BOOK74R

Notes:
"Bk#5 2% & 3%" on front

"U(2) F_4 H/X = 614
U(3) F_4 H/x = 279" on spine

Please note that in order to "pick-up" the light red pencil markings, this logbook had to be copied on the darkest toner available. Therefore, there is a lot of dark background on the majority of pages.

Blank pages: page opposite page 1, 3, 24, 62, 72, 73, 89, 90, 92, 96, 106, 112, 114, 120, 174-186, 232-249, 262-265, 298, 300, inside back cover sheets

-pages 86, 87, 122, 124, 250, and 251 each have 1 sheet taped to it
-page 159 has 1 (8.5x11) graph sheet taped
-pages 161/162 has a paper clip at top
-pages 209 and 215 has 1 half sheet taped to each
-page 222 has 1 sheet taped to it
-page 265 has 3 sheets taped to it

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
August 26, 1999

E-13

Standard Blank Book

No. 38

Journals Double $ and Cts. no Units

S. E. Ledgers " " "

D. E. Ledgers Full Page Form "

Records with Margin Line

In 150 and 300 Pages

Made in U.S.A.

TO REORDER THIS BOOK, SPECIFY NUMBER, RULING AND THICKNESS AS INDICATED ON BACKBONE OF BOOK

A BOORUM & PEASE PRODUCT

U(2) F_4 and $C_{25}H_{52}$ blocks.

Analyses of materials received:

Reg #	Blend #	gU/g	% CH_2	Net U kg	Assay	U^{235} kg
378142	1	.60043	20.78	64.858	2.01	1.304
3	2	.600241	20.81	65.306	2.01	1.313
4	3	.593023	21.76	62.454	2.01	1.255
6	4	.595819	21.35	68.936	2.02	1.393
7	5	.603266	20.41	65.816	1.99	1.310
8	6	.595290	21.46	64.768	2.00	1.295
9	7	.599880	20.86	65.267	2.00	1.305
378150	8	.594346	21.59	76.195	1.99	1.516
1	9	.594739	21.54	66.046	2.00	1.321
Averages		0.59769 ± .00185 ± .3%	21.178	MT 599.646	2.0033	12.012

sp gr. from 144 samples 2.88259 ± .00009 (95% confidence)

gU/cc = 1.72313

$\frac{N^{28}}{N^{25}} = \frac{235}{238}\left(\frac{100}{2.0033}-1\right) = 48.30028$ $\quad \frac{N^{U}}{N^{25}} = \frac{N^{28}}{N^{25}}+1 = 49.30028$

$\frac{N^{25}}{N^{U}} = 0.020284$ $\quad gU/cc = (.21178 \times 2.88259 \frac{500}{352}) = .52035$

$\frac{N^{28}}{N^{U}} = 0.979716$

$\frac{N^{C}}{N^{28}} = \frac{.52035 \times 237.94}{12 \times 1.72313} = 5.98775$

$\frac{N^{H}}{N^{U}} = \frac{N^{C}}{N^{U}} \cdot \frac{N^{H}}{N^{C}} = 5.98775 \times \frac{52}{25} = 12.45452$

$\frac{N^{H}}{N^{25}} = \frac{N^{U}}{N^{25}} \cdot \frac{N^{H}}{N^{U}} = 614.01132$

$\frac{N^{F}}{N^{U}} = 4.0000$

2 Calculated by J. T. Thomas 14 Jan 66

U(3) F_4 and $C_{25}H_{52}$ blocks

Analysis of materials received.

Req. No.	Batch No.	g U / g	% Paraffin	% U^{235}	Net Wt. (g)
378215	1	0.64155	15.36	2.98	74,575
378216	2	.64254	15.23	2.98	85,275
378218	3	.64166	15.35	2.99	70,925
378220	5	.63992	15.58	3.01	81,900
378222	6	.63995	15.572	3.01	60,750
378223	7	.64069	15.474	2.98	60,075
378224	8	.64121	15.405	2.97	61,025
378225	9	.64183	15.324	2.97	61,000
378226	10	.64045	15.493	2.99	59,175
378227	11	.64323	15.138	2.93	60,410
378230	14	.64319	15.144	3.01	59,875
378231	15	.64068	15.474	2.99	56,450
378233	17	.64119	15.41	2.98	60,075
378234	18	.64154	15.36	2.99	60,625
378234	19	.64195	15.31	3.00	62,200
		avg .64144 ± .00097 ± .15%	avg = 15.375	2.98533 ± .02797	

$\rho = 3.4454$ g/cc ; $\rho(U) = 2.20998$ g U/cc ; % UF_4 = 84.625

$$\frac{N^{28}}{N^{25}} = \frac{235}{238}\left(\frac{100}{2.985} - 1\right) = 32.09115$$

$$N^U/N^{25} = 33.09115$$

$$N^{25}/N^U = 0.03022$$

$$N^{28}/N^U = 0.96978$$

$$g C/cc = .15375\{3.4454\}(0.85227) = 0.45147$$

$$\frac{N^C}{N^U} = \frac{0.45147}{12}\left(\frac{237.91}{2.20998}\right) = 4.05016$$

$$\frac{N^H}{N^U} = \frac{N^C}{N^U} \cdot \frac{N^H}{N^C} = 4.05016\left(\frac{52}{25}\right) = 8.42433$$

$$\frac{N^H}{N^{25}} = \frac{N^H}{N^U} \cdot \frac{N^U}{N^{25}} = 8.42433(33.09115) = 278.7708$$

$$\frac{N^F}{N^U} = 4.00$$

4 Source rotated at 0.147 rev/sec

Expt 1. Purpose Determine M_c for near cube geometry.
Check reactivity on 26×26×16" stack.

Expt 2. Stack now 26×26×24"

Expt 3. Put sheet of Plexiglas $15\frac{1}{2} \times 13\frac{1}{4} \times 1$ on south face of stack as in Expt 2. Use to raise neutron level and measure negative period. TMC 5 sec time interval

Expt 4 Moved $\frac{1}{4}$" BF_3 to top of table support struct. and placed 2" BF_3 in pig.
Stack same as Expt 3.

Expt 5 added $\frac{1}{4}$" × 12" × 12" to top of stack

2:

U(2) F_4 $1/x = 0.14$

U(2) Expt 1.

~~Instrument Check~~ on 10-13-65 Source 60 mcf

PM-1	Low Trip	OK	Trip OK
PM-2			OK
[illegible]	$> 3 \times 10^{-11}$	Motor Trip OK	Bldg Trip OK
[illegible]	$> 3 \times 10^{-10}$	OK	Red light ✓
[illegible]	Responds	JH	Bldg Alarm ✓
[illegible]	Responds	JH	Press. Diff. 0.18"
[illegible]		Motor Trip	

steel Only slight change in neutron level above background
$k << 1$.

Expt. 2.

$k \leq 1$ multiplication from $\ell_N = 20$.

Expt 3.

$k > 1$ scram on low level PM.

Rent; tubes together $k > 1$; removed Plexiglas - Measure negative period with TMC.

Expt 4 TMC

2:05 PM tubes together $k > 1$; Measured pos. period ~~0.2~~

Removed Plexiglas and meas. neg period ~~0.2~~

Expt 5

added $\frac{1}{4}$" x 12" x 12" to top of stack.

tubes together no reflector $k > 1$

Expt. 6 Removed top 4 additions have now 26×26×24" stack.
Examine count rate from ~~four~~ three counters to be used in period measurements. Have 3 detectors feeding TMC.
2 - 2" BF_3 and 1 - 1/4" BF_3

Expt. 7.
26×26×24" stack.
Reg. per. on TMC - U2-1 (5 sec ch)

Expt. 8.
26×26×24 1/4" less 1/4×2"×6" on one top corner S.E. and 1/4×2"×4" on other top corner S.W. of stationary table
Pos per. on TMC - U2-2 (5 sec ch)
T_{mN} = 84.687 sec → 11.230 ¢ T_{mc} = 85.626 sec → 11.137 ¢

U(2) 4/x = 61

Expr. 6

Instrument Check on 10-14-65 Source 10 mc β

PM-1		Low Trip	o/c	~~Alarm~~ Trip	o/c
PM-2				~~Alarm~~ Trip	o/c
IC-1	$>3\times10^{-11}$	Meter Trip	o/c	Test Trip	o/c
IC-2	$>3\times10^{-11}$	Meter Trip	o/c	Red light.	OK
IC-3	Responds	Calibration	JT	alarm	o/c
IC-4	Responds	Calibration	JT	Press diff	0.14"
~~CRM~~		Meter Trip			

Expr. 7

Table together $k > 1$ with Plexiglas

Removed plexiglas, $k < 1$, Neg pr. on TMC.

S.E.

S.W.

Expr. 8 Table together $k > 1$ no plexiglas.

Evaluate 1/4" ch.

Expn. 9 26×26×24 stack with 1/4" layer added. There is an overhang on east side at S.E. corner 2×8×1/4 and on South side in SW corner of 2×4×1/4.

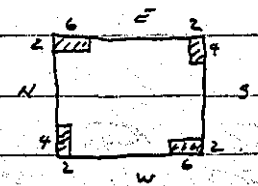
b>1 U2-3 (5 sec ch) $L_nN = 80.605$ sec → 11.657¢ ; TMC = 78.889 sec

Expn. 10 Stack same as Expn 9

U2-4 (1 sec ch)

$L_nN = 77.912$ sec → 11.956¢ ; TMC = 80.293 sec → 11.690¢

Expn. 11 Top 1/4" layer as in diagram shaded area absent.



U2-5 (5 sec)

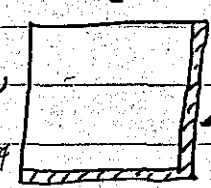
$L_nN = 80.084$ sec → 11.713¢ TMC = 78.911 → 11.843¢

Expn. 12 Same as 11, U-2-6 (1 sec ch)

TMC = 79.207 → 11.810¢

Expn 13 25×25×25" stack with plexiglass cell piece as above

Expn 14 25×25×25 1/2" hexo edges as shown on top



shaded area 1/2" × 1"

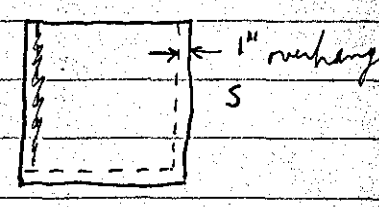
$L_nN = 277.231 \rightarrow 4.185¢$

b>1 U2-7 (5 sec ch) TMC = 273.240 → 4.239¢

b<1 U2-8 (5 sec ch) $L_nN = -111.592 \rightarrow -20.743¢$

TMC = -111.086 → -20.960¢

Expn 15 25×25×25 1/2" with 1" overhang on two sides of top 1/2" layer



b<1 U2-9 (1 sec ch)

$L_nN = -115.088 \rightarrow -19.386¢$ TMC = -110.583 → 24.180¢

Expn. 9.

Expn. 10.

Expn. 11.

Expn. 12

Expn. 13

Expn. 14

Expn. 15

U(2)F4 H/x - 6.1

Expt. 9

Instrument Check on 10-15-65 Source Cone 6

PM-1		Low Trip	OK	~~Alarm~~ Trip	OK
PM-2				~~Alarm~~ Trip	OK
IC-1	$>3\times10^{-11}$	~~Meter~~ Trip	OK	Fast Trip	OK
IC-2	$>3\times10^{-11}$	~~Meter~~ Trip	OK		
IC-3	Responds	Calibration			
IC-4	Responds	Calibration			
CRM		~~Meter~~ Trip			

Red light OK
alarm OK
Press diff 0.14"

Expt 9. tables together $k > 1$
$k = 1$ Table sep. = .072" (1.9 mm)
Check counting rate at 0.9 on IC-3

Expt 10. tables together $k > 1$

Expt 11. Table together $k > 1$

Expt. 12 " " $k > 1$

Expt 13 tables together $k << 1$

Expt 14 tables together $k > 1$ with plexiglass
Removed plexiglass $k < 1$

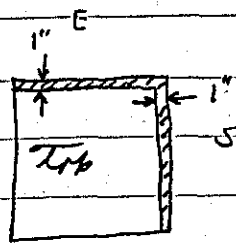
Expt 15 tables together $k > 1$ with plexiglass
Removed plexiglass $k < 1$

Expr 16 25 x 25 x 26" Stack

b > 1 V2-10 (5 sec Ch)

L_N = 94.676 → 10.313¢ TMC = 93.931 → 10.375¢

Expr 17 25 x 25 x 25 3/4" Stack, Shaded area → Thin part of stack.



26" high (Measured with meter stick (65.737 x 63.961 x 63.975 cm)

b < 1 V2-11 (10 sec Ch)

L_N = -560.238 → -2.492¢ TMC = -581.412 → -2.395¢

Expr 18 24 x 26 x 26"

b < 1 V2-12 (10 sec Ch)

L_N = -534.181 → -2.623 TMC = -554.930 → -2.518¢

Expr 19 24 x 26 x 26 1/4" (Meter stick 66.567 x 61.390 x 66.995 cm)

b > 1 V2-13 (5 sec Ch)

L_N = 98.150 → 10.28¢ TMC = 98.889 → 9.970¢

U(2)F1 11/K-614

Instrument Check on 10-18-65 Source 10 mcr

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 > 3X10"	Meter Trip OK	~~Fans~~ Trip OK	
IC-2 > 3X10"	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S J R.	Alarm OK	
IC-4 Responds	Calibration S J R.	Pressdif 0.14"	
CRM	Meter Trip		

Eqpt 16 b = 1 table separ. ~ 3.5 cm. IC-3 = .05 Bg. count check

b = 1 " " " IC-3 = 1.0 Counter check.

b > 1 tables together no plexiglass

Eqpt 17 b > 1 tables together with plexiglass refl.

b < 1 " " no plexiglass

Eqpt 18 Restacked. 24 x 26" base 8x26" on movable table

(95cm) 26" high

b > 1 table together with plexiglass refl.

b < 1 " " no plexiglass

Eqpt 19 b > 1 table together no plexiglass

Eqn 20 took stack down and restacked

24 x 26 x 26 1/4" (Meter stick 61.217 x 66.503 x 67.008 cm)

$k > 1$ U2-14

$\ln N = 60.801 \rightarrow 14.314\,¢$ TMC = 61.864 → 14.139 ¢

Repeat above.

$k > 1$ U2-15

$\ln N = 61.758 \rightarrow 14.206\,¢$ TMC = 62.074 → 14.105 ¢

Repeat above

$k > 1$ U2-16 (1 sec ch.)

$\ln N = 59.932 \rightarrow 14.461\,¢$ TMC = 61.361 → 14.221 ¢ Eqn

Eqn 21 24 x 26 x 26"

$k < 1$ U2-17

$\ln N = -1042.304 \rightarrow -1.296\,¢$ TMC = -1047.965 → -1.289 ¢

Eqn

Counting Ch #1, 1/4" BF_3

in cable rack, south of stack

Ch # 2, 2" BF_3 - # 1941, Preamp #r. , Amp. #. Y140347

On ledge SW corner of room

Ch # 3, 1/4" BF_3 thin tube

~ 6½' above floor, west of stack, ~ 5' west of edge of table

Ch # 4, 2" BF_3 - #. 1938,

On platform near N.E. corner.

U(2) F_4 $H/X = 614$

Instrument Check on 10-19-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip	OK
PM-2		Alarm Trip	
IC-1 $> 3 \times 10^{-11}$	Meter Trip OK	Test Trip	OK
IC-2 $> 3 \times 10^{-4}$	Meter Trip OK	Red light	OK
IC-3 Responds	Calibration S/B.	alarm	OK
IC-4 Responds	Calibration S/B.	Press. dif.	0.14"
GRM	Meter Trip		

Expt 20 Restacked 24x26" base ½ on each table

$b = 1$ Table sepan. ~ 2.25 rev. Check counts add 4th counter. ¼" BF_3 and adjust count rate ~ = others.

$b > 1$ table together no plexiglass

Expt 21 Removed ¼" from top

24 x 26 x 26"

$b > 1$ Table Together with plexiglass

$b <$ table together no plexiglass

Photomultiplier scrammed table on first try Probably loosened up stacks so this data is questionable.

Expt 22 24 x 26 x 26"

Repeat Expt 21

$t > 1$ U2-18

$\ln N = 1157.392 \rightarrow 1.0934$

Expt 2

U235 H/K

Instrument Check on 10-20-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	~~Test~~ Trip OK	
IC-2 > 3×10^{-11}	Meter Trip OK	Red light OK	
IC-3 Respond	Calibration S/R	alarm OK	
IC-4 Respond	Calibration S/R.	Press dif. 0.14"	
CRM	Meter Trip		

Eppn 22 tightened up stands and reran Eppn 21.

$k = 1$ with plexiglass table sepn. ~ 2.85 rev. Check counter

$k > 1$ tables together no plexiglass

TMC dropped several points on the print out
Shut down to have it checked.

Expt. 23 24 x 26 x 26 1/4" stack

Same as Expt 20 except stack was tightened up as much as possible

$k > 1$ V2 - 19 (1 sec)

$\ln N = 59.498 \rightarrow 14.534$ TMC = 60.044 → 14.442

Expt 24 24 x 26 x 26" $k > 1$ V2 - 20 (1 sec) with plexiglass

$\ln N = 24.755 \rightarrow 25.353\,¢$ TMC = 24.897 → 25.272¢

Expt 25 24 x 26 x 26" with plexiglass

$k > 1$ V2 - 21 (1 sec)

$\ln N = 27.143 \rightarrow 24.050\,¢$ TMC = 27.225 → 24.008¢

Expt 26 24 x 26 x 26" no plexiglass

$k > 1$ V2 - 22 (5 sec)

$\ln N = 1817.788 \rightarrow 0.703\,¢$ TMC = 1867.864 → 0.684¢

U(2) F_4 H/X = 6.14

Instrument Check on 10-22-65 Source 10 mcr

PM-1 Low Trip OK Hi Alarm Trip OK

PM-2 Alarm Trip

IC-1 3×10^{-11} Water Trip OK Fast Trip OK

IC-2 3×10^{-11} Water Trip ✓ Red light on o/2

IC-3 Response oK Calibration Alarm ABC oK

IC-4 Response oK Calibration Pres Dif 0.14

CRM Water Trip

24-X26X26-¼" Stack

Eqpt. 23 $b = 1$ Table separation ~ 2.24

$b > 1$ Table together no plexiglass

Chromel P-alumel thermocouple K-2 Pole

Temp 1.028 mv. = 78.53°F

Eqpt. 24 24X26X26" Stack A

$b > 1$ Table together with plexiglass

Eqpt Took data on TMC to plot for to determine dead time corr. Had to screw to prevent setting off alarms. this loosened up the stack so that it had to be packed together again.

Eqpt. 25 $b > 1$ table together with plexiglass

Eqpt. 26 $b > 1$ table together no plexiglass

$k = 1$ (0.97 revs) Temp 1.0223mV = 78.30°F

Expr 27 24x26x26" stack with al boxes and 3/4" steel plate on Top
b>1 U2-23 (1sec) no plexiglass
L_N = 64.710 → 13.693¢ TMC = 64.987 → 13.651¢

Expr 28 24x26x26" no plexiglass still have moisture used to support al boxes
b>1 U2-24 (5sec)
L_N = 212.152 → 5.301¢ TMC = 214.538 → 5.249¢

Expr 29 24x26x26" no plexiglass removed moisture
b>1 U2-25 (5sec)
L_N = 217.147 → 5.194¢ TMC = 220.551 → 5.124¢

Expr 30 24x26x26 1/4" no plexiglass
b>1 U2-26 (1sec)
L_N = 44.949 → 17.595 TMC = 46.034 → 17.320¢

Expr 31 24x26x26" no plexiglass
L>1 U2-27 (5sec)
L_N = 217.147 → 5.194 TMC = 219.819 → 5.139¢

Expr 32 24x26x26 1/4" no plexiglass
b>1 U2-28 (1sec)
L_N = 44.732 → 17.652 TMC = 45.756 → 17.390

Expr 33 24x26x26" no plexiglass b>1 U2-29 (5sec)
L_N = 215.627 → 5.226 TMC = 220.460 → 5.126

Expr 34 24x26x26 1/4" no plexiglass b>1 U2-30 (1sec)
L_N = 44.732 → 17.652 TMC = 45.126 → 17.550

V(2) Fy H/x = 614

Instrument Check on 10-25-65 Source 10 mcV

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 > 3x10⁻¹¹	Meter Trip OK	~~Part~~ Trip OK	
IC-2 > 3x10⁻¹¹	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration S/R.	alarm OK	
IC-4 Responds	Calibration S/R.	Pres Dif 0.14	
CRM	~~Trip~~ Meter Trip		

al boxes

Expt 27 24x26x26" Stack A with al boxes and ¾" x 4' x 4' steel plate on top
b > 1 no plexiglass table together.
11 AM Temp 0.8818 mv.

Expt 28 24x26x26" Stack A removed al boxes and steel plate
but left al support ~~the~~ resistant on table.
b > 1 Table together no plexiglass 12²⁵ temp 0.9112 mv.

Expt 29 24x26x26" Stack A removed resistant and ¾ support
al boxes on top of stack
b > 1 table together no plexiglass 1⁰⁰ PM temp 0.9185 mv.

Expt 30 24x26x26¼" Stack B 1⁴⁵ PM temp 0.9273 mv.
b > 1 table together no plexiglass

Expt 31 24x26x26" Stack A 2²⁰ temp 0.9380 mv.
b > 1 Table together no plexiglass

Expt 32 24x26x26¼" Stack B 2⁵⁰ PM temp 0.9340 mv
b > 1 tables together no plexiglass

Expt 33 24x26x26" Stack A 3²⁵ PM temp 0.9378 mv
b > 1 table together no plexiglass

Expt 34 24x26x26¼" Stack B 4⁰⁰ PM temp 0.9385 mv
b > 1 table together no plexiglass
b = 1 table separ ~ 2.2 cm.

Expt 35 $24 \times 26 \times 26\frac{1}{4}$" w/ plexiglass

$k > 1$ U2-31 (1 sec)

$L_N = 41.258 \rightarrow 18.607\,¢$ TMC = $42.351 \rightarrow 18.295\,¢$

Expt. 36 $24 \times 26 \times 26$"

$k > 1$ U2-32 (5 sec)

$L_N = 188.266 \rightarrow 5.878\,¢$ TMC = $193.941 \rightarrow 5.730\,¢$

Expt 37 $24 \times 26 \times 26\frac{1}{4}$"

$k > 1$ U2-33 (1 sec)

$L_N = 42.995 \rightarrow 18.116\,¢$ TMC = $43.197 \rightarrow 18.061\,¢$

Expt 38 $24 \times 26 \times 26$"

$k > 1$ U2-34 (5 sec)

$L_N = 190.003 \rightarrow 5.832\,¢$ TMC = $192.055 \rightarrow 5.778\,¢$

Expt 39 $24 \times 26 \times 26\frac{1}{4}$

$k > 1$ U2-35 (1 sec)

$L_N = 43.429 \rightarrow 17.997\,¢$ TMC = $43.518 \rightarrow 17.973\,¢$

Expt 40 $24 \times 26 \times 26$

$k > 1$ U2-36 (5 sec)

$L_N = 205.638 \rightarrow 5.446\,¢$ TMC = $203.505 \rightarrow 5.496\,¢$

Expt 41 $24 \times 26 \times 26\frac{1}{4}$

$k > 1$ U2-37 (1 sec)

$L_N = 43.429 \rightarrow 17.997\,¢$ TMC = $44.291 \rightarrow 17.767\,¢$

Expt 42 $24 \times 26 \times 26$ Stack A By meter stick (61.302 x 66.545 x 66.362 cm) (24.134 x 26.199 x 26.127 in.)

$k > 1$ U2-38 (5 sec)

$L_N = 206.289 \rightarrow 5.432\,¢$ TMC = $209.905 \rightarrow 5.350\,¢$

Expt 43 $24 \times 26 \times 26\frac{1}{4}$ ~~Stack~~ B By meter stick (61.302 x 66.545 x 67.115 cm) (24.134 x 26.199 x 26.423 in.)

$k > 1$ U2-39 (1 sec)

$L_N = 44.298 \rightarrow 17.766\,¢$ TMC = $45.025 \rightarrow 17.576\,¢$

Avg worth of $\frac{1}{4}$" of fuel from Expts U2-25 → U2-39 = $12.314 \pm 0.116\,¢$

U(2) F4 11/x = 6 14

Instrument Check on 10-26-65 Source 10 mcV

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3X10⁻¹¹	Meter Trip OK	East Trip OK	
IC-2 > 3X10⁻¹¹	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S.J.R.	Alarm A OK B off setting	
IC-4 Responds	Calibration S.J.R.	Pres Dif 0.14	
CRM	Meter Trip		

Expt 35 24x26x26¼" "Stack B"

b=1 table sepn ~2.29 cm. 9-14

b>1 table together no plexiglass temp 0.8554mV

Expt 36 24x26x26" Stack A

b>1 tables together no plexiglass

Expt 37 24x26x26¼" Stack B

b>1 tables together no plexiglass

Expt 38 24x26x26 Stack A

11:30 b>1 tables together no plexiglass

Expt 39 24x26x26¼ Stack B

12:57 b>1 tables together no plexiglass

Expt 40 24x26x26 Stack A

1:27 PM. b>1 tables together no plexiglass

Expt 41 24x26x26¼ Stack B

2:12 PM b>1 tables together no plexiglass

Expt 42 24x26x26 Stack A

2:46 PM b>1 tables together no plexiglass

Expt 43 24x26x26¼ Stack B

3:30 PM b>1 tables together no plexiglass

Stack C

Expt 44 $24 \times 26 \times 25\frac{3}{4}$ By metric (61.302 × 66.545 × 65.732 cm)
24.134 × 26.199 × 25.878

$t < 1$ U2-40 (5 sec)

$\ln N = -270.782 \rightarrow -5.623\phi$ TMC = $-276.008 \rightarrow -5.498\phi$

Expt 45 $24 \times 26 \times 26$

$t > 1$ U2-41 (5 sec)

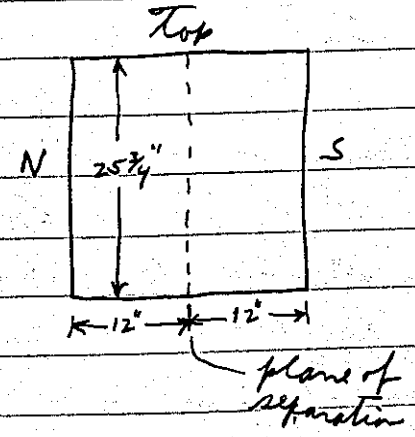
$\ln N = 145.488 \rightarrow 7.307\phi$ TMC = $147.157 \rightarrow 7.238\phi$

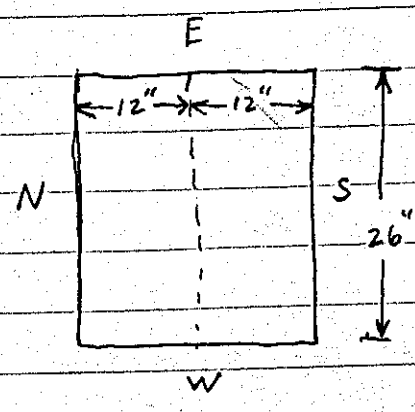
Expt 46 $24 \times 26 \times 25\frac{3}{4}$

$t <$ U2-42 (5 sec)

$\ln N = -266.439 \rightarrow -5.733\phi$ TMC = $-271.283 \rightarrow -5.611\phi$

Stack C





U(2) F_4 $H/X = 614$

Instrument Check on 10-27-65 Source 10 mc Y

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	~~Part~~ Trip OK	
IC-2 > 3×10^{-11}	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S/R.	alarm A+C OK B does not trip	
IC-4 Responds	Calibration S/R	Prec. dif 0.14	
CRM	Meter Trip		

Expt 44 $24 \times 26 \times 25\frac{3}{4}$" Stack C

10^{05}_{AM} $k < 1$ tables together no plexiglass

Expt 45 $24 \times 26 \times 26$" Stack D

10^{54}_{AM} $k > 1$ tables together no plexiglass

Expt 46 $24 \times 26 \times 25\frac{3}{4}$ Stack C

1^{33}_{PM} $k < 1$ tables together no plexiglass

Expt 47 $24 \times 26 \times 25\frac{3}{4}$ Stack C

To find plexiglass shim that can be used on drum to shim for critical mass

$\frac{1}{2} \times 26 \times 3\frac{3}{4}$" plex. $k < 1$

$1 \times 26 \times 6$" $k < 1$

$1 \times 26 \times \approx 9$" $k > 1$

U-235 F_4 $14/x = 614$

Instrument Check on 10-28-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1	> 3×10^{-4}	OK	Test Trip OK
IC-2	> 3×10^{-4}	OK	Redlight OK
IC-3	Responds	S/B	alarm OK
IC-4	Responds	S/B	Pres. sig 0.14
CRM	Meter Trip		

Stack C $24 \times 26 \times 25\ 3/4$"

Eppr 48 To Check worth of and operation of plexiglass shim on rod drive. $1 \times 12 \times 26$" piece of Plexiglass

$k > 1$ Table together and shim all the way in.

$k \neq 1$ Shim ~ 2" from stack.

$k = 1$ shim all the way in. Table separ. = 1.5 rev.

Eppr 49 To check worth of foil stringer

$k > 1$ table together, shim all the way in

$k = 1$ " " , shim ~ 2" from stack

Placed 7 Cd. foil covers in Al. stringer

$k > 1$ table together, shim all the way in

$k = 1$ " " , shim ~ 1/4" from stack

Expt 51 11 bare gold foils across center of stack
(2 mil, 5/16 dia, 48.7 mg)

	−10"	−8"	−6"	−4"	−2"	0	+2"	+4"	+6"	+8"	+10"
Foil #	H 30	H19	H 1	H 21	H 16	H 8	H 18	H10	H14	H 4	H 11
Ratio Foil/N	0.44295	0.63200	0.78050	0.89582	0.98684	1.0	0.96521	0.89705	0.76431	0.61221	0.42657

V(2) F4 H/X = 614

Instrument Check on 10-29-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3X10⁻¹¹	Meter Trip OK	Fast Trip OK	
IC-2 > 3X10⁻¹¹	Meter Trip OK	Redlight OK	
IC-3 Respond	Calibration S/R.	alarm OK	
IC-4 Respond	Calibration S/R	Pres dif 0.14	
CRM	Meter Trip		

Stack C 24x26x25 3/4"

Expr 50 To determine power level for Au foil activation runs.
1 gold foil (2 mil, 5/16" dia, 48.7 mg) at center of stack

9 33/AM b=1 Power = 10. on IC-3
9 52/AM Shut down.
Foil counted ~7800 on one counter and ~8300 on other in 1 min.

Expr 51 11 bare gold foils
11:14.5 Start time at 37.0 on IC-3
b=1 100 on IC-3, $2.6^{\times 10^{-8}}$ on IC-2, $\pm \overset{0.35 \times 10^{-7}}{\text{R}}$ on IC-1
11:39.5 Shut down.

Expt 52 11 bare gold foils (2 mil, 5/16" dia 48.7 mg)

-10	-8	-6	-4	-2	0	+2	+4	+6	+8	+10
H-7	H22	H15	H13	H6	H24	H12	H3	H23	H25	H-9
0.43553	0.62843	0.77956	0.89782	0.98522	~~0.98483~~ 1.0	0.96483	0.89204	0.76695	0.61485	0.42805

Expt 53 11 bare gold foils (2 mil, 5/16" dia, 48.6 mg)

G5	G18	G1	G13	G10	G26	G9	G7	G16	G11	G17
0.43993	0.63049	0.77513	0.90133	0.98174	1.0	0.9663	0.88851	0.76332	0.61437	0.42381

Expt 54 7 Cd. covered gold foils (2 mil, 5/16" dia, 48.6 mg)

	-9	-6	-3	0	+3	+6	+9
	G28	G20	G6	G15	G22	G24	G23
	0.52955	0.77785	0.95111	1.0	0.94354	0.78293	0.53803

U(z) F_4 $H/x = 614$

Instrument Check on 11-[illegible]-65 Source 10 mcY

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ _____ Alarm Trip _____

IC-1 $> 3 \times 10^{-11}$ Meter Trip OK ~~Rate~~ Trip OK

IC-2 $> 3 \times 10^{-11}$ Meter Trip OK Red light OK

IC-3 Responds Calibration S & R. Alarm OK

IC-4 Responds Calibration S & R. Pres. sig 0.15"

CRM _____ Meter Trip _____

Stack C $24 \times 26 \times 25\ 3/4$"

Expt 52 11 bare gold foils.

9:05, 20 sec Start time at 37.0 on IC-3

$b = 1$ 100 on IC-3, 2.6×10^{-9} on IC-2.

9:30, 10 sec Started T_1 expt. Table with screen. Opened 3 rev. (in 30 sec).

Shut down at 9:35

Expt 53 11 bare gold foils

11:26, 45 Start time at 37.0 on IC-3

$b = 1$ 100 on IC-3, 2.6×10^{-8} on IC-2

11.51, 45 sec Shut down.

Expt 54 7 Cd covered gold foils

2:24, 34 sec Start time at 37.0 on IC-3

$b = 1$ 100 on IC-3, 2.6×10^{-8} on IC-2

2:49, 34 sec Shut down.

Expt 55 — 7 Cd covered gold foils (2 mil, 5/16" dia., 48.6 mg)

-9"	-6"	-3"	0	+3"	+6"	+9"
G27	G8	G2	G19	G12	G21	G3
0.53081	0.77718	0.94848	1.0	.94790	0.78391	0.53855

Expt 56 — 7 Cd covered gold foils (2 mil, 5/16" dia., 48.8 mg)

J3	J4	J10	J16	J17	J11	J6
0.52563	0.77306	0.93664	1.0	0.94493	0.78583	0.53870

UCB Fy H/X = 614

Instrument Check on 11-2-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	~~Fast~~ Trip OK	
IC-2 > 3×10^{-11}	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration I.P.R.	alarm OK	
IC-4 Responds	Calibration I.P.R.	Pres dif. 0.15"	
CRM	Meter Trip		

Stack C

Expr. 55 7 Cd covered gold foil

9:13, 10 sec Start time at 37.0 on IC-3

$b = 1$ 100 on IC-3 and 2.6×10^{-3} on IC-2.

9:38, 10 sec Shut down.

Expr 56 7 Cd covered gold foil

1:01, 23 sec Start time at 37.0 on IC-3

$b = 1$ 100 on IC-3 and 2.6×10^{-3} on IC-2.

Expt. 58 11 bare foils 2% U in paraffin

-10"	-8"	-6"	-4"	-2"	0	+2"	+4"	+6"	+8"	+10"
C-2	C-6	C-4	C-11	C-18	C-24	C-21	C-5	C-16	C-40	C-31
0.42480	0.62164	0.77270	0.90363	0.98406	1.0	0.95376	0.89548	0.75918	0.60782	0.42483

Expt. 59 11 bare foils 2% U in paraffin

~~C-1~~	~~C-3~~	~~C-7~~	~~C-9~~	C-10	C-12	C-13	~~C-14~~	C-15	C-17	C-19
C-19	C-17	C-15	C-14	C-13	C-12	C-10	C-9	C-7	C-3	C-1
0.43430	0.62907	0.78259	0.90806	0.99176	1.0	0.97118	0.90156	0.76373	0.61431	0.42271

V(2)F4 H/K = 617

Instrument Check on 11-3-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3X10-"	Meter Trip OK	Beat Trip OK	
IC-2 > 3X10-"	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration S/R	alarm OK	
IC-4 Responds	Calibration S/R	Press diff 0-15"	
CRM	Meter Trip		

Stack C

Expt 57 1 bare 2% U in paraffin

10:54 Start Time at 3.7 on IC-3

b = 1 10 on IC-3, 2.98 on IC-2

11:05 Shut down.

Expt 58 11 bare foils 2% U in paraffin

1:11, 52 sec Start time at 3.7 on IC-3

b = 1 ? on IC-3, 2.50 on IC-2

1:21, 52 sec Shut down.

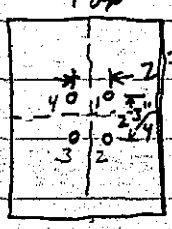
Expt 59. see page 32 for data

Expt 60 11 bare foil of 2% Enriched U in paraffin

-10"	-8"	-6"	-4"	-2"	0	+2"	+4"	+6"	+8"	+10"
C-20	C-25	C-29	C-34	C-37	C-39	C-38	C-36	C-32	C-27	C-22
0.43125	0.63283	0.77912	0.89121	0.99460	1.0	0.96015	0.90099	0.77206	0.61475	0.41845

Expt

Expt 61



2 Cd covered and 2 bare Au. foils
(2 mil, 7/16" dia, 48.8 mg)

Expt

Position	1	2	3	4
	J-8 Bare	J-12 Cd.	J-2 Bare	J-13 Cd.
Cd Ratio =	1/4 = 3.63020		3/2 = 3.66336	
	1/2 = 3.59451		3/4 = 3.67629	

Expt

avg Cd Ratio = 3.64109 for 2 mil Au

U(2) F_4 $H/x = 614$

Instrument Check on 11-4-65 Source 10 mcV

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	$> 3 \times 10^{-11}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-11}$	Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	S. f. R.	alarm	OK
IC-4	Responds	Calibration	S. f. R.	Press lit	0.14"
CRM		Meter Trip			

10"

-22

11845

Stack C

Eppn 59 11 bare foils 2% Enriched U in paraffin.

8:47,9 Start time at 7.4 on IC-3

$t_b = 1$ 20 on IC-3, $5.6^{\times 10^{-9}}$ on IC-2

8:57,9 Shut down

Eppn 60 11 bare foils of 2% Enriched U in paraffin

10:48,22 sec Start time at 7.4 on IC-3

$t_b = 1$ 20 on IC-3,

10:58,22 sec Shut down.

Eppn 61 To meas. Cd ratio. 2 Cd covered and 2 bare Au. foils.

1:27 PM Start time at 37 on IC-3

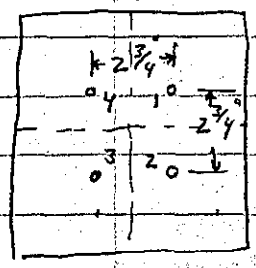
$t_b = 1$ 100 on IC-3 and 2.6+ on IC-2

1:52 PM Shut down

Expt 62 11 Bare foils of 2 % Enriched U in paraffin

-10"	-8"	-6"	-4"	-2"	0	+2"	+4"	+6"	+8"	+10"
B-1	B-2	B-3	B-5	B-7	B-0	B-10	B-9	B-8	B-11	B-12
0.43456	0.62207	0.80259	0.88131	0.98268	1.0	0.97606	0.89437	0.78296	0.62052	0.43093

Expt 63 top



2 Cd covered and 2 bare In foils 9.3 w/o In-Al alloy (9 mil, 5/16") Expt

Pos. 1	2	3	4
Foil 11 Bare	12 Cd	22 Bare	13 Cd
1/4 = 2.24501		3/2 = 2.25156	
1/2 = 2.23453		3/4 = 2.26157	
Avg Cd ratio for In = 2.24816			

Expt

Expt 64 2 Cd covered and 2 bare gold foils (5 mil, 5/16", 4)

512 Bare	510 Cd	511 Bare	504 Cd
1/4 = 4.50276		3/2 = 4.48310	
1/2 = 4.48426		3/4 = 4.51147	
Avg Cd ratio for 5 mil Au = 4.49539			

Expt

Stack C V(2) F_4 H/X = 614

Instrument Check on 11-5-65 Source 10 mCi

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	> 3×10^{-4}	Meter Trip	OK	~~Test~~ Trip	OK
IC-2	> 3×10^{-4}	Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	S/R	alarm	OK
IC-4	Responds	Calibration	S/R	Pres. sig	0.15"
CRM		Meter Trip			

Data from Foils in positions +2" and -2" show upto 3.5% asymmetry. For this reason the 4"x4" blocks in this region were changed on both table.

