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September 11, 2020
E-57451

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Response to Request for Additional Information – Application for Amendment 17 to Standardized NUHOMS® Certificate of Compliance No. 1004 for Spent Fuel Storage Casks, Revision 1 (Docket No. 72-1004, CAC No. 001028, EPID: L-2020-LLA-0128)

Reference: Letter from Yen-Ju Chen (NRC) to Prakash Narayanan (TN Americas LLC), Amendment No. 17 to Certificate of Compliance No. 1004 for the Standardized NUHOMS® System – Request for Additional Information, dated August 31, 2020

TN Americas LLC (TN) hereby submits our response to the Request for Additional Information (RAI) forwarded by the letter referenced above. Enclosure 2, herein, provides the response to the RAI. The RAI response did not require changes to the Application for Amendment 17, the Certificate of Compliance (CoC) Appendices, or to the UFSAR. The public version of the RAI response is provided as Enclosure 3. Portions of this RAI response include proprietary information, which may not be used for any purpose other than to support NRC staff review of the application. In accordance with 10 CFR 2.390, TN is providing an affidavit (Enclosure 1), specifically requesting that this proprietary information be withheld from public disclosure.

Should you have any questions regarding this submittal, please do not hesitate to contact Mr. Douglas Yates at 434-832-3101 or me at 410-910-6859.

Sincerely,

A. Prakash

Prakash Narayanan
Chief Technical Officer

cc: Chris Jacobs, NRC DFM

Enclosures:

1. Affidavit Pursuant to 10 CFR 2.390
2. RAI and Response (Proprietary Version)
3. RAI and Response (Public Version)

Enclosures transmitted herein contain SUNSI. When separated from enclosures, this transmittal document is decontrolled.

AFFIDAVIT PURSUANT
TO 10 CFR 2.390

TN Americas LLC)
State of Maryland) SS.
County of Howard)

I, Prakash Narayanan, depose and say that I am the Chief Technical Officer of TN Americas LLC, duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information that is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.390 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought meets the provisions of paragraph (a) (4) of Section 2.390 of the Commission's regulations. The information is contained in Enclosure 2 as listed below:

- Enclosure 2, Portions of the Response to the Request for Additional Information

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by TN Americas LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1) The information sought to be withheld from public disclosure involves portions of the response to the request for additional information related to the analysis of the Standardized NUHOMS® dry spent fuel storage system, which are owned and have been held in confidence by TN Americas LLC.

2) The information is of a type customarily held in confidence by TN Americas LLC, and not customarily disclosed to the public. TN Americas LLC has a rational basis for determining the types of information customarily held in confidence by it.

3) Public disclosure of the information is likely to cause substantial harm to the competitive position of TN Americas LLC, because the information consists of descriptions of the design of dry spent fuel storage systems, the application of which provide a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with TN Americas LLC, take marketing or other actions to improve their product's position or impair the position of TN Americas LLC's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

Further the deponent sayeth not.

A. Prakash

Prakash Narayanan
Chief Technical Officer, TN Americas LLC

Subscribed and sworn before me this 11th day of September, 2020.

Notary Public

My Commission Expires 10/16/2023

RONDA JONES
NOTARY PUBLIC
MONTGOMERY COUNTY
MARYLAND
MY COMMISSION EXPIRES OCT. 16, 2023

Enclosure 2 to E-57451

RAI and Response
(Proprietary Version)

Withheld Pursuant to 10 CFR 2.390

RAI 8-1:

Provide the data and analysis that supports the conclusion that the neutron and gamma radiation exposures associated with the amendment are bounded by the Standardized NUHOMS® Certificate of Compliance (CoC) renewal time-limited aging analysis (TLAA), "Evaluation of Neutron Fluence and Gamma Radiation on Storage System Structural Materials."

The renewal of the Standardized NUHOMS® CoC included a TLAA to demonstrate that neutron and gamma radiation exposures will not lead to embrittlement of the structural materials during the period of extended operation (AREVA, 2015). The TLAA is summarized in FSAR Section 12.2.5. The amendment application states that the amendment does not impact the TLAA because the neutron and gamma sources associated with the amendment are bounded by those already considered by the TLAA.

