5 wt%. The U_3Si_2 material properties can be found in Section 6.3.2.3 of the SAR and details of the full analysis can be found in Section 6.3.4.2.2.

Request

Westinghouse requests an amendment to the license to include the new CFA criticality safety analysis. Section 6 of SAR Revision 13 has been completely revised as a result of the new CSA methodology. However, the packaging design has been neither changed nor been modified because of this amendment request. All changes made to the SAR address previous RAI concerns or support the addition of the new CSA methodology.

We also request CoC Rev. 7 expiration to be extended one-year beyond the date of issuance of the new certificate. CoC Rev. 7 was the consolidated 5-year renewal, and is the basis for DOT CAC Rev. 5, the Competent Authority approval for majority of international validations. In addition, we request CoC Rev. 9 expiration to be extended one-year beyond the date of issuance of the new certificate to coincide with the Rev. 7 expiration. CoC Rev. 9 (and Rev. 8) were the Traveller VVER design approval, and is the basis for DOT CAC Rev. 7, the Competent Authority approval for required international validations of the Traveller VVER design. With an extended expiration for CoC Rev. 7 and Rev. 9, we will align all international validations to a new single certificate, and are providing Competent Authorities one year for review and approval for new validations. As noted in our September 2016 meeting with NRC staff, it is important to maintain CoC Rev. 7 valid through the review and issuance of a new certificate. Thus, as discussed, we may request an extension in Summer 2017 of the Rev. 7 expiration, currently set for 31 October 2017; the expiration extension is to ensure international validations remain effective until this amendment request has been reviewed and approved by NRC staff.

Finally, it is requested that this application be reviewed for the Joint United States – Canada process for package approval and validation, in accordance with NUREG 1886. The current Canadian endorsement for the Traveller STD and Traveller XL Package is CDN/E216/-96, (Rev 5).

SAR Revision

All requests are consolidated into the SAR Revision 13. The page changes for the amendment are marked as Revision 13 and the revised portion of the page is marked using change bars, consisting of a vertical line drawn in the right margin. Changes are also noted in the application *Record of Revisions* and *List of Effective Pages*. The revised SAR Revision 13 is provided as Enclosure 1.

Revisions to the SAR include the following:

- Complete revision of Section 6, including development of bounding fuel parameters defined as CFAs, which represent a combination of fuels, as discussed in Sections 6.2 and 6.9.2. Revision of method for establishing subcriticality, which now includes the evaluation of uncertainties as independent sensitivities and the accumulation of penalties, and is discussed in Section 6.3.4. Addition of U_3Si_2 loose fuel rod contents to the Rod Pipe configuration, as discussed in Section 6.3.4.2.2. Updated the code version to SCALE 6.1.2 and the SCALE model of the Traveller packaging, as discussed in Section 6.3.
- Clarifications added to Sections 1, 4, 5, 7, and 8, but major details have not changed. Sections 1, 4, 5, 7, and 8 are updated to Revision 13 pages and change bars are not used. Sections 7 and 8

- include additional details to represent the current usage of the packages and activities that are applicable to all sites that use the packages.
- Section 2 and 3 include an update to reference sections to address the update of IAEA regulations, as incorporated by 49 CFR 171.7. Section 2.12.8.3 (pages 2-240 – 2-240C) includes additional details of the VVER fuel assembly performance expectations resulting from the previously defined Traveller VVER FEA. Section 2.12.9 has been added to discuss the performance comparison of zirconium alloys. Section 3.2.1 and tables have been revised to incorporate additional material property references. Section 3.6.5.1 (pages 3-46, 3-46A) includes additional details of the condition of the moderator block after fire testing, as justification to support the criticality evaluations defined in Section 6.3.4.3.3.
 - Inclusion of RAI responses from foreign Competent Authorities.