Eppa 62 11 bare foils of 2% Enriched U in paraffin
9:28,40 sec Start time at 7.5 on IC-3
b = 1 20 on IC-3 and -5.6×10^{-9} on IC-2
9:38,40 Shut down

Eppa 63 To meas. Cd ratio for Indium
11 49 Start time at 7.5 on IC-3
b = 1 20 on IC-3 and 5.6×10^{-9} on IC-2
11 59 Shut down

Eppa 64 To meas. Cd. ratio for 5 mil gold foils
1:30,33 sec Start time at 11 on IC-3
b = 1 30 on IC-3 and 7.3×10^{-9} on IC-2
1:55,33 Shut down

Expt 65 2 Cd covered and 2 bare U -Al foils

Pos (see Expt 63)	1	2	3	4
	1 bare	2 Cd	3 Bare	4 Cd
	1/4 = 22.99238		3/2 = 22.09494	
	1/2 = 22.26399		3/4	

Expt 6

Expt 66 Repeat of Expt 65

	1 bare	2 Cd	3 Bare	4 Cd.
	1/4 = 22.94792		3/2 = 22.18480	
	1/2 = 22.52356		3/4 = 22.01609	
avg of Expt 65 and 66	1/4 = 22.97015		3/2 = 22.13987	
	1/2 = 22.39377		3/4 = 22.01609	

Expt 6

avg Cd Ratio = 22.37997 for U -Al

Expt

Expt 67 2 Cd covered and 2 bare gold foils
(1 mil, 5/16")

Rod w/ foils Position	402 Bare	406 Cd	407 bare	408 Cd.
Cor. for foil Wt.	1/4 = ~~3.05260~~ 3.05266		3/2 = ~~3.00581~~ 3.03134	
	1/2 = ~~3.01445~~ 3.02990		3/4 = ~~3.03077~~ 3.04978	

avg Cd ratio for 1 mil Au = ~~3.02584~~ 3.03864 ± 0.0133

U(2) F_4 H/x = 614

Instrument Check on 11-8-65 Source 10 mCi

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	~~Fast~~ Trip OK	
IC-2 > 3×10^{-11}	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration L/R-	Alarm OK	
IC-4 Responds	Calibration L/R	Pressure diff 0.15"	
CRM	Meter Trip		

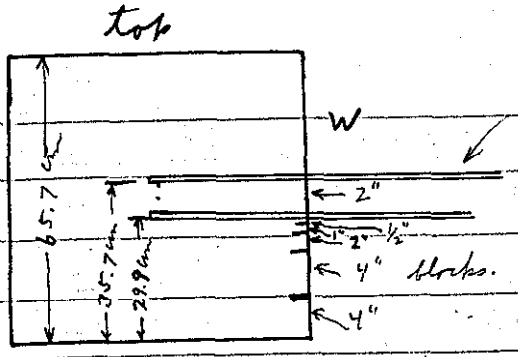
Stack C

Expt 65 To meas. Cd ratio for 9 mil U.-Al foils.
9:47, 38 sec Start time at 37 on IC-3
$b = 1$ at 100 on IC-3 and 3.0×10^{-8} on IC-2
10:07, 3F Shut down

Expt 66 Repeat of Expt 65.
12:39, 5 sec Start time at 37 on IC-3
$b = 1$ at 100 on IC-3 and 3.0×10^{-8} on IC-2
12:59, 5 Shut down

Expt 67 To meas. Cd ratio for 1 mil gold foil
2:59, 30 sec Start time at 37 on IC-3
$b = 1$ at 100 on IC-3 and 3.1×10^{-8} on IC-2
3:24, 30 sec Shut down.

Expt 69 –



1 U^{238} detector in top position (painted with red pigment)

Expt 69 Ch #1 with U^{238} = 5855/30min 1166.655
Ch #2 with U^{235} = 683076/30min

Expt #70 Ch #1 with U^{235} = 706610/30min 1232.102
Ch #2 with U^{238} (on top) = 5735/30min

Expt #71 Ch #1 With U^{235} (on top) = 7175/315/30min 1257.724
Ch #2 with U^{238} = 5705/30min

Expt 72 Ch #1 With U^{238} = 5885/30min 1210.963
Ch #2 With U^{235} (on top) = 712651/5/30min
Not cor. for dead time → avg 1216.861

U^{235} detector — No. 5-3, 97.34% U^{235}, 0.3379 mg U^{235}

U^{238} detector — No. 8-2, ~ 7 ppm of U^{235}, 0.3989 mg U

see pp. 80 + 82

U(2) F_4 H/x = 614

Instrument Check on 11-10-65 Source 10 mcV

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 > 3X10⁻⁹	Meter Trip OK	~~Rate~~ Trip OK	
IC-2 > 3X10⁻⁹	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S.J.A.	Pres Sig 0.15	
IC-4 Responds	Calibration S.J.A.	alarm OK	
CRM	Meter Trip		

Stack E 24X26X25 3/4"

Expr. 68 Have restacked top south 1/4 of stack and put a 1/4" V^{235} fission ch. and a 1/4" U^{238} fission ch. in center of stack. separated vert. by 2".

Counting channel #1 — Amp Y102542, Scalar Y120248, Pre Amp 696

" " #2 — Amp. Y102541, Scalar Y120242, Pre Amp 694

Check counters { Ch #1 with U^{235} = 127405/5 min
Ch #2 with U^{238} = 1035/5 min
→ power = 5.4 ~~on~~ on 3X10⁻⁹ scale on IC-2

Switch Amps. { Ch #1 with U^{238} = 1035/5 min
Ch #2 with U^{235} = 125105/5 min
→ power = 5.35 on 3X10⁻⁹ scale on IC-2

Expr 69 Power = 5.0 on 3X10⁻⁹ Scale IC-2

Expr 70 Power = 5.0 on 3X10⁻⁹ Scale IC-2

Expr 71 Power = 5.0 on 3X10⁻⁹ Scale IC-2

Expr 72 Power = 5.0 on 3X10⁻⁹ scale IC-2

Expt 73 24 x 26 x 24" high plus 6" polyethylene on Top.
$k << 1$

Expt 74 24 x 26 x 24 1/4" high plus 6" poly. on Top.
$k < 1$

Expt 75 24 x 26 x 24 1/2" high plus 6" poly. on Top.
$k > 1$
$\ln N = 1057.504 \rightarrow 1.1924$ ¢

Expt 76 24 x 26 x 24 1/2" high plus 6" ~~poly~~ paraffin on Top
(paraffin ~ 1/2" narrower than poly in 24" dim.)
$k > 1$
$\ln N = 2813.244 \rightarrow 0.4574$ ¢

Expt 7

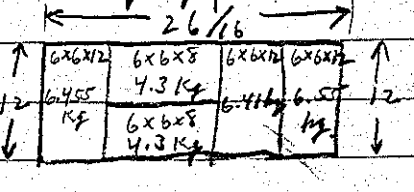
Expt 7

Expt 7

Expt 7

Density of polyethylene calc. from dimen. and weight of one block = 0.91997 g/cc

Density of stack shown below = 0.91484 g/cc



U(2 F4 H/x = 614

Instrument Check on 11-11-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3 x 10⁻¹¹	Meter Trip OK	Test Trip OK	
IC-2 > 3 x 10⁻¹¹	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S f R	alarm OK	
IC-4 Responds	Calibration S f R.	Pres dif 0.15"	
CRM	Meter Trip		

Eqn 73 Tables together $b \ll 1$

Eqn 74 Table together $b > 1$ with plexiglass shim
$b < 1$ no plexiglass

("dim.)

Eqn 75 Table together no plexiglass
$b > 1$

Eqn 76 Table together no plexiglass
$b > 1$

Expt 77 22 x 24 x 22" high stack plus 6" of polyethylene on top and sides and 6" of plexiglass on bottom.
$k_\infty > 1$

Expt 78 22 x 24 x 21 3/4" plus poly and plexiglass refl as above.
$k > > 1$

Expt 79 22 x 24 x 21 1/2" plus poly. and plexiglass refl as above
$k > 1$ + 20.274 ¢
$\ln N = 36.046 \rightarrow 20.274$

Expt 80 22 x 24 x 21 1/4" plus poly. and plexiglass refl as above.
$k > 1$ + 6.532 ¢
→ Stack F Measured with meter stick (56.315 x 61.287 x 54.377 cm / 22.171 x 24.128 x 21.403 in)

Instrument Check on 11-12-65 Source 10 mcr

PR-1	Low Trip OK	Alarm Trip OK	
PR-2		Alarm Trip	
IC-1 > 3×10^{-4}	Meter Trip OK	Beep Trip OK	
IC-2 > 3×10^{-4}	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration S & R	alarm OK	
IC-4 Responds	Calibration S & R.	Press dif 0.15"	
CRM	Meter Trip		

Eqn 78 tables separated by ~ 4 rev.
$b > 1$

Eqn 78 tables separated by ~ 1.2 rev.
$b > 1$

Eqn 79 tables together
$b > 1$

Eqn 80 tables together
$b > 1$

Stack F

Expt 81 22 x 22 x 22" high stack plus 6" of polyethylene on top and sides and 6" of plexiglass on bottom
$b \ll 1$

Expt 82 22 x 22 x 23" high stack plus 6" of polyethylene on top and sides and 6" of plexiglass on bottom
$b > 1$ +4.638¢

Stack G → Measured with meter stick $\left(\frac{56.298 \times 56.293 \times 58.770\text{cm}}{22.165 \times 22.163 \times 23.138\text{in.}}\right)$

Expt

Expt

U2 Fy A/x = 614

Instrument Check on 11-15-65 Source 10 mcr

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	~~Test~~ Trip OK	
IC-2 > 3×10^{-4}	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration 1 MR.	alarm OK	
IC-4 Responds	Calibration 1 MR.	Presently 0.15"	
GRM	Meter Trip		

Expt 81 Have restacked fuel table target 10 x 22 x 22. With 12 x 22 x 22 on movable machine a 22 x 22 x 22" stack. Tables together

$k << 1$

Expt 82 tables together Stack G

$k > 1$

Expt 83 22 x 22 x 40" high bare stack.
$k < 1$

Expt 84 22 x 22 x 42" high
$k > 1$ $\ln N = 46.317 \rightarrow 17.250\,¢$

U(2) F4 H/X = 614

Instrument Check on 11-16-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3 x 10⁻¹¹	Meter Trip OK	~~Rate~~ Trip OK	
IC-2 > 3 x 10⁻¹⁴	Meter Trip OK	Red light OK	
Ic-3 Responds	Calibration S/A	alarm OK	
IC-4 Responds	Calibration S/A	Press dif 0.15"	
CRM	Meter Trip		

Eqn 83 tables together

$b < 1$

Eqn 84 tables together

$b > 1$

$b = 1$ tables separated 2.9 rev.

Expt 87 21x21x66" high

$k > 1$

$\ln N = 629.725 \rightarrow 1.960\,\phi$

Expt

Expt

Expt

U(2) F_4 $H/x = .14$

Instrument Check on 11-17-65 Source 10 mcr

PM-1	Low Trip	OK	Alarm Trip OK
PM-2			Alarm Trip
IC-1 $> 3 \times 10^{-11}$	Meter Trip	OK	~~Alarm~~ Trip OK
IC-2 $> 3 \times 10^{-11}$	Meter Trip	OK	Red light OK
IC-3 Responds	Calibration	S.J.R.	alarm OK
IC-4 Responds	Calibration	S.J.R.	Pre disp 0.15"
CRM	Meter Trip		

Eppn 85 21×21×52" high Tables together $b \ll 1$

Eppn 86 21×21×60" high Tables together $b < 1$

Eppn 87 21×21×66" high

Tables together $b > 1$

Eqm 88 21 X 22 X 50'

$b > 1$ U2-88 (5 sec)

$L_n N = 178.929 \rightarrow 6.139\,\phi$ TMC = 178.942 → 6.139 ¢

V(2) F4 H/x = 614

Instrument Check on 11-18-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3 X 10⁻¹¹	Meter Trip OK	~~Rate~~ Trip OK	
IC-2 > 3 X 10⁻¹¹	Meter Trip OK	Red light OK	
IC-3 Respond	Calibration ~ 1/2.	alarm OK	
IC-4 Respond	Calibration ~ 1/2.	Pressdiff 0.15"	
CRM	Meter Trip		

Eff. 88 21 x 22 x 50" high Stack - Stack H

Check 4 counters connected to TMC and position so ~ same count rate in each counter.

1 to 1 tables together not plexiglass

Stack H

Expt 89 21 x 22 x 50" Stack (53.842 x 56.345 x 127.546 cm) (21.198 x 22.183 x 50.215 in)

b > 1 V2 - 89 (5 sec)

L_N = 143.751 → 7.380 ¢ TMC = 141.460 → 7.479 ¢

Expt 90 21 x 22 x 49" Measured with meter stick (53.842 x 56.345 x 125.006 cm) (21.198 x 22.183 x 49.215 in)

b < 1 V2 - 90 (10 sec)

L_N = -1825.002 → -0.729 ¢ TMC = -1909.152 → -0.696

Expt 91 21 x 22 x 50"

b > 1 V2 - 91 (5 sec)

L_N = 144.185 → 7.362 ¢ TMC = 146.057 → 7.283 ¢

Expt 92 21 x 22 x 49"

b < 1 V2 - 92 (10 sec)

L_N = -742.642 → -1.847 ¢ TMC = -759.706 → -1.803 ¢

Expt 93 21 x 22 x 50"

b > 1 V2 - 93 (5 sec)

L_N = 160.689 → 6.724 ¢ TMC = 162.520 → 6.661 ¢

Expt 94 21 x 22 x 49"

b < 1 V2 - 94 10 sec

L_N = -896.816 - 1.516 ¢ TMC = -940.344 → -1.442 ¢

U(2)Ty 11/x - 19

Instrument Check on 11-19-65 Source 10mcr

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 > 3X10⁻⁴ Meter Trip OK Feat Trip OK

IC-2 > 3X10⁻⁴ Meter Trip OK Red light OK

IC-3 Responds Calibration S/R Alarm OK

IC-4 Responds Calibration S/R Pres. dif 0.15"

CRM _____ Meter Trip _____

Expt 89 21x22x50" Stack separated ~2.2 sec.
b=1 Check counter
tables together b>1 no plexiglass

Expt 90 21x22x49" Stack
b<1 Table together no plexiglass

Expt 91 21x22x50" Stack
b>1 tables together no plexiglass

Expt 92 21x22x49" Stack
b<1 tables together no plexiglass

Expt 93 21x22x50" Stack
b>1 Tables together no plexiglass

Expt 94 21x22x49" Stack
b<1 tables together no plexiglass

Expt 95 — 21x22x49"
b>1 V2-95 (5 sec)
Log N — T = 1233.50 sec, ρ = 1.027¢
TMC = 1226.864 → 1.033¢

Expt 96 — 21x22x50"
b>1 V2-96 (5 sec)
Log N — T = 112.916 sec, ρ = 8.980¢
TMC = 113.358 → 8.952¢

Expt 97 — 21x22x49"
b<1 V2-97 (10 sec)
Log N — T = -6687.07 sec, ρ = -~~0.197~~¢
TMC = -7298.957 → -0.180¢

Expt 98 — 21x22x50"
b>1 V2-98 (5 sec)
Log N — T = 137.888 sec, ρ = 7.638¢
TMC = 138.175 → 7.625¢

Expt 99 — 21x22x49"
b<1 V2-99 (5 sec) Log N → T = -2034.19 sec, ρ = -0.652¢
TMC = -2153.021 → -0.616

Expt 100 — 21x22x50"
b>1 V2-100 (5 sec) Log N → T = 144.837 sec, ρ = 7.334¢
TMC = 146.992 → 7.245

Expt 101 — 21x22x50" plus mock up of support struct. on top.
b>1 V2-101 (5 sec) Log N → T = 153.088 sec, ρ = 7.003¢
TMC = 155.744 → 6.903

Expt 102 — 21x22x50" b>1 V2-102 (5 sec) Log N → T = 196.735 sec ρ = 5.659¢
TMC = 201.812 → 5.536¢

U(2)F4 11/x = 614

Instrument Check on 11-22-65 Source 10 mcr

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 > 3x10⁻¹¹ Meter Trip OK Fan Trip OK

IC-2 > 3x10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S/R alarm OK

IC-4 Responds Calibration S/R Pres dif 0.15"

CRM _____ Meter Trip _____

Expt 95 21x22x49" stack

k = 1 table span ~ 4.0 cm. with plexiglass.

check counter.

k > 1 tables together no plexiglass

Expt 96 21x22x50" stack

k > 1 tables together no plexiglass

Expt 97 21x22x49"

k < 1 table together no plexiglass

Expt 98 21x22x50"

k > 1 tables together no plexiglass

Expt 99 21x22x49"

.652¢ k < 1 table together no plexiglass

Expt 100 21x22x50"

k > 1 tables together no plexiglass

34¢ Expt 101 21x22x50" added to tops and 3/4"x4'x4' steel plate on top to simulate support structure.

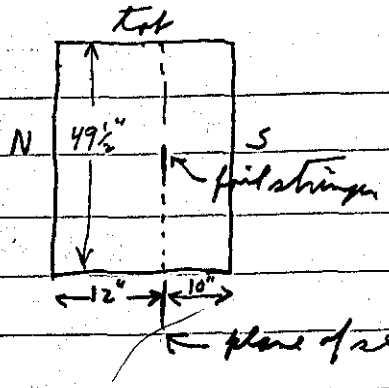
k > 1 tables together no plexiglass

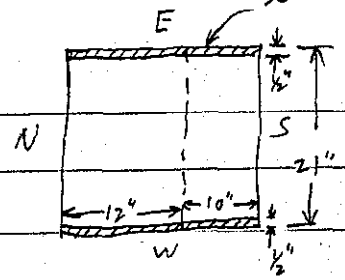
03¢ Expt 102 21x22x50" Removed N. tops

k > 1 tables together no plexiglass

735 and .594¢ Avg worth of 1" of fuel in 21x22" stack from Expts 89-100 = 8.277 ± 0.456 ¢

Expt 103





foils at center of stack in vertical direction.

Expt 104 9 bare foils 2% Enriched U in paraffin

-8"	-6"	-4"	-2"	0"	+2"	+4"	+6"	+8"
B-20	B-10	B-11	B-34	B-0	B-2	B-37	B-40	B-3
0.46555	0.68716	0.87273	0.97189	1.0	0.96277	0.85527	0.67868	0.43705

U(2) F_4 H/X = 514

Instrument Check on 11-23-65 Source 10 mcV

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 $>3\times10^{-11}$	Meter Trip OK	~~Last~~ Trip OK	
IC-2 $>3\times10^{-11}$	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S/A	Alarm OK	
IC-4 Responds	Calibration S/A	Prec lif 0.15"	
CRM	Meter Trip		

Eppr. 103 To determine stack to run foils in and to adjust plexiglass shim on rod drive.

21 X 22 X 49½" less ½" x 1" x 22" on top in 21" dimension produces a stack ~~that~~ that can be held critical with shim and with the al foil stringer with 9 U(2%)-paraffin foils in stack.

k = 1 Table together plexiglass shim ~ 3" from stack.

Eppr. 104 9 bare foils 2% Enriched U in paraffin

12:52 Start rise at 7.4 on IC-3

k = 1 20 on IC-3, 8.3 on 3×10^{-8} on IC-2

1:02 Shut down

Expt 105 7 bare foils 2% U in paraffin

-6"	-4"	-2"	0	+2"	+4"	+6"
B-15	B-33	B-31	B-8	B-17	B-30	B-29
0.69798	0.85630	0.97174	1.0	0.97999	0.83817	0.66702

Expt 106 7 bare foils 2% U in paraffin

B-7	B-22	B-44	B-26	B-9	B-13	B-12
0.68786	0.85483	0.97370	~~0.96755~~ 1.0	0.96455	0.84875	0.67420

Expt 107 7 bare foils 2% U in paraffin

B-1	B-32	B-21	B-24	B-27	B-5	B-38
0.71079	0.87303	0.99796	1.0	0.97401	0.85915	0.68179

Expt 108 7 bare foils 2% U in paraffin

C-32	C-36	C-38	C-34	C-20	C-37	C-27
0.69842	0.86845	1.05709	1.0	0.96906	0.85318	0.67897

U(2) F_4 H/x = 614

Instrument Check on 11-24-65 Source 10 mCr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	~~Test~~ Trip OK	
IC-2 > 3×10^{-11}	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S/B.	alarm OK	
IC-4 Responds	Calibration S/B.	Pres. dif 0.15"	
CRM	Meter Trip		

21 X 22 X 49½" Stack (see Eppr 103)

Eppr 105 9 bare foils 2% U in paraffin
8:52 Start time at 7.4 on IC-3
b = 1 20 on IC-3 ~8.4 on 3×10^{-8} on IC-2
9:02 Shut down

Eppr 106 7 bare foils 2% U in paraffin
10:20 Start time at 7 on IC-3
b = 1 20 on IC-3
10:27, 30 sec. Shut down

Eppr 107 1:16 Start time at 7.5 on IC-3
b ~ 1 20 on IC-3
1:23 Shut down.

Eppr 108 7 bare foils 2% U in paraffin
2:44 Start time at 7 on IC-3
b ~ 1 20 on IC-3
2:51 Shut down.

U(2) F_4 H/x = 617

Instrument Check on 11-26-65 Source 10 mCt

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 $> 3 \times 10^{-4}$	~~Meter~~ Trip OK	~~Fast~~ Trip OK	
IC-2 $> 3 \times 10^{-4}$	Meter Trip OK	Red light OK	
IC-3 Respond	Calibration S & R.	alarm OK	
IC-4 Respond	Calibration S & R.	Press. dif 0.15"	
CRM	Meter Trip		

Expt. 109 40 x 40 x 16" Stack

$k << 1$

Expt. 110 40 x 40 x 17"

$k > 1$ Table separation = 7.8 cm.

$k = 1$ Table separation = 8.7 cm.

Expt. 111 40 x 20 x 16½" on one table 40 x 20 x 16¼" on other table.

$k > 1$ with plexiglass shim

$k > 1$ no plexiglass.

Expt. 112 40 x 20 x 16½" on one table, 40 x 20 x 16" on other

$k < 1$ with plexiglass shim

Expt 115 40 x 44 x 16" + ¼" on ½ of top.

$b > 1$ U2-115 (1 sec)

$\ln N = 42.713 \rightarrow 18.196$ TMC = 43.565 → 17.960 ¢

Expt 116 40 x 44 x 16" + ¼" on SW ¼ of top

$b > 1$ U2-116 (5 sec)

$\ln N = 165.466 \rightarrow 6.561$ ¢ TMC = 165.499 → 6.560 ¢

Expt 117 40 x 44 x 16" Stack I

$b < 1$ U2-117 (10 sec)

$\ln N = -312.696 \rightarrow -4.754$ TMC = −316.717 → −4.684

Stack I

Meas. with meter stick (and steel tape on 44" dim) (102.273 x 112.633 x 40.836 cm high / 40.265 x 44.344 x 16.077 in.)

VB7 H/K 517

Instrument Check on 11-30-65 Source 10mCi

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 >3X10⁻¹¹	Meter Trip OK	Fast Trip OK	
IC-2 >3X10⁻¹¹	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration N/A.	alarm OK	
IC-4 Responds	Calibration N/A.	Press dif 0.15"	
CRM	Meter Trip		

Expers 113 40x42x16"
b<1 with plexiglass shim.

Expts. 114 40x44x16 Stack I (20x44x16" on each table)
b>1 with plexiglass shim
b<1 no plexiglass

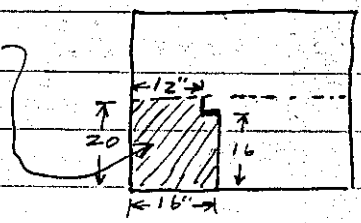
Expts 115 40x44x16" plus 1/4" on 1/2 of top
b>1 no plexiglass.
Check ~~each~~ detector and meas. pts. on TMC.

Expts 116 40x44x16" plus 1/4" on SW 1/4 of top.
b>1

Expts 117 40x44x16"
b≤1 Let decay down to ~ background level.

Expts 118 40x44x16" plus 1/4" x 20x12" on SW corner of top
b<1 to check by level.

Expts 119 40x44x16 plus 1/4" on top as
b≃1



Expr 120 40x44x16" + 1/4" on SW 1/4 of Top
b > 1 V2-120 (5 sec)
$L_n N = 152.871 \rightarrow 7.012$ TMC = 150.678 → 7.097

Expr 121 40x44x16" + 1/4" on SW and NE 1/4's
b > 1 V2-121 (1 sec)
$L_n N = 40.541 \rightarrow 18.819$ TMC = 40.814 → 18.738¢

Expr 122 40x44x16 + 1/4" on NE 1/4 of Top
b > 1 V2-122 (5 sec)
$L_n N = 141.145 \rightarrow 7.492¢$ TMC = 132.992 → 7.868¢

Expr 123 40x44x16
b < 1 V2-123 (10 sec)
$L_n N = -410.407 \rightarrow -3.498$ TMC = -417.142 → -3.436¢

Expr 124 40x44x16 + 1/4" on NE 1/4 of Top
b > 1 V2-124 (5 sec)
$L_n N = 132.459 \rightarrow 7.894¢$ TMC = 132.747 → 7.880¢

Expr 125 40x44x16" + 1/4" on SW and NE 1/4's of Top
b > 1 V2-125 (1 sec)
$L_n N = 41.258 \rightarrow 18.607¢$ TMC = 41.570 → 18.517¢

Expr 126 40x44x16" + 1/4" on SW 1/4 of Top
b > 1 V2-126 (5 sec)
$L_n N = 142.448 \rightarrow 7.436$ TMC = 141.599 → 7.472

V2½ F4 H/C 1617

Instrument Check On 12-1-65 Source _____

PM-1 _____ Dew Trip OK ~~Alarm~~ Trip OK

PM-2 _____ Alarm Trip _____

IC-1 ~~3 X 10⁻¹¹~~ Meter Trip OK ~~Test~~ Trip OK

IC-2 3 X 10⁻¹¹ Meter Trip _____

IC-3 Response OK Calibration S & R Red light OK

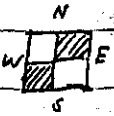
IC-4 Response OK Calibration S & R Alarm OK

CRM _____ Meter Trip _____ ~~Press Dif .15"~~

Expr 120 40" X 44" X 16" + 1/4" Covering 1/4 of stack on SW Corner

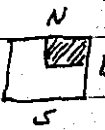
b > 1

Expr 121 40 X 44 X 16" + 1/4" on SW and NE 1/4's of Top



b > 1

Expr 122 40 X 44 X 16 + 1/4" on NE 1/4 of Top



b > 1

Expr 123 40 X 44 X 16

b < 1

Rm temp 21.6° C at 2:00 PM.

Expr 124 40 X 44 X 16 + 1/4" on NE 1/4 of Top

b > 1

Expr 125 40 X 44 X 16" + 1/4" on SW and NE 1/4's of Top

b > 1

Expr 126 40 X 44 X 16" + 1/4" on SW 1/4 of Top

b > 1

Expt 127 40x44x16"
$k < 1$ U2-127 (10 sec)
$L_N = -362.635 \rightarrow -4.016\ ¢$ TMC $= -370.527 \rightarrow -3.920\ ¢$

Expt 128 40x44x16" + 1/4" on NW 1/4 of Top
$k > 1$ U2-128 (5 sec)
$L_N = 134.284 \rightarrow 7.806\ ¢$ TMC $= 132.907 \rightarrow 7.872\ ¢$

Expt 129 40x44x16"
$k < 1$ U2-129 (5 sec)
$L_N = -377.835 \rightarrow -3.835\ ¢$ TMC $= -386.546 \rightarrow -3.739\ ¢$

Expt 130 40x44x16" + 1/4" on NW 1/4 of Top.
$k > 1$ U2-130 (5 sec)
$L_N = 140.429 \rightarrow 7.524\ ¢$ TMC $= 140.428 \rightarrow 7.524\ ¢$

Expt 131 40x44x16"
$k < 1$ U2-131 (5 sec)
$L_N = -353.949 \rightarrow -4.128\ ¢$ TMC $= -358.265 \rightarrow -4.072\ ¢$

Expt 132 40x44x16" + 1/4" on SE 1/4 of Top
$k > 1$ U2-132 (5 sec)
$L_N = 148.528 \rightarrow 7.182\ ¢$ TMC $= 149.679 \rightarrow 7.136\ ¢$

Expt 133 40x44x16"
$k < 1$ U2-133 (5 sec)
$L_N = -340.920 \rightarrow -4.306\ ¢$ TMC $= -345.170 \rightarrow -4.247\ ¢$

U(2)F4 H/x = 614

Expr 127 40x44x16"
b < 1

Instrument Check on 12-2-65 Source 10 mcr

PM-1 Low Trip OK Alarm Trip OK
PM-2 Alarm Trip
IC-1 > 3x10⁻¹¹ Meter Trip OK ~~Ext~~ Trip OK
IC-2 > 3x10⁻¹¹ Meter Trip OK Red light OK
IC-3 Responds Calibration S/R. alarm OK
IC-4 Responds Calibration S/R. Pres. dif 0.15"
CRM Meter Trip

Expr 128 40x44x16" + ¼" on NW ¼ of Top
b > 1

Expr 129 40x44x16
b < 1

Expr 130 Same as 128

Expr 131 Same as 129

Expr 132 40x44x16" + ¼" on SE ¼ of Top
b > 1

Expr 133 40x44x16"
b < 1

Expt 134 40x44x16" + 1/4" on SE 1/4 of top
$t_0 > 1$ V2-134 (5 sec)
$\ln N = 152.871 \rightarrow 7.012\,¢$ TMC = 155.118 → 6.927¢

Expt 135 40x44x16
$t_0 < 1$ V2-135 (5 sec)
$\ln N = -328.760 \rightarrow -4.489\,¢$ TMC = -333.234 → -4.419 ¢

Eqn 134 40x44x16 + 1/4" on SE 1/4 of top

b > 1

+

Eqn 135 40x44x16

b < 1

Expr 136 40 x 44 x 16"

$b < 1$ V2-136 (5 sec)

$\mathcal{L}_N = -307.045 \rightarrow -4.855$ TMC $= -315.048 \rightarrow -4.713$ ¢

Expr 137 40 x 44 x 16" + Mockup of all tapes and Table on top.

$b > 1$ V2-137 (1 sec)

$\mathcal{L}_N = 11.574 \rightarrow 37.384$ ¢ TMC $= 12.017 \rightarrow 36.743$ ¢

Expr 138 40 x 44 x 16" + all tapes and 3/4" x 4' x 4" steel plate on top

$b > 1$ V2-138 (1 sec)

$\mathcal{L}_N = 11.617 \rightarrow 37.321$ TMC $= 12.171 \rightarrow 36.527$ ¢

Expr 139 40 x 44 x 16"

$b < 1$ V2-139 (5 sec)

$\mathcal{L}_N = -272.085 \rightarrow -5.592$ TMC $= -281.346 \rightarrow -5.375$

VCM F4 11/x 6/7

Instrument Check on 12-3-65 Source _____

PM-1 _____ Low Trip OK Hi Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 3 X 10^{-11} Meter Trip OK Dev. Trip OK

IC-2 3 X 10^{-11} Meter Trip OK

IC-3 Response OK Calibration _____ Red light OK

IC-4 Response OK Calibration _____ Alarm OK

CRM _____ Meter Trip _____ Press Dif .15"

Expr 136 40 X 44 X 16

K < 1

Expr 137 40 X 44 X 16 Added Al Boxes AND 3/4" X 4' X 4' steel Plate on top to simulate Support Structure.

K > 1 Steel plate on top may have been displaced slightly before measurement.

Expr 138 Same as 137

k > 1

Expr 139 40 X 44 X 16"

k < 1

Foil Position	Eqn 140A			Eqn 141		
-18"	C-3	0.33759		B-1	0.33443	
-16"	C-4	0.46572		B-2	0.45351	
-14"	C-5	0.58329		B-3	0.57332	
-12"	C-7	0.69420		B-5	0.66667	
-10"	C-8	0.77398		B-6	0.77313	
-8	C-11	0.84601		B-7	0.83508	Eqn
-6	C-13	0.91829		B-8	0.91182	
-4	C-14	0.97163		B-9	0.96301	
-2	C-15	0.98002		B-10	0.97826	
0	C-1	1.0		B-0	1.0	
+2	C-16	0.98214		B-11	0.99411	
4	C-17	0.97741		B-12	0.94801	Eqn
6	C-19	0.90831		B-13	0.90935	
8	C-22	0.85331		B-14	0.85670	
10	C-24	0.77141		B-15	0.77910	
12	C-25	0.69091		B-17	0.68290	
14	C-29	0.58589		B-20	0.57038	Eqn
16	C-30	0.46701		B-21	0.46077	
18	C-31	0.34737		B-23	0.34352	

V(2)T1 · H/x · 11

Instrument Check on 12-6-60 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 3X10-11	Meter Trip OK	Beam Trip OK	
IC-2 3X10-11	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S.J.R.	alarm OK	
IC-4 Responds	Calibration S.J.R.	Press dif 0.15"	
CRM	Meter Trip		

Eqpt 140 40x44x16" Stack plus 11 - 4x4x1/4 and 20 - 2x2x1/4 pieces along North edge of top.
19 foils 2% U in paraffin - 3/8" above center line.
9:04 Start time at 10 on IC-3.
h=1 at 29 on IC-3
Shut down at 9:12, 30 sec. Were shut down early because of loss of air pressure.

Eqpt 140 A Foils in same 140 mount activated enough. Will reexpose same foils in same positions.
10:30, 30 sec Start time at 10 on IC-3
h=1 at 30 on IC-3
10:40, 30 sec Shut down

Eqpt 141 40x44x16" Stack as above
19 foils 2% U in paraffin
1:10 Start time at 22 on IC-3
h=1 at 64 on IC-3
1:20 Shut down

Foil Position	Expt 142		Expt 143	
-18	B-35	0.33423	C-2	0.33135
-16	B-25	0.45564	C-10	0.46386
-14	B-38	0.57839	C-12	0.58371
-12	B-41	0.67221	C-20	0.67942
-10	B-32	0.76876	C-23	0.77393
-8	B-26	0.84969	C-27	0.84913
-6	B-42	0.91742	C-32	0.91382
-4	B-33	0.95380	C-34	0.98744
-2	B-24	0.98183	C-35	0.99903
0	B-40	1.0	C-43	1.0
+2	B-28	1.01171	C-36	1.02115
4	B-37	0.96136	C-37	0.97550
6	B-31	0.90307	C-38	0.90123
8	B-34	0.85136	C-39	0.85441
10	B-29	0.77996	C-40	0.76821
12	B-27	0.68047	C-41	0.67544
14	B-36	0.58340	C-42	0.58222
16	B-30	0.45940	C-44	0.46683
18	B-22	0.34462	C-45	0.34797

Verify Rx - 614

Instrument Check on 12-7-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 3 X 10⁻¹¹	Meter Trip OK	Exc. Trip OK	
IC-2 3 X 10⁻¹¹	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S/R.	alarm OK	
IC-4 Responds	Calibration S/R.	Press dif. 0.15"	
CRM	Meter Trip		

Eff. 142 40 x 44 x 16" stack (see Eff. 140)
19 foils — 27% V in paraffin.
8:42 Start time at 22 on IC-3
b = 1 at 60 on IC-3
9:02 Shut down.

Eff. 143 40 x 44 x 16" stack same as above.
19 foils — 27% V in paraffin
11:12, 35 sec Start time at 22 on IC-3
b = 1 at 70 on IC-3
11:22, 35 sec Shut down

Expt 144 See page 40 for figure
U^{238} is painted with red glitter

Ch #1; U^{238}; top pos. = 6125/30min 1214.861

Ch #2; U^{235}; bottom = 7,441,025/30min

Expt 145 Ch #1, U^{235}, bottom = 7,429,665/30min 1205.136

Ch #2, U^{238}, top = 6165/30min

Expt 146 Ch #1, U^{235}, ~~top~~ = 7,402,525/30min 1183.457

Ch #2, U^{238}, bottom = 6255/30min

Expt 147 Ch #1, U^{238}, bottom = 6365/30min 1179.388

Ch #2, U^{235}, top = 7,506,805/30min

avg 1195.710

U^{235} detector — ~~No 8-2~~ No 5-3, 97.34% U^{235}, .3379 mg U^{235}

U^{238} detector — No 8-2, ~7 ppm of U^{235}, .3889 mg U

Instrument Check on 12-9-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 7.3×10^{-4}	Meter Trip OK	Pwr. Trip OK	
IC-2 7.3×10^{-4}	Meter Trip OK	Red light OK	
IC-3 Responds	Sfa.	alarm OK	
IC-4 Responds	Sfa.	Press dif 0.15"	
ECI	Meter Trip		

See page 40

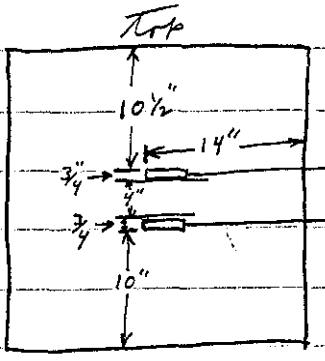
Eppr. 144 Have restacked stack E 24 x 26 x 25 3/4" with a 1/4" U^{235} fission Ch and a 1/4" U^{238} fission Ch in center of stack separated vertically by 2". Counting channel #1 – Amp Y-140347, Scaler Y120248, Preamp 696 Counting Ch. #2 – Amp. Y102541, Scaler Y120242, Preamp. 694 Counting Ch's adjusted to have same sensitivity to fission pulses. Tables together. k = 1 Power = 5 on IC-3; 0.77×10^{-7} on IC-2

Eppr. 145 tables together k = 1 Power = 5 on IC-3, 0.77×10^{-8} on IC-2

Eppr. 146 tables together k = 1 Power = 5 on IC-3, 0.77×10^{-8} on IC-2

Eppr. 147 tables together k = 1 Power = 5 on IC-3, 0.77×10^{-8} on IC-2

Expt 149 24 x 26 x 26" stack + ¼" x 8" x 26" across center of top.



Ch #1, U^{238}, top pos. = 4565/30 min 1554.610
Ch #2, U^{235}, bottom = 7,096,795/30 min

Expt 150 Ch #1, U^{235}, bottom = 7,150,975/30 min 1700.589
Ch #2, U^{238}, top pos = 4205/30 min

Expt 151 Ch #1, U^{235}, top = 7,649,085/30 min 1639.675
Ch #2, U^{238}, bottom = 4665/30 min

Expt 152 Ch #1, U^{238}, bottom = 4695/30 min 1664.642
Ch #2, U^{235}, top = 7,815,495/30 min

avg 1639.879

V2F4 H/X-217

Instrument Check on 12-10-65 Source 10 mc Y

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ _____ Alarm Trip _____

IC-1 > 3X10⁻¹¹ Meter Trip OK Fast Trip OK

IC-2 > 3X10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S.J.R. Alarm OK

IC-4 Responds Calibration S.J.R. Press diff 0.15"

CRM _____ Meter Trip _____ _____

Since the ratio of 235:238 counts is considerably larger than expected we have placed 2 parallel plate detectors fabricated at ORNL in stack and will recheck ratio. Det. identification — FC-7, ~~5.0~~ mg of U ~~4-6 ppm U235~~ 99.97% U^{238}

FC-10 5.0 mg of U 99.9% U^{238}

Ampl. and pre-amps same as in Expts. 144-147

Expt 148 tables together, b=1, power ~ 0.6 on IC-3 Check counters. Ch #2 pulse is rapped.

Expt 149 Have replaced amp. in Ch #2 Now using Y-140346 Tables together

b=1 Power = 0.5 on IC-3 and 0.78×10^{-9} on IC-2

Expt 150 Tables together

b=1 Power = 0.55 on IC-3 and ~ 0.78×10^{-9} on IC-2

Expt 151 tables together

b=1 Power ~ same as above.

Expt 152 Same as above.

Instrument Check on 4-1-66 Source _____

PM-1 _____ Low Trip OK Hi Trip OK

PM-2 _____

IC-1 3×10^{-11} OK OK

IC-2 3×10^{-11} OK

IC-3 Response OK Red light OK

IC-4 Response OK Alarm OK

CRM _____ Press Dif. 0.07

Expr time Purpose check stack (24 x 26 x 25 2% U F4 & Parrin)

153 9^{15} for Reactivity and Alignment

9^{35} tables together w/Plexyglas 24" x 19 5/8 K>1 W/Plexy

$\rho < 1$ without Plexi.

