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

December 13, 2018

MEMORANDUM TO: Yoira K. Díaz Sanabria, Deputy Director
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: Norma García Santos, Project Manager **/RA/**
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
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SUBJECT: SUMMARY OF OCTOBER 31, 2018, MEETING WITH THE UNITED STATES DEPARTMENT OF TRANSPORTATION AND GLOBAL NUCLEAR FUELS-AMERICAS TO DISCUSS THE APPLICATION FOR THE REVALIDATION REQUEST OF THE MODEL NO. TK-C69 (DOCKET NO. 71-3093)

Background

On October 31, 2018, a public meeting was held in Rockville, Maryland, at the request of the United States (U.S.) Department of Transportation (DOT) and Global Nuclear Fuels-Americas (GNF-A), representative of TVEL (a Russian company) with the U.S. Nuclear Regulatory Commission (NRC) staff. The meeting was noticed on October 19, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18292A511), as an open meeting. Enclosure 1 includes the list of participants (in person and by phone). Enclosure 2 includes the meeting agenda. Enclosure 3 includes the presentation slides. Enclosures 4 and 5 correspond to handouts provided at the meeting.

Discussion

The purpose of the meeting was to discuss details related to the request to NRC from DOT to provide a revalidation recommendation for the Model No. TK-C69. The DOT submitted this request by letter dated August 28, 2018 (ADAMS Accession No. ML18256A140). The Model No. TK-C69 is a package certified by the Russian competent authority for transporting fresh fuel from TVEL, a Russian company. The following section includes a summary of the discussion during the October 31, 2018, meeting.

CONTACT: Norma García Santos, NMSS\DSFM
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I. BACKGROUND

GNF (the applicant) briefly discussed their role in the review of the revalidation request for the Model No. TK-C69. The applicant explained that its company formed a consortium with TVEL, a company based in Russia, to bring to the U.S. market a type of fuel to be used in pressurized water reactors (i.e., TVS-K fuel). The TVS-K fuel is similar to Westinghouse's fuel. The applicant explained that GNF serves as the U.S. representative for this consortium and interacts with DOT, NRC, and TVEL to complete the revalidation process.

TVEL and GNF are planning to transport the TVS-K fuel in the Model No. TK-C69, a package certified by the Russian competent authority. The Russian Certificate RUS/3240/AF-96T (Revision 1) for the Model No. TK-C69 expires on July 23, 2021. The applicant mentioned that this package was revalidated in Sweden, which occurred in 2014, prior to GNF's involvement with TVEL (i.e., 2016). Since the revalidation in Sweden, the design of the packages has slightly changed.

The staff asked why the applicant decided to use a foreign package for transporting the fuel in the U.S., instead of requesting a letter authorization for transporting the fuel in an NRC-approved package, since the applicant informed the staff that the plan was to ship a fuel assembly to Braidwood for testing purposes. The applicant explained that it decided using the Model No. TK-C69 because it provides business flexibility, since this package is used for shipping this type of fuel assembly from TVEL to other countries.

II. SCHEDULE

The applicant mentioned that the "driver" for the revalidation is a shipment to the Braidwood Nuclear Power Station (Braidwood) for the next fuel outage in the fall of 2019. Therefore, the applicant briefly described the schedule as follows:

1) Mid-May 2019– Obtain revalidation approval from DOT.
2) Mid-June 2019– Ship eight lead test assemblies (LTAs) to Braidwood.
3) July-August 2019 – Load the fuel in the Braidwood Nuclear Power Station.
4) June 2020 – Ship eight LTAs from Russia to another U.S. utility.
5) August 2020 – Assemble four LTAs in Wilmington, North Carolina (NC), and domestic shipment of those assemblies.

In terms of item No. 5, the DOT and NRC pointed out that if the intent is to continue shipping the TVS-K fuel assembly from NC to other facilities in the U.S.; GNF\TVEL needs to ship the material in an NRC-approved shipping package. The applicant noted that the site(s) for the 2020 shipment(s) has (have) not been selected yet. Also, the applicant mentioned that the goal is having larger reload shipments using another package.

For the revalidation request, the applicant submitted the request to DOT on July 27, 2018, and supplemented the application on September 27, 2018. The supplement included the following information:

1) Mapping the International Atomic Energy Agency (IAEA) SSR-6, 2012 Edition, to the safety analysis report for the Model No. TK-C69.
2) Mapping of Russian standards to American National Standards Institute (ANSI) standards.

