



May 13, 2020

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

Attn: Document Control Desk

Subject: Submission of a Responses to the NRCs Request for Supplemental Information for the NAC International MAGNASTOR® Cask System Amendment No. 10

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. 7, March 24, 2019
 2. MAGNASTOR Cask System Final Safety Analysis Report (FSAR), Revision 10, NAC International, February 2019
 3. ED20190099, Submission of a Request to Amend the U.S. Nuclear Regulatory Commission Certificate of Compliance No. 1031 for the NAC International MAGNASTOR® Cask System, October 9, 2019
 4. ED20190125, Submission of a Request to Amend the U.S. Nuclear Regulatory Commission Certificate of Compliance No. 1031 for the NAC International MAGNASTOR® Cask System, December 9, 2019
 5. U.S. Nuclear Regulatory Commission (NRC), Application for Amendment No. 10 to the Model No. MAGNASTOR® Storage Cask- Request for Supplemental Information, March 11, 2020

NAC International (NAC) hereby submits responses to the NRCs Request for Supplemental Information (RSI) (Reference 5). In accordance with NAC's administrative practices, upon final acceptance of this application, the 19C changed pages will be reformatted and incorporated into the next revision of the MAGNASTOR FSAR. NAC is requesting an effective date for this amendment to be prior to March 2021.

If you have any comments or questions, please contact me on my direct line at 678-328-1236.

Sincerely,

A handwritten signature in black ink, appearing to read 'Wren Fowler'.

Wren Fowler
Director, Licensing
Engineering

Enclosure:

Enclosure 1 – Response to the NRCs RSI for MAGNASTOR FSAR, Amendment 10

ED20200061

NM5526

NM55

Enclosure 1

**NAC INTERNATIONAL
RESPONSE TO THE
UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REQUEST FOR SUPPLEMENTAL INFORMATION

May 2020

**FOR REVIEW OF THE CERTIFICATE OF COMPLIANCE NO. 1031,
AMENDMENT NO. 10**

(TAC NO. L24757 DOCKET NO. 72-1031)

May 2020

TABLE OF CONTENTS

| | <u>Page</u> |
|--------------------------|-------------|
| THERMAL EVALUATION | 3 |

**NAC INTERNATIONAL RESPONSE
TO
REQUEST FOR SUPPLEMENTAL INFORMATION**

THERMAL EVALUATION

- 4.1 Show that low-wind speeds do not adversely impact the fuel peak clad temperature or other components important to safety such that the components exceed their allowable temperature limits.

Section 4.1 of the SAR states that in the MSO, air exits through 24 outlet holes and two robot access holes. Section 4.11 of the SAR states that since the configuration is symmetrical, the inlets and outlets are simplified into a two-dimensional axisymmetric model by using equivalent dimensions for the air inlets and outlets, which are assumed to extend around the MSO periphery. Normal low-speed wind could affect the cask thermal performance (by inhibiting the air flow at the outlet vents which could have an impact on the cooling effect by reducing the mass flow rate through the annular gap) because of the many axi-symmetric outlet openings resulting in higher predicted temperatures compared to quiescent conditions. The staff has performed three-dimensional (3-D) sensitivity calculations based on a range of wind speeds which is typically considered normal (in the range of 0 to 15 miles per hour) to obtain bounding speeds for several cask designs. The staff's 3-D model included an extended domain to represent the surrounding environment. Details of these analyses were documented in NUREG-217 4 "Impact of Variation in Environmental Conditions on the Thermal Performance of Dry Storage Casks".

The staff needs this information to have assurance predicted temperatures remain below allowable limits during long term storage.

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

NAC International Response to Thermal Evaluation RAI 4.1:

NAC International has reviewed NUREG-2174 for its applicability to the new MAGNASTOR cask design. NUREG-2174 determines that sustained low wind speeds (i.e., less than 5 mph) negatively effects the thermal performance of underground cask designs. This is, in part, because of back pressure developed on the outlet vent due to the low wind speed and coupled with the fact that the design of the air inlets requires the incoming air to go downward for the entire length of the cask before coming back up the entire length of the cask and out through the outlet vent.

For vertical systems with at least four inlet and outlet vents, there is no negative effect on thermal performance due to sustained low wind speeds. NAC has reviewed the NUREG and it is apparent that any outlet back pressure

due low wind is directly compensated by the casks design because that same pressure is forcing air into the cask air inlets. In this design, the inlet pressure due to the wind and the developed buoyancy force caused by the air heating up makes the air go into and straight up the annulus between the cask and the canister and out the outlet vent. Thus, the outlet vent back pressure due to low wind is negated by the fact that it is also forcing air straight into the cask air inlets. Furthermore, air entering the outlet would not impede air flowing up the annulus and would only serve to enhance the air flow out of the other side of the cask.

NAC does not expect any negative thermal performance effects due to low wind speed even though this new cask design has traditional inlets and non-traditional outlet vents. These non-traditional outlet vents are circular and encompass the entire perimeter of the upper cask. Nevertheless, NAC has determined that this cask design is most likely going to be used inside an ISFSI building or enclosure. Casks inside this building are not susceptible to any sustained low wind speeds because it is an indoor ISFSI and not directly exposed to any environmental wind conditions.