10^{06} Separate tables

10^{25} fuel stack 24 x 26 x 25.5" U F4 and Paraffin

cond table sep Plexyglass

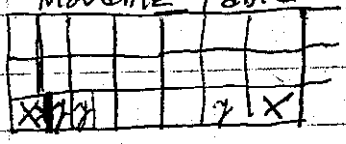
K>1 1.8 Rev with

K<1 0.0 Removed

11^{00} Shut Down

Expr 154

Movable table



U2, F4 H/X = 614

Instrument Check on 1-3-66 Source _____

PM-1	Low Trip OK	Hi Alarm Trip	OK
PM-2		Alarm Trip	
IC-1 3×10^{-11}	Meter Trip OK	Fast Trip	OK
IC-2 3×10^{-11}	Meter Trip OK	2" 1 way	
IC-3 Response OK	Calibration		Red light OK
IC-4 Response OK	Calibration		Alarm OK
CRM	Meter Trip		Press Dif .15"

Parrish)

Exp# 153 Purpose: Check Counters

see p. 97

Instrument Check on 4-5-66 Source _____

PM-1	Low Trip OK	Hi Alarm Trip	OK
PM-2		Alarm Trip	
IC-1 3×10^{-11}	Meter Trip OK	Fast Trip	OK
IC-2 3×10^{-11}	Meter Trip OK		
IC-3 Response	Calibration S.G.R		Red light OK
IC-4 Response	Calibration S.G.R		Alarm OK
CRM	Meter Trip		Press. Dif .07"

(KF4)

Purpose: Check stack for Reactivity 24x26-25.75 (for Pulsing)

Expr	time	Cond.	table Sep	Plexyglass
154	9^{40}	K < 1	0.0	5"x5" with
	10^{04}	Separate tables to 16" (Add 1/4" to half of stack)		
	10^{16}	K < 1	0.0	with
	10^{50}	Separate Add fuel to make 2/3 of stack 26" High		
	11^{06}	K > 1	0.0	without
	11^{20}	Separate - Remove 2 1/4x4x4 Pcs from spaces Marked X		
	11^{24}	K > 1	0.0	w/o
	11^{33}	Separate - Remove 2 1/4xHxH" from Spaces Marked X		
	11^{38}	K = 1	0.0	Adjust with Plexy glass Shim
	3^{40}	Shut Down		

86 Instrument Check on 4-6-66 Source _____

PM-1 _____ Low Trip OK Hi Trip OK

PM-2 _____ Trip _____

IC-1 3×10^{-11} Meter Trip OK Test Trip OK

IC-2 5×10^{-11} Meter Trip OK

IC-3 Response OK Calibration _____ Red light OK

IC-4 Response OK Calibration _____ Bldg Alarm OK

CRM _____ Meter Trip _____ Press Dif. 0.07"

Purpose: Pulse at Crit (UF_4 3% stack) 24 x 26 x 26 4"

Less 1/4" Removed from Spaces Marked X

X	X			X	X	X

Expr time ON Movable table

155 9^{10} AM Cond table Sepr. Plexyglass Shim

K>1 0.0 out

9^{24} Separate tables 30 Rev to Adjust fuel 2 Pos Remove 1/4 x 2 x 2

Check Crit { 9^{30} K=1 0.0 with shim out

12^{00} K=1 0.0 " " "

" 2^{15} K<1 ≈ -0.08¢ 0.0 Adjust shim to Make K=1

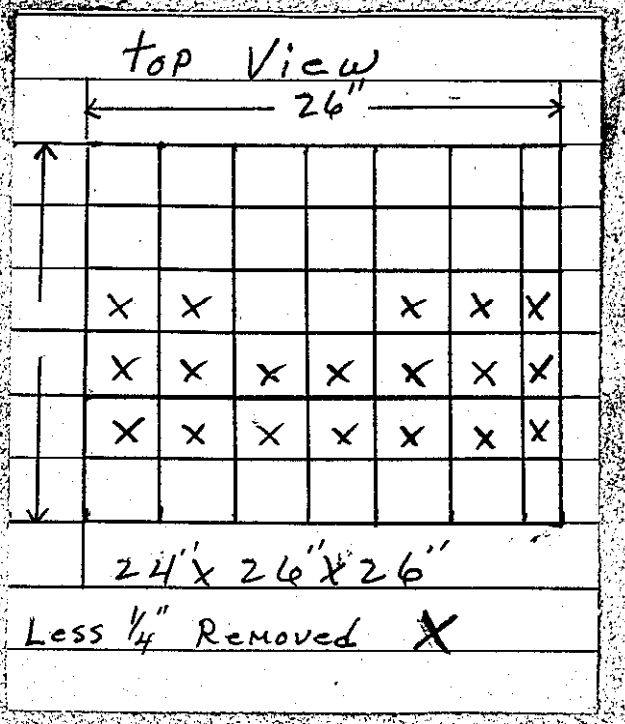
" 3^{58} K<1 ≈ -0.05¢ 0.0

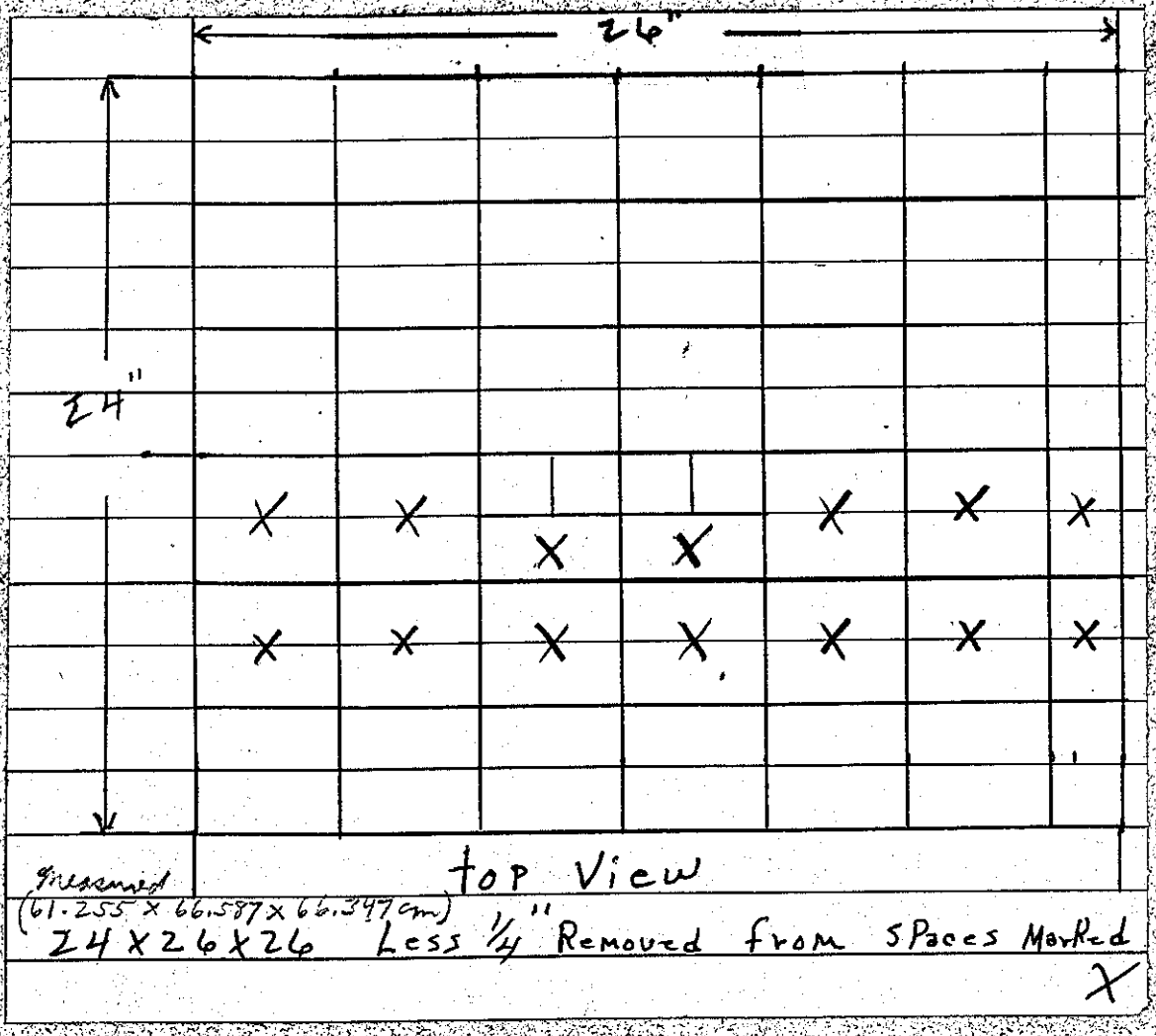
4^{19} Shut Down

Pulsing data: Ch width = 70 μsec ; By ratio = 4 ; Delay ratio = 2

Burst width = 450 μsec ; Rate = 35 CPS. ; 135 KV. ; Avg Beam I ≈ 1 MA

Meas. λ_c from Computer fit = -137.1 ± 55 sec^{-1}


top View
26"
24" x 26" x 26"
Less 1/4" Removed



Measured
(61.255 x 66.587 x 66.347 cm)
24 X 26 X 26 Less 1/4" Removed from Spaces Marked X

U-21 Fy H/X-514 Instrument Check on 4-19-66 Source _____

PM-1 _____ Low Trip OK Hi Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip OK Fact Trip OK

IC-2 3×10^{-11} Meter Trip OK

IC-3 Response OK Calibration S.G.R.

IC-4 Response ✓ Calibration S.G.R.

CRM _____ Meter Trip _____

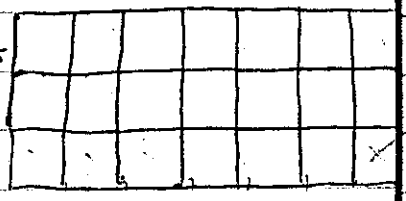
Red light ✓

Alarm ✓

Press Dif 0.07"

Rarpose: Rerun of Exp # 155 (No change in Stack)

Expr time	Cond	table Sepr.	Plexyglass Shim
156 8^{30}	K<1	0.0.	out
8^{50}	K<1	0.0	with
lower Power to Add fuel 1 Pc (1/4x4x4).			
24x26x26 less 1/4" Removed from Spaces marked X			
9^{00}	K<1	0.0	with
Add 2 Pcs (1/4 x 4x4) 24x26x26 Less			
9^{20} 1/4" Removed from Spaces Marked X			
	K<1	0.0	with
Added 1 Pc 1/4 x 4x4 2 Pc 1/4 x 2 x 2"			
9^{40}	K<1	0.0	with
9^{55}	Added 4 Pcs (1/4 x 2 x 2)		
10^{13}	K=1	0.0	Adjust with Shim
10^{28}	Start Pulsing	.8 Rev to 0	
12^{45}	K≤1 (-.113¢)	0.0	Adjust with Shim to make slightly Pos
4^{19}	check Critical ~~t=~~	k≤1 (-0.16¢)	
4^{35}	Shut down		



Pulsing Data: Ch width = 80 μsec ; Bg ratio = 4 ; Delay ratio = 2

Burst width = 450 μsec ; Rate = 35 CPS ; 135 KV. ; Avg Beam I = 1 Ma

Mean λc from Computer fit = -139.93 ± 0.32 sec^{-1}

88 See p. 258 for continuation of 27b Effo's

3% Uranium in paraffin

Instrument Check on 12-15-65 Source 10mcV

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 3X10⁻"	Meter Trip OK	~~Fast~~ Trip OK	
IC-2 3X10⁻"	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S/R	alarm OK	
IC-4 Responds	Calibration S/R	Pres. dif 0.15"	
CRM	Meter Trip		

Expt. 1 Purpose – To determine dimensions of critical unit.
Stack 24X24X12 half on each table
$k << 1$

Expt 2 Stack 24X24X20
$k > 1$ Table sepn. ~ 2.5"

Expt 3 Stack 22X22X20
$k > 1$ Table sepn ~ 1.5"

3 2 0

Instrument Check on 12-16-65 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK
PM-2		Alarm Trip
IC-1 > 3 X 10⁻⁴	Meter Trip OK	Part Trip OK
IC-2 > 3 X 10⁻¹¹	Meter Trip OK	Red light OK
IC-3 Responds	Calibration SJR	alarm OK
IC-4 Responds	Calibration SJR.	Pres. dif 0.15"
CRM	Meter Trip	

Expt. 4 Stack 20x20x20

$k > 1$ Table sepn. ~ .5"

$k = 1$ Table sepn .53"

Expt. 5 Stack 20x20x19" high

$k > 1$ Table sepn ~ 5 rev.

$k = 1$ Table sepn 5.9 rev.

Expts 8, 9, & 10 to meas. subcritical multiplication and B_g.

Expt 8 $19 \times 20 \times 18\frac{3}{4}$" high

$k < 1$ $-13.662¢$ from $\log N$

$B_g = 2 \times 10^{-12}$ on IC-2, 1×10^{-12} on IC-1, 0.0016 on IC-3, .0018 on IC-4

Expt 9

$k < 1$ $-1.796¢$ from $\log N$

$B_g = 1.6 \times 10^{-}$" on IC-2, $0.5 \times 10^{-}$" on IC-1, 0.01 on IC-3, 0.01 on IC-4

Expt 10

$k < 1$ Table separation = 0.8 rec.

$B_g = 3.15 \times 10^{-}$" on IC-2, $0.95 \times 10^{-}$" on IC-1, 0.021 on IC-3, 0.016 on IC-4

3 2, 0

Instrument Check on 12-17-65 Source 10 mc γ

PM-1 _____ Low Trip OK 2" Alarm Trip OK Contact

PM-2 _____ Alarm Trip _____

IC-1 > 3×10^{-4} Meter Trip O/K Contact Fast Trip OK Contact

IC-2 > 3×10^{-4} Meter Trip O/K 2" Red light OK

IC-3 Responds Calibration S.f.R. alarm OK

IC-4 Responds Calibration S.f.R. Pres dif 0.15"

CRM _____ Meter Trip _____

Expt 6 Stack 19 x 19 x 19" high

$k < 1$ Tables together + plexiglass

Expt 7 Stack 19 x 19 x 20" high

$k > 1$ Tables together no plexiglass

$\ln N = 42.778$
$= 18.1764$
10 x 19" base on each table

Expt 8 Stack 19 x 20 x 18 3/4" high

$k < 1$ tables together no plexiglass

Expt 9 Stack 19 x 20 x 18 3/4" high + 1/4 x 4 x 16" on center of top

$k < 1$ tables together no plexiglass

Expt 10 Stack Same as Expt 9 + 4 - 1/4 x 4 x 4 pieces in middle of 4 quadrants

$k \geq 1$ tables together

$k \simeq 1$ tables separ = 0.7 rev.

37 J

19 x 20 x 18 3/4" high

Instrument Check on 1-3-66 Source 10 mCt

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3 x 10⁻¹¹	Meter Trip OK	Fast Trip OK	
IC-2 > 3 x 10⁻¹¹	Meter Trip OK	Red light OK	
IC-3 Respond	Calibration S/R	alarm OK	
IC-4 Respond	Calibration S/R.	Press Drf. 0.15"	
CRM	Meter Trip		

Eppa II Ch Check instruments and adj pos. Th get same c. rate.

b = 1 with plexiglass, Table span = 2.9 rem.

Check count rates on 4 counters

Shut down Th mon counter

b = 1 Table span = 2.9 rem. with plexiglass.

after checking reflector worth in Expt 13., decided to only open tabs on screw (min. of 25 sec.) while making perturbation changes

Expt 14 $19 \times 20 \times 18\frac{3}{4}$ + $\frac{1}{4}$" on N half of stack

k>1 V3-14 (5 sec) 20 ← 4 counters ganged.

L_N = 151.786 → 7.054¢ TMC = 153.763 → 6.978¢

Expt 15 $19 \times 20 \times 19$"

k>1 V3-15 (1 sec) 10

L_N = 31.703 → 21.938¢ TMC = 31.850 → 21.876¢

Expt 16 $19 \times 20 \times 19$"

k>1 V3-16 (1 sec)

L_N = 30.401 → 22.498¢ TMC = 31.065 → 22.208¢

Expt 17 $19 \times 20 \times 18\frac{3}{4}$"

k<1 V3-17 (5 sec)

L_N = -225.833 → -7.006¢ TMC = -229.071 → -6.883¢

Expt 18 $19 \times 20 \times 18\frac{3}{4}$ + $\frac{1}{4}$" on S $\frac{1}{2}$ of stack

k>1 V3-18 (5 sec)

L_N = 137.671 → 7.647¢ TMC = 139.224 → 7.578¢

Expt 19 $19 \times 20 \times 18\frac{3}{4}$

k<1 V3-19 (5 sec)

L_N = -218.667 → -7.294¢ TMC = -223.175 → -7.110¢

Expt 20 $19 \times 20 \times 18\frac{3}{4}$ + $\frac{1}{4}$" on S $\frac{1}{2}$ of stack

k>1 V3-20 (5 sec)

L_N = 150.048 → 7.122¢ TMC = 152.170 → 7.039¢

~70°F night before. Warmed up to 74° to 75°F morning day

Instrument Check on 1-4-66 Source _____

(U3) F_4 $\frac{H}{X} = 279$

PM-1 _____ Low Trip OK Hi Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip OK Fast Trip OK

IC-2 3×10^{-11} Meter Trip OK

IC-3 Response Calibration S & R Red light OK

IC-4 Response Calibration S & R Alarm OK

CRM _____ Meter Trip _____ Press Dif 0.15"

19 x 20 x 19" high

Eqpt 12 $k = 1$ Table span ~ 4.2 rev. with plexi. Check. Counters.

$k > 1$ Table together on plexi. 1" piece → ½+¼+¼" on top → S

For checks reflects worth of man working on batch.

Eqpt 13 $k = 1$ Table span ~ 4.95 rev. with 6 x 12 x 16" poly on one side

Eqpt 14 19 x 20 x 18¾" + ¼ on N half of stack. 1" piece → ½ + ¼" piece → N S

$k > 1$ Table together on plexi.

Eqpt 15 19 x 20 x 19" 1" thick → ½+¼+¼" →

11:38 $k > 1$ Table together

Eqpt 16 19 x 20 x 19 Top in. all 1" thick pieces.

12:04 $k > 1$ Table together

Eqpt 17 19 x 20 x 18¾"

2:30 $k < 1$ Table together

Eqpt 18 19 x 20 x 18¾ + ¼ on S ½ Top in. ¼+½" → 19" high

3:05 $k > 1$ Table together

Eqpt 19 19 x 20 x 18¾

3:42 $k < 1$ Table together.

Eqpt 20 19 x 20 x 18¾ + ¼ on S ½ Same Eqpt. 18

4:11 $k > 1$ Table together

Expt 22 ~~b>1 V3-22A (5 sec)~~ To obtain data to check Computer code and T2

V3-22A (1 sec)

Removed 2-¼x4x4 pieces from N½

V3-22B (5 sec)

V3-22C (5 sec)

V3-22D (5 sec)

V3-22E (5 sec)

V3-22F (1 sec)

Expt 23 19x20x18 3/4" + ¼" on 5½

b>1 V3-23 (5 sec) $\ln N = 231.261 \rightarrow 4.916\,\phi$ TMC = 232.686 → 4.889¢

Expt 24 19x20x18 3/4

b<1 V3-24 (5 sec)

$\ln N = -178.929 \rightarrow -9.470\,\phi$ TMC = -179.874 → -9.403¢

Expt 25 19x20x18 3/4 + ¼" on 5½

b>1 V3-25 (5 sec)

$\ln N = 237.776 \rightarrow 4.799\,\phi$ TMC = 243.074 → 4.704¢

Expt 26 19x20x18 3/4

b<1 V3-26 (5 sec)

$\ln N = -174.260 \rightarrow -9.819\,\phi$ TMC = -177.465 → -9.577¢

Stock V3-A 19x20x18¾" high

Mens (48.590 x 51.145 x 47.932 cm / 19.130 x 20.136 x 18.871 in.)

74°F night before 75°F during day

U(3) F_4 $\frac{H}{X}$=279 Instrument Check on 1-5-66 Source 10 mCi

PM-1	Low Trip OK	Alarm Trip	OK
PM-2		Alarm Trip	
IC-1 > 3×10^{-11}	Meter Trip OK	Fast Trip	OK
IC-2 > 3×10^{-11}	Meter Trip OK	Redlight	OK
IC-3 Responds	Calibration S/A	alarm	OK
IC-4 Responds	Calibration S/A	Press. Dif	0.15"
CRM	Meter Trip		

Expt 21 $19\times20\times18\frac{3}{4}$" + $\frac{1}{4}$" on S ½

Check Counter + Rg.

This stack was subcritical by ~ 13.5 ¢ today.

Tightened and straightened stack as much as possible and made stack ~ 4.0 ¢ positive.

Expt 22 $19\times20\times18\frac{3}{4}$" + $\frac{1}{4}$" on S ½ and $\frac{1}{4}$" × 8 × 8 in center of N ½

10:45 k > 1 Tables together Shaded area 19" high →

Expt 23 $19\times20\times18\frac{3}{4}$" + $\frac{1}{4}$" on S ½

1:23 k > 1 Tables together

Expt 24 $19\times20\times18\frac{3}{4}$" V3-A

k < 1

Expt 25 $19\times20\times18\frac{3}{4}$" + $\frac{1}{4}$" on S ½ V3-B

k > 1

Expt 26 $19\times20\times18\frac{3}{4}$" + V3-A

k < 1

Expt 27 | 19x20x18 3/4" high
b<1 V3-27 (5 sec) | $\ln N = -194.346 \rightarrow -8.4834$
TMC = -197.308 → -8.317¢

Expt 28 | 19x20x18 3/4" + 1/4" on S 1/2
b>1 V3-28 (5 sec) | $\ln N = 166.117 \rightarrow 6.5394$
TMC = 167.383 → 6.497¢

Expt 29 | 19x20x18 3/4"
b<1 V3-29 (5 sec) | $\ln N = -202.489 \rightarrow -8.042$
TMC = -204.590 → -7.936

Expt 30 | 19x20x18 3/4" + 1/4" on S 1/2
b>1 V3-30 (5 sec) | $\ln N = 162.426 \rightarrow 6.664$
TMC = 164.144 → 6.605

Expt 31 | 19x20x18 3/4"
b<1 V3-31 (5 sec) | $\ln N = -200.861 \rightarrow -8.126$
TMC = -205.089 → -7.912

Expt 32 | 19x20x18 3/4 + 1/4" on S 1/2
b>1 V3-32 (5 sec) | $\ln N = 168.940 \rightarrow 6.446¢$
TMC = 171.740 → 6.358¢

Expt 33 | 19x20x18 3/4
b<1 V3-33 (5 sec) | $\ln N = -197.603 \rightarrow -8.300¢$
TMC = -200.622 → -8.139¢

Expt 34 | 19x20x18 3/4 + 1/4" on S 1/2
b>1 V3-34 (5 sec) | $\ln N = 175.455 \rightarrow 6.242$
TMC = 178.939 → 6.139

Expt 35 | 19x20x18 3/4
b<1 V3-35 (5 sec) | $\ln N = -201.404 \rightarrow -8.098$
TMC = -206.824 → -7.826 ↓ From TMC

Avg Worthof 1/4" ffuel on 1/2 of 19x20" Slab from Expts 23–35 = 14.378 ± 0.222¢

75°-76° F U(3) F_4 #/x = 279

Instrument Check on 1-6-66 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1 > 3x10⁻¹¹	Meter Trip OK	Fast Trip OK	
IC-2 > 3x10⁻¹¹	Meter Trip OK	red light OK	
IC-3 Responds	Calibration S/A	alarm OK	
IC-4 Responds	Calibration S/A	Press dif 0.15"	
CRM	Meter Trip		

Eqpt 27 19x20x18 3/4" high
b=1 table apart = with plexig. check counters.
b<1 tables together or plexiglass

Eqpt 28 19x20x18 3/4" + 1/4" on S 1/2 (same as Eqpt. 18)
b>1 table together

Eqpt 29 19x20x18 3/4
b<1 tables together

Eqpt 30 19x20x18 3/4 + 1/4" on S 1/2
b>1

Eqpt 31 19x20x18 3/4
b<1

Eqpt 32 19x20x18 3/4 + 1/4" on S 1/2
b>1

Eqpt 33 19x20x18 3/4
b<1

Eqpt 34 19x20x18 3/4 + 1/4" on S 1/2
b>1

Eqpt 35 19x20x18 3/4
b<1

TMC

Expt 36 19x20x18 3/4"
$b<1$ U3-36 (5 sec) $\ln N = -144.185 \rightarrow -12.949$ ¢
TMC = -146.982 → -12.568 ¢

Expt 37 19x20x18 3/4" plus al boxes and steel plate on Tot.
$b>1$ U3-37 (5 sec) $\ln N = 181.100 \rightarrow 6.077$ ¢
TMC = -180.984 → 6.080 ¢

Expt 38 19x20x18 3/4
$b<1$ U3-38 (5 sec) $\ln N = -144.403 \rightarrow -12.923$ ¢
TMC = -144.936 → -12.845 ¢

Expt 39 19x20x18 3/4 plus al boxes and steel plate on Tot.
$b>1$ U3-39 (5 sec) $\ln N = 183.489 \rightarrow 6.009$ ¢
TMC = 184.316 → 5.986 ¢

Expt 40 19x20x18 3/4"
$b<1$ U3-40 (5 sec) $\ln N = -138.974 \rightarrow -13.731$ ¢
TMC = -143.956 → -12.981 ¢

From TMC
Avg Worths of Lucoat Uranium on 19x20" Stack = 18.843 ± 0.123 ¢

U(3) F_4 $H/x = 279$

Instrument Check on 1-7-66 Source 10 m-ct

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 > 3 X 10⁻¹¹ Meter Trip OK Heat Trip OK

IC-2 > 3 X 10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S/R. Alarm OK

IC-4 Responds Calibration S/R. Press dif. 0.15"

CRM _____ Meter Trip _____

Expt 36 19 x 20 x 18 3/4"

~ 11:20 AM $k < 1$

Expt 37 19 x 20 x 18 3/4" plus al boxes and steel plate on top.

1:40 PM. $k > 1$

Expt 38 19 x 20 x 18 3/4"

$k < 1$

Expt 39 19 x 20 x 18 3/4" plus al boxes and steel plate on top

$k > 1$

Expt 40 19 x 20 x 18 3/4"

$k < 1$

32,U

Instrument Check on 1-10-66 Source 10 mcr

PM-1 _____ Low Trip OK Hi Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 3 X 10⁻¹¹ Meter Trip OK Batt Trip OK

IC-2 3 X 10⁻¹¹ Meter Trip OK

IC-3 Response Calibration

IC-4 Response Calibration

CRM _____ Meter Trip _____

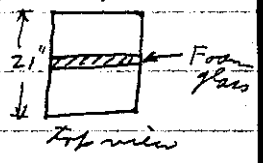
Red light ok
Alarm ok
Press Dif .15"

To ~~check~~ mean subcritical background.

Expr # 41 19 x 20 x 18 3/4 plus 2 - 1/4 x 4 x 4 pieces on top

k = 1 with plexiglass Check counters at ~ 1 on IC-3.

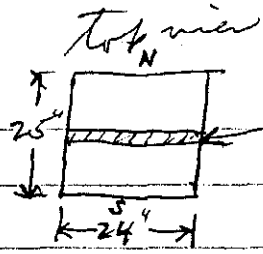
k < 1 no plexiglass. Tables together $\Delta N = -0.709\%$



Expr 42 19 x 21 x 20" high with 1" of foam glass in center

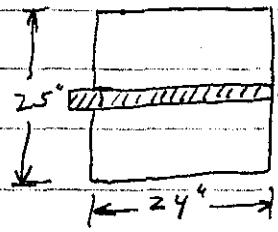
k << 1 Tables together

Eppn 43



1" foam glass
(1" x 23 5/8" x 18" high)
Note foam glass 3/8" narrow on one edge.

Eppn 47



(1 x ~25 5/8 x 18") foam glass.

Instrument Check on 1-11-66 Source 10 mcr

VC) F. H/C = 77

PM-1 _____ Low Trip OK Hi Trip OK

PM-2 _____

IC-1 3 x 10⁻¹¹ OK OK

IC-2 3 x 10⁻¹¹ OK

IC-3 Response OK

IC-4 Response OK

CRM _____

Red light OK
Bldg Alarm OK
Press Dif .15

Expr 43 $b << 1$ with plexiglas 24x25x16" high with 1" foam glass in center

Expr 44 24x25x18" high with 1" foam glass in center

$b > 1$ Table separ. = 2 rev. no plexiglass

45 24 x 25 x 17 3/4" high + 1/4 x 12 x 24 on South 1/2 foam glass in center

$b > 1$ Table separ = 0.9 rev. no plexiglass

Expr 46 24 x 25 x 17 3/4" with 1" foam glass in center.

$b > 1$ Table together no plexiglass $\ln N = 9.413\phi$

Expr 47 24x25x17 3/4" Same as 46 except added 1x2x18"

$b > 1$ $\ln N = 9.289\phi$ piece of foam glass on edge that was short.

Expr 48 24x25x17 1/2" high + 1/4 x 12 x 24 on South 1/2 1" foam glass in center

$b < 1$ $\ln N = -11.181\phi$

Expr 49 24x25x17 3/4" high Same as Expr 47.

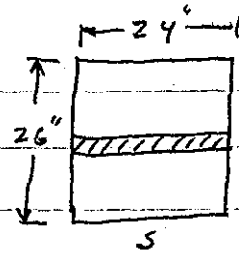
$b > 1$ Table together no plexiglass $\ln N = 9.462\phi$

$b = 1$ Table separation = 1.48 rev.

Expr 50 Same as Expr 49 except there is no foam glass.

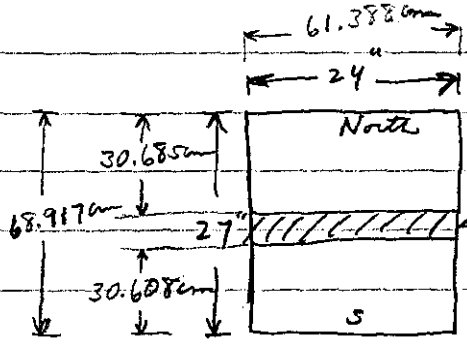
$b = 1$ table separation = 9.95 rev.

Expr 5-1



← 2" of foam glass. Sticks up above ☆ ~3"

Expr 55+56



← 3" of foam glass.

56.119cm high

Red figures measured with meter stick.

V3, F1 11-27

Instrument Check on 1-12-66 Source 10 mcr

PM-1		Low Trip	OK	Hi Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	3×10^{-4}	Meter Trip	OK	Test Trip	OK
IC-2	3×10^{-4}	Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	S/R.	alarm	OK
IC-4	Responds	Calibration	S/R	Press Dif.	0.15
CRM		Meter Trip			

3"

Expr. 51 24 x 26 x 20" high with 2" of foam glass in center
$b > 1$ Tables together no plexiglass $\Delta N = 7.789\phi$

Expr. 52 24 x 26 x 20" high less 1/4" on N 1/2
$b < 1$ tables together no plexiglass $\Delta N = -5.123\phi$

Expr. 53 Same as Expr. 52 except foam glass was removed
$b = 1$ Table separation 12.00 rev.

Expr. 54 To check amount of material that may be stacked on one table
24 x 26 x 12" high all green blocks.
+ 6" x 22" x 12" polyethylene on one end and 1" x 13 x 15" plexiglass shim on other
$b < 1$ tables together

Expr. 55 24 x 27 x 22" high with 3" of foam glass in center.
$b \gtrsim 1$ tables together no plexiglass $\Delta N = 0.276\phi$
$b = 1$ Table separation = 0.7 rev

Expr. 56 Same as Expr. 55 except foam glass was removed
$b = 1$ Table separation = 14.78

73.5°F night before to 74°F during day U(3)F4 11/x = 279

Instrument Check on 1-13-66 Source 10 mCi

PM-1	Low Trip		Alarm Trip OK
PM-2			Alarm Trip
IC-1 > 3 X 10⁻⁴	Meter Trip OK		Fast Trip OK
IC-2 > 3 X 10⁻⁴	Meter Trip OK		Red light OK
IC-3 Responds	Calibration S/A		alarm OK
IC-4 Responds	Calibration S/A		Press Dif 0.15"
CRM	Meter Trip		

Expr 57 16 X 16 X 30" high + 6" X 16" X 30" of polyethylene on N face.
1 X 13 X 15"
k > 1 Tables together with plexiglass on S face
k ≤ 1 tables together no plexiglass.

Expr 58 16 X 16 X 36" high
k < 1 Tables together with plexiglass

Expr 59 16 X 16 X 40" high
k < 1 tables together with plexiglass

Expr 60 16 X 16 X 44" high
k < 1

Expr 61 16 X 16 X 45" High tables together with Plexiglass
K < 1 Plexiglass Removed

Expr 62 16 X 16 X 46" High tables together with Plexiglass
K < 1 Plexiglass Removed
$\sum N = -340.269 \rightarrow -4.316$

73.5°F during night to 74 during day Instrument Check on 1-14-66 Source _____

PM-1 _____ Low Trip OK 1" Hi Trip OK Contact

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip OK Contact Last Trip OK Contact

IC-2 3×10^{-11} Meter Trip OK ~~a. 2"~~

IC-3 Response Calibration S.g.R Red light OK

IC-4 Response Calibration S.g.R. Alarm OK

CRM _____ Meter Trip _____ Press Dif ~~at~~ 0.15"

39% U F_4

Expr. 63 16 x 16 x 47 = tables together ✓

$K > 1$ $\mathcal{L}N = 293.148 \rightarrow 3.9814$

Expr 64 Separate tables And Re-Run #63

$K > 1$ $\mathcal{L}N = 276.428 \rightarrow 4.1964$

Expr 65 Separate tables And Re-Run #63

$K > 1$ $\mathcal{L}N = 273.605 \rightarrow 4.2344$

" 66 Separate tables And Re-Run #63

$K > 1$ $\mathcal{L}N = 275.776 \rightarrow 4.205$ ✓

Perturbation measurement on tall stack

Expt 68 16×16×47" high
$k > 1$ U3-68 (1 sec) $\ell n N = 67.533 \rightarrow 13.279\,¢$
TMC = 69.011 → 13.072¢

Expt 69 16×16×46" + 1" on N half
$k > 1$ U3-69 (1 sec) $\ell n N = 134.631 \rightarrow 7.789\,¢$
TMC = 136.655 → 7.694¢

Expt 70 16×16×46" high
$k > 1$ U3-70 (1 sec) $\ell n N = 310.520 \rightarrow 3.778\,¢$
TMC = 314.923 → 3.731¢

Expt 71 16×16×45" high
$k < 1$ U3-71 (1 sec) $\ell n N = -234.518 \rightarrow -6.682\,¢$
TMC = −233.811 → −6.712¢

Expt 72 16×16×46" high
$k > 1$ U3-72 (1 sec) $\ell n N = 317.686 \rightarrow 3.702\,¢$
TMC = 322.621 → 3.650¢

Expt 73 16×16×45" high
$k < 1$ U3-73 (1 sec) $\ell n N = -237.124 \rightarrow -6.598\,¢$
TMC = −243.908 → −6.374¢

Expt 74 16×16×46" high
$k > 1$ U3-74 (1 sec) $\ell n N = 318.337 \rightarrow 3.695\,¢$
TMC = 324.663 → 3.629¢

V31 F4

74°F early evening night 1st

74°F ~ 75°F morning day

Instrument Check on 2-1-66 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip	OK
PM-2		Alarm Trip	
IC-1	> 3X10-11 Meter Trip OK	Fast Trip	OK
IC-2	> 3X10-11 Meter Trip OK	Redlight	OK
IC-3	Responds Calibration SJA.	alarm	OK
IC-4	Responds Calibration SJA.	Press Dif	0.08"
CRM	Meter Trip		

Eppn 67 16X16X47" high. To check counter position.
b = 1 Table sep. = 2.25cm. no plexiglass

Eppn 68 16X16X47" high
b > 1 table together no plexiglass.

Eppn 69 16X16X46" +1" on north half.
b > 1

Eppn 70 16X16X46" V3-D Table together no plexiglass
b > 1

Eppn 71 16X16X45" high V3-C
b < 1 Table together no plexiglass

Eppn 72 16X16X46" high V3-D b > 1

Eppn 73 16X16X45" high V3-C
b < 1 Table together no plexiglass

Eppn 74 16X16X46" high
b > 1 Table together no plexiglass

Perturbation meas on tall stack V(3) F4

74.5°F night lifted to 72° during day.

Instrument Check on 2-2-66 Source 10 mcV

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	> 3 x 10⁻"	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 x 10⁻"	Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	1 pR	alarm	OK
IC-4	Responds	Calibration	1 pR	Press lif	0.08"
CRM		Meter Trip			

Eppa 75 16 x 16 x 46" high

b = 1 Table separ. = 1.23 cm., no plexiglas, check counts.

b > 1 table together no plexiglas

V3-75 (1 sec) LnN = 411.493 → 2.9214

TMC = 421.184 → 2.858 ¢

Eppa 76 V3-6 16 x 16 x 45" high (Meas dimensions 40.900 cm x 40.934 cm x 114.667 cm / 16.102 in. x 16.116 in. x 45.145 in.)

b < 1 Table together no plexig.

V3-76 (1 sec) LnN = −211.718 → −7.597 ¢

TMC = −218.037 → −7.320 ¢

Eppa 77 V3-D 16 x 16 x 46" high (Meas dim. 40.900 x 40.934 x 117.218 / 16.102 in. x 16.116 in. x 46.149 in.)

b > 1 table together no plexiglass

V3-77 (1 sec) LnN = 424.522 → 2.837 ¢

TMC = 435.272 → 2.773 ¢

Expt 78 16x16x45" high
b < 1 table together no plexiglass
V3-78 (1 sec) LnN = -216.604 → -7.381 ¢
TMC = -214.244 → -7.484 ¢

Expt 79 16x16x46" high
b > 1 Table together no plexiglass
V3-79 (1 sec) LnN = 445.151 → 2.715 ¢
TMC = 437.281 → 2.761 ¢

Expt 80 16x16x45" high
b < 1 Table together no plexiglass
V3-80 (1 sec) LnN = -210.089 → -7.672 ¢
TMC = -212.907 → -7.543 ¢

Expt 81 16x16x46" high
b > 1 Table together no plexiglass
V3-81 (1 sec) LnN = 420.179 → 2.865 ¢
TMC = 439.753 → 2.746 ¢

Expt 82 16x16x45" high
b < 1 table together no plexiglass
V3-82 (1 sec) LnN = -199.058 → -8.222 ¢
TMC = -212.770 → -7.550 ¢

Avg worth of 1" offset on 16x16" stack from Expts 70-82 = 10.227 ± 0.132 ¢
From TMC.

U 3 H/X 279 Instrument Check on 5-23-66 Source _____

~72.3°F during day

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3 X 10⁻¹¹ Meter Trip ✓ Fast Trip ✓

IC-2 3 X 10⁻¹¹ Meter Trip ✓

IC-3 Response ✓ Calibration S & R Red light ✓

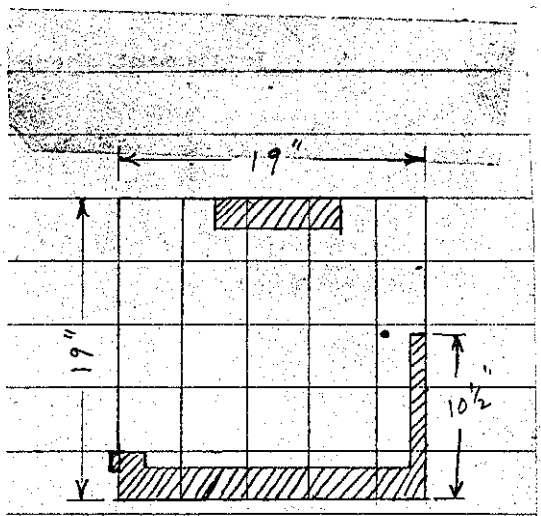
IC-4 Response ✓ Calibration S & R Bldg Alarm ✓

CRM _____ Meter Trip _____ Press Diff 0.07

Purpose - Check Crit on (UF, 3%) stack 19"x19"x18"

Expr time		Condition	table Separation	
83	12⁵⁰	K < 1	0.0	W/Plexyglass
	1¹⁰	Separate Add 1½" to Ht of Stack		19x19x19½
	1²⁸	K > 1	2.15	with
	1⁴²	K < 1	0.0	w/o
	1⁴⁴	Separate Add ¼" (Short ~1" on 2 sides of ¼" mat.)		
	2⁰³	K > 1	2.8	with
	2²⁰	K < 1	0.0	W/O
		Separate added fuel to make 19x19x19¾ plus ¼" on South 2" and 1" on ½ East and		
	2⁵⁵	K > 1	2.2	with
	3¹⁵	K = 1 use Plexyglass Shim to Maintain Crit		(Approx 1" out)
	3¹⁸	K < 1 with shim out Approx 7"		
	3²⁶	Separate Position Counter added ¼ x 2x4 on north edge		with
	3³⁹	K > 1	2.1	With
	3⁵⁵	K = 1	0.0	Shim out Approx 1"
	H⁰⁰	Shut Down		

122 U-3 H/k 279



S
19"x19"x19¾" high
plus ¼" on shaded
areas

U-3 H
~71.6°F
PM-
PM-
IC-
IC-
IC-
IC-
CR
Pu

time
125
145
150
205
225
235
245
255
415
Se
A
S
1
L
K
S

122 U-5 H/E 279

Instrument Check on 5-24-66 Source _____

~71.7°F night time to ~72.3°F during day

PM-1		Low Trip ✓	Hi Alarm Trip ✓
PM-2			Alarm Trip
IC-1	3×10^{-11}	Meter Trip ✓	Fast Trip ✓
IC-2	3×10^{-11}	Meter Trip ✓	
IC-3	Response ✓	Calibration S. G. R	Red light ✓
IC-4	Response ✓	Calibration S. G. R.	Bldg Alarm —
CRM		Meter Trip	Press. Dif. 0.07"

Purpose: Pulse at critical (UF$_4$ 3%) stack

Expr	time	condition	table Separation	
84	9^{00}	K ~ 1	0.0	Plexyglass shim out 2"
	12^{45}	K > 1 ~0.3¢	0.0	
	1^{20}	Adjust crit with Plexyglass Shim		
	4^{15}	Check Critical		
		K < 1 ~0.1¢	0.0	
	4^{27}	Shut Down		

Expr 85

Meas. block → 48.541 × 48.554 × 50.446 cm high + 0.635 cm on shelf (area shown above)

Pulsing Data: Ch width = 80 μsec; B ratio = 2; Delay ratio = 2

Burst width = 500 μsec; Rate = 35 CPS; 150 KV; Avg Beam I ≃ 1 ma.

1^{18} K < 1 0.0

~~Separate~~

Meas. λ_c from Computer fit = -242.427 ± 0.577 sec^{-1}

U-3 H/L 279 Instrument Check on 5-25-66 Source _____

~71.6°F night before to 72.4°F during day

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Hi Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Test Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response ✓ Calibration S. & R.

IC-4 Response ✓ Calibration S. & R.

