



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

April 7, 2017

Mr. Wren Fowler
Director, Licensing
NAC International
3930 East Jones Bridge Road, Suite 200
Norcross, GA 30092

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF THE MODEL
NO. NAC-LWT

Dear Mr. Fowler:

By letter dated December 23, 2016, you submitted an application for amendment of Certificate of Compliance No. 9225, for the Model No. NAC-LWT transport package. The application proposed adding damaged NRX and NRU fuel as authorized contents.

In connection with the staff's review, we need the information identified in the enclosure to this letter. We request you provide this information by May 5, 2017. Inform us at your earliest convenience, but no later than April 21, 2017, if a substantial date change is needed. To assist us in re-scheduling your review, you should include a new proposed submittal date.

If you have any questions regarding this matter, please contact me at 301-415-5790.

Sincerely,

/RA/

John Vera, Project Manager
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9225
CAC No. L25177

Enclosure: Request for Additional Information

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF THE MODEL NO. NAC-LWT – DATE: APRIL 7, 2017

DISTRIBUTION:

SFM r/f JChang VWilson JVera TTate YDiaz-Sanabria
JMcKirgan

DOCUMENT NAME: G:\SFST\JV\NAC-LWT nrxu dmg RAI1.docx

ADAMS Accession No.: ML17100A119

OFC	DSFM		DSFM		DSFM		DSFM	
NAME	JVera		SFiguroa*		JChang*		VWilson*	
DATE	3/28/2017		3/31/2017		3/28/2017		3/31/2017	
OFC	DSFM		DSFM		DSFM		-----	
NAME	YDiaz-Sanabria*		TTate*		JMcKirgan*		-----	
DATE	3/31/2017		3/31/2017		4/7/2017		-----	

* concurred by email

OFFICIAL RECORD COPY

Request for Additional Information
Docket No. 71-9225
Model No. NAC-LWT Package

6.0 Criticality

- 6-1 Clarify if the definition of damaged fuel proposed to be added to the CoC includes cladding and provide updated analyses as necessary.

From staff evaluations of the broken rod configuration, removing the cladding, as is typically done with LWR damaged SNF within a damaged fuel can, increases reactivity significantly. The staff recognizes that inserting damaged fuel in the caddy would reduce reactivity, but does not have enough information to determine if the decrease is enough to off-set the reactivity increase due to removing the cladding. NUREG-16174, Section 6.5.2, "Spent Nuclear Fuel Contents" states in part "If the contents include damaged fuel, the maximum extent of damage should be specified and shown to be bounded by the criticality analysis." Therefore, the applicant should clarify if the proposed damaged fuel content has cladding present or if there is a possibility of shipping bare fuel material. If the proposed damaged fuel includes the cladding, this needs to be specified within the definition of damaged fuel and within the CoC. If it is the applicant's intent to request approval of bare fuel material, it should provide a criticality safety evaluation demonstrating that the presence of the caddy reduces reactivity enough to account for the increase in reactivity due to lack of cladding or that the package would be subcritical under both normal conditions of transport and under hypothetical accident conditions.

This information is needed to verify that the package will remain subcritical per the requirements of 10 CFR 71.55(b)(1), 71.55(d)(1), and 71.55(e)(1).

- 6-2 Justify that loading a lower amount of damaged fuel from that contained within an assembly is bounded by the criticality analyses for undamaged fuel.

The criticality analyses for the undamaged NRU/NRX fuel are based on a single assembly within a basket tube. The words "up to the equivalent number of a fuel assembly" were added to the definition of undamaged NRU/NRX fuel, indicating that less than a full assembly may be loaded. If less fuel is loaded this could increase reactivity by increasing the amount of moderation. NUREG-1617, Section 6.5.2, "Spent Nuclear Fuel Contents" states "Because of the additional moderation, the contents with less fissile material might be more reactive." Therefore, the applicant should justify that the current criticality analyses for undamaged fuel remain bounding for both the proposed damaged and undamaged fuel contents if less fuel than what is contained in an assembly is loaded. Otherwise, the applicant should provide a criticality analysis for the most reactive case. Alternatively, the staff may condition the certificate of

compliance to specify that fuel equivalent to a full assembly must be loaded in each tube for both the damaged and undamaged NRU/NRX fuel.

This information is needed to verify that the package will remain subcritical per the requirements of 10 CFR 71.55(b)(1), 71.55(b)(2), 71.55(d)(1), 71.55(e)(1), and 71.55(e)(2).

Observations

Observation 1: Staff notes the availability of an updated standard, ANSI N14.5, "American National Standard for Radioactive Materials – Leakage Tests on Packages for Shipment," (2014). NRC Information Notice (IN)-16-04, "ANSI N14.5-2014 Revision and Leakage Rate Testing Considerations," was issued on March 2016 and discusses the topic of leakage rate testing and the ANSI N14.5 standard.