



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

December 2, 2022

MEMORANDUM TO: Carrie Safford, Deputy Director
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: Pierre Saverot, Project Manager
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

A handwritten signature in black ink, appearing to read "Saverot".

Signed by Saverot, Pierre
on 12/02/22

SUBJECT: SUMMARY OF NOVEMBER 22, 2022, MEETING WITH
NATIONAL NUCLEAR SECURITY ADMINISTRATION

Background

On November 22, 2022, a (partially closed) Observation Public Meeting was held by teleconference between the NRC staff and representatives from the National Nuclear Security Administration (NNSA), Holtec International (Holtec), and Pacific Northwest National Laboratory (PNNL) to discuss proposed responses to the request for supplemental information (RSI) for the Model No. HI-STAR PBT package. By letter dated January 27, 2022 (Agencywide Documents Access and Management System {ADAMS} Accession No ML22026A527), the staff had previously advised NNSA of specific testing needs required for this new package design. On February 10, 2022, staff held an Observation Public Meeting to discuss in detail why this application could not be accepted for detailed review and some of the draft RSIs. The formal RSI letter was issued on March 15, 2022 (ADAMS No. ML22069A730) and staff held a proprietary clarification call with the applicant on March 22, 2022. Pre-application meetings were held on August 20, 2019, March 31 and August 31, 2021, before NNSA submitted an application for a Certificate of Compliance by letter dated October 13, 2021 ADAMS Accession No. ML21287A133.

This Observation Public Meeting was noticed on November 9, 2022 (ADAMS Accession No. ML22313A037). The attendance list and the publicly available presentation slides are provided as Enclosure Nos. 1 and 2, respectively.

CONTACT: Pierre Saverot, NMSS/DFM
301-415-7505

Discussion

The Model No. HI-STAR PBT package is designed for road transport of Tritium Producing Burnable Absorber Rods (TPBAR) from the Watts Bar Units 1 and 2 to the Tritium Extraction Facility at the Savannah River site.

Holtec presented specific design changes for the impact limiter, said that the ¼ scale drop tests would be performed at Oak Ridge National Laboratory, talked briefly about polyurethane foam component testing, and developed in detail a new approach for performing the thermal analysis. Holtec clarified that 3 impact limiters would be fabricated and that undeformed impact limiters will be used for each drop. Staff asked if Holtec will make the model conform to some of the test results from previous packages and Holtec responded that using the previous benchmarks on one numerical model will be in fact a starting point and that adjustments will be made based on the newly acquired data.

Staff did not see the value of the proposed static crush tests of 2.5" x 2.5" foam specimens (unconfined) and noted that, earlier, Holtec had proposed unconfined static testing of 6" size samples for which staff voiced similar concerns. Staff questioned how this testing would address the concerns raised by the staff regarding the mechanical properties of the foam. Staff expressed the opinion that the 2.5" size is neither justified nor will it be considered sufficient to address the technical issues related to the foam, issues brought up in the RSIs and reiterated in the previous meetings. In order to obtain a correct and meaningful set of data for the foam, the applicant needs to implement a uniform and established process, with standardized procedures and practices, and perform, at a minimum, a series of foam cube testing from several sizes, both static and dynamic, and both confined and unconfined. The current approach does not provide any reasonable level of confidence to obtain all relevant behavior data for the foam impact limiter. Holtec stated that it would be confident in its modeling of the mechanical properties of the foam if it could verify the model against the results of the ¼ scale drop tests and the testing results from previous packages and the foam manufacturer. Staff responded that relying on a few data points from miscellaneous testing did not address the issues brought up in the RSIs.

Staff also expressed concerns related to the impact limiter stainless steel skin seam welds and the extent of seam splitting occurrence. Although the design changes recently made by Holtec would likely increase the robustness of the impact limiter, Holtec cannot demonstrate that, if the skin or welds do not fail in a ¼ scale test, the LS-DYNA analysis will be simulating the same effect properly since there is no strain data from the ¼ scale test to compare with LS DYNA results. Holtec did say that "in earlier Holtec efforts, the strain computed in the impact limiter skin was below the strain failure limit with no significant breach", but it is staff's opinion that the test program, as designed, will not and cannot provide realistic information on the structural integrity of the skin and that more justification or even a totally different approach will be needed to make that case.