CRM _____ Meter Trip _____

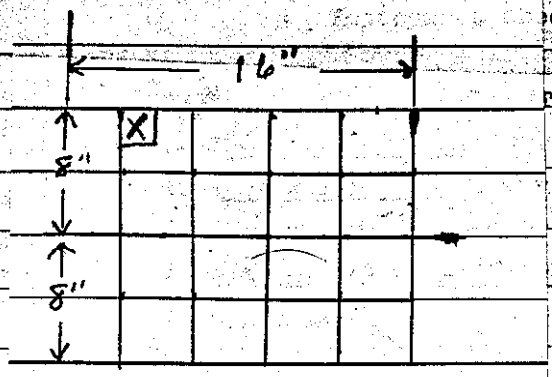
Red light ✓
Bldg Alarm ✓
Press. D.F. 0.07"

Purpose: Check Critical on stack (UF_4 3%)
16x16x16 Reflected with 6" Polyethylene on Sides and top and 6" Plexyglass on Bottom

Expr time	Condition	table Separation
85 1 25	k > 1	2.9 cm.
1 45	k = 1	3.7 cm.
1 50	Separate Remove ½" Stack Now 16x16x15½ Reflected As Above	
2 05	K > 1	0.0
2 25	Separate Removed 1/4 x 4 x 4 from both NE & NW Corners	
2 35	k < 1	0.0
2 45	Separate added (1/4 x 2 x 4) 2	
2 55	K < 1	0.0
4 15	Shut Down	

124

U 3 #1x 279 ~ 72°F



16 x 16 x 15½ Less ¼"
ON Spaces Marked X

ck on 5-26-66 Source

Hi
Trip ✓ Alarm Trip ✓
Alarm Trip
Trip ✓ Fast Trip ✓
Trip
ration JJR Red light ✓
ration Bldg Alarm ✓
Trip Press Dif 0.07"

+ (ΔF/F 3%) stack Reflected with 6"
and top with 6" Plexyglass on Bottom See Sketch

Expr	time	Condition	table Separation	Ex
86	8 35	K < 1	0.0	87
	8 50	Separate		88
	8 57	K < 1	0.0	
	9 15	Separate Add ¼ x 2 x 2 to NE Corner		89
	9 21	K < 1 ~0.09¢	0.0	
	9 53	start Pulsing		90
	1 18	K < 1	0.0	
		Separate Add ¼ x 2 x 2 to NE Corner		9
	1 25	start Pulsing		
	3 58	Check Critical		9
		K < 1	0.0	
	H 10	Shut Down		

Pulsing Data: Ch. Width = 80 msec; Rep rate = 2; Delay ratio = 2
Burst width = 200 msec; Rate = 35 cps.; 150 KV; Steady Beam = 30 μa

Meas. λc from Computer fit = -207.709 ± 0.248 sec⁻¹

U3 H/L 279

Instrument Check on 5-27-66 Source _____

71.7°F night before to ~72.5°F during day

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip _____

IC-3 Response Calibration Spa

IC-4 out Calibration _____

CRM _____ Meter Trip _____

Red light ✓

Bldg Alarm ✓

Press Dif 0.07"

Purpose: Ht Perturbation Meas on Stack 16 x 16 x 15½ (k_{F_4} 3%)

Reflected with 6" Polyethylene on Sides & top with 6" Plexyglass on Bottom

Sketch	Expr. time	condition	table separation
87	9 50	K > 1	0.0
	10 17	Separate Remove ¼" From ¼ of Stack NW Corner	
88	10 33	K < 1	0.0
	10 58	Separate Add ¼" to ¼ of Stack NW Corner	
89	11 13	K > 1	0.0
	11 40	Separate Remove ¼"	
90	12 37	K < 1	0.0
	1 01	Separate Add ¼"	
91	1 13	K > 1	0.0
	1 39	Separate Remove ¼"	
92	1 50	K < 1	0.0
	2 15	Shut Down	

2.5 hr operation time

Stack U3-E 16 x 16 x 15½" high

Measured (40.814 x 40.796 x 39.569 cm high)

126 U(3%) F4 H/x = 279

Instrument Check on 6-1-66 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	>3x10⁻⁴	Meter Trip	OK	Test Trip	OK
IC-2	>3x10⁻⁴	Meter Trip	OK	Redlight	OK
IC-3	Response	Calibration	1 for R	alarm	
IC-4	Out	Calibration		Press Dif.	.07"
CRM		Meter Trip			

To build stack for irradiation of foils (mean cubic)

Expr. 93 19x20x18 3/4" high 10" on moveable table & 9" on fixed table

9:40 k<1

9:55 K<1 foils IN And NO Plexyglass

Shut Down to add plexiglass shim on rod shim. 1"x8"x20"

12:30 k>1 Shim all the way in

12:47 K=1 Using plexiglass shim to adjust Approx 2" out
k<1 ~~with 6 mil~~ shim 5 1/4" out.
Shut Down Add 1/4x2x20" of fuel on moveable table

7 bare foils of 2% U in paraffin.

12:58 Start timing at 7.5 on IC-3

k=1 at 23 on IC-3

1:08 PM Shut down.

Expr 94 2:05 7 Bare foils of 2% U in Paraffin

2:18 Start timing at 7.5 on IC-3

k=1 at 25 on IC-3

2:29 Shut Down

Expt 93 7 Bare foils of 2% U in paraffin

← E W →

-6"	-4"	-2"	0	+2"	+4"	+6"
B-34	B-42	B-29	B-10	B-32	B-35	B-28
~~0.644628~~	~~0.673573~~	~~0.871008~~	~~1.0~~			
0.644628	0.871008	0.974762	1.0	0.981287	0.864610	0.673573

Expt 94 7 Bare foils of 2% U in paraffin

-6"	-4"	-2"	0	+2"	+4"	+6"
B-30	B-26	B-2	B-1	B-27	B-17	B-14
0.652122	0.862486	0.971744	1.0	0.968171	0.861034	0.661518

2" out

20" S

Nominal 20" × 19" × (or 18¾" variable) 17

Stainless cans 51.038cm × 48.529cm ×

↑ Direction in which buckling is measured

128

3% H/A 279

Instrument Check on 6-2-66 Source _____

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Hi Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response ✓ Calibration S.S.R. Red light ✓

IC-4 Out Calibration _____ Bldg Alarm ✓

CRM _____ Meter Trip _____ Press Dif. 0.07"

Purpose; foil Exposure in Stack UF_4 3% 19x20x18 3/4" + 1/4x2x20

Using Plexyglass Shim to adjust Crit. 1"x8"x20"

Temp in cell = 66°F down ~10°F from yesterday

Removed the shim 1/4x2x20" of fuel from movable table.

Expr time		
95	9^{10}	7 Bare foils of 2% U in Paraffin
	9^{20}	Start timing at 7.5 on IC-3
		k>1 ~4.4¢ did not have enough shim to level.
	$9^{24.5}$	Shut down — power level at 8% on IC-3
		Removed 1/4 x 2 x 20" of fuel from N side of stack on movable table.
96	10^{43}	7 Bare foils of 2% U in Paraffin
	10^{54}	Start timing At 7.5 on IC-3
	11^{01}	k>1 ~3.2¢ Shut Down
		Removed 1/4 x 2 x 20" of fuel. Shaded area 18 1/2" high
97	1^{00}	7 Bare foils of 2% U in Paraffin
	1^{11}	Start timing At 7.5 on IC-3
	1^{21}	K=1 at 28 on IC-3 Using Plexyglass Shim to Adjust
		Shut Down
98	2^{40}	7 Bare Foils of 2% U in Paraffin
	2^{51}	K>1 Start timing At 7.5 on IC-3
	3^{01}	Shut Down

Tried to adj Thermostats. Temp. fluctuated constantly during day

Expt 95 7 Bare foils of 2% U in paraffin

-6"	-4"	-2"	0	+2"	+4"	+6"
B-20	B-31	B-3	B-24	B-38	B-33	B-40
0.659422	0.856915	0.979411 ~~0.979064~~	1.0	0.963365	0.857392	0.667925

Expt 96 7 Bare foils of 2% U in paraffin

-6	-4	-2	0	+2	+4	+6
B-0	B-12	B-36	B-6	B-5	B-11	B-17
0.658400	0.846222	0.992808	1.0	0.973275	0.868411	0.666979

Expt 97 7 Bare foils of 2% U in paraffin

-6	-4	-2	0	+2	+4	+6
0.664220	0.869053	0.976352	1.0	0.976224	0.845490	0.663697
B-21	B-15	B-41	B-25	B-7	B-22	B-13

Expt 98 7 Bare foils of 2% U in paraffin

-6	-4	-2	0	+2	+4	+6
C-4	C-5	C-16	~~C-20~~ C-29	C-8	C-24	C-7
0.657709	0.835379	0.962443	1.0	0.963252	0.829901	0.650303

130 [illegible] = 279

Instrument Check on 6-3-66 Source 10mcf

PM-1 Low Trip OK Alarm Trip OK

PM-2 Alarm Trip

IC-1 > 3X10⁻¹¹ Meter Trip OK Fast Trip OK

IC-2 > 3X10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S/R. Bld. alarm OK

IC-4 Out Calibration Pres diff: 0.07"

CRM Meter Trip

Purpose: Foil exposure. Stack 19X20X18 3/4" high using plexiglass shim 1"x8"x20" to adjust critical.

Expr	time	condition
99	10 50	K > 1 with Plexyglass in
	11 02	start timing At 7.5 on IC3
		K = 1 with Plexyglass out Approx 2.5" 24 on Ic-3
	11 12	Shut Down
100	1 10	7 Bare 2% u Paraffin foils
		K > 1 with Plexyglass in
	1 25	start timing At 7.5 on IC-3
	1 35	K = 1 with plexyglass shim out 2.75" 24 on IC-3
		Shut Down
101	2 33	7 Bare 2% u Paraffin foils
	2 41	K > 1 with Plexyglass in
	2 47	start timing At 7.5 on IC-3
		K = 1 with Plexyglass shim out 3" 24 on IC-3
	2 57	Shut Down

Expt 99 7 Bare foils of 2% V in paraffin

-6"	-4"	-2"	0	+2"	+4"	+6"
C-22	C-35	C-13	C-11	C-2	C-12	C-36
0.645676	0.845544	0.966191	1.0	0.971810	0.854605	0.660111

Expt 100 7 Bare foils of 2% V in paraffin

-6	-4	-2	0	+2	+4	+6
C-34	C-39	C-15	C-37	C-10	C-31	C-14
0.652542	0.845406	0.952196	1.0	0.949694	0.840732	0.652886

Expt 101 7 Bare foils of 2% V in paraffin

-6	-4	-2	0	+2	+4	+6
C-40	C-20	C-32	C-27	C-41	C-19	C-45
0.654293	0.846677	0.971499	1.0	0.955073	0.823019	0.651538

132 3% H/x 279

Instrument Check on 6-6-66 Source 10 mcr

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	> 3 X 10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 X 10⁻¹¹	Meter Trip	OK		Red light OK
IC-3	Responds	Calibration	1 fa.		Bld. alarm OK
IC-4	Out	Calibration			Press. dif 0.07
CRM		Meter Trip			

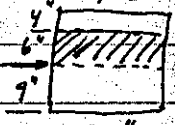
Temp in cell ~ 70°F

Purpose: Foil exposure to measure extrapolation distance

Exp. 102 13 bare gold foils

Tightened up stack for thinner foils and removed some fuel.

Stack now 19 X 20 X 18½" high + ¼" on shaped area



Shim is with 1" X 8" X 20" piece of plexiglass.

10 10 Start timing at 37 on IC-3

k = 1 at ~105 on IC-3. Shim ~ 4" out.

10 10 35 Shut Down

103 1 15 13 bare gold foils

1 25 Start timing At 37 ON IC-3 (30 MIN Exposure)

K > 1 with shim IN

10 1 30 K = 1 With shim out Approx 3" at 107 on IC-3

1 55 Shut Down

	Effn 102 13 Bare gold foils 2 mil, 5/16" dia, 48.3 mg		Effn 103 13 Bare gold foils 2 mil, 5/16" dia, 48.3 mg.	
Foil Position	Foil Ident.	(Foil/N) avg.	Foil Ident.	(Foil/N) avg.
-6"	D-1	0.657911	D-3	0.657955
-5"	D-22	0.751050	D-7	0.748447
-4"	D-31	0.841458	D-24	0.837106
-3"	D-9	0.905319	D-23	0.917295
-2"	D-20	0.958604	D-32	0.960266
-1"	D-6	0.999247	D-2	0.999955
0	D-8	1.0	D-14	1.0
+1"	D-16	0.988778	D-26	0.988759
+2"	D-11	0.954981	D-12	0.952999
+3"	D-18	0.898281	D-28	0.900006
+4"	D-5	0.836693	D-15	0.834500
+5"	D-30	0.754948	D-33	0.753679
+6"	D-17	0.648445	D-19	0.645162

134 3% H/x 279

Instrument Check on 6-7-66 Source 10 mcr

PM-1	Low Trip OK	Alarm Trip	
PM-2		Alarm Trip	
IC-1 ~~Response~~ 3X10-11	Meter Trip OK	Fast Trip OK	
IC-2 ~~Out~~ 3X10-11	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration	Bld. alarm OK	
IC-4 Out	Calibration	Press. Dif. 0.06"	
CRM	Meter Trip		

Temp in cell ~70°F

Stack same as Eppr 102-103

Eppr. 104 9^20 13 Bare Gold foils

K > 1 Shim IN

9^30 Start timing At 37 on IC-3

K=1 with shim out Approx 3" at 110 on IC-3

10^00 Shut Down

105 1^50 13 Bare foils (Gold)

K > 1 Shim IN

2^10 Start timing At 37 on IC-3

K=1 with shim out Approx. 3.5" At 110 on IC-3

3^40 Shut Down

Effn 104
13 Bare gold foils
2 mil, 5/16" dia, 48.2 mg.

Effn 105
13-Bare gold foils
2 mil, 5/16" dia, 48.4 mg.

Foil Position	Foil Ident.	(Foil/N) avg.	Foil Ident.	(Foil/N) avg.
-6"	C-2	0.664623	E-3	0.657868
-5"	C-1	0.763893	E-1	0.750647
-4"	C-13	0.842701	E-14	0.843834
-3"	C-7	0.918135	E-23	0.914662
-2"	C-12	0.963924	E-5	0.959080
-1"	C-9	0.997721	E-12	0.991485
0	C-5	1.0	E-15	1.0
+1"	C-20	0.984371	E-25	0.988430
+2"	C-6	0.954931	E-9	0.951076
+3"	C-19	0.906163	E-8	0.903501
+4"	C-18	0.838867	E-21	0.839033
+5"	C-16	0.763080	E-2	0.745698
+6"	C-11	0.642031	E-20	0.642945

136 3% Hx 279 Instrument Check on 6-8-66 Source

PM-1 Low Trip ✓ Alarm Trip

PM-2 Alarm Trip

IC-1 3×10^{-11} Meter Calib ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Calib ✓

IC-3 Response Calibration

IC-4 Calibration

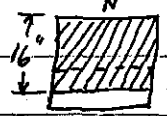
CRM Meter Calib

Red light ✓
Bldg Alarm ✓
Press Dif. 0.06"

~70°F Purpose: foil Exposure

Added some fuel to compensate for Cd. foil cover

Stack is 19X20X18½" high
+¼" on shaded area



Foil Pos
-6"
-4"
-2"
0
+2"
+4"
+6"

Expr time 7 Cd Covered Gold foils

106 9^{20} K>1 Shim IN

9^{44} Start timing At 37 on IC-3

K=1 with shim out Approx 3" At 125 on IC-3

10^{04} Shut Down

107 1^{03} 7 Cd Covered Gold foils

K>1 with shim IN

1^{17} Start timing At 37 on IC-3

K=1 With shim out Approx 3¼" At 120 on IC-3

1^{37} Shut Down

Expt 106
7 cd Covered gold foil
2 mil, 5/16" dia, 48.4 mg.
20 mil cd.

Expt 107
7 cd Covered gold foil
2 mil, 5/16" dia, 48.0 mg.
20 mil cd

Foil Position	Foil Ident.	(Foil/N) avg.	Foil Ident.	(Foil/N) avg.
-6"	E-4	0.653481	A-11	0.651793
-4"	E-13	0.842465	A-8	0.846499
-2"	E-7	0.960884	A-16	0.965558
0	E-22	1.0	A-4	1.0
+2"	E-24	0.960991	A-5	0.960796
+4"	E-18	0.845-849	A-12	0.836552
+6"	E-11	0.650720	A-19	0.643357

"high

138 3% H/X 279

Instrument Check on 6-9-66 Source _____

PM-1 _____ Low Trip ✓ Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response Calibration ✓ Red light ✓

IC-4 Out Calibration _____ Bldg Alarm ✓

CRM _____ Meter Trip _____ Pres. Dif. 0.06"

Purpose: Foil Exposure in ufty 3%

~70°F Stack same as Expr 106-107

Expr	time	
		7 cd Covered Gold foils
108	8^{25}	K>1 with shim in
	8^{43}	start timing At 37 on IC-3
		K=1 with shim out Approx 3.5" At 105 on IC-3
	9^{03}	Shut Down
109	1^{10}	7 cd Covered Gold foils
		K>1 Shim in
	1^{19}	start timing At 37 on IC-3
		K=1 with shim out Approx 3½" At 108 on IC3
	1^{39}	Shut Down

	Effic. 108		Effic. 109	
	Cd Covered gold foil		Cd Covered gold foil	
	.2 mil, 5/16" dia, 48.0 mg.		2 mil, 5/16" dia, 48.5 mg.	
	20 mil Cd.		20 mil Cd.	
Foil Position	Foil Ident	$(Foil/N)_{avg}$	Foil Ident	$(Foil/N)_{avg}$
-6"	A-6	0.650449	F-2	0.656538
-4"	A-18	0.845274	F-4	0.844472
-2"	A-14	0.963645	F-6	0.960029
0	A-3	1.0	F-1	1.0
+2"	A-13	0.957717	F-7	0.955330
+4"	A-15	0.839333	F-5	0.842851
+6"	A-10	0.650911	F-3	0.650598

140

Instrument Check on 6-10-66 Source _____

370 V H/X = 279

PM-1 _____ Low Trip ✓ Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response Calibration S.G.R Red light OK

IC-4 Response Calibration S.G.R Bldg Alarm ✓

CRM _____ Meter Trip _____ Press Dif 0.06"

~70°F

Purpose: foil Exposure on stack UF_6 3%

Same As Expr 108-109 Less 1/4" x 8" x 20"

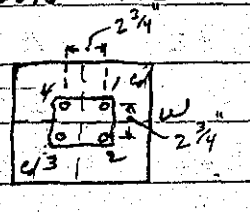
Expr time 2 cd covered Gold foils And 2 Bare Gold foils

110 9^{30} K > 1 Shim in

9^{55} start timing At 37 on IC-3

K = 1 Shim out APProx At 110 on IC-3

10^{10} Shut Down



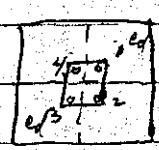
111 12^{55} 2 cd Covered ~~Gold~~ V-al alloy foils And 2 Bare ~~Gold~~ V-al alloy Foils

K > 1 Shim in

1^{10} start timing At 37 on IC-3

K = 1 Shim out Approx. 4" At 220 on IC-3

1^{30} Shut Down



Expt V(3)-110

2 Cd covered and 2 bare Gold foil
2 mil, 5/16" dia, 48.0 mg.

Pos. 1	2	3	4
A-7 Cd	A-1 Bare	A-9 Cd.	A-17 Bare.
	2/1 = 2.395000		4/1 = 2.398155
	2/3 = 2.389903		4/3 = 2.382183

avg Cd ratio = 2.391310

Expt -111

2 Cd covered and 2 bare U-al alloy (10% U) foils
5/16" dia,

Pos 1	2	3	4
C-2 Cd	C-3 Bare	C-4 Cd.	C-1 Bare
	2/1 = 11.749814		4/1 = 12.364487
	2/3 = 11.564234		4/3 = 11.855443

avg Cd ratio = 11.883495

142 U(3)F4 $\frac{H}{X} = 279$

Instrument Check on 6-14-66 Source 10 mc Ra

PM-1	Low Trip OK	Alarm Trip	
PM-2		Alarm Trip	
IC-1 7×10^{-11}	Meter Trip OK	Fast Trip OK	
IC-2 $> 3 \times 10^{-4}$	Meter Trip OK		Red light OK
IC-3 Responds	Calibration S.A.R.		Bldg. alarm OK
IC-4 Responds	Calibration S.A.R.		Press dif 0.07"
CRM	Meter Trip		

~70° F

Purpose: foil exposure to determine Cd ratio for ^{235}U metal
Stacks same as Eppr. 111

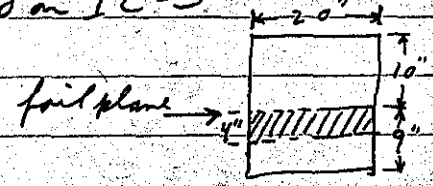
Eppr. 112 2 Cd covered and 2 bare ^{235}U metal foils

11^{00} $b > 1$ Pen. to foot to contact with shim. Separate and remove $\frac{1}{4} \times 4'' \times 20''$ Al foil from movable table. Now 19" x 20" x 11" plus $\frac{1}{4}$" in shaded area

11^{12} $b > 1$ Start timing at 6 on IC-3

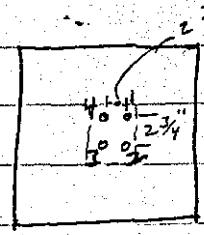
$b = 1$ Shim out ~2" at 20 on IC-3

11^{35} Shut down



Pos 1	2	3	4
4-1 Cd	4-2 Bare	4-3 Cd	4-4 Bare
	$2/1 = 9.337965$		$4/1 = 9.221216$
	$2/3 = 9.411023$		$4/3 = 9.322087$

Avg Cd Ratio = 9.323073



~70°F

U3.F 4/2-19

Instrument Check on 6-15-66 Source 10 mcr

PM-1	Low Trip OK	~~Alarm~~ Trip OK	
PM-2		Alarm Trip	
IC-1 > 3X10⁻¹¹	Meter Trip OK	Fast Trip OK	
IC-2 > 3X10⁻¹¹	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration S.J.R.	Bldg alarm OK	
IC-4 Responds	Calibration S.J.R.	Press dif 0.06"	
CRM	Meter Trip		

Purpose: foil exposure to determine Cd Ratio for ^{235}U metal.
Stack same as Expt 112.

Expt 113 2 Cd covered and 2 bare ^{235}U metal foils.

9:38 to 7 Shim in at 3.7 on IC-3
9:44 Start timing at 10 on IC-3 Shim out ~ 1 3/4"
9:54 Shut down

Pos 1	2	3	4
U-12 Cd	U-16 Bare	U-19 Cd	U-21 Bare
	2/1 = 9.785813		4/1 = 9.725392
	2/3 = 9.186458		4/3 = 9.159938

Avg Cd Ratio = 9.464400

144 U(3) F_4 $H_x = 279$

Instrument Check on 6-21-66 Source 10 mcV

PM-1		Low Trip	OK	Alarm Trip	
PM-2				Alarm Trip	
IC-1	$>3 \times 10^{-11}$	Meter Trip	OK	Fast Trip	OK
IC-2	$>3 \times 10^{-4}$	Meter Trip	OK		Red light OK
IC-3	Responds	Calibration	1 fa.		Bld. alarm OK
IC-4	Responds	Calibration	1 fa		Press dif 0.06"
CRM		Meter Trip			

~ 70°F

Purpose: foil irradiation to determine Cd Ratio for .001" Au.

Stack same as Expt 113.

Expt 114 2 Cd covered and 2 bare .001" Gold foils. 5/16" dia.

9^{30} $b > 1$

9^{35} Start timing at 37. on IC-3

$b = 1$ at 100 on IC-3 Stack ~ 2" out

9^{50} Shut down

Expt 2

Pos 1	2	3	4
406 Cd	407 Bare	408 Cd	402 Bare
	$2/1 = \frac{2.090\,493}{2.072\,895}$		$4/1 = \frac{2.096\,711}{2.091\,996}$
	$2/3 = \frac{2.061\,089}{2.048\,049}$		$4/3 = \frac{2.055\,584}{2.055\,584}$

Avg Cd Ratio = ~~2.067134~~ 2.075 895

Red values corrected for variation in foil wt.

U(3) F_4 $H/x = 279$

PM-1	Low Trip	Alarm Trip
PM-2		Alarm Trip
IC-1	Meter Trip	Fast Trip
IC-2	Meter Trip	
IC-3	Calibration	
IC-4	Calibration	
CRM	Meter Trip	

~70° F

Instrument Check on 6-22-66 Source 10 mcy

PM-1		Low Trip	OK	Alarm Trip OK
PM-2				Alarm Trip
IC-1	$> 3 \times 10^{-11}$	Meter Trip	OK	Fast Trip OK
IC-2	$> 3 \times 10^{-11}$	Meter Trip	OK	
IC-3	Responds	Calibration	S/A	Red light OK
IC-4	Responds	Calibration	S/A	Bld alarm red light OK does not alarm
CRM		Meter Trip		Press dif 0.06" on 2 of 3.

Foil irradiation to determine Cd Ratio for Ln. Stockroom Eqp 113
Eqpt. 115 2 Cd covered and 2 bare In-Al. alloy foils 0.010" 10% In.

2^{24} $b > 1$

2^{32} Start Timing at 15 on IC-3
$b = 1$ at 40 on IC-3, Shim ~ 2" out.

2^{47} Shut Down

Pos 1	2	3	4
13 Cd	12 Bare	11 Cd.	22 Bare.
	$2/1 = 1.688639$		$4/1 = 1.695095$
	$2/3 = 1.681933$		$4/3 = 1.680187$

Avg Cd. Ratio = 1.686 464

U(3) F4 H/X = 279

~ 10°F Instrument Check on 6-23-66 Source 10 mcr

PM-1 _____ Low Trip OK Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 > 3X10⁻¹¹ Meter Trip OK Fast Trip OK

IC-2 > 3-X10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S.J.R. Bld. Alarm OK

IC-4 Responds Calibration S.J.R. Press. Dif. 0.06"

CRM _____ Meter Trip _____

Foil irradiations to determine Cd Ratio for Sn.
Stack same as Eppn. 113.

Eppn. 116 2 Cd covered and 2 bare Sn(10) - Al alloy foils 0.010" x 5/16" dia.

10⁵⁴ k > 1

11⁰² Start timing at 15 on IC-3

k = 1 at 42 on IC-3 Shim out ~ 2"

11¹² Shut Down

Eppn 117 Repeat of Eppn 116. One of the foils in Eppn 116 was lost before it could be counted.

12⁵² k > 1

1⁰⁰ Start timing at 15 on IC-3

k = 1 at 42 on IC-3 Shim out ~ 2½"

1¹⁰ Shut down.

Eppn 118 2 Cd covered and 2 bare Gold foils 0.001" x 5/16" dia.

2¹⁰ k > 1

2¹⁷ Start timing at 70 on IC-3

k = 1 at 220 on IC-3 Shim out ~ 2¾"

2³⁵ Shut Down

Expt. 117

2 Cd covered and 2 Bare In (10) - al foils 0.010" x 5/16" dia.

Pos 1	2	3	4
J1 Cd	J2 Bare	J10 Cd.	J4 Bare
	2/1 = 1.712672		4/1 = 1.712227
	2/3 = 1.738207		4/3 = 1.726397

Avg Cd. Ratio = 1.722376

Expt 118

2 Cd. covered and 2 Bare Gold foils 0.001" x 5/16" dia.

Pos 1	2	3	4
401 Cd	404 Bare	405 Cd.	400 Bare
	2/1 = ~~1.825733~~ 2.099494		4/1 = ~~2.150676~~ 2.150676
	2/3 = ~~1.862813~~ 2.067851		4/3 = ~~2.148000~~ 2.073628

Avg Cd. Ratio = ~~1.996831~~ 2.097912

Red values corrected for variation in foil wt.

148 V(3) F_4 $H/x = 279$

Instrument Check on 6-24-66 Source 10 mcr

PM-1 ____ Low Trip OK Alarm Trip ____

PM-2 ____ Alarm Trip ____

IC-1 > 3×10^{-11} Meter Trip OK Fast Trip OK

IC-2 > 3×10^{-11} Meter Trip OK Redlight OK

IC-3 Responds Calibration S/A Old alarm OK

IC-4 Responds Calibration S/A 0.05" Press Sf.

CRM ____ Meter Trip ____

~10 OF

Foil Irradiation to determine Cd. Ratio for Gold

Stack same as Eppr 113

Eppr 119 2 Cd covered and 2 Bare Gold foils 0.005" x 5/16" dia.

9^{24} $k > 1$

9^{31} Start timing at 37 on IC-3

$k = 1$ at 100 on IC-3 Shim out ~ 2 3/4"

9^{51} Shut down.

Expr 120 11^{05} 2 Cd Covered AND 2 Bare Gold foils 0.005" x 5/16" DIA

11^{10} $K > 1$

11^{16} Start timing AT 37 ON IC-3

$K = 1$ AT 108 ON IC-3 Shim out Approx.

11^{36} Shut DOWN

Expr 121 2 cd Covered AND 2 Bare Gold Foils 0.002" x 5/16" DIA

1^{15} $K > 1$

1^{26} Start timing AT 55 ON IC-3

$K = 1$ AT 155 ON IC-3 Shimout Approx 2 1/2"

1^{46} Shut DOWN

Expt 119

2 Cd covered and 2 Bare Gold foil 0.005" x 5/16" dia

Pos 1	2	3	4
513 Cd.	502 Bare	507 Cd	501 Bare
	2/1 = 2.860442		4/1 = 2.849185
	2/3 = 2.821367		4/3 = 2.806651

Avg Cd Ratio = 2.834411

Expt 120 - 2 Cd covered and 2 Bare Gold foil 0.005" x 5/16" dia

Pos 1-503 Cd.	2-505 Bare	3-511 Cd	4-512 Bare
	2/1 = 2.857620		4/1 = 2.877252
	2/3 = 2.820568		4/3 = 2.825895

Avg Cd Ratio = 2.845334

Expt 121 2 Cd covered and 2 Bare Gold foil - 0.002" x 5/16" dia

Pos 1	2	3	4
E16 Cd	E17 Bare	E10 Cd	E19 Bare.
	2/1 = 2.385726		4/1 = 2.419150
	2/3 = 2.387170		4/3 = 2.387478

Avg Cd Ratio = 2.394881

150 (3) F4 M/X-279 Instrument Check on 6-27-66 Source _____

PM-1 _____ Low Trip ✓ Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response ✓ Calibration _____ Red light ✓

IC-4 Response ✓ Calibration _____ Bldg Alarm ✓

CRM _____ Meter Trip _____ Press Dif. 0.06"

~65.4 to 69°F manually raised to 70°F during day on 27th.

Purpose: Foil irradiation to Determine Cd Ratio for U-Al stack same as 121

Expr time 2 Cd Covered AND 2 Bare U-Al foils 0.005" x 5/16", 16.6mg

122 q^{20} K>1

q^{31} start timing at 70 on IC-3

q^{50} K=1 At 220 on IC-3 Shim out ~ 3"

q^{51} Shut Down

Pos 1	2	3	4
C-4 Cd	C-2 Bare	C-1 Cd.	C-3 Bare
	2/1 = 11.410698		4/1 = 12.053914
	2/3 = 11.887876		4/3 = 11.818145

Avg Cd Ratio = 11.792658

Expr t
123=3

Expr time	Purpose: Arrange Stack UF_4 3% for temp Coef Measurement
123 3 00	
3 11	K > 1
3 18	Separate to Adjust Counters And Stack
3 33	K > 1
3 47	Separate
~~3 55~~	
3 55	K > 1
H 06	Separate - Shut Down

152 V(3) F4 H/X-279 Instrument Check on 6-28-66 Source 5 mc Ba

V(3) F4

PM-1 _____ Low Trip ✓ Alarm Trip _____

PM-2 _____ Trip _____

IC-1 10×10^{-12} Meter [illegible] Fast Trip ✓

IC-2 10×10^{-12} Meter Trip ✓

IC-3 Response ✓ Calibration 5 & f Red light ✓

IC-4 Response ✓ 5 & f Bldg Alarm ✓

CRM _____ Meter Trip _____ Press Dif. 0.06"

Purpose: temp Coef Measurement

Room thermostat setting - 74°F

Expr	time				
			Thermistor from mated	on 24 hr recorder	
			C	temp	F
124	9^{00}	K>1 V3-124	20.75	70°	F
	9^{16}	Separate to lower Power			
125	9^{22}	K>1 V3-125			
	9^{40}	Separate to lower Power ✓			
126	9^{57}	K>1 V3-126			
	10^{10}	Separate Shut Down	20.73°C	70°F	

Raised thermostat setting to 84°F

placed two large tubes that fans on top of return air duct to help circulate the air in the cell.

2^{30}	25.47°C	78 °F	
3^{20}	25.00	77.5	
4^{20}	25.05	78.5°F 77.5	

Stack is nominally 19" x 23" x ~18¾" high. Height is uneven and was adjusted to give ~14¢ free f at this temp. Stack will not be touched until temp coef measurements are completed.

Expr
126
128
129
130

U(3) F4 11/x=279 Instrument Check on 6-29-66 Source Sncr 153

PM-1 _____ Low Trip ✓ Alarm Trip _____
PM-2 _____ Alarm Trip _____
IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓
IC-2 3×10^{-11} Meter Trip ✓
IC-3 Response ✓ Calibration S & R Red light ✓
IC-4 Response ✓ Calibration S & R Bldg Alarm ✓
CRM _____ Meter Trip Press Dif 0.06"

Purpose; temp Coef Measurement

Expr	time	Cond	temp C	Recorder temp f #1	#2
128	9 10	K > 1	25.4	77.5	79
	18 13	Separate to Lower Power			
128	10 43	K > 1			
	11 43	Separate 12"	25.45	77.5	79
129	12 25	K > 1	25.40	77.5	79
	1 20	Separate to lower Power	25.45	78	79
130	2 55	K > 1	25.40	78	78
	4 07	Shut Down	25.30	78	78.5

154 V(3) F4 H/X = 279

Instrument Check on 6-30-66 Source 5 mcr

PM-1 Low Trip OK Alarm Trip

PM-2 Low Trip

IC-1 > 3×10^{-11} Meter Scale OK Fast Trip OK

IC-2 > 3×10^{-11} Meter Scale OK Redlight OK

IC-3 Responds Meter Scale 1/2 Aud. alarm OK

IC-4 Responds Meter Scale 1/2 Pressdif 0.06"

CRM Meter Scale

Temp Coef. Measurement

Expr	time		C	temp #1	F #2
131	9^{00}	K > 1	25.45	78	79
	9^{23}	Start counting at 0.75 on IC-3			
	10^{27}	Separate to lower Power			
~~132~~	10^{45}	~~K > 1~~ Shut Down	25.50	78	79
132	12^{42}	K > 1	25.50	78	79
	1^{00}	Start Counting At .76 on IC-3			
	2^{23}	Shut Down	25.20	78	79
	4^{18}	→	25.40	78	79

Expr
133
1341

U(3) F_4 H_x = 279 Instrument Check on 7-1-66 Source 5 Mcr

PM-1 _____ Low Trip ✓ Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response ✓ Calibration _____

IC-4 Response ✓ Calibration _____

CRM _____ Meter Trip _____

Red light ✓

Bldg Alarm ✓

Press Dif 0.06"

temp Coef Measurement

Expr	time		c	temp F #1	temp F #2
133	8 55	K > 1	25.4	77.5	78+
	9 01	Start counting 1.8 on IC-3			
	10 03	Sparate			
134	10 17	K > 1			
	10 31	Start Counting At 1.1 on IC-3			
	11 40	Separate - Shut Down	25.2	77.5	78
		Change temp Control from 84° to 90°			
	1 04		27.55	82	83
		Change temp Control from 90° to 94°			
	1 45		28.30	82.5	84
	3 45		28.70	83.5	84+
	4 18		28.80	84	84.5
	9 20 PM	3 July 66	29.2	84.5	86.3

156 V③F4 11/X-279 Instrument Check on 7-5-66 Source 5 Mcr

PM-1 _____ Low Trip ✓ Alarm Trip _____
PM-2 _____ Low Trip _____
IC-1 3X10⁻¹¹ ✓ Test Trip ✓
IC-2 3X10⁻¹¹ ✓
IC-3 Response ✓ S&R Red light ✓
IC-4 Response ✓ S&R Bldg Alarm ✓
CRM _____ Meter _____ Press Dif ✓

Purpose: temp. Coef Measurement

Expr	time		C temp	Recorders #1	#2	
135	9¹⁵	K > 1	29.2	85	86.5	Expr
	9³⁰	Start counting At 20 on IC-3				9
	9⁴⁰	Separate				135 10
136	9⁵⁰	K > 1	29.2			
	10⁰⁰	Start counting At 30 on IC-3				
	10¹¹	Separate				139
137	10¹⁹	K > 1	29.4	85	86.3	
	10³⁰	Start Counting At 35 on IC-3				
	10⁴⁴	Separate — Shut Down				140
10⁴⁰		Set temp Control on ~~86~~ 87°				
4⁰⁰		5 July 66	27.3	81.0	82.2	
8¹⁵		6 July 66	27.2	81.0	82.0	
4²⁰		6 July 66	27.0	80.8	82.0	

V(3) F4 H/x = 279

Instrument Check on 7-7-66 Source 10 mcY

PM-1 _____ Low Trip OK Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 > 3x10⁻¹¹ Meter Trip OK Fast Trip OK

IC-2 > 3x10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S/C. Obj alarm OK

IC-4 ~~Responds~~ out Calibration _____ Press diff. 0.05"

CRM _____ Meter Trip _____

Temp Coef Measurement

Exp Time			8:40 AM	°C (ther)	Temp Rec. 1	Temp Rec 2
	9:50			27.0	81	82
				27.2	80.9°F	82.0°F
138	10:05	b > 1				
	10:13	K < 1 Start Counting At 30 on IC-3				
	10:37	Separate				
139	10:46	b > 1				
	10:52	b < 1 Start counting at ~32 on IC-3				
	11:13	Separate				
140	11:18	K > 1				
	11:28	b < 1 Start counting at ~34 on IC-3				
	11:50	Shut Down		27.0	81°F	82°
	11:57	Change temp Control from 87° to 82°				
	2:00 PM	operation for Public Relations movie.				
	3:00	b > 1				
	3:20	Shut down.				
	3:50	Change Temp control from 82° to 80°F				

158 V81F4 H/x = 279

		°C	Temp Rec #1	Rec #2
7-8-66	9 15 AM.	23.23	75.2	76
	12 00	23.5	75.4	76.2
	3 40 PM	23.4	75.0	76.1

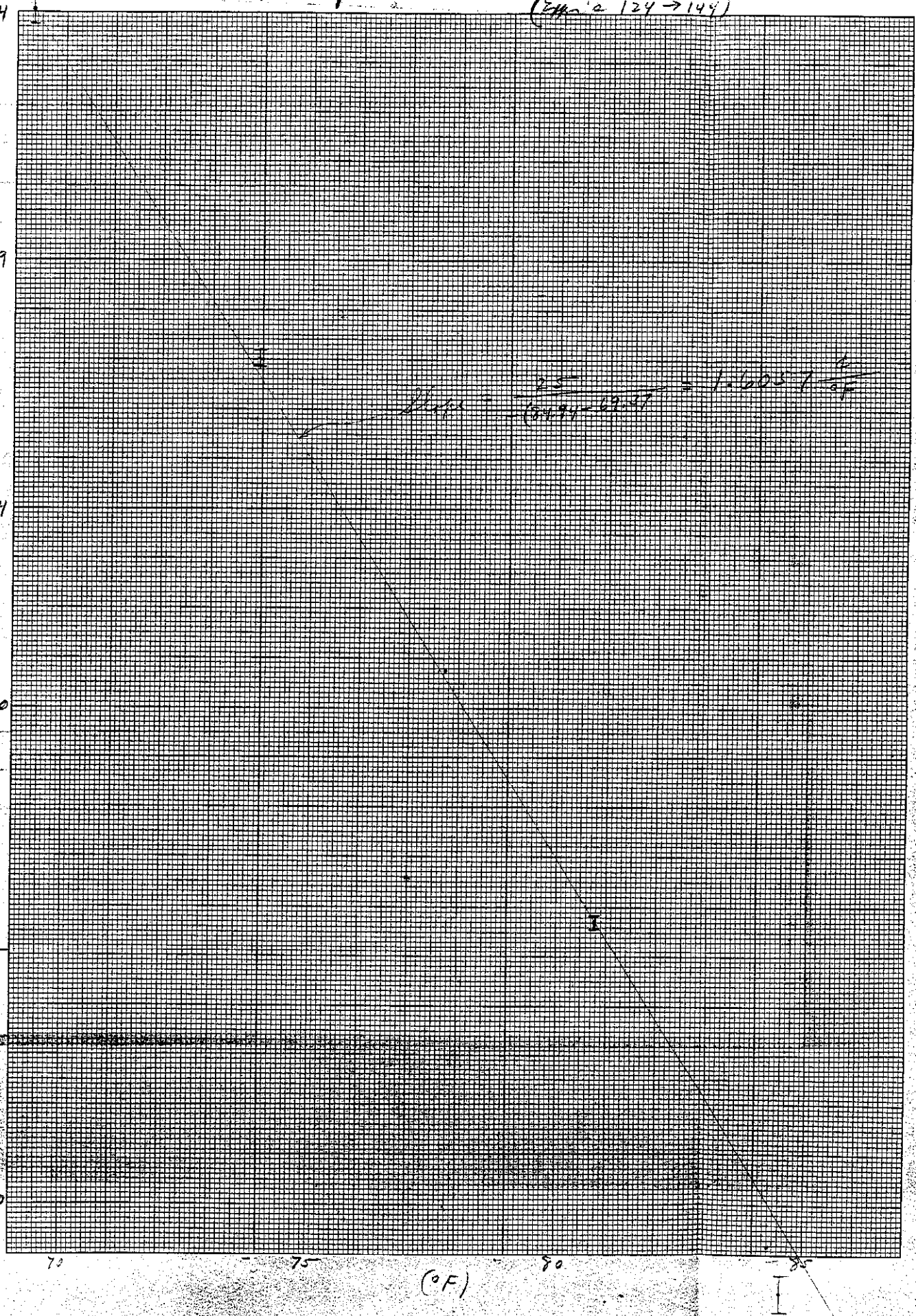
Instrument Check on 7-11-66 Source 10 mcr

PM-1		Low Trip	OK	Alarm Trip	
PM-2				Alarm Trip	
IC-1	> 3 x 10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 x 10⁻¹¹	Meter Trip	OK		Red light OK
IC-3	Responds	Calibration	1 pR.		Rdg. Alarm OK
IC-4	Out	Calibration			Pairs diff. 0.05"
CRM		Meter Trip			

Exp Time — temp Coef measurement

Exp Time			°C (Therm)	Temp °F Rec #1	Rec 2
141	8 32	K > 1	23.2	74.5	76.0
		Start Counting At 0.7 on IC-3			
	8 56	Separate			
142	9 00	K > 1			
		start Counting At 0.5 on IC-3			
	9 19	Separate - Check temp	23.3	74.5	76.0
143	9 27	K > 1			
	9 36	Start Counting at 0.6 on IC-3			
	9 47	Separate			
144	10 00	K > 1			
	10 01	start counting At .5 on IC-3			
	10 3	Separate Shut Down			
	11 08		23.3	74.5	76.0

Temp. Coef. U(3) F_4 in Paraffins $H/_{250}V = 278.7$
(Eqns 124 → 144)



$$\text{Slope} = \frac{25}{(84.94 - 62.47)} = 1.1037 \frac{\text{ft}}{^\circ\text{F}}$$

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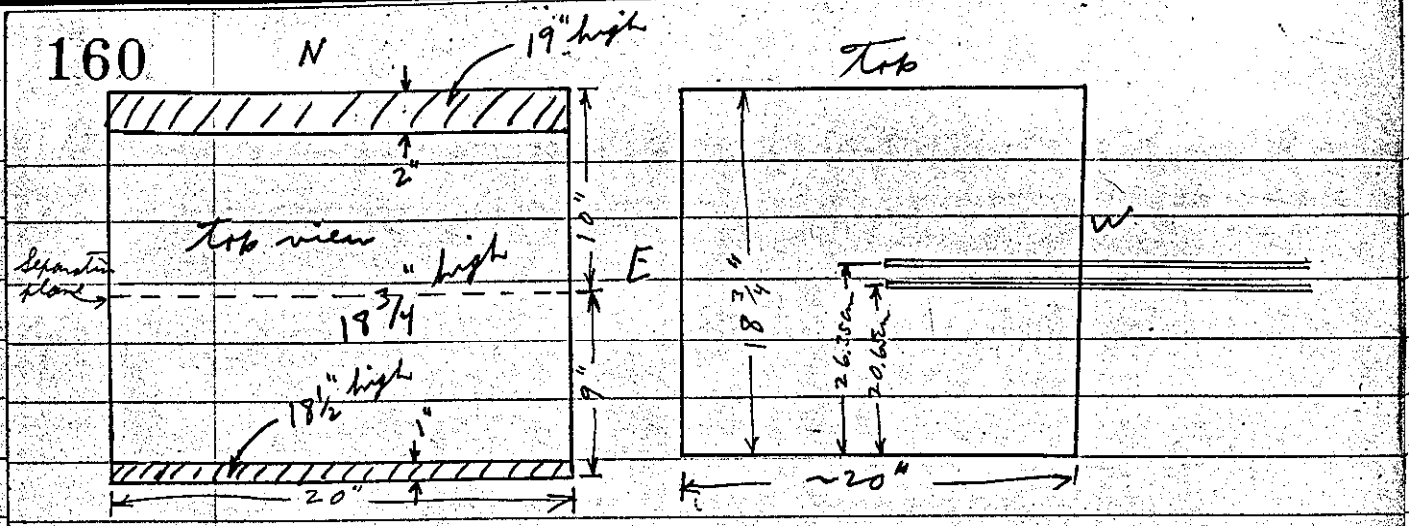


Expt 145 Ch #2 with U^{235} (Top Pos.) Pre Amp 696 = 9,239,295 / 45 min 623.645
Ch #4 with U^{238}, Pre Amp 694, (Ref. Pos.) = 14,815 / 45 min 16:03477 x 10⁻⁴

Expt 146 Ch #2 with U^{238} (Ref. Pos.) Pre Amp 696 = 14,135 / 45 min 645.400
Ch #4 with U^{235} (Top Pos.) " " 694 = 9,122,735 / 45 min 15.49426 x 10⁻⁴

Expt 147 Ch #2 with U^{238} (Top Pos.) = 14,555 / 45 MIN 644.923
Ch #4 with U^{235} (Ref Pos.) = 9,386,855 / 45 min 15.505 73

Expt 148 Ch #2 with U^{235} (Ref Pos.) = 9,306,185 / 45 min 625.206
Ch #4 with U^{238} (Top Pos.) = 14,885 / 45 min 15.99474
avg =

Meas. Stack dimen = 19.096 in x 20.091 in x 18.852 in. high
= 48.505 cm x 51.030 cm x 47.884 cm high

~75°F on Rec #2 V(3)-F4 H/X #279

Instrument Check on 7-18-66 Source 10 mCi

PM-1 Low Trip OK Alarm Trip

PM-2 Alarm Trip

IC-1 ~3x10⁻¹¹ Meter Trip OK Fast Trip OK

IC-2 >3x10⁻⁴ Meter Trip OK Red light OK

IC-3 Responds Calibration Spk. Bldg alarm OK

IC-4 out Calibration Press diff. 0.06"

CRM Meter Trip

Purpose: To meas U^{235}/U^{238} fission ratio in center of cube.

