

**MALLINCKRODT  
NUCLEAR**

division of  
Mallinckrodt Chemical Works

70-36  
2pgs  
EXTRA  
SAINT LOUIS 7, MISSOURI • U.S.A. • CENTRAL 1-8980

Plant  
Hematite, Missouri

December 15, 1960

Mr. J. C. Delaney  
Licensing Branch  
Division of Licensing and Regulation  
U. S. Atomic Energy Commission  
Washington 25, D. C.

Subject: SNM-33

Reference: Our Application of March 5, 1957, "Shipping  
Container for Solid Uranium Compounds"

Gentlemen:

We are respectfully requesting that SNM-33 be amended to permit LTL, LCL, Railway Express, or air shipments of uranium compounds of any enrichment in the export bird cage shown on drawing 3226-5.

10 TID  
11, 12 48  
The bird cage is 2'-6" square and 3'-2" high. The uranium compounds will be packaged in five inch diameter cans or plastic bottles which in turn will be packaged in the six inch O.D. pipe located in the center of the bird cage. With this arrangement a minimum edge to edge spacing of the product container of two feet will be maintained. Table XIX of the Fifth Revision of K-1019 states that a two foot edge to edge spacing is safe for an infinite square array of five inch diameter by four feet tall cylinders.

A maximum of ten containers will be shipped in a single layer. "Do Not Stack" will be stenciled on each bird cage and also shown on the bill of lading. Should a double layer of four cages each accumulate the maximum average fractional solid angle would be 4.4% of 4 $\pi$  steradians calculated in accordance with Figure 2 of K-1309, "General Application of a Theory of Neutron Interaction."

OK  
11-15  
B-75



THE WORLD'S FIRST AND LEADING PRODUCER OF NUCLEAR FUELS

Mr. J. C. Dolaney

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The multiplication factor of a five inch diameter cylinder is 0.58 (Table XVII, K-1019, Fifth Revision). Therefore, a solid angle of 25% of  $4\pi$  steradians is permissible (Figure 6, K-1019).

Please let us know if you require additional information in order to approve this amendment of SNM-33 as requested.

Respectfully yours,

MALLINCKRODT CHEMICAL WORKS



L. J. Swallow  
Hematite Plant

LJS/jrt

cc: AEC (7)