BOOK50R

Notes:
"HFIR CE3" on front
"HFIR CE3 I" on spine

Blank pages: inside front cover sheets, page opposite page 1, 1, 2, 10, 13, 14, 17, 34, 48, 55, 78, 80, 82, 88, 90, 92, 96, 98, 110, 120, 132, 136, 144, 146, 148, 152, 154, 156, 158, 160, 166, 168, 170, 172, 174, 178, 180, 182, 184, 186, 194, 196, 198, 200, 204, 206, 210, 220, 222, 224, 230, 292, 293, 298, 299, page opposite 300, inside back cover sheets

-pages 48/49 slip of paper between pages
-pages 250, 252, 260, 273 has a photo attached to each page

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
August 13, 1999

March 16, 1964

On Friday, March 13, R. Knight and DWM used new punch to obtain 4 ea 2 mil x 1/8 x 1 1/2 in foils for calibration of scintillators.

Ludwig at 9202 Y-12 cleaned and weighed these foils. DWM reweighed them on gramamatic in 108.

Ludwig	DWM	Average	labeled
.1027	.1025	.1026	- 1026
.1028	.1025	.1027	- 1025
1030	.1028	.1029	- 1029
1056	.1054	.1055	- 1057

Mounted foils in 25 mil Al. with Teflon tape.

March 20, 1964

wt. Ratio $\frac{1027}{10.55}$ = .9735 Counting Ratio = .9718

Foils 1026 and 1029 together and labeled 1029

Check for counter losses by foil method of sources using 1029 as std.

$\frac{1027}{1026+1029}$ = .54104 $\frac{1055}{1026+1029}$ = .54326 Sum 1.08430

1.0802

Counted together 1.07610

Count loss ~ .0082

1027 Centered .54104 .53283 .0041

1055 " .55191 .55191

1.09295 108474

1.01736 1.01736

0.07559 .06738

av .07149 Stacked foil loss with

2 layers of

From counting ratio having two foils in same pkg 1029 + 1025

Counting ratio

54104 x 2 = 1.08208

Loss in Std 1/1.08208

because of self abs. = 1 - .92414 = .07586

Correction for weight of U in foil because of self absorption

Foil WT = RATIO x WT. OF STD (1027) / (1 + .07586 x FOIL RATIO) X .92998

WT = RATIO x .095458 (1 + .07586 x FOIL RATIO)

3-24-

March 23, 1964

Repeat of Foil Calibration for self abs corr.

Average value from 4 detn of $\frac{1025}{1024}$ → .53586

× 2

1.07172

therefore the losses were 7.172%

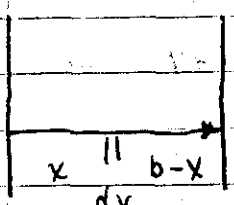
USING 1025 AS STD

U^{235} FOIL WT = $\frac{\text{MEASURED COUNTING RATIO}}{1.07172} \times 0.10279\ UX_{.982} \times (1 + .07172 \times \text{COUNT RATIO})$

$U^{235} = \text{COUNT RATIO} \times 0.089311 (1 + .07172 \times \text{Count Ratio})$

3-24-63

Linear Approx. to Foil Self Shielding



S = Source per unit vol.

$$\int_0^b S\,dx\,e^{-\mu(b-x)} = S\int_0^b e^{\mu(x-b)}\,dx = \frac{Sb}{\mu b}\left[e^{\mu(x-b)}\right]_0^b$$

$$= Sb\left[\frac{1-e^{-\mu b}}{\mu b}\right] = Sb\left[\frac{1-1+\mu b-\frac{(\mu b)^2}{2}+\frac{(\mu b)^3}{6}}{\mu b}\right.$$

$$= Sb\left[1-\frac{\mu b}{2}+\frac{(\mu b)^2}{6}-\right.$$

Actual Counting Rate Ratio for foils of thickness b_1 and b_2

$$\text{Ratio}\left(\frac{b_1}{b_2}\right) = \frac{ESb_1\left[1-\frac{\mu b_1}{2}+\frac{(\mu b_1)^2}{6}-\right]}{ESb_2\left[1-\frac{\mu b_2}{2}+\frac{(\mu b_2)^2}{6}-\right]}$$

If $b_1 = 2b_2$, Counting ratio = 1.86616, b_2 = 0.10227 g × 0.932 wt% U^{235}

$$1.86616 = 2\,\frac{1 - \frac{2\mu b_2}{2} + \frac{4(\mu b_2)^2}{6}}{1 - \frac{\mu b_2}{2} + \frac{(\mu b_2)^2}{6}}$$

$$0.93308 = \frac{1 - \mu b_2 + \frac{2}{3}(\mu b_2)^2}{1 - \frac{\mu b_2}{2} + \frac{(\mu b_2)^2}{6}}$$

If $\mu b_2 = .144$ $\quad (\mu b_2)^2/6 = .020736/6 = .003456$

$1 - .144 + .013824 = .869824$

$1 - .072 + .003456 = .931456$ $\quad = .933333$

If $\mu b_2 = .146$ $\quad (\mu b_2)^2/6 = .021316/6 = .003553$

$1 - .146 + .014212 = .868212$

$1 - .073 + .003553 = .930553$ $\quad = .933007$

From Graph plot

$\therefore \mu b_2 = 0.1584$ $\quad (\mu b_2)^2/6 = .025091/6 = .004182$

$0.1584 \quad 1 - \mu b_2/2 + \mu b_2^2/6 = 1 - .0797 + .004182$

$= 0.924482$

Unknown Foil with Std of b_2 = 0.10227 g ×.932

$$\text{Obs. Count Rate Ratio} = \frac{b_1\,(1 - \mu b_1/2 + (\mu b_2)^2/4)}{b_2\,(0.924\,84)}$$

$$\frac{b_1}{b_2} = \frac{C.R.R \times .92484}{1 - \mu b_1/2 + (\mu b_2)^2/6} \quad \therefore \frac{\mu b_1}{2} = \frac{\mu b_2}{2} \times \frac{b_1}{b_2} \simeq \frac{\mu b_2}{2} \times CRR$$

$$\text{Foil Wt} = \frac{C.R.R \times (.92484) \times (0.1027) \times (.932)}{\left(1 - \frac{\mu b_2}{2} \times CRR\right)}$$

for value of $\frac{\mu b_2}{2}$, use $\left[\frac{\mu b_2}{2} - \frac{(\mu b_2)^2}{4}\right]$ of .07516

Denominator must equal .92484 when CRR = 1

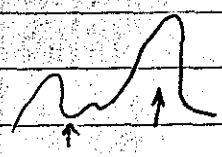
$$\text{FOIL WT} = \frac{\text{C.R.R.} \times 0.088522}{1 - 0.07516\ \text{C.R.R.}}$$

An alternate form would be (for ease in calculation)

$$\text{FOIL WT} = \text{C.R.R.} \times 0.088522\,(1 + 0.081268\ \text{CR.R})$$

SA-2 and SA-1 now have DD-2 amplifiers!

3-30-64 Counters adjusted so that $E_S = 400$, $E = 86$, $\Delta E = 600$ is the proper settings, $E = 75$ is somewhat too low.



Counts on 37% foil and U^{238} (Segre Q) showed the lowest peak distorted by U^{238} gamma rays. At these settings Bkg SA-2 = 118, SA-1 = 199 - or 200.

$$\left(\frac{1079}{1025}\right) CRR = 1.85278$$

$$\frac{CRR}{2} = .92639 = \frac{1 - \mu b_2 + \frac{4}{6}(\mu b_2)^2}{1 - \frac{\mu b_2}{2} + \frac{(\mu b_2)^2}{6}}$$

$\mu b_2 = \sim .1622$ $\quad 1 - \frac{\mu b_2}{2} + \frac{(\mu b_2)^2}{6} = 0.923285$, b_1 = unknown

$$b_1 = \frac{b_1}{a} = \frac{CRR \times .923285 \times .1027\ g \times .932\ \text{wt\% } U^{235}}{1 - \mu b_1/2 + (\mu b_2)^2/6 \rightarrow 1 - \frac{\mu b_2}{2}\left(\frac{b_1}{b_2}\right) \times CRR}$$

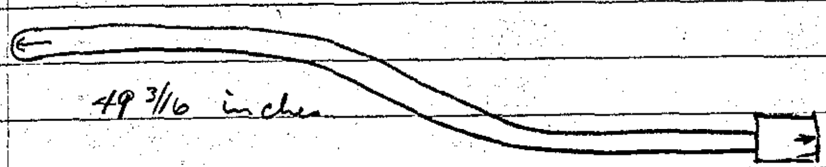
when CRR = 1, $\mu b_2/2 = .076715$

$$\therefore b_1 = CRR \times \frac{.088378}{(1 - .076715\ CRR)}$$

1.56
20.25
21.81

Measurements of position of fission counter and assembly

Inside thimble to blow tanks



counter Tip to preamp housing back end
71 5/8 in

From DWG	Counter Tip to U foil plating	7/8"
	" " to Center of U	2 3/8"
	to end of U	3 7/8"

Diam centerpost 1.319

At Top of Baffle	Centerpost	To	thimble	[illegible]	in
at Cap	"	"	"	[illegible]	
Below "	"	"	"	[illegible]/16	

Distance from Ring Mount for fuel element to thimble
at Baffle plate 1 [illegible]/16
Below cap (8 in above plate) 1 [illegible]

0.66
.50
3.50
4.66

Removable Fuel Plates — INNER PLATES

Useable Punched foils

Received on 4/13/64

1. IE-6-A
2. IE-8-A
3. IE-13-A
4. IE-19-A
5. IE-10-B
6. IE-6-D
7. IE-3-E
8. IE-7-E
9. IE-15-E
10. IE-6-F
11. IE-18-F
12. IE-7-G

Foils Punched in wrong location

1. IE-10-F
2. IE-3-G
3. IE-15-G

No foils Punched

1. IE-9-A

Outer Plates

Received 4/13/64

Foils not Punched

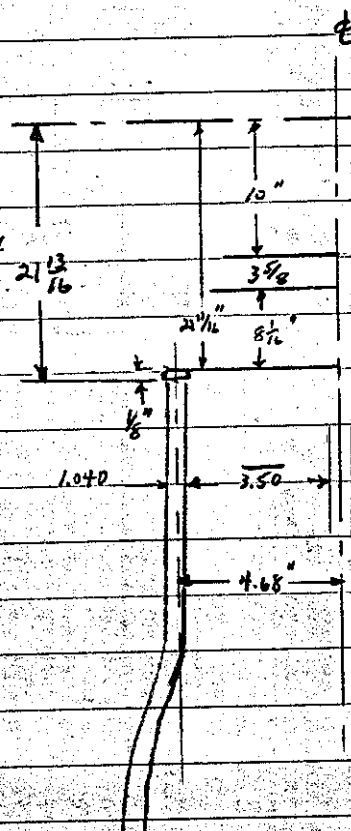
1. OE- 4-N
2. OE - 11-N
3. OE - 2-M
4. OE - 6-W

Received 4/14/64

Foils Punched

1. OE - 4-F
2. OE - 7-F
3. OE - 8-F
4. OE - 13-F
5. OE - 16-F
6. OE - 6-G
7. OE - 8-G
8. OE - 9-G
9. OE - 15-G
10. OE - 16-G
11. OE - 2-I
12. OE - 15-I

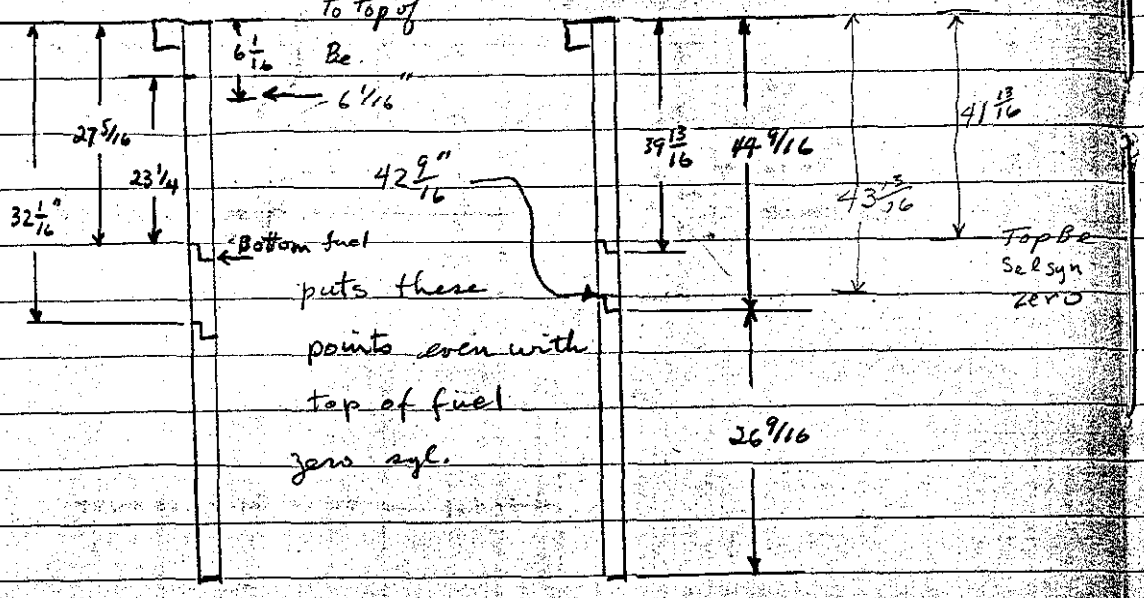
Fission Chamber Thimble & drive assembly installed on 4/15/64



Selsyn set at 21.81 when up against end of thimble
When counter is lowered, counter increases
to read directly distance from center line.
limits: Up 21.81
Down 34.34

Measurements of Control cylinders 4/15/64

DWH
RC
JTI



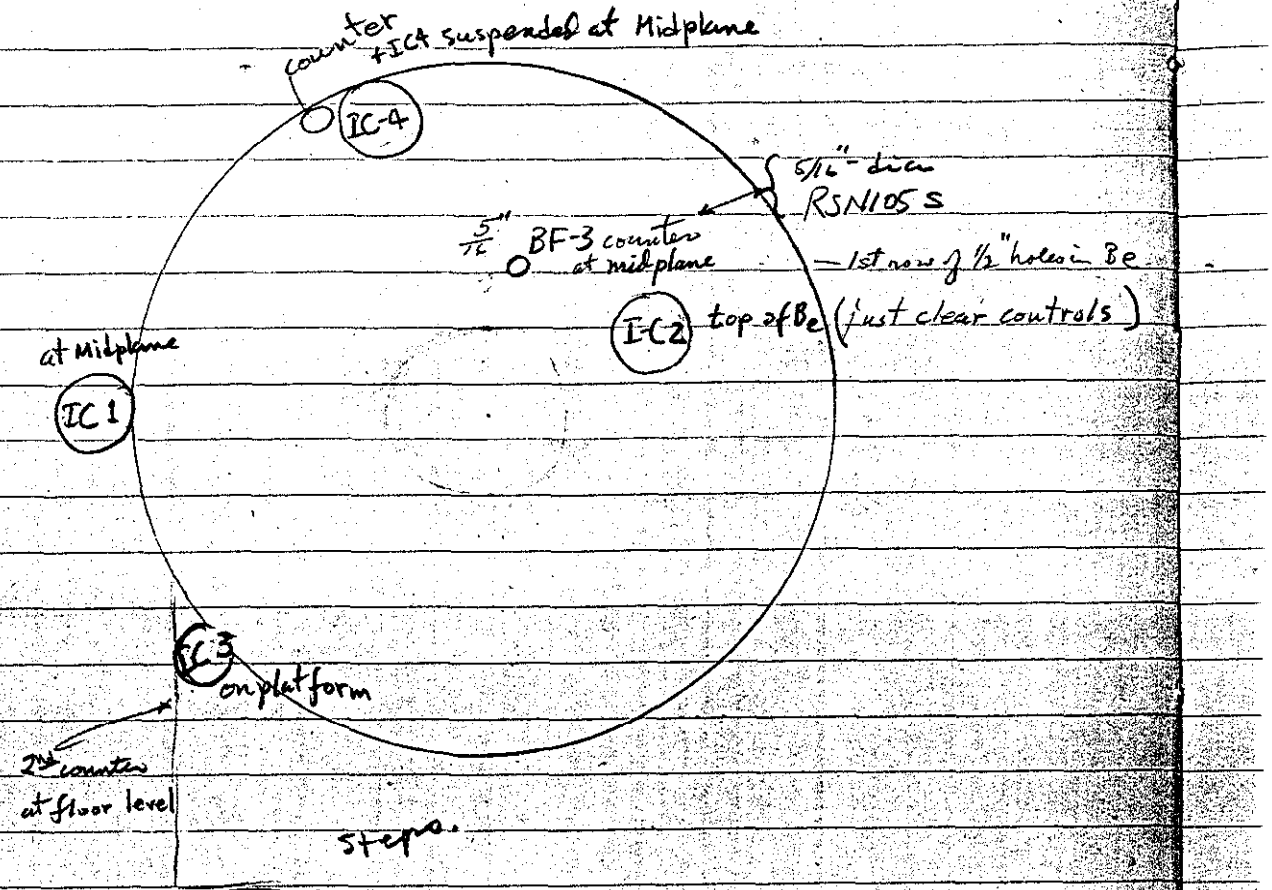
Outer

Limit switch settings

down	999.501	up	998.877
up	20.06	down	25.501

Safety

up	20.62
down	997.52


counter
+IC4 suspended at Midplane
IC-4
5/16" dia
RSN105 S
5/16" BF-3 counter
at midplane
— 1st row of 1/2" holes in Be
IC-2
top of Be (just clear controls)
at Midplane
IC 1
IC 3
on platform
2nd counter
at floor level
steps.

HFIRCE 3-1

Instrument Check on 4-17-64 Source 10 mcy

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	> 3 x 10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 x 10⁻¹¹	Meter Trip	OK		
IC-3	Responds	Calibration	✓		
IC-4	Responds	Calibration	✓		
CRM		Meter Trip			

Preliminary Check on 4-18-64

Room ~~113~~ Pressure Differential 1/4"

Red Light On and Personnel Check

Scrams and Bldg. Alarm Reset ✓

Source Inserted ✓

Safety Withdrawn ✓

Controls Set Tuner at 10.00 Outer Inserted (999.50)

Reflector Water Be

Moderator Water

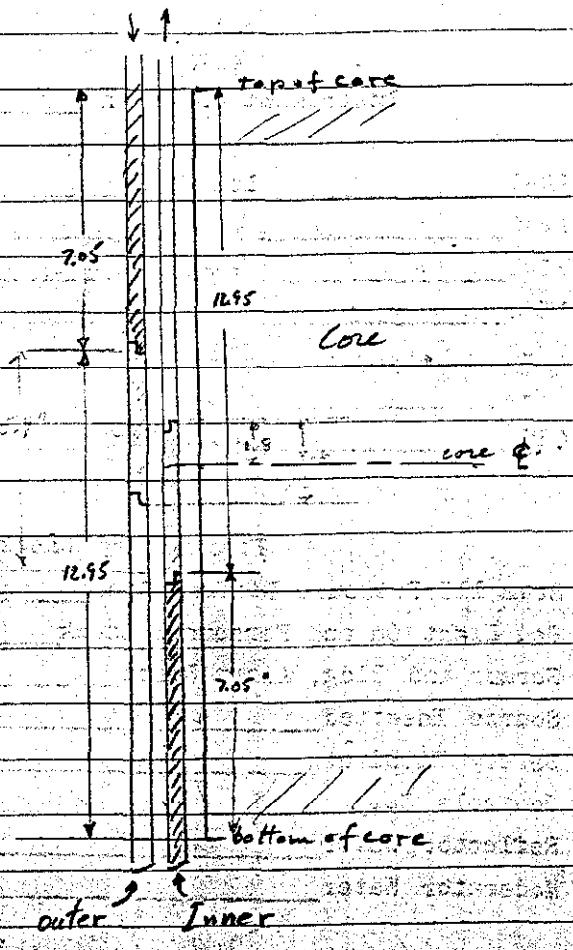
Not able to get critical because 1/8" pipe plug not inserted in thermocouple location on base of outer fuel annulus.

Dwg

Control Rods (ORNL Dwg E 42 48C Rev. A)

Cu-Ag (blk) - 4 3/4 Ag Plated - Al

No target.


top of core
7.05
12.95
Core
1.5
core ℄
12.95
7.05
bottom of core
outer
Inner

HEIR CE 3 - 2 No target

Instrument Check on 4-20-64 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
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	✓		
IC-4	Responds	Calibration	✓		
CRM		Meter Trip		Clock 252 c	

Preliminary Check on 4-20-64

Room ~~113~~ Pressure Differential 1 1/4"

Red Light On and Personnel Check OK

Scrams and Bldg. Alarm Reset OK

Source Inserted OK

Safety Withdrawn to 20.62

Controls Set Inner at 10.00 Outer at 99.50

Reflector Water none

Moderator Water

92° Critical - positive period.

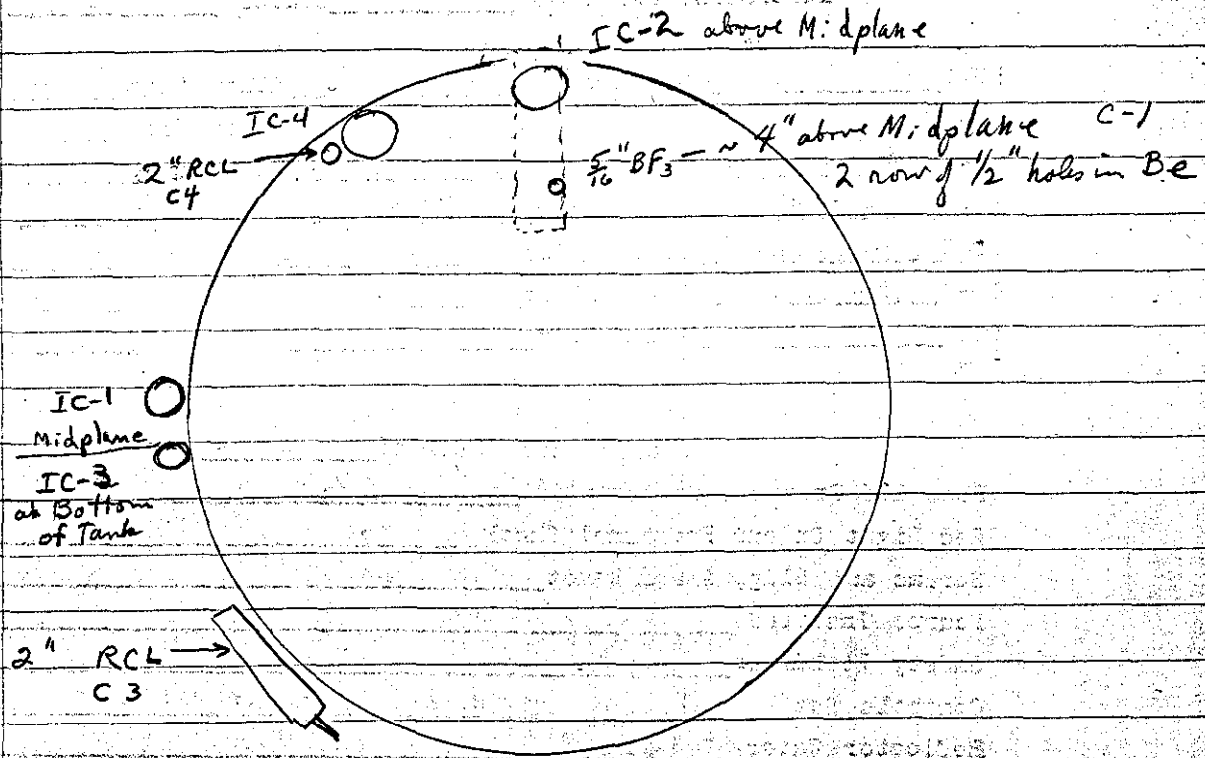
	Inner	Outer	Water	Safety
not allowed k > 1	13.20	13.20	25.885	20.62
k = 1	13.12	13.12	25.885	20.62
k = 1	12.95	12.95	27.170	27.03 (28.05 noted)

Blk actions each inserted 7.5 in.

150.4 sec Period → 7.11 ¢ ; displacement of both rods 0.08"

$\frac{7.11}{.08} = 90$ ¢/in for both rods.

Noted fission chamber did not record a single count with log N at 0.75 (IC-4)



Instrument readings at k=1

IC-1	5.7×10^{-10}	(on 10×10^{-10} Scale
IC-2	6.7×10^{-10}	(on 10×10^{-10}) Scale
No response on Fission counter.		(PHS output found to be ~2 volts Q1743's called did not work on this pulse. current took amp Is okay.
IC 3	1.2×10^{-11}	
IC 4	2.2×10^{-9}	
C-4	Saturated - blocked on x1K	
C-3	Responds.	

Found Roller mounting ring on fuel element not correct and rollers too tight. Replaced with #2 element ring.

Expr. 3 no target

Instrument Check on 4-21-64 Source 10 mcy

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ _____ Alarm Trip OK

IC-1 > 3×10^{-4} Meter Trip OK Fast Trip OK

IC-2 > 3×10^{-4} Meter Trip OK _____

IC-3 Responds Calibration _____ _____

IC-4 Responds Calibration _____ _____

CRM _____ Meter Trip _____ Clock ?52c

Preliminary Check on 4-21-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check ✓

Scrams and Bldg. Alarm Reset ✓

Source Inserted ✓

Safety Withdrawn ✓

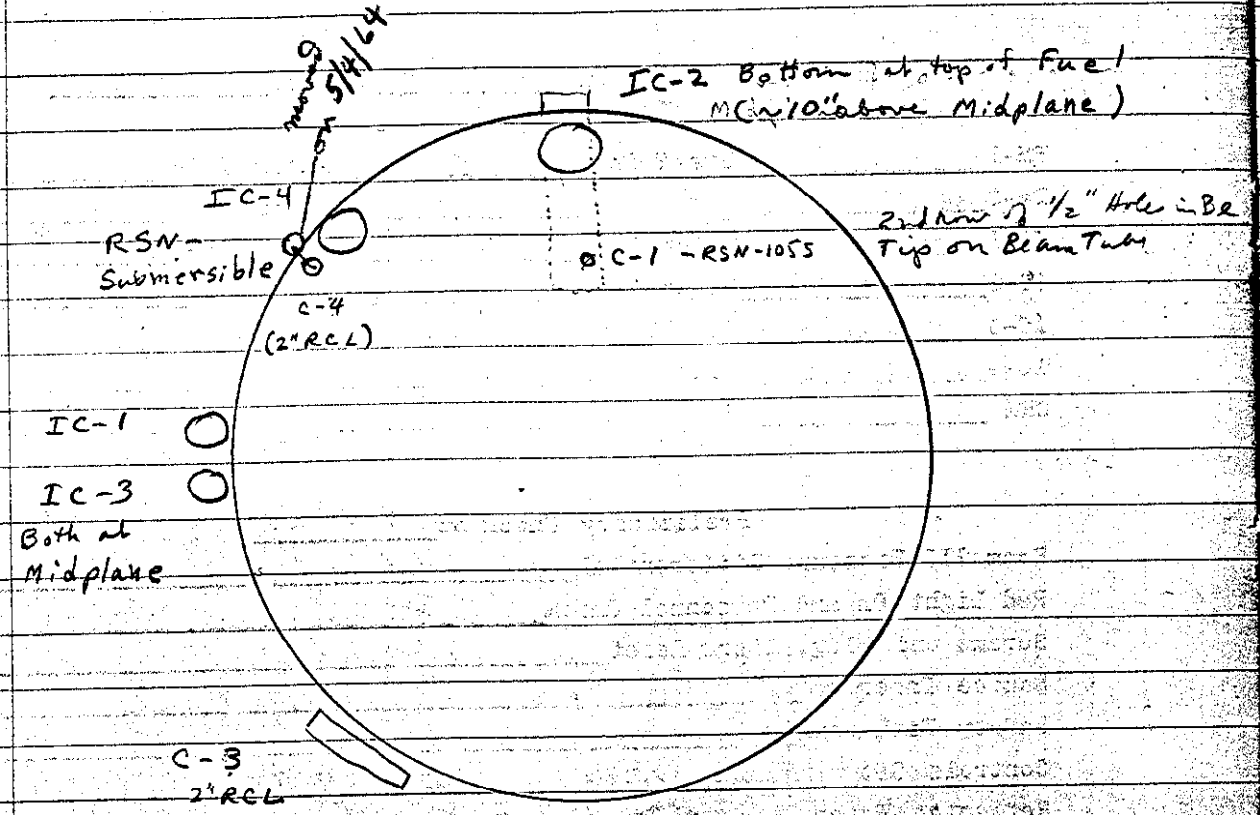
Controls Set Inner 10.00 Outer 999.49

Reflector Water 6" above Be (by measurement

Moderator Water _____

Condition	Inner	Outer	Safety	Water 130.4 cc	Comment
k>1	14.62	14.62	26.13	26.27	ρ = 8.10.4 Postive period.
k=1	14.55	14.55	26.13	26.27	Instr. readings p22

Raised Outer Control to 14.6 and returned to 14.53 to have k=1. there appears to be a dependence on readings as to how critical is approached. Can move Inner control as much as 0.1" with little response. Roller found damaged (inner control grid)



C-2 is HFIR Fission counter.

Add 5ml Triton X-100 to Mod. H_2O – upon stirring etc decided to discard. Added ~60 H_2O to barrel + 5ml Triton X-100

10^{30} Pumped up in fuel element and drained.

11^{06} N.B C-4 jammed at IC-4 = 1.1×10^{-10} amp

3 = $1.8 - \times 10^{-9}$ amp.

EXP – 4

Instrument Check on 4-22 Source 10 mc γ

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	3×10^{-11}	Meter Trip	OK	Fast Trip	OK
IC-2	3×10^{-11}	Meter Trip	OK		
IC-3	Responds	Calibration	OK		
IC-4	"	Calibration	OK		
CRM	—	Meter Trip	—		

Preliminary Check on 4-22

Room 113 Pressure Differential DWA

Red Light On and Personnel Check DWA CC

Scrams and Bldg. Alarm Reset DWA

Source Inserted DWA Response on 1 2 3 & 4

Safety Withdrawn DWA 20.62

Controls Set DWA 14.50 Outer 999.49

Reflector Water ~6 in above Be

Moderator Water 26 1/2 on Liq Level Selsyn

	Condition	Inner	Outer	Source	Safety	Mod.	
11:04	Pos Per	14.51	14.51	Out	26.03	25.73	150.4 sec ρ = 7.1 ±
21	k = 1 (40')	14.51	14.44 14.436	"	"		Slightly + .1 −
31	Post Per	14.51	14.51	"	"	(26.36)	708.4 sec ρ = 1.75 ±
	k ≅ 1	14.51	14.46	"	"	"	

Critical positions above without target

4/23/63

Measurements made with dial indicator showed very poor reproducibility upon reversing directions, more than 50 mil lag of control rods. Tightened cables both inner and outer, and loosened rollers on inner control at top. Meas. on Inner Control

Approaching setting from same direction dial reading
.000
.098
.099
.098

Approaching setting from opp. direction .016
.015

Inner moved ~ 2 mils when outer changed from up to dn
Outer " ~ 4 mils " inner changed from up to dn

Meas on Outer indicate that there is approx .01 - .02 inch lag of rod motion on reversing direction

DWM

Changed limit switch on Outer control, now at lower at 0.0[illegible].

4/22/63 EXP #5

Purpose: Critical control rod positions with Target.

	Cond.	Inner	Outer	Safety	Mod.	Ref H_2O	
13^{52}	PosPer	14.10	14.10	26.00	27.06	~6" down Be	59.1 sec
14^{04}	k=1	14.10	13.91	"	"	"	P = 14.6
	k=1 −	14.00	14.00	"	"		
	+	14.005	14.005				

Repeat approach to Critical (for Reproducibility)

14^{30} PM	PosPer	14.10	14.10	26.00	26.83	6" down Be	38.68 sec
14^{42}	k=1	"	13.87	"	"		P = 19.4
	k=1	13.98	13.98				

28

4-23-64

1 PM No counts on L&C fission counter (HFIR) when IC-4 = 3×10^{-9} (Counter on Noise Pulses)

3 1/2 PM Noted Fission Pulses in HFIR F.C. (C2)

Reactivities:

Motion of Rod	Reactivity
Outer ↑	−1.5 ¢
" ↓	+1.4 ¢
Inner ↓	−0.8 ¢
" ↑	+1.9 ¢

Expr. 6 without target.