Expt 145 Have restacked top half of stack on fixed table and placed a 1/4" U^{235} fission Ch. (← Det #5-3) and a 1/4" U^{238} fission Ch (← Det #8-2) in closing plane as shown on p. 160. see p 40

623.645 Counting channel #2 – Amp. Y-140347, Scaler Y-120247, Pre Amp. 696

" " #4 – Amp. Y-102541, Scaler Y-120248, Pre Amp 694

645.400 11⁰⁷ Start counting Power = 3.84 on 3x10⁻⁸ Scale IC-2, 9.7 on IC-3

644.923 11⁵² Shut down

Expt 146 Swapped ~~Pre Amps~~ Counting channels on detectors. Left detectors in same pos.

Ch #2 Pre AMP – 694 Ch #4 Pre AMP = 694

625.206 12³² Start Counting Power = 3.75 on 3x10⁻⁸ Scale IC-2 9.8 on IC-3

1¹⁷ Shut down

Expt 147 Swapped detector pos.

2 in. high 1⁴⁴ start Counting Power = 3.85 on 3x10⁻⁸ IC-2 10 on IC-3

1 cm high 2³⁰ Shut Down

Expt 148 Swapped counting Ch. on detectors. Left det. in same pos.

3⁰² start Counting Power = 3.82 on 3x10⁻⁸ IC-2 10 on IC-3

3⁴⁷ Shut Down

Used plexiglass shim 7/8" x 5 x 5 7/8", ~1.5" out for b=1

V(3)F4 14/X = 279

Instrument Check on 7-21-66 Source 10mcV

PM-1		Low Trip OK	Alarm Trip	
PM-2			Alarm Trip	
IC-1	> 3x10-11	Meter Trip OK	Fast Trip OK	
IC-2	> 3x10-11	Meter Trip OK	Red light OK	
IC-3	Responds	Calibration Sys	Alg alarm ok	
IC-4	Responds	Calibration Sys	Press Diff: 0.05"	
CRM		Meter Trip		

Purpose: To reassemble the stack used in Expts 72→82 and adjust detectors in preparation for measuring width of support structure on this assembly.

Expt 149 — 16 x 16 x 44" high

$k < 1$ ~~$\Delta k/o$~~ shim

2nd Separate to Add Fuel 2" 16"x16"x46"

$k < 1$ ~ 7.4 ¢

3rd Separ. Shut Down

15

15

15

15

15

V(3) F4 H/x - 279

Instrument Check on 7-22-66 Source 10 mc Ra

PM-1 _____ Low Trip OK Alarm Trip _____
PM-2 _____ _____ Alarm Trip _____
IC-1 > 3 x 10⁻¹¹ Meter Trip OK Fast Trip OK
IC-2 > 3 x 10⁻¹¹ Meter Trip OK Red light OK
IC-3 Responds Calibration S for R. Bldg alarm OK
IC-4 Responds Calibration S for R Prim Diff 0.05"
CRM _____ Meter Trip _____

Purpose to measure worth of support structure on tall stack.

Expt 150 16 x 16 x 46"
9^{08} k<1 W/o shim
9^{19} Shut down to add 1" of fuel.
9^{35} Stack 16" x 16" x 47"
9^{47} K~1 table sep 3.4" with shim
K>1 " " 0.0" W/o shim
9^{50} Separate to move counters Resistivities are averages of 3 counts and 1 in N.
151 10^{12} k>1 W/o Shim 16 x 16 x 47" ρ = 5.083¢
10^{19} Start counting at 1.2 on IC-3.
10^{30} Separate
152 12^{45} k>1 16 x 16 x 47" high + Al. boxes and steel plate on top.
Start counting at .5 on IC-3 ρ = 6.887¢
1^{04} Separate to Remove Al Boxes and Steel Plate
153 1^{20} K>1 W/o Shim ρ = 4.337¢
Start counting at .5 on IC-3
1^{46} Separate
154 2^{25} K>1 16"x16"x47" + Al Boxes and steel 11" on top ρ = 5.208¢
2^{49} Separate to Remove Al Boxes and Steel Plate
155 3^{10} K>1 W/o Shim ρ = 4.472¢
3^{36} Shut Down Avg Worth of Support Struct = 1.490¢ ± 0.737

164

V(3) F_4 $H/X = 279$

Instrument Check on 29 July 66 Source 10 mc Ra

PM-1 _____ Low Trip OK Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 $> 3 \times 10^{-11}$ Meter Trip OK Fast Trip OK

IC-2 $> 3 \times 10^{-11}$ Meter Trip OK Red light OK

IC-3 Respond Calibration _____ Alg alarm OK

IC-4 Respond Calibration _____ Press diff. 0.05"

CRM _____ Meter Trip _____

Purpose to check counters and counting rate. Plan Exp 156 to run experimental investigation of effect of Cd and paraffin shields on data from BF_3 detectors. Have 2 - 2" BF_3 det. covered with Cd and paraffin and a 3rd 1/4" BF_3 det. that will be used ~~xxxx~~ with various Cd + paraffin shields.

1 45 $b > 1$ 16x16x47" stack with plexiglas shim

2 00 $b \simeq 1$ expan. = 3.4 rev. " "

2 17 Separate To add paraffin + Cd to C-1

2 23 $b > 1$

2 32 $b \simeq 1$ expan = 3.4 rev

2 38 Shut down

V(3) F_4 $H/x = 279$

Instrument Check on 1 Aug 66 Source 10 mc/

PM-1 _____ Low Trip OK Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 $7 \times 3 \times 10^{-11}$ Meter Trip OK Fast Trip OK

IC-2 $> 3 \times 10^{-11}$ Meter Trip OK Red light OK

IC-3 Responds Calibration S/A. Oldg diam OK

IC-4 Respond Calibration S/A. Pres diff 0.05"

CRM _____ Meter Trip _____

To check effect of Cd + paraffin on period mean with BF_3 det.

Effm 1s-7 9^{00} AM $k > 1$ 16x16x47" stack with plexiglass shim

Check counter.

9^{19} Start counting at 0.5 on IC-3 Det 1 in Cd lined paraffin

Shut down to check scaler on Ch. 2. Replaced scaler.

158 10^{42} Start counting at ~0.7 on IC-3 Det 1 in Cd lined paraffin.

159 11^{10} $k > 1$

11^{17} Start counting at ~0.53 on IC-3 Det 1 bare

11^{30} Shut down Det 1 may have moved during run

160 12^{47} $K > 1$ Det 1 in Cd lined paraffin

12^{57} Start counting at ~0.5 on IC-3

1^{10} Shut DOWN

161 1^{25} $K > 1$ Det 1 bare

1^{31} Start counting at ~0.5 on IC-3

1^{43} Shut DOWN

162 1^{50} $K > 1$ Det 1 in Cd lined paraffin.

2^{00} Start counting ~0.5 on IC-3

2^{12} Shut down

163 2^{25} $K > 1$ Det 1 bare.

2^{36} Start counting ~0.5 on IC-3

2^{47} Shut DOWN

166

V(3) F4 H/x = 279

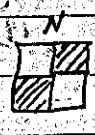
Instrument Check on 2 Aug 66 Source 10 mcV

PM-1	Low Trip OK	Alarm Trip	
PM-2		Alarm Trip	
IC-1 > 3x10⁻¹¹	Meter Trip OK	Fast Trip OK	
IC-2 > 3x10⁻¹¹	Meter Trip OK	Redlight OK	
IC-3 Responds	Calibration S/R.	Bldg Alarm OK	
IC-4 Responds	Calibration S/R.	Press dif. 0.05"	
CRM	Meter Trip		

Have restacked blocks to make 32"x32"x12" high assembly.

Expo

164	12^{46}	$k<1$	with $8\frac{1}{2}\times15\frac{1}{2}\times1$" plexiglass shim added $\frac{1}{4}$" on SW and NE quadrants.
165	1^{10}	$k>1$	with $8\frac{1}{2}\times15\frac{1}{2}\times1$" plexiglass
		$k>1$	Dep ~1.7 rem. W/O plexiglass
		$k>1$	Table closed W/O plexiglass
166	1^{45}	$k>1$	removed $\frac{1}{4}$" from NE quadrant. with plexiglass
	2^{11}	$k<1$	W/O plexiglass
		Shut down to change plexiglass shim	
167	2^{25}	$K>1$	With Plexyglass
	2^{32}	$K<1$	W/O Plexyglass
	2^{50}	Shut Down	



168

169

170

171

V(3) F_4 $H/X = 279$

Instrument Check on 5 Aug 66 Source 10 mcr

PM-1		Low Trip OK	~~Alarm~~ Trip
PM-2			Alarm Trip
IC-1	$>3\times10^{-11}$	Meter Trip OK	East Trip OK
IC-2	$>3\times10^{-11}$	Meter Trip OK	Red light OK
IC-3	Response	Calibration N.G.R.	Bldg alarm OK
IC-4	Response	Calibration N.G.R.	Press dif. 0.05"
CRM		Meter Trip	

H. Perturbation meas. on short stack.

Added 1/4" to NE quad. 32"x32"x12" + 1/4" on shaded area.

168 9^{40} $k>1$ with large plexiglas

$k=1$ separ. = ~ check counters.

10^{20} Shut Down moved det on C-2, + C-4 down to assembly

169 1^{35} $k>1$ No plexiglas Start counting at ~0.5 on IC-3

1^{50} Shut Down $\rho = 10.720\,\phi$ Avg of 2 counters + 1 on N.

170 2^{00} $K<1$ Removed 1/4" from SW quad.

7 Start counting at ~ 35 on IC-3 $\rho = -12.738\,\phi$

2^{28} Shut Down

171 3^{35} $k>1$ Added 1/4" on SW quad. Start counting at ~0.5 on IC-3

3^{50} Shut Down $\rho = 10.656\,\phi$

168

V(B) F_4 $H/X = 279$

Instrument Check on 8 Aug 66 Source 10 mcr

PM-1 _____ Low Trip OK Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 $> 3 \times 10^{-11}$ Meter Trip OK Fast Trip OK

IC-2 $> 3 \times 10^{-11}$ Meter Trip OK Red light OK

IC-3 Responds Calibration S/R. Hg Alarm OK

IC-4 Responds Calibration S/R. Press. Diff. 0.05"

CRM _____ Meter Trip _____

HT Perturbation Meas. on short stack

32" x 32" x 12" + 1/4" on shaded quadrants.

N

172 9^{14} $k > 1$ $\rho_1 = 9.939$ $\rho_3 = 10.074$ $\rho_2 = 10.070$ $\rho_N = 10.063$ $\rho_{avg} = 10.012$

9^{28} Separate

173 9^{36} $k > 1$ with Shim $\rho_1 = -13.091$ $\rho_2 = -13.372$ $\rho_3 = -13.675$ $\rho_N = -13.662$

9^{55} $k < 1$ Start counting at ~~40~~ 45 on IC-3

10^{06} Separate

174 10^{17} $k > 1$ $\rho_1 = 8.910$ $\rho_3 = 9.102$ $\rho_2 = 9.218$ $\rho_N = 9.264$ $\rho_{avg} = 9.124$

$k > 1$ Start Counting at ~.5 on IC-3

10^{32} Separate

175 10^{47} $k > 1$ with Shim $\rho_1 = -13.175$ $\rho_3 = -13.996$ $\rho_2 = -14.326$ $\rho_N = -14.089$

11^{04} $k < 1$ Start counting at ~ 40 on IC-3

11^{14} Separate

176 11^{25} $K > 1$ $\rho_1 = 8.483$ $\rho_3 = 8.657$ $\rho_2 = 8.779$ $\rho_N = 8.980$

11^{32} $k > 1$ Start Counting at ~ 0.5 on IC-3

11^{40} Separate

177 12^{20} $K > 1$ whith Shim

12^{39} $k < 1$ Start counting at ~.40 on IC-3

12^{50} Separate $\rho_1 = -14.501$ $\rho_3 = -14.577$ $\rho_2 = -15.013$ $\rho_N = -15.190$

178 179 180 181 182

Temp ~ 74.1 °F from thermometer by 12" from stand
~ 75 °F on recorder in NW corner of room.

178 1^{05} K>1 $\rho_1 = 7.149$ $\rho_3 = 7.918$ $\rho_2 = 8.002$ $\rho_N = 8.034$
1^{14} b>1 Start counting at ~ 0.5 on IC-3
1^{23} Separate

179 1^{35} b>1 w ith Shim
1^{54} b<1 Start counting at ~ 40 on IC-3
2^{04} Separate $\rho_1 = -15.985$ $\rho_3 = -15.429$ $\rho_2 = -15.822$ $\rho_N = -15.435$

180 2^{15} K>1 $\rho_1 = 7.246$ $\rho_3 = 7.235$ $\rho_2 = 7.295$ $\rho_N = 7.380$
2^{26} b>1 Start counting at ~ 0.5 on IC-3
2^{37} Separate

181 2^{46} K>1 with Shim $\rho_1 = -15.718$ $\rho_3 = -15.926$ $\rho_2 = -16.341$ $\rho_N = -15.759$
b<1 Start counting at ~ 40 on IC-3
3^{19} Separate

182 3^{35} b>1 $\rho_1 = 7.166$ $\rho_3 = 7.122$ $\rho_2 = 7.222$ $\rho_N = 7.244$
3^{43} b>1 Start counting at ~ 0.5 on IC-3
3^{54} Separate Shut Down

Stub V(3)-F
Measured Stub Dims → (81.706cm x 81.658cm x 30.556cm high) 32.168in x 32.149in x 12.030in

170 temp ~75°F on recorder in NW corner

U(3) F4 H/X = 279

Instrument Check on 9 Aug 66 Source 10 mCi

188

PM-1 _____ Low Trip OK Alarm Trip _____

PM-2 _____ Alarm Trip _____

IC-1 >3X10⁻¹¹ Meter Trip OK Fast Trip OK

189

IC-2 >3X10⁻¹¹ Meter Trip OK Red light OK

IC-3 Responds Calibration S.J.R. Bldg alarm OK

IC-4 Responds Calibration S.J.R. Press Diff. 0.05"

CRM _____ Meter Trip _____

Eff.

Th meas worth of support structure on 32"X32"X12" stack.

12 1/4" of fuel.

on shaded areas.

183 10^{22} k>1 $\rho_1 = 7.140$ $\rho_3 = 7.412$ ¢

$\rho_2 = 7.329$ $\rho_N = 7.173$ ¢

10^{30} k>1 Start counting at ~0.5 on IC-3

10^{43} Separate

184 11^{25} Remove 1/4" from 1/2 of stack And Add Al Boxes + 1" steel Pl

11^{35} K>1 Start counting at ~0.5 on IC-3

plus support structure

11^{40} Shut Down $\rho_1 = 37.228$ Repeat $\rho_1 = 36.929$

$\rho_N = 37.780$ $\rho_N = 37.441$

185 12^{42} Same as 184

k>1 Start counting at ~0.5 on IC-3

k=1 Table sep. = 2.9 sec.

186 Removed support mock-up and added 1/4" of fuel on 2 quad.

1^{42} k>1 Start counting at ~0.5 on IC-3

1^{52} Table screamed because IC-2 trip point was not advanced as power increased.

2^{10} k>1 Start counting at ~0.5 on IC-3. $\rho_1 = 7.258$ $\rho_3 = 7.273$

$\rho_2 = 7.326$ $\rho_N = 7.436$

2^{28} Separate

advanced 1/4" fuel from 2 quad.

187 2^{50} K>1 Start Counting At .5 on IC-3

$\rho_1 = 37.642$

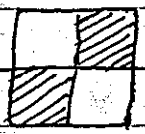
$\rho_N = 38.127$

plus support structure on top

2^{54} Separate

188 3^{10} K > start Counting At 0.5" on IC-3
3^{15} Shut Down (188) same As 187, $\rho_1 = 37.650$ $\rho_N = 37.780$

189 3^{35} Removed Al Boxes And steel Plate. Added
1/4" fuel to 2 quad. $k > 1$



$\rho_1 = 6.681$ $\rho_3 = 6.601$
3^{55} Shut Down $\rho_2 = 6.693$ $\rho_N = 6.786$

172 V(3) F_4 $H/X = 279$

Instrument Check on 11 Aug 66 Source 10 mc Ir

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	$> 3 \times 10^{-11}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-11}$	Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	O.K.	Bldg alarm	OK
IC-4	Responds	Calibration	O.K.	Pressure diff.	0.06"
CRM		Meter Trip			

To meas reactivity vs. table separation for hazards analysis report.

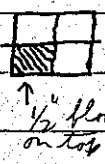
~~32x~~

190 9^{33} 32 x 32 x 12" plus 1/4" on shaded area

b > 1 table closed start counting at 0.5 on IC-3.

9^{50} Separate

191 10^{05} Remove 1/4" from NE quad. And Add 1/4" to SW quad.



b > 1 table closed

10^{28} Separate

192 10^{40} Add 1/4" to NE quad

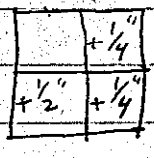
10^{44} table closed. b > 1 start Counting at 0.5 on IC-2

b = 1 separate

K = 1 table Sep. 3.30 rev.

10^{57} Separate

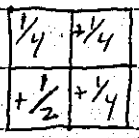
193 11^{13} b > 1 Add 1/4" to SE quad.



b = 1 Table Sep. = 3.52 rev.

11^{30} Separate

194 Add 1/4" fuel to NW quad



1^{00} b > 1 Table sep = 3.52 rev.

b = 1 " " = 4.50 rev.

1^{11} Separate

195 Removed ¼" from NE quad and replaced with ½"

N	
+¼	+½
+½	+¼

1^{25} $k>1$ table sep. = 4.5 rev

$k=1$ table sep. = 5.35 rev.

1^{37} Separate

196 1^{50} Removed ¼" from NW quad AND Replaced with ½"

N	
+½	+½
+½	+¼

$k>1$ table sep = 5.35 rev.

$k=1$ table sep = 6.30 rev.

~~1^{55}~~ 2^{05} Separate

197 added ¼" to SE quad.

N	
+½	+½
+½	+½
	+¾

← was single piece.

2^{18} $k>1$ table sep = 6.30 rev.

$k=1$ table sep = 7.11 rev.

2^{31} Separate

198 added ¼" to NE quad

+½	+½
	+¼
+½	+½
	+¾

2^{41} $k>1$ table sep = 7.11 rev.

$k=1$ table sep = 7.98 rev.

2^{50} Separate

199 added ¼" to SW quad

+½	+½+¼
+½+¼	+½
	+¾

3^{10} $k>1$ Table sep. = 7.98 rev

$k=1$ Table sep. = 8.70 rev.

$k>1$ to increase power

$k<1$ table sep = 9.00 rev.

3^{45} Shut Down

Instrument Check on 3 Nov. 67 Source 10 m cat

PM-1 _____ Low Trip OK _____ Alarm Trip Would not Trip at 850V
PM-2 _____ _____ Alarm Trip _____
IC-1 _____ Meter Trip OK 1" Fast Trip OK ½" _____
IC-2 _____ Meter Trip OK 1" Bed light OK
IC-3 Responds Calibration OK JT Bldg Alarm OK
IC-4 Responds Calibration OK JT Press. Dif 0.1"
CRM _____ Meter Trip _____

Temp 21.6°C

82 Stack same as Expt 79
2 Cd covered and 2 bare 1 mil gold foils
10 29 AM Start timing at 10 on IC-3
b=1 at 30 on IC-3
10 59 AM. Shut down

Position	1	2	3	4
	401 Cd	403	404 Cd	409
		2/1 = 3.95469		4/1 = 3.87520
		2/3 = 3.93950		4/3 = 3.81938

Avg Cd Ratio = 3.89719

83 Stack same as Expt 79
15 bare 2 mil gold foils
1 02 PM Start timing at 3.5 on IC-3
b=1 at 10.5 on IC-3
1 32 PM Shut down

188 U(2)F4-6

Instrument Check on 21 Nov 67 Source 10 mc I

PM-1 Low Trip OK ½" Alarm Trip OK Cont.
PM-2 Alarm Trip
IC-1 Meter Trip OK 1" Fast Trip OK ½"
IC-2 Meter Trip OK 1" Red light OK
IC-3 Responds Calibration S/B OK Dly Alarm OK
IC-4 Responds. Calibration S/B. OK Press Dif 0.13"
CRM Meter Trip

84 Stack same as Eppn 79.
2 Cd covered and 2 bare 2 mil Gold foils
9^03 AM Start timing at 5.5 on IC-3
k=1 at 16 on IC-3
9^43 AM Shut down.

Position	1	2	3	4
	G-2 Cd	G-3	G-4 Cd	G-8
1		2/1 = 4.71995		4/1 = 4.67770
		2/3 = 4.70610		4/3 = 4.67115

avg Cd Ratio = 4.69372

85 Same as Eppn 84
2^02 Start timing at 5.5 on IC-3
k=1 at 16 on IC-3
2^42 Shut down

	1 G-13 Cd	2 G-14	3 G-21 Cd	4 G-25
		2/1 = 4.72859		4/1 = 4.70854
		2/3 = 4.72409		4/3 = 4.64801

avg Cd Ratio = 4.70231

U(2) F-6

Instrument Check on 22 Nov. 67 Source 10 mCi

PM-1 _____ Low Trip OK ½" Alarm Trip OK Contact

PM-2 _____ Alarm Trip _____

IC-1 _____ Meter Trip OK 1" Fast Trip OK ½"

IC-2 _____ Meter Trip OK 1" Red light OK

IC-3 Responds Calibration OK S.J.R. Bldg alarm OK

IC-4 Responds Calibration OK S.J.R. Press. dif 0.12"

CRM _____ Meter Trip _____

22.0° C

86 Stack same as Expt 79
15 bare 2 mil gold foils across center
9^00 AM Start timing at 3.5 on IC-3
b=1 at 10.5 on IC-3
9^30 AM. Shut down

87 Stack same as Expt 79
2 Cd covered and 2 bare 5 mil gold foils
1^09 PM. Start timing at 3.5 on IC-3
b=1 at 10 on IC-3
1^39 PM. Shut down

Position	1	2	3	4
	504 Cd	502	503 Cd	505
		2/1 = 5.88444		4/1 = 5.81029
		2/3 = 5.87214		4/3 = 5.81820

Avg Cd Ratio = 5.84652

190 U(2) F_4 - 6

Instrument Check on 24 Nov. 67 Source 10 mc Ir

PM-1 Low Trip OK - ½" Alarm Trip OK S-Cont

PM-2

IC-1 Meter Trip OK 1" Alarm Trip

IC-2 Meter Trip OK 1" Fast Trip OK S-½"

IC-3 Responds Calibration OK 1/R. Red light OK

IC-4 Responds Calibration OK 1/R. Bldg alarm OK

CRM Meter Trip Press Dif - 0.12"

21.8°C

88 Stack same as Eff. 79

2 cd covered and 2 bare 5 mil gold foils

9[20] AM Start timing at 3.5 on IC-3

b = 1 at 10 on IC-3

9[50] AM. Shut down

Position	1	2	3	4
	504 cd	507	509 cd	510
		2/1 = 5.92270		4/1 = 5.84150
		2/3 = 5.84596		4/3 = 5.78603

Avg cd Ratio = 5.84905

89. Stack same as Eff. 79

15 bare 2 mil gold foils

1[25] PM Start timing at 3.5 on IC-3

b = 1 at 10 on IC-3

1[55] PM Shut down

$U(2)F_4 - 6$

Instrument Check on 27 Nov. 67 Source 10 mc Ra

PM-1	Low Trip OK 1/2"	Alarm Trip	OK Cnt.
PM-2		Alarm Trip	
IC-1	Meter Trip OK 1"	Fast Trip	OK 1/2"
IC-2	Meter Trip OK 1"		Red. light OK
IC-3 Responds	Calibration OK S/R.		Bldg alarm OK
IC-4 Responds	Calibration OK S/R.		Press Brk 0.12"
CRM	Meter Trip		

21.9°C

90 Have restacked material on fixed table and inserted a 1/4" dia U^{235} fission detector No. 5-3, and a 1/4" dia U^{238} fission detector No. 8-2 on vertical axis of assembly separated vertically by 3 1/2" of fuel.
Trial run to check reactivity. Stack 32x34x34 on movable. 34 on fixed
$k < 1$

90b added 1/4" less 1/4 x 4 x 20' on fixed table.
$k = 1$ with shim out ~5"

90c Have counter connected. Start up to check counters.
$k = 1$
U^{235} counter not working. Shut down.

90d Start up to check counters.
$k = 1$ at 0.5 on IC-3
Both counters working. ~2000 c/m on U^{235} fission ch at this power. Shut down.

U(2)F4 - 6

Instrument Check on 30 Nov. 67 Source 10 mc Ra

PM-1 _____ Low Trip OK ½ Alarm Trip OK Scr Cont

PM-2 _____

IC-1 _____ Meter Trip OK 1" Test Trip OK ½"

IC-2 _____ Meter Trip OK 1" Red light-OK

IC-3 _____ Calibration OK JTT Bldg. alarm OK

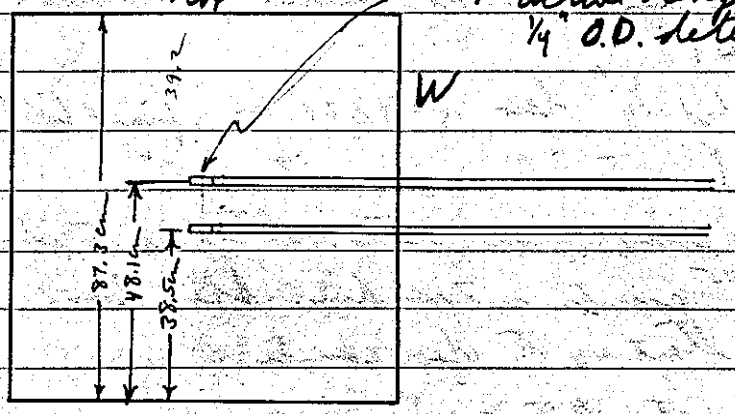
IC-4 _____ Calibration OK JTT Press Diff MRD 0.12"

CRM _____ Meter Trip _____

21.1 °C

91 To measure U^{235} & U^{238} fission ratio

Use ¼" fission detector 5-3 and 8-2 in central plane of assembly on vert. axis as shown in sketch below.



Channel #4 Pre A. 696 → Amp. Y102541 → Scaler Y120243

Channel #2 Pre Amp. 694 → Amp. Y140347 → Scaler Y120247

Stack 32 x 34 x 34" high + ¼ x 8 x 34 across center of Top.

$f = 1$ at 0.55 on IC-3 ; 24 on 3×10^{-9} scale on IC-2

Exp 91a Ch #2 – V^{235} on top = 10,311,025/75 min
Ch #4 V^{238} on bottom = 6,095/75 min
Ratio = 1691.719

91b Ch #4 – V^{235} on top = 10,170,975/75 min
Ch #2 – V^{238} on bottom = 6095/75 min
= 1668.741

91c Ch #2 – V^{238} on top = 4535/60 min
Ch #4 – V^{235} on bottom = 7,778,265/60 min
= 1715.163

91d Ch #4 – V^{238} on top = 4975/60 min
Ch #2 – V^{235} on bottom = 8,365,925/60 min
= 1681.593

Background ~ $\frac{55}{937}$ min on V^{235} ch
~ $\frac{9}{937}$ min on V^{238} ch.

Avg Ratio = 1689.3

U(2) F_4-6

Instrument Check on 1 Dec 67 Source 10 mc Ir

PM-1	Low Trip OK ½"	Alarm Trip OK Cont.	
PM-2		Alarm Trip	
IC-1	Meter Trip OK 1"	Fast Trip OK ½"	
IC-2	Meter Trip OK 1"	Red light OK	
IC-3 Responds	Calibration OK 1/R	Bldg Alarm OK	
IC-4 Responds	Calibration OK 1/R	Press Diff. 0.12"	
CRM	Meter Trip		

21.0°C

Expr 92 stop Same as Expr 91. Repeat of $U^{235}:U^{238}$ fission rate meas.
K=1 at 0.9 on IC-3 and 35.5 on 3×10^{-9} scale on IC-2

92a Ch #4 - U^{238} on top = 8625/70 min
Ch #2 - U^{235} on bottom = 14,389,995/70 min } 1668.405

92b Ch #2 - U^{238} on top = 8585/70 min
Ch #4 - U^{235} on bottom = 14,397,095/70 min } 1677.0

92c Ch #4 - U^{235} on top = 14,584,035/70 min
Ch #2 - U^{238} on bottom = 8705/70 min } 1675.4

92d Ch #2 - U^{235} on top = 13,564,715/65 min
Ch #4 - U^{238} on bottom = 8075/65 min } 1679.8

Avg Ratio = 1675.75

Data from run 91 probably better because there would be fewer lost counts in ^{235}U detector at lower power.

Instrument Check on 8 Dec 67 Source 10 mc Ra

PM-1	Low Trip OK ½"	Alarm Trip OK Cont.	
PM-2		Alarm Trip	
IC-1	Meter Trip OK ½"	Fast Trip OK Contact	
IC-2	Meter Trip OK 1"	Red light OK	
IC-3	Calibration ~~check~~ Out for repair	Obj. Alarm OK	
IC-4 Responds	Calibration OK S/A.	Press Diff 0.12"	
CRM	Meter Trip		

21.9°C

Expr. 93 Have restacked material with a 30"x30" base 16" on movable table and 14" on fixed table. 44" high $k \simeq 1$ with 2 piece of plexiglass.
$k < 1$ no plexiglass

94 46" high $k > 1$ with 2 piece of plexiglass
$k < 1$ W/O plexiglass ~326 sec μ.

95 47" high $k > 1$ no plexiglass

Check counters

C-1 → U^{233} det. near center on east side

C-3 → ½" BF_3 Cd, Paraffin Shields, on balcony.

C-4 ¼" BF_3 in cable rack

96 47" high 30"x30" base
$k > 1$

97 30x30x46" high
$k < 1$

98 30x30x47" high
$k > 1$

99 30x30x46" high
$k < 1$

8 Dec 67 Cont.

100 30 x 30 x 47" high
k > 1

Instrument Check on 11 Dec 67 Source 10 mCr

PM-1	Low Trip OK ½	Alarm Trip	OK Contact
PM-2		Alarm Trip	
IC-1	Meter Trip OK ½"	Fast Trip	OK Cont.
IC-2	Meter Trip OK 1"	Red light	OK
IC-3	Out for repair	Beep alarm	OK
IC-4	Response Calibration OK 8 µR.	Press Diff	0.12"
CRM	Meter Trip		

22.5 °C

101 30 x 30 x 47" high
Have lost ~ 2+ % reactivity from run 100 because of increase in temp. Shut down to add ¼" of fuel.

102 30 x 30 x 46¼" high
k < 1

103 30 x 30 x 47¼" high
k > 1

104 30 x 30 x 46¼" high
k < 1

11:25 AM
22.5°C 105 30 x 30 x 47¼" high
k > 1

106 30 x 30 x 46¼" high
k < 1

107 30 x 30 x 47¼" high
k > 1

108 30 x 30 x 46 1/4" high

$f < 1$

109 30 x 30 x 47 1/4" high

$f > 1$

110 30 x 30 x 46 1/4" high

$f < 1$

111 30 x 30 x 47 1/4 high

$f > 1$

Instrument Check on 12 Dec 67 Source 10 mc K

PM-1 _____ Low Trip OK ½" Alarm Trip OK Cont.

PM-2 _____ _____ Alarm Trip _____

IC-1 _____ Meter Trip OK ½" Fast Trip OK Cont.

IC-2 _____ Meter Trip OK 1" Red light OK

IC-3 Quart Calibration _____ Dely alarm OK

IC-4 Responde Calibration OK S/R. Press Sig. 0.12"

CRM _____ Meter Trip _____ _____

21.9° C

112 30 x 30 x 47¼" high

b > 1

113 30 x 30 x 46¼ high

b < 1

114 30 x 30 x 47¼" high

b > 1

115 30 x 30 x 46¼" high

b < 1

116 30 x 30 x 47¼" high

b > 1

117 30 x 30 x 46¼" high

b < 1

118 30 x 30 x 47¼" high

b > 1

119 30 x 30 x 46¼" high

b < 1

Ave. 30 x 30 x 46¼"

Mass Dimen 76.500 x 76.450 x 117.571 cm high

10:30

11:5

Instrument Check on 13 Dec 67 Source Contact

PM-1 Low Trip OK ½" Alarm Trip OK Cont-31

PM-2 Alarm Trip

IC-1 Meter Trip OK ½" Fast Trip OK Cont-31

IC-2 Meter Trip Red light-OK

IC-3 Response Calibration Bldg alarm-OK

IC-4 Response Calibration Press Diff-0.12"

CRM Meter Trip MSD

21.2°C

120 30×30×46¼ + Support mock up on top (mock up consists of ⅛" of Al, 5 layers of Al tape and 1" styrofoam)
b<1

10:30AM 121 Removed Support mock-up. 30×30×46¼
11:06 b<1

* 122 30×30×46¼ Replaced support mock-up.
b<1

123 30×30×46¼ Removed support mock-up.
b<1

* 124 30×30×46¼ Replaced S. mock-up.
b<1

125 30×30×46¼ Removed S. mock-up.
b<1

* Some blockers were moved slightly each time mock-up was placed on stack. No adjustments were made between runs 120-121, 122-123, or 124-125. The stack was tightened up at points marked *

Instrument Check on 14 Dec 67 Source 10 mc-Ra

PM-1		Low Trip	OK ½"	Alarm Trip	OK Cont
PM-2				Alarm Trip	
IC-1		Meter Trip	OK ½"	Fast Trip	OK
IC-2		Meter Trip	OK 1"		Red light OK
IC-3	Responds	Calibration	OK 1 µA		Bldg alarm OK
IC-4	Responds	Calibration	OK 1 µA		Press Dif. 0.12"
CRM		Meter Trip			

126 Have removed fuel down to 36" and reflected with 6" of plexiglass in top under assembly and 6" of polyethylene on side and top.
Moved IC-2 to just outside refl at SW corner.
Placed U^{233} counter inside refl 3" from bottom.
BF_3 det on top of refl at side.
k > 1 at ~ 6.45 rev.

127 30 X 30 X 35" high refl.
k > 1 at 6.0 rev.
k = 1 at 7.1 rev.

Instrument Check on 15 Dec 67 Source 10 mc Ra

PM-1 Low Trip OK ½ Alarm Trip OK Cont.

PM-2 Alarm Trip

IC-1 Meter Trip OK ½ Fast Trip OK

IC-2 Meter Trip OK 6" from Bowl. Red light OK

IC-3 Responds Calibration OK 1 f.a. Bldg. alarm OK

IC-4 Responds Calibration OK 1 f.R. Press Dif 0.12"

CRM Meter Trip

21.6° C

128 30 x 30 x 34" high Refl as in Exp 26.

b > 1 at 3.3 mr.

b = 1 at 5.3 mr.