Regarding the proposed new thermal evaluation, staff asked Holtec to (i) explain why the gaps are "understated" in the thermal models, and (ii) provide a sensitivity study if lower gaps are used for NCT. Staff noted that the applicant will no longer use the references of the original application since such reference papers were not providing an accurate representation of the material properties for the foam, foam char, as well as the quantity of foam char during the regulatory fire and post-fire hypothetical accident conditions.

Staff noted also that the addition of the thermal shield, which reduces seal temperatures, is in fact a very positive development to respond to the thermal issues of this package: it appears now that such a revised modeling approach could well be conservative. As long as the applicant describes in detail the three thermal models, why such a modeling was chosen, how the models are merged together, why it is done that way and not another way, and how it

provides accurate and conservative results, staff currently believes this novel approach could be a good starting point for a resolution of the thermal issues. Staff also noted that the drain seal temperature is now lower than the seal temperature while it was the opposite in the application (probably due to the distance from the flame). Staff asked that all topics, mentioned above, be well described in the revised application and that all models be provided (FLUENT).

Overall, except for the potential resolution of the thermal RSIs, staff believes that substantial work is required for this application to be accepted for a detailed review. The applicant has not yet proposed an integrated approach to demonstrate that the proposed ¼ scale tests and the proposed analysis of testing results would respond to staff's key concerns expressed in the structural RSIs, i.e., (i) scaling effects of both the testing range and foam component specimens, (ii) effect of confining the foam material in a stainless-steel skin, (iii) integrity of the skin extrapolated from a ¼ scale test, and (iv) strain rate effects for the entire range expected for the foam impact limiter. There are still many "gaps" in the structural evaluation of the package, and staff believes the applicant has not "made a convincing case" that it could respond to the structural RSIs in a manner that could be acceptable to the staff.

Because only a very limited number of RSIs was discussed in the three clarification meetings (February, March, and November 2022), staff used the example of RSI 3-9 (tarp on the package) to reiterate the need to receive full responses to all RSIs, without exception, as a prerequisite for this application to be accepted for detailed review. Staff will commit to an expedited review schedule only if the revised application is of a quality that meets staff's technical expectations and is complete. No timeline was discussed nor could be contemplated for submitting a revised application due to the remaining uncertainties on a "path forward" for a complete resolution of all technical issues.

No regulatory commitments were made during this meeting.

Docket No. 71-9386
EPID L-2021-NEW-0009

Enclosures:

1. Meeting Attendees
2. Presentation Public Slides

**Meeting Between National Nuclear Security Administration
and the
U.S. Nuclear Regulatory Commission
November 22, 2022
Meeting Attendees**

NRC/NMSS/DFM

Pierre Saverot
Patrick Koch
JoAnn Ireland
Loren Howe
Darrell Dunn

HOLTEC INTERNATIONAL

Kishore Gangadharan
Chuck Bullard
John Zhai
Chuck Bullard
Raja Maheedhara
Abrar Mohammad
Joseph Grusetski
Kimberly Manzione
Myron Kaczmarisky

PNNL

Laurie Martin
Harold Adkins
Brian Koeppel
Dean Paxton
Laura Hay

NNSA

Kathy Schwendenman
Becky Sipes
Urszula Christner
Nanette Founds
Maureen Holloway

Tetra Tech (Contractor to NNSA)

Josh Flach

Summary of November 22, 2022, meeting with NNSA DATE December 2, 2022

DISTRIBUTION:

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BDesai, R-II/DRS/EB3

DHills, R-III/DNMS/MCID

GWarnick, R-IV/DNMS/RIB

ADAMS Accession No.: ML22335A555; Memo ML22335A556

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| OFFICE | NMSS/DFM/STLB | NMSS/DFM/STLB | NMSS/DFM/STLB | NMSS/DFM/STLB |
| NAME | PSaverot | <i>PS</i> SFigueroa | <i>SF</i> YDiaz-Sanabria | <i>YD</i> PSaverot |
| DATE | Dec 1, 2022 | Dec 2, 2022 | Dec 2, 2022 | Dec 2, 2022 |

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