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Your ref: USA/9297/AF-96
Our ref: LTR-LCPT-16-08

June 27, 2016

Subject: Amendment Request Application USA/9297/AF-96 for Model Nos. Traveller STD, XL, and VVER Packages

References: (1) Docket 71-9297
(2) Certificate of Compliance USA/9297/AF-96, Rev 8
(3) Canadian Nuclear Safety Commission Endorsement CDN/E216/-96, (Rev 5)

Dear Director,

An application is hereby submitted to amend the license USA/9297/AF-96 for Model Nos. Traveller Standard, XL, and VVER Packages. The purposes of this amendment request is to revise a non-safety related VVER fuel assembly parameter, the fuel assembly envelope, defined for the contents of Traveller VVER package design. The Traveller VVER package design was incorporated into Safety Analysis Report Rev. 12 and approved in Revision 8 of the Certificate of Compliance dated 29 Oct 2015. Westinghouse has continued to develop the VVER fuel design to better meet customer needs in the global market.

The change to the VVER fuel design is a small reduction in the assembly envelope to facilitate operations. The VVER assembly envelope parameter revision is a non-safety related fuel assembly parameter and has not resulted in the revision of any specification or parameter important to the Traveller package safety case. Thus there has been no change to any technical evaluations of the SAR safety case. Details of the fuel parameter change are included in the letter.

Background

VVER fuel assemblies are a hexagonal fuel design for use in a light water reactor. The Traveller VVER shipping package was developed to ship VVER type fuel assemblies and licensed in 2015. This package type is required due to an increased requirement for VVER type fuel from a Westinghouse customer. This is a very critical delivery for Westinghouse and the nuclear industry.

As discussed in SAR Rev. 12, Section 6.10.11.3.1, there are two variations of the VVER fuel assembly, however the fuel specifications important to criticality safety (e.g., pellet diameter, fuel rod diameter, pitch, rod positions, etc.) remain the same between the fuel assembly variations.

The VVER fuel assembly parameter change is a reduction of the VVER fuel assembly envelope. The reduction of the envelope is to facilitate more space around the edge of the assembly when loading into the reactor core. The reduction of the fuel assembly envelope does not impact any fuel specifications important to criticality safety and does not impact the licensed contents of the Traveller VVER package.

Fuel Parameter Revision Details

The fuel assembly envelope is defined based on the dimensions of the assembly skeleton hardware (i.e., grid assemblies). This parameter is used for loading of the fuel assembly to ensure that the assembly will properly fit into the package cavity—this detail is not assessed in the SAR. In the Traveller VVER criticality analysis, the size of the assembly rod array is defined solely based on the number of rods in the hexagonal array and the rod pitch, which is the same for all VVER fuel designs. The hexagonal rod array is placed directly against the Traveller clamshell wall, taking no credit for the offset provided by the assembly hardware that defines the assembly envelope. Thus the assembly envelope is a parameter listed in the CoC that is not used for any analysis in the SAR.

The VVER assembly envelope listed in the CoC is based on prior VVER fuel designs. Evolutions in the design has reduced the fuel assembly envelop by 0.07 cm [0.178 in], as shown in Table 1 below. Note the 0.0001 cm difference between the listed nominal lattice pitch of the Traveller CoC and revised VVER fuel design is due to retention of significant figures / rounding (e.g., 0.502 in x 2.54 cm = 1.27508 cm), and is shown here to confirm the fuel lattice pitch is unchanged.

Table 1: Comparison of Revised VVER Fuel Specifications

Parameter	Traveller CoC Rev. 7, Section 5.(b)(3)(i)	Updated VVER Fuel Designs
Fuel Assembly Design	VVER	VVER
Nominal Assembly Envelope	23.48 cm [9.244 in]	23.41 cm [9.215 in]
Nominal Lattice Pitch	1.2751 cm [0.502 in]	1.275 cm [0.502 in]

Any change to the VVER fuel design has not resulted in the revision of any specification or parameter important to the Traveller package safety case. Tolerances are defined by manufacturing limits, and do not deviate from previous design tolerances. The Traveller VVER content weight of 839 kg [1850 lbs], as specified in CoC Section 5.(a)(2), remains bounding of all current VVER fuel designs. The structural and thermal analyses are not impacted by the revised VVER fuel design since the fuel parameters for both analyses are either bounded (i.e., content weight in Chapter 2) or unchanged (i.e., fuel parametric properties in Chapter 3). The general information (Chapter 1) is unchanged since “VVER” is used generically. And there is no impact to Chapters 7 or 8, as activities are generic to all Traveller types.

