3p82

Docket: 70-36(M)
Project: S-8

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November 14, 1962

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UNITED NUCLEAR (CHEMICAL DIVISION), DOCKET 70-36

References: (1) Application dated October 24, 1962
(2) CEB memo to SSNMB, 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 maximum for an infinite cylinder for uranium solutions or uranium compounds (maximum density 5.2 g/l), for any moderation, any enrichment and full water reflection (reference 2).

BE 1483
4/10/27/65

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:
Draft ltr-JJLane,11/13/62

DLR:MS:CEB

CDLuke/vj
11/14/62

B-114

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

11-14-62

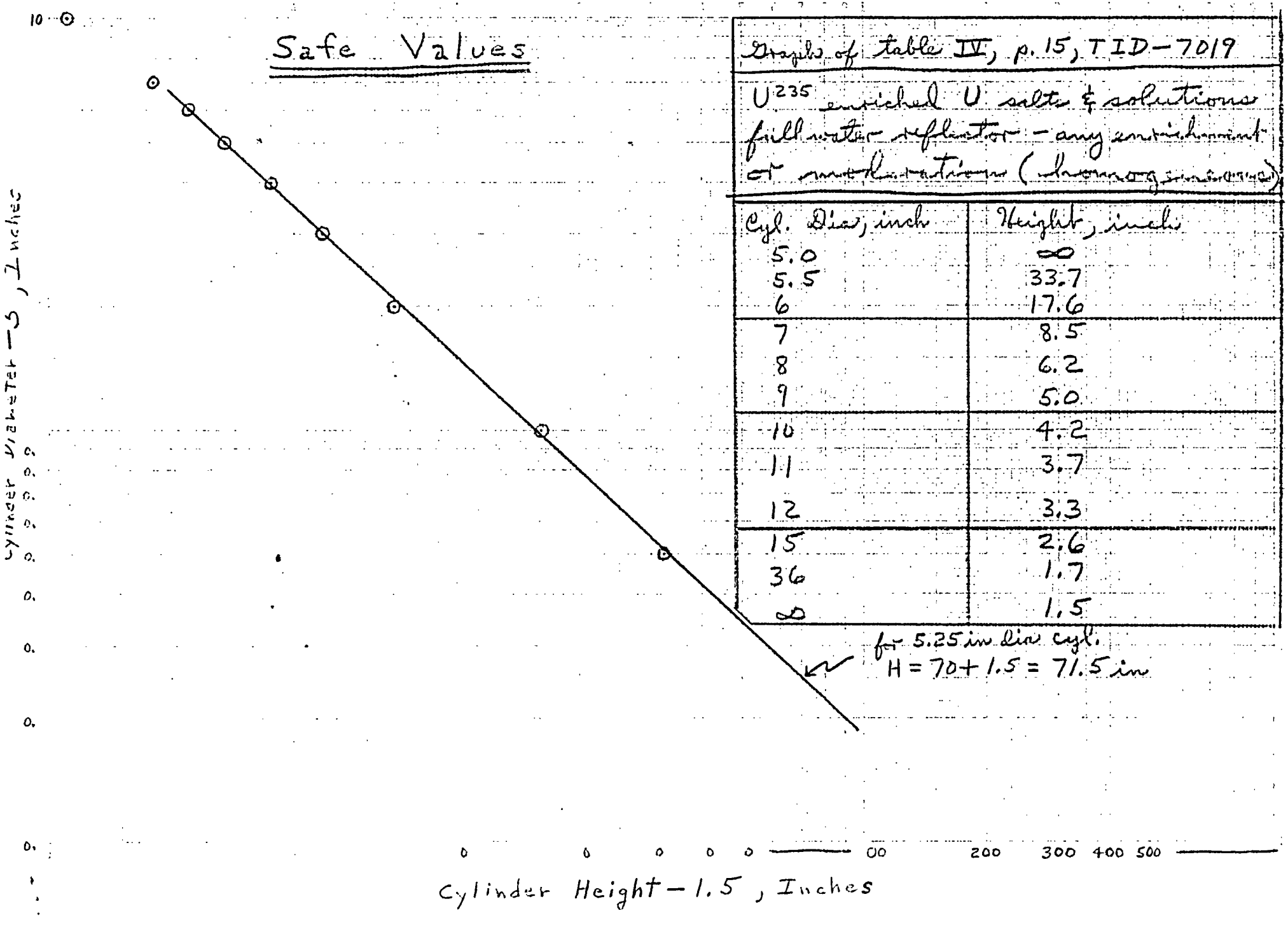
Safe Values

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

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

Cyl. Dia, inch	Height, inches
5.0	∞
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
∞	1.5

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



Subject – United Nuclear (Mallinckrodt)
To confirm acceptance 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

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

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

$\lambda' = 6.35$ cm. (inf. cyl.) " " " " "

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

$H = 36.5 \times 2.54$ cm.

$R = ?$

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

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

$R + 6.15 = 13.38$

$R = 7.23$ cm

$D_c = 14.46$ cm or 5.69 in

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