BOOK75R

Notes:
"Snap" on front
"UO_2" 1963 & 1965" on spine

Blank pages: page opposite page 1, 1-9, 12, 14, 16, 20, 22, 29-34, 61, 62, 65, 66, 75, 76, 78-80, 102, 116-120, 134, 136-210, 212-300, inside back cover sheets

-pages 28/29 has 1 small green sheet between pages
-page 113 has 1 small sheet taped
-pages 136/137 has 2 large sheet between pages
-pages 238/239 has 1 large graph sheet between pages

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

E-2

Stainless steel tubes + end caps

314 tubes + box = 14,442 gms

box − 397

14045 gms

$\frac{14045}{314}$ = ~~33.135~~ 44.729 gms Tube weight

324 end caps 207.706 gms

$\frac{207.706}{324}$ = 0.64107 gms End cap weight

Average pellet UO_2 weight = 11.3772 gms

2c pellets per tube = 295.8 gms/tube

8283

Tube No.	Net Wt. (Gms)	Tube No.	Net Wt. (Gms)
1	295.80	29	295.90
2	296.02	30	296.00
3	295.80	31	295.65
4	296.05	32	296.20
5	295.75	33	295.70
6	295.85	34	295.70
7	295.85	35	295.85
8	295.58	36	295.70
9	295.85	37	295.60
10	296.00	38	295.90
11	295.65	39	295.95
12	295.95	40	295.60
13	295.75	41	295.64
14	295.85	42	295.61
15	295.84	43	295.90
16	295.60	44	295.95
17	295.90	45	296.00
18	295.85	46	296.00
19	296.00	47	295.85
20	296.00	48	295.85
21	296.00	49	295.71
22	295.70	50	295.70
23	295.85	51	295.65
24	295.90	52	295.90
25	295.70	53	295.80
26	295.85	54	295.85
27	295.85	55	295.95
28	295.60	56	295.85

828339/295.335

828296/295.820

Tube No.	Net Wt. (Gms)		Tube No.	Net Wt. (Gms)	
57	295.85		85	295.65	
58	295.60		86	296.00	
59	295.95		87	295.95	
60	295.75		88	295.95	
61	295.75		89	295.70	
62	296.00		90	295.90	
63	295.90		91	295.90	
64	296.00		92	295.70	
65	295.65		93	296.00	
66	295.65		94	295.85	
67	295.80		95	295.85	
68	295.85		96	295.95	
69	295.65		97	296.00	
70	295.80		98	295.75	
71	295.75		99	295.85	
72	295.90		100	296.00	
73	295.60		101	296.00	
74	295.80		102	295.80	
75	295.80		103	296.00	
76	295.85		104	295.70	
77	295.85		105	295.95	
78	295.85		106	295.65	
79	296.00		107	295.65	
80	296.00		108	295.85	
81	295.80		109	295.95	
82	295.90		110	295.90	
83	295.95		111	295.65	
84	296.00		112	295.80	
8183.25 / 295.83			8283.90 / 295.853		

Tube No.	Net Wt. (Gms)		Tube No.	Net Wt. (Gms)	
113	295.85		141	295.70	
114	296.00		142	295.95	
115	295.70		143	295.95	
116	295.65		144	295.95	
117	295.80		145	295.86	
118	295.80		146	295.75	
119	296.00		147	295.90	
120	295.85		148	295.92	
121	295.68		149	295.90 ~~335.43~~	
122	295.75		150	295.68	
123	295.80		151	295.85	
124	295.75		152	295.73	
125	295.85		153	295.84	
126	295.65		154	295.67	
127	295.85		155	295.97	
128	295.95		156	295.76	
129	295.80		157	295.65	
130	295.70		158	295.89	
131	295.67		159	295.70	
132	295.66		160	295.60	
133	295.75		161	295.63	
134	295.92		162	295.96	
135	295.88		163	295.68	
136	295.90		164	295.65	
137	295.90		165	295.65	
138	295.95		166	295.85	
139	295.93		167	295.85	
140	295.70		168	295.95	

