

Request for Additional Information
NAC International
Docket No. 71-9356
Certificate of Compliance No. 9356
Model No. MAGNATRAN® Transportation Package

By application dated November 26, 2012, as supplemented on February 15 and March 29, 2013, December 1, 2014, and January 13 and 21, 2015, NAC International (NAC) submitted an application for approval of Certificate of Compliance No. 9356, for the Model No. MAGNATRAN® transportation package. This request for additional information identifies information needed by the U.S. Nuclear Regulatory Commission staff in connection with its materials review of the application. The requested information is listed by chapter number and title in the applicant's safety analysis report (SAR). The staff used the guidance provided in NUREG-1617, "Standard Review Plan for Transportation Packages for Spent Nuclear Fuel," 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.

Chapter 1 – General Information Evaluation

1. Specify on Drawing No. 71160-505 (sheet 1 of 4) the type of metallic seal and the materials of construction of the seal. Provide justification for the lower temperature of use for the metallic O-ring specified on the drawing.

NRC's request for additional information (RAI) question 3-5c, in the non-proprietary enclosure to NRC letter dated September 10, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13254A109) asked for references for the minimal acceptable operating temperature for normal conditions of transport "Cold" at -40°F for the components in the table in Section 3.3.2 of the SAR. Note that the safe operating range of the metallic O-rings is obtained from the technical information presented in Section 4.5.2 of the SAR. This section is Helicoflex literature which only specifies the upper operating temperature. The lower operating temperature is not provided. NRC's question 1-5c in the non-proprietary enclosure to NRC letter dated September 10, 2013, stated that Drawing No. 71160-505 (sheet 1 of 4) lists the metallic O-ring and EPDM O-ring as commercial, but there are many different construction and materials used in the metallic O-rings that are "commercial," which may affect the ability of these components to work properly within the specified temperature range.

The response to NRC's question 3-5c referred to a manufactures catalogue of specifications. There are many configurations of metallic O-rings but since only the section dealing with Helicoflex was provided, NRC staff assumes that Helicoflex will be the metallic O-ring used in the MAGNATRAN packaging. This should be stated on the governing drawings. The catalogue further indicated on page 9 that there were a variety of materials that could be used in the seals and the maximum temperature of use depended on the size of the O-ring and material used. Neither was specified on the drawing or the SAR. Some of these temperatures could be below the temperatures specified in the Table in SAR Section 3.3.2.

Enclosure

The only mention of lower usable temperatures was a general note i.e., “General characteristics – temperatures from -172°C up to 800°C.” No mention was made of which O-ring designs these temperatures applied to. The NRC can only assume that this temperature range brackets all Helicoflex O-rings and materials used. It could also be assumed that particular O-ring sizes and materials would have a more limited range.

This information is needed to confirm compliance with 10 CFR 71.51, 10 CFR 71.71, and 10 CFR 71.73.

2. Specify on the drawings that the bolts will be procured in accordance with the American Society of Mechanical Engineers material specification ASME SB-637.

The bolts that are used to fasten the MAGNATRAN lid to the top forging of the packaging body are fabricated from ASME SB-637, Grade N07718, nickel alloy (see SAR Section 2.1.2.2). The ductile-to-brittle transition temperature of this steel is below the expected operating temperatures, so brittle fracture of the bolts is not expected. Procurement of the bolts in accordance with the ASME SB-637 specification will ensure that the material receives the proper heat treatment and possesses the required mechanical properties.

This information is needed to determine compliance with 10 CFR Part 71.

3. Indicate on Drawing No. 71160-502, sheets 7 and 8, that note Δ12 (regarding the dye penetrate test) applies to the closure welds on the stainless steel cladding of the neutron shields not only the attachment of the neutron shields to the cask body.

NRC question 2-11 in the non-proprietary enclosure to NRC letter dated September 10, 2013, requested the applicant to provide the applicable standards and codes, such as those presented in the MAGNASTOR SAR (Docket No. 72-1031), for the neutron shielding fabrication, examinations of the welds, and qualifications of the personnel. A liquid penetrant inspection of the neutron shield assembly welds with Note Δ12 as follows: “PT Final pass. Examined per ASME Section V, Article 6 with acceptance per Section III, Article NF-5350,” was added to NAC drawing 71160-502, Revision 2P. The note was added for the welds of the neutron shield assembly to the cask body and not to the fabrication welds that sealed the stainless steel shell around the neutron absorber. This seal is necessary as it prevents the intrusion of water into the neutron shields material, which prevents degradation of the shield material.

This information is needed to determine compliance with 10 CFR 71.47(a).

Chapter 2 – Structural Evaluation

Materials Questions

1. Either 1) provide assurance that the neutron absorber plates have not degraded during storage to a condition where they cannot meet all regulatory requirements during transport or, 2) place a step in the operating procedure requiring, prior to loading stating “that using either operational experience, experimental data, or reference to an NRC approved calculation or guidance that option 1 is met.”

NRC's question 6-1c in the non-proprietary enclosure to NRC letter dated September 10, 2013, asked the applicant to demonstrate that any material used as poison plates meets the assumptions used in the criticality safety analyses under all conditions specified in 10 CFR 71.71 and 10 CFR 71.73. The applicant's response was "Chapter 6 contains the criticality analysis of the poison plates. Chapter 8 contains the thermal and structural analyses of the poison plates. Section 8.1.5.1.3 contains acceptance testing, including the neutron attenuation capability related testing of the materials, and thermal and structural values, and states which poison plate material has what credit applied." The acceptance testing was prior to loading when the absorber plates were new. The thermal and structural analysis assumes that the absorber plates are in the as-manufactured condition. The canisters being loaded into the MAGNATRAN packaging were previously stored for an undetermined length of time stored in the MAGNASTOR storage cask. The analysis must account for any degradation in the absorber plates during the storage duration.

This information is needed to determine compliance with 10 CFR 71.55 and 10 CFR 71.59.

2. Provide reference(s) for all specified material properties, including emissivity, used as design basis throughout the SAR.

The application must include a description of the proposed package in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package.

This information is needed to determine compliance with 10 CFR 71.33.

Chapter 7 – Operating Procedures Evaluation

1. Revise Chapter 7, "Operating Procedures," to augment the canister decontamination procedures to include: 1) a description of how the decontamination will be conducted, 2) the criteria for salt and corrosive agent removal, and 3) the method for determining whether the salt had been remove from the crevices.

RAI 7-9 asked for a description in the operating procedures that the package exterior will be decontaminated of chloride-containing salts and other corrosive agents since the cask was made of 304 stainless steel and could be used in a marine atmosphere. "The operating procedures in Chapter 7 have been revised to include the decontamination/cleaning of the package surfaces of chloride-containing salts and other corrosive agents..." The revision did not include: 1) description of how the decontamination was going to be conducted, 2) the criteria for salt and corrosive agent removal, or 3) method for determining if the salt had been remove from the crevices.

This information is needed to determine compliance with 10 CFR 71.43(d).