

Request for Additional Information
Docket No. 72-1031
Certificate of Compliance No. 1031
Model No. MAGNASTOR® Storage System

By letter dated October 9, 2019 (Agencywide Documents Access and Management System Accession No. ML19296C938), NAC International (NAC or the applicant) submitted an application, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, for Amendment No. 9 to Certificate of Compliance No. 1031 for the Model No. MAGNASTOR® storage system. This request for additional information identifies information needed by the U.S. Nuclear Regulatory Commission staff in connection with its review of the application. The requested information is listed by chapter number and title in the applicant's safety analysis report (SAR). The NRC staff used NUREG-1536, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility — Final Report," in its review of the application.

Each question describes information needed by the staff for it to complete its review of the application and to determine whether the applicant has demonstrated compliance with regulatory requirements.

Thermal Evaluation

- 4-1 Provide technical bases that support temperature variations larger than 65 °C (117 °F) during vacuum drying-cooldown cycling.

Section 4.11.2.2 of the SAR provides analysis results during vacuum drying and cooldown phases that exceeds the 65 °C (117 °F) Interim Staff Guidance No. 11 (ISG-11), Revision No. 3, "Cladding Considerations for the Transportation and Storage of Spent Fuel," acceptance criteria during thermal cycling. Per ISG-11 Revision 3, the intent of the thermal cycling acceptance criteria is to limit precipitation of radial hydrides (during loading operations) that could result in fuel cladding failure. The staff needs this information to verify cyclic vacuum drying and cooldown will not result in cladding property changes that could challenge the cladding intended functions.

This information is needed to determine compliance with 10 CFR 72.236(b) and 72.236(f)

- 4-2 Add a limiting condition for operation to the technical specifications (TS) to specify the duration for a second vacuum drying stage.

Section 4.11.2.2 of the SAR states that, based on maximum fuel temperature after 24-hour vacuum drying and the 24-hour cooldown, the allowable time for a second vacuum drying is determined as 12 hours, as shown in SAR Table 4.11-6. However, the 12-hour time duration for the second drying stage is not identified in the TS. This time needs to be incorporated in the TS to ensure cask users have the appropriate controls in place during loading operations to avoid exceeding any applicable temperature limits.

This information is needed to determine compliance with 10 CFR 72.236(b) and 72.236(f)

Enclosure

Chapter 5 Shielding Evaluation

- 5-1 Provide shielding calculations based on bounding source terms rather than the decay heat.

In Section 6.2 of the Calculation Package No. 30076-5002 Rev. 0, the applicant states: "The design input Pattern Y has the higher peripheral total (i.e., "C" location) heat load, 24.1 kW for Pattern Y versus 23.2 kW in Pattern X. However, the symmetric Pattern X in Table 6-1 is bounding at 34.6 kW versus 33.2 kW in Pattern Y, 23 kW in Pattern Z, and 23.4 kW in Pattern Z'. Due to the small heat load difference in Pattern X and Y, both were evaluated for maximum dose rates with Pattern X dose rates being bounding and listed here. However, patterns Z and Z' are not evaluated for maximum dose rates due to lower heat loads." However, the staff notes from the data presented in the calculation package that Pattern Y has higher dose rates than Pattern X at location "C".

Based on a study published in NUREG/CR-6700, "Nuclide Importance to Criticality Safety, Decay Heating, and Source Terms Related to Transport and Interim Storage of High-Burnup LWR Fuel," there is very little or essentially no overlap between the isotopes that are important to shielding and the ones important to decay heat. Therefore, it is not clear that using the bounding decay heat correlates to a bounding source term. Therefore, the shielding calculations should be based on the source terms rather than decay heat.

This information is needed to determine compliance with 10 CFR 72.236(d).

13. Technical Specifications

- 13-1. Revise the TS to correct the following discrepancies.
- a. Typo on page B2-5 "Reduced Col Times" should be "Reduced Cool Times."
 - b. It appears that the listing of B2/B3 and B1 in Table B2-8 in the revised TS submitted with Amendment No. 9 have been reversed. As submitted, the more than four of the B3 locations may have up to 1800 W, however, in previous approved versions of the TS, Table B2-2 shows that only four B3 locations are authorized to load up to 1800 W.
 - c. It is not clear whether the note listed at the bottom of Table B2-8 in the revised TS submitted with Amendment No. 9 is the same as the "Note 1" listed in the Table.
 - d. The note at the bottom of page B2-5 in the revised TS submitted with Amendment No. 9 has 2 loading patterns labeled F and no loading pattern labeled "E".
 - e. Table B2-8 in the revised TS submitted with Amendment No. 9 shows that loading patterns G and H may have 900 W decay heat, however Table B2-2 does not show a 900 W decay heat in it the loading patterns G and H.
 - f. The footnotes in Table B2-10 in the revised TS submitted with Amendment No. 9 are inconsistent. The footnote for the 74 rod configuration of the 9×9 fuel assembly changed from "(a)" to "(i)" and it is listed at "(i)" at the page, however, for the 91, 92, and 96 fuel rod patters for the 10×10 fuel assemblies is still listed as "(a)."

- g. The revised Table B2-1 item I.C, in the TS submitted with Amendment No. 9 appears to be missing the link to Table B2-5 for the nonfuel hardware cool times.
- h. The revised Table B2-1 item I.E and II.F, in the TS submitted with Amendment No. 9 appears to be missing that low-enriched axial end blankets are authorized.
- i. Table B2-5, Note 1 (regarding minimum cooling time for the WE14×14 fuel assemblies) in the revised TS submitted with Amendment No. 9 appears to have been deleted.