129 30 x 30 x 33" high Reflector

b > 1 Stable load

130 30 x 30 x 32¾" high Reflector

b > 1

131 30 x 30 x 32½" high Reflector

b > 1

21.6° C at 4:30 PM

Nominal dimen 30 x 30 x 32½"

Meas dimen = 76.508 x 76.444 x 82.577 cm high

Instrument Check on 18 Dec 67 Source 1.0 mc γ

PM-1	Low Trip OK ½"	Alarm Trip OK	Cont.
PM-2		Alarm Trip	
IC-1	Meter Trip OK ½"	Fast Trip OK	
IC-2	Meter Trip OK 1"	Red light OK	
IC-3 Responds	Calibration OK 1 p.a	Aldy alarm OK	
IC-4 Responds	Calibration OK 1 p.a	Pres Diff 0.12"	
CRM	Meter Trip		

21.5°C

132 Have restacked fuel.
Now 40"x40" base 26" high Bare,
$k_\infty > 1$

133 40x40x26" high less ¼" on ½
$k < 1$

134 40x40x26" + ¼" on ½
$k > 1$

Instrument Check on 19 Dec 67 Source 10 mcr

PM-1	Low Trip OK ½"	Alarm Trip OK Cont.
PM-2	[illegible]	Alarm Trip
IC-1	Meter Trip OK ½"	Fast Trip OK
IC-2	Meter Trip OK 1"	Redlight OK.
IC-3 Responds	Calibration OK 1 R	Oldg Alarm OK
IC-4 Respond	Calibration OK 1 R.	Press Dif 0.12"
CRM	Meter Trip	

= 22.4° C

135 40 x 40 x 26 + ¼" on 5 half.
b > 1

136 40 x 40 x 26 less ¼" on 5 half.
b < 1

137 40 x 40 x 26 + ¼" on 5 half
b > 1

138 40 x 40 x 26 less ¼" on 5 half.
b < 1

139 40 x 40 x 26 + ¼" on 5 half.
b > 1

140 40 x 40 x 26 less ¼" on 5 half.
b < 1

141 40 x 40 x 26 + ¼" on 5 half.
b > 1

142 40 x 40 x 26 less ¼" on 5 half.
b < 1

22.6° C 4:30 PM

Instrument Check on 20 Dec 67 Source 10 mcr

PM-1		Low Trip	OK ½"	Alarm Trip	OK Conf.
PM-2				Alarm Trip	
IC-1		Meter Trip	OK ½"	Fast Trip	OK
IC-2		Meter Trip	OK 1"		Red light OK
IC-3	Responds	Calibration	OK 1/R		Alg. Alarm OK
IC-4	Responds	Calibration	OK 1/R.		Press Dif 0.12"
CRM		Meter Trip			

22.9°C

143 40x40x26" + ¼" on S. half.
b>1

144 40x40x26 less ¼" on S half.
b<1

145 40x40x26 + ¼" on S half.
b>1

146 40x40x26 less ¼" on S half.
b<1

147 40x40x26 + ¼" on S half.
b>1

148 40x40x26 less ¼" on S half.
b<1

149 40x40x26 + ¼" on S half.
b>1

150 40x40x26 less ¼" on S half.
b<1

22.9°C

Nominal Dims 40x40x26"

Meas Dims 101.971 x 101.850 x 66.057 Cm

Instrument Check on 21 Dec 67 Source 10 mCi

PM-1	Low Trip OK ½	Alarm Trip OK	Cnt
PM-2		Alarm Trip	
IC-1	Meter Trip OK ⅓"	Fast Trip OK	
IC-2	Meter Trip OK 1"	Red light OK	
IC-3 Responds	Calibration OK Lf.R.	Bldg alarm OK	
IC-4 Responds	Calibration OK Lf.R.	Pneu. Drf 0.12"	
CRM	Meter Trip		

22.7°C

151 40x40x26 less ¼" on N half.
Have added support and stuck up on top of assembly.
k > 1

152 40x40x26 less ¼" on N half (Removed S.S.)
k < 1

153 40x40x26 less ¼" on N half + S.S.
k > 1

154 40x40x26 less ¼" on N half. (Removed S.S.)
k < 1

Instrument Check on 28 Dec 67 Source 10 mCt

PM-1 _____ Low Trip OK ½" Alarm Trip OK Cont

PM-2 _____ _____ Alarm Trip _____

IC-1 _____ Meter Trip OK ½" Fast Trip OK-MT

IC-2 _____ Meter Trip OK 1" Red light OK

IC-3 Responde Calibration OK 1 fR Bldg alarm OK

IC-4 Responde Calibration OK 1 fR. Prob Dif = 0.12

CRM _____ Meter Trip _____

~19°C @ 9 AM ~20.3°C at start of run 155

155 1PM Have restacked 32"x34" base with a 2x5x6" cavity in center of fixed table.

Placed 2 parallel plat fission ch. in cavity with 1¼ x 4"x6" of fuel behind them.

34" high.

k>1 with plexiglass (one piece)

k<1 without

156 34" high + ¼ on half.

k>1 with plexi. (2 pieces)

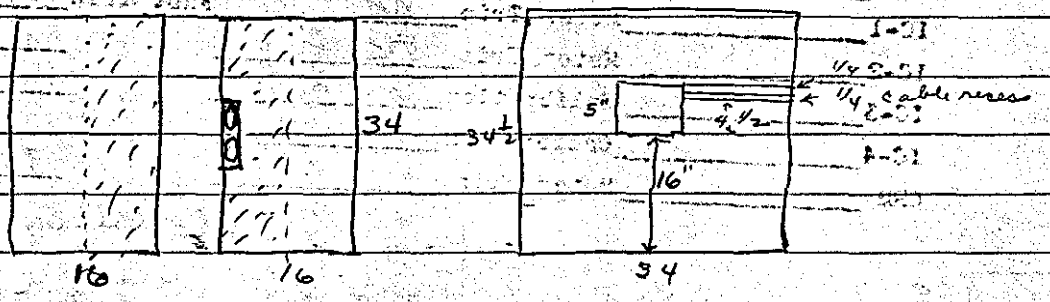
k<1 W/O plexi ~ -11.9¢

157 added ½"

Now 32 x 34 x 34½" high + ¼ x 16 x 34" across center of top.

k>1 W/O plexi. ~ 3.6¢ pos.

Restacked to 32 x 34" base with two fission counters in assembly



cavity 6" wide x 3/4" deep

1/4" Top layer 8" x 16"

	Pre AMP	AMP
C-1	FC-7 (238) - Y	Y102 542
		x64 x ~~64~~

208

Instrument Check on 1-2-68 Source 10 mc Ra

PM-1	Low Trip OK	Hi Alarm Trip OK	
PM-2		Alarm Trip	
IC-1	Meter Trip OK	Fast Trip OK	
IC-2	Meter Trip OK	Rm Press -0.14" H_2O	
IC-3	Calibration 3×10^{-11}	Red Light On	
IC-4	Calibration 8×10^{-11}		
CRM	Meter Trip	Temp 21°C	
		Bld. Alarm A	OK
		B	OK
		C	OK

158 L

excess react (init period with ~~Most~~ both plexiglas shims. 4167.9s → 650

11:40	Start counts for 1 hr	C-1-FC-7(238)		C-2-FC-9(235)		@ -400 V NICE PS
	PHS	~~300~~	~~5473~~ (109)	~~9543190~~	(300)	
		300	4631 (300)	91 11 725	(300)	1967.6
		200	4,783	10,336,535		2161.1
		100	5,212	10,468,835		2008.6
			Background counts in 20 minutes			
Jan 3 9:15	PHS	100	127 or 6.35 CM/MIN	205		
			3	3		
			381	615		
			4831	10,468,200		2166.9
9:40		200	000	15		
		150				

#160

PHS	C-1 (238-7)	Bkgd	C-4 (235-9		C_3		C_1/C_3	C_4/C_2
100	5212 - 381 = 4831		10,968,835					2167
200	4783 - 0		10,336,535					2161
300	4631	0	9 111 725					1968
	C_4 235-9		C_1 238-7				C_4/C_3	
100	45 377 775		23355 - 95	23260	$10\,123\,8_5$ - 109 =		.022 98	
150	43 800 495		22663 - 12	22651	$984\,11_5$ - 109		.023 19	
200	42 502 200		22167 - 0	22161	$976\,99_5$ - 109		.022 68	
	235-9		238-7				C_4/C_3	
100	999 615 - 95		X		20465 - 109 = 20356		49.11	2137
150	1043 165		X		22415 - 109		46.77	2017
200	1034 195		X		22875 - 109 = 22766		45.43	2003
	238-		C_1 (235)				~~.030 03~~	
100	22 584 - 7		44 038 735 - 828		987 185 - 109		.022 87	
150	22065 - 0		43 596 225 - 15		999 975 - 109		.022 06	
200	21 122 - 0		43 019 905 - 15		1013 575 - 109		.0 2084	
100			903 385 - 828 = 902 557		18605 - 109 = 18496		48.80	2134
150			958 945 - 15 = 958 930		20225 - 109 = 20116		47.67	2161
200			970 365 - 15 = 970 350		20965 - 109 = 20856		46.53	2233

60

Instrument Check on 1-3-68 Source 10 mcr

PM-1		Low Trip	OK ½"	Alarm Trip	OK Cont
PM-2				Alarm Trip	
IC-1	3×10^{-4}	Meter Trip	OK ½"	Fast Trip	OK Cont
IC-2	3×10^{-11}	Meter Trip	OK 2"	Red light	OK
IC-3	Response	Calibration		Dly alarm	OK
IC-4	Response	Calibration		Press Dif	0.12"
CRM		Meter Trip			

T = ~21.4°C ?

Place ½" BF_3 counter in tray at south edge of Fixed Table (elev ~7')
~4' from top edge of assembly in small counter paraffin pig
counter is wrapped with cadmium except for a ~1/8" slit

+1500 V + in	Hamner POS	− A10 cts	gain @ 16 x 1.0 max. delay line, Cf Source against side of pig
3'	200	18940	
"	150	20510	
"	100	21190	
"	50	21790	

19'17" 150 140 cts → 7.26 ¢/MIN x 15 = 109

#159 never react with both plexiglas shims +210.9 sec → 5.3 ¢

Added 8 ea ¼ x 4 x 4 To each half (4 x 32 strip on each half)

#160 etc reset on start up + sec → ¢ T=21.7°C

IC-3	PHS	C_1 (238	C_3 (BF_3 Norm)	C_4 (235)	
~1.0	200	22167 − 0	976995 −109	42502200	−11
15' to	150	22663 −	984115 −109	43800480	−
Turn	100	23355 −95	1012385 −109	45377770	−150
	100	559 −95	20465 −109	999615	
~.02	150	440 −	22415 −109	1043165	
	200	486 −0	22875 −109	1034895	

T = 21.9

IC-3 Exchange positions of 235 and 238 counters (each scaler set so that 238 scaler x 1)

N1.0	PHS	C_1 (235) #9	C_3 (BF_3)	C_4 (238) #7	
"	200	430 1990 $\underline{5}$	101357 $\underline{5}$ -109	21122	
"	150	435962 $\underline{25}$	99997 $\underline{5}$ -109	22065	
3:30-45 PM	100	440 3873 $\underline{5}$	98718 $\underline{5}$ -109	22584	
		Lower Power			
IC-3 .02	100	90338 $\underline{5}$	1860 $\underline{5}$ -109	412	
"	150	95899 $\underline{5}$	2022 $\underline{5}$ -109	415	
"	200	970365 $\underline{5}$	2096 $\underline{5}$ -109	431	
Bkg	200	01 $\underline{5}$	16 $\underline{5}$	4	(Furnace air off, probably added counts)
			(N30 leads half of time in Cave)		
start 5:01 PM	100				
stop 8:11 AM		5024 $\underline{5}$	473 $\underline{5}$	411	= 0.45
15h 10'		910	910	910	x15
		5.21 x15 = 228	5.2 x15 = 78		
					Shut down @ 4:45
Jan 4, 68	100	765	85	5	
Bkg	150 15'	15	75	0	
		C_4 (235-9)		C_1 (238-7)	
		Exchange counters (235 is on C_4)			
Bkg	150 15'	12	75	5	
Bkg	100 5'	36		25	

Remove 235-9 - Install 235-10 on C_4

Instrument Check on 1-4-68 Source 10 mcr

PM-1		Low Trip	OK ½	Alarm Trip	OK Contact
PM-2				Alarm Trip	
IC-1	3×10^{-4}	Meter Trip	OK ½	Fast Trip	OK Cont.
IC-2	3×10^{-4}	Meter Trip	OK 1"	Red light	OK
IC-3	Responds	Calibration	OK 1/R	Bldg alarm	OK
IC-4	Responds	Calibration	OK 1/R.	Press Dif =	0.12"
CRM		Meter Trip			

Temp 21.6°C

Expt. 161

Fission counter at -400 V.

~11'19 start 15' count U-238-7 - C-1 x 32 x 1.0 DL 28152+1662=29814

TMC H: Level Input Baseline 51 (17 ch) 15' live Time (~2 sec longer than C_3)

$C_3 = 993055 - 109 \approx 992950$ $C_1/C_3 = .03003$

C_1 (PHS @ 100) 27595

~11'47 Start 15' count U-235-9 - C4 x 32 x 1.0 DL 1276269+62191=1338460

TMC H: Level Input Baseline 51 (17 ch) 14.16+1.4 live Time .94427

$C_3 = 24865 - 109 \approx 24760 \times .94427 = .23380.$

C_4 (PHS @ 100) 134776 $\times .94427 = 1272654.$ or ~ $C_4/C_3 = 57.25$

$C_4/C_1 = 1906.$

Expt 162 B_g on U-238 = 4 on TMC ← Exchanged positions of 235 & 238 counters in stack

~1'53 start 15' count U-238 - C4 x 32 x 1.0 D.L. Baseline 51 15' live Time (~.02 longer)

C_4 (phs @ 100) = 27755 $C_3 = 117760 - 105 = 117750.$

C_1 (phs @ 100) = 51433 435. TMC 2nd 27736 + 1380 = 29116

$C_4/C_3 = .02473$

12:22 PM Start 15' count U-235-9 C-1 32x1.0DL Live Time = 14.41125/15 = .96075

Baseline 51 (17ch)

C_1 (100) 1019425 TMC (Int) 997037

C_4 (100) 475 + 54563

C_3 (150) 21355 - 105 = 21250 1051600 TMC / C_2 = 49.49

~225 sec after shutdown start 2' count for background on C3 → 20 cts in 2'17'

30 cts in 3'55'

$\frac{49.49}{02473} = 200.$

#163 Added 5/16 "RSN - - - counter to Channel 2 for another Norm Counter counted on rise to power for ~8'

C_2 = 24735

C_3 = 13765

Shutdown

C_3

40 03 20 cts in 1'13"

40 04

Eastwing to Power

2' Min count C_2 1290 ← noise from scram

C_3 05? Stopping

Set up on Ch-2, 5/16" BF_3 RSN- counter DD2 preamp and AMP Y-134495 (0.5μs DL) Gain 100 x 1.1

Recorded PHS data on TMC @ Baseline 51, some low channels show high counts (Noise in low ch.)

With Baseline at 75, Ch 5-67 are still high.

With Baseline at 100, Ch 56 are high

With C_2 gain 50 x 1.0 Max HV = 1575 5/16" Counter

C_3 gain 16 x 1.0 Max HV = 1575 1/2" Counter

PHS on TMC @ 0.75

Found bad tube in C4 scaler — not passing zero Y-140343

Found loose connection in C-1 scaler Y-120247

after soldering — dead — but found bad x10 driver stage

Jan 8 Battery

-600V - AID (Y102542) C-1 gain 32x1 U-235-9

-600V - AID (Y102541) C-4 gain 32x1 U-238-9

½ BF_3 @ 1650 (Hanmer) C-3 AID (140347) 16x1 PHS = 1.00

(RSN-) 5/16 BF_3 @ 1750+ (NICC) C-2 DD2 (140345) 20x1.1 Max PHS = 1.00

	C-2	C-3
15' Bkg	75	75
5' Bkg + 10 mc γ on F_2 @ 1'	25	35
5' Bkg	35	35 + 10 mc γ in Pig

Instrument Check on Jan 8 Source 10 mc γ

PM-1	Low Trip OK ~½"	Hi ~~Alarm~~ Trip OK	Contact
~~PM-2~~		Alarm Trip	
IC-1	Meter Trip OK ~1"	Fast Trip OK	
IC-2	Meter Trip OK ~2"	Bldg A OK	(sluggish)
IC-3 8×10⁻¹¹	Calibration Down	B OK	
IC-4 3×10⁻¹¹	Calibration Down	C OK	
CRM	Meter Trip		

T = 20.3°C

~11⁴⁵ Start approach To Crit
11⁵¹ Tables Regetting + period

15' Count

#164

A
IC-2 = .475 × 10 × 10⁻⁹
3 = 1.05 [×10⁻⁹]
4 = 4.8 [×10⁻⁹]

C_3 103647 5
C_2 120911 5
(238) C_4 92770

(238) Hi level TMC Baseline 75 Int. 24895
31 ~~esch~~ + 1960
~~26612~~
26855

N.B C_4 scaler observed to count in burst during run, but not observed as pulses on Scope. TMC output appears normal.

B
Same as A on IC-2, 3, 4

C_3 106549 5
C_2 121671 5
C_4 53815

238 Hi level TMC Baseline 75 Int = 25012
(31) 1819
26831

#164 15 min counts

	A	B	C	D
	$V^{238} \rightarrow TMC$	$V^{238} \rightarrow TMC$	$V^{235} \rightarrow TMC$	$V^{235} \rightarrow TMC$
IC-1			4.5×10^{-11}	5.0×10^{-4}
IC-2	4.75×10^{-9}	same as A	9.45×10^{-11}	1.05×10^{-10}
IC-3	1.05	↓	0.022	0.025
IC-4	4.8		0.09	0.10
C_2	1209115	1216715	23685-75	26815-75
C_3	1036475	1065495	23225-75	30925-75
C_4	92770	53815	$C_1(^{235}) = 1,086,785$	$C_4 = 1,222,605$
TMC Fixed, Baseline = 75				
			14.34978 min/line	14.27600 min/line
Last Count	24895	25012	1,016,099	1,137,254
Extra to get to (31)	+ 1960	+ 1819	+ 83138	+ 92322
Overflow			+ 2000	+ 2000
Total	26855	26,831	1,101,237	1231576
Robert Count Con. for line time			1,151,136	1,294,034
$238/C_2$	0.02221	0.02205		
$238/C_3$	0.02591	0.02518		
$235/C_2$			48.76	48.39
$235/C_3$			49.73	41.95
$(235/238)C_2$	$(2195)_{CA}$	$(2211)_{CB}$	$(2179)_{DA}$	$(2195)_{DB}$
$(235/238)C_3$	$(1919)_{CA}$	$(1875)_{CB}$	$(1619)_{DA}$	$(1666)_{DB}$
$(235/238)C_3$	data not acceptable. C_3 normalizer data bad.			

Changed Power Level. 15' count.

C
- IC-2 = .3.15 (3x10^{-10}) — C_3 = 23225 -75
- 3 = 0.022 ~~x10~~ — C_2 = 23685 -75
- 4 = 0.09 — C_4(235) = 1086745
- 1 = 4.5 x10^{-4}

(235) Hi level TMC Baseline 75 Int. 1,016,099
14.34978 min limitations (31) + 83,138
x 1/15 = .956652 1099,237
Est overflow 2,000
1,101,237

D
- IC-1 = .50 x 10 x 10^{-18} — C_3 = 30925 -75 Bkg
- IC-2 .35 x 3 x 10^{-10} — C_2 = 2681 5 -75
- IC-3 .025 — C_1(235) = 122260 5
- IC-4 .10

(235) H. level TMC Baseline 75 Int 1,137,254
14.27600 / 15 = 0,95173 +(31) 92,322
Est overflow 2,000
1,231,578

3 17/pm 5 min Bg. C_3 = 1010 counts.

Jan 9 Overnite count on C_3 with 5/16" RSN-1055 detector showed bad data - Connector dirty & TMC
Found bad scaler C_3, replaced. Cleaned connector on RSN-1055 H Replaced Tubes in C_4 AID
and alcohol got in connector and caused excessive counts.

C_1	AID Y102542	x32 x1.0 max	-600 V	235-9	Jan 12 Found it is
C_2	DD2 Y140345	x20 x1.1 max	1800	NICC	PHS = 100
C_3	AID Y140347	x32 x1.0 max	1750	Hamner Y118715	PHS = 100
C_4	AID Y102541	x32 x1.0 max	-600 V	238-7	

with Source 1' counts

	C_1	C_2	C_3	C_4
1700	~~6437~~	6437 S	9371 S	
		6488 S	9352 S	
		6498 S	9400 S	
1750		6686 S	9426 S	
		6713 S	9399 S	
		6766 S	9457 S	
1800		6833 S	9579 S	
		6821 S	9557 S	
		6791 S	9514 S	

Use C_2 @ 1800 and C_3 @ 1750 (U235)

15' Bkg 6 S 7 S 7 S 8 (TMC @ 51)

Instrument Check on 9 Jan 68 Source 10 mcY

PM-1 Low Trip OK ½" Hi Trip OK Contact

PM-2 Alarm Trip

IC-1 Meter Trip OK 1" Fast Trip OK

IC-2 Meter Trip OK ~2" Red light OK

IC-3 Respond Calibration OK 1/2. Bldg. alarm OK

IC-4 Respond Calibration OK 1/2. Press Sig. 0.12"

CRM Meter Trip

Temp 20.6°C

Added 16 ea ¼ x ¼ x 4 (slightly less than 6 in per decade)

#165 + Period ∫ ≤ 6 in/decade not controllable!

Remove 16 ea ¼ x ¼ x 4 (now same as #164)

#166 + Period

#166

	A $U^{238} \rightarrow TMC$	B $U^{238} \rightarrow TMC$	C $U^{235} \rightarrow TMC$	D $U^{235} \rightarrow TMC$
IC-1	2.50×10^{-9}	2.51×10^{-9}		4.6×10^{-11}
IC-2	5.25×10^{-9}	5.15×10^{-9}	6.6×10^{-10}	9.6×10^{-11}
IC-3	1.2	1.1	0.018	0.024
IC-4	5.5	5.4	0.067	0.082
TMC				
C_2	1,265,745 ± 75	1,230,305 ± 75	1634 ± 75	2314 ± 75
C_3	987,26 ± 75	1,040,425 ± 75	1440 ± 75	2070 ± 75
C_4	2847 ± 8	2735 ± 8	C_1 = 783805	C_1 = 111362 ±
~~TMC~~	slightly Poo. period ~2 sec longer counting	Poo Period	Pos Per.	Pos. Per.
TMC			14.49802 TMC/sec	14.29364 TMC/sec
Hi level	Int C. = 28503	Int C = 27,402	Int C. = 755,965	Int C. = 1,105,578
Baseline	(23) + 1412	(23ch) + 1370	23ch + 38,880	(23ch) + 54,882
	29,915	28,772	Overflow + 1200	Overflow + 2530
$238/C_2$	0.023636	0.023387	~ 796,045	1,116,990
$238/C_3$	0.027516	0.027656	Con. for time = 823,607	Con. for time = 1,172,189
$235/C_2$			50.6212	50.810
$235/C_3$			57.474	56.820
$(235/238)C_2$	(2141.7)C_A	2164.5)C_B	2149.7)D_A	2172.6)D_B
$(235/238)C_3$	2088.7)C_A	2078.2)C_B	2065.0)D_A	2054.5)D_B

Still suspect C_3 normalizer data. Troubling results

Bg after run 15' count C_1=75, C_2=85, C_3=95

avg $\left(\frac{235}{238}\right)C_2$ = 2157.1

4:45 PM 9/20/76 Interchanged 235 & 238 fusion ch in stacks. Now 235 on C_4, 238 on C_1. Background after 16hr overnight

C_3 = 5135 = 80.2/15min C_4 = TMC@S1 = 82212

TMC @ 75(Ac, Bch) = 14279

Jan 10

	C_1	C_2	C_3	C_4
15' Bkg	⊢	85	875	2570

~2K in burst

TMC @ 51 = 812

" @ 75 = 52

15' Bkg	TMC @ 51 = 3	85	95

Observed noise bursts in C_4 AID. EKR suspects contact on D.L. (R.T) switch -- switched it many times to clear. Since AID is used only in D.L. do plan to remove switch!

Instrument Check on 10 Jan 68 Source 10 mCr

PM-1	Low Trip OK ½"	Alarm Trip OK Contact	
PM-2		Alarm Trip	
IC-1	Meter Trip OK 1"	Fast Trip OK	
IC-2	Meter Trip OK ~2"	Red light OK	
IC-3 Responds	Calibration OK 1 μa.	Obj alarm OK	
IC-4 Responds	Calibration OK 1 μa.	Prec Dif 0.12"	
CRM	Meter Trip		

Temp 20.6°C

#167 Removed 4 x 32 x ¼" of fuel from movable table.
Added a 13 x 22 x 1" piece of plexiglas for getting to power.

10 10 AM $k > 1$

10 30 $k \simeq 1$ slightly pos.

12 05 Shut down.

FC-7 was on C_1 in the ~~east~~ position
and FC-9 was on C_4 in the west position

#167

	A $U^{238} \rightarrow$ TMC	B $U^{238} \rightarrow$ TMC	C $U^{235} \rightarrow$ TMC	D $U^{235} \rightarrow$ TMC
IC-1	2.45×10^{-9}	2.45×10^{-9}	$.53 \times 10 \times 10^{-11}$	5.45×10^{-11}
IC-2	5.01×10^{-9}	5.05×10^{-9}	$.37 \times 3 \times 10^{-10}$	$.38 \times 3 \times 10^{-10}$
IC-3	1.2	0.9	.021	0.0285
IC-4	3.6	3.4	.076	0.077
C_2	1,219,885 - 85	1,231,385-85	27185-85	28235-85
C_3	1,090,875 - 85	1,099,675-85	24405-85	25185 - 85
C_1 (scaler)	24505 - 3	27115	C_4 1304085	C_4 1253165
TMC — Hi Level; Poo. Period		Baseline = 51		
TMC live time	15.00	15.0	$\frac{15}{14.101 \text{ 44}} = 1.0639$	14.06807
Integral Count	26210	26769	1,230,681	1273951
Extrapol to Zero pulse ht	1443	1421	52301	54055
Overflow Est	100	100		
	27753	28290	1282,982	1328,006
Bkg	3	3	- 812	812
Total Count	27750	28287	1,282,170	1,327,194
Total Count for live time			1,363,871	1,415,113
$^{235}/C_2$	0.022750	0.022973		
$^{238}/C_3$	0.025440	0.025725		
$^{235}/C_2$			50.327	50.270
$^{235}/C_3$			56.080	56.379
$\left(\frac{235}{238}\right)_{C_2}$ $\frac{FC-9}{FC-7}$	2212.2 (CA)	2190.7 (CB)	2209.7 (DA)	2188.2 (DB)
$\left(\frac{235}{238}\right)_{C_3}$ $\frac{FC-9}{FC-7}$	2204.4 (CA)	2180.0 (CB)	2216.2 (DA)	2191.6 (DB)

Avg. $\left(\frac{235}{238}\right)_{C_2} = 2200.2 \leftarrow \left(\frac{FC-9}{FC-7}\right) \rightarrow \left(\frac{235}{238}\right)_{C_3} = 2198.0$ Overall average $\frac{FC-9}{FC-7} = 2199.12 \pm 12.32$

F.C. 7 — ^{238}U — 5.0 mg U — 99.99% ^{238}U — 4-6 ppm ^{235}U

F.C. 9 — ^{235}U — 5.2 mg U — 99.9% ^{235}U

$2199.1 \times \frac{5.0}{C_2} = 211$

220

	C_1	C_2	C_3	C_4
				TMC(75) = 8
	Bkg 15'	85	85	425

#168 ~2:00 PM + Period Removed 4 x 3.2 x ¼ fuel from fixed table.
~ 4:00 PM Shutdown Replaced FC-9 by FC-10 on C_4
~ calibrated IC-3 & 4 FC-10 = ^{235}U - 5.0 mg U - 99.9% U^{235}

168	A	B	C	D
FC-1	.242 x 10 x 10^{-9}	.248	.53 x 10 x 10^{-11}	.575
2	.496 x 10 x 10^{-9}	.503	.37 x 3 x 10^{-10}	.40
3	1.1	1.15	.1028	.029
4	4.8	5.0	.095	.11
C-1 #7	266855	269355	X	X
C_2	1210835-85	1224025-85	269755-85	293055-85 (180)
C_3	1083935-85	1096125-85	242755-85	264755-85 (1536)
C_4 #10	X	X	1249255	1373865
Live Time	15.0	15.0	14.11986	14.03920
Corr. Factor	1.00	1.00	1.062333	1.0
Int. Ct	25803	25986	1162321	1270692
Extr. Zero (3M)	1941	1909	59442	65036
Quality	50	~150	1,221,763	1,335,727
(75) Total	27,794	27,995	1,297,919	1,427,141
$^{238}/C_2$	0.022956	0.022832	$^{235}/C_2$ = 48.268	48.841
$^{238}/C_3$	0.025614	0.025496	$^{235}/C_3$ = 53.650	54.078
$\left(\frac{235}{238}\right) C_2$	2102.6 (CA)	2114.0 (CB)	2127.6 (DA)	2139.1 (DB)
$\left(\frac{235}{238}\right) C_3$	2092.3 (CA)	2104.4 (CB)	2108.8 (DA)	2121.1 (DB)
	Avg $\left(\frac{235}{238}\right) C_2$ = 2120.8	14.08	Avg $\left(\frac{235}{238}\right)_{C_3}$ =	2706.6
FC-10 / FC-7 →	Overall avg = 2113.74	The mass C... needed		
4:45 PM	15' Bkg	C_1 = 15	C_2 = 75 TMC = 25	C_4 TMC = 8

4.45PM 10 Jan Replaced FC-7 by FC-8 on C_1

5[12] → 6[12] PM 10 Jan Bg. $C_1 = 0$; $C_2 = 345/60\text{min} = 86/15\text{min}$; $C_3 = 325/60\text{min} = 81/15\text{min}$; $TMC = 39/60\text{min} = 10/15\text{min}$

Instrument Check on 11 Jan 68 Source 10 mCi

PM-1 _____ Low Trip OK ½" Alarm Trip OK

PM-2 _____ _____ Alarm Trip _____

IC-1 _____ Meter Trip OK 1" Fast Trip OK

IC-2 _____ Meter Trip _____ Red light OK

IC-3 Responds Calibration OK s/a. Oly Alarm OK

IC-4 Responds Calibration OK s/a Press Dif 0.12"

CRM _____ Meter Trip _____

Temp 20.9°C

#169 8[45] $k > 1$

Found that detector FC-8 was no good. Shut down.

#170 Replaced FC-8 by FC-9 & FC-9 (^{235}U) on C_1 and FC-10 (^{235}U) on C_4. FC-9 on East side, FC-10 on West side.

9[40] AM $k > 1$

9[50] $k = 1$ $IC\text{-}2 = 0.33 \times 3 \times 10^{-10}$; $IC\text{-}3 = 0.02$

~ 11[05] Shut down

11[20] Changed positions of ^{235} Fiss Chm assembly.

Now FC-10 on East side on C_1 and FC-9 on West side on C_4

#171 11[30] $k > 1$

1[00] PM Shut down

#172 $k > 1$ ~ 2[00] PM Replaced FC-10 and 9

Shutdown ~ by FC-17 & 18 (N_p^{237} fiss'l)

222 #170 10 min counts

	A	B	C	D
FC-1	—	4.4×10^{-11}	4.7×10^{-11}	4.96×10^{-11}
2	9.66×10^{-11}	9.45×10^{-11}	9.96×10^{-11}	1.065×10^{-10}
3	0.0236	0.023	0.024	0.0255
4	0.097	0.094	0.1	0.107
C_1	753115	722205	766845	817895
C_4	733825	706865	747875	797405
TMC – Hi Level – Baseline = 75				
TMC live time	9.55468	9.49399	9.55455	9.43119
~~Integral~~ TMC on	C_1 (FC-9)	C_4 (FC-10)	C_1 (FC-9)	C_4 (FC-10)
Integral Ct.	705735	662416	718298	743208
Extrap. to zero pulse ht.	57582	33291	59152	37062
Overflow	1000	695,707	1000	
Total Ct.	764,317		778,450	780,270
Total Cts. Cor. for live time	799,940	732,787	814,743	827,329
$FC\text{-}9/C_1$	1.06218	$\frac{FC\text{-}10}{C_1} = 1.01465$	$\frac{FC\text{-}9}{C_1} = 1.06246$	$\frac{FC\text{-}10}{C_1} = 1.01153$
$FC\text{-}9/C_4$	1.09090	$\frac{FC\text{-}10}{C_4} = 1.03667$	$\frac{FC\text{-}9}{C_4} = 1.08941$	$\frac{FC\text{-}10}{C_4} = 1.03753$
$\left(\frac{FC\text{-}9}{FC\text{-}10}\right)_{C_1}$	1.04684 (AB)	1.05007 (AD)	1.04711 (CB)	1.05034 (CD)
$\left(\frac{FC\text{-}9}{FC\text{-}10}\right)_{C_4}$	1.05154 (AB)	1.05066 (AD)	1.05087 (CB)	1.05000 (CD)

East/west = $\left(\frac{FC\text{-}9}{FC\text{-}10}\right)_{avg.} = 1.04968 \pm 0.00159$

171 — 10 min Counts

	A	B	C	D
I_{C-1}	5.1×10^{-11}	5.4×10^{-11}	5.25×10^{-11}	5.4×10^{-11}
-2	1.095×10^{-10}	1.155×10^{-10}	1.119×10^{-10}	1.155×10^{-10}
-3	0.027	0.028	0.028	0.026
-4	0.11	0.115	0.110	0.11
C_1	830995	858715	834495	858075
C_4	873145	903455	875725	898875
TMC	Hi Level − Baseline = 75			
TMC on	C_1 FC-10	C_4 FC-9	C_1 FC-10	C_4 FC-9
TMC live time	9.46852	9.39917	9.46787	9.40625
TMC Integral Ct.	769246	838458	772509	834561
Extrap to zero pulse ht	47245	52329	47803	52508
Overflow	4200		4200	
Total Ct.	820691	890787	824512	887,069
Total Ct Cor. for live time	866,757	947,729	870,853	943,063
	$\frac{FC-10}{C_1} = 1.04304$	$\frac{FC-9}{C_1} = 1.10366$	$\frac{FC-10}{C_1} = 1.04357$	$\frac{FC-9}{C_1} = 1.09904$
	$\frac{FC-10}{C_4} = 0.99268$	$\frac{FC-9}{C_4} = 1.04901$	$\frac{FC-10}{C_4} = 0.99444$	$\frac{FC-9}{C_4} = 1.04916$
$\left(\frac{FC-9}{FC-10}\right)_{C_1}$	1.05812 (BA)	1.05758 (BC)	1.05369 (DA)	1.05315 (DC)
$\left(\frac{FC-9}{FC-10}\right)_{C_4}$	1.05675 (BA)	1.05488 (BC)	1.05690 (DA)	1.05503 (DC)

$$\text{uranium} = \left(\frac{FC-9}{FC-10}\right)_{avg} = 1.05576 \pm 0.00172$$

224

#172 N_p^{237}

C_1 – FC-18 – 2.1 mg – (East) – A1D x16 PHS = 75

C_4 – FC-17 – 1.7 mg – (West) – A1D x16 PHS = 75

C_2 – RSN-1055 – Same position as Exp# 166-171 DD-2 x20, mag. → PHS =

	A	B	C	D
Beg all bars than 0.1% (C_2, C_1, C_4) 10 min live		2,496,625	2,478,165	2,503,015
	95685	94205	94505	95255
	66715	66415	65615	66905
TMC – Hi Level – Baseline 60				
TMC on	C_1 (FC-18)	C_1 (FC-18)	C_4 (FC-17)	C_4 (FC-17)
TMC live time	10.00000	10.11326	10.00753	10.00000
TMC Integral Counts	95322	94990	65390	66651
Extrap to Zero fake hit	1725	1725	670	670
Cor. total	97047	96715	66060	67321
Total Cor for live time	97,047	95632	66070	67,321
	$\frac{FC-18}{C_1}$ = 1.01423	$\frac{FC-18}{C_1}$ = 1.01515	$\frac{FC-17}{C_1}$ = 0.69848	$\frac{FC-17}{C_1}$ = 0.70675
	$\frac{FC-18}{C_4}$ = 1.45465	$\frac{FC-18}{C_4}$ = 1.43992	$\frac{FC-17}{C_4}$ = 1.00602	$\frac{FC-17}{C_4}$ = 1.00622
$\left(\frac{FC-18}{FC-17}\right)_{C_1}$	1.45205 (AC)	1.43506 (AD)	1.45337 (BC)	1.43636 (BD)
$\left(\frac{FC-18}{FC-17}\right)_{C_4}$	1.44595 (AC)	1.44566 (AD)	1.43130 (BC)	1.43102 (BD)
		Avg $\frac{FC-18}{FC-17}$ = 1.44135	1.43930 ± 0.00914	
$\left(\frac{FC-18}{FC-17}\right)_{C_2}$		$\frac{FC-18}{C_2}$ = 0.0383045	$\frac{FC-17}{C_2}$ = 0.0266366	$\frac{FC-17}{C_2}$ = 0.0268960
		1.43804 (BC)	1.42417 (BD)	Avg = 1.43110

Avg $\frac{FC-17}{C_2}$ = 0.0267663 Avg $\frac{FC-7}{C_2}$ from #167 A+B and 167 A+B = 0.0228978

Not Cor for Masses in Det. $\frac{FC-17}{FC-7}$ = $\frac{FC-18}{FC-7}$ =

= 75
75
mag. → PHS = 100

Instrument Check on 12 Jan 60 Source 10 mcr

PM-1		Low Trip	OK ½"	Alarm Trip	OK Cocked
PM-2				Alarm Trip	
IC-1		Meter Trip	OK 1"	Fast Trip	OK
IC-2		Meter Trip	OK 2"		Red light OK
IC-3	Response	Calibration	OK 1/8		Bldg. alarm OK
IC-4	Response	Calibration	OK 1/8.		Press Dif. 0.12"
CRM		Meter Trip			

Temp 20.9°C

-17)

#173 Replaced Np^{237} det. by U^{234} det FC-14, C1 East; FC-13 C4 West.

~9:30 k > 1

~11:30 Shut down

#174 1:01 PM ± Period k > 1 Now have U^{236} FC. in assembly.

2:40 PM Shut down

5
2
D)
D)
960
0
878

226 #173

U^{234}

C_1 – FC-14 – East – 4.6 mg – AID x 32 x 1.0 mag PHS = 150

C_4 – FC-13 – West – 4.4 mg – AID x 32 x 1.0 mag. PHS = 150

C_2 = RSN-105 Same as Exp 166-172 – DD2 x 20 x 1.1 mag PHS = 100

10 min Counts	A	B	C	D
C_2	298185 - 65	301445 - 65	302735 - 65	297665 - 65
C_1	219845 - 4980	221645 - 4980	222685 - 4980	218705 - 4980
C_4	172845 - 7620	174665 - 7620	174375 - 7620	172365 - 7620
TMC	→ Baseline = 150			
TMC on	C_1 FC-14	C_1 FC-14	C_4 FC-13	C_4 FC-13
TMC Live Time	10.23045	10.00292	10.00580	10.00000
TMC Integral Counts	195875	192823	148469	146496
Extrapol. To Zero	32065	32160	30952	30928
Overflow Bkg	~100 - 21	100 - 21	- 75	- 75
Cor Total	228019	225,062	179,346	177346
Cor for Live Time	222883	224,996	179242	177346
	$\frac{FC-14}{C_2}$ = 0.74763	$\frac{FC-14}{C_2}$ = 0.74655	$\frac{FC-13}{C_2}$ = 0.59220	$\frac{FC-13}{C_2}$ = 0.59592
	$\frac{FC-14}{C_1}$ = 1.03732	$\frac{FC-14}{C_1}$ = 1.03845	$\frac{FC-13}{C_1}$ = 0.82333	$\frac{FC-13}{C_1}$ = 0.82979
	$\frac{FC-14}{C_4}$ = 1.34897	$\frac{FC-14}{C_4}$ = 1.34692	$\frac{FC-13}{C_4}$ = 1.07488	$\frac{FC-13}{C_4}$ = 1.07649
$\left(\frac{FC-14}{FC-13}\right)_{C_2}$	1.26246 (AC)	1.25458 (AD)	1.26064 (BC)	1.25277 (BD)
$\left(\frac{FC-14}{FC-13}\right)_{C_1}$	1.25991 (AC)	1.25010 (AD)	1.26128 (BC)	1.25146 (BD)
$\left(\frac{FC-14}{FC-13}\right)_{C_4}$	1.25800 (AC)	1.25312 (AD)	1.25309 (BC)	1.25121 (BD)

Avg $\frac{FC-14}{FC-13}$ = 1.25546 ± 0.00421

174 U^{236}

C_1 – FC-12 – 4.8mg – A1D x32 x1.0 PHS = 100

C_4 – FC-11, 5.0mg, A1D x32 x1.10 PHS = 100

C_2 – RSN-1055, DD2 x20x1.1 PHS=100

10 min Counts	A	B	C	D
C_2	301015 -65	306065 -65	306375 -65	304395 -65
C_1	151575 -30	154265 -30	155485 -30	154175 -30
C_4	123215 -25	126515 -25	126945 -25	124595 -25
TMC →	Baseline = 75			
TMC on	C_1 FC-12	C_4 FC-11	C_1 FC-12	C_4 FC-11
TMC Livetime	9.90423	9.91949	9.94697	9.92111
TMC Integral Counts	148684	124995	153,280	123,150
Extrap to zero	6308	12748	6357	11,945
Overflow	750		750	
Bkg.	-10	-14	-10	-14
Total	155,732	137129	160,377	135,081
Total Corr for Livetime	157,238	138,242	161,232	136,155
	$\frac{FC-12}{C_2}$ = 0.52247	$\frac{FC-11}{C_2}$ = 0.45177	$\frac{FC-12}{C_2}$ = 0.52637	$\frac{FC-11}{C_2}$ = 0.44739
	$\frac{FC-12}{C_1}$ = 1.03757	$\frac{FC-11}{C_1}$ = 0.89631	$\frac{FC-12}{C_1}$ = 1.03716	$\frac{FC-11}{C_1}$ = 0.88329
	$\frac{FC-12}{C_4}$ = 1.27639	$\frac{FC-11}{C_4}$ = 1.09291	$\frac{FC-12}{C_4}$ = 1.27034	$\frac{FC-11}{C_4}$ = 1.09300
$\left(\frac{FC-11}{FC-12}\right)_{C_2}$	0.86468 (BA)	0.85827 (BC)	0.85630 (DA)	0.84995 (DC)
$\left(\frac{FC-11}{FC-12}\right)_{C_1}$	0.86385 (BA)	0.86420 (BC)	0.85131 (DA)	0.85164 (DC)
$\left(\frac{FC-11}{FC-12}\right)_{C_4}$	0.85625 (BA)	0.86033 (BC)	0.85632 (DA)	0.86040 (DC)

Avg $\frac{FC-11}{FC-12}$ = 0.85779 ± 0.00488

Instrument Check on 15 Jan 68 Source 10 mc Ra

PM-1	Low Trip OK ½"	Alarm Trip OK	Contact
PM-2		Alarm Trip	
IC-1	Meter Trip OK 1"	Fast Trip OK	
IC-2	Meter Trip OK 2"	Red light OK	
IC-3 Responds	Calibration OK 1 µA	Bldg alarm OK	
IC-4 Responds	Calibration OK 1 µA	Press Sig 0.12"	
CRM	Meter Trip		

Temp 21.0°C

Exp # 175 Have placed ¼" dia fiss. Ch. in assembly. Removed 4x34x¼" from each side.