The staff noted that it will need translated portions of the standards included in the application to be able to perform the review and reach a regulatory finding. The staff also mentioned that in terms of internal workload priorities, review of domestic work has higher priority than foreign-related work.

III. TECHNICAL DISCUSSION

The applicant briefly discussed the information submitted in the application. The package accommodates two fuel assemblies. One way to open the package is by removing the lid and lifting the base up and putting it in a stand. The principal components of the package are built of austenitic stainless steel. Per the applicant, the package does not have shock absorber materials. The containment boundary is the fuel rod itself.

In terms of the application, the staff noted that it would need access to translated portions of the codes and standards included in the application as well as supporting analyses. The staff asked the applicant to explain how the Russian regulations are equivalent to the IAEA SSR-6 regulations.

A. Structural Evaluation

The applicant noted that the design of the Model No. TK-C69 was improved. In the original design, the one used in Sweden, the entire length of the assembly inside of the package can be seen from outside. Some of the updates to the original model include the following:

1) eliminated the gap between the cradle and cradle lid,
2) enclosed sides and the bottom of the platform, the top is not completely enclosed, and
3) higher strength fastening bolts to keep the platform attached to the base of the package.

The applicant mentioned that it included additional analysis for the updated version of the package in the application. The applicant used LS-DYNA to evaluate the dynamic drop tests related to the package. The staff asked if the drop test simulations included the bars depicted in the picture presented at the meeting, and that it will likely ask for the calculations/models related to the structural analysis (e.g., hard drive) to be provided. The applicant noted that it will get back to the staff in this regard.

B. Thermal Evaluation

In general, the staff pointed out that the applicant should provide the following information:

1) an evaluation in which the gaps between components does not disappear,
2) an evaluation considering a no gap between components,
3) the decay heat associated with the contents, and
4) information in the application addressing pressurization of the containment boundary during a fire accident.

The staff also asked to include in the application an explanation of whether the package would be shipped under exclusive or non-exclusive use.

C. Containment Evaluation

The applicant mentioned that the package provides confinement. In general, the staff pointed out that the applicant should provide the following information:

1) A description of the clam shell closure, fastening device, confinement, and containment,
2) A demonstration of the maximum activity allowed in the package (A2 calculation),
3) A demonstration that combustible gases are not generated,
4) Address pressure build up within the containment boundary and demonstrate that there is no pressure build up,
5) A clear description of the containment boundary,
6) Explain the meaning of "trustworthy package methods,"
7) Provide the reference in which the application addresses preventing loss or dispersal of material under normal conditions of transport, and
8) Provide the reference in which the application addresses ensuring subcriticality under normal conditions of transport and hypothetical accident conditions.

D. Criticality Safety Evaluation

The staff asked what type of fuel is being transported. The applicant pointed out that Table 6-2 of the application includes a description of the fuel and that it is uranium dioxide fuel, no reprocessed fuel.

The staff mentioned that the staff was not familiar with the code used to perform the criticality safety analysis. The staff pointed out that it would need a benchmark analysis. The applicant noted that the safety analysis report (the application) includes a benchmark analysis based on version 5 of the code instead of version 6. The staff pointed out that the benchmarking analysis should include the entire bundle, for plastic deformation, considering version 6's cross-section libraries. The applicant also mentioned the following about the criticality safety evaluation:

1) the code is a Monte Carlo code
2) eigenvalue results are similar to MCNP5 code with ENDF/B-V and ENDF/B-VI cross section data, and
3) the hypothetical accident conditions model was consistent with deformation observed during testing and determined from LS-DYNA results (e.g., fuel rod pitch adjustments for several pins to reflect effects seen in drop tests).

GNF noted that TVEL did V&V of the S-95TUK code. GNF pointed out that it does not have access to the code S-95TUK code and that this code is similar to the MCNP code. The k_{eff} value was estimated using the ENDF-V cross section data.