8282.69 / 295.810

8282.41 / 295.80

Tube No.	Net Wt. (Gms)	Tube No.	Net Wt. (Gms)
169	295.80	197	295.70
170	295.85	198	295.74
171	295.87	199	295.65
172	295.60	200	295.63
173	295.67	201	295.84
174	295.94	202	296.00
175	295.93	203	295.83
176	295.60	204 EMPTY NOT USED	
177	295.85	205	295.70
178	295.65	206	295.60
179	295.95	207	295.85
180	295.85	208	295.83
181	295.87	209	295.65
182	295.83	210	295.63
183	295.85	211	295.64
184	296.00	212	295.63
185	295.84	213	295.84
186	295.65	214	295.85
187	295.80	215	295.60
188	295.61	216	295.76
189	295.85	217	295.63
190	295.75	218	295.83
191	295.65	219	296.00
192	295.70	220	295.71
193	295.75	221	295.82
194	295.85	222	295.70
195	295.85	223	295.67
196	295.85	224	295.73
8282.76 /	295.795	7985.06 /	295.742

GRAND TOTAL WT OF 279 TUBES 82533.26 g

AVG WT OF EACH TUBE 295.818 g

Tube No.	Net Wt. (Gms)		Tube No.	Net Wt. (Gms)
225	295.82		253	295.71
226	295.95		254	295.83
227	295.92		255	295.95
228	296.00		256	295.63
229	295.91		257	295.85
230	295.77		258	296.00
231	296.00		259	295.98
232	295.62		260	295.82
233	295.85		261	295.60
234	295.67		262	295.95
235	295.99		263	295.87
236	295.81		264	295.83
237	295.90		265	296.00
238	295.77		266	295.83
239	296.00		267	295.96
240	295.98		268	295.61
241	295.95		269	295.96
242	295.80		270	296.00
243	295.75		271	295.61
244	295.88		272	296.00
245	295.82		273	295.85
246	295.82		274	295.75
247	295.90		275	295.77
248	295.75		276	295.83
249	296.00		277	295.75
250	295.64		278	295.85
251	295.81		279	296.00
252	295.62		280	295.85
8283.70 /	295.846		8283.64 /	295.846

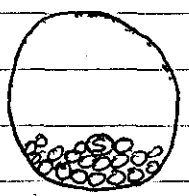
9/19/62

C.A. _____ Expr. _____ Run _____

Sheet _____ Date _____

Purpose: Multiplication of UOxide Elements in 9.5" Diamter can.

Loaded manualy in can placed on fixed side of Horizontal table



10^7 PoBe source inside tube positioned roughly as shown

1. 3 = Tubes:

	Counter # 2			# 3	
Time	Tot. Counts	Cpm.	Time	Tot Counts.	Cpm
5	14358	2872	5	1249	249
5	14470	2894	5	1209	242
5	14689	2938	5	1312	262
		Avg 2901			Avg 253

ICM 1.000

ICM 1.000

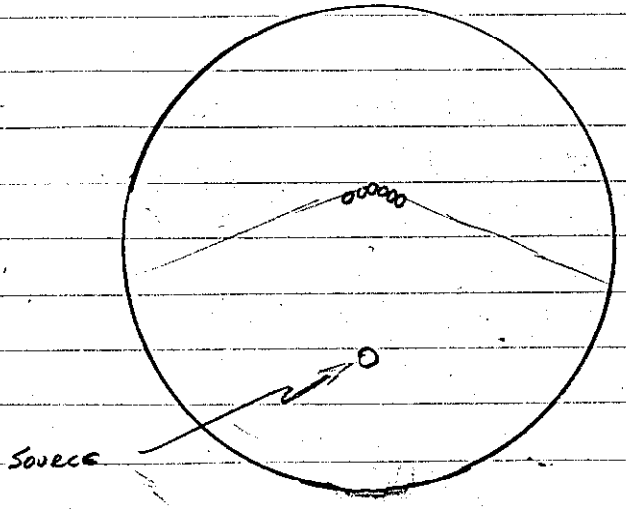
		Counter #2			Counter #3	
2. 40 Tubes:	t	Tot. cts.	CPM	t	Tot cts	CPM
	5	16567	3313	5	1228	246
	5	16705	3341	5	1241	248
	5	16142	3228	5	1202	240
			Avg 3294			Avg 245
	Item	0.881				
3. 50 Tubes:			3799			
	5	$296\frac{50}{=}(64)$	~~3794~~	5	$21\frac{1}{=}(64)$	269
	5	$294\frac{30}{=}$	3769	5	$21\frac{17}{=}$	272
	5	$295\frac{26}{=}$	3781	5	$20\frac{62}{=}$	268
			Avg 3783			avg 270
		0.767			0.937	
4. 60 Tubes:	5	$228\frac{3}{=}(64)$	2919	5	$23\frac{49}{=}(64)$	304
	5	$228\frac{8}{=}$	2920	5	$23\frac{18}{=}$	304
			avg 2920			avg 304
		0.993			0.832	
5. 70 Tubes:	5	$239\frac{11}{=}(64)$	3072	5	$24\frac{23}{=}(64)$	312
	5	$240\frac{16}{=}$	3075	5	$23\frac{12}{=}$	297
			avg 3074			304
		0.944			0.832	

6

7.

