

Docket: J-36(M)  
Project: S-8

Donald A. Russbaumer, Chief  
Source & Special Nuclear Materials Br.

November 14, 1962

Charles D. Luke, Chief  
Criticality Evaluation Br.

UNITED NUCLEAR (CHEMICAL DIVISION), DOCKET 70-35

- References:
- (1) Application dated October 24, 1962
  - (2) CEB memo to BSMME, November 1, 1962
  - (3) Telecon with L. J. Swallow, November 15, 1962

We had recommended against the 5.25" ID shipping container as exceeding the 5" ID maxima for an infinite cylinder for uranium solutions or uranium compounds (maxima density 5.2 g/l), for any moderation, any enrichment and full water reflection (reference 2).

BE 1483  
10/27/65

Mr. Swallow (reference 3) stated he had taken credit for cylinder height, as permitted by Table IV, TID-7019. We accept this table as a criterion for the materials described in paragraph 1 above, and agree that 5.25" ID is a safe diameter for the 36 1/2" height.

Attachment:  
Ltr ltr-JJLane, 11/15/62

By CDZ 3/9/64  
Loading

$$.785(5.25)^2 \times 36.5 = 791 \text{ in}^3$$

$$\times 16.6 = 13,000 \text{ cc}$$

$$\approx 13 \text{ L}$$

$$\text{max wt} = 13 \times 3.2 = 41.6 \text{ kg}$$

of other leaks out  
5.25" dia inner  
set to 55 gal drum  
of plate thickness

Note: See CDZ  
Notebook for proof of  
solid angle Calc.