Revised SAR Rev. 12 Pages

As there is only a single page change for the fuel specification defined in Chapter 6, Revision 12 of the SAR is maintained. The *Record of Revisions* notes the change as Revision 12 amended for clarity of record keeping.

Page changes are as follows, and included as enclosure to this letter:

- Record of Revisions, Page v – includes description of revision
- List of Effective Pages, page 5 of 6 – updates date of page 6-172
- Page 6-172, Table 6-45 – revised to amend “Nominal Assembly Envelope” to values listed in Table 1 above

Certificate of Compliance Revision

Section 5.(b)(3)(i), Table *Parameters for VVER Fuel Assemblies* revised as follows:

Parameters for VVER Fuel Assemblies

Fuel Assembly Description	VVER
Fuel Assembly Type	VVER
No. of Fuel Rods per Assembly	312
No. of Non-Fuel Rods	19
Nominal Guide Tube Wall Thickness	0.08 cm (0.032 in.)
Nominal Guide Tube Outer Diameter	1.2598 cm (0.496 in.)
Nominal Pellet Diameter	0.7844 cm (0.309 in.)
Nominal Clad Outer Diameter	0.9144 cm (0.360 in.)
Nominal Clad Thickness	0.0572 cm (0.023 in.)
Clad Material	Zirconium alloy
Nominal Assembly Envelope	23.41 cm (9.215 in.)
Nominal Lattice Pitch	1.2751 cm (0.502 in.)

Additionally, Westinghouse requests to amend the Certificate of Compliance to allow continued use of Revision 7 for two years beyond the new certificate issue date. The current US DoT Competent Authority Certification (CAC) references NRC CoC, Revision 7, and international certificates are requiring increasingly more review time. And with the impending application of the criticality safety case revision, we ask for the extended overlap to ensure fuel shipments continue without delay.

As an update to the February meeting where Westinghouse shared with NRC staff the scope and timeline the full Traveller criticality safety upgrade project, work progresses well on the Traveller licensing documentation and criticality safety case engineering analyses. The target date is still maintained as January 2017 for application submittal to the NRC. We intend, as discussed, to provide an update on the fuel assembly comparison and package assessment in late summer, and a full project review around November with details of the licensing and safety case revision. We will propose a meeting date as we near completion of the engineering analyses and SAR revision.

Request

Westinghouse requests an amendment to the license to revise the VVER assembly envelope identified in Table 6-45 of SAR Rev. 12 and the CoC. There has been no revision to any safety analysis and no changes to the Traveller VVER packaging design. The first delivery is scheduled for Fall 2016 and will require validation by multiple foreign competent authorities. Therefore, we request the revision to the certificate at the earliest possible date. We apologize for the late notice and are available to provide any additional details.

This application is submitted to amend the VVER assembly envelope parameter of the license USA/9297/AF-96 for Model Nos. Traveller Standard, XL, and VVER Packages. The amendment requests revision of a non-safety related VVER fuel assembly parameter, the assembly envelop, defined for the contents of Traveller VVER package design. Details of the fuel parameter change are included in the letter. There has been no change to the technical evaluations of the SAR safety case.

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).

One copy of the amendment request is submitted electronically via EIE system and another copy emailed

to our prior Project Manager, Pierre Saverot. Additional copies or electronic submissions are available upon request. Should you have any questions, or require additional information. Please feel free to contact any of us, as needed: myself or the Nuclear Fuel Transport Director, Wes Stilwell at 1-803-647-3438 or stilwewe@westinghouse.com.

Best regards,

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

Enclosure:

Safety Analysis Report Revision 12 - 6/2016 amended pages:

- Record of Revisions, Page v
- List of Effective Pages, page 5 of 6
- Page 6-172, Table 6-45

cc:

T. Grange, Westinghouse – UK
W. Stilwell, Westinghouse – USA
P. Kembler, Westinghouse – Sweden

*Electronically approved records are authenticated in the Electronic Document Management System.