Certificate Revision

The following revisions were made to the draft CoC, included as non-proprietary Enclosure 2, to accommodate the new criticality safety analysis. Other changes, including details to accommodate the current certificate format, are provided in the following sections:

- CoC Section 5.(a)(2): Package weights and dimensions were adjusted due to corrections in the conversion factors. These specifications can be found in SAR Revision 13, Section 1.2.1.1.
- CoC Section 5.(b):
 - All contents specifications and restrictions revised to incorporate new CSA method. The full contents specification can be found in SAR Revision 13, Section 6.2.
 - Polyethylene packing material limits reduced for fuel assembly contents per SAR Revision 13, Section 1.2.2.2
- CoC Section 5.(c): Criticality Safety Indices have been increased for all contents types per SAR Revision 13, Section 1.1 and Section 6.1.3

Draft CoC Section 6 (requirements of Subpart G of 10 CFR Part 71) remain applicable to all Traveller family packagings.

Westinghouse has a quality assurance program, approved by the Commission that satisfies the provisions of Subpart H (Quality Assurance) of Part 71. Further, Westinghouse complies with the terms and conditions of the applicable requirements of Subparts A (General Provisions), G (Operating Controls and Procedures), and H (Quality Assurance) of Part 71.

One copy of the amendment application is submitted electronically via NRC Electronic Information Exchange (EIE) system and emailed to the Project Manager, Huda Akhavannik. Additional electronic or hard copy submissions are available upon request. Should you have any questions, or require additional information, please contact me either by telephone at (301) 931-5301 or by email at sloma1t@westinghouse.com, or contact the Engineering & Regulatory Compliance Manager, Wes Stilwell, directly at (803) 647-3438 or by email at stilwewe@westinghouse.com.

Best regards,

*

Tanya Sloma
Licensing, Compliance and Package Technology
Nuclear Fuel Transport
Westinghouse Electric Company LLC

Enclosures:

Non-Proprietary Enclosure:

1. LTR-LCPT-17-03-Rev1-NP Attachment

Safety Analysis Report Revision 13 Application for Certificate of Compliance for the Traveller PWR Fuel Shipping Package, NRC Certificate of Compliance USA/9297/AF-96 (SAR Revision 13, dated February 2017)

File name	Description	File Size (MB)	File Date
LTR-LCPT-17-03-Rev1-NP Attachment.pdf	SAR Rev. 13	174.8	3/19/2017

File Section Listing:

Traveller_SAR_Rev13_Front Matter.pdf	SAR Rev. 13, Front Matter	18.1	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 1.pdf	SAR Rev. 13, Chapter 1	18.1	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 2.pdf	SAR Rev. 13, Chapter 2	53.7	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 3.pdf	SAR Rev. 13, Chapter 3	42.3	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 4.pdf	SAR Rev. 13, Chapter 4	0.5	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 5.pdf	SAR Rev. 13, Chapter 5	0.5	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 6_nonprop.pdf	SAR Rev. 13, Chapter 6	69.9	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 7.pdf	SAR Rev. 13, Chapter 7	0.7	3/17/2017
Traveller 71-9297 SAR Rev 13_Chapter 8.pdf	SAR Rev. 13, Chapter 8	0.7	3/17/2017

NOTE: files may be split into multiple files for the EIE submittal due to 100 MB application size limit

2. Draft CoC Revision 10, with markups

File name	Description	File Size (MB)	File Date
DRAFT CoC 71-9297.R10 NRC.docx	Draft CoC Rev. 10	0.4	2/9/2017

3. AW-17-4547, LTR-LCPT-17-03-Rev1-P Attachment, "Application for Certificate of Compliance for the Traveller PWR Fuel Shipping Package, Safety Analysis Report, Revision 13 Chapter 6, Criticality Evaluation, NRC Certificate of Compliance USA/9297/AF -96 Docket 71-9297 (Proprietary)", dated 15 March 2017.

Proprietary Enclosure:

1. LTR-LCPT-17-03-Rev1-P Attachment

Safety Analysis Report Revision 13, Chapter 6, Criticality Evaluation (SAR Revision 13, Chapter 6, dated February 2017)

File name	Description	File Size (MB)	File Date
LTR-LCPT-17-03-Rev1-P Attachment.pdf	SAR Rev. 13, Chapter 6	67.7	3/19/2017

cc w/o enclosures:

W. Stilwell, Westinghouse-USA
 T. Grange, Westinghouse-UK
 P. Kember, Westinghouse-Sweden
 H. Akhavanik, NRC