^{235}U #5-3 on C_1 -- EAST ℄ 20.5/8" norm above Table [Sym about m-s plane]

^{238}U #8-2 on C_4 -- WEST ℄ " " " "

k>1 38.24 sec period with 3 plexiglas shims.

ρ too high to level. Shut down.

Removed 32x34x½" fuel + 8x34x¼" Stack now 32x34x34" high

176 Also moved BF_3 det. C_2 + C_3 to approx. 13" above stack.

k>1 ρ-OK Count rate on C_2 + C_3 too high.

Shut down and moved C_2 + C_3 det. to cable rack.

177 k>1 BF_3 det on C_2 giving intermittent noise and finally lost pulses completely. Ct. rate on C_3 still too high.

Shutdown. Cleaned connections on C_2.

Placed Cd (20 mil) around both C_2 + C_3 det. opposite stack. Det. in cable rack

12:45 178 k>1

A+B k=1 at 14 on IC-3

2:20 PM Reduced power to ~ 0.3 on IC-3

C+D

3:15 PM Shutdown.

#178
15 min Counts

C_1 – ^{235}U, ¼" OD, #5-3, AID x 32 x 1.0, PHS = 50
C_4 – ^{238}U, ¼" OD, #8-2, AID x 32 x 1.0, PHS = 50
C_2 – RSN-1055 5/16" BF_3, cd covered, DD2 x 32 x 1.1, PHS = 100, HV = 1800
C_3 – RSN-1055 5/16" BF_3, cd covered, AID x 32 x 1.0, PHS = 100, HV = 1750V

	A	B	C	D
C_1	41186685-835	39,197,215-835	987,853-835	1,003,535-835
C_4	27,645-10	26,025-10	585-10	645-10
C_2	did not start	1,210,855-5	27,375-5	27,975-5
C_3	1,905,565-15	1,795,365-15	40,405-15	41,515-15
Ic-2	6×10^{-8}	5.8×10^{-8}	1.38×10^{-9}	1.38×10^{-9}
Ic-3	14	13.8	0.3	0.3
TMC →	Baseline = 50			→
TMC on	C_4 (8-2)	C_4 (8-2)	C_1 (5-3)	C_1 (5-3)
TMC live time	15.0	15.0	14.54446	14.53439
TMC Integral Counts	26944	25354	928719	943342
Extrap to zero	1792	1788	111,670	112629
	— 6.65%	— 7.05	— 12.02%	— 11.94%
overflow and Rej				
Total Counts	28736	27142	1,040,389	1,055,971
Total Counts for live time	28736	27142	1,072,975	1,089,799
	$\frac{8-2}{C_2}$ —	$\frac{8-2}{C_2} = 0.022416$	$\frac{5-3}{C_2} = 39.2026$	$\frac{5-3}{C_2} = 38.9631$
	$\frac{8-2}{C_3} = 0.015080$	$\frac{8-2}{C_3} = 0.015118$	$\frac{5-3}{C_3} = 26.5654$	$\frac{5-3}{C_3} = 26.2602$
$\left(\frac{5-3}{8-2}\right)_{C_2}$		1748.87 (CB)		1738.18 (DB)
$\left(\frac{5-3}{8-2}\right)_{C_3}$	1761.63 (CA)	1757.20 (CB)	1741.39 (DA)	1737.02 (DB)

Avg $\frac{5-3}{8-2}$ = 1747.38 ± 9.39

Instrument Check-on Source

PM-1	Low Trip	OK	½"	Alarm Trip	OK
PM-2					
IC-1	Meter Trip	OK	1"	Fast Trip	OK
IC-2	Meter Trip	OK	2"	Fast Trip	OK
IC-3	Calibration	OK	3/16	Fast Trip	OK
IC-4	Calibration	OK	3/16	Fast Trip	OK
CRM	Meter Trip				

Temp 21.1°C

#179 Detectors #'s 5-3 + 8-2 same as Run 178
Assembly same as Run 178. Normalizing BF_3 det. same as #178.
Have interchanged amplifier strings at detectors
so that C_1 is now on Det 8-2 on West side
and C_4 is on Det 5-3 on East side.

9^{10} $k > 1$

$k = 1$ at ~ 15 on IC-3

10^{25} $k < 1$ Reducing power for runs ~ 235 - Def.

$k = 1$ at ~ 0.3 on IC-3

11^{50} Shut down

#179
15 min counts

C_1 – ^{238}U, ¼" O.D., #8-2, AID #Y102542, x32 x1.0 max, PHS=50 V=1350
C_4 – ^{235}U, ¼" O.D., #5-3, AID #Y102541, x32 x1.0 max., PHS=50
C_2 – RSN1055, 5/16" BF_3, Cd covered, DD2 #Y140345, x20 x1.1 max, PHS=100 HV=1820
C_3 – " " " AID #Y140347, x32 x1.0 max, PHS=100 HV=1751

	A	B	C	D
IC-2	6.3×10^{-8}	6.1×10^{-8}	1.446×10^{-9}	1.515×10^{-9}
IC-3	15.0	14.2	0.32	0.33
C_1	28745 – 5	27425 – 5	595 – 5	685 – 5
C_4	—	—	1070995 – 3060	1,114875 – 3060
C_2	1,396,095 – 5	1,342,355 – 5	30,053 – 5	31,865 – 5
C_3	1,967,415 – 15	1,889,585 – 15	42,515 – 15	44,295 – 15
			$\frac{C_2}{C_3}$ .70705	$\frac{C_2}{C_3}$ .71951
TMC →	Baseline = 50			
#178. TMC on	C_1 (8-2)	C_1 (8-2)	C_4 (5-3)	C_4 (5-3)
TMC livetime	15.0	15.0	14.43667	14.40569
TMC integral counts	28050	26782	1,003,765	1,042,764
Extrapol. to zero	2394 8.53%	2378 8.88%	94,470 9.41%	97,786 9.38%
Overflow and Neg.	—	—	—	—
total counts	30,444	29,160	1,098,235	1,140,550
total corr for livetime	30,444	29,160	1,141,089	1,187,604
	$\frac{8-2}{C_2}$ = 0.0218066	$\frac{8-2}{C_2}$ = 0.0217231	$\frac{5-3}{C_2}$ = 37.9730	$\frac{5-3}{C_2}$ = 37.2757
	$\frac{8-2}{C_3}$ = 0.0154742	$\frac{8-2}{C_3}$ = 0.0154321	$\frac{5-3}{C_3}$ = 26.8492	$\frac{5-3}{C_3}$ = 26.8203
$\left(\frac{5-3}{8-2}\right)_{C_2}$	1741.35 (CA)	1748.05 (CB)	1709.38 (DA)	1715.95 (DB)
$\left(\frac{5-3}{8-2}\right)_{C_3}$	1735.09 (CA)	1739.83 (CB)	1733.23 (DA)	1737.96 (DB)

Avg $\frac{5-3}{8-2}$ = 1732.60 ± 12.34

2:

< 99.9%

FC-7, U^{238}, 5.0 mg U, 4-6 ppm ^{235}U
FC-8, No food
FC-9, 5.2 mg U, 99.9% ^{235}U
FC-10, 5.0 mg U, 99.9% ^{235}U
FC-11, 5.0 mg U, 98.55% ^{236}U } 0.99% ^{235}U, 0.46% ^{238}U
FC-12, 4.8 mg U, 98.55% ^{236}U

FC-13, 4.6 mg U, 97.81% ^{234}U
FC-14, 4.4 mg U, 97.81% ^{234}U
FC-17, 1.7 mg Np^{237} } < 10 ppm ele
FC-18 2.1 mg Np^{237} }
5-3, 0.3471 mg U, 97.34% ^{235}U,
8-2, 0.3989 mg U, ~7 PPm ^{235}

Expt #	167 10 Jan 68	168 10 Jan 68	170 11 Jan 68	171 11 Jan 68	172 11 Jan 68	173 12 Jan 68
East	$C_1 \rightarrow$ FC-7	$C_1 \rightarrow$ FC-7	$C_1 \rightarrow$ FC-9	$C_1 \rightarrow$ FC-10	$C_1 \rightarrow$ FC-18	$C_1 \rightarrow$ FC-14
West	$C_4 \rightarrow$ FC-9	$C_4 \rightarrow$ FC-10	$C_4 \rightarrow$ FC-10	$C_4 \rightarrow$ FC-9	$C_4 \rightarrow$ FC-17	$C_4 \rightarrow$ FC-13
FC-7 / C_2	0.022862	0.022894				
FC-9 / C_2	50.2985					
FC-10 / C_2		48.5545				
FC-11 / C_2						
FC-12 / C_2						
FC-13 / C_2						0.59406
FC-14 / C_2						0.74709
FC-17 / C_2					0.026766	
FC-18 / C_2					0.038304	
(FC-9 / FC-7) avg C_2+C_3	2199.12 ± 12.32					
(FC-10 / FC-7) avg C_2+C_3		2113.74 ± 14.08				
(FC-9 / FC-10) avg C_1+C_4			1.04968 ± .00159	1.05576 ± .00172		
(FC-11 / FC-12) avg C_1, C_3+C_4						1.25546 ± .00421
(FC-13 / FC-13) avg C_1, C_2+C_4						
(FC-18 / FC-17) avg C_1, C_2+C_4					1.43930 ± .00914	
(5-3 / 8-2) avg C_2+C_3						

, 97.81% ^{234}U } 97.81% ^{234}U }		1.49% 0.07%	^{235}U ^{236}U + 0.63% ^{238}U				
.37 } .37 }	< 10ppm	Heavy element Cont.					
, 97.34% ^{235}U, 0.3379mg ^{235}U							
, ~7 ppm ^{235}U							
	173 12 Jan 68	174 12 Jan 68	178 15 Jan 68	179 16 Jan 68			
Jan 68							
:-18	$C_1 \rightarrow FC\text{-}14$	$C_1 \rightarrow FC\text{-}12$					
:-17	$C_4 \rightarrow FC\text{-}13$	$C_4 \rightarrow FC\text{-}11$					
		0.44958					
		0.52442					
	0.59406						
	0.74709						
766							
804							
		0.85779 ±.00488					
	1.25546 ±.00421						
30							
14			1747.38 ±9.39	1732.60 ±12.34			

Cont. from p. 88

2 2o U Fy in paraffin H/x = 614

Instrument Check on 4/21/66 Source 10 mcr

PM-1	Low Trip OK		Alarm Trip OK
PM-2			Alarm Trip
IC-1 > 3x10⁻¹¹	Meter Trip OK		Fast Trip OK
IC-2 > 3x10⁻¹¹	Meter Trip OK		Red light OK
IC-3 Responds	Calibration S/A.		Alarm OK
IC-4 Responds	Calibration S/A.		Press dif. 0.16"
CRM	Meter Trip		

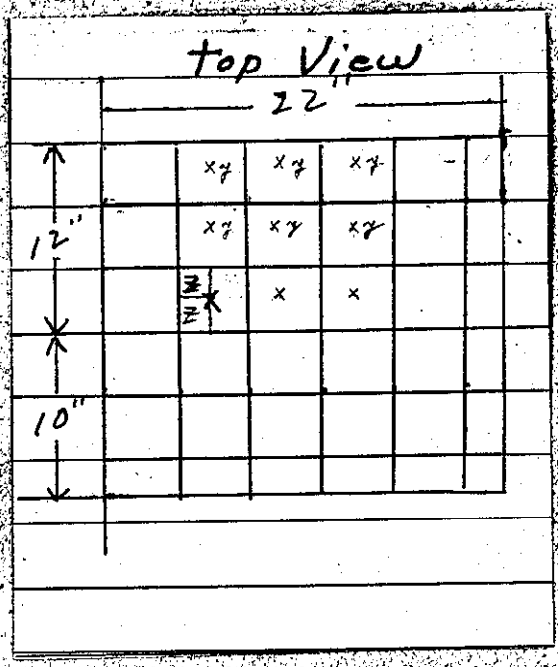
Expr 157

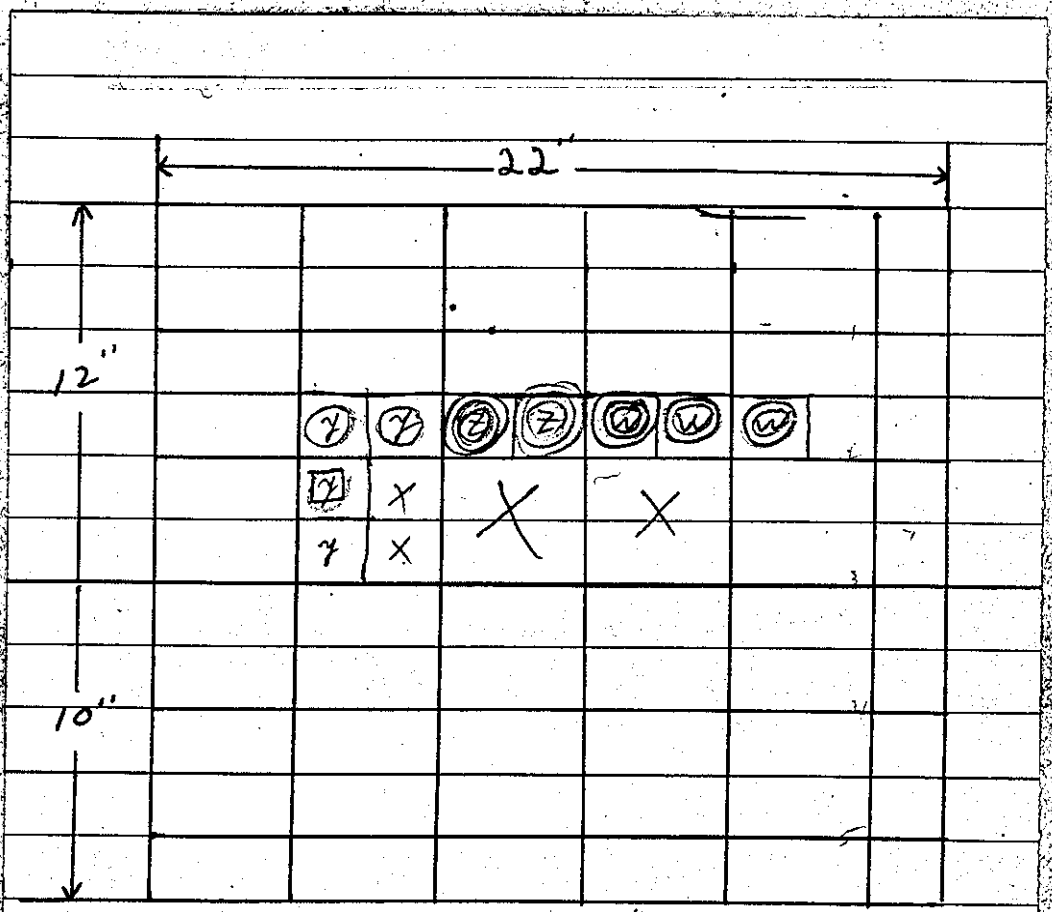
To build a stack reflected with 6" of polyethylene on side and top and 6" of plexiglass on bottom and adjacent to get k = 1.

Stack 22" x 22" x 23" high reflected as above.

time	condition	table Separation
8 40	K < 1 (~ -3¢)	0.0
9 01	Shut Down	Add 9 Pcs 1/4" x 4" x 4" to Movable table (marked x)
9 40	K > 1 (~ +2.2¢)	0.0
9 57	Shut Down	Remove 6 Pcs 1/4" x 4" x 4" (marked y)
10 30	K > 1	0.0
10 55	Shut Down to Adjust Inst.	
11 12	K > 1	0.0
12 15	Check Crit – Shut Down	(Removed 2 x 4 x 1/4 marked z)
12 40	K ~ 1	0.0
1 22	Start Pulsing	
2 15	Scram (Neutron Burst with Accelerator)	

Expr 158


top View
22"
12"
10"



22" x 22" x 23" high plexi 1/4" on spaces marked by w, x, y, z
(56.279 x 56.160 x 58.701 cm high) + 1/4 in plexi

U_2F_4 $H/x = 614$ Instrument Check on H-22-66 Source _____

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ " " Trip _____

IC-1 3×10^{-11} " " ✓ Test Trip ✓

IC-2 3×10^{-11} " " ✓

IC-3 Response OK SQR Red light ✓

IC-4 Response OK SQR Alarm ✓

CRM _____ Meter Trip _____ Press Dif. 0.065

Purpose: Pulse at Critical stack 22"x22"x23" + 1/4" indicated by X (see sketch) $U F_4$ 2%, Reflected with 6" of Polyethylene on Sides and top and 6" Expr time of Plexyglass on Bottom

158	8^{30}	condition	table Separation
		$K < 1$	0.0
	8^{50}	Shut Down	Added 1 Pc 1/4 x 4 x 4 marked X
	9^{06}	$K < 1$ (~ -0.553¢)	0.0
	9^{26}	Shut Down	Added 1 Pc. 1/4 x 2 x 4 marked Z
	9^{38}	$K < 1$ (~ -.263¢)	0.0
	10^{00}	Shut Down	Added 3 Pc 1/4 x 2 x 2 marked W
	10^{09}	$K > 1$	0.0
	10^{30}	Start Pulsing	
	11^{00}	Shut down because neutron source pulse too small. Trouble with pulse generator.	

252 U(2)F$_4$ H/x = 614

Instrument Check on 26 April Source 10 mcr

PM-1		Low Trip	OK	Alarm Trip	
PM-2				Alarm Trip	
IC-1	> 3X10^{-11}	Meter Trip	OK	Fast Trip	OK
IC-2	> 3X10^{-11}	Meter Trip	OK		Red light OK
IC-3	Responds	Calibration	1 fa		alarm OK
IC-4	Responds	Calibration	1 fa		Bucs. diff. 0.06"
CRM		Meter Trip			

Purpose: Check Crit and Count Rate on Stack
22"x22"x23" + 1/4" Indicated on Sketch (See P251)
UF$_4$ 2% Reflected with 6" of Polyethylene on
Sides and top with 6" Plexyglass on Bottom;

Have placed BF$_3$ detector on top of fuel inside reflector.

Exor time	Condition	table Separation
159 12^{22}	K~1	0.0
1^{20}	lower Power to Check Accelerator	
1^{30}	K~1	0.0
H^{26}	Shut Down	

Pulsed for ~ 2.5 hr.

Pulsing data: Ch width = 160 μsec; Bg ratio = 2; Delay ratio = 2
Burst width = 900 μsec; Rate = 12 CPS.; 135 KV;
Steady beam current ≃ 20 μamps; Avg pulsing I below meter sens.

Meas. λc from Computer fit = −137.49 ± 0.34

U(2)F4 #/x-614 Instrument Check on 11-27-66 Source _____ 253

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓
PM-2 _____ Alarm Trip _____
IC-1 3 x 10⁻¹¹ Meter Calib ✓ Fast Trip ✓
IC-2 3 x 10⁻¹¹ Meter Calib ✓
IC-3 Response OK Calibration _____ Red light ✓
IC-4 Response OK Calibration _____ Alarm ✓
CRM _____ Meter Calib _____ Press Dif 0.06"

Purpose: Pulse At Critical Stack 22"x22"x23" ±1/4" indicated on Sketch (see P. 251) at F4 2% Reflected with 6" of Polyethylene on Sides And top with 6" Plexyglass on Bottom

Expr	time	condition	table Separation	
160	9 05	K > 1.	0.0	Critical due to Temp coef. of ρ. ~4°F below from previous day. Corrected
	9 31	Shut Down	Remove 1/4" x 2"x4" see (Sketch) P 251	
	9 44	K>1	0.0	
	10 10	Shut Down	Remove 1/4" x 2" x 4"	◎ "
	10 17	K>1	0.0	"
	10 31	Shut Down	Remove 3 Pcs 1/4 x 2 x 2	◎ "
	10 43	K > 1 Slightly	0.0	
	11 00	Shut Down	Remove 1 Pc 1/4 x 2 x 2"	□ "
	11 10	K ~ 1	0.0	
	11 25	start Pulsing	check critical — ~0.11¢ positive.	
	4 18	Shut Down		

Pulsing data same as Expr. V2-159, p. 252.

Meas. λ_c from Computer fit = -136.572 ± 0.266

U(2%) F_4 in paraffin H/x = 614

Instrument Check on 5-3-66 Source 10 mcr

PM-1 ✗ Low Trip OK Alarm Trip OK

PM-2 Alarm Trip

IC-1 7.3×10^{-11} Meter Trip OK Fast Trip OK

IC-2 $> 3 \times 10^{-11}$ Meter Trip OK Red light OK

IC-3 Out for maintenance Calibration — Alarm OK

IC-4 Responds Calibration 1/2 - Press Diff. 0.06"

CRM Meter Trip

Purpose: To do ht. perturbation meas. on tall stack

see pp. 53-57.

Expt 161 Pile stacked 21 x 22 x 48" high

$k > 1$ with plexiglass (19½ x 24 x 1")

$k < 1$ no plexiglass

Expt 162 21 x 22 x 49" high

$k > 1$ with plexiglass

$k < 1$ no plexiglass

Let decay down to background → ~ 3.5 on 3x10⁻¹¹ scale on IC-2 and 0.013 on IC-1

405 Shut Down

U (2%) F_4 in Paraffin H/x 614 Instrument Check on 5-4-66 Source _____ 255

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} _____ Fast Trip ✓

IC-2 3×10^{-11} _____

IC-3 _____ Red light ✓

IC-4 Response OK _____ Alarm ✓

CRM _____ Meter Trip _____ Press Dif 0.06"

Purpose: Ht Perturbation Meas on table stack 21"x22"x ~~45~~ 49" High.

Expr	time	Condition	Table Separation	Plexyglass 19½x24x1
163	9 02	K > 1	0.0	with
	9 17	Shut Down to Adjust Counters		
	9 48	K > 1	0.0	W
	10 13	K < 1	1"	w/o
	10 22	IC-2 → -3.431¢, IC-4 → -3.444¢, IC-3 → -3.603¢, IC-4 → -3.450¢ Separate to Add fuel	1"	to Ht 49" Lift
164	10 36	K > 1	0.0	w/o
IC-1 0/3 ~1		4.436¢ 4.372¢ 4.466¢ 4.604¢ Separate to Remove fuel	1"	49" Lift
165	11 15	K ≤ 1	0.0	W/o
	11 39	-3.762¢ -3.860¢ -3.898 Separate to Add fuel	1"	to Top
166	12 45	K > 1	0.0	w/o
	1 09	4.246¢ 4.205¢ 4.295¢ 4.327¢ Separate to Remove fuel	1"	
167	1 21	K ≤ 1	0.0	w/o
	1 58	-4.125¢ -4.115¢ -4.276¢ Separate to Add fuel	1"	
168	2 14	K > 1	0.0	w/o
	2 40	3.767¢ 3.744¢ 3.852¢ Separate to Remove fuel	1"	
169	2 54	K < 1	0.0	w/o
	2 22	-4.547 -4.531 -4.716 Separate to Add fuel	1"	
170	3 37	K > 1	0.0	w/o
	4 05	3.346 3.360 3.392 Shut Down		

256 V(2)F4 H/X-614 Instrument Check on 5-5-66 Source _____

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response ✓ Red light ✓

IC-4 _____ Calibration _____ Alarm ✓

CRM _____ Meter Trip _____ Press Dif 0.06

Purpose: Rerun of Exp # 163-170 See P. 255 →

Expr	time	Condition					Exp
		21x22x50" high table Separation				Plexyglass 19½x24x	
171	8^{35}	K > 1	0.0			w/o	180
	9^{03}	3.908¢ Separate to Remove fuel	3.897¢		3.968¢ 1"	from top	
172	9^{20}	K < 1 21x22x49" high	0.0			w/o	181
	9^{47}	-4.167¢ Separate to Add fuel	-4.139¢		-4.186¢ 1"		
173	10^{05}	K > 1 21x22x50" high	0.0			w/o	182
	10^{38}	3.960¢ Separate to Remove fuel	3.902¢	4.029¢	4.015¢ 1"		
174	10^{53}	K < 1	0.0			w/o	183
	11^{25}	-4.266¢ Separate to Add fuel	-4.244¢	-4.428¢	-4.428¢ 1"		
175	12^{41}	K > 1	0.0			w/o	184
	1^{21}	3.650¢ Separate to Remove fuel	3.611¢	3.756¢	3.663¢ 1"		
176	1^{36}	K < 1	0.0			w/o	185
	2^{04}	-4.649¢ Separate to Add fuel	-4.585¢	-4.754	-4.754 1"		
177	2^{25}	K > 1	0.0			w/o	
	2^{56}	3.389¢ Separate to Remove fuel	3.358¢	3.422¢	3.412¢ 1"		
178	3^{07}	K < 1	0.0			w/o	
	3^{35}	-4.911¢ Separate to Add fuel	-4.871¢	-4.994¢	-4.994¢ 1"		Avg
179	3^{50}	K > 1	0.0			w/o	
	4^{25}	3.143¢ Shut Down	3.121¢	3.216¢	3.168¢		

U(2) F4 H/x = 614 Instrument Check on 5-6-66 Source _____ 257

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} _____ Fast Trip ✓

IC-2 3×10^{-11} ✓

IC-3 Response ✓ 5g. R Red light ✓

IC-4 Response ✓ 5g R Bldg Alarm ✓

CRM _____ Motor Trip _____ Press Dif 0.06"

Purpose: Rerun of Expr # 163-179 (See P 255)

Exp	time	Condition	table Separation		Plexyglass 19½x24x1	
180	10^{55}	$k>1$	0.0			w/o
		1.991¢	1.986¢	2.006¢	2.006¢	
	11^{55}	Separate to Remove fuel			1" from P&P	
181	12^{13}	$K<1$	0.0			w/o
		-6.369¢	-6.356¢	-6.561¢	-6.517¢	
	12^{38}	Separate to Add fuel	1"			
182	12^{53}	$K>1$	0.0			w/o
		1.736¢	1.764¢	1.754¢	1.785¢	
	1^{36}	Separate to Remove fuel	1"			
183	1^{53}	$K<1$	0.0			w/o
		-6.627¢	-6.583¢	-6.819¢	-6.788¢	
	2^{18}	Separate to Add fuel	1"			
184	2^{35}	$K>1$	0.0			w/o
		1.542¢	1.528¢	1.544¢	1.518¢	
	3^{14}	Separate to Remove fuel	1"			
185	3^{29}	$K<1$	0.0			w/o
		-6.951¢	-6.973¢	7.151¢	7.177¢	
	4^{54}	Shut Down				

Measured stock (53.804cm x 56.302cm x 124.948cm)

Avg Worth of 1" of fuel on 21x22" stack from Expts 163-185 = 8.229¢ ± 0.183¢

U(2) F_4 #/x=614

Instrument Check on 5-9-66 **Source** _____

PM-1	Low Trip ✓	Hi Alarm Trip	✓
PM-2		Alarm Trip	
IC-1	3×10^{-11} Meter Trip ✓	Fast Trip	✓
IC-2	3×10^{-11} Meter Trip ✓		
IC-3	Response ✓ Calibration 5g R	Red light	✓
IC-4	Response ✓ Calibration 5g R	Bldg Alarm	✓
CRM	Meter Trip	Press Dif 0.07"	

Purpose: Check Critical on Stack 40x44x16" UF_4 2%

Expr	time	Condition	table Separation	Plexyglass	
186	1 50	K > 1	0.0	w	
	2 05	Separate Add 1/4" to 1/4 of Stack SW Corner			
	2 21	K < 1	0.0	w/o	
	3 05	Shut Down			

		Condition	table Separation	Plexyglass	
	3 30	Separate Add fuel			
196	3 43	K > 1	0.0	w/o	
		5.8494	5.8254	6.0094	5.9484
	4 05	Shut Down			

Room temp Approx 78° f

4 15 Reduce thermostat From 74° to 70°

U(2)

Expr

187 8

188

189 1

190 1

191 1

192 1

193

194

195

U(2) F_4 $^{14}/_{X} = 614$ Instrument Check on 5-10-66 Source _____ 259

PM-1 _____ Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} ✓ Fast Trip ✓

IC-2 3×10^{-11} ✓

IC-3 Response ✓ S&R Red light ✓

IC-4 Response ✓ S&R Bldg Alarm ✓

CRM _____ Press Dif 0.08"

Purpose: Ht. Perturbation Meas on stack 40"x44"x16" (at 2%) + 1/4" to ht on 1/4 of stack

Shadecast area 16 1/4" high

Expr time condition table Sep; Plexyglass 2 Pcs

187 8^{40} K < 1 40x44x16" + 1/4" on SW 1/4 of stack 0,0 1/4 of w/o

-4.3614 -4.3894 -4.4854 -4.5144

9^{22} Separate Add 1/4" fuel to NE Corner of stack

188 9^{35} K > 1 40x44x16" + 1/4" on SW and NE quadrant of stack. 0.0 w/o

6.0824 6.5914 6.7244 6.7044

9^{55} Separate Remove 1/4" from 1/4 of stack NE Corner

189 10^{09} K < 1 0.0 w/o

-4.5774 -4.5314 -4.7164 -4.6784

10^{51} Separate Add 1/4" fuel (As indicated in Expr 187)

190 11^{06} K > 1 0.0 w/o

6.4134 6.4054 6.5034 6.3844

11^{27} Separate Remove fuel

191 11^{41} K < 1 0.0 w/o

-4.7334 -4.7474 -4.8114 -4.8114

12^{23} Separate Add fuel

192 12^{41} K > 1 0.0 w/o

6.212 6.204 6.3644 6.2894

1^{01} Separate Remove fuel

193 1^{16} K < 1 0.0 w/o

-4.9364 -4.9114 -5.0494 -5.0704

1^{58} Separate ~~Remove~~ Add fuel

194 2^{13} K > 1 0.0 w/o

6.0464 6.0584 6.1844 6.1524

2^{35} Separate Remove fuel

195 2^{48} K < 1 0.0 w/o

-5.1054 -5.0764 -5.2594 -5.2134

(See P 258)

260

U(2) F_4 H/x = 614

Instrument Check on 5-11-66 Source _____

PM-1 _____ Low Trip ✓ Hi Alarm Trip ✓

PM-2 _____ Alarm Trip _____

IC-1 3×10^{-11} Meter Trip ✓ Fast Trip ✓

IC-2 3×10^{-11} Meter Trip ✓

IC-3 Response ✓ Calibration _____ Red light ✓

IC-4 Response ✓ Calibration _____ Bldg Alarm ✓

CRM _____ Meter Trip _____ Press Dif 0.68"

Purpose: Re-run of Expr's. 187-196 see P. 259

temp → 8⁰⁰ AM 78°F 4²⁰ 78.5°F Shaded Area 16¼" high

Expr	time	condition	table Separation	2 Pcs Plexyglass
197	8³⁰	K > 1	40x44x16 + ¼" on NE & SW Quadrants of stack 0.0	w/o
		4.871¢ 4.847¢ 4.948¢ 4.977¢		
	9⁰⁰	Separate Remove fuel (¼ from ¼ of stack)		
198	9¹⁴	K < 1	40x44x16+¼" on SW ¼ of stack 0.0	w/o
		-6.169¢ -6.103¢ -6.261¢ -6.376¢		
	9⁵⁷	Separate Add fuel		
199	10¹³	K > 1	0.0	w/o
		4.933¢ 4.847¢ 5.006¢ 4.961¢		
	10³⁷	Separate Remove fuel		
200	10⁵²	K < 1	0.0	w/o
		-6.195¢ -6.131¢ -6.396¢ -6.467¢		
	11³²	Separate add fuel		
201	11⁴⁹	K > 1	0.0	w/o
		4.847¢ 4.801¢ 4.924¢ 4.907¢		
	12¹⁴	Separate Remove fuel		
202	12²⁸	K < 1	0.0	w/o
		-6.32¢ -6.30¢ -6.51¢ -6.47¢		
	1⁰⁷	Separate Add fuel		
203	1²²	K > 1	0.0	w/o
		4.744¢ 4.724¢ 4.867¢ 4.816¢		
	1⁴⁷	Separate Remove fuel		
204	2⁰²	K < 1	0.0	w/o
		-6.467¢ -6.410¢ -6.598¢ -6.590¢		
	2⁴¹	Separate Add fuel		
205	2⁵⁶	K > 1	0.0	w/o
		4.544¢ 4.530¢ 4.665¢ 4.626¢		
	3²²	Separate Remove fuel	4¹⁴	Shut Down
206	3³⁴	K ≤ 1 -6.613¢ -6.568¢ 0.0 -6.[illegible]¢	w/o	-6.765¢

Measured stock used in Expts 186→206
(102.284cm x 112.636 cm x 40.759cm)

Avg Width of ¼" on ¼ of top of 40x44" stock from
Expts. 187-206 = 11.177 ± 0.082 ¢

2% Assay $UF_4 + CH_2$ (Final Blends) 6th Dilution

4410-28

Blend #	Batch #	Net (g)	Req #	G.U/G	W/O U-235	U-(g)	U-235 (g)	W/O UF_4	W/O CH_2
2	2-130	79,550	378326	.5339	2.11	42,472	896	70.44	29.56
3	2-129	81,250	327	.5355	2.03	43,509	883	70.65	29.35
5	2-127	80,325	328	.5378	2.01	43,199	868	70.95	29.05
6	2-6129	79,900	329	.5306	2.04	42,395	865	70.00	30.00
7	2-6130	80,770	330	.5280	1.99	42,647	849	69.65	30.35
8	2-6131	79,600	331	.5276	2.03	41,680	846	69.60	30.40
10	2-6133	82,250	332	.5277	1.98	43,421	864	69.89	30.11
12	2-6135	71,200	333	.5306	2.05	37,779	774	70.01	29.99
13	2-6136	81,125	334	.5369	2.01	43,556	875	70.84	29.16
14	2-6137	82,350	335	.5269	1.94	43,390	842	69.52	30.48
17	2-6140	80,975	337	.5323	2.07	43,103	892	70.23	29.77
23	2-6146	69,250	342	.5375	2.03	37,222	756	70.91	29.09
24	2-6147	71,400	343	.5347	1.99	38,178	760	70.54	29.46
33	2-6152	79,125	322	.5281	2.04	41,786	852	69.68	30.32
34	2-6153	80,600	323	.5356	2.04	42,848	874	70.66	29.34
35	3-6154	79,700	324	.5283	2.04	42,106	859	69.70	30.30
36	2-6157	78,500	344	.5264	2.04	41,322	843	69.45	30.55
37	2-6158	76,500	357	.5271	2.04	40,476	826	69.80	30.20
38	2-6161	77,900	355	.5399	2.04	42,058	858	71.23	28.77
39	2-6162	79,075	347	.5271	2.04	41,839	854	69.81	30.19
40	2-6163	77,500	356	.5337	2.04	41,362	844	70.41	29.59
41	2-6164	78,000	353	.5362	2.04	41,824	853	70.74	29.26
42	2-6165	77,400	350	.5324	2.04	41,208	841	70.28	29.72
43	2-6166	78,300	351	.5401	2.04	42,290	863	71.26	28.74
44	2-6167	74,700	352	.5268	2.04	39,352	803	69.50	30.50
Totals and averages		1,956,145		.532281	2.03	1,041,222	21,140	70.22%	29.78
								±0.55%	
Correction for purity (blends 33 through 44)				.531910	±.004248	1,040,484	21,125	±.8%	
					±.8%				
*Material transferred to ORNL		1,958,582				935,412	18,990	70.17	29.83

W/O U-235 (2.03) ± .04

Comments

1. Blends No. 1, 4, 7, 11, 16, and 20 were cross blended into blends 30, 31, 32, 33, 34, and 35.
2. Blends No. 15, 18, 19, 21, 22, 30, 31, and 32 were cross blended into blends 36 through 44.
3. W/O U-235 for blends 33 through 44 are the average W/O U-235 of blends 1, 4, 9, 11, 15, 16, 18, 19, 20, 21, and 22.
4. Blends 33 through 44 were not analyzed spectrographically. The average purity correction factor for blends under No. 33 was: .99854

Total Vol = 764,034.9 cm^3

Avg overall density = 2.302 g/cm^3

Based on assumed assay of 2.00 W/O ^{235}U in U

$\frac{gU^{235}}{g} = 0.01064$

H/U = 19.678

$H:^{235}U = 971.7$

Atoms/cm^3:

- $^{235}V = 0.6276 \times 10^{20}$
- $^{238}V = 30.3630 \times 10^{20}$
- $H = 609.842 \times 10^{20}$
- $C = 293.193 \times 10^{20}$
- $F = 123.962 \times 10^{20}$

* The average g.u/g (.531910) and the average % U-235 (2.03) are used to determine the uranium and U-235 transferred to ORNL on WB 26-84-165

UF_4 (2% Enriched) + CH_2 Blocks For ORNL 6th Dilution 4410-28

Batch #	Box #	Part Numbers		Net (g)	Date
2-6183	1	6B 1/4	1 thru 44	1,735	6-19-67
2-6184	2	6B 1/2	1 " 46	3,602	"
2-6183	1	6B1	1	5,300	"
2-6184	2	6B1	2 thru 34		"
2-6183	1	6B4	1 " 13	7,819	"
2-6184	2	6A 1/4	1 thru 8		6-29-67
2-6185	3	6A 1/4	9 " 70	17,574	"
2-6186	4	6A 1/4	71 " 114		"
2-6186	4	6A 1/2	1 " 9		"
2-6187	5	6A 1/2	10 " 41		"
2-6188	6	6A 1/2	41 " 73	33,880	"
2-6189	7	6A 1/2	74 " 105		"
2-6190	8	6A 1/2	106 " 111		"
2-6190	8	6A1	1 " 13		"
2-6191	9	6A1	14 " 29		"
2-6192	10	6A1	30 " 45	75,641	"
2-6193	11	6A1	46 " 61		"
2-6195	12	6A1	62 " 77		"
2-6196	1	6A1	78 " 112		"
2-6196	1	6A2	1 " 42		"
2-6197	2	6A2	43 " 109	249,678	"
2-6198	3	6A2	110 " 176		"
2-6200	4	6A2	177 " 207		"
2-6200	4	6A4	1 " 18		"
2-6201	5	6A4	19 " 45		"
2-6202	6	6A4	46 " 72		6-13-67
2-6203	7	6A4	73 " 99		"
2-6204	8	6A4	100 " 126		"
2-6205	9	6A4	127 " 153		"
2-6206	10	6A4	154 " 180		"
2-6207	11	6A4	181 " 207		6-20-67
2-6208	12	6A4	208 " 234		"

Batch #	Box #	Part Numbers		Net (g)	Date
2-6209	9	6A4	235 thru 261		6-26-67
2-6210	7	6A4	262 " 288		"
2-6211	5	6A4	289 " 315	1,355,515	"
2-6172	6	6A4	316 " 342		6-27-67
2-6173	8	6A4	343 " 369		"
2-6175	10	6A4	370 " 396		"
2-6177	7	6A4	397 " 423		"
2-6178	5	6A4	424 " 450		"
2-6179	11	6A4	451 " 477		"
2-6215	6	6A4	478 " 504		"
2-6217	9	6A4	505 " 531		6-28-67
2-6218	12	6A4	532 " 558		"
2-6220	5	6A4	559 " 562		"
	5	6B4	14 thru 26	7,848	7-7-67

Summary Data

Part Size		No.	Net (g)	U (g)	U-235 (g)
6B 1/4	2x2x1/4	44	1,735	923	19
6B 1/2	2x2x1/2	46	3,602	1,916	39
6B1	2x2x1	34	5,300	2,819	57
6B4	2x2x4	26	15,667	8,333	169
6A 1/4	4x4x1/4	114	17,574	9,348	190
6A 1/2	4x4x1/2	111	33,880	18,021	366
6A1	4x4x1	112	75,641	40,234	817
6A2	4x4x2	207	249,678	132,866	2,696
6A4	4x4x4	562	1,355,515	721,012	14,637
Totals		1256	1,758,592	935,412	18,990

2% Assay Alloys for ORNL 4110-28 6th Dilution

Pl. #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Lab	378278	378279	378280	378277	378281	378285	378286	378287	378288	378289	378290	378291	378292	378293	378294	378295	378296	378297	378298	378299	378300	378301	378302	378303
Al	25	10	40	20	15	12	15	12	8	6	12	30	15	10	2	<1	10	20	6	6	1	15	60	15
B	<.1	<.1	<.1	<.1	.1	<.1	<.1	<.1	1.0	1.0	.2	.5	.8	<.1	<.1	<.1	1.5	.1	<.1	<.1	<.1	<.1	<.1	<.1
Be	<.01	<.01	<.01	.05	.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	.01	.02	<.01	<.01	<.01	<.01	<.01	<.01
Ca	50	60	50	70	50	45	50	65	35	50	100	150	150	100	30	40	60	125	40	70	70	30	100	60
Cd	.4	.4	<.1	.2	.2	<.1	<.1	.4	4.0	5.0	.6	.2	.1	.2	.1	.2	.4	<.1	.2	.3	.2	.1	.3	.4
Co	1	1	<1	1	1	1	1	2	1	2	5	3	3	18	15	4	1	1	6	2	1	10	25	5
Cr	175	175	150	175	125	150	175	200	200	175	200	200	200	300	300	150	150	225	250	200	200	350	800	275
Cu	8	8	6	6	4	7	6	6	4	5	5	6	4	3	3	3	5	5	4	40	6	10	8	5
Fe	400	400	200	400	115	175	200	150	90	80	175	500	175	200	175	150	140	190	175	150	150	250	350	200
Li	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Mg	50	40	25	40	18	25	25	45	35	35	40	50	40	30	20	25	40	60	60	60	55	80	60	50
Mn	15	15	10	15	8	10	10	12	12	15	20	20	20	25	18	15	15	15	18	20	15	30	40	15
Na	6	15	10	8	30	15	10	10	90	100	100	40	30	30	30	20	100	100	50	100	150	45	50	30
Ni	75	125	70	125	50	75	60	300	80	100	200	100	90	300	300	150	45	75	400	200	150	800	1200	350
P	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Si	15	15	<10	15	30	15	15	10	10	10	15	20	20	18	10	<10	<10	<10	<10	<10	<10	50	200	55
V	4	5	2	4	3	4	5	5	5	5	2	6	6	6	6	2	4	5	3	3	3	4	6	3
As	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Au	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ba	4	6	4	5	5	4	3	4	2	3	<2	4	2	2	2	2	2	3	<2	2	<2	<2	<2	<2
Bi	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cs	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Ga	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ge	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Hf	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
In	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
K	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	10	<6	<6	<6	<6	<6	<6
Mo	60	60	40	40	30	40	40	40	25	20	60	60	90	90	70	60	10	10	15	4	<4	40	100	15
Nb	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	100	4	<4	<4	<4	60	<4	<4	<4	<4	<4	<4
Pb	4	2	2	4	2	2	2	8	2	2	<1	8	4	3	3	2	5	3	6	4	5	6	6	3
Pd	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pb	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<26	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Sb	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sn	2	3	2	2	4	2	4	4	2	2	2	5	5	4	4	4	2	3	4	5	4	10	30	4
Sr	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Ti	10	6	<4	10	8	4	6	6	<4	<4	<4	4	4	<4	<4	<4	5	15	10	6	4	4	6	4
Tl	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
W	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Zn	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	50	<10	<10	<10	<10	<10	<10
Zr	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total																								

266 U(2) H/x = 972

Instrument Check on 30 June 67 Source 10 mc Ra

PM-1	Low Trip	OK	Alarm Trip	OK
PM-2		[redacted]	Alarm Trip	
IC-1	Meter Trip	OK	Fast Trip	OK
IC-2	Meter Trip	OK		Red light OK
IC-3 Responds	Calibration	S/R OK		Bld alarm OK
IC-4 Responds	Calibration	S/R. OK		Pres Diff. 0.11"
CRM	Meter Trip			

¼" Al plate on top of Al tote on table.