Instrument Check-on 4-23-64 Source 10 mcK

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	JII		
IC-4	Responds	Calibration	JII		
CRM		Meter Trip			

purpose: check reproducibility of controls.

Preliminary Check-on 4-23-64

Room 113 Pressure Differential 1.4

Red Light On and Personnel Check JII

Scrams and Bldg. Alarm Reset JII

Source Inserted JII 1 2 4 respond.

Safety Withdrawn 20.63" → 26.00

Controls Set Inner 14.38" Outer .01

Reflector Water 26-in. above Be.

Moderator Water 26-7.3"

	Condition	Inner	Outer	Safety	
					62.15 sec
A)	k>1 pos. per.	14.53	14.53	26.00	→ ρ = 14.4 ¢
	k=1	14.53	14.38	"	
B)	Moved outer control down to 13.18 and returned to 14.38; k<1 neg. period				
	k=1	14.53	14.39^5		
C)	Moved outer control up to 14.45" and returned to 14.39^5; k>1 pos. period				
	k≡i	14.53 (3.8 ¢)	14.37^8 (4.29 ¢)		
	k=1	14.41	14.53		
D)	Moved inner control up to 14.00 and returned to 14.41^2; k<1 neg. period				
	k=1	14.40^5	14.53	(overshot)	
E)	Moved inner control down to 14.47 and returned to 14.40^5; pos. period				
	k=1	14.38^4	14.53		
F)	k>1 +Per	14.53 ↑	14.53 ↑		ρ = 14.4 ¢
	k=1	14.45^5 ↑	14.45^5 ↑		
		13.745	14.37^5		

~~Moved Counter C1 (RSN 1255) to Region between Fuel Annuli~~

Reactivity: 1.76 div/sec → 38.2 sec → 19.5¢

displacement of outer rod 0.205" ¢.97/in

" of outer + Inner 0.100" ¢1.95/in

Expr. 7 with target.

Acc. in Beam hole

Condition	Inner	Outer	Safety	core	H_2O Refl.
k>1	13.34^5	14.05^5 $13.^{97}$ 14.05	26.00	26.79	6" above Be
R=1	13.34^5	14.05^5 $13.^{768}$ 13.84^8	"	"	"
k=1	$13.^{24}$	13.95 $13.^{87}$ 13.95	"	"	"
k=1	$13.^{25}$ ↓→↑	13.96 $13.^{88}$ 13.96	"	"	"

N.B. Selsyn on Outer = 0.08 when Top of Outer control = 6 1/16 in above Be. Above readings in errors

N.B. Inner Selsyn = 00.00 Measures ∓2 1/2 in above Be. Should be ∓1 13/16. See p 16 Selsyn = 00.71

Changed inner .71 → 0

" outer .08 → 0

	Down	Up
Inner	24.81	
Outer	99.94	25.98

Expr. 8 with target

Instrument Check on 4-24-64 Source 10 mcY

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

Preliminary Check on 4-24-64

Room 113 Pressure Differential 1.4

Red Light On and Personnel Check JII

Scrams and Bldg. Alarm Reset JII

Source Inserted ✓ Response 1 2 3 4

~~Safety Withdrawn~~ 26.00"

Controls Set Inner 13.34 Outer 0

Reflector Water 6" above Be

Moderator Water 26.58"

Condition	Inner	Outer
k>1	13.34⁵	13.97
k=1	13.34⁵	13.79⁵
k=1	13.56	13.56
	14.00	13.07
	13.00	14.21
	12.00	15.48
	11.00	16.93⁵
	10.00	18.67
	9.00	20.96
	8.00	25.90
	24.75	6.90
	24.00	7.01⁵

cont'd

Expr 8.

Condition	Inner	Outer
k=1	23.00	7.22
	22.00	7.515
	21.00	7.85
	20.00	8.27
	19.00	8.798
	18.00	9.445
	17.00	10.19
	16.00	11.05
	15.00	11.98
	14.00	13.045

Expr. 9.

Subcritical pulsing: 3PN1

Acc. @ 150 kv 0.9 ma. target current 4 μa.; pressure 10^{-5}

Burst width 300 μs @ 220 cps.

TMC 20 μs chan. Bkg. lots 2 delay time 2 μs disc. 4; Hem ½

Arrangement: RSV-150-S BF3 Detector @ 1500 v. (NICC PS)

DD-2 (Y-14034) gain 50 x 1.1 positive PHS with 2 ea. 100 Ω Terminal resistors on cable to TMC; +2.4 pulse.

condition	Inner	Outer	Safety
k<1	13.56	00.00	26.00

Experiment 10 - 3PN2

k<1	13.56	2.00	26.00

Exp. 11 3PN 3

k<1	13.56	4.00	26.00

Exp. 12 3PN 4

k<1	13.56	6.00	26.00

Expr. 13 3PN 5

k<1	13.56	8.00	26.00

3PN - Summary on P-5

4/24/64 Moved counter (RSN 1055) C1 to region between fuel annuli

Reactivity: T = 47.8 sec ρ = 14.8 ¢ 2.2 div/sec.

displacement of Outer 0.175 in. → $.97/in

Reactivities: 5.5 div/sec → T = 114.5 sec → ρ = 8.57 ¢

Displacement of Outer = .09 in. → $0.95/in.

Expr. 14 with Target.

Instrument Check on 4-27-64 Source 10 mc 8

PM-1		Low Trip	OK	Alarm Trip OK
PM-2				Alarm Trip OK
IC-1	> 3×10^{-11}	[illegible]	OK	Fast Trip OK
IC-2	> 3×10^{-11}	[illegible]	OK	
IC-3	Responds	[illegible]	JH	
IC-4	Responds	Calibration	JH	
CRM		Meter Trip		

Preliminary Check on 4-27-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH Response 2+4

Safety Withdrawn JH 26.00

Controls Set inner 11.00 outer 999.54

Reflector Water 6" above Be.

Moderator Water 16.79"

Condition	Inner	Outer	Safety	
	13.56	13.66	16.00	Pos Per
	13.56	13.57	26.00	level
	13.605	13.605	20.62	level

Pulse at critical: (summary PS0) 3PN-6

Acc. 150 Kv. with 0.81 ma. Vac. $\sim 8 \times 10^{-5}$ Beam Current 0.8 μa

40 cps @ 800 μs. delay

TMC: Disc 4; Bkg 2; Delay x2; ch. width 160 μs.

Insert safety To 10.00"

accumulate counts @ 300 cycles.

Reactivity: 3.56 div/sec → T = 77.4 sec → ρ = 12¢

Outer rod displacement = 0.215 in → $0.56/in

Inner + Outer " " = 0.095 in → $1.26/in

Expr 15

4.5" Dia Styrofoam.

Instrument Check on 4-28-64 Source 10 mc Ra

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	JTI		
IC-4	Responds	Calibration	meter Removed for service.		
CRM		Meter Trip			

Preliminary Check on 4-28-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JTI

Scrams and Bldg, Alarm Reset JTI

Source Inserted JTI 2+4 Responds

Safety Withdrawn Set at 26.00

Controls Set Inner 10.00 outer 999.93

Reflector Water 6" above Be.

Moderator Water 26.59"

Purpose: Evaluate Styrofoam in island.

Styrofoam: Dia = 4.5" length = 24 3/8" top of Styrofoam level with core.

Condition	Inner	Outer	Safety
$k>1$	12.00	12.00	26.00
$k=1$	12.00	11.785	26.00
$k=1$	11.905	11.905	26.00

10[15]

Reactivity: 3.65 div/sec → T = 79.3 sec → ρ = 11.8 ¢

Expr. 16

Outer rod displacement = 0.23 in. → $0.51/in.

Inner + " " " = 0.105 in → $1.12/in.

Expr. 17 Reactivity 1.72 div/sec → T = 37.4 sec → ρ = 18.8 ¢

Inner + Outer rod displ. = 0.10 in. ⇒ $1.98/in.

Expr 18 Reactivity: 2.16 div/sec → T = 46.9 → ρ = 17.1 ¢

Outer rod displacement = 0.17 in. → $1.00/in

Inner + Outer " " = 0.075 in. → $2.28/in.

Expr 16 with Styrofoam.

4 3/16" Dia x 24 3/8" long. 67% void

Condition	Inner	Outer	Safety	Water
k > 1	11.91	11.91	26.00	26.75
k = 1	11.91	11.68	26.00	26.75
k = 1	11.80⁵	11.80⁵	26.00	26.75

Expr 17 no Styrofoam.

Preliminary foil exposure to determine Power level + time.

[HFER*2]07 foil 2. 54.81 mg ~ 3/4 off center in island.

Condition	Inner	Outer	Safety	Water
k > 1	14.16	14.16	26.00	26.58
k = 1	14.06⁵	14.06⁵	26.00	26.58

30 minute exposure.

Shut down @ 2:35:40

Expr 18 with Styrofoam.

2 3/16 Dia. x 24 3/8 in island. 18.6% Void.

Condition	Inner	Outer	Safety	H₂O	
k>1	13.45⁵	13.45	26.00	26.48	Pos Pcs
k = 1	13.45	13.28	26.00	26.48	level
k = 1	13.37⁵	13.37⁵	26.00	26.48	

Foils:

Inner : IE 8 A location 37A

Outer : OE 16 G 78B

Norm : foil 48 in Plate 10F in 17th slot from 37A.

Start 10:25:21 Expose for 30 min. at { 1.0 on IC-3 (10^{-9}) / 5.2 IC-2 (3×10^{-9}) }

Shut down 10:55:21

Expr 22 { Reactivity: 1.98 div/sec → T = 43 sec → ρ = 18.1¢ / Outer rod displacement = 0.30 in. → 60¢/in }

Expr. 23 { Reactivity: 2.5¢ div/sec → T = 55.2 sec → ρ = 15.3¢ / Inner rod displ. = ~0.2 → 59¢/in }

Expr 19 with Styrofoam 4 3/16" Dia

3PN-7 see page 50

8 EXP 20 - 3PN-8 8.00

9 EXP 21 - 3PN-9 0.00

Expr. 22 Foil Exposure with 4 3/16" dia Styrofoam

Instrument Check on 4-29-64 Source 10 mcf

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	JII		
IC-4	out	Calibration			
CRM		Meter Trip			

Preliminary Check on 7-29-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JII

Scrams and Bldg, Alarm Reset JII

Source Inserted JII Response on 2 + 3

Safety Withdrawn 26.00 in.

Controls Set In: 11.805 Outer: 0

Reflector Water 6" above Be

Moderater Water 26.51 in.

Condition	Inner	Outer
k>1	11.80	12.15
k=1	11.80	11.85

4 3/16" Styrofoam.	Expr 23		Safety	H_2O
k>1	11.80	12.06	26.00	26.71
k=1	12.00	12.00	21.64	"

cycle Safety from 21.64 to 10.0 for 3PN-10 see p50

4/23/64 Installed Fission Counter.

Exp 24 with Styrofoam 4 3/16" Dia.

Instrument Check on 4-30-64 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	> 3 x 10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 x 10⁻¹¹	Meter Trip	OK		
IC-3	Responds	Calibration	JK		
IC-4		Calibration			
CRM		Meter Trip			

Preliminary Check on 4-30-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg, Alarm Reset JH

Source Inserted no

Safety Withdrawn 26.00

Controls Set Inner 0 Outer 0

Reflector Water 6" above Be

Moderator Water @ 26.44"

Purpose: Pulse neutron Control worth.

Condition	Inner	Outer	Safety		
k<1	9.00	9.00	26.00	3PN-11	(p 50)

Expr 25

k<1	6.00	6.00	26.00	3 PN-12	p.50

Expr 26

k<1	4.00	4.00	26.00	3PN-13	p 50

Expr. 27

k<1	2.00	2.00	26.00	3 PN-14	p 50

Expr 28

k<1	0.00	0.00	26.00	3PN-15	p 50

Exp 29

Foils:

Inner: IE-3E location 37A

Outer: OE-9G location 78B

Norm.: foil 6 in plate IE-10F in 17th slot from 37A

Island: foil 3 of IE-10-F ~ centered

Start 9^{57} 17 Expose for 30 min. at { 1.0 IC3 (10^{-9}) / 5.2 IC2 (3×10^{-9})

Shutdown 10^{27} 17

Counting Data

	Fission counter	I-3	C4	Instrument Reading IC-2	IC-3
~~Bkg.~~	position	c/m	c/m		
BRg	21.81	0	100	902	— —
	21.81	26,508	35630	153276	5.1 (3×10^{-9}) 1.0 (10^{-9})
	22.81	17829			
	23.81	11460	ave. of 13 counts.		
	21.81	26221			

Exp 30

21.81	3272	4739	14408	5.3 (3×10^{-9})	0.1 (10^{-9})

ave of 5 counts.

Expr 29 — {no target} {no void.}

Instrument Check on 5-4-64 Source 10 mc

PM-1	Low Trip OK	Alarm Trip OK	
PM-2		Alarm Trip OK	
IC-1 >3×10⁻⁵	Meter Trip OK	Fast Trip OK	
IC-2 >3×10⁻⁴	Meter Trip OK		
IC-3 Responds	Calibration JT R.		
IC-4	Calibration		
CRM	Meter Trip		

Preliminary Check on 5-4-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JT

Scrams and Bldg. Alarm Reset JT

Source Inserted JT responds on 1, 2 & 3.

Safety Withdrawn 26.00

Controls Set Inner 14.06, Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.48"

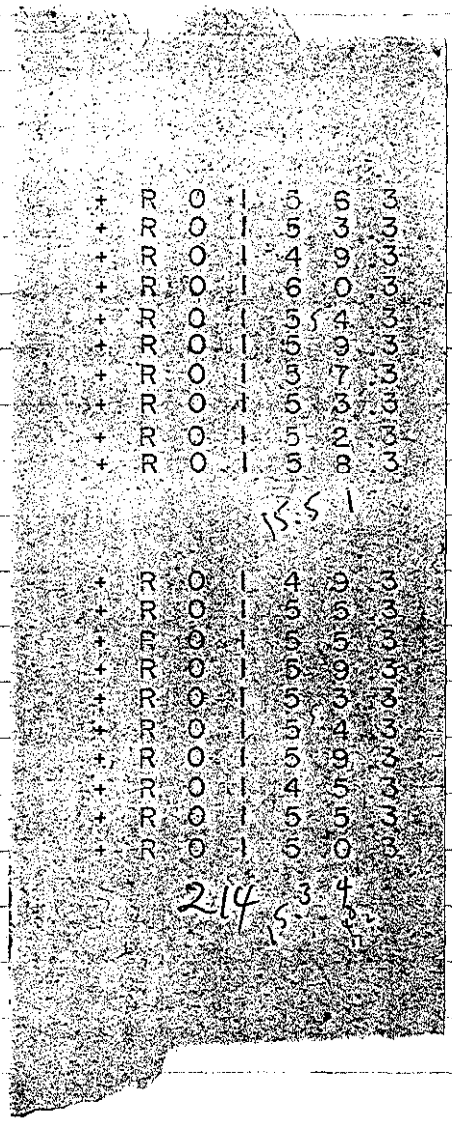
Foil Exposure

	Condition	Inner	Outer	Safety		
1.725 div/sec T=37.5 ⇒ ρ=19.84 ~ $/993/in	k>1	14.06	14.31	26.00	Start	9^{57} 17
	k=1	14.08^5	14.08^5	26.00	Stop	10^{27} 17

Expr. 30 with Styrofoam

3 7/8" Dia 24 3/8" long.

		Inner	Outer	Safety	H_2O
2.28 div/sec T=49.5 sec ρ=16.54 ⇒ $1.61/in	k>1	12.05	12.05	26.00	26.67
	k=1	12.05	11.78 (27)	"	"
	k=1	11.92	11.92	"	"



+	R	0	1	5	6	3
+	R	0	1	5	3	3
+	R	0	1	4	9	3
+	R	0	1	6	0	3
+	R	0	1	5	4	3
+	R	0	1	5	9	3
+	R	0	1	5	7	3
+	R	0	1	5	3	3
+	R	0	1	5	2	3
+	R	0	1	5	8	3
				15.51		
+	R	0	1	4	9	3
+	R	0	1	5	5	3
+	R	0	1	5	5	3
+	R	0	1	5	9	3
+	R	0	1	5	3	3
+	R	0	1	5	4	3
+	R	0	1	5	9	3
+	R	0	1	4	5	3
+	R	0	1	5	5	3
+	R	0	1	5	0	3
				21.4	5.3	4

RoC sensitivities with target.

Expt. 31

Instrument Check on 5-5-64 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
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	JH		
IC-4		Calibration			
CRM		Meter Trip			

Preliminary Check on 5-5-64

Room 113 Pressure Differential 1.3"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH 1 2 + 3 Respond

Safety Withdrawn >6.00

Controls Set Inner 0.0 outer

Reflector Water > 6" above Be

Moderator Water 26.53

2 PM

Condition	Inner	Outer	Condition	Inner	Outer
1. K>1	8.17	25.90	15. K>1	10.00	19.01
2. K<1	8.17	23.86	16. K<1	10.00	18.50
3. K>1	8.32	23.86			
4. K<1	8.32	23.16			
5. K>1	8.51	23.16			
6 K<1	8.51	22.40			
7 K>1	8.70	22.40			
8 K<1	8.70	21.75			
9 K>1	8.90	21.75			
10 K<1	8.90	20.72			
11 K>1	9.20	20.72			
12 K<1	9.20	19.71			
13 K>1	9.60	19.71			
14 K<1	9.60	19.01			

Expr.	page	3PN-No.	Inner	Outer	Safety	Cycles	Ch. width	13kg	Del
9	35	1	13.56	0.00	26.00	76543	20	×2	×2
10	35	2	"	2.00	"	167659	20	2	2
11	35	3	"	4.00	"	61669	40	2	2
12	35	4	"	6.00	"	59978	40	2	
13	35	5	"	8.00	"	59249	40	2	
14	37	6	13.605	13.605	20.62 cycle 10.00	300/ 13612	160	2	
14	43	7	10.00	10.00	26.00	28744	80	2	
20	43	8	8.00	8.00	26.00	~36000	40	2	
21	43	9	0.00	0.00	26.00	39640	40	2	
23	43	10	12.00	12.00	21.64	12202	160	4	
24	45	11 *	9.00	9.00	26.00	47335	40	2	
25	45	12	6.00	6.00	26.00	46943	40	2	
26	45	13 *	4.00	4.00	26.00	53361	40	2	
27	45	14	2.00	2.00	26.00	54532	40	2	
28	45	15	0.00	0.00	26.00	49423	40	2	
34	57	16	13.56 <	0.0	26.00	15846	80	4	
35	57	17	13.56 >	0.0	26.00	10271	80	2	
36	57	18	13.56	0.0	26.00	8779	80	2	
37	57	19 *	10.00	0.0	26.0	41982	40	2	
38	57	20	8.00	0.0	26.0	48187	40	2	
39	57	21	6.00	0.0	26.0	52884	40	2	
40	57	22 *	4.00	0.0	26.0	139184 ~~~130000~~	20	2	
41	57	23	4.00	0.0	26.0	55346	40	2	
42	57	24	2.00	0.0	26.0	53361	40	2	
43	57	25	0.0	0.0	26.0	92108	40	2	
44	59	26	0.0	0.0	26.0	84240	40	2	
45	59	27 *	15.49	0.0	k=1 26.0	5709	160	4	

Delay	Disc.	Mem.	Burst	Rep. rate	Target Current	Current (ma.)
x 2	4	1/2	300	220	4 μa	0.9
2	4	"	300	220	"	"
2	4	"	500	130	"	"
2	4	"	500	130	"	"
2	4	"	500	130	"	"
2	4	1/2	800	40	.8 μa.	.82
2	4	1/2	700	80	3 μa	
2	4	1/2	600	135	5 μa	
2	4	1/2	400	135	5 μa	146 KV .8
2	4	1/2	800	38	0.6 μa	146 KV .8
2	4	1/2	600	125	4.2 μa	145 KV 0.85
2	4	1/2	500	130	4.8	0.90
2	4	1/2	450	128	4.8	0.90
2	4	1/2	400	138	4.6	0.95
2	4	1/2	400	138	5.0	0.95
2	4	1/2	600	130	4.0	.9
2	4	1/2	600	130	4.6	.9
2	4	1/2	800	140	7.5	.93
2	4	1/2	500	140	6.2	.93
2	4	1/2	500	115	5.4	.93
2	4	1/2	500	130	6.2	.92
2	4	1/2	300	220	6.2	.82
2	4	1/2	500	130	6.2	.92
2	4	1/2	600	130	8.0	.92
2	4	1/2	600	270	5.5	.91
2	4	1/2	400	127	4.0	.91
2	4	1/2	800	20	.8	.82

3. PN	Est λ	Cal. λ		Island
1	1591	1432 ± 15	7.1	T
2	1861	1406 ± 12	6.9	
3	1430	1360 ± 20	6.6	
4	1298	1284 ± 10	6.4	
5	1134	1100 ± 10	5.4	
6	210	199 ± 1	3.1	T
7	674	680 ± 3	3.1	V
8	950	920 ± 3	4.2	
9	1476	1425 ± 6	6.5	
10	274	219 ± 1	1	
11	854	830 ± 8	3.8	
12	1105	1220 ± 5	5.1	
13	1265	1270 ± 5	5.8	
14	1383	1350 ± 10	6.2	
15	1396	1410 ± 10	6.4	T
16	414	402 ± 2	2.22	T 3/4 Conical Cyl.
17	412	402 ± 2	2.22	
18	418	402 ± 2	2.22	
19	993	930 ± 10	5.1	
20	1343	(1230 ± 40)	6.8	
21	1600	(1500 ± 100)	8.2	1500 ± 35) Repeat calculations
22	1889	1854 ± 100	10.0	1850 ± 40)
23	1806	(1700 ± 25)	9.4	
24	20-11	(1870 ± 40)	10.2	
25	2193	(2000 ± 60)	11.1	
26	2011	(2000 ± 60)	11.1	
27	171	180 ± 1		

with Target.

Expt 32

Instrument Check on 5-6-64 Source 10 mc 8

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
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	JH		
IC-4		Calibration			
CRM		Meter Trip			

Preliminary Check on 5-6-64

Room 113 Pressure Differential 1.3"

Red Light On and Personnel Check JH

~~Scrams and Bldg. Alarm React~~ JH

Source Inserted JH 1, 2 & 3 respond

Safety Withdrawn 26.00

Controls Set Inner 10.00 Outer 6.00

Reflector Water 6" above Reflector

Moderator Water 26.76"

Continue Expt. 31.

	Condition	Inner	Outer		Condition	Inner	Outer
17.	K>1	10.00	18.00	29.	K>1	11.85	15.90
18.	K<1	10.00	18.50	30.	K<1	11.85	15.49
19.	K>1	10.25	18.50	31.	K>1	12.15	15.49
20.	K<1	10.25	17.74	32.	K<1	12.15	14.96
21.	K>1	10.65	17.74	33.	K>1	12.52	14.96
22.	K<1	10.65	17.25	34.	K<1	12.52	14.57
23.	K>1	10.98	17.25	35.	K>1	12.85	14.57
24.	K<1	10.98	16.70	36.	K<1	12.85	14.21
25.	K>1	11.25	16.70	37.	K>1	13.20	14.21
26.	K<1	11.25	16.28	38.	K<1	13.20	13.80
27.	K>1	11.60	16.28	39.	K>1	13.50	13.80
28.	K<1	11.60	15.90	40.	K<1	13.50	13.28

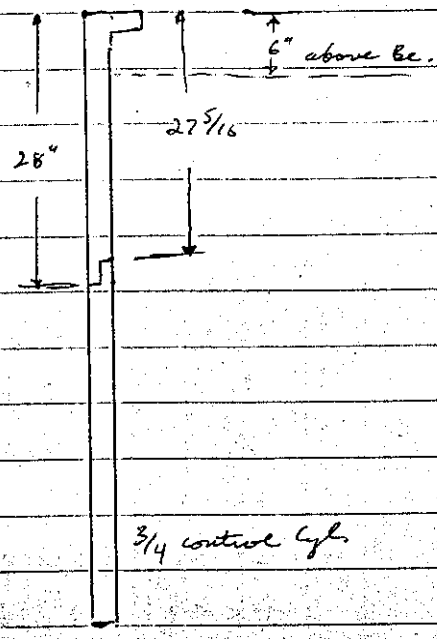
(over)

5-6-64 Exp# 32 (Cont)

11 HH AM	Condition	Inner	outer
H1	K > 1	13.85	13.38
H2	K < 1	13.85	13.00
H3	K > 1	14.20	13.00
HH	K < 1	14.20	12.69
H5	K > 1	14.50	12.69
H6	K < 1	14.50	12.26
47	k > 1	14.85	12.26
48	k < 1	14.85	11.81
49	k > 1	15.29	11.81
50	k < 1	15.29	11.48
51	K > 1	15.75	11.48
52	K < 1	15.75	11.13
53	K > 1	16.05	11.13
54	K < 1	16.05	10.84
55	K > 1	16.40	10.84
56	K < 1	16.40	10.54
57	K > 1	16.80	10.54
58	K < 1	16.80	10.15
59	K > 1	17.20	10.15
60	K < 1	17.20	9.71
61	K > 1	17.85	9.71
62	K < 1	17.85	9.25
~~63~~	~~K > 1~~	~~18.35~~	~~9.25~~
63	K > 1	18.50	9.25
64	K < 1	18.50	8.95
65	K > 1	19.15	8.95
66	K < 1	19.15	8.55
67	K >	19.70	8.55
68	K < 1	19.70	8.17
69	K > 1	20.55	8.17
70	K < 1	20.55	7.76
71	K > 1	21.60	7.76
72	K < 1	21.60	7.41
73	K > 1	22.70	7.41
74	K < 1	22.70	7.04
75	K > 1	24.81	7.04
76	K < 1	24.81	6.76

5/7/64 Installed 3/4 control cylinder

Limits	up	down
Inner	99820	24.77
		000.00
Outer	26.05	99994



Reactivity: 2.52 in/sec ⇒ T = 54.8 sec ⇒ ρ = 15.4¢

Inner cyl. displ = 0.276 ⇒ 4.56/in

with target.

Expt 33

Instrument Check on 5-8-64 Source 10 mc/

BPM-1		Low Trip	OK	Alarm Trip	OK
BPM-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	JH		
IC-4		Calibration			
CRM		Meter Trip			

Preliminary Check on 5-8-64

Room 113 Pressure Differential 1.3"

Red Light On and Personnel Check JH - cc

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 12.70 → 26.00"

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.47"

Condition	Inner	Outer	Safety
R > 1	15.62	0.0	26.00
R = 1	15.35	0.0	26.00
R = 1	15.51	0.0	20.77

Expt.	Inner	Outer	Safety	BPM
34	13.56	0.0	26.00	16
35	13.56			17
36	13.56			18
37	10.00			19
38	8.00			20
39	6.00			21
40	4.00			22
41	4.00			23
42	2.00			24
43	0.00			25

Reactivity: 1.45 div/sec ⇒ T = 31.5 sec ⇒ ρ = 22¢

Inner rod displacement = 0.355" ⇒ ρ = $\frac{6.2¢}{in.}$

Expr. 44	Inner	Outer	Safety	3PN
44	0.0	0.0	26.00	26

Expr. 45

Condition	Inner	3/4 Outer	Safety	3PN
k = 1	15.49	0.0	20.77 cycle to 10"	27

Expr. 46 w Target 3/4 rod

Instrument Check on 5-11-64 Source Cover

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 JU

IC-4 _____ Calibration _____

CRM _____ Meter Trip _____

Preliminary Check on 5-11-64

Room 113 Pressure Differential 1.3"

Red Light On and Program Light JU

Scrams and Blds, Alarm Reset JU

Source Inserted JU 1 2 + 3 respond.

Safety Withdrawn 20.76"

Controls Set Inner 10.00 Outer 0.0

Reflector Water 6" above BC

Moderator Water 26.69"

	Condition	Inner	3/4 Outer	Safety
1.45 div/sec.	k > 1	15.89	0.0	20.69
	k = 1	15.53⁵	0.0	20.69
	3PN-28	cycle safety to 10.00"		
End	k = 1	15.53⁵	0.0	20.69

Reactivity: 2.25 div/sec → T = 48.9 sec → ρ = 16.6 ¢

Inner rod displacement = 0.243 in ⇒ 68 ¢/in

53 div/sec → T = 1152 sec ⇒ ρ = 1.09 ¢

⇒ k = 1.00007

Expr. 47 — Outer 3/4 control W/Styrofoam void 4 3/16" dia.

Condition	Inner	3/4 Outer	Safety	Island H_2O
2.25 div/sec $k>1$	11.23	0.0	26.00	26.72
$k=1$	10.98^7	0.0	26.00	"
$k=1$	11.38^5	0.0	20.77	26.72
3 PN-29 (p.100) cycle Safety to 10.00"				
53 div/sec $k \geq 1$	11.38^5	0.0	20.77	26.68

Expr 48 — W/4 3/16" dia Styro. void.

Instrument Check on 5-12-64 Source 10 mc Ra

PM-1	Low Trip OK	Alarm Trip	OK
PM-2		Alarm Trip	OK
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 JII		
IC-4	Calibration		
CRM	Meter Trip		

Preliminary Check on 5-12-64

Room 113 ~~Pressure Differential~~ 1.3"

Red Light On and Personnel Check JII

Scrams and Bldg. Alarm Reset JII

Source Inserted JII

~~Safety Withdrawn~~ 26.00"

Controls Set: In: 0.0 out: 0.0

Reflector Water 6" above Be.

Moderator Water

Condition	Inner	3/4 Outer	Safety	
$k<<1$	0.0	0.0	26.00	3PN-30 (p.100)

Reactivity 2.46 div/sec ⇒ T = 53.5 sec ⇒ ρ = 15.6 ¢

Inner cyl. displ. = 0.21 ⇒ $.74/in

Reactivity: 2.234 div/sec ⇒ T = 48.5 sec ⇒ 16.7 ¢

Inner cyl. displ. = 0.19 ⇒ $.88/in

Expt 49

Installed target contained in sealed Al. cylinder.

⇒ Target + void.

Condition	Inner	Outer 3/4	Safety	H_2O	
k>1	12.59	0.0	26.00	26.41	
k=1	12.38	0.0	26.00	26.41	
k<1	0.0	0.0	26.00	26.41	3PN-31 (p.100)

Expt. 50 Target + Void 3/4 control Cyl.

Pulse at critical

Instrument Check on 5-13-64 Source Cone

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

Preliminary Check on 5-13-64

~~Room 113~~ Pressure Differential 1.3

Red Light On and Personnel Check C.C

Scrams and Bldg. Alarm Reset C.C

Source Inserted C.C.

~~Safety Withdrawn~~ 26.00

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.69

Condition	Inner	Outer	Safety	
k>1	1256	0.0	26.00	
K=1	12.37	0.0	26.00	level
K=1	12.676	0.0	20.74	

5/13/64 Have put 6 mils of Cd on 4th quad. of 3/4 control cylinder
Rubber cemented 3 pieces 2 mils thick 13 1/16 x 10.
When control cylinder is fully inserted 10" cadmium covers
the top half of the core.

Reactivity: 4.067 dm/sec. ⇒ T = 88.4 sec ⇒ ρ = 10.8¢
Integral displ = 0.249 ⇒ ϕ 43.4/in

Expr. 50 cont'd.

Cycle safety to 10" for 3PN-32 (p100)

End of Pulsing

Condition	Inner	Outer	Safety
k=1	12,675	0.0	20.74

Expr. 51 target + Void; Modified 3/4 control

	Condition	Inner	Outer	Safety	H_2O
88.4 sec	K>1	16.425	999.99	26.00	26.67
10.89					
43.49/m	K=1	16.176	999.99	26.00	26.67

Instrument Check on 5-14-64 Source 10mc

PM-1 Low Trip OK Alarm Trip OK

PM-2 Alarm Trip OK

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

IC-2 >3x10⁻¹¹ Meter Trip OK

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM Meter Trip

Preliminary Check on 5-14-64

Room 113 Pressure Differential 1.3"

Red Light On and Personnel Check JH CC

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.01

Controls Set Inner 0.0 outer 0.0

Reflector Water 6" above Be.

