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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D.C.

IN REPLY REFER TO:
LTJJB
70-36

JAN 31 1962

United Nuclear Corporation
Chemicals Division
3600 North Second Street
St. Louis 7, Missouri

Attention: Mr. L. J. Swallow

Gentlemen:

This refers to your application dated November 17, 1961, for amendment to license SNM-33 to authorize the use of a proposed container for the shipment of low enriched uranium compounds enriched up to 3% U-235 by LTL, LCL, or Railway Express.

In order to continue the evaluation of your application, the following information is required:

1. In your shipping arrangement whereby one drum container is placed above the other, justification of the nuclear safety by the solid angle concept cannot assure a column array instead of considering each individual container. Therefore, it is requested that a solid angle calculation be performed and the results submitted which takes into account the sum of all the solid angles subtended by drums surrounding the center drum.

2. The placement of commingling instructions on the Bill of Lading is not sufficient to insure against the commingling of your shipments with other shipments of special nuclear material. In this connection, we consider the following as acceptable alternatives for methods of control of shipments:

   (a) Ship exclusive use of vehicle directly to destination.

   (b) Accompany each shipment with a courier who would make certain that the shipment would not come within a specified distance from other SNM shipments.

   (c) Design packages so as to be safe in proximity to any number of other SNM packages under conditions of moderation, flooding, wreckage or fire. To date, no containers submitted by licensees for AEC approval have been designed for such a universal contingency.

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(d) Limit each shipment to the amount of SNM permitted by 10 CFR Part 71 which requires no prior approval by the AEC.

(e) Obtain certification from the carrier that shipments will be made by a single carrier and that a single vehicle will pick up the material and deliver it to the consignee with no reloading or transshipment of special nuclear material in between.

Your reply should specify which of the above procedures you intend to use.

4. For individual drum weighing procedures it is noted that you propose to consider as appropriate a weighing error corresponding to 20% of the proper mass. You are requested to revise those procedures so that the weighing and loading error is reduced to 2% or less and submit a description of the revised procedures.

5. Although the framework of your shipping container (birdcage) has sufficient strength to resist an impact force of about 100 G's without any appreciable yield, the strap attachment of the band to the angle frame will resist an impact of about 2 G's if only the toes of the strap are welded as indicated on your drawing No. 3226-4. It is not clear in this drawing whether the sides of the strap are also welded, which would increase the strength of the connection; therefore, you should submit a detailed drawing of this connection indicating all weld points and show by calculations that the strength of this connection, in combined bending and shear, is sufficient to resist an impact force in excess of 30 G's.

6. The clamp assembly that you propose is not satisfactory. An impact force of less than 3 G's (in terms of the loaded drum) would tend to open up the flanged clamp, and a slightly higher impact force would separate the strap from the wing-nut causing the drum to be released. Therefore, it will be necessary that this clamp arrangement be re-designed and greatly strengthened to withstand an impact force in excess of 30 G's. You should submit a revised drawing in this respect and submit calculations to show the increased resistance to impact force.

7. The hinges as designated in the drawing are considerably weaker than desired. The hinge pin is calculated to fail in shear at only 7 G's, the strap in tension at about 13 G's; therefore, a suitable hinge must

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be provided which has, in combined shear and tension, a resistance to an impact force in excess of 30 G's. You should submit with your drawings of an improved hinge, appropriate calculations to show an increased resistance to an impact force in excess of 30 G's.

Very truly yours,

Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Licensing and Regulation

Enclosure:
10 CFR 71