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*Mallinckrodt*  
FINE CHEMICALS  
Standard Since 1867

14 March 1958

Mr. Iqall Johnson  
Chief, Licensing Branch  
Division of Licensing & Regulation  
U. S. Atomic Energy Commission  
Washington, D.C.

SUBJECT: Special Nuclear Materials License No. SNM-33

Dear Mr. Johnson:

In answer to your letter of March 11 requesting additional information on our applications for amendment of our Special Nuclear Materials License No. SNM-33, we are pleased to reply as follows:

I. Pelleting Process

1. High assay material (above approximately 10%) has a "limited safe" batch size too small to be adequately blended in the large mechanical open pot blender. For these materials, blending with the lubricant and moisture necessary for proper pellet manufacture will be accomplished in a small household blender with similar mixing action. This blender has been found quite satisfactory for experimental blending at 1/2 pound batch size. The blender will be housed in the dust hood and operated at not more than a "limited safe" batch.
2. Two types of granulating equipment have been found entirely satisfactory for our purpose. One is a simple screen in which the blended powder containing lubricant and moisture is forced through a proper size screen for sizing. The other type of equipment is an approximately 3" diameter "meat grinder". In all cases, the "limited safe" batch used in the blending operation will be processed as a single batch through the granulating equipment to insure nuclear safety.
3. Following granulation, the individual "limited safe" batch of granulated oxide will be loaded into trays and not more than one "limited safe" batch will be placed in an oven at a given time. When the oven capacity is obviously greater than a single "limited safe" batch, we will install a slot type guard at the face of the oven to limit loading to a single bank of trays or a single batch, whichever is appropriate depending upon assay. This is the same technique used in our high assay plant for drying ammonium diuranate filter cake and approved in our previous applications.

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4. Following drying, the dried granulated press feed powder will be loaded into 1 gallon, wide mouth, polyethylene bottles having a 5" inside diameter up to an assay where the bottle will hold a "limited safe" batch. Above this assay, smaller polyethylene bottles adequate to hold a "limited safe" batch will be the container for transfer from the granulating and drying hood to the press. At high assays, the mechanical feed mechanism of the press, which has a capacity of about 3 gallons, will not be used. In these cases, the small polyethylene bottles holding a "limited safe" batch or less will be used for manually loading the die cavity. This technique will incur never more than a "limited safe" batch in or around the press at any given time.

## II. Hooded Grinding Operation

No questions.

## III. All-Assay UO<sub>2</sub> Production Facility

The question on this application has reference to the hydrolysis equipment. Two hydrolysis and precipitation tanks will be used - one for low assay material and one for high assay material. A single cylinder heating station on an accurate scale will be available. A single pump for circulation of the water and slurry will be installed. Flanged pipe connections have been designed to connect the cylinder heating station to either the low or high assay hydrolysis unit. Flanged pipe connections have been designed to connect the single pump to either the high or low assay hydrolysis tank. Before a cylinder can be removed from the locked position in the warehouse, the Manager and Foreman make an inspection of the piping arrangement in the hydrolysis hood to determine that the proper flange connections are installed and that the unused connections are removed from the system and the unused flange blanked off.

## IV. UO<sub>2</sub>F<sub>2</sub> and UO<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub> Facility

The shipping container for solutions or crystals of uranyl nitrate, uranyl fluoride, and uranyl sulfate will be polyethylene bottles made from 4-1/2" I.D. polyethylene pipe with suitable top and bottom pieces welded thereto. The wall thickness of the polyethylene is 3/16". The maximum outside dimension of the bottle and its fittings (at the top and bottom weld junction) is 4-15/16". We have designed stainless steel canisters 5" I.D. with flanged tops to receive these polyethylene bottles. We anticipate using two sizes of polyethylene bottles - one approximately 35" high and the other 13" high. These bottles and the stainless steel flanged container will be firmly placed inside birdcages which maintain 2 1/4" spacing between adjacent containers. In all cases the salt or solutions will have a U<sup>235</sup> density not to exceed 3.5 g/cc. If we interpret criticality data published by the AEC and its contractors properly, these dimensions and these concentrations give us an "always safe" geometry. We therefore anticipate no limit on weight shipped per container except the limit of the polyethylene bottle capacity.

Mr. Lyall Johnson  
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We sincerely hope that these answers will serve to clarify our applications and that the amendment to our License No. SPM-33 will issue shortly. If there is further information required prior to approval, we request that you call us, collect, so that we may eliminate further delays. Your cooperation is sincerely appreciated.

Very truly yours,

MALLINCKRODT CHEMICAL WORKS

W. M. Leaders  
Technical Director  
Special Metals Division

WML:dj

City of St. Louis)  
State of Missouri)<sup>SS</sup>

Subscribed and sworn to before me this                      day of                      1958

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Notary Public