8.

9.



9.

10.

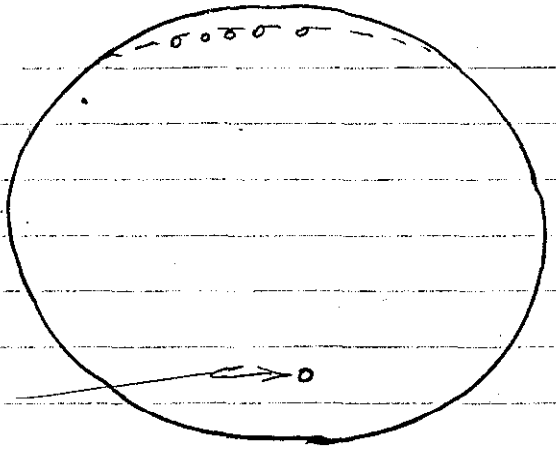
11.

20 Sept 62

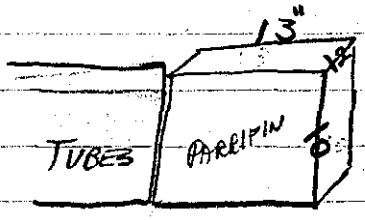
		Counter #2			Counter #3	
		t	Tot. cts.	cpm	t	Tot. cts.	cpm
6.	90 Tubes:	5	$261\frac{35}{=}(64)$	3348	5	$25\frac{51}{=}(64)$	330
		5	$263\frac{28}{=}$	3372	5	$24\frac{52}{=}$	318
				avg 3360			avg 324
			0.863			0.781	
7.	110 Tubes:	5	$272\frac{30}{=}(64)$	3488	5	$26\frac{50}{=}(64)$	343
		5	$278\frac{52}{=}$	3569	5	$25\frac{47}{=}$	329
				avg 3529			avg 336
			0.822			0.753	
8.	140 Tubes:	5	$295\frac{20}{=}(64)$	3780	5	$27\frac{26}{=}(64)$	351
			$295\frac{52}{=}$	3786		$28\frac{18}{=}$	362
				3783			357
			0.767			0.709	
9.	180 Tubes:	5	$316\frac{53}{=}(64)$	4055	5	$28\frac{51}{=}(64)$	369
			0.715			0.686	
10.	220 Tubes:	5	$340\frac{40}{=}(64)$	4360	5	$30\frac{42}{=}(64)$	392
			0.665			0.645	
11.	260 Tubes:		$361-(64)$	4621		$33\frac{26}{49}(64)$	428
			$349\ 51$	0.628			0.591
				avg 4472			632
			0.649				0.400

12.

NOT ROUND



13.



12. 279 TUBES

	COUNTER #2		COUNTER #3	
t	TOT. cts	CPM	t	TOT cts CPM
5	$357\frac{49}{64}$		5	$12\frac{25}{64}$
5	$362\frac{38}{64}$		5	$11\frac{129}{256}$
		avg 4610		avg 604
	0.629			0.919

13. 279 TUBES WITH PARAFIN AT END OF TUBE CONFIGURATION.

5	$694\frac{50}{64}$	8893	5	$30\frac{48}{64}$ 394
5	$696\frac{36}{64}$	8916		$36\frac{15}{64}$ 464
5	$698\frac{17}{64}$	8937		$38\frac{15}{64}$ 489
		avg 8915		avg 449
	0.326			0.564

Core tank – Al – 2.34 Kg
tank Lid 341 gm
Small shim 5.023 x 14
Large shim 15.855 x 14

12 × 5.31 = 63.72 gm

12 × 17.21 = 206.52 g

A. Shinde

INSTRUMENT CHECK

Time 9:00 AM PM Source Pu Be

		Channel A	B	C	D	E
Tables OK	F	10/1000	opr	1050	10/1000	1050
Range	OK					
Source Dist.	Light	1"	OK	38"	1"	1"
% F.S. Trip	ok	100		100	100	100

Source M-226 beside reflector

1)

C.A. _____ Expr. _____ Run _____

Sheet _____ Date _____ 19 __ Time _____ AM PM

Purpose 5 - cm or Dam + 6" Bottom reflector - 1/2" Radial reflector one significant multiplication

