Dr. Luke

Project SNM-8
Docket 70-36

12-30-58

Lyall E. Johnson, Chief
Licensing Branch

Clifford K. Beck, Chief
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MALLINCKRODT CHEMICAL WORKS

We have reviewed the Mallinckrodt request (TWX, 12/29/58, Leaders to Johnson) for temporary permission to ship 4.2% enriched uranium dioxide from St. Louis to Lynchburg, Va. Fifty pounds UO_2 are to be placed in a 5 gallon drum which will be braced in a 55 gallon "shorty" drum birdcage.

Mallinckrodt justifies the mass of contained U-235 per container on the basis of the mass limits specified in TID-7016, and the spacing on the basis of maximum density, kg U-235/cubic feet of birdcage volume, given in TID-7016.

We do not question the U-235 mass (0.848 kg) proposed for an individual container - it is in accord with 0.864 kg permitted by K-1019 for single containers. However, Table 5 in TID-7016 specifies batch sizes for U-235 based on a contained volume of material not exceeding 4.5 liters, whereas the contained volume of the Mallinckrodt drum is 5 gallons (19 liters). Consequently, the spacing criteria of Tables 6 and 7, TID-7016, do not apply.

On the other hand, we have analyzed the Mallinckrodt proposal on the basis of K-1019 (4th revision, deleted), employing the solid angle method of determining spacing requirement. If one assumes a value of k_{eff} of 0.65 for moderated UO_2 in a 5-gallon drum, then the spacing proposed by Mallinckrodt is acceptable. for 7 containers

We are willing to approve the method of shipment proposed by Mallinckrodt for the one transfer of material from St. Louis to Lynchburg. Not over 12 drums will be loaded into each truck, in square array (not stacked in transit or storage). In the meantime, for future such shipments, we suggest that the applicant justify transportation procedures on the basis of accepted references, with which the company is undoubtedly familiar.

HEB:DL&R	HEB:DL&R
CDLuke;jwl	CKBeck
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B-18