

PDR 71-9116



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 04 1980

71-9116

Nuclear Packaging, Inc.
ATTN: Mr. L. J. Hansen
815 South 28th Street
Tacoma, WA 98409

Dear Mr. Hansen:

This is in regard to your letter of November 1, 1979, concerning evaluation of package designs under cold temperature conditions. You are correct in your observation that 10 CFR Part 71 does not require the -40°F condition to be evaluated in conjunction with other tests. Also, 10 CFR Part 71 does not specify the ambient temperature conditions that should be considered when evaluating the various normal and accident condition tests such as the Free-Drop Tests. We note the IAEA Regulations (Safety Series No. 6) specify in Paragraph 213, that brittle fracture should be considered in the design of the packaging to temperatures as low as -40°F (-40°C).

For some designs, temperature can strongly influence the test results and performance of a package. For example, with cold temperatures: liquids in the package may be frozen, stresses may be induced by differential thermal contraction, material properties such as the crush strength of impact limiters may be changed, and materials of construction may be susceptible to brittle failure. Therefore, we believe it is important to evaluate packages under the normal and accident condition tests at cold ambient temperatures.

Currently, 10 CFR Part 71 does not specify a temperature for this purpose. However, Regulatory Guide 7.8, "Load Combinations for the Structural Analysis of Shipping Casks," specifies load conditions that are acceptable to the NRC staff for evaluating the structural adequacy of shipping casks. In that document, an initial temperature of -20°F is prescribed as the lower limit for which casks must be evaluated in conjunction with the normal and accident condition tests. Packages must also be evaluated for -40°F , but not in conjunction with other normal or accident test conditions.

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We are currently in the process of revising 10 CFR Part 71. Proposed changes to 10 CFR Part 71 were recently published for public comment. In the proposed regulations, the Normal Conditions of Transport include a separate test at -40°F. The other tests included under both Normal Conditions of Transport and Hypothetical Accident Conditions are required to be considered in conjunction with temperatures as low as -20°F. Until a final Rule is adopted, we believe packages should be evaluated at cold temperatures consistent with the Regulatory Position described in Regulatory Guide 7.8.

We recognize that cold temperature is an important consideration in selecting materials with suitable toughness. We agree with your suggestion that acceptance criteria for evaluating materials is needed. The NRC Office of Standards Development is developing a Regulatory Guide on this subject with assistance from Oak Ridge National Laboratory. Until that effort is completed, the adequacy of materials from the standpoint of brittle failure must continue to be demonstrated to be adequate by the applicant and evaluated by the Branch on a case-by-case basis.

I hope this letter is responsive to your concerns.

Sincerely,

Original Signed by
CHARLES E. MACDONALD

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle
and Material Safety