Zero
#1 - 22,33
#2 - 22,512

2)

C.A. _____ Expr. _____ Run _____

Sheet _____ Date _____ 19 __ Time _____ AM PM

Purpose 6 in. Top reflector 20" OD placed on upper half. - No increase the count rate on closure

5^{23}

3) Top reflector removed. 5.5" Side Reflector added

Table position	#2 256
0	2^{+93} 1 min
	2^{+79}
4"	2^{+40}
	2^{58}

	#1	#2	1 min
10"	0 +3	2 +64	
16"	0 +33	2 +226	
	0 +9	3 +52	
20.2"		3 +62	
		3 +109	
22.33"		3 +32	
		2 221	

4. Added 1" more of radial reflector + 1/4 of top reflector

10.06"	2 +47	X 256
14.07"	2 221	
16.125"	3 103	
20.185	3 246	
22.33	3 159	
	3 233	

5. Added 3 more inches of top reflector
6.5 in Side refl
4.0 in. top reflector

10.02 in 2^{+75} X 256

16.00 in 3^{185}

20.00 in 5^{+158}

22-335" (up) 7^{+49}

6 added 1" radial reflector (graphite)
7.5" reflector Present

10.00" 41^{+8} X (16)
2^{+149} X 256

16.04" 4^{+200}
4^{+237}

20.00" 19^{+185}
20^{+161}

20.60" 37^{+198}
21.00" 100^{+172}
21.10" 157^{+227}
21.20" looks super with M-226 Source

7 Removed ½" radial reflector. 7" Refl. Present Placed source # in ½" center radial hole.

10.00"	0 +17	x216 / min.
	0 +16	
16.08"	0 +34	
	0 +30	
20.12"	0 +160	
	0 +150	
22.33" up	3 +46	
	3 +56	

Added ½ in radial reflector

C.A. _____ Expr. _____ Run 8

Sheet _____ Date 11-16-1962 Time 2:30 AM PM

Purpose Obtain Critical Condition

6.0" Reflector on Top and Bottom
7.5" Radial Reflector

@ 21.50" positive period = 28.9 on
20.0 f

#1 21.238 #2 21.415 = Level

C.A. _____ Expr. _____ Run 9
Sheet _____ Date _____ 19 ___ Time 3:10 AM PM
Purpose Obtain Crit Condition
Removed 1" Refl from Top.

1.8 div.
@ 22.05 Position Period = 39.08 Sec
18.1 ¢
#1 = 21.78 #2 = 21.95 — Level

C.A. _____ Expr. _____ Run 10
Sheet _____ Date _____ 19 ___ Time _____ AM PM
Purpose Obtain Critical
Removed 1" Refl. from Top

Sub Critical

C.A. _____ Expr. _____ Run 11
Sheet _____ Date _____ 19 ___ Time 4:00 AM PM
Purpose Obtain Critical
Removed Center fuel tube
~~Added 1" Refl to Top.~~

Sub critical

11-19-62

INSTRUMENT CHECK

Time 9:30 AM ~~PM~~ Source Pu Be + γ

		Channel A	B	C	D	E
Range	F	10/1000	opr	10^{-1}	10/1000	1050 V
Source Dist.	OK	4"	0"	36"	3"	1.5"
% F.S. Trip		100	OK	100	85	

Cts #2 - OK

INSTRUMENT CHECK

.437"

Time AM PM S.

S.A.

Sheet 12 Date Time AM PM

Purpose Obtain Critical Condition

Source Dist.

% F.S. Trip

Condition : 6" Refl on Bottom
5" Refl on top (20" dia)
7.5" Radial Reflector
Center fuel tube removed.
Large Radial holes pluged.
Small Radial holes pluged with .437" Plugs.
Axial hole in top open except for small axial fission Counter inserted in same.

VDT #3 = +14
#4 = +13

Scaler #1 = 22.33
#2 = 22.506

Positive Period =

12 b Lower Table to 22.30 on selsyn #1 VDT #3 = -17.5
22.46 on #2 #4 = ~~-26.5~~ off

Positive Period —

The above period diffrence, Probably Caused by a shift in zero point when graphite was loaded on top plate.

Level selsyn # 1 = 22.26 #2 = 22.4285

C.A. _____ Expr. _____ Run 13
Sheet _____ Date _____ Time _____ AM PM
Purpose To check up position of table

Placed .001" Starrett guage on top of graphite to determine when core is in the up position.

