TRANSNUCLEAR
AN AREVA COMPANY

November 3, 2010
E-30015

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Supplement to Submittal of Biennial Report of 72.48 Evaluations Performed for the Standardized NUHOMS® System, Certificate of Compliance (CoC) 1004, for the Period 07/26/08 to 07/23/10, Docket 72-1004

Reference: Letter from Donis Shaw (TN) to Document Control Desk, "Submittal of Biennial Report of 72.48 Evaluations Performed for the Standardized NUHOMS® System, CoC 1004, for the Period 07/26/08 to 07/23/10, Docket 72-1004," July 23, 2010

Pursuant to the requirements of 10 CFR 72.48(d)(2), the submittal referenced above provided 72.48 evaluations performed for the Standardized NUHOMS® System, CoC 1004, for the period 07/26/08 to 07/23/10. Enclosure 1 provides an additional 72.48 evaluation summary, for LR 721004-650 Rev. 0, approved on 11/07/08, including indication as to whether the evaluation had associated Updated Final Safety Analysis Report (UFSAR) changes that were incorporated into the UFSAR for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel, NUH003.0103, Revision 11, submitted on February 1, 2010.

Should you or your staff require additional information, please do not hesitate to contact me at 410-910-6878 or Dr. Jayant Bondre at 410-910-6881.

Sincerely,

Donis Shaw
Licensing Manager

cc: B. Jennifer Davis (NRC SFST), provided in a separate mailing

Enclosures:

1. Evaluation Summary for LR 721004-650 Rev. 0

NMSS24

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Evaluation Summary for LR 721004-650 Rev. 0

LR 721004-650 Rev. 0* – *(no associated UFSAR change)

Change Description

The proposed activity involved the evaluation of potential foreign material that may be present in a loaded NUHOMS® 61BT dry shielded canister (DSC). The foreign material that may have fallen into the DSC during loading operations is 0.16 lbs of carbon steel, with no coatings, and dimensions ½" x ½" x 2¼". The DSC is loaded with a decay heat of 7.2 kW.

Evaluation

The foreign material was evaluated based on storage in the 61BT DSC inside a Model 202 horizontal storage module (HSM) and transfer of the DSC in an OS197 Transfer Cask.

Carbon steel is stable and will not volatize, so the foreign material will not add any gas volume to the DSC.

STRUCTURAL:

Impact of Foreign Material on DSC Pressure Boundary and Fuel Assemblies

The foreign material of concern could induce corrosion of the DSC components and/or fuel assemblies in an environment that is conducive to corrosion (an environment with water, air or other electrolyte present). However, the vacuum drying of the DSC reduces the quantity of water, air or other oxidizing agents to 0.25 volume % or less. This level of concentration of oxidizing agents with the balance of the DSC free volume filled with inert helium gas will not support any significant corrosion in the DSC. Therefore, although carbon steel in the DSC could potentially cause some corrosion in an air/water environment, the lack of an oxidizing agent in the DSC and the inert helium gas fill of 99.75% of the free volume of the DSC will preclude any corrosion of the pressure boundary, basket, other DSC components, or the fuel assemblies.

To quantify any impact of the foreign material on corrosion of the pressure boundary, corrosion rates for stainless steel were researched. The nominal 61BT DSC shell is 0.500" thick. A conservatively assumed rate of 0.0004 inch/year, which assumes a gaseous environment with O_2 and other corrosive gases, still would require over 125 years to reduce the nominal thickness 10%, a value that would still not significantly degrade the pressure boundary. Again it should be noted that the DSC internal atmosphere is not industrial air, but dry helium.

To quantify any impact of the foreign material on corrosion of the fuel cladding, corrosion rates for Zirconium were researched. An extremely conservative case of liquid hydrochloric acid on zirconium gives a rate of < 0.001 inch/year. The cladding thickness for the associated fuel assemblies is 0.028" or greater and full thickness corrosion would require more than 30 years. It again should be noted that the DSC internal atmosphere is not liquid hydrochloric acid, but dry helium. Therefore, the full thickness corrosion would require approximately the same number of years (125 years) as stainless steel.

The conclusion from both of these searches is that both the stainless steel pressure boundary and the zirconium cladding are resistant to corrosion and it would take more than 60 years, even assuming unrealistic environments, to reduce thickness to a level of concern. Therefore,

Evaluation Summary for LR 721004-650 Rev. 0

corrosion from a very small amount of foreign material in a dry helium (inert gas) atmosphere is not a concern for the pressure boundary or the fuel cladding.

Given that the foreign material is carbon steel, the material will maintain its form during vacuum drying and storage conditions. The melting point of carbon steel is well above the bounding temperatures which will be seen inside the canister during vacuum drying and accident conditions such as blocked vents. The maximum calculated cladding temperature for this design using a design basis heat load of 18.3 kW is 827 °F, well below the melting point of carbon steel.

Impact of Foreign Material on DSC Internal Pressure

The impact of the foreign material upon DSC pressurization was assessed. The calculated DSC free volume is 214.86 ft^3. The volume of the carbon steel piece is 0.0003 ft^3. This reduction in volume is well within the accuracy of the calculated DSC free volume, therefore there is no impact on the internal pressure in the canister due to the presence of the foreign material.

EFFECTS ON THE ADDITIONAL DESIGN FUNCTIONS:

There is no adverse impact on the mechanical function. The material is of a small enough weight and volume (much less than 1 lb and 0.0003 ft^3 in the DSC) that no problems are anticipated in successfully vacuum drying. It can be inferred that any reflooding operations would be similarly unaffected. The debris is not large enough to block reflooding through the siphon tube, nor would it interfere with subsequent gas venting.

There is no adverse impact on the thermal function. The limiting source term is unchanged. There are no changes to the acceptance criteria for the fuel types. The volume of the foreign material is not sufficient to alter the DSC internal atmosphere and thus alter gaseous heat transfer.

There is no adverse impact on the shielding function. The introduction of foreign material into the DSC does not change the source term limits of the Fuel Qualification table. The shielding analysis does not explicitly rely on the DSC internal gas environment. The volume of the foreign material is very small, contains no significant material susceptible to activation (no cobalt), and thus will not significantly alter the long term source term.

There is no adverse impact on the criticality function. The DSC will be drained, successfully vacuum dried, and sealed. The very small amount of foreign material will not create a concern during future reflooding. The fuel cladding will not be breached by this small amount of material, within a dry helium atmosphere. Thus the cladding will not be breached and there will be no dispersal or reconfiguration of pellet material. The fuel assembly will not become "damaged".

There is no adverse impact on the DSC weight. The weight of the foreign material is less than 0.2 lb. This will not change the DSC CG location or exceed any weight limits.

There is no impact on the confinement capabilities of the DSCs as there are no new leak paths introduced. As discussed previously, the foreign material will not adversely impact the stainless steel DSC pressure boundary.

The eight 72.48 evaluation criteria were met.