Moderator Water

Reactivity: 3.734 div/sec ⇒ T = 81.1 sec ⇒ ρ = 11.6¢

Inner cyl. displ. 0.255 in ⇒ ρ.44¢/in

Reactivity: 2.368 div/sec ⇒ T = 51.4 sec ⇒ ρ = 16¢

Inner cyl. displ. = 0.315 ⇒ ρ.5¢/in

Reactivity: 2.867 div/sec ⇒ T = 62.3 sec ⇒ ρ = 14¢

Inner cyl. displ. 0.27 in ⇒ ρ.52¢/in

Expr 52

Condition	Inner	3/4 Mod. Outer	Safety	H_2O	
k>1	16.44	999.99	26.00	26.635	
k=1	16.185	999.99	26.00	26.635	
k<1	13.56	999.9	26.00	26.635	3PN-33 (p100)
k<1	13.56	999.9	26.00	26.635	3PN-34
Expr 53 ⇒ k<1	0.0	"	"	"	3PN-35

Expr 54

k>1	16.95	999.99	26.00	~~26.635~~	
k=1	16.635	999.99	26.00	26.635	3PN-36
k=1	16.635	999.99	26.00	26.77	end

Expr. 55

Removed Tot Void and put in Styrofoam Void 4 3/16" dia.

k>1	14.60	999.99	26.00	26.665	
k=1	14.33	"	"	"	
k<1	13.56	"	"	"	3PN-37

Expr 56

k<1	13.56	999.99	26.00	26.665	3PN-38

Expr 57

k<1	0.0	999.99	26.00	26.665	3PN-39

Reactivity: 1.934 div/sec. → T = 42.0 → ρ = 18.4 ¢

Inner cyl. displ. = 0.35" ⇒ $53/in

Expr 58.

Modified 3/4 Control Cylinder – 4 3/16 dia Styrofoam Void.

Pulse at critical!

Instrument Check on 5-15-64 Source 10 mc 8

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	> 3 x 10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 x 10⁻¹¹	Meter Trip	OK		
IC-3	Responds	Calibration	JII		
IC-4	Responds	Calibration	JII		
CRM		Meter Trip			

Preliminary Check on 5-15-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JII C.C.

Scrams and Bldg. Alarm Reset JII

Source Inserted C.C.

Safety Withdrawn C.C.

Controls Set Inner 0 Outer 0

Reflector Water 6" above Be

Moderator Water 20.41"

Condition	Inner	Outer	Safety
K>1	15.15	999.99	20.77
K=1	14.80	"	"
3 PN-40	cycle Safety to 10"		
end K=1	14.80	999.9	20.77

5-21-64

Removed 3/4 outer control cylinder and reinstalled 4/4 outer control cylinder. (See pp 16 and 56)

Drive nut on Safety worn excessively causing binding, also motor was smoking - both replaced.

Set outer control at 6 1/16" above Be and selsyn at 0.0.

Limits	up	down
Inner	998.21	24.77
Outer	26.04⁵	0.0
Safety	20.75	997.52

Expr 59 With target

Instrument Check on 5-22-64 Source 10 mc Ra

PM-1 Low Trip OK Alarm Trip OK

PM-2 Alarm Trip OK

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 JII

IC-4 Responds Calibration JII

CRM Meter Trip

Preliminary Check on 5-22-64

Room 113 Pressure Differential 1.8"

Red Light On and Personnel Check JII

Scrams and Bldg. Alarm Reset JII

Source Inserted JII

Safety Withdrawn 26.00"

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be.

Moderator Water

	Condition	Inner	Outer	Safety		
					T = 41.3	P = 18.6
1.9 div/sec.	R > 1	13.75	13.75	26.00		
	R = 1	13.75	13.55	"	$.93/in	
	R = 1	13.57	13.75	"	$1.03/in	
	R = 1	13.66	13.66	"	$2.04/in	
	Relocated Rhodite chamber — Expr. 60					
4.967 div/sec.	R > 1	13.66	13.75	"	T = 107.9 113.3	P = 9.3 8.9
	R = 1	13.66	13.66	"	$1.01/in	
9.6 div/sec. 9.2	R < 1	13.56	13.66	"	T = −207.6 −198.8	P = −7.7 −8.2
					$.77/in	

5-22-64

Rechecked zero position of control cylinders.

Inner cyl. 4 13/16" above Be. → selsyn reads zero.

Outer cyl. 6 1/16 " " " " " "

Limits:	Inner	Outer	Safety
	24.70		
down	~~998.11~~	999.93	997.41
up	998.14	26.09	20.76

Rhoette

6.5 div/sec ⇒ T = 141.2 sec ⇒ 13.4¢ 13.5¢ → 1.35/in

2.067 div/sec ⇒ T = 44.9 sec ⇒ ¢ = 17.6¢ 16.1¢ → 1.34/in

6.34 div/sec ⇒ T = -137.8 sec ⇒ ¢ = 13.9¢ 13.3¢ → 1.48/in

Expt 61 With Target

Check critical position of rods.

	Condition	Inner	Outer	Safety	H_2O	
1.934	k>1	13.55	13.40	26.00	26.69	T= 42.0 ρ=18.4
	k=1	13.55	13.71	"	"	
	k=1	13.62⁵	13.62⁵	"	"	Rhoette 17.54

Expt 62

Instrument Check on 5-25-64 Source 10 mc

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	> 3×10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3×10⁻¹¹	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 5-25-64

Room 113 Pressure Differential	1.4"
Red Light On and Personnel Check	JH
Scrams and Bldg. Alarm Reset	JH
Source Inserted	C.C
Safety Withdrawn	no
Controls Set	Inner 24.70 Outer 0.0
Reflector Water	6" above Be
Moderator Water	26.40"

Purpose: check critical with safety inserted with target

Condition	Inner	Outer	Safety
k=1	24.70	13.37	997.42
k<1	24.70	13.27	"
k>1	"	13.49	"
k=1	"	13.37	"
k<1	13.53	26.09	"

Rhoette

~~2.716~~ 3.03 div/sec = ~~59~~ 65.8 sec period = ~~11.6~~ 13.5 ¢ +12.94 ~~⇝~~ 9%

Expr. 63

Foils

Inner. IE - 76 location 37 A

Outer. OE - 86 location 78 B

Norm. foil 5 in plate IE 10 F in 17th slot from 37 A

Begin 8^{33} AM Expose for 30 min. at 1, 4, 4 on { IC-3 10^{-9}, IC-4 10^{-9}, IC-2 3×10^{-9} }

Shutdown 9^{02} AM.

Condition	Inner	Outer	Safety
k>1	13.76	26.09	997.42
k=1	13.62	26.09	"

Expr. 63 Foil Exposure with target.

Instrument Check on 5-26-64 Source 10 mc γ

PM-1 ____ Low Trip OK Alarm Trip OK
PM-2 ____ ____ Alarm Trip OK
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 JH
IC-4 Responds Calibration JH.
CRM ____ Meter Trip ____

Preliminary Check on 5-26-64

Room 113 Pressure Differential 1.4"
Red Light On and Personnel Check JH C.C.
Scrams and Bldg, Alarm Reset JH
Source Inserted C.C.
Safety Withdrawn 26."
Controls Set Inner 13.62 Outer 0.0
Reflector Water 6" above Be
Moderator Water 1" above Reflector H_2O → Selsyn not op.

Condition	Inner	Outer	Safety
k>1	13.62	13.85	26.00 · ¢77/in
k=1	13.64	13.64	26.00

205 cnt/sec.
T = 44.5 sec
ρ = 17.7¢

Shut down with scram button

Rhoette:

IC2 1.45 to 5.6 on 3×10^{-10} scale

Rhometer 5 ~~10^{-9}~~ to 2×10^{-8}

Expr. 64 W/Target.

	Condition	Inner	Outer	Safety	H_2O		
1.	K>1	24.70	7.16	26.00	~27.00	20.5	+19.3
		.274					
2.	K<1	23.026	7.16	26.00	27.00	~~25.5~~	-14.9
			.285				
3.	k>1	23.026	7.445			16.2	+14.4
		.961					
4.	k<1	22.075	7.445			12.6	-13.7
			.275				
5.	k>1	22.075	7.72			18.0	+15.7
		.795					
6.	k<1	21.32	7.72			11.8	-11.4
			.23				
7.	K>1	21.32	7.95			12.6	+11.5
		.57					
8	k<1	20.75	7.95			13.2	-10.5
			.22				
9	k>1	20.75	8.17			12.8	+11.4
		.52					
10	k<1	20.23	8.17			13.8	-10.5
			.21				
11	K>1	20.23	8.38			11.0	10
		.475					
12	k<1	19.785	8.38			14.6	-10.6
			.22				
13	k>1	19.785	8.60			13.5	10.6
		.405					
14	k<1	19.38	8.60			14.0	-10.1
			.21				
15	K>1	19.38	8.81			11.4	+10.0
		.38					
16	k<1	19.00	8.81			14.4	-11.3
			.23				
17	K>1	19.00	9.04			11.4	+10.2
		.36					
18	K<1	18.64	9.04			12.7	-10.6
			.22				
19	K>1	18.64	9.26			11.1	10,9
		.345					
20	k<1	18.295	9.26			12.7	-10.5
			.225				
21	K>1	18.295	9.485			11.3	+10.6
		.345					
22	k<1	17.95	9.485			15.0	-12.0
			.235				
23	k>1	17.95	9.72			11.1	10.1
		.296					
24	k<1	17.654	9.72			12.6	-10.4
			.225				
25	k>1	17.654	9.945			12.3	11.6
		.304					
26	k<1	17.35	9.945			16.2	-11.0
			.23				
27	k>1	17.35	10.175			12.2	10.8
		.29					
28	k<1	17.06	10.175			14.8	-10.6
			.225				

Expr. 64 W/Target

	Condition	Inner	Outer		Ratio
29	k>1	17.06 ±.275	10.40	12.2	10.7
30	k<1	16.78 ±.225	10.40	12.5	-10.4
31	k>1	16.78 ±.265	10.62 ±.5	11.6	10.4
32	k<1	16.52	10.62 ±.5	15.3	-10.9
33	k>1	15.17 ±.24	12.10 ±.5	11.6	10.5
34	k<1	14.93	12.10 ±.247	15.5	-11.7
35	k>1	14.93 ±.245	12.35 ±.2	11.7	10.2
36	k<1	14.68 ±.5	12.35 ±.245	16.8	-11.6
37	k>1	14.68 ±.5 ±.212	12.59 ±.5	11.6	10.6
38	k<1	14.46 ±.7	12.59 ±.5 ±.25	14.6	-10.4
39	k>1	14.46 ±.7 ±.237	12.84 ±.5	13.4	11.9
40	k<1	14.23	12.84 ±.5 ±.24	14.6	-10.6
41	k>1	14.23 ±.212	13.08 ±.5	11.8	10.5
42	k<1	14.01 ±.5	13.08 ±.5 ±.205	13.4	-10.7
43	k>1	14.01 ±.5	13.32	10.9	10.2
44	k<1	11.65	16.00 ±.308	16.9	-13.8
45	k>1	11.65 ±.16	16.30 ±.8	10.3	9.6
46	k<1	11.47	16.30 ±.8 ±.269	13.5	-10.4
47	k>1	11.47 ±.183	16.57 ±.7	10.9	9.8
48	k<1	11.28 ±.5	16.57 ±.7 ±.283	13.5	-10.7
49	k>1	11.28 ±.5 ±.175	16.86	11.1	9.9
50	k<1	11.11	16.86 ±.315	12.0	-10.4
51	k>1	11.11 ±.18	17.13 ±.5	10.4	9.3
52	k<1	10.93	17.13 ±.5	13.7	-10.7
53	k>1	9.73 ±.17	19.70	10.9	9.6
54	k<1	9.56	19.70 ±.71	16.0	-12.1
55	k>1	9.56 ±.18	20.11	11.8	10.2
56	k<1	9.38	20.11 ±.424	11.0	-12.2
57	k>1	9.38	20.53 ±.4	11	9.6

66 1/m
1.32
.91
1.32
.87
1.32
.60
1.34

Expt 64 (cont'd) w/Target.

	Condition	Inner	Outer		Rhesus
58	R<1	9.22⁴ .15	20.53⁴ .406	12.6	-10.3
59	R>1	9.22⁴ .154	20.94	10.5	9.4
60	R<1	9.07	20.94 .454	13.4	-10.7
61	R>1	9.07 .22	21.39⁴	11.2	10.
62	R<1	8.85	21.39⁴ .576	(20.1)	-15.3
63	R>1	8.85 .115	21.97	11.2	9.6
64	R<1	8.73⁵	21.97 .55	12.5	-9.8
65	R>1	8.73⁵ .15	22.52	11.6	10.5
66	R<1	8.58⁵	22.52 .635	13.1	-9.8
67	R>1	8.58⁵ .205	23.15⁵	11.9	9.9
68	R<1	8.38	23.15⁵ 1.10	(28)	-19.2
69	R>1	8.38 .15	24.25⁵	14.8	9.3
70	R<1	8.23	24.25⁵ 1.25.5	13.9	-10.9
71	R>1	8.23 .215	25.51	9.8	8.0
72	R<1	8.01⁵	25.51	12.1	-12.3
73	~~R>1~~ R<1 ~64	8.01⁵	26.08⁵		~6

Expr. 65

Instrument Check on 5-27-64 **Source** [illegible]

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

Preliminary Check on 5-27-64

~~Room 113 Pressure Differential~~ 1.4"

Red Light On and Personnel Check JA C.C.

Scrams and Bldg. Alarm Reset ~~[illegible]~~ JA

Source Inserted no

~~Safety Withdrawn~~ 26.00"

Controls Set Inner 13.62 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.78"

Expr	Condition	Inner	Outer	Safety	
65	k<1	13.62	0.0	26.00	3PN-41
66	k<1	"	"	"	3PN-42
67	k<1	13.00	0.0	26.00	3PN-43
68	"	12.50	0.0	"	3PN-44
69	"	12.50	12.00	26.00	3PN-45
70	"	12.50	0.0	"	3PN-46
71	"	12.00	"	"	3PN-47
72	"	10.00	"	"	3PN-48
73	"	8.00	"	"	3PN-49
74	"	6.00	"	"	3PN-50
75	"	2.00	"	"	3PN-51
76	"	0.00	"	"	3PN-52

Expt 78 Foil Exposure

Foils:

Inner: IE 15 E located in slot 97A

Outer OE 4 F " " " 209B

Norm foil 6B of IE 10E - Slot 12 from 37A

Begin exposure at 855 AM Expose for 30 min at 1 IC3 ($\times 10^9$)
4.5 on IC4 ($\times 10^9$)
4.5 IC2 (3×10^9)

End " at 925 AM

Expt 77 Foil Exposure w/Target

Instrument Check on 5-28-64 Source correct

RM-1		Low Trip	OK	Alarm Trip	OK
RM-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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 5-28-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH CC

Scrams and Bldg, Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 13.62 Outer 0.0

Reflector Water 6" above Be

Moderator Water ~~Same as Be. H₂O~~ relays not op.

2.116 kw/sec
T = 46 sec
ρ = 17.3

Condition	Inner	Outer	Safety	
K>1	13.65	13.80	26.00	
K=1	13.63²	13.64⁵	26.00	8/108/in
K=1	13.64³⁵	13.64³⁵	26.00	

Shut down by scram buttons

Expt	Cond.	Inner	Outer	Safety	3PM
78	K<1	24.70	0.0	26.00	55
79	K<1	24.70	0.0	26.00	56
80	K<1	24.70	0.0	"	57
81	K<1	0.0	26.09	"	58

Expr. 82 Foil Exposure

Foils

Inner IE-18F located in slot 37A

Outer OE-15-I located in slot 78B

Norm. ℄c of IE10F " " " 12 from 37A.

Begin Exposure at $11^{18}/A$ expose for 30 min. at .60 IC-3 (10^{-8})
.65 IC-4 (10^{-8})
3.8 IC-2 (3×10^{-8})

End Exposure at $11^{49}/A$

Expt. 82 Foil Exposure W/Target

Instrument Check on 6-1-64 Source Cmcf

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	$> 3 \times 10^{-4}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-11}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 6-1-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 13.62 Outer 4.00

Reflector Water 6" above BC

Moderator Water

	Condition	Inner	Outer	Safety	
1.993 div/sec	k>1	13.63	13.85	26.00	1.87/in
T = 42 sec.	k=1	13.63	13.64	26.00	
ρ = 18.44	Shut down with scram button				

Expr. 83 w/target

Instrument Check on 6-2-64 Source 10 mc Ra

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	$>3\times10^{-4}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 6-2-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg, Alarm Reset JH

Source Inserted ← acc.

~~Safety Withdrawn~~ 26.00

Controls Set Inner 0.0 outer 26.09

Reflector Water 6" above Be

Moderator Water ~29.00

Condition	Inner	Outer	Safety	3PN
k<1	0.0	26.09	26.00	59

Expr 84

Pulse at critical w/Target H_2O

1.633 div/sec	R>1	8.35	26.09	~~20.76~~ ~~26.00~~	~26.00	P 121/-
T=35.5 sec.	k=1	8.18	26.09	20.76	26.71	3PN-60
ρ=20.5		Expr 84a				
Rhodie = 19.2 sec.	k=1	8.18	26.09	20.76	26.71	3PN-61
		Expr 85				
	R=1	24.70	6.99	20.76	26.71	3PN-62

Pulse. Expr. 86 W/Target

Instrument Check on 6-3-64 Source 10 mrd

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	$> 3 \times 10^{-11}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-9}$	Meter Trip	OK		
IC-3	Responds	Calibration	JTC		
IC-4	Responds	Calibration			
CRM		Meter Trip			

Preliminary Check on 6-3-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JTC C.C.

Scrams and Bldg. Alarm Reset JTC

Source Inserted C.C

Safety Withdrawn 20.77 in.

Controls Set In. 24.70 Out. 0.0

Reflector Water 6" above Be.

Moderator Water ~~~~ " above Refl. Water.

Condition	Inner	Outer	Safety	H_2O	
$k>1$	24.70	7.15	20.77		ϕ 1.49/in
$k=1$	24.70	6.99 (16)	20.77		3PN-63

1.2 cc div/sec

T = 27.5 sec

ρ = 23.8

Expt. 87 W/T+V

Instrument Check on 6-4-64 Source 10 mcy

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

Preliminary Check on 6-4-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH CC

Scrams and Bldg, Alarm Reset JH

Source Inserted out

Safety Withdrawn 26.00"

Controls Set Inner 24.70 Outer 0.0

Reflector Water 6" above Be

Moderator Water ~ Be

	Condition	Inner	Outer	Safety	
Expt. 87	k<1	24.70	0.0	26.00	3PN-64
Expt 88	k<1	"	"	"	3PN-65
2.133 kw/sec. Expt 89	k>1	12.62	12.64	"	$.91/in
T=46.4 ρ<19.2	k=1	12.62	12.45	"	
	k=1	12.54	12.54	"	
	k=1	12.63⁵	12.63⁵	20.77	3PN-66
90	k<1	13.60	0.0	26.00	3PN-67
91	k<1	0.0	0.0	26.00	3PN-68

Foils

Inner IE 8A location 97A

Outer OE 16G " 209B

Norm foil 48 of EE10F in 17th slot from 37A

Begin exposure at 11:06 AM Expose for 30 min. at {1, 5, 4} on {IC3 (10^{-8}), IC4 (10^{-8}), IC2 (3×10^{-8})}

End " " 11:36 AM. 5.5 IC1 (3×10^{-8})

Expr. 92 Foil Exposure w/Target

Instrument Check on 6-5-64 Source Co 60

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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 6-5-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted C.C.

Safety Withdrawn 26.00"

Controls Set Inner 13.64 Outer

Reflector Water 6" above Be

Moderator Water ~Be.

Condition	Inner	Outer	Safety		Roethe
$k>1$	13.64	13.80	26.00	98.7 kw	15.14
$k=1$	13.64	13.63	26.00		

2.233 kw/sec
T = 48.5 sec
ρ = 14.7¢

Shut down by interrupting magnet current on safety.

Expr. 93 w/target

Instrument Check on 6-9-64 Source [illegible]

PM-1 ______ Low Trip OK Alarm Trip OK

PM-2 ______ Alarm Trip OK

IC-1 >3×10⁻¹¹ Meter Trip OK Fast Trip OK

~~IC-2 >3×10⁻¹¹ Meter Trip OK~~

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM ______ Meter Trip ______

Preliminary Check on 6-9-64

~~Room 113 Pressure Differential~~ 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

~~Safety Withdrawn~~ 0.0 (9973.1

Controls Set Inner 0.0 outer 0.0

Reflector Water ~6" above Be

Moderator Water 26.64"

	Condition	Inner	Outer	Safety	
2.350 div/sec T= 5.66 ρ= 16.14	k>1	17.36	17.36	9973.1	$/in
	k=1	17.36	17.21	"	1.07
	k=1	17.21⁵	17.36	"	1.11
	k=1	17.28⁶	17.28	"	1.05
5.0 div/sec T= 108.6 ρ= -22.1	k<1	17.20	17.20	"	-1.33

Expt. 100 w/Target.

Instrument Check on 6-10-64 Source 10 mc

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

Preliminary Check on 6-10-64

Room ---

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 0.0

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.25"

	Condition	Inner	Outer	Safety		
2.36 dis/sec T = 50.3 P = 16.1	K>1	17.36	17.36	9973.1	$.94/in	
	K=1	17.28	17.29	9973.1	3PN-7C	
Expt. * 1.0 dis/sec T = 17.3 P = 7.3		K_{eff} = .99454 (.0064)			3PN *	
101	K<1	17.24	17.24	9973.1	77	$.81/in
102	"	17.00	17.00	"	78	
		~~17.00~~	~~17.00~~	"	~~8~~	
103	"	16.75	16.75	"	79	
104	"	16.75	16.75	"	80	

EXP	BAR	PAGE NO.	3PN NO.	CONDITION k	INNER (IN)	OUTER (IN)	SAFETY (in)	Chan. width	Brg	Delay	Disc.	Mem.	Burst width	Rep. Rate
46	*	59	28	k=1	15.53[5]	0.0	20.77	160	4	4	4	1/2	800	25
47	*	61	29	k=1	11.38[5]	0.0	20.	160	4	2	4	1/2	800	23
48		61	30	k<1	0.0	0.0	26.00	40	2	2	4	1/2	400	128
49		63	31	k<1	0.0	0.0	26.00	40	4	4	4	1/2	300	128
50	*	63	32	k=1	12.67[5]	0.0	20.77	160	4	4	4	1/2	800	38.8
52		65+2	33	k<1	13.56	999.99	26.00	40	4	4	4	1/2	800	127
52		65+2	34	k<1	13.56	-999.99	26.00	80	4	4	4	1/2	800	126
53	*	65+2	35	k<1	0.0	-999.99	26.00	40	4	4	4	1/2	600	117
54	*	65+2	36	k=1	16.63[5]	"	20.77	160	4	4	4	1/2	800	38.8
55	*	67	37	k<1	13.56	999.99	26.00	80	4	4	4	1/2	800	125
56	*	67	38	k<1	13.56	"	"	80	4	4	4	1/2	800	90
57	*	67	39	k<1	0.0	"	"	40	2	4	4	1/2	500	129
58	*	68	40	k=1	14.80	"	20.77	180	4	4	4	1/2	900	40
65		83	41	k<1	13.62	0.0	26.00	20	4	16	4	1/2	350	195
66		83	42	k<1	13.62	0.0	26.00	40	4	8	4	1/2	500	121
67		83	43	k<1	13.00	0.0	26.00	40	4	8	4	1/2	500	122
68		83	44	k<1	12.50	0.0	26.00	40	4	8	4	1/2	600	121
69		83	45	k<1	12.50	12.00	26.00	40	4	8	4	1/2	600	119
70		83	46	k<1	12.50	0.0	26.00	40	4	8	4	1/2	480	119
71		83	47	k<1	12.00	0.0	26.00	40	4	8	4	1/2	480	119
72		83	48	k<1	11.00	0.0	26.00	40	4	8	4	1/2	480	119
73		83	49	k<1	9.00	0.0	26.00	40	4	8	4	1/2	480	119
74		83	50	k<1	6.00	0.0	26.00	40	4	8	4	1/2	480	119
75		83	51	k<1	2.00	0.0	26.00	40	4	8	4	1/2	480	124
76		83	52	k<1	0.0	0.0	26.00	40	4	8	4	1/2	480	124
78		85	53	k<1	24.70	0.0	26.00	80	4	4	4	1/2	480	143
78		85	54	k<1	24.70	0.0	26.00	40	4	8	4	1/2	480	120
78		85	55	k<1	24.70	0.0	26.00	40	4	8	4	1/2	500	117
79		85	56	k<1	24.70	0.0	26.00	40	16	8	4	1/2	200	117
								80	8	4	4	1/2	400	63

Acc V	acc current	Beam current	cyc.	Sat. λ	Calc λ	Island Condition
145	.8 ma	1 μa	14233	184	179±1	3/4 Cont W/Target
146	.87	1.2	22189	211	202±1	3/4 cont W/4 3/16 Styro V.
145	.90	4.0	150493	1437 6.8	(1250±20) 6.3	4 3/16" Styro. Void 3/4
145	.96	4.0	137125	1725 7.9	(1660±30) 7.8	T + Void. 3/4
145	.87	2.0	21647	218	212±1	W/T+V. 3/4
145	.84	4.0	100019	682 2.6	(610±10) 2.44	3/4 C-Mod. W/T+V
148	.84	2.0	71006	608 2.3	(600±10) 2.4	"
145	.86	4.0	247402	1785 6.9	1750±10 7.0	"
145	.86	1.2	12008	~241	247±2	"
145	.90	4.0	21850	312 1.4	325±5 1.4	3/4 C-Mod W/4 3/16 Styro. V.
145	.95	4.0	21060	323 1.4	325±5	"
145	.95	6.0	18458	1290 5.6	1300±10 5.6	"
144	.86	1.6	36682	230	232±1	"
146	.91	6.0	247790	1548 7.78	1420±20 7.30	3/4 control W/T
145	.93	6.0	115605	1430 7.19	1370±20 6.99	"
145	1.01	8.1	75061	1444 7.22	1410±75 7.26	"
145	1.01	10.4	70853	1535 7.72	1450±25 7.37	"
145	.96	8.0	69291	834 4.20	780±10 3.91	"
145	1.04	10.4	53777	1515 7.62	1430±15 7.30	"
145	1.04	10.4	120072	1567 7.88	1500±25 7.65	"
145	1.02	10.0	178204	1599 8.04	1560±30 7.98	"
145	1.02	10.0	152161	1738 8.74	1735±40 8.76	"
145	1.06	10.0	197100	2038 10.25	1930±25 9.86	"
145	1.10	11.8	97805	2302 11.58	2125±15 10.85	"
145	1.10	12.0	95956	2303 11.58	2200±20	"
145	1.05	7.0	8307	931 4.68	971±4 4.98	
145	1.05	11.5	29180	991 4.98		
145	.94	2.0	138162	1001 5.04		
145	.94	2.0	154847	1028 5.17		

Expr	page	3-PN No.	Condition	Inner	Outer	Safety	Chan. width	Bkg	delay	disc	Mem.	Burst width	Rep Rate	Acc KV	Relat I
80	85	57	k<1	24.70	0.0	26.00	80	8	4	4	1/2	400	69	145	0.
81	85	58	k<1	0.0	26.09	26.00	80	8	8	4	1/2	800	71	145	0.
83	89	59	k<1	0.0	26.09	26.00	80	8	16	4	1/2	800	70	145	0.
	89	59	k<1	0.0	26.09	26.00	80	8	16	4	1/2	800	70	145	0.
84	89	60	k=1	8.18	26.09	20.77	160	8	16	4	1/2	900	36	145	0.
84a	89	61	k=1	8.18	26.09	20.77	160	8	16	4	1/2	900	36	145	0
85	89	62	k=1	24.70	6.99	20.77	160	8	16	4	1/2	900	36	145	0.
86	91	63	k=1	24.70	6.99	20.77	160	8	16	4	1/2	900	36	145	0
87	93	64	k<1	24.70	0.0	26.00	40	4	16	4	1/2	480	100	145	0
88	93	65	k<1	24.70	0.0	26.0	40	4	16	4	1/2	480	100	145	1
89	93	66	k=1	12.635	12.635	20.77	160	8	16	4	1/2	1600	36	145	0.
90	93	67	k<1	13.60	0.0	26.00	40	4	16	4	1/2	600	117	145	1
91	93	68	k<1	0.0	0.0	26.00	40	4	16	4	1/2	600	117	145	0
93	97	69	k<1	17.20	17.20	9973.1	160	4	16	4	1/2	900	32.4	145	0
94	97	70	k<1	17.20	17.20	9973.1	80	4	16	4	1/2	800	70.0	145	0
~~95~~	~~97~~	~~71~~	~~k<1~~	~~16.50~~	~~16.50~~	~~9973.1~~	~~40~~	~~4~~	~~16~~	~~4~~	~~1/2~~	~~400~~	~~40~~	~~145~~	
95	97	71	k<1	15.00	15.00	9973.1	40	4	16	4	1/2	400	100	145	1
96	97	72	k<1	16.00	16.00	9973.1	40	4	16	4	1/2	400	100	145	1
97	97	73	k<1	16.5	16.5	9973.1	40	4	16	4	1/2	400	100	145	1
98	97	74	k<1	17.00	17.00	9973.1	320	4	2	4	1/2	500	20	145	1
99	97	75	k<1	1700	1700	9973.1	160	4	4	4	1/2	500	30	145	1
100	99	76	k<1	17.24	17.24	9973.1	640	~~4~~	~~4~~	4	1/2	1000 ~~320~~	8.5 ~~2.15~~	138	
101	"	77	k<1	17.24	17.24	9973.1	1280	2	2	4	1/2	1280	9.2	138	1
102	"	78	k<1	17.00	17.00	9973.1	640	2	2	4	1/2	640	8.0	145	1
103	"	79	k<1	16.75	16.75	9973.1	320	2	4	4	1/2	1280	18.0	145	1
104	"	80	k<1	16.75	16.75	9973.1	40	4	2	4	1/2	1280	20.0	145	1
105	111	81	k<1	16.50	16.50	9973.1	80	4	16	4	1	1280	15	145	1
105'	111	82	k<1	16.75	16.75	9973.1	80	4	16	4	1/2	1280	15	145	1
105"	111	83	k<1	15.75	15.75	9973.1	80	4	16	4	1/2	1280	45	145	1

elator I ma	Beam cur. μa	cycles	Est λ	Calc. λ	Island
0.94	2.0	47554	977 (4.91)	971±4 (4.98)	T
0.90	3.0	66448	1523 (7.66)	1325±50 (7.56)	
0.74	0.6	344997	1488 (7.48)	1325±50 (7.56)	
0.91	3.0				
0.87	4.0	4486	176	172±1	
0.82	3.0	17565	187	173±1	
0.89	2.0	10208	193	195±1	
0.92	2.0	55250	205	195±1	T
0.91	4.0	125008	559 (2.4)	565±3 (2.4)	T+V
1.02	8.0	69019	565 (2.4)	565±3 (2.4)	
0.89	4.0	17412	238	236±1	
1.00	10.0	100023	1123 (4.2)	1180±20 (4.6)	
0.91	6.0	420134	1994 (8.4)	1900±100 (7.1)	T+V
0.90	1.9	35006	165		T+Safety
0.84	2.1	110008	165		
~~1.09~~	3.2				
1.05	10.0	260001	1309	905±25	
1.05	10.0	276441	758	700±25	
1.05	10.0	198856	605	500±20	
1.05	20	19212	290	280±5	
1.03	2.6	55115	295	280±5	
~~1.01~~	2.0	5251		170±30	
1.01	1.2	4357		170±10	
1.01	1.2	130777		300±10	
1.03	4.6	43002		450±30	
1.02	5.0	38522		630±30	
1.01	3.0	91807		640±40	
1.00	3.0	125001		580±20	
1.0	10.0	150004		1256±40	