VDT #3 = +10 Selsyn #1 = 22.30
#2 =

C.A. _____ Expr. _____ Run 14

Sheet _____ Date 11-19-1962 Time _____ AM PM

Purpose An attempt to evaluate Center fuel element (#189)

Center fuel element out (See Run 11)

14 a Positive Periods - 255 Sec. = 4.5¢

VDT ~~#3 #4~~ 8 Selsyn #1 = 22.315

#4 = 12.3 #2 = 22.478

b Level - VDT #3 = off Selsyn #1 = 22.28

4 = " #2 = 22.440

c Negative Period — 298 Sec

5.0¢ #1 = 22.21

#2 = 22.372

Center fuel element in position

15 a + Period - 15.2 Sec. = 24.93¢ 22.10

f - Period - 228 Sec. 21.375

6.9¢

11-20-62

INSTRUMENT CHECK

Time 9:10 AM ~~PM~~ Source Sb Be # 8

	Channel A	B	C	D	E
Range	10/1000	off	10^{12}	10/1000	1050 V.
Source Dist.	6"	0"	48"	3"	1.5"
% F.S. Trip	100	9%	100	85	100+

Ch #2 9%

C.A. _____ Expr. _____ Run 16

Sheet _____ Date _____ 19 __ Time _____ AM PM

Purpose To Evaluate Center Fuel Tube.

Center fuel tube removed.

16a Positive Period ~~2.16 ¢~~

VDT #3 = +12.0 Selsyn #3 = 22,308

#4 = 1. #4 = 22.478

b Negative Period Log N = 146.5 Sec. #3 = 22.10

Log N = 12.65 ¢ #4 = 22.272

A - $\frac{90}{35}$ - 150 sec

CRM - $\frac{80}{30}$ - 150 sec - Center element out

C - $\frac{62}{29}$ 300 sec

LN

17a Placed Center tube in position

@ Log N - 2 Decades in 81 sec #3 22.10

Factor of 2 increase Center element in

Pos Period C - 12.77 sec

A - 12.53 Log N = 15.9 Sec

D - 11.31 24.4 ¢

17b Level — Selsyn #1 = 21.67
#2 = 21.840

C.A. _____ Expr. _____ Run 18
Sheet _____ Date _____ 19 __ Time _____ AM PM
Purpose To Evaluate graphite plug in foil holes of the reflector

18a Removed plugs from two (2) of the foil holes. Plugs = .437" dia
Holes = .500" "

Negative period — 478 Sec Selsyn #1 = 21.67
2.95 ¢ #2 = 21.845

19a Irradiation of 1 u foil to determine ~~Rotation~~ power level for flux traverses.
Log N = .01 → .02 Selsyn #1 = 21.67
Time = 15 min #2 =

Speed Chek on ultra slow positioning device —
10 mils travel = 45 Seconds
Total travel — selsyn #1 = 6.120 to 6.188
Time = 5 min 5 sec #2 = 6.314 to 6.374
#1 = 68 mils
#2 = 60 mils

Counts @	E = 400	Time after Shutdown
1 minute	40,326	20 min
	38,495	22 "
	E = 500	
	26,514	25 min
	E = 600 – 17,875	27 "
	E = 300 – 44,185	30 "

1.67
1.845
1.88
374

11-21-62

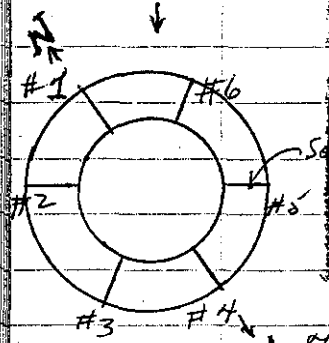
INSTRUMENT CHECK

Time 1:00 AM/PM Source PuBe + γ

	Channel A	B	C	D	E
Range	1000	Off	10^{-12}	100	1050 V.
Source Dist.	6"	0"	36"	1.5"	1"
% F.S. Trip	100	OK	100	OK	100 +

Ch #2 OK

½" Radial Holes



C.A. Run #20

Sheet Date 11-21-62 Time 1:30 AM/PM

Purpose: Foil Exposure

U^{235} .295" dia .004" Thick

6" Bottom, 5" Top, 7½" Radial Refl.

Center fuel tube removed.