Eff 1 Approach to critical for 32 x 34" base assembly. 24" high Tables closed → $k_{eff} << 1$, No multiplication

2 32" high Tables closed → $k_{eff} << 1$, Slight multiplication

3 34" high Tables closed $k_{eff} < 1$, Mult. ~ 3

4 35" high Tables closed $k > 1$ T = 52.98 sec → 15.754¢

5 34 3/4 high + 1" x 19¾" x 24" plexiglas on one side $k > 1$ T = 25.68 sec 24.826¢ ρ_1 = 14.12¢

~~34~~ 3/4 high Removed plexiglas $k > 1$ T = 90.116 10.711¢

6 34½ + ¼ on half. With plexiglas $k > 1$ T = 31,486 22.029¢

W/o plexiglas $k > 1$ T = 129.8 8.021¢ ρ_1 = 14.06¢

7 34½" high $k > 1$ with plexiglas T = 381.95 19.471¢

$k > 1$ w/o plexiglas T = 211.5 5.315¢ ρ_1 = 14.16¢

8 34" high + ½ on half of top. $k > 1$ w/ pl. T = 64.71 13.694 ρ_1 = 14.34¢

$k < 1$ w/o pl. T = -2070.3 sec. -0.641¢

$U(2)F_4$ $\frac{H}{X} = 972$

Instrument Check on 7 Sept 67 Source 10 mc γ

~~PM-1~~	Low Trip OK	Alarm Trip OK	
~~PM-2~~		Alarm Trip	
IC-1	Meter Trip OK	Fast Trip OK	
IC-2	Meter Trip OK		Red light OK
IC-3 Responds	Calibration S/R. OK		Alg. alarm OK
IC-4	Calibration		Press Diff. 0.06"
~~CRM~~	Meter Trip		

⅛" Al plate on top of 5 layers of Al trays on table

Eff. 9 Have stacked 32 x 34 x 32" high assembly. 16" x 34" bare on each table. $k_{eff} << 1$

10 Stack now 32 x 34 x 34" high + ½" on N half of top.

$k > 1$ with plexiglas same as Eff. 5.

$k < 1$ W/O plexiglas

Opened Table 1.75 rev. and let power decay to ($\rho = -4.01\,\$$) background. $B_2 \sim 0.0045$ on IC-3 and ~ 0.0055 on IC-4

~~4:~~ 3: PM. Closed tables

after 72 min power still increasing. Nearly Const period $\therefore k \geq 1$

4:12 PM Shut down.

268 U(2)F_4-6 Temp = 19.7°C

Instrument Check on 8 Sept 67 Source 10 mc Ir

PM-1 Low Trip OK Alarm Trip OK
PM-2 Alarm Trip
IC-1 Meter Trip OK Fast Trip OK
IC-2 Meter Trip OK Red light OK
IC-3 Response Calibration Hdg alarm OK
IC-4 Response Calibration Press diff 0.06"
CRM Meter Trip

Time	Expos.		
9:00	11	Stack now 32x34x34½" high. To check and adjust counters for bkg. perturbation measurement. Moved IC-3 from under table to balcony which reduced sens. about a factor of 4. Will take all data above 0.1 on IC-3 or ≈ 1.5 decades above background.	3.00
10:15	12	32x34x34½" b>1	
12:05	13	32x34x34" b<1	
1:15	14	32x34x34½" b>1	
2:05	15	32x34x34" b<1	
2:55	16	32x34x34½" b>1	
3:30	17	32x34x34" b<1	

Instrument Check on 15 Sept 67 Source 10 mCi

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1		Meter Trip	OK	Fast Trip	OK
IC-2		Meter Trip	OK		Red light OK
IC-3	Respond	Calibration	S.J.R.		Bldg alarm OK
IC-4	Respond	Calibration	S.J.R.		Press diff 0.06"
CRM		Meter Trip			

To adjust stack to $k = 1$ and check out ~~the~~ pulsing (in room) equipment for prompt neutron decay const. meas.

	Expt.		
3.00PM.	18	32 x 34 x 34" + ½" on N half.	$k > 1$
	19	32 x 34 x 34¼" high	$k > 1$

270 U(2)F4 -6 Temp ~ 20.1°C

Instrument Check on Sept 18, 67 Source 10 mcf

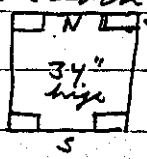
RM-1		Low Trip OK	Alarm Trip OK	
RM-2			Alarm Trip	
IC-1		Meter Trip OK	Test Trip OK	
IC-2		Meter Trip OK		
IC-3 Respond		Calibration OK S.J.R.	Red light OK	
IC-4 Respond		Calibration OK S.J.R.	Bldg Alarm OK	
CRM		Meter Trip	Pres Diff 0.06"	

To finish adjusting assembly and to pulse at critical

time Eff.

10AM 20 32x34x34¼" less ¼x4"x4" piece on each corner. Have a 1"x6"x6" piece of plexiglas on rod shims on south face of stack for control element. k>1

12:10 21 Pulsing 32x34x34" less ¼x4x8 on each corner. k ≃ 1 ; T ≃ 2655 sec ; ρ ≃ 0.48¢



½" BF_3 detector on top surface of stack near center. Pulse source ~5" from center of side of stack.

Pulsing Data: Ch Width = 160 μsec ; Br ratio = 4 ; Delay ratio = 8. Control # 35 cps

Burst width = 700 μsec ; Rate = 45 cps ; 147 KV ; Avg Beam I = 6 μamps.

Take data for 300 pulses and then separate table to 9ren to reduce power in assembly and repeat.

4:10 Check critical T ≃ 4830 sec ρ ≃ 0.27¢

4:25 Shut down

Estimate from hand plot $\alpha = \frac{\beta}{\ell} = -102.6\ sec^{-1}$

From Computer $\alpha = \frac{\beta}{\ell} = -103.8 \pm 2\ sec^{-1}$

9:30

10:3

3:1

3:30

4:1

U2 Fy-6 Temp ~ 20.3°C

Instrument Check on Sept 19, 67 Source 10 mCi

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip	
IC-1	Meter Trip OK	Fast Trip OK	
IC-2	Meter Trip OK	Red light OK	
IC-3 Responds	Calibration OK	S/R	Bldg alarm OK
IC-4 Responds	Calibration OK	S/R	Prim dif 0.06"
CRM	Meter Trip		

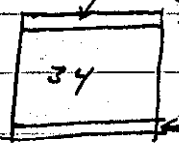
To pulse the bare assembly of U(2) Fy-6 at critical.

Expn.

9:30 22 Stack same as Expn 21 $k > 1$ $\rho \simeq 0.7\,\$$

Removed fuel from N + S edges of stack.

10:30AM. Now 32 x 34 x 34" less ½ x 4 x 34" on north and south side of top.



$k \simeq 1$ $T \simeq 10{,}800$ sec $\rho \simeq 0.1\,\$$

Pulsing Data: Ch width = 320 μsec ; Bg ratio = 2 ; Delay ratio = 2

Burst width = 1500 μsec ; Rate = 21/sec (Rate control set at 11 CPS)

HV = 147 KV ; Avg Beam I = 8.5 μamp.

Collect data for 200 pulses per cycle.

3:15PM Check critical

$k = 1$

Estimate from hand plot $\alpha = \frac{\beta}{\ell} = -104.5\ \text{sec}^{-1}$

From Computer $\alpha_{BC} = \frac{\beta}{\ell} = -106.4$

Avg Expn 21 & 22

$\alpha_{DC} = -105.1 \pm 1.5\ \text{sec}^{-1}$

3:30 23 Pulsing above stack with table separated from

Ch Width = 160 μsec ; Bg ratio = 4 ; Delay ratio = 8

Burst width = 700 μsec ; Rate = 42 CPS ; 147 KV ;

From Computer $\alpha = -184.9$

$\rho = 1 - \frac{\alpha}{\alpha_{DC}} = .759\ \$ = 75.9\,\$$

Nominal Dims 32 x 34 x 34" high

4:16PM Shut down. Meas. Dims 81.56 x 86.77 x 86.44 cm high

272 U(2)F4-6

Instrument Check on 20 Sept 67 Source 10 mCi

PM-1	Low Trip OK		Alarm Trip OK
PM-2			Alarm Trip
IC-1	Meter Trip OK		Fast Trip OK
IC-2	Meter Trip OK		Red light OK
IC-3 Responds	~~Calibration~~ OK	S.J.R.	Bldg alarm OK
IC-4 Responds	Calibration OK	S.J.R.	Press Dif 0.06"
CRM	Meter Trip		

To find critical assembly reflected with 6" of polyethylene.

2:20PM 24 Have stacked 30"x32" x 28" high assembly reflected with 6" of polyethylene.

Moved IC-2 and IC-3 to positions just outside refl. on fixed table.

$k < 1$

Add 2" fuel 30"x32" x30" $k < 1$

Add 1½" fuel 30"x32" x 31½" $k > 1$ at ~0.5 rev.

Instrument Check on 21 Sept 63 Source 10 mcf

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1		Meter Trip	OK	Fast Trip	OK
IC-2		Meter Trip	OK		Red light OK
IC-3	Responds	Calibration	OK 1/4 R.		Dly alarm OK
IC-4	Responds	Calibration	OK 1/4 R.		Press Dif 0.06"
CRM		Meter Trip			

25 30 x 32 x 31" high refl. 6" polyethylene.
$k > 1$ $T = 136.8$ sec $\rho \simeq 7.687\,¢$ } 2.83¢

26 30 x 32 x 30 3/4" + 1/4" on South half.
$k > 1$ $T = 234.5$ sec $\rho \simeq 4.856\,¢$ } 3.43¢

27 30 x 32 x 30 3/4" high
$k > 1$ $T = 912.0$ sec $\rho \simeq 1.375\,¢$

avg = 3.155
1/4" worth 6.31¢

28 30 x 32 x 30 3/4" less 1/4" x 12 x 16 on East side of movable table.
Detector inside refl on surface of fuel ~ middle of 5 face.
1/2" x 10" BF_3 $k = 1$ $\rho \simeq 0.09\,¢$
Pulsing: Ch. Width 320 μsec; Bg ratio = 2; Delay ratio = 4
Burst width = μsec; Rate 21 CPS (control set at 11)
HV = 1.48 KV Avg Beam I = 2 μamp
$k = 1$ $\rho \simeq -0.06\,¢$
From Computer $\alpha = \frac{\beta}{\ell} = -106.5\,sec^{-1}$

Critical height = $78.20 - \frac{0.635}{6.31}(1.375) = 78.06$ cm
see Expt 30 ↑

274 $U(2)F_4$-6 Temp ~20°C

Instrument Check on 22 Sept 67 Source 10 mCi

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1		Meter Trip	OK	Fast Trip	OK
IC-2		Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	OK S/A.	Rdg alarm	OK
IC-4	Responds	Calibration	OK S/A.	Press Dif.	0.06'
CRM		Meter Trip			

Refl 9:35

29 Stack same as Expt 28. Changed to ¼" min BF_3 detector.
$k < 1$ ~ 1¢ Count rate too low on ¼" det.

30 added ¼ x 6 x 16" fuel. Replaced ½ x 10" BF_3 det. at upper edge of core.
30 x 32 x 30¾ high less ¼ x 6 x 16" on top.
$k \simeq 1$ $T = 2741$ sec $\rho \simeq 0.47¢$
Pulsing: Ch. width = 320 μsec; Bg ratio = 2; Delay ratio = 4
Burst width = 1500 μsec; Rate = 21 cps (Control at 11)
HV = 147 KV Avg Beam I = 9.5 μ amps.
Check Critical $T = 3246$ sec $\rho \simeq 0.40¢$

4:15 PM Shut down
From Computer $\alpha = -107.9$ sec^{-1}
Avg of Expts 28+30 $\alpha = -107.2 \pm 1.6$ sec
Meas. Dims 76.53 x 81.63 x 78.20 cm high
(Nominally 30" x 32" x 30¾")

U(2)-6 Temp 24.1°C U(2) F_4-6 275

Instrument Check on 26 Sept 67 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1		Meter Trip	OK	Fast Trip	OK
IC-2		Meter Trip	OK	Red light	OK
IC-3	Responds	Calibration	OK S.F.R.	Bld. alarm	OK
IC-4	Responds	Calibration	OK S.F.R.	Press Dif	1.0"
CRM		Meter Trip			

Extra
9:35 AM 31 Have stacked 32" x 32" base assembly 29" high reflected with 6" of polyethylene. Measurement (81.52 x 81.60 x 73.63 cm high)
BF_3 $k < 1$

32 32 x 32 x 29" + 1/4 on top of top
$k > 1$

Q #1 → C-1 → 1" BF_3 det in Cd-Paraf. shield in cable rack.

C-3 → 1/2" BF_3 det in Cd-Paraf. shield on balcony

33 32 x 32 x 29 1/4" high
$k > 1$

4 C-4 1/4" BF_3 det in cable rack.

34 32 x 32 x 29" + 1/4 on North half of top
$k > 1$

35 32 x 32 x 29 1/4"
$k > 1$

36 32 x 32 x 29" + 1/4 on South half of top
$k > 1$

Temp at 4:15 PM 25.2°C

276 V(2) F4 - 6

Instrument Check on 4 Oct 67 Source 10 mc Ra

PM-1 Low Trip OK Alarm Trip OK
PM-2 Alarm Trip
IC-1 Meter Trip OK Fast Trip OK
IC-2 Meter Trip OK Red light OK
IC-3 Response Calibration 1 yr. OK Bldg alarm OK
IC-4 Response Calibration 1 yr. Pulse Hgt. 0.09"
CRM Meter Trip

Time	Expo	
11:05		Have reattached 32 x 34 x 34" high assembly Rg Refl
	37	32 x 34 x 34" was ~ 24°C overnight.
		$k < 1$ with plexiglas Temp ~ 20.8°C at 11:30
	38	32 x 34 x 34 + ½" on South half. T_{LN} = -186.7 sec
		$k < 1$
2:15	39	32 x 34 x 34½" ~~½" on South half.~~ Temp = 22.5°C T_{LN} = -488.6
		$k < 1$
	40	32 x 34 x 35" T_{LN} = 124.2
		$k > 1$
	40A	32 x 34 x 34¾" + Plexiglas (1" x 19⅝" x 24")
		$k = 1$ at 4.1 rem.
	40B	Same as 40A + 6" x 16" x 36" of polyethylene ~ 14" from side of Stack
		$k = 1$ at 4.3 rem
	40C	Same as 40A + 6 x 16 x 36" of poly against side of Stack
		$k = 1$ at 6.5 rem.

U(2) F_4 - 6 277

Instrument Check on 5 Oct 67 Source 10 mc Ir

PM-1 Low Trip OK Alarm Trip OK

PM-2 Alarm Trip

IC-1 Meter Trip OK Fast Trip OK

IC-2 Meter Trip OK Red light OK

IC-3 Responds Calibration by R. OK Alg alarm OK

IC-4 Responds Calibration by R. OK Pneu dif 0.09"

CRM Meter Trip

Time	Expo	
10:45	41	32 x 34 x 34 1/2" high; T_{LN} = -169.5 sec. Temp = 22.3°C
		$h < 1$
12:20	42	32 x 34 x 34 1/4" high T_{LN} = -243.9
		$h < 1$
1:10	43	32 x 34 x 34 3/4" high T_{LN} = 224.7
		$h > 1$
1:50	44	32 x 34 x 34 1/4" T_{LN} = -241.5
		$h < 1$
2:35	45	32 x 34 x 34 3/4" T_{LN} = 223.7
		$h > 1$
3:10	46	32 x 34 x 34 1/4" T_{LN} = -241.0
		$h < 1$
3:55	47	32 x 34 x 34 3/4" T_{LN} = 218.2
		$h > 1$
4:35		Temp = 22.1°C

278 V(2) F4-6

Instrument Check on 6 Oct 67 Source 10mCi

PM-1 Low Trip OK Alarm Trip OK
PM-2 Alarm Trip
IC-1 Meter Trip OK Fast Trip OK
IC-2 Meter Trip OK Red light OK
IC-3 Responds Calibration 5 yr OK Bldg Alarm OK
IC-4 Responds Calibration 5 yr OK Press. Dif. 0.09"
CRM Meter Trip

Time	Exp.		
		Temp = 22.3°C	
8:25	48	32x34x34 3/4" T_{LN} = 185.7	11:10 AM
		b > 1	
	49	32x34x34 1/4" T_{LN} = -273.0	
		b < 1	
	50	32x34x34 3/4" T_{LN} = 185.0	
		b > 1	
	51	32x34x34 1/4" T_{LN} = -272.1	
		b < 1	
11:20	52	32x34x34 3/4" Temp = 21.9°C T_{LN} = 188.9	
		b > 1	
	53	32x34x34 1/4" T_{LN} = -275.8	
		b < 1	
	54	32x34x34 3/4" T_{LN} = 185.9	
		b > 1	
	55	32x34x34 1/4" T_{LN} = -272.7	
		b < 1	
	56	32x34x34 3/4" T_{LN} = 185.7	
		b > 1	

Meas. Dimen = 81.45 x 86.70 x 88.32 cm.
↖ Nominal Dimen = 32 x 34 x 34 3/4" high

U(2) F4-6

Instrument Check on 11 OCT 67 Source 10 mCi

PM-1		Low Trip	OK ½"	Alarm Trip	OK Contact
PM-2				Alarm Trip	
IC-1		Meter Trip	OK 1"	Fast Trip	OK ½"
IC-2		Meter Trip	OK 1"		Red light OK
IC-3	Responds	Calibration	S.J.R. OK		Red light OK
IC-4	Responds	Calibration	S.J.R. OK		Bldg Alarm OK
GRM		Meter Trip			Press Dif. 0.09"

Expo.

Temp = 21.9°C

11:10AM 57 32 X 34 x 34¼" Stack with support mock-up on top. Mock-up consists of ¼" x 24" x 48" al + 5 layers 3" al bottles and 1" x 24 x 48" iron on each side.

b < 1

58 Removed support mock-up. 32 x 34 x 34¼"

b < 1

59 32 x 34 x 34½" with support mock-up on top.

b > 1

60 32 x 34 x 34½ Removed support mock-up.

b > 1

Temp = 22.1°C

280 U(2) F4 - 6

CRM _____ Meter Trip _____

IC-4 Standard Calibration OK Ref. 1.0R Phase adj. OK

IC-3 Standard Calibration Phase - check in room. Ref. adj. OK

IC-2 Meter Trip OK 1" Overlight OK

IC-1 Meter Trip OK 1" Fast Trip OK ½"

PM-2 Alarm Trip

PM-1 Low Trip OK ½" Alarm Trip OK Confirm

Instrument Check on 12 Oct 67 Source 10 mCi

Temp = 21.9°C

Expt

61 32 x 34 x 34½" Stack

11AM. Have positioned 1" x 12" x 26" plexiglas shim on rod shims against bottom of South face to use for fins control during foil irradiations.

15 foils 2% Vin paraffin across center of stack, Using extra plexiglas shims on side to get up to power.

11:15 Start timing at 2 on IC-3

k ≃ 1 at 5.5 on IC-3 Shim out ≃ 6"

11:25 Shut down

Expt 62 Foil Exposure same As #61 (with Dif foils)

12:55 10 Min Exposure Start timing at 2 on IC-3

K ≃ 1 At 5.5 to 6 on IC 3

63 Same as #61

2:43 Start timing at 2 on IC-3

k ≃ 1 at 4.5 on IC-3

2:53 Shut down.

U(2) F_4 in Paraffin Foils

U(2) F_4 - 6

Foil Position	Expt 61		Expt 62		Expt 63	
-14"	D-31	0.33290	D-9	0.34374	E-3	0.33402
-12	D-35	0.51032	D-7	0.51270	E-5	0.50706
-10	D-33	0.63825	D-17	0.64449	E-7	0.62899
-8	D-21	0.77143	D-3	0.79114	E-9	0.77210
-6	D-38	0.84876	D-20	0.87732	E-11	0.85628
-4	D-37	0.91076	D-14	0.93052	E-13	0.90704
-2	D-29	0.97651	D-24	0.99830	E-15	0.97449
0	D-36	1.00000	D-11	1.00000	E-1	1.00000
+2	D-32	0.98326	D-22	0.99081	E-14	0.98655
4	D-26	0.93508	D-25	0.94098	E-12	0.92846
6	D-30	0.86935	D-34	0.86616	E-10	0.85230
8	D-13	0.75868	D-40	0.75958	E-8	0.74494
10	D-23	0.62961	D-39	0.63728	E-6	0.62426
12	D-16	0.50546	D-6	0.50288	E-4	0.49538
14	D-28	0.33811	D-12	0.34751	E-2	0.33028

Traverse across center of stack in nominal 34" dimension

Meas. width = 86.65 cm

282 U(2) F_4 - 6

Instrument Check on 13 Oct 67 Source 10 mc Y

PM-1		Low Trip	OK ½"	Alarm Trip	OK Contact
PM-2				Alarm Trip	
IC-1		Meter Trip	OK 1"	Fast Trip	OK ½"
IC-2		Meter Trip	OK 1"		Red light OK
IC-3	Responds	Calibration	OK 1 f.R.		Bld. Alarm OK
IC-4	Responds	Calibration	OK 1 f.R.		Press. Dif .09"
CRM		Meter Trip			

Temp 21.5°C

Expr

1 9:20	64	32 x 34 x 34½ less ¼ x 4 x 34 on N side of top.
10		15 foils of U(2) F_4 in Paraffin.
9:39		Start timing at 2 on IC-3
		k ≃ 1 at 5 on IC-3
9:49		Shut down
1 Expr		
	65	32 x 34 x 34½ less ¼ x 4 x 34 on N side of top
12 30		15 foils of U(2) F_4 in Paraffin
		Start timing At 2 on IC-3
		K ≃ 1 At 5 on IC-3
1 04		Shut Down
4		
4		

U(2) F_4 in Paraffin foils U(2)F_4-6

Foil Position	Expt 64		Expt 65		Expt 66	
-14"	C-3	0.34628	C-22	0.34078	B-15	0.33848
-12	C-5	0.51462	C-24	0.52162	B-3	0.51607
-10	C-7	0.64010	C-28	0.64085	B-20	0.64124
-8	C-17	0.79004	C-30	0.77536	B-27	0.78039
-6	C-11	0.86119	C-32	0.87144	B-26	0.85764
-4	C-13	0.91746	C-35	0.91995	B-5	0.92534
-2	C-15	0.99462	C-38	0.99971	B-21	0.99325
0	C-1	1.00000	C-19	1.00000	B-12	1.00000
+2	C-14	0.99702	C-37	1.00171	B-28	0.98666
4	C-12	0.96027	C-34	0.95450	B-17	0.93936
6	C-10	0.84836	C-31	0.85756	B-42	0.85596
8	C-8	0.74512	C-29	0.74785	B-34	0.75436
10	C-16	0.63740	C-25	0.63986	B-40	0.64232
12	C-4	0.51255	C-23	0.50963	B-8	0.51455
14	C-2	0.34207	C-20	0.33712	B-11	0.33979

284 $U(2)F_4$-6

Instrument Check on 17 Oct 67 Source 10 mc R

PM-1		Low Trip	OK ½"	Alarm Trip	OK Contact
PM-2				Alarm Trip	
IC-1		Meter Trip	OK 1"	Test Trip	OK ½"
IC-2		Meter Trip	OK 1"		Redlight OK
IC-3	Responds	Calibration	OK 1/2 a.		Bldg alarm OK
IC-4	Responds	Calibration	OK "		Press Dif 0.09"
CRM		Meter Trip			

Temp 22.5°C

66 32x34x34½ less ¼ x 4 x 34 on N side of bx.

15 foils of $U(2)F_4$ in Paraffin

Start timing at 4 on IC-3

1:51 $t \simeq 1$ at 4.7 on IC-3

2:01 Shut down.

U(2) F_4-6 285

Instrument Check on 18 Oct 67 Source 10 mc K

PM-1	Low Trip OK ½"	Alarm Trip	OK Contact
PM-2		Alarm Trip	
IC-1	Meter Trip OK 1"	Fast Trip	OK ½"
IC-2	Meter Trip OK 1"		Red light OK
IC-3 Respond	Calibration OK 1 p.		Bldg Alarm OK
IC-4 Respond	Calibration OK 8 p.		Press Dif 0.1"
CRM	Meter Trip		

Temp 22.2°C

67 Start 32x34x34½" + ¼x16x34 on center of top.
~~same as Exp. 64-66~~

15 Cd covered 2 mil gold foils

9:46 Start timing

b = 1 at 25 on IC-3

10:06 Shut down.

286 Cd covered 2 mil gold U(2) F_4-6

Foil Position	Expt 67		Expt 69		Expt 70	
-14"	H-14	0.34122	G-15	0.34278	J-14	0.34268
-12"	H-4	0.50030	G-24	0.50048	J-12	0.50436
-10"	H-11	0.63973	G-16	0.64284	J-10	0.63760
-8"	H-18	0.76254	G-5	0.75139	J-8	0.76260
-6"	H-9	0.86093	G-18	0.85946	J-6	0.86038
-4"	H-13	0.94006	G-6	0.93106	J-4	0.93720
-2"	H-23	0.99947	G-22	0.98826	J-2	0.99801
0	H-6	1.00000	G-20	1.00000	J-1	1.00000
+2	H-12	0.99122	G-7	0.98515	J-3	0.98357
4	H-3	0.94555	G-23	0.93198	J-5	0.94818
6	H-25	0.85794	G-11	0.86934	J-7	0.87276
8	H-7	0.76584	G-9	0.76402	J-9	0.76798
10	H-24	0.64880	G-17	0.64986	J-11	0.66171
12	H-15	0.50561 est.	G-28	0.50950	J-13	0.50257
14	H-22	0.34546	G-1	0.34599	J-15	0.34064

	Expt 72				
-14"	C-3	0.33756	+6	C-10	0.85793
-12"	C-5	0.49423	+8	C-8	0.76859
-10"	C-7	0.63116	+10	C-6	0.64420
-8"	C-9	0.75390	+12	C-4	0.50476
-6	C-11	0.85848	+14	C-2	0.34595
-4	C-13	0.92752			
-2	C-15	0.98021			
0.0	C-1	1.00000			
+2"	C-14	0.97749			
+4"	C-12	0.94874			

Instrument Check on 19 Oct 67 Source Spontaneous

PM-1 ____ Trip OK ½" ____ Trip OK ____
PM-2 ____ Alarm Trip ____
IC-1 ____ Meter Trip OK 1" ____ Fast Trip OK ½" ____
IC-2 ____ Meter Trip OK 1" Red light OK
IC-3 Responder Calibration OK S/R Rdy Alarm OK
IC-4 Responder Calibration OK S/R Pass Dif ~0.1"
CRM ____ Meter Trip ____

Temp 22.0°C

68		Stack 32×34×34½
		2 Cd. covered and 2 bare In (93)-al foils
906		Start timing at 4 on IC-3
		b ≃ 1 at 9.5 on IC-3
9:16		Shut down
69		Stack same as Expt 67
		15 Cd covered 2 mil Gold foil
11:36		Start timing at 18 on IC-3
		b = 1 at 43 on IC-3
12:06		Shut down

Expt 68 data Pos

	1	2	3	4
In Foil	11 Cd	12	13 Cd	22
		2/1 = 2.72570		4/1 = 2.74998
		2/3 = 2.77960		4/3 = 2.72080

Avg Cd Ratio = 2.74402

288 U(2) F_4-6

Instrument Check on 20 Oct 67 Source Jul-Oct

PM-1 ____ Low Trip OK ½" Alarm Trip OK Cal-Lgt

PM-2 ____ Alarm Trip ____ S-N1

IC-1 ____ Meter Trip OK 1" Fast Trip OK ½ S-31

IC-2 ____ Meter Trip OK 1" ____ Red light S-32 OK

IC-3 Responds Calibration S/A ____ Hdy-Alarm S-33 OK

IC-4 Responds Calibration S/A ____ Pres Diff 0.7" B-10

CRM ____ Meter Trip ____

Eqn 70 Stock same as Eqn 67

15 Cd covered 2 mil gold foil

1[34] PM. Start timing at 16 on IC-3

$k \simeq 1$ at 43 on IC-3

2[04] Shut down

U(2) F4-6 289

Instrument Check on 23 Oct 63 Source 1/8 mcY

PM-1 Low Trip OK ½" Alarm Trip OK Collect

PM-2 Alarm Trip

IC-1 Meter Trip OK 1" Fast Trip OK 1-3/4"

IC-2 Meter Trip OK 1" Red-beam OK

IC-3 Response Calibration S/R: OK Alarm OK

IC-4 Response Calibration S/R OK Press Diff 0.1"

CRM Meter Trip

Temp 21.7°C

Eqpt 1 Stack 32 x 34 x 34½

2 Cd. covered & 2 bare In(10) - al foil.

10⁴⁵ AM Start timing at 4 on IC-3

b slightly greater than 1 Max power = 14 on IC 3

10⁵⁴ AM. Shut down

Pos	1	2	3	4
In Foil	J 1 Cd	J-2	J-4 Cd	J-10
		2/1 = 2.84449		4/1 = 2.70336
		2/3 = 2.84431		4/3 = 2.72914

Avg Cd Ratio = 2.78032

Eqpt 2 Stack 32 x 34 x 34½" + ¼ x 12 x 34 across middle of top.

15 Cd covered 2 mil gold foil

2:02 PM Start timing at 18 on IC-3

b = 1 at 42 on IC-3

2³² PM Shut down

290 U(2) F_4-6

Instrument Check on 25 Oct 67 Source ~10 mcr

PM-1 Low Trip OK ½" Alarm Trip OK Contact
PM-2 Alarm Trip
IC-1 Meter Trip OK 1" Fast Trip OK ½"
IC-2 Meter Trip OK 1" Red light OK
IC-3 Responds Calibration OK 8/0. Bld. alarm OK
IC-4 Responds Calibration OK 8/0 Press dif. Ok"
CRM Meter Trip

Temp = 21.9°C

73 Stack 32 x 34 x 34½" less ¼ x 4 x 34 from N side of top.
2 Cd covered and 2 bare U(92) metal foils
9¹²/AM Start timing at 4 on IC-3
b ≃ 1 at 10 on IC-3
9¹⁷/AM Shut down

Foils too hot when counted. Data does not look good.

74 Stack same as Expt 73
15 Bare 2 mil gold foils
2³⁰ PM Start timing at
2⁴⁵ PM b slightly greater than 1, could not level. Max power = 34 on IC-3
Shut down

V(2) Fy-6

Instrument Check on 26 Oct 67 Source Lower

PM-1	Count Window	Trip OK	½"	Alarm Trip OK Contact
PM-2	Count Window			Alarm Trip S-M
IC-1		Meter Trip OK	1"	Fast Trip OK ½"
IC-2		Meter Trip OK	1"	Red light-OK
IC-3	Respond	Calibration OK	1/4	Cld. alarm-OK
IC-4	Respond	Calibration OK	1/4	Press Lf 8-0.1"
CRM		Meter Trip		

75 Stack 32x34x34¼ + 16x34x¼ on center of top.
2 Cd covered and 2 bare U(92) metal foils, 4 mil
9⁴⁴ Start timing at 3.6 on IC-3
b = 1 at 10 on IC-3
9⁴⁹ Shut down

4 mil, U(92) metal Cd Ratio

Pos. 1	2	3	4
U-14 Cd	U-10	U-9 Cd	U-6
	2/1 = 22.18264		4/1 = ~~22.77264~~ 22.23054
	2/3 = 22.61069		4/3 = 22.25696

Avg Cd Ratio = 22.32021

Instrument Check on 31 Oct 67 Source 10 mcr

850V

PM-1 Low Trip OK Alarm Trip Did not trip. Reported A. D. Roh

PM-2 Low Trip Alarm Trip

IC-1 Meter Trip OK ½" Fast Trip OK Control

IC-2 Meter Trip OK 1" Red light OK

IC-3 Respond Calibration OK S/R Bldg Alarm OK

IC-4 Respond Calibration OK S/R Press Diff 0.1

CRM Meter Trip

Temp = 21.9°C

77 Stack same as Expt 75

2 Cd covered and 2 Bare V(92) metal foils

8^49 AM. Start timing at 7.5 on IC-3

b = 1 at 2 on IC-3

8^54 AM Shut down

4 mil, V(92) metal Cd Ratio

Position 1	2	3	4
V-1 Cd	V-3	V-10 Cd	V-11
	2/1 = 22.31804		4/1 = 21.98214
	2/3 = 22.20046		4/3 = 22.09669

Avg Cd Ratio = 22.14933

78 Stack same as Expt 75

15 bare 2 mil gold foils

1^29 PM Start timing at 3.6 on IC-3

b slightly > 1 Max power 3.9 on IC-3 ; Avg P ≃ 20

1^47 PM Shut down

294 U(2)F4-6

Instrument Check on 19 Nov. 67 Source 10 mCr

PM-1 Low Trip OK Alarm Trip Would not trip at 850V did at 925V

PM-2 Alarm Trip

IC-1 Meter Trip OK 1" Fast Trip OK ½"

IC-2 Meter Trip OK 1" Redlight OK

IC-3 Responds Calibration OK JT Bldg alarm OK

IC-4 Responds Calibration OK JT Press. Dif. OK 1"

CRM Meter Trip

Temp 22.3°C

79 Stack 32 x 34 x 34¼ + ¼ x 8 x 34" in center.

10 2P AM Stack 15 bare gold foil 2 mil.

→ Start timing at 3.6 on IC-3

b = 1 at 10 on IC-3

10 55 AM Shut down

80 Stack same as Expt 79

2 cd covered and 2 bare 10 w/o U(93)-al foils 5 mil thick

3 04 PM Start timing at 5.5 on IC-3

b ≃ 1 at 12 on IC-3 (slightly neg)

3 19 PM. Shut down

5 mil, 10 w/o U(93)-al alloy Cd Ratio

Pos	1	2	3	4
	P-1 Cd	P-2	P-3 Cd	P-4
		2/1 = 31.16023		4/1 = 30.40286
		2/3 = 30.31876		4/3 = 29.73827

Avg Cd Ratio = 30.40286

Instrument Check on 29 Nov. 67 Source 10 mCr

PM-1	Low Trip OK	Alarm Trip	Same as Nov.
PM-2		Alarm Trip	
IC-1	Meter Trip OK " 1"	Fast Trip	OK ½"
IC-2	Meter Trip OK 1"		Red light OK
IC-3 Responds	Calibration OK JT		Bldg. alarm OK
IC-4 Responds	Calibration OK JT		Press Dif. 0.1"
CRM	Meter Trip		

925V
850V

81 Stack same as Expt 79
2 Cd covered and 2 bare 10 w/o U(93)-al foils, 5 mil thick.

12 54/ PM Start timing at 5:5 on IC-3

t = 1 at 13 on IC-3

1 09/ PM Shut down

5 mil, 10 w/o U(93)-al alloy Cd Ratio

Position 1	2	3	4
P-5 Cd	P-6	P-7 Cd	P-8
	2/1 = 31.81092		4/1 = 30.53266
	2/3 = 31.23470		4/3 = 30.43942

Avg Cd Ratio = 31.00442

it

10286

73827

296. U(2) F_4 - 6 Bare Gold 2 mil thick

Foil Pos.	Expt 74		Expt 78		Expt 79		
-14"	D-23	0.34504	D-2	0.34466	B-16	0.34322	A
-12"	D-28	0.51431	D-20	0.51388	B-4	0.51208	A
-10	D-7	0.64100	D-25	0.64920	B-7	0.64592	A
-8	D-9	0.77206	D-29	0.77542	B-8	0.77551	A
-6	D-22	0.86228	D-4	0.86060	B-11	0.86136	A
-4	D-26	0.92694	D-12	0.92877	B-9	0.92556	A
-2	D-30	0.99502	D-16	0.99203	B-3	0.99248	A
0	D-11	1.00000	D-3	1.00000	B-1	1.00000	A
+2	D-17	0.98120	D-32	0.98578	B-15	0.98158	A
4	D-31	0.94370	D-23	0.93650	B-6	0.94466	A
6	D-8	0.85279	D-33	0.84948	B-10	0.85295	A
8	D-19	0.74686	D-15	0.74782	B-5	0.74822	A
10	D-14	0.64016	D-5	0.63892	B-13	0.63598	A
12	D-18	0.50514	D-13	0.50566	B-14	0.50406	A
14	D-6	0.34322	D-27	0.33788	B-12	0.34222	A

	Expt 83		Expt 86		Expt 89	
322	A-19	0.34130	F-8	0.34030	E-21	0.34862
208	A-7	0.50846	F-10	0.50979	E-8	0.51518
592	A-17	0.63924	F-12	0.63906	E-14	0.64712
751	A-13	0.76400	F-14	0.76728	E-2	0.77760
136	A-11	0.85593	F-16	0.85686	E-11	0.86099
556	A-5	0.91840	F-18	0.92477	E-4	0.92762
48	A-3	0.98546	F-20	0.99005	E-3	0.99733
000	A-1	1.00000	F-21	1.00000	E-12	1.00000
158	A-16	0.97896	F-19	0.98432	E-15	0.98662
766	A-4	0.94205	F-17	0.94798	E-22	0.94383
295	A-6	0.84826	F-15	0.85374	E-24	0.84762
722	A-8	0.75180	F-13	0.75030	E-23	0.75300
798	A-10	0.63870	F-11	0.63870	E-7	0.64000
106	A-12	0.50466	F-9	0.50672	E-13	0.50921
222	A-14	0.34300	F-7	0.34106	E-18	0.33969

See p. 187 for continuation of $V(2)F_4$ L6 experiments.

Paraffin

Date	Sample NO	Description	Req NO.	Analysis Results
5-17-66	1	Orginal, Used in Green Blocks	593131	
"	2	Stores stock	593132	
"	3	Fisher Lab in storage Cat # 03-723-5010	593133	
	4	Esso in storage	593134	
6-2-66	2A	Stores stock		