NAC INTERNATIONAL

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April 18, 2022

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Attn: Document Control Desk

Subject: RAI Response to NAC's Amendment Request for the NAC International MAGNASTOR® Cask System Amendment No. 12

Docket No. 72-1031

References:

1. U.S. Nuclear Regulatory Commission (NRC) Certificate of Compliance (CoC) No. 1031 for the NAC International MAGNASTOR Cask System, Amendment No. 9, December 7, 2020
2. MAGNASTOR Cask System Final Safety Analysis Report (FSAR), Revision 12, NAC International, September 2021
3. ED20220004, Submission of an Amendment Request for the NAC International MAGNASTOR Cask System Amendment No. 12, January 24, 2022
4. ML22041A550, Teleconference for the Discussion of Amd. No. 12 and Potential Revision to Certificate of Compliance No. 1031 for the MAGNASTOR Storage System, February 24, 2022
5. ED20220032, Supplement to NAC's Amendment Request for the NAC International MAGNASTOR® Cask System Amendment No. 12, March 18, 2022
6. NRC Letter, Application for Amendment No. 12 to the Model No. MAGNASTOR Storage Cask – Request for Additional Information, April 12, 2022

NAC International (NAC), hereby, submits responses to the Request for Additional Information (RAI) presented in Reference 6. The RAI can be summarized as requesting the following:

1. Provide a description of the measurement techniques used to determine the as poured concrete density, and
2. Provide a citation of an industry standard that is followed for the use of commercial grade ready mix concrete, and
3. Provide a description of product specifications and fabrication procedures that ensure the concrete physical properties and characteristics are met

NAC has elected to not put our responses into the Final Safety Analysis Report (FSAR). Rather, we are electing to have this information placed in the Technical Specifications (TS) as proposed in Enclosure 1 to this letter. The following explains where NAC's responses to the previously listed RAI topics can be found.

1. A description of the measurement techniques used to determine the as poured concrete density can be found in Enclosure 1, Page 2, 2nd paragraph.
2. A citation of an industry standard that is followed for the use of commercial grade ready mix concrete can be found in Enclosure 1, Page 2, 1st paragraph where ASTM C94 is referenced.
3. A description of product specification and fabrication procedures that ensure the concrete physical properties and characteristics are met can be found in Enclosure 1, Page 2, 3rd and 4th paragraphs.

NAC is requesting the changes being proposed to the TS via this amendment be included in those TS changes for Amendments 0 thru 9 via the issuance of a Certificate of Compliance (CoC) revision. In addition, NAC is also requesting these proposed TS changes be incorporated into Amendment 11, which is currently under review and approval by the NRC. In effort to expedite the rulemaking process, NAC is requesting that all CoC revisions and Amendment 11 be processed thru rulemaking as a single package. Note, NAC previously requested that Amendment 10 proceed forward in the rulemaking process without this proposed TS change. If you have any comments or questions, please contact me on my direct line at 678-328-1236.

Sincerely,

Wren Fowler

Digitally signed by Wren Fowler
Date: 2022.04.18 11:35:22 -04'00'

Wren Fowler
Director, Licensing
Engineering

Enclosure:
Enclosure 1 – Proposed Technical Specification Changes

Enclosure 1

Proposed Technical Specification Changes

MAGNASTOR®, Amendment 12

(Docket No 72-1031)

NAC International

April 2022

MAGNASTOR Certificate of Compliance, Amendment 9

Description, 4th Paragraph

The concrete cask is the storage overpack for the TSC and provides structural support, shielding, protection from environmental conditions, and natural convection cooling of the TSC during long-term storage. The concrete cask body is a reinforced concrete (Type II Portland cement) structure with a carbon steel inner liner. The liner inner diameter incorporates standoffs to minimize impact loads on the TSC and to maintain convective heat flow paths under accident conditions. The concrete cask has an annular air passage to allow a passive convection air flow around the TSC. The air inlets and outlets are offset in elevation from the TSC to minimize radiation streaming. The spent fuel decay heat is transferred from the fuel assemblies to the TSC shell using pressurized helium circulated by convection through the fuel basket, conduction and radiation. Heat flows by convection from the TSC shell to the circulating air and by radiation from the TSC shell to the concrete cask liner. The heated air is exhausted, by convective flow, through the concrete cask air outlets. The top of the concrete cask is closed by a carbon steel lid with concrete shielding and is bolted in place.

Technical Specification, Appendix A, Section 1.1

CONCRETE CASK	The CONCRETE CASK is the vertical storage module that receives, holds and protects the sealed TSC for storage at the ISFSI. The CONCRETE CASK passively provides the radiation shielding, structural protection, and heat dissipation capabilities for the safe storage of spent fuel in a TSC. Closure for the CONCRETE CASK is provided by the CONCRETE CASK LID.
CONCRETE CASK LID	The CONCRETE CASK LID is a thick concrete and steel closure for the CONCRETE CASK. The CONCRETE CASK LID precludes access to the TSC and provides radiation shielding.

Technical Specification (TS) Appendix A, Section 4.2

4.2 Codes and Standards

The American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), 2001 Edition with Addenda through 2003, Section III, Subsection NB, is the governing Code for the design, material procurement, fabrication, and testing of the TSC.

The ASME Code, 2001 Edition with Addenda through 2003, Section III, Subsection NG, is the governing Code for the design, material procurement, fabrication and testing of the spent fuel baskets.

The American Concrete Institute Specifications ACI-349 and ACI-318 govern the CONCRETE CASK design and construction, respectively.

The concrete used in the construction of the CONCRETE CASK LID, at minimum, shall be of a commercial grade ready-mix type that can develop a density of 140 pcf. The mix and batching should meet the purchaser's requirement of unit weight (i.e., density) and any additional purchaser indicated attributes (e.g., air content), as allowed by ASTM C94.

The unit weight (i.e., density) of the concrete in the CONCRETE CASK LID can be verified by either test method ASTM C138 or an approved shop fabrication procedure by following the basic equation of $\rho=W/V$. The shop procedure shall include steps to weigh the lid before and after concrete placement and in calculating the actual volume (V) of the cavity to be filled with a record of the weight (W) of concrete placed into the cavity.

The CONCRETE CASK LID concrete placement shall be in a dry and clean cavity or form with procedures and equipment that ensure the concrete placed is thoroughly consolidated and worked around any reinforcement and/or embedded fixtures and into the corners of the cavity or form.

The CONCRETE CASK LID concrete shall be protected from the environment during curing to minimize development of cracks by one or more of various methods such as moist cure or liquid membrane forming chemicals. Type II Portland cement may be substituted by an alternate cement type for the CONCRETE CASK LID if the density requirement can be met.

The American National Standards Institute ANSI N14.6 (1993) and NUREG-0612 govern the TRANSFER CASK design, operation, fabrication, testing, inspection, and maintenance.