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

May 7, 2021

EA-20-066

Mr. Kent S. Cole
President and CEO
NAC International
3930 East Jones Bridge Road, Suite 200
Norcross, Georgia 30092

SUBJECT: NRC REVIEW OF NAC INTERNATIONAL'S RESPONSE LETTER TO INSPECTION REPORT 07201015/2020-201 NOTICE OF VIOLATION EA-20-066; AND RESPONSE TO DISPUTED NOTICE OF VIOLATION

REFERENCE 1: NAC INTERNATIONAL RESPONSE LETTER TO NRC NOTICE OF VIOLATION DATED JANUARY 29, 2021 (ML21036A037)

REFERENCE 2: NAC INTERNATIONAL – NOTICE OF VIOLATION; U.S. NUCLEAR REGULATORY COMMISSION INSPECTION REPORT NO. 07201015/2020-201 DIVISION OF FUEL MANAGEMENT DATED DECEMBER 21, 2020 (ML20330A281)

Dear Mr. Cole:

This letter acknowledges receipt of your letter to the U.S. Nuclear Regulatory Commission (NRC), dated January 29, 2021 (accessible at Agencywide Documents Access and Management System (ADAMS) at Accession Number ML21036A037), that provided a response to our notice of violation (Notice) issued on December 21, 2020 (ML20330A281) associated with Inspection Report 07201015/2020-201.

The NRC completed its review of your response (Ref. 1) to the two violations issued to NAC International (NAC) (Ref. 2). While the NAC response letter states that NAC is not contesting the two violations in the Notice, NAC maintains a position that it disagrees with certain aspects of the bases cited by the NRC for the issued violations. Additionally, NAC requested that the NRC reconsider the significance of the Notice that was dispositioned as Severity Level III.

The NRC has reviewed the information in your letter and determined that no additional or new information has been provided since the Pre-decisional Enforcement Conference (PEC) held on October 20, 2020, including the supplemental information NAC provided to the NRC after the PEC. Therefore, the NRC's assessment of the basis for the two violations and the determination of their severity level remains unchanged.

As stated in the Notice, Violation 1 involved NAC's failure to subject concrete cask version 5 (CC5) of the MAGNASTOR dry cask storage system (Certificate of Compliance No. 1031, Amendment 7) to design control measures commensurate with those applied to the original design as required by 10 CFR 72.146(c), "Design controls." Specifically, NAC did not employ the method of evaluation (MOE), as described in the final safety analysis report (FSAR), when performing the concrete cask tip-over engineering analysis in assessing CC5's resulting deceleration g-loads upon pad impact. In its response to the Notice, NAC confirmed that instead of utilizing the computer software LS-DYNA (as described in the FSAR) when assessing a non-mechanistic tip-over event, its evaluation consisted only of "performing calculations confirming that the angular velocities of CC5 and CC1 were essentially the same," to then determine "the previous results of the licensing basis LS-DYNA model for CC1 were applicable to CC5." By not identifying its departure from the MOE described in the FSAR (i.e., LS-DYNA), NAC failed to subject the CC5 design changes to design control measures commensurate with those applied in the original design.

In your response, NAC disagreed with the staff's analysis of Violation 2 and its characterization of the violation as having a significance of Severity Level III. Further, NAC reaffirmed its position that its non-usage of LS-DYNA when evaluating the CC5 concrete cask design change was not a departure from the MOE described in the FSAR. NAC continues to contend that its usage of a linear scaling or a ratioing method for angular velocity comparisons for the tip-over analysis was appropriate. NRC staff stands by its issuance of Violation 2 as described in the Notice (Ref. 2) which asserted that NAC's failure to use LS-DYNA during its evaluation of the CC5 concrete cask design departed from the MOE described in the FSAR. Specifically, as acknowledged by NAC, the computer program LS-DYNA, as described in the FSAR, was not utilized to determine Independent Spent Fuel Storage Installation (ISFSI) concrete pad impact deceleration values for a tip-over event. Therefore, by not employing an element of the MOE (i.e., computer program LS-DYNA) to evaluate MAGNASTOR CC5 concrete cask design for the non-mechanistic tip-over event, the NRC staff concluded that the usage of a different MOE for the CC5 tip-over event evaluation should have been provided to the NRC staff for its review in accordance with 10 CFR 72.48(c)(2)(viii).

