

2 pgs

Docket 70-36  
Project S-8

Donald A. Nussbaumer, Chief  
Source & Special Nuclear Materials Branch

March 9, 1964

Charles D. Luke, Chief  
Criticality Evaluation Branch, DLR

UNITED NUCLEAR CORPORATION, CHEMICALS DIVISION - AMENDMENT TO  
PRODUCE AND SHIP 6.5% UO<sub>2</sub> PELLETS - DOCKET NO. 70-36  
DECEMBER 19, 1963

SYMBOL: DLR:RHO

UNC has requested a license amendment to convert UF<sub>6</sub> to UO<sub>2</sub> for U-235 enrichments up to 6.5 w/o U-235 in the Green Room and routinely utilize the Pellet Plant to produce uranium oxide pellets up to 6.5 w/o U-235.

In order to approve this license amendment request, it will be necessary for UNC to satisfactorily answer the questions concerning the Green Room, Pellet Plant and shipping containers that we raised in our memorandum, Luke to Nussbaumer, dated October 22, 1963. In addition, we request the following be sent to UNC:

"1. We consider the values reported in Figure 18 of HW-69273 to be non-conservative, for low enriched uranium metal rods, when compared with calculations based upon critical bucklings from Figure 6 of HW-69273 and conservative extrapolation distances. Using a safety factor of 0.85, we calculated a minimum safe thickness for an infinite slab of 5 w/o enriched uranium metal rods to be 3.1 inches. However, with allowance for the reduced reactivity of the oxide rod lattices compared with metal rods, we agree that 3.0" is a safe slab thickness for up to 6.5 w/o enriched (U-235) uranium oxide rod lattices moderated and reflected by light water.

"2. Because Figure 14 of HW-69273 does not extend up to 6.5 w/o enriched uranium metal rods, please confirm that when nuclear safety for 6.5 w/o enriched uranium oxide pellets depends on a safe mass quantity during processing, storage and/or shipping this safe mass limit will not exceed 700 g U-235 or submit a nuclear safety analysis justifying a greater U-235 safe mass limit."

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B-171

RHE  
3-6-67  
S-8

UNC, Hematite (Sec. , 1963 application)

UO<sub>2</sub> rods, light water moderated and reflected

Ltr, R.D. Stevenson to E.M. Shank (Eurochemie)  
Dtd February 3, 1967

Calculated Bucklings by Les Brown

U-235 Enrichment, %	2.7	3.9	5.0
max. Buckling, 10 <sup>-6</sup>	10,200	12,300	13,600
Rod dia. @ max. buckling, in.	0.63	0.46	0.39

linear extrapolation of the <sup>(very conservative)</sup> 3.9% and 5.0% pts.  
to 6.5% gives:  $B^2 = 15,300 \times 10^{-6} \text{ cm}^{-2}$   
using  $\lambda = 8.0 \text{ cm}$ .

$$t_c = \frac{\pi}{\sqrt{B^2}} - 2\lambda = \frac{\pi}{0.124} - 16.0$$

$$= 25.4 - 16.0 = 9.4 \text{ cm}$$

$$= 3.7 \text{ inches}$$

$$t_s = \underline{\underline{3.1 \text{ inches}}}$$

~~8/1~~