Expr.#	Page	3-PN#	k	Inner	Outer	Safety	Island	Chan. width	Bkg	Delay	Disc	Mem.	Burst width	cps	KV	I ma	Beam I μa
108	115	84	<1	0.0	0.0	26.00	T	40	4	4	4	1/2	1000	30	145	.100	7.0
110	117	85	<1	24.70	0.0	26.00	T	40	4	8	4	1/2	800	30	145	.105	6.0
112	121	86	<1	14.06	0.0	2600	W	40	4	8	4	1/2	480	50	145	1.05	5.0
113	121	87	<1	1406	0.0	2600	W	40	4	8	4	1/2	800	120	145	0.94	12.0
114	121	88	<1	0.0	14.06	2600	W	40	4	8	4	1/2	800	120	145	0.95	14.0
115	121	89	<1	0.0	14.06	2600	W	10	256	64	4	1/2	800	120	145	0.95	14.0
116	121	90	<1	11.80	0.0	2600	S	10	64	32	4	1/2	500	210	145	0.84	11.5
117	121	91	<1	11.80	0.0	26.	S	40	32	8	4	1/2	480	100	145	1.05	10.5
118	121	92	<1	0.0	11.8	26.0	S	40	32	8	4	1/2	480	100	145	1.04	10.5
127	135	93	<1	99812	99812	26.0	T	80	2	2	4	1/2	800	70	145	.92	7.5
128	135	94	<1	"	"	"	"	10	32	64	4	1/2	800	240	145	.92	20.0
129	137	95	<1	"	"	"	"	10	2	2	4	1/2	200	320	144	1.06	17.0
—	—	96	<1	13.63	13.63	0	T	40	8	8	4	1/2	500	110	145	1.01	120.
175	153	114	<1	0.0	0.0	26.00	T	40	4	4	4	1/2	600	100	145	.98	8.
176	153	115	<1	0.0	0.0	26	T	160	4	8	4	1/2	1000	35	145	1.06	8.
177	153	116	<1	15.23	0.0	26	T	20	4	8	4	1/2	600	200	145	.92	8.
178	153	117	<1	26.87	0.0	26	T	20	4	8	4	1/2	600	200	145	.92	6.
179	153	118	<1	15.23	2.0	26	T	40	4	8	4	1/2	600	110	145	.92	8.
180	153	119	<1	15.23	4.0	26	T	40	4	8	4	1/2	600	100	145	.85	8.
181	153	120	<1	15.23	6.0	26	T	40	4	8	4	1/2	600	100	145	.85	8.
182	153	121	<1	15.23	8.0	26	T	20	4	32	4	1/2	600	180	145	.96	6.
183	153	122	<1	0	15.23	26	T	20	4	16	4	1/2	600	180	145	.84	6
184	161	123	k=1	15.2	15.2	20.7	T	160	8	8	4	1/2	1000	36	145	.83	2.0
190	161	124	k<1	0.0	25.58	26	T	20	8	32	4	1/2	640	170	145	.88	10.0
191	163	125	k<1	26.87	0	26	T	20	8	32	4	1/2	900	160	145	.85	9.0
193	167	126	k<1	15.23	0	26	T	20	8	16	4	1/2	640	150	145	.82	6.0
194	167	127	k<1	15.61	0	26	W	40	4	16	4	1/2	640	110	145	.97	14.0
195	169	128	k=1	15.63	15.63	20.27	W	160	8	8	4	1/2	1000	30	145	.90	4.0

Estimate λ	Calc. λ	Cycles	λ/λ_c
8374	5500 ± 500	615618	
1577	1500 ± 30	226673	
2208	1800 ± 50	240008	
2200	2000 ± 200	646656	
3412	3 —— 200	913471	
4329	3400 ± 200	544467 ~~613025~~	
1570	1500 ± 40	613025	
1742	——	1015864	
1752	1780 ± 50	715564	
	——	953086	
	3600 ± 200	1700000	
	4000 ± 300	4500000	
	1350 ± 50	750000	1.18 mg B/g Boron in Core
			Eu_2O_3 Rods
43021	3000 ± 50	400000	
30100	3000 ± 40	240000	14.872
2132	2122 ± 20	2700,000	10.453
1881	1802 ± 15	1622923	8.88
2074	2140 ± 9	180000	10.542
2074	2076 ± 18	1107.19	10.226
2100	1900 ± 15	110000	9.360
1880	1700 ± 18	740,000	8.374
2602	2650 ± 20	1450000	13.054
215	203 ± 3	45016	1
1218	2400 ± 25	1490000	11.823
1909	1828 ± 9		9.005
2319	2160 ± 15	1450000	10.647
2173	2104 ± 26	600000	10.365
2222	203 ± 2	44707 ~~1450000~~	1

Expr #	Page	3PN #	K	Inner	Outer	Safety	I/L	Ch. width	Brg	Delay	Disc	Mem	Burst width	cps	KV	I
196	169	129	k<1	24.75	0	26.00	W	20	8	16	4	1/2	500	150	145	.8
197	171	130	k<1	0	24.75	26.00	W	20	8	16	4	1/2	500	180	145	.95
198	171	131	k<1	0	0	26.00	W	20	8	16	4	1/2	500	180	145	.95
199	173	132	K=1	14.50	14.50	20.78	T+V	160	8	8	4	1/2	10^2	35	145	.8
200	175	133	k<1	14.41	0	26.00	T+V	20	8	16	4	1/2	400	200	145	.81
202	179	134	k<1	24.75	0	26.00	T+V	20	8	16	4	1/2	400	200	145	.81
203	179	135	k<1	0	24.75	26.00	T+V	20	8	16	4	1/2	400	200	148	.82
204	181	136	k<1	15.23	0	26.00	T+V	20	8	16	4	1/2	400	200	148	1.06
207	183	137	k<1	0	0	26.00	T+V	20	8	16	4	1/2	400	200	150	1.08
209	185	138	k<1	15.23	0	26.00	V	20	8	16	4	1/2	400	200	150	0.95
210	187	139	k<1	15.61	0	26.00	V	40	8	16	4	1/2	600	100	150	0.97
211	187	140	k<1	24.75	0	26.00	V	40	8	16	4	1/2	600	100	150	0.97
212	187	141	k<1	0	24.75	26.00	V	40	8	16	4	1/2	600	100	150	1.01
213	187	142	k<1	0	0	26.00	V	20	8	32	4	1/2	600	100	150	.97
214	189	143	k=1	14.02	14.02	20.78	V	160	8	8	4	1/2	1000	38	148	.95
215	189	144	k<1	0	Rotated 0	26.00	V	40	8	16	4	1/2	600	100	150	1.01
216	189	145	k<1	15.61	Rot. 0	26.00	V	40	8	16	4	1/2	600	100	150	1.00
217	189	146	k<1	15.61	Rot 0	26.00	W	20	8	32	4	1/2	600	180	150	.91
218	189	147	k<1	0	Rot 0	26.00	W	20	8	32	4	1/2	600	180	150	.91
219	191	148	k=1	14.09	Rot 13.975	20.78	V	160	8	8	4	1/2	1000	38	146	.84
220	191	149	k<1	15.23	Rot 0	26.00	T+V	40	8	16	4	1/2	600	100	150	1.00
221	191	150	k<1	0	Rot 0	26.00	T+V	20	8	32	4	1/2	600	180	150	1.00
222	191	151	k<1	15.23	Rot 0	26.00	T	20	8	32	4	1/2	600	180	150	1.0
223	191	152	k<1	0	Rot 0	26.00	T	20	8	32	4	1/2	600	180	150	1.0
224	193	153	k<1	0	R 0 3/4	26.00	T	20	8	32	4	1/2	600	180	150	1.0
225	193	154	k<1	15.23	R 0 3/4	26.00	T	40	8	16	4	1/2	600	80	148	1.0
226	193	155	k<1	15.23	R 0 3/4	26.00	T	80	8	16	4	1/2	1000	60	148	1.0
227	197	156	k=1	15.23	R 3/4 12.58	20.78	T	160	8	8	4	1/2	1280	38	148	1.0
228	195	157	k<1	0.0	R 0.0 3/4	26.00	V	20	8	32	4	1/2	600	180	150	1.06

Beam I	Cycles	λ_{est}	$\lambda_{calc.}$	n/λ_c
8.0	1450000	1948	1848±24	9.103
13.0	2250000	2542	2288±32	11.271
13.0	2450000	3010	2887±50	14.222
2.0	89812	258	237±3	1
7.0	2450000	2060	1980±15	8.354
4-6.0	3674977	1606	1485±8	6.308
4.0	3554452	2312	2148±30	9.063
17.0	1341746	1958	1895±11	7.996
14.00	346184	3046	2834±19	11.958
10.0	350000	1465	1412±7	6.28
8.0	111038	1375	1338±8	5.95
8.0	100000	1059	1070±4	4.76
8.0	150000	1645	1600±14	7.11
12.0	450000	2144	2105±8	9.36
14.0	70409	227	225±1	1
19.0	760035	1960	1940±10	8.62
22.0	1200000	1375	1346±12	5.85
12.0	500000	2075	2060±14	10.15
12.0	530000	2776	2626±22	12.94
4.0	102.10	226	225±1	1
8.0	830000	1865	1770±25	7.47
15.0	350000	2732	2526±20	10.66
15.0	300000	2162	2096±14	10.33
15.0	500.000	2875	2650±30	13.95
7.0	500000	2576	2646±20	14.96
3.8	100000	709	690±4	3.90
3.8	60000	681	690±2	3.90
2.5	45212	187	177±1	1
14.0	770000	1939	1900±10	1027

Back from shop.

R = 1.00007

Expr.#	Page#	3PN #	k	Inner	Outer	Safety	Island	Chan. width	Brg	Delay	Disc.	Mem	Burst† width	Cps	KV	I
229	199	158	K<1	15.23	R 3/4 0.0	26.00	T+V	80	8	16	4	1/2	1000	60	148	1.0
230	199	159	K<1	0	R 3/4 0	26.00	T+V	20	8	32	4	1/2	600	180	148	1.02
231	201	160	K=1	15.23	R 3/4 9.67	20.86	T+V	160	8	8	4	1/2	1000	35	148	.84
232	203	161	K<1	15.23	R 3/4 0 cd	26.00	T+V	20	8	32	4	1/2	600	100	149	1.13
233	203	162	K<1	15.23	R 3/4 0 cd	26.00	T+V	20	8	25/6 32	4	1/2	600	100	149	1.19
234	203	163	K=1	15.23	R 3/4 6.82		V	160	8	8	4	1/2	1000	35	150	.90
235	205	164	K<1	15.23	R 3/4 0 cd	26.00	T+V	20	8	32	4	1/2	600	100	150	0.97
236	205	165	K<1	15.23	R 3/4 0 cd	26.00	T+V	40	8	16	4	1/2	600	100	150	1.00
237	205	166	K<1	15.23	R 3/4 0 cd	26.00	T+V	80	4	8	4	1/2	640	80	150	1.05
238	207	167	K<1	~~0~~	R 3/4 0	26.00	T+V	20	8	32	4	1/2	600	180	150	1.20
239	207	168	K<1	15.23	R 3/4 0	26.00	T+V	80	4	16/32	4	1/2	1000	70	150	1.08
240	207	169	K<1	15.23	R 3/4 0 cd	26.00	T+V	40	8	16	4	1/2	630	100	150	.90
241	207	170	K<1	15.23	R 3/4 0 cd	26.00	T+V	40	8	16	4	1/2	630	100	150	.90
243	209	171	K<1	0	0	26.00	T	40	8	16	4	1/2	630	100	150	1.05
244	209	172	K<1	0	0	26.00	T	20	8	32	4	1/2	630	180	150	1.07
245	209	173	K<1	0	0	26.00	W	20	8	32	4	1/2	630	210	150	1.02
246	209	174	K<1	0	0	26.00	V	20	8	32	4	1/2	630	210	150	1.03
247	211	175	K<1	0	0	26.00	T+V	20	8	32	4	1/2	630	210	150	.98
248	211	176	K<1	15.23	14.00	26.00	T	80	8	16	4	1/2	1000	70	150	.81
249	211	177	K<1	15.23	13.00	26.00	T	80	8	16	4	1/2	1000	70	150	.82
250	211	178	K<1	15.23	11.00	26.00	T	40	8	16	4	1/2	630	100	150	.86
251	211	179	K<1	15.23	9.0	26.00	T	20	8	32	4	1/2	630	210	150	.87
252	211	180	K<1	15.23	7.0	26.00	T	20	8	32	4	1/2	630	210	150	.88
253	211	181	K<1	15.23	5.0	26.00	T	20	8	32	4	1/2	630	210	150	.90
254	211	182	K<1	15.23	3.0	26.00	T	20	8	32	4	1/2	630	210	150	.90
255	211	183	K<1	15.23	1.0	26.00	T	20	8	32	4	1/2	630	210	150	.91

Beam I	Cycles	λ_{est}	λ_{cal}	λ/λ_c	
12.0	50000	457	450 ± 1	1.96	
23.0	220000	2509	2410 ± 25	10.48	
8.0	26007	237	230 ± 1.4	1	
28.5	110 000	2525	2450 ± 26	10.65	Error: either control or safety
28.0	110.000	2565	2550 ± 25	11.09	subtract Beg from 3PK-161 inserted. JH
3.9	10510	191	185 ± 1	1	
8.0	110000	10 832	825 ± 6	3.48	
8.0	110 000	23 786	780 ± 4	3.29	
8.0	40 000	23 787	780 ± 3	3.29	
20.0	150,000	2509	2430 ± 50	10.57	
10.0	20,000	451	439 ± 10	1.91	
4.0	110.000	1059	1040 ± 20	4.39	CL (10.00)
4.0	100000	631	630 ± 15	2.66	CL (15.23) end 3/4 rod.
8.0	120000	2915	2325 ± 400	11.44	3/4 rods. Slots alligned (R)
16.0	240000	2833	2600 ± 200	12.79	
18.0	270000	2652	2675 ± 100	13.24	
20.0	200000	2495	1982 ± 20	8.81	
20.0	270000	2792	2609 ± 70	11.01	
3.0	37162	486	474 ± 3	2.33	
3.0	40622	711	685 ± 10	3.37	
5.0	59090	1157	1090 ± 40	5.36	
12.0	131666	1500	1511 ± 80	7.43	
14.0	137189	1840	1750 ± 50	8.61	
14.0	154706	2064	2040 ± 60	10.04	
14.0	152385	2127	2070 ± 70	10.18	
16.0	138525	2127	2080 ± 75	10.23	

Exp 105 W/Target

Instrument Check on 6-12-64 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	>3x10^11	Meter Trip	OK	Fast Trip	OK
IC-2	<3x10^11	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration			
CRM		Meter Trip			

Preliminary Check on 6-12-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 8873.1

Controls Set Inner 16.50 Outer 16.50

Reflector Water 6" above Be

Moderator Water 26.75"

	Condition	Inner	Outer	3PN#
105	k<1	16.50	16.50	81
105'	k<1	16.75	16.75	82
105"	k<1	16.75	15.75	83

Foil Exposure:

Foils

Inner	IE 13 A	location	146a
Outer	OE 13 F	"	315 b
Norm	foil 4 of IE10F	"	17th slot from 37a

Begin timing 8^{26}/AM Expose 30 min at

1 on IC-3 10^{-8} scale
4. on IC-2 3×10^{-8} "
5. on IC-1 3×10^{-8} "
5 on IC-4 10^{-8} scale (meter)

Shutdown 8^{56}/AM

Expr. 106 w/Target.

Expose foils

Instrument Check on 6-15-64 Source 10 mc[illegible]

PM-1		Low Trip	ok	Alarm Trip	ok
PM-2				Alarm Trip	ok
IC-1	>3×10⁻¹¹	Meter Trip	ok	Fast Trip	ok
IC-2	>3×10⁻¹¹	Meter Trip	ok		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	Recorder not op.		
CRM		Meter Trip			

Preliminary Check on 6-15-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH c.c.

Scrams and Bldg. Alarm Reset J.H.

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 13.6 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.77"

1.612 div/dec
T = 35. sec
ρ = 20.¢4

Condition	Inner	Outer	Safety	
k > 1	13.63	13.85	26.00	4.97/in
k = 1	13.63	13.64' (209)	26.00	

Interrupt mag. current for shut down at 8⁵⁰ pm

Foils:

Inner: IE-19A, Location 1a

Outer: OE-7F Location 1b

Norm: foil 2 of IE 10F, " slot 17 from 37a

Target foil 1 " " ", " 23/32" from center of Island.

Begin Exposure at 8:46, expose for 30 min. at { 1, 6, 4.5, 5.2 } on IC3 10^{-8}; IC4 10^{-8}; IC2 3×10^{-8}; IC1 3×10^{-8}

End exposure at 9:16 AM

Expr 107 w/Target

Foil Exposure

Instrument Check on 6-16-64 Source 10 mc γ

PM-1 Low Trip ok Alarm Trip ok

PM-2 Alarm Trip ok

IC-1 > 3×10⁻⁴ Meter Trip ok Fast Trip ok

~~IC-2 > 3×10⁻⁴ Meter Trip ok~~

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM Meter Trip

Preliminary Check on 6-16-64

~~Room 113 Pressure Differential 1.4"~~

Red Light On and Personnel Check JH C.C.

Scrams and Bldg, Alarm Reset JH

Source Inserted JH

~~Safety Withdrawn 26.00"~~

Controls Set Inner 13.63 outer 0.0

Reflector Water 6" above Be.

Moderator Water

	Condition	Inner	Outer	Safety		Rhoctte
1.7 div/dec T = 36.94 sec	k>1	13.63	13.85	26.00	¢.96/in	18.494
ρ = 19.98	k=1	13.63	13.64^2 208	26.00		

Interrupt magnet current for shutdown.

Expr 108	k<1	0.0	0.0	26.00	3PN-84

foils

Inner IE-7E location: 37a

Outer OE-2I location: 78b

Norm: foil 1-C of IE 10E location: slot 17 from 37a

Begin Exposure 8:43 AM Expose 30 min. at { 1, 6, 4.2, 1.7 } Ic3 10^{-8} Ic4 10^{-8} Ic2 3×10^{-8} Ic1 18×10^{-8}

End 4 9:13 AM

Expr 109 w/Target

Instrument Check on 6-17-64 Source 10 mc/

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	$>3\times10^{-4}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 6-17-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH 1 2 3 & 4 respond.

~~Safety Withdrawn~~ 26.00

Controls Set Inner 13.63, Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.60"

Condition	Inner	outer	Safety	Rhoots
K>1	13.63	13.85	26.01	17.89
K=1	13.63	13.65	26.01	

.. 9 13.5 Drop Safety to Shut Down

Expr. 110 R<1 24.70 0.0 26.00 3PN-85

Foils:

Inner IE-6F location 72 a

Outer OE 16F location 155 b

Norm. Foil 1B of IE-10F location slot #17 from 37 a

Reflector water

	Foil	location
From IE-15b	4B	in contact with Be
	4C	2" from Be surface
	4D	4" from Be "
	4E	6" from Be "

foil on radial lines midway between beam tube ⊥ to 72 a and radial beam tube at 1a.

Begin exposure at 9⁰⁵ AM Expose 30 min. at 1.0, 6.0, 4.2, 6 on IC3 10^{-8}, IC4 10^{-8}, IC2 3×10^{-8}, IC1 3×10^{-8}

End exposure 9³⁵ AM

Foil Exposure Expr 116 w/Target.

Instrument Check on 6-18-64 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 6-18-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH" C.C.

Scrams and Bldg. Alarm Reset

Source Inserted JH

Safety Withdrawn 26.00"

Controls Set Inner 13.63 Outer

Reflector Water 6" above Be.

Moderator Water 26.85

Condition	Inner	Outer	Safety
K>1	13.63	18.85	26.00
K=1	13.63	13.63	26.00

Dropped safety to shutdown.

Expr 112 wo/T - wo/V

Instrument Check on 6-19-64 Source 10 mcf

PM-1		Low Trip	ok	Alarm Trip	OK
PM-2				Alarm Trip	ok
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	JII		
IC-4	Responds	Calibration	JII		
CRM		Meter Trip			

Preliminary Check on 6-19-64

Room 113 Pressure Differential 44"

Red Light On and Personnel Check JII c.c.

~~Scrams and Bldg. Alarm Reset~~ JII

Source Inserted No - wa. Acc.

Safety Withdrawn 26.00

Controls Set Unstable

Reflector Water 6" above Rc

Moderator Water 26.85"

Expr.	Condition	Inner	Outer	3PNth
112	k<1	14.06	0.0	86
113	k<1	14.06	0.0	87
114	k<1	0.0	14.06	88
115	k<1	0.0	14.06	89

foils:

Inner	~~IE-18F~~	Location	37a
Outer	OE 15I	"	98b
Inner	IE-7G	"	97a
Outer	OE 8G	"	207b
Norm	foil 6 of IE 10F	"	17th Slot from 37a

Begin Exposure at 10^{48} Expose 30 min. at

1	IC3	10^{-9}
6	IC4	10^{-9}
4.4	IC2	3×10^{-9}
5.6	IC1	3×10^{-9}

End " " 11[illegible]

Expr. 116 w/target

Instrument Check on 6-22-64 Source 10 mc Y

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

Preliminary Check on JH

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted C.C.

Safety Withdrawn 26.00

Controls Set I: 13.63 O: 0.0

Reflector Water 6" above Bc

Moderator Water 26.83'

Condition	Inner	Outer	Safety
k>1	13.63	13.85	26.00
k=1	13.63	13.64	26.00

Interrupt Mag current for Shutdown

Foils:

Inner IE-6A location 121a

Outer OE-6G location 259b

Norm: 4C of IE 10F location: 17th slot from 37a

Target foil 1E of IE 3G 23/32" from ℄ of island at midplane

foil 1G of IE 3G put in ~~slot~~ foil position 3

in plate IE-10F (norm plate)

	2	IC-3	10^{-8}
Begin exposure 10:38 AM Expose for 30 min at	1.1	IC-4	10^{-7}
	3.3	IC-2	10×10^{-7}
End exposure 11:08 AM	3	IC-1	10×10^{-6}

26-10 reads ~1 mm through window

Expr. 119 W/Target

Instrument Check on 6-24-64 Source 40 mc Ra

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

Preliminary Check on 6-24-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 13.63 Outer 0.0

Reflector Water 6" above Bc

Moderator Water ~24+ note

Condition	Inner	Outer	Safety	Rhotte
k>1	13.63	13.85	26.00	18.05 f'
k=1	13.63	13.64	26.00	

Interrupt Magnet current for shut down

Expr. 120	Reinstalled Fission counter.			H_2O
k>1	13.63	13.70	26.00	~26.00
k=1	13.63	13.48	26.00	

IC-3 1×10^{-9} scale gives ~2450 c/m

Fission Counter Characteristics

Expr 121 w/Target

Instrument Check on 6-25-64 Source comet

PM-1 ______ Low Trip OK Alarm Trip ok

PM-2 ______ Alarm Trip ok

IC-1 > 3x10^-11 Meter Trip OK Fast Trip OK

IC-2 > 3x10^-11 Meter Trip OK

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM ______ Meter Trip ______

Preliminary Check on 6-25-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH c.c.

Scrams and Bldg, Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 13.63 Outer 0.0

Reflector Water 6" above Be

Moderator Water 25.97"

Condition	Inner	Outer	Safety
k>1	13.63	13.85	26.00
k=1	13.63	13.64	26.00

Expt 122 – Preliminary run to check critical conditions preparatory to receiving 1 curie source. Have moved IC-3 from against outside tank to top of moveable table assembly machine.

Fission counter traverse at critical (IC4 6.4×10^{-8})

Location	F.C. C/m.	Norm (6.4/6)	C_4	C_3
21.81	42116	39484	23583	23825
23.81	17279	16199	25753	25852
25.81	7060	6619	25977	18.484
27.81	3123	2928	24935	22226
29.81	1476	1384	25942	24254
31.81	738	692	26121	24557
26.81	4834	4532	26191	23175
22.81	27053	25362	26315	26176
21.81	42500	39844	25877	26205

Expt 122 w/ Target

Instrument Check on 6-30-64 Source 1 curie

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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 6-30-64

Room ~~113~~ Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg, Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00"

Controls Set Inner 13.63 Outer 0.0

Reflector Water 6" above Be

Moderator Water

Condition	Inner	Outer	Safety
K=1	13.63	13.64	26.00

Expt. 123 w/Target + 1 curie source

Condition	Inner	Outer	Safety	Fission counter @ 21.81"	C_4	BF_3 c/sec.
K<1	7.00	0.0	0.0	7	12	
"	13.63	0.0	26.00	13	23	0.6
"		10.00		19	39	2.6
"		12.00		32	76	13.0
"		13.00		81	190	102 (8622)
"		13.50		362	897	1280
K=1		13.63		43032	23748	128×10^3 (56×23440^3)

Foils

Inner IE-6G location 37a

Outer 0E 8F " 78b

Norm. 4E of Plate IE36 location: slot 12 from 37a

Reflector Water

Foils of IE 36	Location	
6B	Contact	On radial line bisecting Tangential beam tube
6C	2	
6F	4	
6G	6	

Begin Exposure at 11 17/Am Expose 30 min. at

1.0	IC 4	10^{-8}
5.0	IC 3	60^{-8}
1.8	IC 2	3×10^{-8}
1.6	IC 1	10×10^{-8}

End Exposure 11 47/Am

Foil Exposure Expr 124 w/Target.

Instrument Check on 7-1-64 Source 10 mc Ra

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	$> 3 \times 10^{-4}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-4}$	Meter Trip	OK		
IC-3	Response	Calibration	JH		
IC-4	Response	Calibration	JH		
CSM		Meter Trip			

Preliminary Check on 7-1-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH, C.C

Scrams and Bldg, Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set In: ~~13.3~~ 0.0 Out: 26.085

Reflector Water 6" above Be.

Moderator Water 27.6"

Condition	Inner	Outer	Safety	Rhoetle
k>1	8.32	26.08	26.00	42.5 ¢
k=1	8.13	26.08	26.00	

Interrupt Mag.

Expt 125

Instrument Check on 7-2-64 Source 10 mc Ra

PM-1 Low Trip OK Alarm Trip OK

PM-2 Alarm Trip OK

IC-1 > 3x10" Meter Trip OK Fast Trip OK

IC-2 > 3x10" Meter Trip OK

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM Meter Trip

Preliminary Check on 7-2-64

Room 113 Pressure Differential 1.4"

Red Light Camera Pressure Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH (accelerator)

Safety Withdrawn 26.00

Controls Set variable

Reflector Water 6" above Be

Moderator Water 26.49"

Condition	Inner	Outer	
k<1	0.0	0.0	check counter response

Expt 127	location	F.C c/m	c_3	c_4	$\ln N$	IC-2
	21.81	420	420	1179	$(1\times10^{3})(5\times10^{4})$	5.1
	24.81	118	410	1177		
	28.81	24	427	1218		
	32.81	5	434	1234		
	21.81	044	457	1256		

Expr. 127 w/Target.

Instrument Check on 7-7-64 Source 10 mc

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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 7-7-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set In: 13.63 Out: 0.0

Reflector Water 6" above Be

Moderator Water 27.67"

Check critical conditions prior to bringing in 10 curie Sb-source.

	Condition	Inner	Outer	Safety	
	R>1	13.63	13.85	26.00	
	R=1	13.63	13.62	26.00	
	k<1	9981.4	9999.2	26.00	3PN-93
Expr 128	k<1	9981.4	9999.2	26.00	3PN-94

Expt 129

Instrument Check on 7-8-64 Source Ionex

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	$> 3 \times 10^{-11}$	Meter Trip	OK	Test Trip	OK
IC-2	$> 3 \times 10^{-11}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 7-8-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc.

Safety Withdrawn 26.02

Controls Set Inner 9981.4 Outer 99992

Reflector Water 6" above Be.

Moderator Water 26.80"

Condition	Inner	Outer	
k<1	9981.4	99992	3PN-95

Installed Sb-source

location 1. 5" from control blades

counts in 5 min 240, 220. ave 0.72 c/sec

Traverse at critical normalized to 1.0×10^{-8} on IC-3

Position	c/min.
21.81	368250
22.81	
24.81	98530
28.81	1964 0
32.81	464 0
25.81	65500

Location 2. 3" from control blades

approach to critical

Inner	Outer	c/min.	M^{-1}	Inner	Outer	c/min.	M^{-1}
0	0	80	1.0	20	0	340	
4	4	90	.89	24.78	0	400	1.0
6	6	110	.73		2	950	.89
8	8	130	.62		4	700	.57
10	10	200	.40		6	2050	.195
12	12	430	.19		6.8	11790	.034
13	13	1240	.065				
13.6	13.6	22190	.0036				

Traverse at critical normalized to 1.0×10^{-8} on IC-3

Position	c/min.	Position	c/min
21.81	38452	33.81	319
23.81	14793	30.81	983
25.81	6474	28.81	2005
27.81	2871	26.81	4458
29.81	1363	24.81	10238
31.81	665	22.81	24623

Expt 130

Instrument Check on 7-9-64 Source [illegible]

PM-1 ______ Low Trip ok Alarm Trip ok

PM-2 ______ Alarm Trip ok

IC-1 >3×10⁻⁴ Meter Trip ok Fast Trip ok

IC-2 >3×10⁻⁴ Meter Trip ok

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

GRM ______ Meter Trip ______

Preliminary Check on 7-9-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted Sb source

Safety Withdrawn 20.00

Controls Set inner 0.0 outer 0.0

Reflector Water 6" above Be

Moderator Water 27.26

Condition	Inner	outer	Rheotte
k>1	13.63	13.75	9.41 ¢
k=1	13.63	13.69[5]	

Fission Counter Traverse with Sb-source

k>1	13.63	13.80	14.95 ¢
k=1	13.63	13.63[5]	/

Expts. 131-168 in HFIRCE 3 #2 Book

8/7/64 Drained Borated Mod. water - flushed system with tap water twice - once with drain. water.

Expt 169

Zero position of controls have changed

noted when both selsyns are zero

Inner 41 $\frac{45}{64}$ above Be surface } cf p 72 41 $\frac{13}{16}$

Outer 5 $\frac{63}{64}$ above Be surface } 6 $\frac{4}{16}$

Expt 169 W/T

Instrument Check on 8-10-64 Source Cored

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

PM-2 _____ _____ ~~Alarm~~ Trip OK

IC-1 $>3\times10^{-4}$ Meter Trip OK Fast Trip OK

IC-2 $>3\times10^{-4}$ Meter Trip OK _____

IC-3 Responds Calibration JTT _____

IC-4 Responds Calibration JTT _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 8-10-64

~~Room 113 Pressure Differential~~ 1.4"

Red Light On and Personnel Check East OK

Scrams and ~~Bldg. Alarm~~ Reset JTT

Source Inserted JTT

Safety Withdrawn 26.00

Controls Set Inner 13.63 Outer 0

Reflector Water 6" above Be

Moderator Water ~2600

Condition	Inner	Outer
$k>1$	13.63	13.85
$k>1$	13.70	13.85
$k=1$	13.73	13.73
$k<1$	13.73	13.645

Reset Controls – Expt 169(a)

$k=1$	13.75	13.75

8/12/64

Added ~500 cc N Nitric acid to ~30 l. of moderator water. Pumped moderator water into core and let stand ~5 min. Repeated twice. Drained acid soln from system. Flushed 4 times with tap water. Flushed twice with demin water. Filled system with ~30 liters of clean demin. water. JH

Expt 170 W/T

Instrument Check on 8-11-64 Source 10 mc Ra

PM-1		Low Trip	ok	~~Alarm~~ Trip	ok
PM-2				~~Alarm~~ Trip	ok
IC-1	$>3\times10^{-4}$	Meter Trip	ok	Test Trip	ok
IC-2	$>3\times10^{-4}$	Meter Trip	ok		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

~~Preliminary~~ Check on 8-11-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check FH

Scrams and ~~Bzdg, Alarm~~ Reset JH

Source Inserted JH

Safety Withdrawn 24.00

Controls Set Inner 13.73 Outer 0.0

Reflector Water 6" above Be

Moderator Water ~26"

Condition	Inner	Outer	Rheostat
K>1	13.75	13.90	11.23
K=1	13.75	13.75	

Drained Mod. H_2O - Flushed system with Dem. H_2O and refilled with clean H_2O (-6.624)

Expt 171 check crit position of Rods

K=1	13.70	13.70

Expt 172 W/T

Instrument Check on 8-12-64 Source 10 mc Ra

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	$>3\times10^{-4}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 8-12-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and ~~Bldg. Alarm~~ Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 13.63 Outer 0.0

Reflector Water 6" above Bc

Moderator Water ~26.00

Condition	Inner	Outer	Rhoctle
k>1	13.63+	13.80	6.0¢
k=1	13.63+	13.78	
k=1	13.67	13.67	
k<1	13.67	13.56	-10.24¢

Expt 173 WLT

Instrument Check on 8-13-64 Source 1 curie Y

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 JH

IC-4 " Calibration JH

CRM Meter Trip

Preliminary Check on 8-13-64

Room 113 Pressure Differential 1.4

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 2600

Controls Set In: 24.70 Out: 0.0

Reflector Water 6" above BC

Moderator Water ~27.00

	Condition	Inner	Outer	div/sec	T	P	Throttle	ℓ/m
1.	k>1	24.71 (1.533)	7.16	1.55	33.7	21.14	19.63	
2.	k<1	23.17⁵	7.16 (.27)	6.6	-143.4	-13.05	12.22	.223
3.	k>1	23.17⁵ (.923)	7.43	2.03	44.1	17.82	15.84	1.143
4	k<1	22.25	7.43 (.255)	7.025	-152.7	-11.86	11.04	.321
5	k>1	22.25	7.66³	3.55	55.4	15.28	13.35	1.155
6	k<1	17.87	9.59 (.23)	7.05	-153.2	-11.80	11.75	
7	k>1	17.87	9.84	2.945	64.0	13.80	12.10	1.024
8	k<1	17.54 (.33)	9.84	7.05	-153.2	-11.80	11.60	.776
9	k>1	17.54	10.08 (.24)	3.20	69.5	13.01	11.43	1.034
10	k<1	17.23³ (.307)	10.08	7.025	-152.7	-11.84	11.50	.810

	Condition	Inner	Outer	div/sec	T	ρ	Rayette	
11	R>1	15.50	11.85	2.725	59.2	14.58	12.60	
12	R<1	15.24	11.85	6.55	-142.3	-13.20	11.1	1.068
13	R>1	15.24	12.10	3.10	67.4	13.30	11.40	1.060
14	R<1	14.99	12.10	6.55	-142.3	-13.20	11.25	1.082
15	R>1	14.99	12.34	3.35	72.8	12.57	10.54	1.097
~~16~~	(R=1	13.67	13.67)					
16	R<1	13.56	13.67	7.25	-157.5	-11.33	10.62	1.03
17	R>1	13.56	13.92	3.26	70.8	12.83	10.28	.966
18	R<1	13.34	13.92	6.65	-144.5	-12.91	10.97	1.170
19	R>1	13.35	14.19	3.1	67.4	13.30	12.36	.971
20	R<1	13.11	14.19	6.95	-151.0	-12.06	11.00	1.079
21	R>1	10.00	18.60	3.75	81.5	11.56	11.17	
22	R<1	9.84	18.60	7.35	-159.7	-11.09	10.03	1.415
23	R>1	9.84	———					

Sylsen on outer control cylinder sticks at 18.60, however motion of cylinder still possible.

