NRC FORM 699 (03-2013)

U.S. NUCLEAR REGULATORY COMMISSION

CONVERSATION RECORD

DATE OF SIGNATURE: 8-10-16

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	DATE OF CONTACT	TYPE OF CONVERSATION
See below.	08/02/2016	☐ E-MAIL ☑ TELEPHONE ☐ INCOMING ☑ OUTGOING
E-MAIL ADDRESS	TELEPHONE NUMBER	
	(888) 447-9153	

ORGANIZATION	DOCKET NUMBER(S)
Virginia Electric Power Company (Dominion) and AREVA	72-16
LICENSE NUMBER(S)	CONTROL NUMBER(S)
SNM-2507	

SUBJECT

Second RAI Teleconference (Corrected)

SUMMARY

NRC participants: Chris Allen, Zhian Li, Eli Goldfeiz, Meraj Rahimi, Bernard White and Jason Piotter
Dominion participants: Tom Szymanski, Tom Brookmire, Rich Ridder, David Tomlinson and Brian Vitiello
AREVA participants: Don McGee, Philippe Pham, Tom Edwards, Venkata Venigalla, Phil Lozmack and Gary Clark

Prior to the call commencing at 3 P.M., the attached request for additional information (RAI) was provided to Dominion. Staff asked if there were any questions about the RAI, and Dominion inquired about the breadth of the scope of the RAI. Staff responded that the initial scope in addressing the RAI would be to determine if the neutron shield temperature, in the radial direction, remained below the design basis temperature identified in the amendment request. If a revised thermal evaluation determined that the radial neutron shield design basis temperature was exceeded, the applicant needed both to identify the associated degradation and to propose mitigating actions. AREVA then stated previously provided shielding calculations indicated that, after being in service for a long period of time at temperatures below the design basis temperature, the dose rate increased only by 10%. Although staff expressed appreciation for this insight, staff stated that using information associated with normal degradation did not clearly resolve the issue. Next, AREVA asserted that changing the thermal modeling assumptions identified in the RAI would actually lower the predicted radial neutron shield temperature. They also emphasized that the thermal calculations reported average bulk temperatures because

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ACTION REQUIRED (IF ANY)

Continue on Page 3

NAME OF PERSON DOCUMENTING CONVERSATION

Chris Allen

SIGNATURE

William C. Allen

CONVERSATION RECORD (continued)

SUMMARY: (Continued from page 1)

the design basis neutron shield temperature was an average bulk temperature. Subsequently, staff asked AREVA to identify the peak radial neutron shield temperature if possible. AREVA provided the requested information, and they identified the temperature gradient between the inner radial neutron shield surface and the outer radial neutron shield surface. In addition, AREVA indicated that a similar temperature gradient was generated by thermal calculations submitted to support approval of the TN-68 Part 72 certificate of compliance. Since the peak radial neutron shield temperature provided by AREVA in response to staff's question exceeded the neutron shield bulk design basis temperature, staff indicated that RAI would be revised especially since insufficient information had been provided thus far for the materials reviewer to determine how the neutron shield would behave locally at temperatures above the bulk design basis temperature. The call concluded at approximately 3:45 P.M.

Request for Additional Information
Virginia Electric and Power Company
Docket No. 72-16
Proposed Amendment to Special Nuclear Materials License No. SNM-2507

By letter dated August 24, 2015, as supplemented October 8, November 18, November 19, December 1, and December 28, 2015; January 14, March 22, March 23, April 21, May 13, June 15, and June 21, 2016, Virginia Electric and Power Company submitted to the NRC an amendment request to license number SNM-2507 technical specifications for the North Anna Independent Spent Fuel Storage Installation. The proposed changes would allow storage of spent fuel in a modified TN-32B bolted lid cask as part of the High Burn-up Dry Storage Cask Research and Development Project sponsored by the Department of Energy and the Electric Power Research Institute.

Shielding

1. Demonstrate that the regulatory dose limit of 10 CFR 72.104 can still be met given the potential for exceeding the neutron shield temperature limit and resulting accelerated neutron shield degradation.

   The applicant's calculated average bulk resin temperature at the hottest radial neutron shield cross section (including discretization error) is very close to the allowable temperature limit, per the current design bases. There is minimal safety margin given that an average, instead of a peak, bulk resign temperature for the hottest ring was used. If deficiencies associated with the thermal model (e.g., lack of radiation heat transfer in air gaps between components), and heat transfer parameter values (e.g., cask's outer surface emissivity and absorptivity) are added, the neutron shield temperature may exceed the allowable limit. For example, the predicted peak cladding temperature is not very sensitive to the absorptivity value used in the analysis. However, the predicted neutron shield temperature is more sensitive to the absorptivity value used in the analysis because this region is very close to the external surface. . Furthermore, per Kirchhoff's law of thermal radiation ("Heat Transfer" by James Sucec, 2005, Radiation Heat Transfer chapter), the emissivity and absorptivity values should be equal. Lack of radiation heat transfer in the air gaps between components would be slightly conservative for PCT prediction but will be slightly non-conservative for the neutron shield temperature because more heat will be added to these air gaps (including any air gap close to the neutron shield region. Also, using updated results, the applicant needs to obtain the analysis discretization error for the normal conditions of storage by calculating the grid convergence index (GCI) following the procedure described in American Society of Mechanical Engineers Verification and Validation 20-2009 (ASME V&V 20-2009), "Standard for Verification and Validation in Computational Fluid Dynamics and Heat Transfer."

   Staff needs this information to determine if the TN-32B HBU cask meets the regulatory requirements of 10 CFR 72.104.