The staff requests additional information to support the conclusion that radiation embrittlement remains a non-credible aging mechanism for the storage system structural materials. Provide the neutron and gamma radiation source data or calculated cumulative radiation exposure data for the structural materials and demonstrate that the TLAA remains bounding.

This information is needed to evaluate compliance with 10 CFR 72.236(g).

Reference

AREVA, 2015. AREVA Inc. Non-Proprietary Certificate of Compliance Renewal Application for the Standardized NUHOMS® System Certificate of Compliance No. 1004 (Docket No. 72-1004) Revision 1, Appendix 3E, October 2015 (ADAMS Accession No. ML15295A349).

Response to RAI 8-1:

Neutron Fluence

The neutron source increases significantly for lower enrichments. Historically, CoC No. 1004 neutron sources were computed with burnup/enrichment combinations that are significantly conservative compared to those from actual operating reactors. In the TLAA neutron fluence analysis, the limiting 69BTH dry shielded canister (DSC) analysis is performed for a burnup of 62 GWd/MTU and an enrichment of 2.6%. The computed neutron source at 3 years cooling is **[ ]** (see Appendix 3E, Table 3E-2).

In CoC 1004, Amendment 17, minimum enrichments are selected based on a review of fuel assembly discharge data, which are summarized in CoC 1004 UFSAR Table T.5-29. For a burnup of 62 GWd/MTU, a minimum enrichment of 3.8% is used, as indicated in UFSAR Section T.5.2.6. For this reason, the computed neutron sources for Amendment 17 are significantly lower than the values used in the TLAA analysis, despite the shorter cooling time used in Amendment 17. In Amendment 17, the largest neutron source used in the 61BTH DSC analysis is 4.919×10^8 n/s at a cooling time of 1.3 years (see UFSAR Table T.5-18c), which is approximately half of the neutron source used in the TLAA analysis at a cooling time of 3 years. Despite the shorter cooling time, the neutron source is significantly lower due to the more realistic burnup/enrichment assumption.

In addition, in the TLAA documented in Appendix 3E of the CoC 1004 renewal application and summarized in UFSAR Section 12.2.5, the total neutron fluence is approximately [ ] of the embrittlement limit. The neutron fluence within a horizontal storage module (HSM) is too low to have any effect on embrittlement.

Therefore, the current TLAA neutron fluence analysis bounds Amendment 17, and no change is required to CoC 1004 UFSAR Section 12.2.5 or CoC 1004 Amendment 17.

Gamma Energy Deposition

In Appendix 3E of the CoC 1004 renewal application, gamma energy deposition in the concrete is computed for both the 37PTH DSC and 69BTH DSC. These DSCs are selected to bound all other pressurized water reactor (PWR) and boiling water reactor (BWR) DSCs. The results are:

- [ ] rad for the 37PTH DSC (see Section 3E.3 of Appendix 3E)
- [ ] rad for the 69BTH DSC (see Section 3E.3 of Appendix 3E)

Therefore, for gamma energy deposition, the 37PTH DSC bounds the 69BTH DSC by more than a factor of two. The reduction in cooling time to 1 year in Amendment 17 increases the gamma energy deposition for the BWR DSCs, but the PWR DSC remains bounding.

This may be demonstrated explicitly by adding a 1-year cooling time data point to the gamma energy deposition analysis. Because this data point is added to the existing methodology, the penalizing burnup/enrichment combination of 62 GWd/MTU and 2.6% is utilized. This source is provided in Table 8-1-1. Note that the decay heat for this source is 4.6 kW, which far exceeds the DSC fuel assembly heat limit and is conservative. The Table 8-1-1 source is added to the 69BTH DSC MCNP model to compute the gamma energy deposition rate in the concrete, which is provided in Table 8-1-2.

The total integrated gamma energy deposition is [ ] rad, which represents a [ ] increase over the 69BTH DSC value reported in Appendix 3E of the CoC 1004 renewal application. However, the 37PTH DSC gamma energy deposition remains bounding, with a value of [ ] rad.

Therefore, the current TLAA gamma energy deposition analysis also bounds Amendment 17, and no change is required to CoC 1004 UFSAR Section 12.2.5 or CoC 1004 Amendment 17.

Impact:

No change as a result of this RAI.

Proprietary Information on Pages 3 and 4
Withheld Pursuant to 10 CFR 2.390