8-14-64

Removed control cylinders - Install Eu_2O_3 rods.

See drawings E 49903 - Inner

E 49901 - Outer

Inner control:

location of grey-black interface is 46 1/8" from top of control cylinder. (Re: D. Cheverton X-rays of rods)

Outer: location of grey-black interface is 31 7/8" from top of control cylinder (X-rays)

grey section 5" long.

Black " 22" long.

Locate top of Inner cylinder 44 1/8" above Be.

" " " Outer cylinder 9 7/8" " "

Limits	up	Down
Inner	999.98	2686.5
Outer	25.58.5	999.91

Eu_2O_3 Experiment 174 W/T und Eu_2O_3 Rods

Instrument Check on 8-17-64 Source 10 mc

~~FM-1~~		Low Trip	OK	~~Alarm~~ Trip	OK
~~FM-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	Response	Calibration	JH		
IC-4	Response	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 8-17-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg, Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set In. 0.0 Out 0.0

Reflector Water 6" above Be.

Moderator Water ~27"

Condition	Inner	Outer	Safety	Δ	Rhoetta	ln N	T	ρ
K>1	15.30	15.29⁵	26.00	.115	12.264	3.075 div/sec	66.8	13.384
K=1	15.30	15.18	26.00			1.16		
K=1	15.19⁵	15.29⁶	26.00	.105		1.27		
K=1	16.23⁵	15.23⁵	26.00	.065 .060		2.14		
K<1	15.23⁵	15.15⁵	26.00	.080	-10.344	1.35½ 7.5 div/sec	163	10.784

Eu_2O_3 Expr 175 Pluse W/T

Instrument Check on 8-21-64 Source 10 mc

~~PM-1~~		Low Trip	OK	~~Alarm~~ Trip	OK
PM-2				~~Alarm~~ Trip	OK
IC-1	$> 3 \times 10^{-6}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-6}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 8-21-64

Room 113 ~~Pressure~~ Differential 1.4"

Red Light On and Personnel Check JH

Screms and Bldg. ~~Alarm~~ Reset JH

Source Inserted Acc

~~Safety Withdrawn~~ 26.00

Controls Set - Vun.

Reflector Water 6" above Be

Moderator Water ~26"

Expt.	Condition	Inner	Outer	Safety	3PN# (p 104)
175	R<1	0.0	0.0	26.00	114
176	k<1	0.0	0.0	26.00	115
177	k<1	15.23	0.0	26.00	116
178	k<1	26.87	0.0	26.00	117
179	k<1	15.23	2.0	26.00	118
180	k<1	15.23	4.0	26.00	119
181	k<1	15.23	6.0	26.00	120
182	k<1	15.23	8.0	26.00	121
183	k<1	0	15.23	26.00	122

Expr. 184 W/o Tor Void

Instrument Check on 8-24-64 Source 10 mc

PM-1		Low Trip	OK	~~Alarm~~ Trip	ok
PM-2				~~Alarm~~ Trip	ok
IC-1	> 3 × 10⁻⁴	Meter Trip	ok	Fast Trip	ok
~~IC-2~~	~~> 3 × 10⁻⁴~~	~~Meter Trip~~	~~OK~~		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 8-24-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 15.65 Out 10.04

Reflector Water ~6" above Be

Moderator Water ~27"

Condition	Inner	Outer	Rhoette	ln N	T(sec)
k > 1	15.65	15.67	+17.44¢	1.5 div/sec	41.3
k = 1	15.65	15.55 (.12)			
k = 1	15.54⁵	15.67 (.105)			
k = 1	15.62	15.62	+2.[illegible]		
k < 1	15.62	?	-12.12¢	6.975 div/sec.	151.6

15.23
13.98

Expr. 185 W/Styrofoam Void — 4 3/16 dia.

Condition	Inner	Outer	Rhoette	ln N	T(sec)
k > 1	14.00	14.10	+16.30	2.117	46
k = 1	14.00	13.92⁸			
k = 1	13.98	13.98			

Expr. 186 W/T+void.

Condition	Inner	Outer	Rhoette	div/sec	T(sec)
K>1	14.38	14.68	+15.524	2.1	45.6
K=1	14.38	14.53 (.15)			
K=1	14.44	14.44			

Expr 187 W/T Rhoette

K>1	15.23	1540 (.125)	15.614
K=1	15.23	15.275	
K=1	15.23	15.23	
K=1	16.00	14.46	
K=1	18.00	12.625	
K=1	20.00	11.205	
K=1	22.00	10.21	
K=1	24.00	9.58	
K=1	26.00	9.27	
K=1	14.00	16.705	
K=1	12.00	19.70	
K=1	10.03	25.61	

Experiment 188 Sensitivity.

		Rhoette			div/sec.	T(sec)	pf	flm
1	K>1	19.08	10.30	25.61	1.625	35.3	20.54	
2	K<1	14.53	10.30	24.17 (1.44)	6.725	146.1	12.69 (23 23)	.2.31
3	K>1	12.84	10.44 (.14)	24.17	2.70	58.7	14.68 (27)	1.9.55
4	K<1	9.91	14.00	16.64	8.0	173.8	9.87	15.1
5	K>1	15.09	14.16 (.16)	16.64	2.475	53.8	15.59 (2, 4 6)	15.91
6	K<1	11.50	14.16	16.43 (.21)	7.15	155.4	11.54 (27 13)	12.92
7	K<1	12.55	18.005 (.195)	12.525	6.75	146.7	12.63	
8	K>1	10.04	18.20	12.525	3.95	85.8	11.12	12.18
9	K<1	13.22	18.20	12.36 (.160)5	6.25	135.8	14.27	15.87
10	K>1	13.50		12.365	2.74	59.5	14.53	

Expr 188

	Condition	Inner		Outer	dis/dec	T (sec)	ρ(ψ)	
11	k<1	10.15	20.00	R=1 11.20$_5$ .07$_5$ 11.12^5	8.575	186.3	8.97	1.20
12	k>1	13.28	.27 20.27	11.12^5	2.775	60.3	23 3 6 14.39	.86^5
13	k<1	11.28	20.27	.1 65 10.96	7.25	157.5	.72 11.33	1.56
14	k≤1	10.27	24.00	9.49^5	7.45	161.9	10.88	
15	k>1	11.18	.67 24.67	9.49^5	3.45	75.0	12.30	.35^5
16	k<1	12.28	24.67	.15 9.34^5	7.10	154.3	11.70	1.60

Exp. 189 W/T

Instrument Check on 8-25-64 Source corner

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

PM-2 _____ ~~Alarm~~ Trip OK

IC-1 > 3×10^{-4} Meter Trip OK Fast Trip OK

IC-2 > 3×10^{-4} Meter Trip OK _____

IC-3 Responds Calibration JU _____

IC-4 Responds Calibration JU _____

CRM _____ Meter Trip _____ _____

Prelidinary Check on 8-25-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JU C.S.

Scrams and Bldg. Alarm ~~Reset~~ JU

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 15.23 Outer 8.00

Reflector Water 6" above Be

Moderator Water 26.5"

Condition	Inner	Outer	Safety	Roetta
K>1	15.23^2	15.40	26.00	16.38 ↑
k=1	15.25^2	15.23^2	26.00	
K=1	15.26^5	15.26^5	20.77	3PN-123
Exper 190				
K<1	0	25.58	26.00	3PN-124

TMC

256 - 2 - 80 - 2° 1973

256 2 80 2° 580

Expr. 191 W/T

Instrument Check on 8-31-64 Source 10 mc β

PM-1		Low Trip	OK	~~Alarm~~ Trip	OK
PM-2				~~Alarm~~ Trip	OK
IC-1	$> 3 \times 10^{-4}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-11}$	Meter Trip	OK		
IC-3	Responds	Calibration	JTI		
IC-4	Responds	Calibration	JTI		
CRM		Meter Trip			

Preliminary Check on 8-31-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JTI

Scrams and Bldg. Alarm Reset JTI

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 26.87 Outer 0.05

Reflector Water > 6" above BC

Moderator Water ~26.00

Condition	Inner	Outer	Safety	
K<1	26.87	0.05	26.00	3PN-125

Expr. 192 Sb-Source 3" from Control Blades.

K<1 (13)	9999.8	0.05	26.00	
10 min Count	F.C. 210 .35%/sec	C-3 ?	C-4 1990	
K<1 (6)	24.76	0.05	26.00	
10 min C.	720 1.2%/sec	2320	3950	

Bkg	Delay	ch.	ct	cycles	
256	2	80	2^{10}	1361	
				560, 523, 575	
				151, 154	
256	2	80	2^{13}	218, 219	9700 c/sec
			2^{15}	165, 166	

2 min. Counts

Inner	Outer	F.C.	C-3	C-4
8.00	8.00	45	330	390
12.00	12.00	120	450	810
14.00	14.00	450	770	2080
15.00	15.00	2670	2890	11670
15.20	15.20	11090	11610	40700

5/18/5

Expt 193 W/T

Instrument Check on 9-1-64 Source 10 mc

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

Preliminary Check on 9-1-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Screams and Bldg. ~~Alarm Reset~~ JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 15.23 Outer 0.05

Reflector Water 6" above BC

Moderator Water 26.00

Condition	Inner	Outer	Safety	
K<1	15.23	0.05	26.00	3PN-126

Expt 194

Removed target; only H_2O in island. Rhoetta

Condition	Inner	Outer	Safety	20.43	~131
K>1	16.00	15.35	26.00		
K=1	16.00	15.19	26.00		
K=1	15.61	15.61	26.00	3PN-127	

Expr. 195 W/O

Instrument Check on 9-2-64 Source 10 mc/

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	$> 3\times10^{-4}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 9-2-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH c.c.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 15.61 outer 0.0

Reflector Water 6" above Be

Moderator Water ~ 26-00

Condition	Inner	Outer	Safety	Rheostat			
k>1	15.61	15.70^5	26.00	14.63	4.6 div/sec	T=100 sec	ρ = 9.88¢
							~ 80¢/in
k=1	15.61	15.59^5	26.00				
k=1	15.63	15.63	20.77				
Pulse at critical			3PN-128				
k ≤ 1	15.63	15.63	20.77	Neg. Period 54 div/sec			
	k = .9927			T = - 1173 sec		ρ = -1.15¢	

Expr 196

k<1	24.75	0	26.00	3PN-129

Expt 197 W/O

Instrument Check on 9-3-63 Source 10 mc

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

Preliminary Check on 9-3-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 0. Outer 24.75

Reflector Water 6" above Be

Moderator Water 26

Condition	Inner	Outer	Safety	
$k<1$	0	24.75	26.00	3PN-130
Expt 198				
$k<1$	0	0	26.00	3PN-131

Expt. 199 W/T+V

Target in Al. can.

Instrument Check on 9-4-64 Source Lower

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				~~Alarm~~ Trip	OK
IC-1	$> 3 \times 10^{-4}$	Meter Trip	OK	Fast Trip	OK
IC-2	$> 3 \times 10^{-4}$	Meter Trip	OK		
IC-3	Responds	Calibration	JN		
IC-4	Responds	Calibration	JN		
CRM		Meter Trip			

W/T+V

Preliminary Check on 9-4-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JN C.C.

Scrams and Bldg. Alarm Reset JN

Source Inserted JN

Safety Withdrawn 26.00

Controls Set Inner 14.4" Outer 0

Reflector Water 6" above Be

Moderator Water

Condition	Inner	Outer	Safety	Reactor	div/sec	T	ρ
k>1	14.40	14.65	26.00	19.69 ↑	1.55	33.7	21.14 ↑
k=1	14.40	14.45	26.00				
k=1	14.41	14.41 ↑	26.00				
k=1	14.50	14.50	20.77	3PN-132			

Neg. Period 87 div/sec T = -1890.5 ⇒ ρ = -.703 ↓

k = .99551

Exp. 200 W/T+V

Instrument Check on 9-8-64 Source Co 60

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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 9-8-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 14.41, Outer 0.06

Reflector Water 6" above Be

Moderator Water -26"

Constrain	Inner	Outer	Safety	
KC1	14.41	0	26.00	3PN-133

Foils

Inner IE-3E location Slot 97a

Outer OE-4F " " 207b

Norm foil 4 of IE15G " " 17 from 37a

Begin exposure at 9^{23}/$_{AM}$; Expose 30 min. Power level on IC I 10×10^{-8} 2

End " at 9^{53}/$_{AM}$: Ic2 3×10^{-8} 5.4

Ic3 10^{-8}

Ic4 6×10^{-8}

Alarm readings

A: 150

B: 120

C: 260

Foil Exposure Expt 201 W/T

Instrument Check on ~~9-15-64~~ 10-1-64 Source 10 mc/

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			

Preliminary Check on ~~9-15-64~~ 10-1-64

Room 113 Pressure Differential 1.64"

Red Light On and Personnel Check JII c.c.

Scrams and Bldg. Alarm Reset JII

Source Inserted JII

Safety Withdrawn JII

Controls Set Jn. 15.23 Outer 0

Reflector Water 6" above Be

Moderator Water ~26

Condition	Inner	Outer	
k>1	15.225	15.40	
k=1	15.225	15.202	9:45 AM
k=1	15.225	15.235	9:50 AM

Expt 202 W/T+V

Instrument Check on 10-12-64 Source 10mc Ra

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

Preliminary Check on 10-12-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH c.c.

Scrams and Bldg, Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 24.75 Outer 0.0

Reflector Water 6" above Be

Moderator Water ~26"

Condition	Inner	Outer	Safety	3PW
k<1	24.75	0.0	26.00	134
Expt. 203 k<1	0	24.75	26.00	135

Expt. 20# W/T+V

Instrument Check on 10-15-64 Source 10 mc

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	$>3\times10^{-4}$	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			

Preliminary Check on 10-15-64

Room 113 Pressure Differential 1.8"

Red Light On and Personnel Check JH cc.

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 15.23, Outer 0

Reflector Water 6" above Be

Moderator Water ~27"

Condition	Inner	Outer	Safety	3PM
K<1	15.23	.05	26.02	13C
	Expt 205 W/T+V			
K>1	24.75	8.05	26.00	
K=1	24.75	7.89	"	
"	22.00	8.70	"	
"	20.00	9.64	"	
"	18.00	10.98	"	
"	16.00	12.725	"	
"	14.00	14.86	"	
"	12.00	17.57	"	
"	10.00	21.495	"	
"	~~8.00~~		"	
	9.785	22.00		

Condition	Inner	Outer	Safety (W/T+V)	3PN#
k=1	9.11	24.75	26.00	

Exp. 206 W/T+V

k<1	0.0	0.0	26.00	137

Exp 207 W/T+V

Instrument Check on 10-19-64 Source 10 mc Ra

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

Preliminary Check on 10-19-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be

Moderator Water >26"

Condition	Inner	Outer	Safety	3PN#
k≠1	0.0	0.05	26.00	137

Expt. 208

Replace T+V with Styrofoam void $4\frac{3}{16}$" Dia

Condition	Inner	Outer	Safety
k>1	14.00	14.10	26.00
k=1	13.97^5	13.97^5	26.00
k=1	14.00	13.95	"
k=1	16.00	11.80	"
k=1	18.00	10.06^5	"
k=1	20.00	8.76^5	"
k=1	22.00	7.85	"
k=1	24.75	2.08	"
k=1	12.00	16.47	"
k=1	10.00	19.90	"
k=1	9.96	20.00	"
k=1	9.17^5	22.00	"
k=1	8.48	~~24.75~~	

Expt. 209

				3PN#
k<1	15.23	0.0	"	138

Expt. 210 W/Styrofoam void

Instrument Check on 10-20-64 Source 10 mc 8

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

Preliminary Check on 10-20-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set: Inner 15.61 Outer 0.05

Reflector Water 6" above Be

Moderator Water > 36"

Condition	Inner	Outer	Safety	3PN#
K<1	15.61	0.05	26.00	139
	Expt 211			
K<1	24.75	0.05	26.00	140
	Expt 212			
K<1	0	24.75	26.00	141
	Expt 213			
K<1	0	0	26.00	142

Expt. 215 –

Have disconnected outer control cylinder and rotated it ~45°
∴ slots are alligned.

Expr 214 W/V

Instrument Check on 10-21-64 Source conned

PM-1 ____ Low Trip ____ ~~Alarm~~ Trip OK

PM-2 ____ ~~Alarm~~ Trip OK

IC-1 >3×10⁻¹¹ Meter Trip OK ~~Fast~~ Trip OK

IC-2 >3×10⁻¹¹ Meter Trip OK

IC-3 Responds Calibration JN

IC-4 Responds Calibration JN

CRM ____ Meter Trip ____

Preliminary Check on 10-21-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JN G.C.

~~Scrams and Bldg. Alarm Reset JN~~

Source Inserted JN

Safety Withdrawn 26.00

Controls Set Inner 13.975 Outer 10.00

Reflector Water 6" above Be

Moderator Water >26"

Condition	Inner	Outer	Safety	3PN#		Rhvette
k>1	13.97^5	14.14	26.00			15.424
k=1	13.97^5	13.97	26.00			
k=1	14.02^5	14.02^5	21.76	143	k=1 at end.	

Expr 215 Rotated outer cylinder

k<1	0.0	0.0	26.00	144

216

217 W/W

218 W/W

Outer cylinder in rotated position and clamped to drive mechanism.

Expr. 219 W/V

Instrument Check on 10-22-64 Source Correct

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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Check on 10-22-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C

Scrams and Bldg. Alarm Tests JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set On: 10.00 Out: 13.97.5

Reflector Water 6" above Be

Moderator Water > 26"

Condition	Inner	Outer	Safety	
K>0	14.12	13.97.5	26.00	
K=1	13.81	13.97.5	26.00	
K=1	14.09	13.97.5	20.78	3PN-148 K=1 at end
K=1	14.04	14.02.5	20.78	
	Expr. 220	W/T+V		
K<1	15.23	0.0	26.00	3PN-149
	Expr 221	W/T+V		
K<1	0	0.0	2600	3PN-150
	Expr 222	W/T		
K<1	15.23	0.0	26.00	3PN-151
	Expr 223	W/T		
K<1	0	0	26.00	3PN-152

10/26 Outer rod removed and sent to shop to have one quadrant of Eu_2O_3 removed and replaced by aluminum.

11/2 Outer rod installed – slots aligned.

Rod and sqlsyns set as on p. 150.

Expr. 224 W/T & 3/4 Outer control

Pulse W/T both rods in. 3PN-153

Expr 225 W/T

Inner	Outer	safety	
15.23	0	26.00	3PN-154

Expr. 226 W/T

15.23	0	26.00	3PN-155

Expr. 227 W/T and 3/4 Rod.

Instrument Check on 11-4-64 Source 10 mc #

PM-1 _____ Low Trip 6K Alarm Trip OK

PM-2 _____ _____ Alarm Trip OK

IC-1 $>3\times10^{-11}$ Meter Trip 6K Fast Trip OK

IC-2 $>3\times10^{-11}$ Meter Trip OK

IC-3 Responds Calibration JH _____

IC-4 Responds Calibration JH _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 11-4-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Alarms and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.85

Condition	Inner	Outer	Safety
k>1	22.60	0.0	26.00
k=1	21.84	0.0	26.00
k=1	21.43	2.0	"
k=1	20.54	4.0	"
k=1	19.37	6.0	"
k=1	18.08[5]	8.0	"
k=1	16.78	10.0	"
k=1	15.52	12.0	"
k=1	14.31	14.0	"
k=1	13.22	16.0	"
k=1	12.22[5]	18.0	"

Condition	Inner	Outer	Safety	
k=1	11.354	20.00	25.00	
k=1	10.70	22.00	25.00	
k=1	10.27	24.00	25.00	
k=1	10.18	24.75	"	
k=1	15.23	12.455	"	
k=1	15.23	12.58	20.78	3PN-156
k=1	15.23	12.58	20.78	end of 3PN156

T = 1152 sec ⇒ 1.094 ϕ ⇒ Δρ .00007

∴ k = 1.00007

Expt. 228 W/V$_s$ 3/4 Rod

Instrument Check on 11-5-64 Source 10 mc Be

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

Preliminary Check on 11-5-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 0.0 Outer 0.0

Reflector Water 6" above Be

Moderator Water 26.87"

Condition	Inner	Outer	Safety	
k<1	0.0	0.0	26.00	3PM-157
	Expt 229	W/T+V	3/4 Rod.	
k<1	15.23	0.0	26.00	3PM-158
	Expt 230	W/T+U	3/4 Rod	
k<1	0.0	0.0	26.00	3PM-159

Expr. 231 W/T+V 3/4 Rod.

11/5/64 Condition	Inner	Outer	Safety	
K > 1	17.60	0	26.00	
K = 1	17.35^5	0	26.00	
k = 1	17.35^5	2.00	26.00	
Note: Reactor has k<1 as outer rod is pulled to 1.82" !				
k = 1	17.10	4.00	26.00	
Note: Reactor initially k<1 as rod is moved from 2 to 4.				
k = 1	16.55^5	6.00	26.00	
k = 1	15.80	8.00	26.00	
k = 1	14.92	10.00	26.00	
k = 1	13.89	12.00	26.00	
k = 1	12.83	14.00	26.00	
k = 1	11.81	16.00	26.00	
k = 1	10.92^5	18.00	26.00	
k = 1	10.17^5	20.00	26.00	
k = 1	9.58	22.00	26.00	
k = 1	9.15^5	24.00	26.00	
k = 1	9.06^5	24.75	26.00	
k = 1	15.23	9.37^6	26.00	
k = 1	15.23	9.67	20.86	3PN-160

11/6/64 Note: Expts. 232 and 233

Have determined replaced quadrant by using γ source and cutie pie detector. Cemented a sheet of cadmium 0.023" on Al-section ⇒ it represents 4th quadrant at 13.00" withdrawn when remaining 3 quadrants are at zero position.

Expt 232 W/T+V 3/4 Rod + cd.

Instrument Check on 11-6-64 Source 10 mc Ra

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	JT		
IC-4	Responds	Calibration	JT		
CRM		Meter Trip			

Preliminary Check on 11-06-64

Room 113 Pressure Differential 1.4

Red Light On and Personnel Check JT c.c.

Scrams and Bldg. Alarm Reset JT

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 0 Outer 0

Reflector Water 6" above Be

Moderator Water > 26"

Condition	Inner	Outer	Safety	
K<1	0.0	0.0	26.00	BPN-161

Expt 233

k<1	0.0	0.0	26.00	BPN-162

Expt 234 W/V_s 3/4 Rod no cd.

k>1	15.23	6.57	26.00	
k=1	15.23	6.12	26.00	
K=1	15.23	6.925	20.86	BPN-163

Expr 238 W/T+V 3/4 Rod

Instrument Check on 11-13-64 Source 10 mc

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
IC-1	> 3 × 10⁻¹¹	Meter Trip	OK	Fast Trip	OK
IC-2	> 3 × 10⁻¹¹	Meter Trip	OK		
IC-3	Responds	Calibration	—		
IC-4	Responds	Calibration	—		
CRM		Meter Trip			

Preliminary Check on 11-13-64

Room 113 Pressure Differential 64

Red Light Check and ... Check JH C.C.

Scrams and Bldg. ... JH

Source Insertion Acc

Safety Withdrawn 26.00

Controls Se. Variable

Reflector Water 6" above Be

Moderator Water > 26"

Expr #	Condition	Inner	Outer	Safety	SPN #
238	k<1	0	0	26.00	167
239	k<1	15.23	0	26.00	168
240	k<1	15.23	0	26.00	169

set Cd on 4th Quadr. to represent withdrawn condition of 10.23"

Expr #	Condition	Inner	Outer	Safety	SPN #
241	k<1	15.23	0	26.00	170

Set Cd on 4th Quadr. to represent withdrawn condition of 15.23"

Expr 235 W/T+V 3/4 Rod + Ca.

Instrument Check on 11-12-64 Source 10 mc #

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ _____ Alarm Trip OK

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

IC-2 >3x10⁻¹¹ [illegible] OK _____

IC-3 Responds [illegible] JH _____

IC-4 Responds [illegible] JH _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 11-12-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH .cc

Scrams and Bldg. Alarm Reset JH

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Inner 05.23 Outer 0.0 + Cd.

Reflector Water > 6" Be

Moderator Water >24"

Expr#	Condition	Inner	Outer	Safety	
235	Kcl	05.23	0.0	26.00	3PN-164
236	"	"	"	"	3PN-165
237	"	"	"	"	3PN-166

11-14-64 3/4 Blade removed and sent to shop to have 4th quadrent replaced.

11-20-64 Outer control returned and installed
Salsyns reset as on p. 150.
slots are alligned.

Expr. 242 foil Exposure

Inner IE 7G location 72a
Outer DE 8G " 155b
Normalizer: foil 4F of IE 15G, 17th slot from 37a
Begin 30 min exposure at 9[00] am. Expose at (IC1) 1.6 on 10×10^{-8} scale
(IC2) 4.2 3×10^{-8}
IC3 10 10^{-8}
End exposure at 9[40] AM. IC4 6 10^{-8}

Expr 242 w/T foil Exposure

Instrument Check on 11-23-64 Source 10 mcf

PM-1 Low Trip o/c Alarm Trip o/c

PM-2 Alarm Trip o/c

IC-1 $> 3 \times 10^{-11}$ Meter Trip OK Test Trip o/c

IC-2 $> 3 \times 10^{-4}$ Meter Trip o/c

IC-3 Responds Meter Trip JH

IC-4 Responds Meter Trip JH

CRM Meter Trip

Preliminary Check on 11-23-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn JH 26.00

Controls Set Inner 15.23 Outer 00

Reflector Water > 6" above Be

Moderator Water 28.92

Condition	Inner	Outer	Safety		
k>1	15.23	15.40	26.00		
k=1	15.23	15.28[5]	26.00		
k=1	15.23	15.23	26.00	Reset scram on Outer. Interrupt Msg. for shut down.	
Expr 243 k<1	0	0	26.00	w/T	3PN-171
244 k<1	0	0	26.00	w/T	172
245 k<1	0	0	26.00	w/w	173
246 k<1	0	0	26.00	w/w	174

Expr 247 w/T+V

Instrument Check on 11-24-64 Source comet

PM-1		Trip OK	Alarm Trip OK
PM-2			Alarm Trip
IC-1	> 3×10^{-11}	OK	Fast Trip OK
IC-2	> 3×10^{-11}	OK	
IC-3	Responds	JN	
IC-4	Responds	JN	
CRM		Motor Trip	

Preliminary Check on 11-24-64

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JN cc.

Scrams and Bldg. Alarm Test JN

Source Inserted Acc

Safety Withdrawn 26.00

Controls Set Variable

Reflector Water 6" above Be

Moderator Water ~26.00

Expr.	Condition	Inner	Outer	Safety	Island	3PN*
247	k<1	0	0	26.00	T+V	175
248	k<1	15.23	14.00	26.00	T	176
249	k<1	15.23	13.0	"	T	177
250	k<1	15.23	11.0	"	"	178
251	k<1	15.23	9.0	"	"	179
252	k<1	"	7.0	"	"	180
253	k<1	"	5.0	"	"	181
254	k<1	"	3.0	"	"	182
255	k<1	"	1.0	"	"	183

11/24/64 Drained moderator H_2O.
added H_2O containing 1.4 g $^{B}/l$. see notebook II

1/18/65 System has been drained of Borated H_2O - rinsed with dilute nitric acid and flushed with demin. H_2O.

Expt. 295 W/W

1

Instrument Check on 1-18-65 Source 10 mcX

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ Alarm Trip out

IC-1 > 3 x 10⁻¹¹ Meter Trip OK Fast Trip OK

IC-2 > 3 x 10⁻¹¹ Meter Trip OK

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM _____ Meter Trip _____

Preliminary Check on 1-18-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH - C.C.

Scrams and Bldg. Alarm Reset OK

Source Inserted JH

Safety Withdrawn 26.00

Controls Set In: 0.0 Out: 0.0

Reflector Water None

Moderator Water _____

Condition	Inner	Outer	Safety	No Reflector or Island H_2O
$K<<1$	26.89	0.0	26.00	
$K<<1$	25.00	0.0	26.00	
$K>1$	25.00	9.25	26.00	4.567 div/sec → 9.954
$K=1$	24.62[3]	9.25	26.00	~26.7 ¢/m
$K=1$	25.00	9.18	26.00	142 ¢/m
$K=1$	14.78	14.78	26.00	
$K=1$	14.92	14.92	20.00	
$K=1$	15.58[5]	15.58[5]	10.00	
$K=1$	16.23	16.23	(19[0]5.3)	

At Completion of Expr. 286 checked
0 position on outer rod
and 20" " " inner rod

Outer 9 7/8" above Be 999.91 Reset 0-00
Inner 24 1/8" " " 20.06 to 20.00

Experiment 296 w/w

add Reflector - Island water to expr. 295.

Reflector ~ 6" above Be.

Condition	Inner	Outer	Safety	
k > 1	16.19	15.60	26.00	1.30 div/dec → 23.5 4 1.34/in
k = 1	16.01⁵	15.60	26.00	
k = 1	15.84	15.84	26.00	
k = 1	15.88	15.88	20.00	
k = 1	17.39	17.39	10.00	
k = 1	19.45	19.45	0 (99.75.3)	

Expr 297

Repeat part of 296 with selsyn reset.

Condition	Inner	Outer	Safety
k = 1	15.81	15.81	26.00

Drained moderator water - added 0.98 g B/l moderator

see notebook 2.

1-19-65
Drained B-moderator, flushed, washed with HNO_3 solution, flushed and filled with demin. H_2O.