The staff recognized that a number of calculations had been done of benchmarks with MCNP and the TUK code with both ENDF versions. The staff, however, emphasized that those calculations only show that the codes perform comparably (and is a code-to-code comparison) but the calculations do not constitute a benchmark of the TUK code for the package analysis being done, which apparently used ENDF/B-V per the application. The staff also pointed to the ANSI/ANS standard (8.1) about how code-to-code comparison is not a benchmark. The staff also briefly indicated that for the benchmark calculations, the calculations need to exercise the same code features and parameters (e.g., cross-sections) as are used in the package analysis. The application should also discuss the area of applicability of the benchmark analysis and include trending on important parameters to show what was done to address bias and bias uncertainty from the benchmark analysis is bounding and appropriate for the package analysis.

GNF responded that it would take this information back since the analyses were done by the package owner and not GNF.

The staff also noted that, while use of nominal package dimensions may be acceptable for the normal conditions of transport analysis (since the reported k-effective values are quite small for that analysis), the package tolerances that maximize package reactivity should be used in the hypothetical accident conditions analysis (since the reported k-effective values are quite high, above 0.9). The staff further explained that, based on experience with significant damage to dummy assemblies in tests for other fresh fuel packages and the similarity of this package with those packages, the staff expects that the hypothetical accident conditions analysis should address significant fuel assembly deformation.

The staff also asked if the analysis under hypothetical accident conditions considered tolerances. GNF responded this it will get back to the staff in this regard.

E. Package Operations, Acceptance Tests, and Maintenance Program

The applicant described the loading and unloading options for the package. The staff asked to add the torque values to the “Package Operations” chapter. The applicant did not highlight any information from the “Acceptance Tests and Maintenance Program” chapter.

Docket No. 71-3093
EPID No. L-2018-NEW-0005

Enclosures:
1. Meeting Attendees
2. Meeting Agenda
3. Presentations Slides
4. Copy of Section 2.1.4, “Codes and standards used for design purposes,” of the application.
5. DOT’s Handout

cc: Attendees

SUBJECT: SUMMARY OF OCTOBER 31, 2018, MEETING WITH THE UNITED STATES DEPARTMENT OF TRANSPORTATION AND GLOBAL NUCLEAR FUELS-AMERICAS TO DISCUSS THE APPLICATION FOR THE REVALIDATION REQUEST OF THE MODEL NO. TK-C69 (DOCKET NO. 71-3093), DOCUMENT DATE: December 13, 2018

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OFFICE	DSFM	E	DSFM	N	DSFM	N
NAME	NGarcía Santos		WWheatley by email for SFigueroa		JMcKirgan	
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Public Meeting
Model No. TK-C69, Revalidation
Docket No. 71-3093

October 31, 2018
9:00 A.M. – 11:30 A.M. (EST)
Location: OWFN-16-D3

Attendees List

Name	Organization
Meraj Rahimi	NRC
Norma García Santos	NRC
John Wise	NRC
Tae Ahn	NRC
Santiago Aguilar	NRC
James Rubenstone	NRC
Michel Call	NRC
JoAnn Ireland	NRC
Antonio Rigato	NRC
Jeremy Tapp	NRC
Jimmy Chang	NRC (Phone)
Joel Wiebe	NRC (Phone)
Peter Habighorst	NRC (Phone)
Michael Conroy	DOT
Philp Wengloski	EXELON
Robert S. Close	EXELON
Richard Augi	GNF
Russell Stachowski	GNF
Christopher Kmiec	GNF
Erik Kirstein	GNF
Rebecca Steinman	Exelon (phone)

Public Meeting
Model No. TK-C69, Revalidation
Docket No. 71-3093

Agenda

October 31, 2018
9:00 A.M. – 11:30 A.M. (EST)
Location: OWFN-16-D3

Purpose:

Discuss information related to the application for a revalidation recommendation for the Model No. TK-C69, Certificate of Competent Authority RUS/3240/AF-96T, Revision 1.

Outcome:

Clarify questions from the staff regarding the application and applicant's need for the revalidation of the Model No. TK-C69.

Process:

9:00-9:15 AM	Introductions	All
9:15-9:30 AM	Summary of Model No. TK-C69 revalidation request and anticipated ship dates and routes	GNF
9:30-10:00 AM	Summary of Model No. TK-C69 Safety Analysis Report (SAR\Application) by chapter	GNF
10:00-10:30 AM	Discussion of Russian standards cited in the Model No. TK-C69 application	GNF
10:30-11:00 AM	TK-C69 SAR questions for GNF	DOT/NRC
11:00-11:30 AM	Review of meeting action items/discussion of next steps	GNF
11:30 AM	Adjourn meeting	All