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**To: Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Rulemaking and Adjudications Staff**

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OFFICE OF THE SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

**From: Jack Hovingh, PE
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Subject: Paragraph: 10 CFR 71.73 (c)(4) Thermal

Reference:

Nuclear Regulatory Commission, 10 CFR 71, *Compatibility with IAEA Transportation Safety Standards (TS-R-1) and Other Transportation Safety Amendments, Federal Register* / Vol. 67, No. 83 / Tuesday, April 30, 2002 / Proposed Rules.

Recommendation:

I recommend that the initial conditions before and following the 10 CFR 71.73 fire be made identical to the normal conditions of transport under 10 CFR 71.71 (c)(1), e.g., in 38°C still air with insolation. This will bring the thermal portion of 10 CFR 71.73 into conformance with IAEA TS-R-1, and eliminate the possibility that can occur under the current 10 CFR 71.73, that the maximum package internal temperatures following the fire cooldown can be greater than caused by the fire.

Comparison of 10 CFR 71.73 and IAEA TS-R-1

The conditions for the thermal portion of the hypothetical accident (10 CFR 71.73) [2000] and IAEA TS-R-1 [1996] are given in Table 1 below.

Table 1. Conditions for the thermal portion of a hypothetical accident.

Condition	10 CFR 71.73	IAEA TS-R-1
Initial Temperature, °C	-29<T<38	38
Initial Insolation	May be neglected	Yes
Content Decay Heat	Yes	Yes
Environment Emissivity	>0.9	>0.9
Package Emissivity	>0.8	>0.8
Environment Temperature, °C	>800	>800
Test Time, minutes	30	30
Facility	Fire	Fire
Post-test Temperature, °C	-29<T<38	38
Post-test Insolation	Implied	Yes

Template = SECY-067

SECY-02

The initial thermal conditions of a package prior to the thermal portion of a hypothetical accident are, under 10 CFR 71.73, similar to those used to estimate the package surface temperatures for 10 CFR 71.43(g), e.g., in 38°C still air without insolation. The initial thermal conditions of a package prior to the thermal portion of a hypothetical accident are, under IAEA TS-R-1, §728, identical to those used to estimate the temperatures of the package for normal conditions of transport under 10 CFR 71.71(c)(1), e.g., in 38°C still air with insolation.

The application of insolation to a package during the post-test cool down is unspecified in 10 CFR 71.73 [2000], but the Federal Register (Vol. 60, No.188, pg. 50257, [September, 1995]) noted that "NRC adopts the view of the thermal experts who participated in developing the IAEA regulations. Those experts thought the effects of solar radiation may be neglected before and during the thermal test but such effects should be considered in the subsequent evaluation of the package response." This recommendation was not incorporated into 10 CFR 71.73 [2000].

Issues:

The difference in the initial conditions prescribed by 10 CFR 71.73 and IAEA TS-R-1 result in different temperature implications for a given package. Some packages, with the surface heat flux from the content decay much less than the insolation, may have lower internal temperatures during a 10 CFR 71.73 test than for normal conditions of transport. Conversely, for all packages the IAEA TS-R-1 tests will result in the maximum internal temperatures being greater than for normal conditions of transport. For no loss of thermal effectiveness and with insolation, the steady state post-test temperatures will be the same for the 10CFR 71.73 and the IAEA TS-R-1 tests. For no loss of thermal effectiveness, with insolation, and with no change in emissivity, the steady state post-test temperatures will be the same for the 10CFR 71.73 and the IAEA TS-R-1 tests and equal to that of the normal conditions of transport.

The application of the current version of IAEA TS-R-1, §728 [1996] may result in greater internal package temperatures from the thermal hypothetical test than will result from the application of the current version of 10 CFR 71.73 [2000].

Recommendation:

I recommend that the initial conditions before and following the 10 CFR 71.73 fire be made identical to the normal conditions of transport under 10 CFR 71.71 (c)(1), e.g., in 38°C still air with insolation. This will bring the thermal portion of 10 CFR 71.73 into conformance with IAEA TS-R-1, and eliminate the possibility that can occur under the current 10 CFR 71.73, that the maximum package internal temperatures following the fire cooldown can be greater than caused by the fire.

Jack Hovingh

Jack Hovingh 21 May, 2002