Foil pos.		Radial Hole
0 CM	Bare	1-U-12
5.5 CM.	"	1-U-17
13 CM.	"	1-U-16
Top 2 3/8	"	Horiz-U-22
.5 CM.	"	2-U-4
8 cm.	"	2-U-21
16 cm.	"	2-U-14
1.0	"	3-U-8
10.5	"	3-U-19
		4-Source
0 CM.	Cd Cord	5-U-3
5.5 Cm	"	5-U-2
13.0 cm	"	5-U-10
1.0 cm	"	6-U-11
10.5 Cm	"	6-U-18

Log N = .01 → .022

Time = 20 min

Selsyn #1 = 22.2 ±

#2 "

11-27-62

INSTRUMENT CHECK

Time 8:25 AM PM Source Rube + γ

		Channel A	B	C	D	E
Range	F	10/1000	opr	10^{12}	10/1000	1050
	OK					
Source Dist.		7"	0"	36"	1.5"	1.5"
% F.S. Trip		100	OK	100	80	100

C.A. _____ Expr. _____ Run 21

Sheet _____ Date 11-27-62 Time _____ AM PM

Purpose Foil Exposure

U^{235}, .298" dia., .004" thick

6" bottom, 5" top and 7½" radial reflector

Center foil tube out

X - Bare foils

⊗ - Cd covered

Radial Holes

Foil Position	1	2	6
0 cm		X-U-18	
2.0 "	X-U-1		⊗-U-20
3.5 "	X-U-5	⊗-U-23	
6.5 "	X-U-9		
8.0 "	X-U-7	⊗-U-24	
16.0 "	X-U-13	~~⊗~~	⊗ U-6

2¾" axial in top reflector X-U-25

UOT #3 = -13

#4 = 0

log N = .01 → .015

Time = 20 min.

Scl Sys # 1 = 22.28

2 = 22.453

C.A. _____ Expr. _____ Run 22

Sheet _____ Date 11-27-62 Time 3:10 ~~AM~~ PM

Purpose: Fission Counter Traverse.

6" Bottom, 5" Top + 7½" Radial Refl.
Center Tube out; 4 Radioleps in.

ERR

Gain 1,932
Bias 0.2 μa
Wipe =10

U^{235}

Selsyn

Up Position #1 = 22.30 Positive Period
#2 = 22.474

Count Position #1 = 22.215
#2 = 22.389

Selsyn for Counter set at 39.95 to give and Counter position ~ ½" from bottom of core when in the up position (22.30).

Counter (U^{235})

Selsyn	BF_3	U^{235}	Selsyn	BF_3	U^{235}
33.95	94 +121 X256	7 +16 X256	25.95	68 +215	4 +196
	101 +225	8 +45		61 +1	4 +97
32.95	111 +13	8 +170	24.95	53 +148	3 +89
	116 +66	9 +91		48 +93	2 +258
31.95	122 +28	10 +102	23.95	41 +212	2 +238
	126 +232	10 +146		86 +204	2 +205
30.95	126 +40	10 +187	22.95	32 +214	3 +41
	126 +184	10 +182		28 +117	2 +176
29.95	125 +119	10 +186	21.95	25 +93	2 +194
	121 +233	10 +172		21 +189	2 +91
28.95	112 +216	10 +42	20.95	19 +141	2 +4
	108 +117	9 +156		17 +154	2 +36
27.95	99 +125	8 +18	19.95	15 +130	1 +77
	89 +240	7 +40		13 +236	1 +78
26.95	82 +3	6 +57	18.85	11 +218	0 +163
	74 +143	5 +155		10 +116	0 +155
			17.95	8 +244	0 +88
				8 +16	0 +61

11-28-62

INSTRUMENT CHECK

Time 8:48 AM PM Source Pu Be + γ

		A	B	D	E
Range	F	10/1000	8K	10 / 1000	1050
Source-Dist.	OK	7"	0"	12"	2"	2"
% F.S. Trip		100	OK	100	85	100

ctr = 2 - OK

7.77

C.A. _____ Expr. _____ Run 23

Sheet _____ Date 11-28 1962 Time AM PM

Purpose Repeat Run 22

except

all radial plugs out

Reflector Control Mounted (9"x9"x1") Plexiglas

In up position for Counts.

