



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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April 17, 2017

MEMORANDUM TO: Anthony Hsia, Deputy Director
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: Huda Akhavannik, Project Manager **/RA/**
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: SUMMARY OF MARCH 30, 2017, CLOSED MEETING WITH
NAC INTERNATIONAL, REGARDING OUTSTANDING ISSUES
ON THE MODEL NO. MAGNATRAN TRANSPORTATION
PACKAGE

Background.

On March 30, 2017, a closed meeting was held in Rockville, Maryland, at the request of U.S. Nuclear Regulatory Commission (NRC) staff to discuss the outstanding issues on the Model No. MAGNATRAN transportation package and to discuss the future of the review.

NAC International (NAC, or the applicant) initially submitted the Model No. MAGNATRAN for staff review in January 2011. Since that time, staff and NAC have had multiple rounds of requests for supplemental and additional information (RSIs and RAIs.) Initial RSIs and RAIs primarily involved the generic issue of secondary impact considerations in the hypothetical accident condition 30-foot drop with respect to their new impact limiter design. In light of the number of RSIs, and the timing with which NAC planned on responding to them, NRC suspended its review of the application in the RSI letter dated April 1, 2011. In November 2012, NAC resubmitted their application including a redesigned and reanalyzed impact limiter, which is similar to an already approved impact limiter design for the Model No. NAC-STC. Since their resubmission, NAC and staff discussed potential RSIs and NAC has received four RAI letters. Each letter contained multiple questions.

Some of the thermal questions included application of their "delta-T" thermal methodology which does not include the package's thermal inertia when evaluating the fire test for hypothetical accident conditions, calculation of thermal conductivities, and NAC's evaluation of gaps in the thermal models for both normal conditions of transport and hypothetical accident conditions. NAC also received shielding questions requesting that tolerances be included in the licensing drawings on certain items important to both the shielding analysis and criticality safety.

The list of meeting attendees, including those participating via telephone, is provided as Enclosure 1. The meeting handout is provided as Enclosure 2. Enclosure 2 was determined to be proprietary and is being withheld from the public.

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Discussion.

The primary purpose of the meeting was to discuss the current status of the Model No. MAGNATRAN safety review and possible future actions NRC staff is considering with respect to the continuation of the review.

The NRC staff began the meeting by stating that at this time in the review, staff is assessing the best path forward. Staff stated that this decision will consider the information being provided in this meeting and will take NAC's views into account prior to making a decision.

At the meeting NRC discussed what appears to be an error in NAC's basket model for normal conditions of transport. NRC staff evaluation shows that the directionally-dependent thermal conductivities of the neutron absorber plates were switched causing the effective thermal conductivity through the plate width to be artificially high by about a factor of 15. NRC determined that this switch caused the peak cladding temperatures calculated by NAC to be non-conservative by about 75 °F. Additionally, NRC discussed the following concerns with NAC's thermal analysis:

- NAC's "delta-T" model for the fire test for hypothetical accident condition contains a non-physical model that does not account for thermal inertia of the contents to determine peak clad temperature;
- the results of NAC's three-dimensional fire test model computed a 25 °F increase in peak cladding temperature, whereas, NRC independent model predicted 136 °F rise in temperature; and,
- a simplified grid sensitivity analysis of a three-dimensional thermal model in which the applicant predicted a 29 °F change in peak clad temperature between a coarse grid and a fine grid, whereas, based on standard industry practices, staff would have expected a change of no more than a few degrees.

NAC began their presentation and went through these issues, providing details on their thinking and licensing basis conservatisms. Staff, NAC, and members from Pacific Northwest National Laboratory (PNNL), contractors for the staff, who were involved in reviewing the ANSYS portion of the review, discussed some of the discrepancies and gained clarity on the issues.

Next, NRC discussed its concerns with the licensing drawings not containing tolerances on items important to the shielding evaluation and criticality safety. While the applicant's analysis demonstrates margin to all of the limits, the staff's confirmatory analysis indicates that the package dose rates may have little or no margin to the dose rate limits for normal conditions of transport. In addition to uncertainties identified by NAC in the application, the staff's analysis accounted for other uncertainties the staff identified and addressed items for which the staff determined the applicant used non-bounding or non-conservative values and assumptions to provide a bounding estimate of package dose rates. NAC and staff discussed the discrepancies and the history of the questions and acknowledged that the level of detail on the drawings should not result in unnecessary administrative amendments but should have a sufficient level of detail to ensure fabrication consistent with the safety analysis. Staff indicated that tolerances consistent with the safety analysis would be necessary.

NAC concluded their remarks by describing the actions they plan to take next. NAC intends to correct editorial errors, revise their licensing drawings to include tolerances important to shielding, add neutron absorber tolerances for criticality safety, and refine their thermal model mesh studies. NAC described that due to the customer need, they are striving to complete this project as soon as they can. Staff thanked NAC for their presentation and stated that they

would consider this information and respond to NAC with their decision on the continuation of their review by mid-April.

Docket No. 71-9356

TAC No. L24701

Enclosures:

1. Meeting Attendees
2. Proprietary Meeting Handout

A. Hsia

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REGARDING OUTSTANDING ISSUES ON THE MODEL NO. MAGNATRAN
TRANSPORTATION PACKAGE – DATE: APRIL 17, 2017

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NRC Attendees

G:\SFST\Akhavannik\MAGNATRAN\03302017 Public Meeting Summary Huda.docx

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ADAMS Package No.: ML17110A380

OFC:	SFM	SFM	SFM	SFM
NAME:	HAkhavannik	BWhite	SFiguera	JMcKirgan
DATE:	3/31/2017	04/03/17	04/03/17	4/17//17

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Meeting Attendees
NAC and NRC Meeting
March 30, 2017, 1:00 p.m. –3:00 p.m.

NAME	AFFILIATION
John McKirgan	NRC/NMSS/SFM
Yaira Diaz Sanabria	NRC/NMSS/SFM
Huda Akhavannik	NRC/NMSS/SFM
Joe Borowsky	NRC/NMSS/SFM
George Carver	NAC
Mike Yakhsh	NAC
Wren Fowler	NAC
Kent Cole	NAC
Michael Layton	NRC/NMSS/SFM
Travis Tate	NRC/NMSS/SFM
Holger Pfiefer	NAC
Anthony Hsia	NRC/NMSS/SFM
Damaris Marcano	NRC/NMSS/SFM
Michel Call	NRC/NMSS/SFM
Jason Piotter	NRC/NMSS/SFM
Harold Adkins	PNNL
Jim Fort	PNNL
Judi Cuta	PNNL
Sarah Suffield	PNNL
David Richmond	PNNL