Exp. 300 W/W

Instrument Check on 1-20-65 Source 10 mc Ra

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 _____

Preliminary Check on 1-20-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

~~Scrams and Bldg. Alarm~~ Reset JH

Source Inserted JH

Safety Withdrawn 26.00

Controls Set 12.52 Outer 0.0

Reflector Water ~6" above Be

Moderator Water ~27.00

Condition	Inner	Outer	Safety	
K>1	15.76	16.00[5]	26.00	2.017 div/sec
K=1	15.76	15.86	26.00	
K=1	15.81	15.81	26.00	
"	16.00	15.60	"	
"	18.00	13.71	"	
"	20.00	12.26	"	
"	22.00	11.26	"	
"	24.00	10.63	"	
"	25.00	10.44	"	
"	22.70	11.01	"	
"	18.89	13.00	"	
"	16.56	15.00	"	

NB. Expr. 301 Plastic Cyl W/T

Special Plastic cylinder #2 for island as described in drawing #

Cylinder is water tight and contains concentric cylinders of Plastic. Expts will be conducted with and without water in cyl.

a) Cylinder inserted in island - no reflector water - controls fully withdrawn no moderator

b) Critical positions of controls over core length.

Expr. 300 cont'd w/w

Condition	Inner	Outer	Safety
K=1	14.73	17.00	26.00
K=1	13.30	19.00	26.00
K=1	12.20	21.00	26.00
K=1	11.44	23.00	26.00
K=1	11.01	25.00	26.00

Temp of Mod. & Refl. 20°C

Expr. 301 Plastic Cyl. W/T

Have removed safety and inserted Plastic cylinder, containing air, into the island.
No reflector water present - no moderator.
Both control cylinders withdrawn to 25.00 in. Apparent neutron source multiplication ~ 1.15

Expr. 302 Pl. Cy. W/T

add reflector + moderator

	Condition	Inner	Outer	Cond.	Inner	Outer
2.517 div/dec	K>1	14.40	14.86^5	K=1	21.94	9.00
	K=1	14.40	14.71^5	K=1	18.33	11.00
	K=1	14.54^5	14.54^5	K=1	15.97	13.00
	K=1	16.00	13.00	K=1	14.12	15.00
	K=1	18.00	11.26^5	K=1	12.59	17.00
	K=1	20.00	9.92	K=1	11.32	19.00
	K=1	22.00	8.97	K=1	10.31	21.00
	K=1	24.00	8.36	K=1	9.61	23.00
	K=1	25.01	8.16	K=1	9.17^5	25.00

Expr. 303

Multiplication with nothing in island, no reflector and no moderator – control cylinders at 25.00 in. ~1.12 decaying Rs present.

Expr 304 Pl Cy W/T + water.

	Condition	Inner	Outer	Condition	Inner	Outer
2.32 div/sec.	k>1	15.24	15.62	k=1	20.82	11.00
	k=1	15.24	15.49[5]	k=1	17.82[5]	13.00
	k=1	15.35[5]	15.35[5]	k=1	15.69[5]	15.00
	k=1	16.04	14.69	k=1	13.97	17.00
	k=1	18.00	12.85[5]	k=1	12.58[5]	18.00
	k=1	20.00	11.45	k=1	11.52[5]	21.00
	k=1	22.00	10.46	k=1	10.79	23.00
	k=1	24.00	9.84	k=1	10.36	2500
	k=1	25.00	9.65[5]			

Mod. water temp. 20°C

1-21-65

Multiplication tests – no Refl. no Mod.

#2 Pl. cyl. W/T and Water	1.38
empty	1.35
#1 Pl. cyl. empty	1.41
#1 Pl cyl + water	1.31

Expr. 305 #2 Plastic Cylinder (Void)

Instrument Check on 1-21-65 Source 10 mc Ra

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 JH

IC-4 Responds Calibration JH

CRM _____ Meter Trip _____

Preliminary Check on 1-21-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH c.e.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn none

Controls Set Inner 14.84 Outer 0.0

Reflector Water ~6" Above Be.

Moderator Water ~26"

Condition	Inner	Outer	Condition	Inner	Outer
k>1	14.15	13.99	k=1	19.71	9.00
k=1	14.00	13.99	k=1	16.96	11.00
k=1	16.00	11.88	k=1	14.86	13.00
k=1	18.00	10.15	k=1	13.13	15.00
k=1	20.00	8.85	k=1	11.68	17.00
k=1	22.00	7.99	k=1	10.50	19.00
k=1	24.00	7.37	k=1	9.57	21.00
k=1	25.00	7.19	k=1	8.88	23.00
			k=1	8.48	25.00

Expr 306 #2 Plastic Cyl. W/W

Condition	Inner	Outer	Condition	Inner	Outer
$k_w = 1$	15.68	15.68	$k = 1$	22.13	11.00
$k = 1$	16.00	15.33	$k = 1$	18.60	13.00
$k = 1$	18.00	13.47	$k = 1$	16.83	15.00
$k = 1$	20.00	12.04	$k = 1$	14.55	17.00
$k = 1$	22.00	11.04	$k = 1$	13.11	19.00
$k = 1$	24.	10.41	$k = 1$	12.01	21.00
$k = 1$	25.	10.22	$k = 1$	11.28	23.00
			$k = 1$	10.83	25.00

Mod. water Temp. 20°C

1-26-65 Have removed Be reflector and control cylinders in preparation of HFIRCE-3 Safety tests.

Moderator water selsyn and Safety selsyn are set to read 22.00 in when water is level with top of fuel plates.

Have placed reflector water in safety system.

Expr. 308 Have moved IC-2 and IC-4 to within 8 in from surface of fuel element. They are located on a diameter with fuel plate #1. IC-2 on North.

Expt. 307

Instrument Check on 1-26-65 Source 10 mc Y

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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 1-26-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH cc.

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 0

Controls Set

Reflector Water none

Moderator Water 25.93

No reflector present.

Condition	Safety	Moderator H_2O	
$k<<1$	26.07	25.92	M~1

Add reflector to 26.00 check source response. {IC-2 good, others poor

$k<<1$	26.00	25.92	
$k<1$	26.00	27.15	

Expt. 308

Have place 2 3/16"-dia Styrofoam cylinder in island.

$k<1$	26.00	26.11	M~ 53	TMC
			43	IC-4
			2.6	IC-2, IC-3

Expt. 309

$k<1$	26.00	26.11	3PN-~~25~~ 212	see p. 194

Expr. 310 : 2 7/8" Styrofoam void ~ 31.8% void. ≡ V_3

Expr. 311 : 2 9/16" " " ~ 25.4% void. ≡ V_2

Table of Voids ≡ V_i

No.	Dia (in.)	Vol	Void Fraction in Island
1	2 3/16	18.6	19%
2	2 9/16	25.4	25.3%
3	2 7/8	31.8	31.7%
4	3 1/4	41.1	40.8%
5	3 7/8	58.4	59 %
6	4 3/16	67.	68.5%
7	~~4 3/4~~ 4 1/2	~~87~~ 79	79.2%

Expr. 312

Have placed boral strip 3" x ~20" x 1/4" on drive mechanism adjacent to core on east side. Full insertion ~ 6 of active core.

Expr 310 W/V$_3$ 2 7/8" Styrofoam cyl. 24"

Instrument Check on 1-27-65 Source 10 mc β

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

Preliminary Check on 1-27-65

Room 113 Pressure Differential 1.4

Red Light On and Personnel Check JH - CC.

Scrams and Bldg. Alarm Reset JH.

Source Inserted JH

Safety Withdrawn O

Controls Set —

Reflector Water 26.00

Moderator Water 26.02

Condition	Safety	
$k>1$	17.70	4.4 div/sec → 95.6 sec → 10.2¢
$k=1$	17.36	30 ¢/in.
$k<1$	17.26	21.5 div/sec → 467 sec → -3¢ → 30¢/in.

Expr. 311 W/V$_2$

$k>1$	20.35	3 div/sec → 65.2 sec → 13.6¢	Boral strip has negligible
$k=1$	19.40	14.3¢/in	effect when ~4" from surface of element.

Expr. 312 W/V$_2$ Aux. Boral rod in Refl.

$k>1$	26.00	Aux rod all in.	3.467 div/sec → 75.3 sec → 12.26¢
$k=1$	20.70	" " " "	2.31¢/in
$k<1$	19.97	" " " "	9.1 div/sec → 197.7 sec → -83¢ → 11.4¢/in.

Expr. 313 w/V_2

Boral strip repositioned so that full insertion ~ 10" into active core. Rod is against outer surface of core.

Condition	Safety	Boral rod		
$k = 1$	21.49	6 5/8 (into)	3PN-213	p 295

Expr. 314 w/V_2 "

$k < 1$	0	6 5/8 (into)	3PN-214	

Preliminary Check on 1-28-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH .c.c.

Scrams and Bldg. Alarm Reset ✓

Source Inserted JH

Safety Withdrawn 0

Controls Set —

Reflector Water 26.08

Moderator Water 26.25

Instrument Check on 1-28-65 Source ionex

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	OK
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	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Expr. 315 w/V_2

Condition	Safety	Boral rod		
$K = 1$	21.35	5 1/8" into core	3PN-215	p. 295

Expr. 316 w/V_2

$k < 1$	10.00	5 1/8 into core	Mod H_2O 26.09"	3PN-216

2.523 div/sec

Expr. 324 : → 54.8 sec period → 15.4 ft → 49.2 ft/in

Expr. #	Condition	Safety	Boral Rod	Mod H_2O Height	Island	3PN #
317	k<1	10.00	$5\frac{1}{8}$" into core	26.15	W	217
318	k<1	26.00	$5\frac{1}{8}$" into core	26.17	W	218
319	R<1	10.00	" "	26.01	V_3	219

Instrument Check on 1-29-65 Source 10 mc Y

PM-1 _____ Low Trip OK _____ Alarm Trip OK

PM-2 _____ _____ Alarm Trip OK

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

IC-2 >3x10⁻¹¹ Meter Trip OK _____

IC-3 Responds Calibration JH _____

IC-4 Responds Calibration JH _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 1-29-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 0

Controls Set —

Reflector Water 26.00

Moderator Water 26.02

Expr. 320	Condition	Safety	H_2O	B. rod	Island	
	k>1	18.70	26.02	$5\frac{1}{8}$	V_3	2.467 bi/sec → 53.6 sec → 15.64
	k=1	18.08	26.02	$5\frac{1}{8}$	V_3	25.2 #/m
Expr 321	Removed 12 foil location plates					
	R<1	26.00	20.3	$5\frac{1}{8}$	V_3	
	R=1	26.00	20.72	$5\frac{1}{8}$	V_3	
	R=1	16.64	26.05	$5\frac{1}{8}$	V_3	
Expr 322	Replaced 12 fuel Plates.					
	k<1	20.00	26.18	$5\frac{1}{8}$	V_1	3PN-220
Expr. 323	k<1	10.00	26.09	$5\frac{1}{8}$	V_5	3PN-221
" 324	k>1	14.60	26.11	$5\frac{1}{8}$	V_5	
325	k=1	14.28	26.11	$5\frac{1}{8}$	V_5	

Expt. 327: 1.4 div/dec → 30.4 sec → 22.4 ft → 43 ft/m

1318 hrs. Reactor scrammed for no apparent reason. No trip signals indicated on instruments. ~~Cross was in~~ the reactor was shut down at the time and Cross was in the cell at the work bench.

Exper.	Condition	Safety	H_2O	B. rod.	Island	3PN-#
326	k > 1	14.15	26.18	5 1/8"	V_6	
327	k = 1	13.63	26.18	5 1/8	V_6	
328	k < 1	10.00	26.18	5 1/8	V_6	222

Instrument Check on 2-1-65 **Source** 10 mc γ

PM-1 ______ Low Trip ok ~~Alarm~~ Trip ok
PM-2 ______ ~~Alarm~~ Trip ok
IC-1 > 3×10⁻¹¹ Meter Trip OK Fast Trip ok
IC-2 > 3×10⁻¹¹ Meter Trip OK
IC-3 Responds Calibration JH
IC-4 Responds Calibration JH
CRM ______ Meter Trip ______

Preliminary Check on 2-1-65

Room 113 Pressure Differential 1.4"
Red Light On and Personnel Check JH. C.C.
Scrams and Bldg. Alarm Reset JH
Source Inserted ACC
Safety Withdrawn 0.0
Controls Set ———
Reflector Water 16.00
Moderator Water 27.33

329	k < 1	0.0	27.33	5 1/8"	V_6	223

Expr. 330. Installed poison post – inserted 3 7/8" styrofoam along full length

332. 3.325 div/sec → .72 sec → 12.7 ¢ → 40.3 ¢/in

Expr. 336 : 3.062 div/sec → 66.4 sec → 13.4 ¢ → 45.4 ¢/in

Expr. 337 – Have placed 30 S.S. – strips 5/8" × 24" × 030" into each element. 18 in outer annulus and 12 into the inner. Numbering slots as preceding plate number strips were placed

Inner: 5, 27, 42, 62, 82, 87, 102, 111, 126, 136, 151, (1-10,

Outer: 5, , 63, 83, , 140, 160, , 192, 212, , 244, 264,

, 300, 320, , 350.

2.4 div/sec → 52.1 sec → 15.9 ¢ → 39.8 ¢/in

Expr. 338 – add six S.S. strips to outer annulus

1.83 div/sec → 39.7 sec → 19.07 ¢ → 38.1 ¢/in

36 strips distributed as above worth 62.6 ¢

Expn.	Condition	Safety	H_2O	B. rod	Island	3PN No.
330	k<1	~~out~~ out	28.75	5 1/8	P.P. + V_5	224
331	k<1	10.00	26.20	5 1/8	V_7	225
332	k>1	13.64	26.21	5 1/8	V_7	—
	k=1	13.32[5]	26.21	5 1/8	V_7	—
333	k<1	0	26.25	5 1/8	V_7	226
334	k<1	out	26.28	5 1/8	P.P. + W	227
335	k<1	out	26.34	5 1/8	P.P + V_2	228

Instrument Check on 2-2-65 Source 10 mc Ra

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

Preliminary Check on 2-2-65

Room 113 Pressure Differential 1.4"

~~Red Light On and Personnel Check~~ JH C.C

Scrams and Bldg. Alarm React JH

Source Inserted JH

Safety Withdrawn variable

Controls Set

Reflector Water — 26.00

Moderator Water

Expn.	Condition	Safety	H_2O	B. rod	Island	
336	k>1	13.90	26.25	5 1/8	V_6	
	k=1	13.60[5]	26.25	5 1/8	V_6	
337	k>1	15.29	26.25	5 1/8	V_6	S.S. strips (30)
	k=1	14.89	26.25	5 1/8	V_6	
338	k>1	15.60	26.25	5 1/8	V_6	add 6 SS-strips o.c.
	k=1	15.10	26.25	5 1/8	V_6	

Expr. 339 :- Have grouped 12 S.S. strips in successive slots in the inner annulus. From 108-120

2.02 div/sec → 43.9 sec → 17.87 ¢/sec → 38.02 ¢/in Value 58.8 ¢

Expr. 340 : Have left inner annulus grouped and have grouped 24 strips of outer annulus (234-258.)

1.64 div/sec → 35.6 sec → 20.43 ¢ → 39.28 ¢/in value 54.9 ¢

Expr. 341 : Have removed 12 strips from inner annulus. 24 remain grpd as above in outer annulus. Value 31.3

2.32 div/sec → 50.4 sec → 16.30 ¢ → 41.2 ¢/in

Expr. 342 Have removed strips from outer annulus and replaced 12 strips in the inner annulus grouped as in #339. Value 27.3 ¢

2.30 div/sec → 49.9 sec → 16.41 ¢ → 41 ¢/in

Expr. 343 : Have placed 72 S.S. strips into the inner annulus in alternate slots.

1.98 div/sec → 43.0 sec → 18.11 ¢ → 19.1 ¢/in

Experiment	Condition	Safety	H_2O	B. rod	Island	
339	$K>1$	15.50	26.29	$5\frac{1}{8}$	V_6	S.S. Strips.
	$K=1$	15.03	26.29	$5\frac{1}{8}$	V_6	"
340	$K>1$	15.42	26.29	$5\frac{1}{8}$	V_6	"
	$K=1$	14.90	26.29	$5\frac{1}{8}$	V_6	"
341	$K>1$	14.67	26.29	$5\frac{1}{8}$	V_6	"
	$K=1$	14.275	26.29	$5\frac{1}{8}$	V_6	"
342	$K>1$	14.60	26.29	$5\frac{1}{8}$	V_6	"
	$K=1$	14.20	26.29	$5\frac{1}{8}$	V_6	"
343	$K>1$	19.51	26.29	$5\frac{1}{8}$	V_6	"
	$K=1$	18.56	26.29	$5\frac{1}{8}$	V_6	"

Expr. 344. There are now 82 S.S. strips in the inner annulus, placed in alternate slots.

1.98 div/sec → 43.0 sec → 18.11 ¢ → 14.76 ¢/in

Expr. 345. There are now 90 S.S. strips in the inner annulus eight additional strips distributed uniformly among others.

1.62 div/sec → 35.2 sec → 20.58 ¢ → 6.54 ¢/in 22-24.00 3.165 ¢/in

Expr 345 B. 2.82 div/sec → 61.2 sec → 14.25 ¢ → 12.45 ¢/in

" C. 4.7 div/sec → -102.0 sec → -25.79 ¢ →

" D. 34.4 div/sec → 74.7 sec → 12.33 ¢

Expr. 349 54 S.S. strips uniformly distr. in the inner annulus

1.1 div/sec → 23.9 sec → 25.86 ¢ → 26.12 ¢/in

Expr. 350 42 ss. strips uniformly distr. in the inner annulus

2.05 div/sec → 44.5 sec → 17.71 ¢ → 31.90 ¢/in

Expt. 344

Instrument Check on 2-3-65 Source none

PM-1 _____ Low Trip 6K ~~Alarm~~ Trip OK

PM-2 _____ ~~Alarm~~ Trip OK

IC-1 $>3\times10^{-11}$ ~~Meter~~ Trip 6K ~~Fast~~ Trip OK

IC-2 $>3\times10^{-11}$ ~~Meter~~ Trip OK

IC-3 Responds Calibration JH

IC-4 Responds Calibration JH

CRM _____ Meter Trip _____

Preliminary Check on 2-3-65

Room 113 Pressure Differential 1.4"

Red Light On and ~~Personnel~~ Check JH ✓C

Scrams and Bldg. Alarm Reset JH

Source Inserted JH

Safety Withdrawn 0

Controls Set _____

Reflector Water 26.00

Moderator Water 26.34

Expt.	Condition	Safety	H_2O	B. rod	Island	
344	K>1	21.00 ca.	26.34	5 1/8	V_6	55 S.S. strips (82)
	K=1	19.773	"	"	"	"
345	A K>1	24.00	"	"	"	S.S. Strips (90 82 minus)
	K=1	20.855	"	"	"	"
	B K>1	22.00	"	"	"	"
	C K<1	20.855	"	inserted	V_6	"
	D K>1	20.855	"	out	V_6	"
346	K=1	21.35	"	6 5/8	V_6	3PN-229 90 SS strips
347	K=1	20.855	"	(6 7/8)? 5 1/8	V_6	90 SS Strips
348	K<1	17.605	"	5 1/8	V_6	" " 3PN-230
349	K>1	17.91	"	5 1/8	V_6	54 SS. Strips
	K=1	16.92	"	5 1/4	V_6	" " "
350	K>1	16.60	"	5 1/8	V_6	42 S.S. Strips
	K=1	16.045	"	5 1/4	V_6	" " "

Expt. 351 36 S.S. Strips · uniformly distr in the inner annulus.

1.3 div/sec → 28.2 sec → 23.52¢ → 33.70 ¢/in.

Expt. 352 all 55 strips removed.

1.30 div/sec → 28.2 sec → 23.52¢ → 44.8 ¢/in

Expt. 353 120 SS strips in outer annulus 1 in every 3rd gap.

1.92 div/sec → 41.7 sec → 18.48¢ → 22.4 ¢/in

Expt. 354 90 SS Strips, outer annulus Removed every 4th plate from distribution of Expt. 353

0.91 div/sec → 19.76 sec → 28.70¢ → 29.29 ¢/in

Expt. 355 60 SS. strips; outer annulus; every 3rd strip removed from distribution of Expt. 354. Even distribution.

1.84 div/sec → 39.95 sec → 19.0¢ → 35.65 ¢/in

Expt. 356. 45 SS strips; outer annulus; every 4th strip removed from distribution of Expt. 355

1.36 div/sec → 29.53 sec → 22.85¢ → 40.16¢

Expt	Condition	Safety	H_2O	B-rod	Island	
351	K>1	16.22	26.10	5 1/8	V6	36 S.S. strips (inner)
	K=1	15.522	26.10	5 1/8	V6	" " " "
352	K>1	14.115	26.10	5 1/8	V6	No S.S. Strips
	K=1	13.59	26.10	5 1/8	V6	No S.S. Strips

Instrument Check on 2-4-65 Source 10 mcf

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 JH

IC-4 Responds Calibration JH

~~CRM~~ Meter Trip

Preliminary Check on 2-4-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH .CC

Scrams and Bldg. Alarm React JH A will not Trip

Source Inserted JH

Safety Withdrawn O

Controls Set —

Reflector Water 26.00

Moderator Water 26.17

Expt.	Condition	Safety	H_2O	B-rod	Island	
353	K>1	1900	26.17	5 1/8	V6	120 SS. Strips. (O.A)
	K=1	18.175	26.17	5 1/8	V6	
354	K>1	17.785	26.17	5 1/8	V6	90 S.S.S. outer Ann.
	K=1	16.755 (1800)	26.17	5 1/8	V6	
355	K>1	16.09	26.17	5 1/8	V6	60 SSS. O.A
	K=1	15.56	26.17	5 1/8	V6	
356	K>1	15.61	26.17	5 1/8	V6	45 SSS O.A.
	K=1	15.04	26.17	5 1/8	V6	

Expr. 357 30 S.S. Strips. remove every 3rd ~~2nd~~ SS strip from #356

1.792 div/sec → 38.90 sec → 18.32 ¢ → 41.11 ¢/in

Expr. 358 15 SS Strips removed every other SS strip from #357

1.68 div/sec → 36.47 sec → 20.12 ¢ → 44.22 ¢/in

Expr. 359 all SS removed. temp = 19.5°C

1.58 div/sec → 34.30 sec → 20.90 ¢ → 45.43 ¢/in

Expr 360 45 555., ≃ space OA. ; 15 555., ≃ space Inner Annulus.

2.44 div/sec → 52.77 sec → 15.75 ¢ → 33.51 ¢/in

Expr 361 15 555 ≃ space OA. ; 45 555. ≃ space I A.

1.6 div/sec → 34.74 sec → 20.32 ¢

Expt.	Condition	Safety	H_2O	Brod	Island	
357	$K=1$	15.00	25.91	$5\frac{1}{8}$	V_c	30 SS strip OA
	$K=1$	14.53	25.91	$5\frac{1}{8}$	V_6	
358	$k>1$	14.50	26.12	$5\frac{1}{8}$	V_6	15 SS strip OA.
	$k=1$	14.04[5]	26.12	$5\frac{1}{8}$	V_6	
359	$k>1$	14.04	26.08	$5\frac{1}{8}$	V_6	No. 55
	$k=1$	13.58	26.08	$5\frac{1}{8}$	V_6	
360	$k>1$	16.50	26.24	$5\frac{1}{8}$	V_6	45 SS strip OA 15 SS strip IA.
	$k=1$	16.03	26.24	$5\frac{1}{8}$	V_6	
361	$k>1$	17.66	26.22	$5\frac{1}{8}$	V_6	15 SS OA 45 SS IA.
	$k=1$	16.91	26.22	$5\frac{1}{8}$	V_6	
362	$k<1$	13.58	26.21	$5\frac{1}{8}$	V_6	15 SS OA 45 SS IA BPN-231

Have placed CE-2, suspended from cranes, adjacent to CE-3 on west side. core ~2" above CE-3

Expt. 366. 85 SS strips uniformly spaced in mid annulus of CE-3

Expr. 363 CE-2 + CE-3 + P.P. + V_2

Instrument Check on 2-5-65 Source 10 mc Ra

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	$> 3 \times 10^{-11}$	Meter Trip	OK		
IC-3	Responds	Calibration	JH		
IC-4	Responds	Calibration	JH		
CRM		Meter Trip			

Preliminary Check on 2-5-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH C.C.

Scrams and Bldg. Alarm Reset JH A does not trip

Source Inserted JH

Safety Withdrawn 26.

Controls Set

Reflector Water 26.00

Moderator Water var.

Expr.	Condition	Safety	H_2O	Island	CE-2
363	K>1	21.35	9.75	P.P + V_2	4" submerged; flooded.
	K=1	"	9.485	P.P + V_2	"
364	K>1	21.35	16.295	P.P.	"
	K=1	21.35	9.94	P.P.	"
365	K>1	21.35	13.60	W.	4" Submerged + P.P
	K=1	21.35	13.45	W	" "
	K=1	10.00	14.85	W	" "
	K=1	0.0	18.22	W	" "
366	K>1	0.0	19.345	W	" "
	K=1	0.0	18.85	W	" "

Expt. 367 Have removed CE-2. Removed all SS strips. Installed Al. platform around base of CE-3 to support steel reflector.
1.96 div/sec → 42.55 sec → 18.24 ¢ → 9.45 ¢/in (20.85)

Expt. 369 1/4" Stainless Steel refl moved away from core 1/2" at center of hemi-cyl.

Expt. 370 3/4" Steel refl. placed as close to one side of the core as possible,

Expt. 374 3 3/4" of Steel around 1/2 of core
17.25 div/sec → 374.5 sec → 3.186 ¢ → 0.815 ¢/in (23.39)

Expt. 376. 4 3/4" of Steel around 1/2 of core
1.62 div/sec → 35.2 sec → 20.58 ¢ → 19.6 ¢/in (19.12)

Expr. ~~367~~	Condition	Safety	H_2O	Island			
367	$k>1$	21.74	26.11	V_2			
	$k=1$	19.81 1.93	26.11	V_2			
368	$k<1$	26.00	26.14	V_2	1/4"	Stainless Steel refl.	around 1/2 of Core
369	$k<1$	26.00	26.15	V_2	"	"	"
370	$k<1$	26.00	26.14	V_2	3/4"	Steel refl.	180°
371	$k<1$	19.81	26.14	V_2	"	"	3PN-232

Instrument Check on 2-8-65 Source 10 mcr

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 > 3X10⁻¹¹ Meter Trip OK ~~Rest~~ Trip OK

IC-2 > 3X10⁻¹¹ Meter Trip OK

IC-3 Response Calibration GTI.

IC-4 Int Calibration _____

TRM _____ Meter Trip _____

Preliminary Check on 2-8-65

om 113 Pressure Differential 1.5"

d Light On and Personnel Check SFR C.C.

ams and Bldg. Alarm Reset SFR A does not trip

urce Inserted C.C.

fety Withdrawn 19.81

ntrols Set

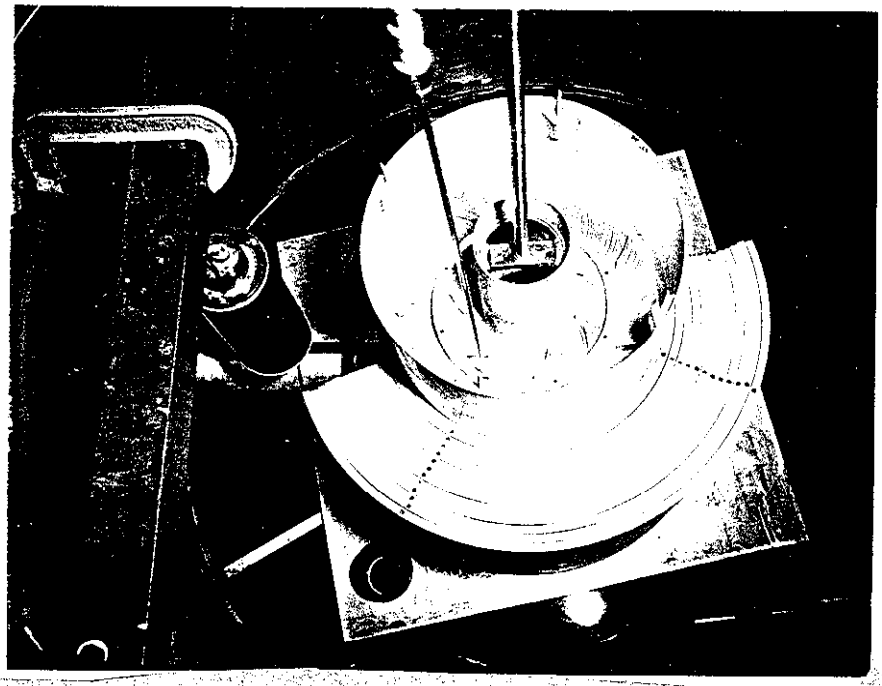
lector Water 26.00

derator Water Vas.

Expr.	Condition	Safety	H_2O	Island	Steel Refl.	3PN-#
372	$k<1$	19.81	26.56	V_2	1 3/4"	233
373	$k<1$	19.81	26.28	V_2	2 3/4"	234
374	$K>1$	26.00	26.42	V_2	3 3/4"	~~235~~
	$k=1$	22.09 3.91	26.42	V_2	3 3/4"	
375	$k<1$	19.81	26.42	V_2	3 3/4"	235
376	$k>1$	19.64 1.050	26.14	V_2	4 3/4"	
	$k=1$	18.59	26.14	V_2	4 3/4"	

Expt. 377 6¼" of steel around ½ of core
1.70 div/sec → 36.9 sec → 19.78 ¢ → 30.7 ¢/in (17.588)

Expt. 378 6¼" of steel around ½ the circumference and
¾" of steel around the other ½



Expt. 380 ¾" of steel all around the core.

Expt 381 ¾" of steel + 4" of lead around 360° of core. (~1" gap in lead)
1.68 div/sec → 36.5 sec → 20.12 ¢ → 55.9 ¢/in (14.33)

382 added 27 lead bricks; 9 cl., 3 high, 2" thick.
1.41 div/sec → 30.6 sec → 22.41 ¢ → 64.03 ¢/in (13.865

Expt.	Condition	Safety	H_2O	Island	Steel Refl	JPN-#
377	$k>1$	17.91	26.01	V_2	$6\frac{1}{4}$"	
	$k=1$	17.26 [5] .645	26.01	V_2	$6\frac{1}{4}$"	
378	$k<1$	26.00	26.26	V_2	$6\frac{1}{4}$" + $\frac{3}{4}$"	
379	$k<1$	19.81	26.26	V_2	$6\frac{1}{4}$" + $\frac{3}{4}$"	236

Instrument Check on 2-9-65 Source 10 mc-Ra

M-1 _____ Low Trip OK Alarm Trip OK

M-2 _____ ~~Alarm~~ Trip _____

IC-1 > 3×10^{-11}" Meter Trip OK ~~East~~ Trip OK

IC-2 > ~~3×10^{-11}~~ Meter Trip OK

IC-3 Responds Calibration _____

IC-4 Responds Calibration _____

CRM _____ Meter Trip _____

Preliminary Check on 2-9-65

Room 113 Pressure Differential 1.5"

Red Light On and Personnel Check JJR C.C.

Scrams and Bldg. Alarm Reset JTT

Source Inserted _____

Safety Withdrawn 19.81

Controls Set _____

Reflector Water Vac

Moderator Water Vac.

