SAFETY EVALUATION REPORT

NAC INTERNATIONAL, INC.

MAGNASTOR® DRY CASK STORAGE SYSTEM

CERTIFICATE OF COMPLIANCE NO. 1031

AMENDMENT 1

DOCKET NO. 72-1031

MAGNASTOR® SYSTEM
DOCKET NO. 72-1031
MODEL NO. MAGNASTOR®
NAC INTERNATIONAL, INC.
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SUMMARY

By letter dated March 26, 2009, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090890292) NAC International, Inc. (NAC) requested an amendment to Certificate of Compliance (CoC) No. 1031, for the MAGNASTOR® spent fuel dry cask storage system. In the application, NAC requested changes to the acceptance testing for Boral neutron absorbing materials. The amendment would revise TS 4.1.1 b and incorporate by reference into the MAGNASTOR CoC, Sections 10.1.6.4.5, 10.1.6.4.6, 10.1.6.4.7 and 10.1.6.4.8 of the FSAR regarding the acceptance testing of borated aluminum alloy and borated metal matrix composite neutron absorber material. Based on the statements and representations in the application, the staff agrees that these changes do not affect the ability of the spent fuel dry cask storage system to meet the requirements of 10 CFR Part 72.

EVALUATION

The MAGNASTOR® dry storage cask CoC permits the use of three types of neutron absorbing materials for criticality safety: borated aluminum alloys; borated metal matrix composites (MMC); and Boral laminates. The acceptance testing in the original MAGNASTOR® CoC specified the neutron attenuation method for verifying the neutron absorbing behavior of borated aluminum alloys, MMCs, and Boral. In this amendment, the applicant requested to be permitted to substitute neutron attenuation measurements of Boral with wet chemical analysis as a method for verifying the ^{10}B content of the material. This change is consistent with acceptance testing of Boral in other Part 72 applications, and the staff finds this change acceptable. For clarification purposes, 90% credit for the efficacy of the neutron absorber (^{10}B) in borated aluminum alloys and borated MMCs, and 75% credit for the ^{10}B content in Boral remains unchanged.

Changes to the Technical Specifications and Safety Analysis Report (SAR) were made regarding neutron absorber qualification and acceptance testing. The maximum diameter of the neutron beam was expanded to 2.54-cm with a 10-percent tolerance. This change is consistent with draft staff guidance (draft SFST ISG-23) regarding the maximum permissible size of neutron beams used for neutron attenuation. The use of radiography as a method for verifying the ^{10}B content was removed from the application. Clarifications were made describing the chemistry of the boron carbide powder used in the neutron absorbing materials, and what constituted significant processing changes to the fabrication of neutron absorbing materials.

During the review process the staff became concerned that if significant open porosity was present in the MMC, rapid vaporization of intruded water (which may occur during vacuum drying) could result in degradation or warping of the absorbing material. This concern

generated a request for additional information (RAI), ML091870820. In response (ML092520258), the applicant stated that testing will be conducted on the neutron absorbing material if the open porosity is greater than 0.5% to verify that degradation of the absorbing material will not occur. The testing method was not described in the application, and therefore could not be evaluated by the staff. As a result, the staff chose to impose a restriction of 0.5% maximum open porosity on MMCs in the MAGNASTOR® CoC. In a telephone call on November 23, 2009 (ML093310470), the applicant stated that a maximum open porosity of 0.5% would not cause any fabrication difficulties. The staff discussed this restriction with the applicant in a subsequent telephone call on December 30, 2009 (ML100080093), and finds that 0.5% limit on open porosity is acceptable.

In response to an RAI (ML093370139), the applicant specified that the boron carbide powder in the neutron absorbers will conform to ASTM C750-3 Type III specifications, with additional quality controls as determined by the applicant. In a clarifying phone call, made December 30, 2009, the applicant informed the staff that the required specifications for the boron carbide powder used for neutron absorbing materials will not result in changes to the boron carbide chemistry from previous applications. The staff confirmed that ASTM C750-3 Type III powder has a long history of use in Boral, dating back to at least 1978. Since no changes are being made to the powder specification of the neutron absorbing materials from previous applications, and Boral plates have decades of use in spent fuel pools, and storage canisters, the staff finds the use of ASTM C750-3 Type III powder acceptable for the application.

The staff finds that the proposed changes to the acceptance and qualification testing of the neutron absorbing materials in the amendment acceptable.

CONCLUSION

The staff performed a detailed safety evaluation of the application for a 10 CFR Part 72 CoC for the MAGNASTOR® System. The staff performed the review in accordance with the guidance in NUREG-1536, “Standard Review Plan for Dry Cask Storage Systems,” dated January 1997. Based on the statements and representations contained in the application and the MAGNASTOR® Final SAR, and the conditions established in the CoC and its Appendices (Technical Specifications and Approved Contents), the staff concludes that the changes indicated for the MAGNASTOR® System do not affect the ability of the container and the design to meet the requirements of 10 CFR Part 72.

Issued with CoC No. 1031, Amendment No. 1 on 8/30/2010.