

MATERIALS RAI

Docket No. 72-1052

Dry Storage System

CASTOR geo69

RAI-M-1 Provide additional information on the cast iron package coatings that demonstrate coating durability and support the emissivity values credited in the thermal analysis.

The specifications and minimum requirements for inner and outer coatings are provided in SAR Section 8.2.6.1, which does not provide any details about materials qualification data, manufacturer data sheets or other bases that demonstrate the performance of the coating under the elevated heat and radiation exposures of the internal package environment. The applicant states the coating is important to safety as thermal analysis relies on emissivity values, however it is not indicated in the bill of materials or the drawing package. The staff notes that the emissivity specification and how the emissivity value will be verified is important, as well as what standard the applicant is using to verify and validate these values.

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

RAI-M-2 Provide additional information on the classification of undamaged versus damaged spent nuclear fuel. Alternatively confirm that the guidance in NUREG-2215 Section 8.5.15.1, "Spent Fuel Classification," is used to differentiate between damaged and undamaged spent nuclear fuel.

SAR section 8.4.1 states that the storage package relies on fuel cladding to meet fuel specific and DSS related regulations. However, it does not explicitly state that the applicant is taking credit for fuel cladding in their analysis and the fuel specific as well as system related functions.

This information is needed to demonstrate compliance with 10 CFR 72.236(h) and (m).

RAI-M-3 Provide additional information to demonstrate that the package drying criteria are adequate to prevent an unacceptable loss of cladding toughness due to hydride reorientation.

SAR Section 7.1.2 provides process steps but is not clear why this will provide adequate drying without any adverse effects to the material (fuel cladding).

This information is needed to demonstrate compliance with 10 CFR 72.236(g) and 10 CFR 72.236(m).

RAI-M-4 Justify that the *[withheld per 10 CFR 2.390]* fuel basket plates will have adequate fracture performance in a drop accident to maintain the assumed fuel configuration in the criticality analyses.

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The SAR does not include toughness testing requirements to verify that brittle fracture will not affect the structural integrity of the basket in a drop accident. The staff notes that the criticality analysis relies on the maintenance of configuration of the neutron absorber plates and fuel assemblies.

Although nonferrous materials are generally excluded from fracture acceptance testing in consensus standards, the proprietary *[withheld per 10 CFR 2.390]* metal matrix composite is a non-code material that contains boron carbide ceramic particles that may diminish fracture performance relative to the conventional aluminum material that are considered in the ASME BPVC.

This information is needed to demonstrate compliance with 10 CFR 72. 236 (b) and (g).

RAI-M-5

Provide analysis to demonstrate that the package drying criteria of *[withheld per 10 CFR 2.390]* is adequate to remove residual moisture such that it limits hydrogen generation and clarify operational procedures that would prevent accumulation of hydrogen during loading operations.

SAR Section 9.1.2 provides process steps but is unclear why this will provide adequate dryness and removal of moisture. Additionally in Table 9.1-2 “Operations for loading of contents”, it is unclear how and if hydrogen levels are monitored to ensure that flammable gas mixture is monitored and mitigated.

This information is needed to demonstrate compliance with 10 CFR the requirements in 10 CFR 72.236(h).