DLR:MS:CEB  
CDLuke/vj  
11/14/62

$$\text{Vol} = 13,000 \text{ cc} = 7.85(5.25)^2 \times t$$

$$t = \frac{13,000}{16.6 \times 398} = 1.99 \text{ in}$$

$$\text{or } t = 36.5 \times \frac{5.25}{22.5} = 1.99 \text{ in}$$

$$(D_{cyl,s} - 5) \text{ vs. } (H_{cyl,s} - 1.5)$$

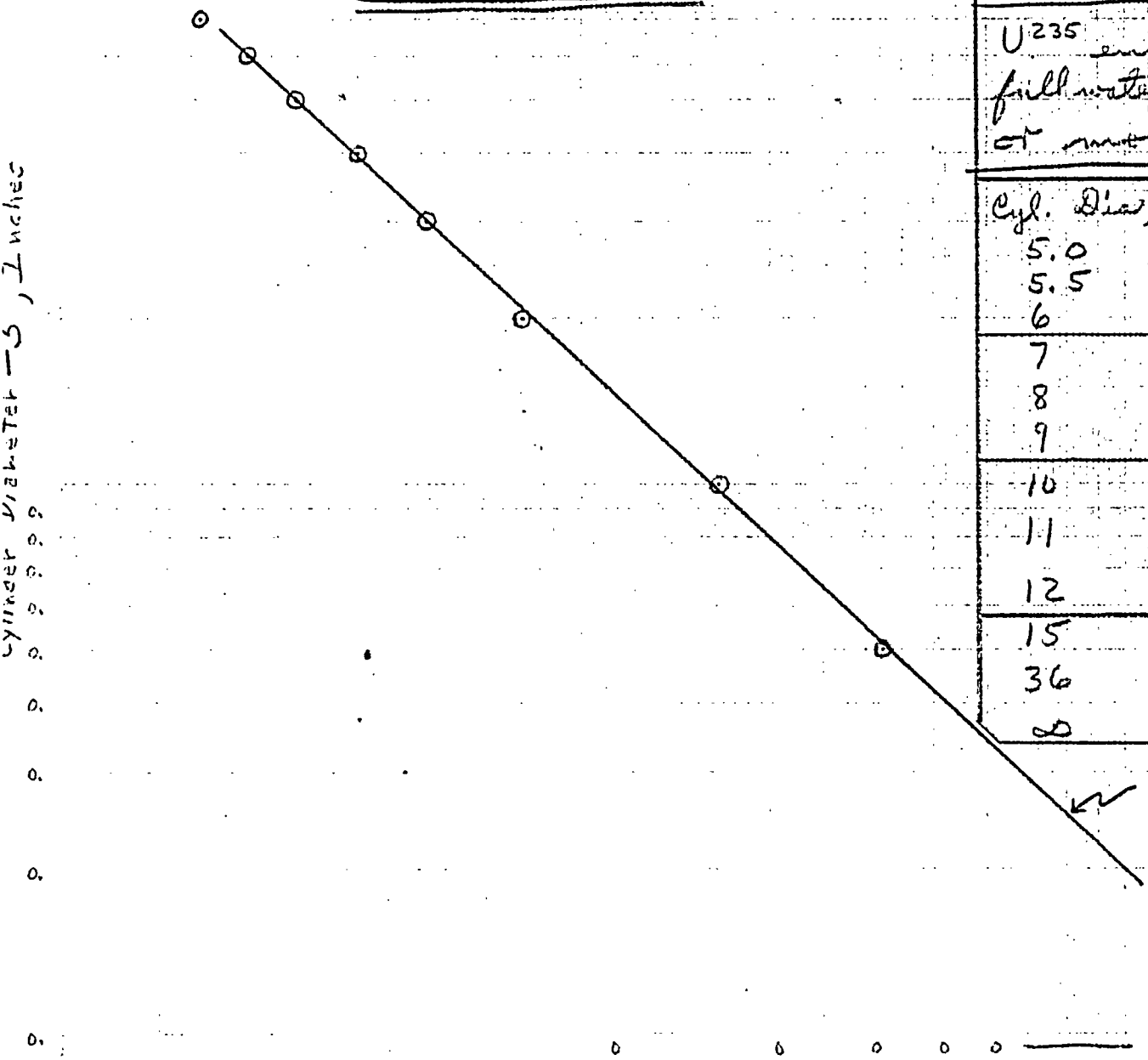
11-19-62  
E. L. Hall  
R

Safe Values

Graphs of table IV, p. 15, TID-7019

$U^{235}$  enriched U salts & solutions  
full water reflector - any enrichment  
or moderation (homogeneous)

Cyl. Dia, inch	Height, inch
5.0	$\infty$
5.5	33.7
6	17.6
7	8.5
8	6.2
9	5.0
10	4.2
11	3.7
12	3.3
15	2.6
36	1.7
$\infty$	1.5



for 5.25 in dia cyl.  
 $H = 70 + 1.5 = 71.5$  in

Cylinder Height - 1.5, Inches

Subject - United States - (Mallikrodt)

To confirm accept. size of 5.25 in  
dia. cyl. of height 36.5 in

11-14-62  
RHS

Docket 70-36  
appl. date Oct. 29, 1962

Constant-buckling conversion

$$\frac{(2.4048)^2}{(R + \lambda)^2} + \frac{\pi^2}{(H + 2\lambda)^2} = \frac{(2.4048)^2}{(R' + \lambda')^2}$$

$\lambda = 6.15 \text{ cm.}$  ( $H/D = 36.5/5.4$ ) from LAMS-2415, Fig. 27

$\lambda' = 6.35 \text{ cm.}$  (inf. cyl.)

$R' = 5.4 \times 2.54 / 2 \text{ cm.}$  (inf. cyl. radius critical)

$H = 36.5 \times 2.54 \text{ cm.}$

$R = ?$

$$\frac{5.78}{(R + 6.15)^2} + \frac{9.87}{(92.7 + 12.3)^2} = \frac{5.78}{(6.85 + 6.35)^2}$$

$$(R + 6.15)^2 = 5.78 / 0.0323 = 179$$

$$R + 6.15 = 13.38$$

$$R = 7.23 \text{ cm}$$

$$D_c = 14.46 \text{ cm or } 5.69 \text{ in}$$

$$D_s = 5.7 \left( \frac{5.0}{5.4} \right) = \underline{\underline{5.27 \text{ in}}}$$