UDT #3 = +10

#4 = out

Selsyn #1 = 22.30

#2 = 22.490

Log N = .015

Selsyn for U^{233} ctr.	BF_3	U^{233}
33.95	523 +33	41 +210
32.92	490 +234	42 +143
31.92	523 +200	42 +135
30.92	684 +210	+65
29.92	456 +2	58
29.42	597 +12	49 +72
28.92	61[illegible] +44	50 +245
27.92	599 +99	51 +189
26.92	573 +52	48 +188
25.92	587 +150	44 +243
24.92	597 +70	40 +96
		37 +140

Fission Counter Selsyn	BF_3	Fission counter
23.92	591 +145	37 +140
22.92	598 +141	37 +289
21.92	460 +115	50 +181
20.92	605 +251	64 +44
19.92	583 +32	39 +59
18.92	771 +196	43 +166
17.92	~~1~~944 +236	27 +236

24

Shift _____ Date 11-28-62 Time 1:30 PM

Purpose To obtain Critical Condition.

No Large (1" dia) radial plugs in outer 2" of Reflector
6" Bottom; 2" Top + 9½" Radial Reflector

3-½" Radial plugs in place.

Selsyn #1 = 21.37 Level
21.85 Super Critical.
22.30 Sub " .

2" Top Reflector is 20" in dia.

11-29-62

INSTRUMENT CHECK

Time 9:00 AM ~~PM~~ Source Pu Be + γ

	Channel A	B	C	D	E
Range	F $\frac{10}{1000}$	opr	10^{-2}	$\frac{10}{1000}$	1050 V.
Source Dist.	OK 7"	0"	42"	25"	1.8"
% F.S. Trip	100+	OK 100	80	100+	

C.A. _____ Expr. _____ Run 25

Sheet _____ Date 11-29-1962 Time AM ~~PM~~

Purpose Fission Counter Traverse

6" Bottom; 2" Top; 9½" Radial Refl,
3 - Rabbit plugs in. (½" dia)

VDT #3 = +10 Selsyn #1 = 22,30

#4 = out #2 = 22.49

Counts taken in up position.

Selsyn	BF_3	Fission	Fission / BF_3
33.92	$382^{+86} = 97,878$	$39^{+77} = 10,061$	1.0279
32.92	$479^{+99} = 122,723$	$49^{+85} = 12,629$	1.0290
31.92	$533^{+21} = 136,660$	$56^{+238} = 14,574$	1.0614
30.92	$559^{+228} = 143,332$	$60^{+42} = 15,402$	1.0745
30.42	$552^{+238} = 141,550$	$59^{+77} = 15,181$	1.0724
29.92	$531^{+43} = 135,979$	$54^{+33} = 13,857$	1.0190
29.67	$540^{+83} = 138,293$	$55^{+198} = 14,228$	1.0288
29.42	$533^{+43} = 136,491$	$55^{+72} = 14,152$	1.0368
29.17	$509^{+59} = 130,363$	$52^{+32} = 13,344$	1.0236
28.92	$488^{+57} = 125,241$	$48^{+238} = 12,526$	1.0001
28.67	$480^{+191} = 123,071$	$48^{+13} = 12,301$	.9995
27.92	$484^{+86} = 123,990$	$45^{+214} = 11,734$	.946
26.92	$484^{+42} = 123,946$	$42^{+241} = 10,993$	.886
25.92	$490^{+87} = 125,527$	$37^{+40} = 9,476$	.754
24.92	$489^{+242} = 125,426$	$30^{+238} = 7,918$	.631
23.92	$727^{+189} = 186,301$	$39^{+99} = 10,083$	.1341
22.92	$929^{+10} = 237,834$	$46^{+21} = 11,847$	.4498
21.92	$958^{+123} = 245,062$	$35^{+34} = 8,999$	1366

0.245" 6.009 23 +121 = 5.945" 0.62 5.7 +20 = 20.92

C.A. _____ Expr. _____ Run 26

Sheet _____ Date 11-29-1962 Time 11:30 AM ~~PM~~

Purpose Radial plug (½" dia)
Evaluation.
3 - Radial plugs in. (½" dia)
6" Bottom, 2" Top, 9½" Radial Reflector

Selsyn #1 = 21.86 > Most Reactive Position
#2 = 22.052

26 a Positive Period — 410 Sec = 2.92 ¢
C = 40 to 88 in 5 min
D = 35 to 70 in 250 Sec
A = 40 to 80 in 320 Sec

26 b Selsyn #1 = 22.30 > up Position
#2 = 22.489
Negative Period — 727 Sec = 1.87 ¢ = Log N
A = 57 to 29.5 in 400 Sec
D = 62 to 28 in 400 Sec
C = 50 to 29.5 in 300 Sec

'SSion/BF3
10
279
290
614
745
724
1190
288
368
236
1001
995
946
886
754
731
741
498
566