RECORD OF REVISIONS (cont.)

<u>Rev. No.</u>	<u>Date</u>	<u>Description of Revision</u>
10 (cont.)		<u>Section 7 – Package Operations</u> 7.1.1.3 Clarification and consolidation of information. 7.1.2, 7.12.1, and 7.2.2 Added tolerances for Torque figures. <u>Section 8 – Acceptance Tests and Maintenance Program</u> Clarification and consolidation of information.
11	December 2013	<u>Section 1 – General Information</u> 1.2.1.3 Maximum Quantity of Material per Package Revised allowable weight for packing materials which are equivalent to polyethylene.
12	March 2015	Addition of the Traveller-VVER packaging with VVER fuel assembly contents in each chapter as required for design approval. Chapters 1, 2, 3 and 6 contain majority of the content addition (including Sections 1.2.1.1.3 and 1.2.1.3, Section 2.12.8, Section 3.3.1.1, and Section 6.10.11). Addition of tie-down detail calculations (Section 2.12.3.2.3). Revision of text to clarify acceptable seal materials, however no changes to materials made (Chapter 2 and Chapter 8). Minor style and composition, non-technical edits made throughout SAR to clarify text.
12 amended	June 2016	Tgxlugf "XXGT"Cuugo dnf "Gpxgmqr "/"pqp-uchgvf "tgrcvgf "revision Revised Table 6-45 (Page 6-172) only

TRAVELLER SAFETY ANALYSIS REPORT
LIST OF EFFECTIVE PAGES (cont.)

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6-107P	2	2/2005	6-137	1	11/2004	6-175	12	3/2015
6-107Q	2	2/2005	6-138	1	11/2004	6-176	12	3/2015
6-107R	2	2/2005	6-139	9	11/2010	6-177	12	3/2015
6-107S	2	2/2005	6-140	1	11/2004	6-178	12	3/2015
6-107T	2	2/2005	6-141	1	11/2004	6-179	12	3/2015
6-107U	2	2/2005	6-142	1	11/2004	6-180	12	3/2015
6-107V	2	2/2005	6-143	1	11/2004	6-181	12	3/2015
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6-107FF	3	3/2005	6-153	1	11/2004	6-191	12	3/2015
6-107GG	3	3/2005	6-154	1	11/2004	6-192	12	3/2015
6-107HH	3	3/2005	6-155	1	11/2004	6-193	12	3/2015
6-108	10	9/2013	6-156	1	11/2004	6-194	12	3/2015
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6-110	1	11/2004	6-158	1	11/2004	7-i	9	11/2010
6-111	1	11/2004	6-159	9	11/2010	7-ii	9	11/2010
6-112	1	11/2004	6-160	1	11/2004	7-1	10	9/2013
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6-118	1	11/2004	6-160F	2	2/2005	8-i	10	9/2013
6-119	1	11/2004	6-160G	2	2/2005	8-ii	9	11/2010
6-120	1	11/2004	6-160H	2	2/2005	8-1	12	3/2015
6-121	1	11/2004	6-160I	2	2/2005	8-2	0	3/2004
6-122	1	11/2004	6-160J	2	2/2005	8-3	0	3/2004
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6-134	1	11/2004	6-172	12	6/2016	8-8B	1	11/2004

Table 6-45 VVER Fuel Assembly Parameters	
Fuel Assembly Type	VVER
Nominal Pellet Diameter	0.3088 (0.7844)
Annular Pellet Inner Diameter	0.1550 (0.3937)
Nominal Clad Thickness	0.0225 (0.0572)
Clad Material	Zirconium alloy
Nominal Clad Outer Diameter	0.3600 (0.9144)
Maximum Stack Length	138.98 (353)
Nominal Assembly Envelope	9.215 (23.41)
Kg's ²³⁵ U Assembly	26
Nominal Lattice Pitch	0.5020 (1.2751)
GT Outer Diameter	0.4960 (1.2598)
GT Thickness	0.0315 (0.0800)
GT Material	ZIRC
IT Outer Diameter	0.4960 (1.2598)
IT Thickness	0.0315 (0.0800)
IT Material	ZIRC