Related to the Notice issued on December 21, 2020, your response discussed the NRC's approval of Amendment 9 for NAC's MAGNASTOR CC6 (ADAMS Accession No. ML20307A119). Specifically, you noted that NAC's approved licensing request for CC6, like CC5 described above, did not use LS-DYNA in the engineering evaluation. The NRC's review of the licensing request for CC6 included an assessment of the physical differences between CC1 and CC6 to assess the appropriateness of NAC's usage of a comparison method in lieu of LS-DYNA. Despite NAC not performing a more in-depth tip-over analysis, the NRC staff concluded that an additional non-mechanistic tip-over analysis of the CC6 using LS-DYNA was not needed. This determination was based, in part, on the design similarities between CC1 and CC6. In the Safety Evaluation Report (SER) for Amendment 9 (ML20307A119), the staff stated:

> *The staff reviewed the applicant's approach and statement and although the staff finds that use of angular velocity alone is a simplistic approach that does not consider the intricacies of complex impact problems involved in evaluating the non-mechanistic tip-over. A more comprehensive evaluation that can evaluate the non-linearity in the analysis (e.g., an analytical evaluation with a LS-DYNA model) should be used for analyses involving more significant changes in angular velocity than that used for CC6 when compared to the tip-over analysis for CC1.*

Therefore, had NAC submitted a similar licensing request for CC5, the staff would have stipulated the usage of LS-DYNA. The basis for this determination is the notable design differences between CC1 and CC5 as compared to CC1 and CC6. For example, as stated in your January 29, 2021, response (Ref. 1), the CC5 loaded cask weight increased by approximately 17,500 pounds (a 5 to 6 percent increase) due to shielding enhancements and a thicker (1.25 inches) cask liner. In contrast, NRC staff determined that modifications made to CC6, as compared to CC1, were not as significant.

For each cask design modification, NAC is required to comply with Title 10 of the *Code of Regulations* (10 CFR) 72.48 to assess whether a license amendment request must be submitted to the NRC. Applicable guidance is provided in Regulatory Guide (RG) 3.72, Revision 1, "Guidance for Implementation of 10 CFR 72.48, Changes, Tests, and Experiments," which describes an approach that is acceptable to the NRC staff to meet the requirements of 10 CFR 72.48. Accordingly, the NRC deems the recently revised RG 3.72, Revision 1 (dated September 2020) to be sufficient guidance for the industry.

The severity level of a violation takes into consideration the following four factors described in Section 2.2.1 of the Enforcement Policy:

a) Whether the violation resulted in actual safety or security consequences.
b) Whether the violation had potential safety and security consequences.
c) Whether the violation impacted the ability of the NRC to perform its regulatory oversight function.
d) Whether the violation involved willfulness.

While willfulness, the actual consequences, and the potential safety or security consequences are important factors evaluated for the significance of the violation, the impact to the ability of the NRC to perform its regulatory function is also a key factor. The latter factor was the focus of the staff's assessment of the significance of Violation 2. The Severity Level III significance was predicated on the staff's determination that, absent the usage of LS-DYNA, approval would not have been granted for the CC5 design change.

The NRC has concluded that information regarding the reasons for the violations, the corrective actions taken and planned to correct the violations and prevent recurrence, and the date when full compliance will be achieved is already adequately addressed on the docket in your January 29, 2021, letter. Therefore, you are not required to respond to this letter. Corrective Action Report No. 21-01, which you indicate in your response addresses the violations, will be used to guide the NRC's review of the effectiveness and completion of your corrective actions during a future follow-up inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions on this matter, please contact Ms. Leira Cuadrado via email at Leira.Cuadrado@nrc.gov.

Sincerely,

Anton Vegel

Digitally signed by Anton Vegel
Date: 2021.05.07 10:34:35 -05'00'

Anton Vegel, Director
Office of Enforcement

Docket No. 72-1015

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DOCUMENT DATE: May 7, 2021

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