

March 17, 2004

Julio Barcelo Vernet  
Commissioner  
Consejo de Seguridad Nuclear  
Justo Dorado, 11  
28040 Madrid, España  
Spain

**SUBJECT: NRC RESPONSE TO A CONCERN OF BLISTERING OF BORAL™ IN NAC  
CASKS DESIGNS IN THE UNITED STATES**

Dear Mr. Vernet:

We are in receipt of your letter dated October 29, 2003, in which you informed the Nuclear Regulatory Commission (NRC) of the NAC International, Inc. (NAC) actions related to BORAL™ deformation by blistering in the Equipos Nucleares, S.A. (ENSA) DPT casks. This deformation occurred late in the year 2000. Specifically, you forwarded an evaluation performed by NAC that considered the possible effects on the NAC-MPC® and NAC-STC® storage and transport cask designs, respectively, of a condition experienced by ENSA during testing of a DPT dual-purpose cask. The NRC is aware of the potential blistering of BORAL™ under certain operating and environmental conditions. Furthermore, it is our understanding that the DPT cask shares similar physical features with the NAC-MPC® and NAC-STC® systems, including the BORAL™ neutron absorber sheets used for criticality control.

NAC formally notified the NRC on February 5, 2001, of the BORAL™ blistering in the tests performed by ENSA on the DPT cask. It is our understanding that the ENSA test conditions, under which blistering was observed, were conducted at high heat-up rates and high hydrostatic pressures well beyond those for operating conditions for the NAC systems. It is also our understanding that the high heat-up rates and hydrostatic pressures did not permit the liquid to drain prior to expanding, thereby leading to blistering.

In support of its conclusions, NAC provided a report followed by a letter addressing independent tests to determine the susceptibility of BORAL™ to blistering. On March 22, 2002, the NRC received a report on the first test entitled, "Evaluation of the Structural Fitness of BORAL™ for Use in NAC Spent Fuel Canisters," which documents that no blisters were observed in the BORAL™ plates used in the NAC-MPC® or NAC-STC® systems. In addition, the report states that the BORAL™ plates used in the DPT cask are thicker than those in the NAC-MPC® or NAC-STC® systems. Further, NAC stated that the acceptance test parameters (i.e., hydrostatic, thermal, and vacuum drying tests) for the DPT cask were different from the conditions the BORAL™ would be exposed to during NAC's short-term operations, such as drying, back filling with inert gas, and transfer of the cask to the pad. A copy of the report is enclosed for your review. On January 15, 2003, the NRC received a letter from NAC documenting additional tests performed on BORAL™ coupons. The letter stated that the tests performed under simulated operating conditions for the NAC systems demonstrated that BORAL™ will perform as licensed for the NAC-MPC® or NAC-STC® systems. However, NAC's tests also showed that the blistering phenomenon appears to be more prone to occur in thicker

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BORAL sheets, and in test coupons subjected to very high hydrostatic pressures and high heat-up rates. I have also enclosed a copy of this letter dated January 15, 2003, for your information.

In summary, the NRC concluded that under cask operating conditions permitted in the cask's certification, blistering should not occur in the BORAL™ for the NAC-MPC® and NAC-STC® systems. This is based on the BORAL™ test results submitted to the NRC by NAC. Experience to date has shown no blistering in currently licensed NAC cask designs constructed in the United States. This suggests that NAC's acceptance tests under simulated operating conditions are not as severe as the tests performed on the DPT and do not lead to blistering of the BORAL™.

We sincerely appreciate being informed of your experiences. Please feel free to contact me should you have further questions.

Sincerely,

/RA/

Martin J. Virgilio, Director  
Office of Nuclear Material Safety  
and Safeguards

Enclosures:

1. Evaluation of the Structural Fitness of  
BORAL™ for Use in NAC Spent Fuel Canisters
2. Ltr dtd January 15, 2003

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1. Evaluation of the Structural Fitness of BORAL™ for Use in NAC Spent Fuel Canisters
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