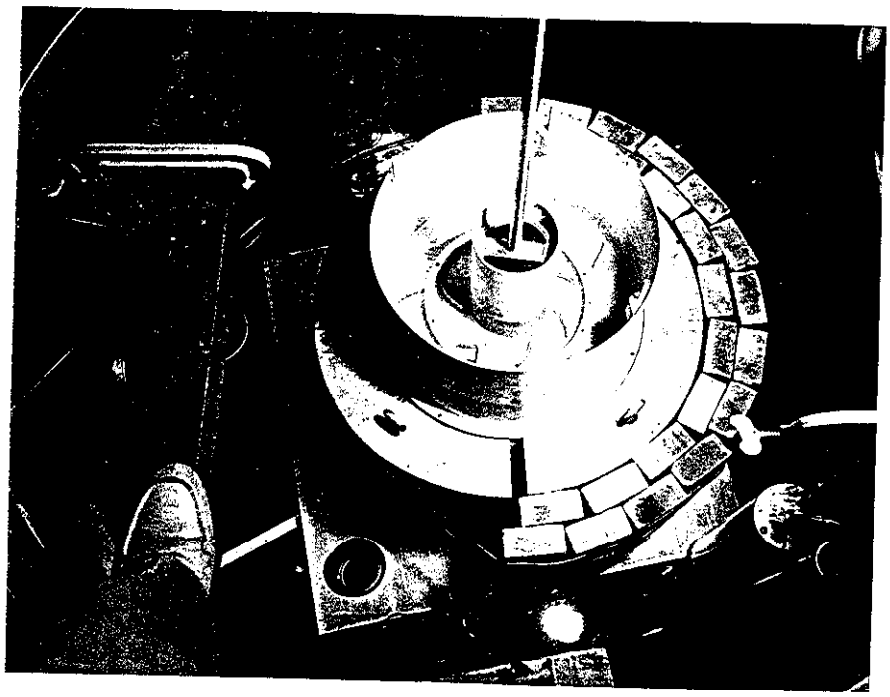
Expt.	Condition	Safety	H_2O	Island	Refl.	JPN-#
380	$k<1$	19.81	26.36	V_2	$\frac{3}{4}$" + $\frac{3}{4}$"	237
381	$k>1$	15.01	26.32	V_2	$\frac{3}{4}$" Steel + 4" lead	
	$k=1$	14.65	26.32	V_2	" "	
382	$k>1$	14.04	26.41	V_2	$\frac{3}{4}$" Steel + 4" lead + 27 lead bricks	
	$k=1$	13.69	26.41	V_2	" " "	

Expt. 383 21°C ; 33 lead bricks added in a 2" layer around ½ of core

1.86 div/sec → 40.38 sec → 18.87 ℓ → 66.21 ℓ/in (13.708)

Expt. 384 72 lead bricks in a 4" layer around ½ of core. ~ 1" gap in 4" lead refl. on one side of core (see picture).

1.40 div/sec → 30.39 sec → 22.503 ℓ → 69.24 ℓ/in (13.285)



Expt. 385 ¾" Steel around 360° of core; 4" lead + 4" lead brick around 180° of Core.

Expt. 387 ¾" Steel around 360° of core; 4" lead + 2" lead brick around 180° of Core.

Expt. 388 ¾" Steel around 360° of core; 4" lead around 180° of Core.

Instrument Check on 2-10-65 Source 10 mCi

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 $> 3 \times 10^{-11}$ Meter Trip OK

IC-3 Responds Calibration

IC-4 Responds Calibration

CRM Meter Trip

Preliminary Check on 2-10-65

Room 113 Pressure Differential 1.5"

Red Light On and Personnel Check S/R C.C.

Scrams and Bldg. Alarm Reset S/R A does not trip

Source Inserted

Safety Withdrawn

Controls Set

Reflector Water 26"

Moderator Water 26.44"

Expr.	Condition	Safety	H_2O	Lead	Refl.
383	$k > 1$	13.85	26.44	$\frac{1}{2}$	$\frac{3}{4}$" steel + 4" lead + 33 lead brick
	$k = 1$	13.56^5	26.44	$\frac{1}{2}$	" " "
384	$k > 1$	13.44^7	26.31	$\frac{1}{2}$	$\frac{3}{4}$" steel + 4" lead + 72 lead brick
	$k = 1$	13.12^2	26.31	$\frac{1}{2}$	" " "
385	$k < 1$	26.00	26.34	$\frac{1}{2}$	$\frac{3}{4}$" steel + (4" lead and 72 brick) $\frac{1}{2}$ core
386	$k < 1$	19.81	26.34	$\frac{1}{2}$	" " 3PN-238
387	$k < 1$	19.81	26.34	$\frac{1}{2}$	$\frac{3}{4}$" steel + (4" lead and 33 brick around 180° of core)
"	"	"	"	"	3PN-239
388	$k < 1$	19.81	26.35	$\frac{1}{2}$	$\frac{3}{4}$" steel + (4" lead on 180° core)
"	"	"	"	"	" " 3PN-240

Expr 389 3/4" steel and 4" lead around 180° of core. Water around other 180°.
1.46 div/sec → 31.70 sec → 21.938 ℓ → 37.18 ℓ/in (17.10)

Expr 390 (3/4" steel + 4" lead + 2" lead brick) around 180° of core.
1.58 div/sec → 34.30 sec → 20.908 ℓ → 48.62 ℓ/in (15.635)

Expr 391 (3/4" steel + 4" lead + 4" lead brick) around 180° of core. No refl. water.
Safety at 26.00"

Expr 392 Same as Expr 391 except safety at 0.00"

Expr 393 (3/4" steel + 4" lead + 4" lead brick) around 180° of core.
1.48 div/sec → 32.13 sec → 21.761 ℓ → 51.81 ℓ/in (15.13)

Expr 394 1/4" steel around 360° of core.

Expr 395 1/4" steel around 180° of core.

Expr. 396 Clean core. H_2O reflector, temp 22° C
1.72 div/sec → 37.34 sec → 19.831 ℓ → 10.12 ℓ/in (20.45)

Instrument Check on 2-11-65 Source 10 mc Ra

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ _____ Alarm Trip _____

IC-1 > 3 X10⁻¹¹ Meter Trip OK ~~Test~~ Trip OK

IC-2 > 3 X10⁻¹¹ Meter Trip OK _____

IC-3 ~~> 3X10⁻¹¹~~ Responds Calibration OK JTT _____

IC-4 Responds Calibration JTT _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 2-11-65

Room 113 Pressure Differential 1.5"

Red Light On and Personnel Check C.C.

Scrams and Bldg. Alarm Reset JTT A does not trip

Source Inserted C.C.

Safety Withdrawn _____

Controls Set _____

Reflector Water 26"

Moderator Water _____

Expr.	Condition	Safety	H_2O	Island	Refl.
389	$k>1$	17.40	26.49	V_2	(¾" Steel + 4" lead) 180° of Core.
	$k=1$	16.81	26.49	V_2	" " "
390	$k>1$	15.85	26.51	V_2	(¾" Steel + 4" lead + 32 lead brick) 180°
	$k=1$	15.42	26.51	V_2	" " " "
391	$k<1$	26.00	26.31	V_2	No refl. water; 3PN-241
"					(¾" Steel + 4" lead + 72 lead brick) 180°
392	$k<1$	0.0	26.31	V_2	" " " " 3PN-242
393	$k>1$	15.34	26.31	V_2	(¾" Steel + 4" lead + 72 lead brick) 180°
	$k=1$	14.92	26.31	V_2	" " " "
394	$k<1$	19.81	26.32	V_2	¼" Steel around 360° 3PN-243
395	$k<1$	19.81	26.31	V_2	¼" Steel around 180° 3PN-244
396	$k>1$	21.59	26.31	V_2	H_2O refl.
~~397~~	$k=1$	19.63	26.31	V_2	" "

Expn. 397 2.48 div/sec → 53.84 sec → 15.573 ϕ → 11.33 ϕ/in (20.32)

Expn. 398 59 div/sec → 1280.9 sec → 0.99 ϕ → 0.32 ϕ/in (23.94)

Expn. 399 Have displaced void (V_2) to observe effect. Removed B^N S. strip
2.52 div/dec → 54.71 sec → 15.411 ϕ → 11.21 ϕ/in (20.28)

Expn. 400 Have removed V_2

Expn. 401 Have placed V_6 in Island
1.19 div/dec → 25.83 sec → 24.748 ϕ → 46.26 ϕ/in (13.523)

Expn 402 3 B^N steel strips ~ equally spaced around inner annulus. (No's. 1, 2, 3)
1.52 div/dec → 33.00 sec → 21.410 ϕ → 38.93 ϕ/in (15.225)

Expn 403 2 B^N S.S. ~ 120° apart in inner annulus. (No's. 1, 3)
2.30 div/dec → 49.93 sec → 16.404 ϕ → 4a50 ϕ/in (14.548)

Instrument Check on 2-12-65 Source comet

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ _____ Alarm Trip _____

IC-1 $>3\times10^{-11}$ Meter Trip OK Fast Trip OK

IC-2 $>3\times10^{-11}$ Meter Trip OK _____

IC-3 Responds Calibration JH _____

IC-4 Responds Calibration JH _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 2-12-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH (E)

Scrams and Bldg. Alarm Reset JH A no trip

Source Inserted JH

Safety Withdrawn 0.0

Controls Set —

Reflector Water ~26.00

Moderator Water _____

Expr.	Condition	Safety	H_2O	Island	Refl.	Temp.
397	k>1	21.00	26.35	V_2	H_2O	3:30 PM 22°C
	k=1	19.625	26.35	V_2	"	
398	k>1	26.00	26.35	V_2	one B^N s. strip in Inner Annulus	
	k=1	22.90	26.35	V_2	H_2O " " " "	
399	k>1	21.00	26.35	V_2	H_2O (only)	V_2 displaced ~1/8"
	k=1	19.625	26.35	V_2	H_2O "	
400	k<1	00.00	26.35	H_2O	H_2O only	JPN-245
H01	k>1	13.80	26.56	V_6	H_2O "	
	k=1	13.265	26.56	V_6	" "	
402	k>1	15.50	26.58	V_6	" "	3 B^N steel strip IA
	k=1	14.95	26.58	V_6	" "	"
403	k>1	14.75	26.58	V_6	" "	2 B^N s.s. inner A.
	k=1	14.345	26.58	V_6	" "	"

Expr. 404

2.392 div/sec → 51.93 sec → 15,962 ¢ → 42.34 ¢/in (13.962)

Expr. 405

2.86 div/sec → 62.09 sec → 14,100 ¢ → 43.52 ¢/in (13.939)

Expr. 406 B^N SS Strips #'s 1-5 ~ equally spaced around inner annulus

2.16 div/sec → 46.89 sec → 17,109 ¢ → 30.55 ¢/in (16.622) ~~(16.53)~~

Expr. 407 B^N SS. Strips #'s 1-5 ~ equally spaced around outer annulus

0.67 div/sec → 14.55 sec → 33,546 ¢ → 38.92 ¢/in (15.279) ~~(15.14)~~

Expr 408 B^N SS. Strips #'s 1, 3, and 4 ~ equally spaced in outer annulus.

1.74 div/sec → 37.78 sec → 19,685 ¢ → 40.59 ¢/in (14.418) ~~(14.34)~~

Expr. 409 B^N SS. Strip #4 in outer annulus.

2.24 div/sec → 48.65 sec → 16,692 ¢ → 45.73 ¢/in (13.727) ~~(13.67)~~

Expr. 410 B^N S.S. Strips #'s 1-5 in adjacent slots in outer annulus.

1.712 div/sec → 37.18 sec → 19,884 ¢ → 41.60 ¢/in (14.472) ~~(14.39)~~

Expts.	Condition	Safety	H_2O	Island	Poison Strips (B" Steel)
404	$k>1$	14.15	26.58	V_6	# 3 minimum
	$k=1$	13.77[3]	"	"	" "
405	$k>1$	14.10[1]	"	"	# 1 " "
	$k=1$	13.77[6]	"	"	" " "
406	$k>1$	16.90[2]	"	"	#'s 1, 2, 3, 4, and 5
	$k=1$	16.34[2]	"	"	" " " "
407	$R>1$	15.71	"	"	# 1 2 3 4 & 5 outer annulus
	$R=1$	14.848	"	"	" " " "
408	$R>1$	14.666	"	"	# 1 3 + 4 "
	$K=1$	14.175	"	"	# 1 3 4 "
409	$R>1$	13.91	"	"	# 4 "
	$R=1$	13.545	"	"	4 "
410	$R>1$	14.71	"	"	#'s 1-5 adjacent slots "
	$R=1$	14.23[2]	"	"	" " " "
411					

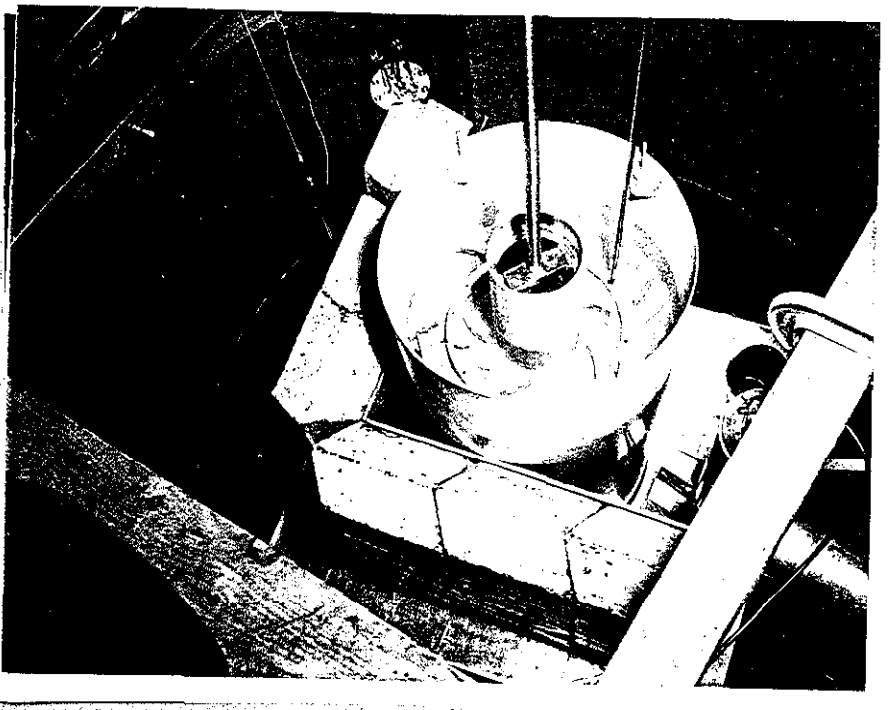
Expr. 411 2.54 div/sec → 55.14 sec → 15.327 ¢ → 47.20 ¢/in (13.441 ~~12.39~~)

Expr. 412 B^N S.S. strips #'s 1, 2, 3, 4, & 5 in adjacent slots in inner annulus.
1.90 div/sec → 41.25 sec → 18.610 ¢ → 38.77 ¢/in (15.41 ~~15.22~~)

Expr. 413 Removed B^N strips. Built at L corner of ¼" flat S steel plates backed by 6" of concrete against core.
1.72 div/sec → 37.34 sec → 19.830 ¢ → 43.02 ¢/in (14.193)

Expr. 414 Removed steel and concrete wall. Placed B^N SS strips ← #'s 1, 2, 3, 4, & 5 in inner annulus with 5 fuel plates between each B^N strip
2.08 div/sec → 45.16 sec → 17.541 ¢ → 32.48 ¢/in (16.23)

Expr. 415 B^N SS Strips #'s 1-5 in inner annulus with 7 fuel plates between each strip.
1.64 div/sec → 35.61 sec → 20.428 ¢ → 31.92 ¢/in (16.40)



Instrument Check on 2-15-65 Source 10 mcr

PM-1 _____ Low Trip OK Alarm Trip OK
PM-2 _____ Alarm Trip _____
IC-1 7 3X10" Meter Trip OK ~~Fast~~ Trip OK
IC-2 7 3X10" Meter Trip OK _____
IC-3 Responds Calibration S/R _____
IC-4 Responds Calibration S/R _____
CRM _____ Meter Trip _____ _____

Preliminary Check on 2-15-65

Room 113 Pressure Differential 1.6"
Red Light On and Personnel Check S/R + C.C.
~~Scrams and Bldg. Alarm Reset~~ S/R A Instrument Trip
Source Inserted S/R.
Safety Withdrawn 0.0
Controls Set _____
Reflector Water ~ 26.00"
Moderator Water _____

Exp.	Condition	Safety	H_2O	Shield	Refl.	
411	$k>1$	13.60	26.52	V_6	H_2O only	Clean core.
	$k=1$	13.28[2]	26.52	V_6	" "	Temp at 0900 21°C
412	$k>1$	15.65	26.56	V_6	" "	8" Strips #1-5 adjacent to inner annulus
	$k=1$	15.17	"	"	"	"
413	$k>1$	14.42[3]	"	"	$\frac{1}{4}$" Steel plate, 6" Concrete floor	
	$k=1$	13.96[2]	"	"	"	"
414	$k>1$	16.50	"	"	H_2O only	8" Strips #'s 1-5 inner annulus
	$k=1$	15.96	"	"	"	"
415	$k>1$	16.72	"	"	"	" "
	$k=1$	16.08	"	"	"	" "

B^N ~ 2.169 w%

Expr. 416 B^N S.S. Strips #'s 1–5 in inner annulus with 10 fuel plates between each strip.
2.01 div/sec → 43.64 sec → 17.940 ¢ → 30.51 ¢/in (16.526) (~~16.43~~)

Expr. 417 B^N S.S. Strips #'s 1–5 ~ equally spaced in inner annulus.
1.94 div/sec → 42.12 sec → 18.360 ¢ → 29.61 ¢/in (16.695) (~~16.59~~)

Expr 418

Have washed core with weak nitric acid. Drained refl water, ~~then~~ cleaned tank and filled with clean water.

Expr. 419 V_6 in Island, H_2O refl., Clean Core.
2.18 div/sec → 47.33 sec → 17.003 ¢ → 50.16 ¢/in (12.651) (~~12.59~~)

Expr 420 BF_3 detector in core.
1.76 div/sec → 38.211 sec → 19.544 ¢ → 49.48 ¢/in (12.753) (~~12.69~~)

Expr.	Condition	Safety	H_2O	Island	Refl	
416	$k>1$	16.82	26.42	V_6	H_2O only	5B" strip in annulus.
	$k=1$	16.23[2]	"	"	"	
417	$k>1$	17.00[5]	"	"	"	"
	$k=1$	16.38[5]	"	"	"	"
418	$k<1$	26.00	"	"	24" high Cd sheet wrapped around core with 1/8" water between Cd and core.	
"						
"	3PN-246					

Instrument Check on 2-19-65 Source 10 mc Ra

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

Preliminary Check on 2-19-65

Room 113 Pressure Differential 1.5"

Red Light On and Personnel Check S.A. C.C.

Scrams and Bldg. Alarm Reset S.A. A does not trip.

Source Inserted S.A.

Safety Withdrawn 0.0

Controls Set

Reflector Water 0.0

Moderator Water 0.0

Expr	Condition	Safety	H_2O	Island	Refl.	
419	$k>1$	12.82	27.75	V_6	H_2O only	Clean Core.
	$k=1$	12.48'	"	"	"	Temp = 25°C
420	$k>1$	12.95	26.01	"	"	BF$_3$ detectors in core.
	$k=1$	12.55[5]	"	"	"	"
421	$k=1$	12.54[5]	27.78	"	"	"

Expr. 422 Have rearranged the pieces of styrofoam that make up V_6
1.77 div/sec → 38.43 sec → 19.472 ¢ → 50.974 ¢/in (12.769

Expr. 423 Have placed V_2 in lockout
2.69 div/sec → 58.40 sec → 14.726 ¢ → 25.535 ¢/in (17.92)

Expr. 424 : 1.50 div/sec → 32.565 sec → 21.583 ¢ 50.78 ¢/in (12.948

Expr. 425 : 3.10 div/sec → 67.301 sec → 13.312 ¢ 35.50 ¢/in (15.663

Expr. 426 : 7.463 div/sec → 162.022 sec → 6.680 ¢ 44.24 ¢/in (14.321

Expr. 427 2.36 div/sec → 51.235 sec → 16.115 ¢ 48.85 ¢/in (13.333

Expt.	Condition	Safety	H_2O	Island	Refl.	
422	$k>1$	12.95	26.15	V_6	H_2O only	BF_3 det. in core.
	$k=1$	12.56[8]	"	"	"	"
423	$k>1$	18.30[2]	26.17	V_2	"	"
	$k=1$	17.73[2]	"	"	"	Temp = 26°C

Instrument Check on 2-24-65 Source 10 mcf

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 JH

IC-4 Responds Calibration JH

CRM _____ Meter Trip _____

Preliminary Check on 2-24-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JH, CC

Scrams and Elds, ~~Alarm~~ ✓ A does not trip

Source Inserted JH

Safety Withdrawn Variable

Controls Set

Reflector Water) coupled Variable

Moderator Water

Expt.	Condition	Safety	H_2O	Island	Refl.	Core Condition
424	$k>1$	13.06	26.59	V_6	H_2O	$BF_3 + H_2O$ = 21°C
	$k=1$	12.63[5.425]	26.59	V_6	"	" " Temp
425	$k>1$	15.85	26.59	V_6	"	" B^N(1,2,3,4,5)
	$k=1$	15.47[5.375]	26.59	V_6	"	" " Lower A.
426	$k>1$	14.39[6]	26.59	V_6	Temp. 21°C	" B^N(1,2,4)
	$k=1$	14.24[5.151]	26.59	V_6	"	" " Lower A.
427	$k>1$	13.50	26.59	V_6	"	" B^N(4) Lower
	$k=1$	13.17[.33]	26.59	V_6	"	" B^N(4) Annulus

Expr. 428 2.11 div/sec → 45.810 sec → 17.377 ¢ → 49.65 ¢/in (12.845)

Expr 429 2.16 div/sec → 46.895 sec → 17.108 ¢ → 48.74 ¢/in (13.325)

Expr 430 3.14 div/sec → 68.172 sec → 13.189 ¢ → 48.14 ¢/in (13.278)

Expr 431 3.14 div/sec → 68.172 sec → 13.189 ¢ → 48.31 ¢/in (13.275)

Expr. 432 1.68 div/sec → 36.474 sec → 20.125 ¢ → 48.97 ¢/in (13.142)

Expr. 433: Howe poured ~8 liters of boiling water into core when water level was 14.03 in. safety inserted. Raised water level to 26.59 in.

Expr 428

Instrument Check on 2-25-65 Source 10 mc Ra

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 _____

IC-3 Responds Calibration JII _____

IC-4 Responds Calibration JII _____

CRM _____ Meter Trip _____ _____

Preliminary Check on 2-25-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check JJI (cont)

~~Scrams and Bldg. Alarm Reset~~ JII A Responds, does not Trip

Source Inserted JII

Safety Withdrawn 0.0

Controls Set —

Reflector Water } combined.

Moderator Water

Expr.	Condition	Safety	H_2O	Island	core Condition	
428	$k>1$	12.99	26.60	V_6	$BF_3 + H_2O$ only	temp
	$K=1$	12.64	26.60	V_6	" " "	71° F (21.7°C)
429	$K>1$	13.50	26.62	V_6	$BF_3 + H_2O$ $B^N(5)$	Inner
	$R=1$	13.14[9]	26.62	V_6	" " $B^N(5)$	"
430	$k>1$	13.41[2]	"	"	" " $B^N(1)$	"
	$k=1$	13.13[8]	"	V_6	" " $B^N(1)$	"
431	$R>1$	13.41[1]	"	V_6	" " $B^N(3)$	"
	$k=1$	13.13[8]	"	V_6	" " $B^N(3)$	
432	$k>1$	13.34[6]	"	V_6	" " $B^N(4)$	Outer
	$k=1$	12.93[5]	"	V_6	" " "	"
433	$k>1$	13.00	26.59	V_6	$BF_3 + H_2O$	Temp Variable
	$k=1$	~ 12.65				
1± PM	$k \leq 1$	12.64	26.59	V_6	" "	"
1⁵⁶ PM	$k \leq 1$	12.64	"	"	" "	"
1⁵⁷ PM	$k=1$	12.65	"	"	" "	* at top of core ≈ 77° F

Expt 434 2.77 div/sec → 60.139 → 14.425¢ → 94.28 ¢/in. H_2O (19.116)

Expt 435 3.2 div/sec → 69.475 → 13.008¢ → 63.15 ¢/in (20.534)

Expt 436 1.13 div/sec → 24.533 → 25.483¢ → 101.53 ¢/in (19.319)

Expt 437 1.2 div/sec → 26.053 sec → 24.625¢ → 34.11 ¢/in (21.314)

Expt. 438 CE-3 moved to a position 8" from east wall of tank.
CE-2 placed beside CE-3, walls in contact.
12 fuel plates removed from each core.
2.08 div/sec. → 45.16 sec → 17.54¢ → 1.096 ¢/in (14.70)

Expt 439 12 fuel plates replaced in each core.
2.72 div/sec. → 59.05 sec → 14.61¢ → 1.249 ¢/in (14.944)

Expr.	Condition	Safety	H_2O	Island	Core Condition	
434	$k>1$	26.00	19.218	V_6	H_2O only	12 foil plates
	$k=1$	"	19.065	"	"	removed.
435	$k>1$	26.00	20.671	V_3	"	"
	$k=1$	"	20.465	"	"	"
436	$k>1$	26.00	19.486	V_7	"	"
	$k=1$	"	19.235	"	"	"
437	$k>1$	26.00	21.795	V_2	"	"
	$k=1$	"	21.073	"	"	"

Instrument Check on 3-1-65 Source 10 mcV

PM-1 Low Trip OK Alarm Trip OK

PM-2 Alarm Trip

IC-1 $>3\times10^{-4}$ Meter Trip OK ~~Fast~~ Trip OK

IC-2 $>3\times10^{-4}$ ~~Meter Trip~~ OK

IC-3 Responds Calibration J.T.T.

IC-4 Responds Calibration J.T.T.

~~CRM~~ Meter Trip

Preliminary Check on 3-1-65

Room 113 Pressure Differential 1.4"

Red Light On and Terminal Check J.T.T. (East)

Scrams and Bldg. Alarm Reset J.T.T. A. does not trip

Source Inserted S.J.R.

Safety Withdrawn Pre Safety

Controls Set

Reflector Water 0.0 } Combined

Moderator Water 0.0 }

Expr.	Condition	H_2O	CE-2 Isl.	EE-3 Island	
438	$k>1$	14.51 18.98	H_2O	H_2O	} 12 plates removed from
	$k=1$	14.65 18.82	"	"	} each core
439	$k>1$	15.022 19.192	"	"	} 12 plates replaced in
	$k=1$	14.905 19.07	"	"	} each core.

Expt 440 0" Sep. , P.P. in CE-3.
1.37 div/sec. → 29.74 sec → 22.79 ¢ → 1.055 ¢/in (16.286)

Expt 441 Cores Separated ~5/16", H_2O in both islands.
1.03 div/sec. → 22.36 sec → 26.84 ¢ → 1.551 ¢/in (15.14)

Expt 442 1.84 div/sec. → 39.95 sec → ~~18.97~~ 19.00 ¢ → 1.152 ¢/in (16.385)

Expt 443 P.P in CE-3 , 1" Sep.
1.84 div/sec → 39.95 sec → ~~18.97~~ 19.00¢ → 59.0 ¢/in (17.915)

Expt. 444 Have put a 3 1/4" Dia Styrofoam void in safety to simulate poison post. Put safety + void in CE-3 check critical water height with Expt. 443.
Safety + Void worth ~ 12.5¢ ~~more~~ than P.P. in this geometry

Expt 445 Safety + V in CE-2, P.P in CE-3, 1" Sep.
2.11 div/sec. → 45.81 sec → 17.38¢ → 43.2 ¢/in (22.589)

Expt 446 Have removed 12 fuel plates from each core.
2.47 div/sec. → 53.63 sec → 15.62¢ → 1.211 ¢/in (15.939)

Expt.	Condition	H_2O	CE-2 Island	CE-3 Island	
440	$k>1$	16.43 20.60	H_2O	H_2O + P.P.	
	$k=1$	16.214 20.38	"	"	
441	$k>1$	15.255 19.42	H_2O	H_2O	Cores separated ~ 5/16"
	$k=1$	15.082 19.25	"	"	
442	$k>1$	16.495 20.66	"	"	Cores separated ~ 1".
	$k=1$	16.33 20.50	"	"	

Instrument Check on 3-2-65 Source 10 mcr

PM-1 Low Trip OK Alarm Trip OK
PM-2 Alarm Trip
IC-1 $>3\times10^{-11}$ Meter Trip OK ~~East~~ Trip OK
IC-2 $>3\times10^{-1}$ Meter Trip OK
IC-3 Responds Calibration S.J.R.
IC-4 Responds Calibration S.J.R.
GRM Motion

Preliminary Check on 3-2-65

Room 113 Pressure Differential 1.4"
Red Light On and Personnel Check S.J.R. C.C.
~~Scrams and Bldg. Alarm Reset~~ S.J.R. Ambient trip
Source Inserted S.J.R.
Safety Withdrawn No safety
Controls Set
Reflector Water 0.0 } combined
Moderator Water 0.0

Expt.	Condition	H_2O	CE-2 Island	CE-3 Island	
443	$k>1$	18.13 22.30	H_2O	H_2O + P.P.	~1" separation
	$k=1$	17.80 21.97	"	"	
444	$k=1$	18.02 22.19 (est)	H_2O	Safety + Void.	"
445	$k>1$	22.857 27.02	Safety + V	H_2O + P.P	"
	$k=1$	22.455 26.62	"	"	"
446	$k>1$	16.025 20.19	H_2O	H_2O	" 12 fuel plates removed from each core.
	$k=1$	15.896 20.06	"	"	"

Expt 447 12 fuel plates removed from each core. Cores spaced 2" apart.
1.95 div/sec. → 42.34 sec → 18.30 ¢ → 85.1 ¢/in (18.277)

Expt 448 Have replaced 24 fuel plates. (?)

Expt 449 P.P. in CE-3
1.57 div/sec. → 34.09 sec → 20.99 ¢ → 40.4 ¢/in (21.945)

Expt 450 P.P. in CE-3; Safety + 3¼" rod in CE-2.
The top of the fuel plates reads 26.17" on the H_2O level gauge.

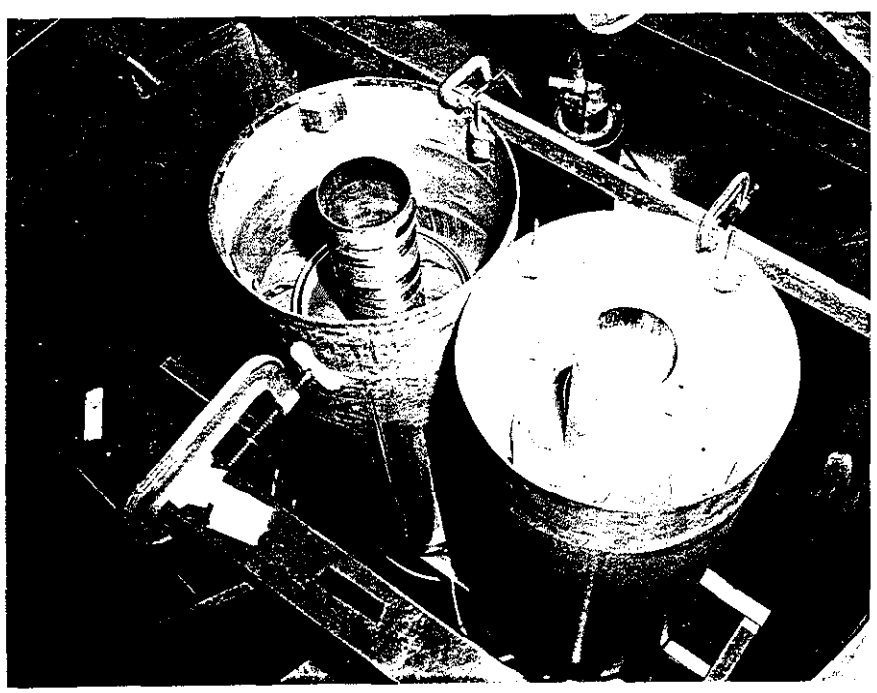
Expt 451 Repeat 448 to check critical H_2O level.
1.42 div/sec. → 30.83 sec → 22.31 ¢ → 113.8 ¢/in (18.599)

Expt 452 3" separation.
2.68 div/sec. → 58.18 sec → 14.76 ¢ → 41.0 ¢/in (21.32)

Expt 453

Expt 454 Have removed 24 fuel plates.
1.28 div/sec. → 27.79 sec → 23.72 ¢ → 58.6 ¢/in (20.63)

Expt.	Condition	H_2O	CE-2 Island	CE-3 Island		
447	$k>1$	18.42 (22.59)?	H_2O	H_2O	~2" separation	24 fuel plates out
	$k=1$	18.205 22.37	"	"	"	"
448	$k>1$	18.736 22.90	"	"	"	
	$k=1$	~~22.35~~ 22.295	"	"	"	
449	$k>1$	26.46	"	H_2O+P.P.	"	
	$k=1$	21.775 25.94	"	"	"	
450	$k<<1$	26.21 30.38	Safety+V.	H_2O+P.P.	"	
451	$k>1$	18.73 22.90	H_2O	H_2O	"	
	$k=1$	18.534 22.70	"	"	"	
452	$k>1$	21.56 25.73	"	"	3" separation	
	$k=1$	21.20 25.37	"	"	"	
453	$k<<1$	25.82 29.99	"	H_2O+P.P.	"	
454	$k>1$	20.90 25.07	H_2O	H_2O	"	24 fuel plates out.
	$k=1$	20.495 24.66	"	"	"	"



Expr. 455 4" Sep. 24 fuel plates out
3.03 div/sec → 65.78 sec → 13.53¢ → 17.0 ¢/in (23.33)

Expr 456 Have replaced 24 fuel plates.
8 div/sec → -173.69 sec → -9.87¢
6.47 div/sec → -140.47 sec → -13.49¢

Expr 457 6" Separation. V_2 placed in CE-3.
0.94 div/sec. → 20.41 sec → 28.20¢ → 44.8 ¢/in (21.88)

Expr 458 24 fuel plates removed. V_2 in CE-3
3.13 div/sec → 67.95 sec → 13.22¢ → 49.9 ¢/in (20.902)

Expr 459 24 fuel plates replaced. 0" separation
1.33 div/sec → 28.88 sec → 23.193¢ → 93.5 ¢/in (18.645)

Instrument Check on 3-3-65 Source 10 mcV

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

Preliminary Check on 3-3-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check

Scrams and Bldg. Alarm Reset A does not trip

Source Inserted S. f. R.

Safety Withdrawn No Safety

Controls Set

Reflector Water 0.0 } Confirmed

Moderator Water 0.0 }

Exp.	Condition	H_2O	CE-2 Island	CE-3 Island.		
~~454~~ 455	$k>1$	23.86 28.07	H_2O	H_2O	4" Separation	24 fuel plates removed.
	$k=1$	23.065 27.23	"	"	"	
~~455~~ 456	$k<1$	25.87 30.04	"	"	"	24 fuel plates replaced.
~~456~~ 457	$k>1$	22.30 26.47	H_2O	V_2	6" Separation	
	$k=1$	21.67 25.84	"	"	"	
~~457~~ 458	$k>1$	21.077 25.249	"	"	"	24 fuel plate removed
	$k=1$	20.814 24.98	"	"	"	"
~~458~~ 459	$k>1$	18.81 22.98	Safety + V	H_2O + P.P.	0 sep.	24 fuel plates in.
	$k=1$	18.56 22.73	"	"	"	"

CE-3 removed. CE-2 placed on pedestal in center of tank

Expr. 460

H_2O level relay reads 21.76" when H_2O is at top of fuel plates V_3. 12 fuel plates removed.

$-10.03 \frac{div}{sec.} \rightarrow 217.76 sec. \rightarrow$ [illegible] $-7.34¢$

Expr. 461 V_6 12 fuel plates removed .29

$2.04 \frac{div}{sec.} \rightarrow 44.29 sec \rightarrow 17.77¢ \rightarrow 61.28 \frac{¢}{in}$ (20.91)

Expr 462 V_4 12 fuel plates removed .44

$1.58 \frac{div}{sec.} \rightarrow 34.30 sec \rightarrow 20.91¢ \rightarrow 47.52 \frac{¢}{in}$ (22.62)

CE-2

Instrument Check on 3-5-65 Source 10mc Ra

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 _____

IC-3 Responds Calibration S.f.R. _____

IC-4 Responds Calibration S.f.R. _____

CRM _____ ~~Meter Trip~~ _____

Preliminary Check on 3-5-65

Room 113 Pressure Differential 1.4"

Red Light On and Personnel Check S.f.R. & C.C.

Scrams and Bldg. Alarm Reset A does not trip

Source Inserted S.f.R.

~~Safety~~ Withdrawn _____

Controls Set _____

Reflector Water } Combined

Moderator Water _____

Expt.	Condition	H_2O.	Safety	Leland	
460	$k \leq 1$	26.79 26.55	26.00	V_3	12 fuel plates removed.
461	$k > 1$	21.06 20.82	26.02	V_6	" "
	$k = 1$	20.77 20.53	26.02	V_6	" "
462	$k > 1$	22.91 22.67	26.01	V_4	" "
	$k = 1$	22.47 22.23	"	"	" "

~~Extract CE-3~~

Red values are corrected to correspond to a reading of 22.00" at top of fuel plates.

463 V_5 12 fuel plates removed

2.76 div/sec → 59.92 sec → 14.46¢ → .44 → 32.86 ¢/in (21.03)

464 V_7 12 fuel plates removed

1.41 div/sec → 30.61 sec → 22.41¢ → .50 → 44.82 ¢/in (21.12)

465 Replaced 12 fuel plates. V_7 .50

3.74 div/sec → 81.20 sec → 11.59¢ → 23.18 ¢/in (21.75)

466 V_6

3.96 div/sec → 85.97 sec → 11.10¢ → .28 → 39.64 ¢/in (21.55)

467 V_5

1.24 div/sec → 26.92 sec → 24.17¢ → .63 → 38.37 ¢/in (21.85)

468 V_4

3.04 div/sec → 66.00 sec → 13.50¢ → 2.77 → 4.87 ¢/in (24.55)

Removed CE-2. Replaced CE-3.

H_2O Selsyn reads 21.84" when water at top of fuel plates. Reset to

469 read 22.00" when water at top of fuel plates.

V_4 12 fuel plates removed

3.98 div/sec → 86.41 sec → 11.06¢ → .12 → 92.17 ¢/in (19.57)

CE-2

Instrument Check on 3-8-65 Source 10 mc Ra

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

PM-2 _____ Alarm Trip _____

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

IC-2 > 3 X 10⁻¹¹ Meter Trip OK

IC-3 Responds Calibration S.J.R.

2) IC-4 Responds Calibration S.J.R.

CRM _____ Meter Trip _____

Preliminary Check on 3-8-65

Room 113 Pressure Differential 1.5"

7) Red Light On and Personnel Check S.J.R. C.C.

Scrams and Bldg. Alarm Reset S.J.R. A does not trip

~~Source Inserted~~ S.J.R.

Safety Withdrawn _____

5) Controls Set _____

Reflector Water } Combined

~~Moderator Water~~

CE-2 Core

	Expt.	Condition	H_2O	Safety	Island	
5)	463	$k>1$	21.25 21.01	26.00	V_5	12 fuel plates removed
		$k=1$	20.81 20.57	26.00	"	"
5)	464	$k>1$	21.37 21.13	"	V_7	"
		$k=1$	20.87 20.63	"	"	"
	465	$k>1$	22.08 21.84	"	"	12 fuel plates replaced
		$k=1$	21.57 21.33	"	"	"
	466	$k>1$	21.72 21.48	"	V_6	"
		$k=1$	21.44 21.20	"	"	"
7)	467	$k>1$	22.24 22.00	"	V_5	"
		$k=1$	21.81 21.37	"	"	"
	468	$k>1$	26.40 26.16	"	V_4	"
		$k=1$	23.83 23.59	"	"	"

Removed CE-2 and placed CE-3 on pedestal in center of tank.

Rod Release

469	$k>1$	19.65	26.00	V_4	12 fuel plates removed
	$k=1$	19.53	"	"	"

470 V_5 12 fuel plates removed. .205
1.78 div/sec → 38.65 sec → 19.40 ¢ → 94.63 ¢/in (18.977)

471 H_2O Temp 70°F 14.40 hrs. .18
2.4 div/sec. → 52.11 sec. → 15.93 ¢ → 88.50 ¢/in (18.91)

472 B^N SS Strip #1 placed in I.A. .17
2.36 div/sec. → 51.24 sec → 16.12 ¢ → 94.82 ¢/in (19.14)

473 B^N SS strips #1, 2 in I.A. .13
3.72 div/sec → 80.76 sec → 11.64 ¢ → 89.54 ¢/in (19.35)

474 B^N SS strips #'s 1, 2, 3 in I.A. .14
3.74 div/sec. → 81.20 sec → 11.59 ¢ → 82.79 ¢/in (19.59)

475 B^N SS strips #'s 1, 2, 3, 4 in I.A. .14
4.18 div/sec → 90.75 sec → 10.65 ¢ → 76.07 ¢/in (19.86)

476 B^N SS strips #'s 1, 2, 3, 4, + 5 in I.A. .15
4.86 div/sec → 105.51 sec → 9.48 ¢ → 63.20 ¢/in (20.15)

477 5 B^N SS strips + 20 SS strips in I.A. .50
1.66 div/sec → 36.04 sec. → 20.27 ¢ → 40.54 ¢/in (20.84)

CE(3)

Expt.	Condition	H_2O	Safety	Island	
470	$k>1$	19.08	26.00	V_5	12 fuel plates removed
	$k=1$	18.875	26.00	V_5	" " " "
471	$k>1$	19.00	26.00	V_6	" "
	$k=1$	18.82	"	"	" "
472	$k>1$	19.22	"	"	" B^N 55 #1 I.A.
	$k=1$	19.05	"	"	" "
473	$k>1$	19.41	"	"	" B^N #'s 1, 2 I.A.
	$k=1$	19.28	"	"	" "
474	$k>1$	19.66	"	"	" B^N #'s 1, 3, 8 I.A.
	$k=1$	19.52	"	"	" "
475	$k>1$	19.93	"	"	" B^N #'s 1, 3, 4 I.A.
	$k=1$	19.79	"	"	" "
476	$k>1$	20.22	"	"	" B^N #'s 1, 3, 4, 5 I.A.
	$k=1$	20.07	"	"	" "
477	$k>1$	21.09	"	"	" 5 B^N I. +20 555.
	$k=1$	20.59	"	"	" "

282

Washed out selsyn tube with alcohol.

478

2.6 div/sec. → 56.45 sec → 15.08¢ → 31.42 ¢/in (21.84)

479

Change in reading from Eggs 477 & 478 due to alcohol in selsyn tube. Drained tube and rinsed with dist. H_2O. Set selsyn to read 22.00" at top of fuel plate.

H_2O Temp = 70°F at 1140 hrs.

5.82 div/sec. → 126.36 sec → 8.20¢ → 82 ¢/in (20.72)

480

12 fuel plates replaced; V_6; 5 B^N SS Strips + 20 SS Strips

1.57 div/sec. → 34.09 sec → 20.99¢ → 31.80 ¢/in (21.78)

481

V_6; 5 B^N SS Strips + 10 SS Strips

5.14 div/sec. → 111.59 sec → 9.06¢ → 90.6 ¢/in (75.5 ¢/in) (21.12)

482

V_6 5 B^N SS Strips

4.20 div/sec. → 91.19 sec → 10.62¢ → 88.5 ¢/in (66.38 ¢/in) (20.94)

483

V_6 4 B^N SS Strips.

2.74 div/sec → 59.49 sec → 14.54¢ → 96.93 ¢/in (20.50)

484

V_6 3 B^N SS Strips

5.11 div/sec. → 110.94 sec → 9.11¢ → 113.88 ¢/in (20.18)

~~485 V_6 2 B^N SS Strips~~

CE(3) FR

Instrument Check on 3-9-65 Source 10mcr

4)	P-1	Low Trip OK	~~Alarm~~ Trip OK	
	P-2		Alarm Trip	
	I-1 $>3\times10^{-11}$	Meter Trip OK	~~Fast~~ Trip OK	
	I-2 $>3\times10^{-11}$	Meter Trip OK		
	I-3 Response	Calibration S/R.		
	I-4 Response	Calibration S/R.		
	IRM	Meter Trip		

Preliminary Check on 3-9-65

Room 113 Pressure Differential 1.5"

Red Light On and Personnel Check S/R. + C.C.

Scrams and Bldg. Alarm React S/R. A does not trip

Source Inserted S/R.

Safety Withdrawn

Controls Set

Reflector Water } Combined

Moderator Water }

Effv.	Condition	H_2O	Safety	Leland	
478	$k>1$	22.16	26.00	V6	12 fuel plates removed B^N55 #1-5 + 2055's.
1)	$k=1$	21.68	"	"	in I.A.
479	$k>1$	20.77	26.00	"	12 fuel plates removed
	$k=1$	20.~~67~~	"	"	B^N55 #1-5 + 2055's.
480	$k>1$	22.11	26.00	"	12 fuel plates replaced
	$k=1$	21.45	"	"	B^N55 #'s 1-5
					+ 2055 Strip I.A.
481	$k>1$	21.17	"	"	5 B^N55 + 1055 I.A.
18)	$k=1$	21.07 (21.05)	"	"	" " "
482	$k>1$	20.87	"	"	5 B^N55 I.A.
	$k=1$	20.75 (20.71)	"	"	" "
483	$k>1$	20.57	26.00	"	B^N55 #'s 1-4 I.A.
	$k=1$	20.42	"	"	" "
484	$k>1$	20.22	"	"	" #'s 1-3 I.A.
	$k=1$	20.14	"	"	" "
485	$k>1$		"	"	" #'s 1-2 I.A.

Temp = 70°F

485 V_6, 2 B^N SS Strips
4.7 div/sec → 102.04 sec → 9.72 ¢ → 121.5 ¢/in (19.83)

486 V_6, 1 B^N SS Strips
3.15 div/sec → 68.39 sec → 13.16 ¢ → 109.67 ¢/in (19.61)

487 V_6, No strips
3.78 div/sec → 82.07 → 11.50 ¢ → 127.78 ¢/in (19.37)

488 V_6, No strips, Safety control
1.64 div/sec → 35.61 sec → 20.43 ¢ → 49.83 ¢/in (12.565)

489 V_6, 1 B^E SS Strip IA
2.88 div/sec → 62.53 sec → 14.03 ¢ → 48.38 ¢/in (13.355)

490 V_6, B^E SS Strips #'s 1 & 2 I.A.
4.49 div/sec → 97.48 sec → 10.08 ¢ → 41.14 ¢/in (14.378)

491 V_6, B^E SS Strips #'s (1, 2, 3) I.A.
1.15 div/sec → 24.97 sec → 25.23 ¢ → 34.56 ¢/in (15.791)

492 V_6, B^E SS Strips #'s (1, 2, 3, 4) I.A.
3.86 div/sec → 83.80 sec → 11.32 ¢ → 28.30 ¢/in (17.10)

Instrument Check on 3-10-65 Source 10 mcV

PM-1 Low Trip OK Alarm Trip OK
PM-2 Alarm Trip
IC-1 > 3X10⁻¹¹ Meter Trip OK ~~Test~~ Trip OK
IC-2 > 3X10⁻¹¹ Meter Trip OK
IC-3 Responds Calibration S/A.
IC-4 Responds Calibration S/A.
CRM Meter Trip

Preliminary Check on 3-10-65

Room 113 Pressure Differential 1.5"
Red Light On and Personnel Check S/A.
Scrams and Bldg. Alarm Reset S/A. A does not trip
Source Inserted S/A.
Safety Withdrawn
Controls Set
Reflector Water } Combined.
Moderator Water }

Expt.	Condition	H_2O	Safety	Isolant	
485	$k>1$	19.87	26.00	V_6	B^N 55 #'s 1-2 I.A.
	$k=1$	19.79	"	"	" " "
486	$k>1$	19.67	"	"	B^N 55 #1 I.A.
	$k=1$	19.55	"	"	" " "
487	$k>1$	19.41	"	"	No Strips.
	$k=1$	19.32	"	"	" "
488	$k>1$	26.56	12.71	"	"
	$k=1$	"	12.30	"	"
489	$k>1$	"	13.50	"	B^E 55 Strip #1 I.A.
	$k=1$	"	13.21	"	B^E 55 Strip #1 I A
490	$k>1$	"	14.50	"	B^E 55 Strip #1-2 I A
	$k=1$	"	14.25	"	" " "
491	$k>1$	"	16.15	"	B^E 555 #(1,2,3) I.A.
	$k=1$	"	15.42	"	" " "
492	$k>1$	"	17.30	"	" #'s (1,2,3,4) I.A.
	$k=1$	"	16.90	"	" "

493 V_6, B^E 55 Strips #'s (1,2,3,4,5) I.A.
4.96 div/sec → 107.69 sec → 9.32¢ → 18.64 ¢/in (19.25)

494 V_6, B^E 55 Strips #'s (1,2,3,4,5,6) I.A.
-71.2 div/sec → -1545.8 sec → -0.86¢

495 V_6, B^E 55 Strips #'s (1,2) adjacent plates in I.A.
2.67 div/sec → 57.97 sec → 14.80¢ → 42.29 ¢/in (13.845)

496 V_6, B^E 55 Strips #'s (1,2) 5 fuel plates apart I.A.
2.91 div/sec → 63.18 sec → 13.93¢ → 43.53 ¢/in (14.21)

497 V_6, B^E 55 Strips #'s (1+2) 10 fuel plates apart I.A.
1.85 div/sec → 40.17 sec → 18.93¢ → 43.02 ¢/in (14.40)

498 V_6, B^E 55 Strips #'s (1+2) 15 fuel plates apart I.A.
2.33 div/sec → 50.59 sec → 16.26¢ → 42.23 ¢/in (14.388)

499 V_6, B^E 55 Strips #'s (1+2) 25 fuel plates apart I.A.
2.18 div/sec → 47.33 sec → 17.00¢ → 42.5 ¢/in (14.42)

500 V_6, B^E 55 Strips #'s (1+2) 45 fuel plates apart I.A.
2.26 div/sec → 49.07 sec → 16.60¢ → 40.49 ¢/in (14.418)

Expt	Condition	H_2O	Safety	Island		
493	$k>1$	26.56	19.50	V_6	B^E 555	#'s (1,2,3,4,5) I.A.
	$k=1$	"	19.00	"	"	" "
494	$k<1$	"	26.00	"	"	#'s (1,2,3,4,5,6) I.A.
495	$k>1$	"	14.02	"	B^E 555 (1-2) adjusts I.A.	
	$k=1$	"	13.67	"	"	" "
496.	$k>1$	"	14.37	"	"	I.A.
	$k=1$	"	14.05	"	"	" —

Instrument Check on 3-11-64 Source 10 mc Y

PM-1 _____ Low Trip OK Alarm Trip OK

PM-2 _____ Alarm Trip _____

IC-1 $>3\times10^{-11}$ Meter Trip OK ~~Fast~~ Trip OK

IC-2 $>3\times10^{-4}$ Meter Trip OK

IC-3 Responds Calibration S & R.

IC-4 Responds Calibration S & R.

CRM _____ Meter Trip _____

Preliminary Check on 3-11-64

Room 113 Pressure Differential 1.6"

Red Light On and Personnel Check S & R. & C.C.

Scrams and Bldg. Alarm Reset S & R.

Source Inserted S & R.

Safety Withdrawn _____

Controls Set _____

Reflector Water } Combined

Moderator Water }

497	$k>1$	26.53	14.62	V_6	B^E 555 (1+2)	I.A.
	$k=1$	"	14.18	"	" "	" "
498	$k>1$	"	14.58	"	" "	" "
	$k=1$	"	14.195	"	" "	" "
499	$k>1$	"	14.62	"	" "	" "
	$k=1$	"	14.22	"	" "	" "
500	$k>1$	"	14.61	"	" "	" "
	$k=1$	"	14.20	"	" "	" "

501 V_6, B^E ss strips #(1+2) 180° apart .182 I.A.
6.1 div/sec → 132.44 sec → 7.89¢ → 43.35 ¢/in (14.329)

502 V_6, No Strips .35
2.1 div/sec → 45.59 sec → 17.43¢ → 49.80 ¢/in (12.465)

503 V_6, B^E ss strip #1 O.A. .302
3.00 div/sec → 65.13 sec → 13.63¢ → 45.13 ¢/in (12.939)

504 V_6, B^E ss strips #'s (1+2) O.A. .22 180° apart.
4.12 div/sec → 89.45 sec → 10.77¢ → 48.95 ¢/in (13.49)

505 V_6, B^E ss strips #'s (1,2,3,4) OA .57 90° apart.
1.34 div/sec → 29.09 sec → 23.09¢ → 40.51 ¢/in (14.875)

506 V_6, B^E ss strips #'s (1-6) O.A. .53
2.1 div/sec → 45.59 sec → 17.43¢ → 32.89 ¢/in (16.235)

507 V_6, B^E ss strips #'s (1-8) O.A. .377
2.94 div/sec → 63.83 → 13.83¢ → 23.97 ¢/in (18.884)

508 V_6, B^E ss strips #'s (1-10) O.A. .87 > 30 plates apart
3.62 div/sec → 78.59 sec → 11.88¢ → 14.67 ¢/in (20.78)

509 V_6, B^E ss strips #'s (1-11) O.A. 2.99 > 30 plates apart
26.05 div/sec → 565.57 sec → 2.17¢ → 0.73 ¢/in (24.01)

H_2O Temp = 70°F at 1400 hrs.

510 V_6 No Strips .10 (19.35)
3.44 div/sec → 74.69 sec → 12.33¢ → 123.3 ¢/in

511 V_7 .09
4.22 div/sec → 91.62 sec → 10.58¢ → 117.56 ¢/in (19.55)

512 V_5 .13
2.56 div/sec → 55.58 sec → 15.24 → 117.23 ¢/in (19.48)

	Expr.	Condition	H_2O	Safety	Island			
9)	501	$k>1$	26.53	14.42	V_6	B^E 555 (1+2)		I.A.
		$k=1$	"	14.23[5]	"	"	"	"
65)	502	$k>1$	"	12.64	"	No Strips		
		$k=1$	"	12.29	"	"		
9)	503	$k>1$	"	13.09	"	B^E 555 #1		O.A.
		$k=1$	"	12.78[8]	"	"	"	"
1)	504	$k>1$	"	13.60	"	" #(1+2)		"
		$k=1$	"	13.38	"	"	"	"
75)	505	$k>1$	"	15.16	"	" #'s (1,2,3,4)		"
		$k=1$	"	14.59	"	"	"	"
35)	506	$k>1$	"	16.50	"	" #'s (1-6)		"
		$k=1$	"	15.97	"	"	"	"
84)	507	$k>1$	"	18.37[2]	"	" #'s (1-8)		"
		$k=1$	"	17.79[5]	"	"	"	"
8)	508	$k>1$	"	21.32	"	" #'s (1-10)		"
		$k=1$	"	20.51	"	"	"	"
1)	509	$k>1$	"	26.00	"	" #'s (1-[illegible])		"
		$k=1$	"	23.01	"	"	"	"
3.5)	510	$k>1$	19.40	26.00	"	No Strips		
		$k=1$	19.30	"	"	"	"	
	511	$k>1$	19.59	"	V_7	"	"	
5)		$k=1$	19.50	"	"	"	"	
	512	$k>1$	19.55	"	V_5	"	"	
8)		$k=1$	19.47	"	"	"	"	
	513	$k>1$		"	V_4	"	"	

[redacted] Divergence on H_2O safety broke.

Replaced wire on relays water level indicator.
Checked and reset relays to read 22.00" at top of fuel plates.

5/13 V_4
$4.16 \frac{div}{sec} \rightarrow 90.32 sec \rightarrow 10.69¢ \rightarrow 106.9 ¢/in$ (20.12)

5/14 V_3
$2.44 \frac{div}{sec} \rightarrow 52.97 sec \rightarrow 15.76¢ \rightarrow 59.47 ¢/in$ (20,968)

5/15 V_2
$4.15 \frac{div}{sec} \rightarrow 90.10 sec \rightarrow 10.71¢ \rightarrow 71.40 ¢/in$ (22,00)

5/16 V_1
$1.12 \frac{div}{sec} \rightarrow 24.32 sec \rightarrow 25.61¢ \rightarrow 7.55 ¢/in$ (24.15)

Instrument Check on 3-12-65 Source 10 mcV

PM-1		Low Trip	OK	Alarm Trip	OK
PM-2				Alarm Trip	
IC-1	> 3 X 10⁻¹¹	Meter Trip	OK	Rest Trip	OK
IC-2	> 3 X 10⁻¹¹	Meter Trip	OK		
IC-3	Responds	Calibration	S f R		
IC-4	Responds	Calibration	S f R.		
CRM		Meter Trip			

Preliminary Check on 3-12-65

Room 113 Pressure Differential 1.6"

Red Light On and Personnel Check S f R. + C.C.

Scrams and Bldg. Alarm Reset S f R.

Source Inserted S f R.

Safety Withdrawn

Controls Set

Reflector Water 3 Combined

Moderator Water

Expr.	Condition	H_2O	Safety	Island
513	$k > 1$	20.17 (20.18)	26.00	V_4
	$k = 1$	20.07	"	"
514	$k > 1$	21.10	"	V_3
	$k = 1$	20.83⁵	"	"
515	$K > 1$	22.09	"	V_2
	$k = 1$	21.94	"	"
516	$k > 1$	26.38	"	V_1
	$k = 1$	22.99	"	"
517	$k << 1$	26.38	"	H_2O only

M → 5 IC-4, <1 IC-3, ~1 IC-2

Expt #	Page #	SPN #	k	Safety	mod H_2O	Island	Ch. w.	Bkg	Del.	Disc	M	Burst width	Cps	KV	I ma.	I μa.	Cycles	λ_{obs}	λ_c
309	227	1212	k<1	26.00	26.11	V_1	160	4	8	4	1/2	10^3	30	150	0.91	3	24003	-219.9	21
313	231	213	k=1	21.49	26.08	V_2	160	2	8	4	1/2	10^3	35	150	1.0	6	—	—	—
314	231	214	k<1	0	26.08	V_2	20	8	32	4	1/2	630	210	150	1.03	20	657985	-1938	20
315	231	215	k=1	21.35	26.25	V_2	160	2	8	4	1/2	10^3	35	150	1.0	6	30809	-181	177
316	231	216	k<1	10.00	26.09	V_2	40	8	16	4	1/2	630	120	150	.98	10	310000	-1028	104
317	233	217	k<1	10.00	26.15	W	40	8	16	4	1/2	630	120	150	.97	10.5	360 ~~000~~	-1269	130
318	233	218	k<1	26.00	26.17	W	80	8	16	4	1/2	1000	71	150	.97	10	~~503~~ 653	-502	49
319	233	219	k<1	10.00	26.01	V_3	40	8	16	4	1/2	630	120	150	.97	10	300,000	-970	97
328	233	220	k<1	10.00	26.18	V_1	40	8	16	4	1/2	630	120	150	.97	10	340 ~~000~~	-1091	112
323	233	221	k<1	10.00	26.09	V_5	40	8	16	4	1/2	630	120	150	.99	12	300 ~~000~~	-687	66
328	235	222	k<1	10.00	26.18	V_6	80	8	16	4	1/2	1000	70	150	.98	11	140 ~~000~~	-533	54
329	235	223	k<1	0.0	27.33	V_C	40	4	32	4	1/2	10^3	120	150	.90	10	420000	1301	(31
330	237	224	k<1	out P.P in	26.75	P.P $+V_5$	40	4	32	4	1/2	10^3	120	150	.90	12	250 000	837	83
331	237	225	k<1	10.00	26.20	V_7	40	4	32	4	1/2	10^3	120	150	.93	12	170 000	493	47
333	237	226	k<1	0	26.26	V_7	40	4	32	4	1/2	10^3	120	150	.94	12	290 000	1033	110
334	237	227	k<1	out	26.28	P.P	20	8	32	4	1/2	630	220	150	.93	16	620000	1841	184
335	237	228	k<1	out	26.34	P.P $+V_2$	40	8	16	4	1/2	630	120	150	1.02	13	220.000	-1548	15
346	241	229	k=1	21.35	26.34	V_6	160	2	16	4	1/2	2500	34	150	1.04	16	30,000	-192	185
348	241	230	k<1	13.60	26.34	V_6	80	8	16	4	1/2	1000	70	150	1.07	13	120000	-559	55
362	246	231	k<1	13.58	26.21	V_6	80	4	16	4	1/2	1000	70	150	1.05	16	100.000	-428	42
371	249	232	k<1	19.81	26.14	V_2	40	4	32	4	1/2	1000	120	148	1.02	18	266766	-761	73
372	249	233	k<1	19.81	26.56	V_2	40	4	32	4	1/2	1000	120	146	1.01	18	160,000	-568	55
373	249	234	k<1	19.81	26.28	V_2	80	4	16	4	1/2	1000	70	145	1.01	10	60,000	-386	37
375	249	235	k<1	19.81	26.42	V_2	160	2	16	4	1/2	2000	32	145	0.98	8	60,000	-246	24
379	251	236	k<1	19.81	26.26	V_2	80	4	16	4	1/2	1000	70	143	1.05	10	200,000	-673	67
380	251	237	k<1	19.81	26.36	V_2	40	4	32	4	1/2	1400	170	148	1.02	23	340 000	-1444	147
386	253	238	k<1	19.81	26.34	V_2	160	2	16	4	1/2	2000	32	150	1.1	15	60,000	-517	51
387	253	239	k<1	19.81	26.34	V_2	80	4	16	4	1/2	1000	70	150	1.1	14	127,845	-582	57
388	253	240	k<1	19.81	26.35	V_2	40	4	32	4	1/2	1400	120	150	1.1	30	230,000	-725	71

Aiodm 12-16-70

t	λ_{cal}	λ/λ_c	ρ	¼×3" Boral Dist ρ
9	217±1	1.23	.23	
–	—			6¼
38	2081±9	11.76	10.76	6⅜
1	177±1	1	0	5⅛
28	1046±5	5.91	4.91	5⅛
69	1306±7	7.38	6.38	"
12	495±2	2.80 ±.03	1.80	" ← +12.3+ 49 ⇒ 1.15
0	972±4	5.49	4.49	"
91	1125±5	6.35	5.35	"
87	660±4	3.72	2.72	"
33	548±3	3.09	2.09	"
01	1317±8	7.43	6.43	"
37	830±3	4.68	3.68	"
73	470±3	2.65	1.65	"
33	1108±5	6.25	5.25	"
11	1846±8	10.41	9.41	"
48	1547±7	8.73	7.73	"
2	185±1	1	40 S.S. Stripes (inner annulus)	
59	559±2	3.02	"	
8	425±2	2.40	15 S.S. St. (OA) 45 S.S.S (IA) (5⅛)	
1	735±3	4.15 (3.52±.18)	¾" Steel Refl. ½ element	
8	555±2	3.13 (2.66±.14)	1¾ " "	
	375±1	2.12 (1.79±.09)	2¾ " "	
	248±1	1.40 (1.187±.06)	3¾ " "	
3	678±2	3.24±.16	6¼ " " around 180° ; ¾" Steel Refl around other 180°	
4	1470±10	7.03±.38	¾ 360°	
7	525±2	2.46±.13	¾" Steel 360° + (4" lead + 4" lead bricks) 180° of core.	
2	577±2	2.76±.14	¾" Steel 360° + (4" lead + 2" lead bricks) 180° of core	
5	710±10	3.40±.21	¾" Steel 360° + 4" lead 180°	

Expt 374 ρ = 1 when λc adjust at 22.09
From diff model current for predict
22.09" → 19.5" = 18.98
0.184 = $\lambda/\lambda_c - 1 = \frac{22.09}{\lambda_c} - 1$

Used $\lambda_c = 209 \pm 10$ determined from Expt's 374 & 375

Expr #	Page #	SPH #	k	Safety	Mod H_2O	Island	ch. w.	Bkg	Delay	Disc	M	Band width	cps	KV	I ma	I μa	cycles	λ_{est}
391	255	241	k<1	21.00	26.38	V_2	20	4	64	4	1/2	1400	180	150	1.06	31	130,000	-2533
392	255	242	k<1	0.00	26.31	V_2	20	4	64	4	1/2	1400	180	148	1.06	31	130,000	-4828
394	255	243	k<1	19.81	26.32	V_2	40	4	32	4	1/2	1400	110	148	1.23	30	300,000	-1290
395	255	244	k<1	19.81	26.31	V_2	40	4	32	4	1/2	1400	110	150	1.1	26	200,000	-666
400	257	245	k<1	0.00	26.35	H_2O	20	4	64	4	1/2	1400	180	150	1.13	50		-2181
418	263	246	k<1	26.00	26.42	V_6	10	4	128	4	1/2	1400	240	150	1.16	65	1,539,607	

	λ_{cal}	λ/λ_c	
533			
328			
90	1285 ± 15	$6.15 \pm .32$	1/4 360
6	665 ± 3	$3.18 \pm .17$	1/4 180
81	2235 ± 14		Safety 0.0 H_2O only.
	2800 ± 24	$13.40 \pm .74$	Cd sheet around core

29 300

Page

HFIRCE-3

3 U foil calibration of counting system