27a Added 2 - ½" radial plugs.
Selsyn #1 = 21.86
#2 = 22.051
Positive Period — 159 Sec = 6.75 ¢

27b Selsyn #1 = 22.30 > up position
#2 = 22.490
Positive Period. = ~~727 Sec 1.1 ¢~~
948 = 1.32 ¢

54

11-30-62

INSTRUMENT CHECK

Time 12:40 PM Source Pu Be & 8"

Channel		A	B	C	D	E
Range	F	10/1000	Opr	10^{-12}	10/1000	1050V
Source Dist.	OK	6"	0"	4'	2"	2"
% P.S. Trip		95	OK	100	80	100+

Ch #2 - OK

C.A. _____ Expr. _____ Run 27

Sheet _____ Date _____ 19 Time 1:00 PM

Purpose Check Critical Point

No radial plugs (½" dia)
6" Bottom; 5" Top; 7½" Radial Refl.

Selsyn #1 = 22.30 } Slightly Sub Critical
#2 = 22.489

C.A. _____ Expr. _____ Run 28

Sheet _____ Date _____ 19 Time _____ AM PM

Purpose Fission Counter Traverse
Report of Run 22 & 23

VDT #3 = +10 Selsyn #1 = 22.30
#2 = 22.487

Delays for Fission Ctr	BF_3		Fission Counter			55 Ratio
33.88	183	+137	46,985	16	+5	4101	.08728
		147			+193		
32.88	362	45	97,819	32	140	8,332	8976
31.88	328	47	84,013	29	111	7564	9000
30.88	272	197	69,673	25	132	6,511	9345
29.88	422	226	108,229	39	137	10,116	9346
28.88	544	14	139,490	49	248	12,681	90909
28.88	348	52	89,102	30	240	7,928	88976
28.38	480	235	122,932	41	28	10,736	87332
27.88	440	209	112,875	38	123	9,756	86431
26.88	492	123	126,161	40	35	10,363	82141
25.88	421	164	107,899	31	121	7971	73874
24.88	500	98	128,164	33	233	8,569	66859
23.88	580	116	148,587	40	232	10,473	70484
22.88	426	66	109,172	42	207	10,984	100611
21.88	480	218	122,946	54	187	14,031	114123
20.88	533	104	136,666	59	17	15,291	111885
19.88	585	103	149,864	54	70	13,841	92357
18.88	447	125	114,533	26	113	6726	5872
17.88	492	24	126,077	15	124	3953	31357
16.88	539	115	138,008	16	54	4220	30578
22.38	604		154,739	64		16,438	10623

12-3-62

INSTRUMENT CHECK

Time ____ AM / ____ PM Source Pu Be + X

	Channel A	B	C	D	E
Range	F 10/1000	Off	10^1 0	10/1000	1050 V
Source Dist.	OK	8"	0"	4'	2.5"	1.5"
% F.S. Trip	85	OK	100	80	100+

Ctr #2 = OK

C.A. ____ Expr. ____ Run 29

Sheet ____ Date ____ 19 ____ Time ____ AM / ~~PM~~

Purpose To obtain critical for pulsing.

Reflector { 6" on Bottom / 3" on Top (20" dia) / (7½" Radial }

Center fuel tube out; large radial plug in #1 plus 2" of a plug in #2, Spiral fission in #3.
Accelerator on east side.
Scintillation Counter of west side.
VOT #3 = +10 Selsyn #1 = 22.30

Run A ∞

B Chan A 52 to 55 in 500 Sec D ~~33.5 to 38 in 75~~ 71 to 76 in 400 Sec C 75 to 80 in 300 Sec

C 35 to 40 in 850 Sec 31 to 42 in 800 Sec 86 to 94 in 600 Sec

D 72 to 80 in 700 Sec 33.5 to 38 in 750 Sec 65 to 67 in 600 Sec

12-4-62

INSTRUMENT CHECK

Time A.M. P.M.

	A	B	C	D	E
Range	F	10/1000 Oper	10	10/2000	1050V
Source Dist.	OK	9"	4'	2.5"	1.5"
% F.S. Trip		80	100	85	100+

Ato #2 - OK

C.A. Expr. Run 30

Sheet Date 19 Time A.M. P.M.

Purpose Fission Counter Traverse (Axial).

Conditions same as p. 56,

Selsyn	BF_3			Fission			Ratio Fission/BF_3
30.88	394	+148 233	101,012 112,361	47	+36 17	12,068 13,329	1.1947
30.38	438			52			1.1862
29.88	465	207	119,247	55	127	14,207	1.1914
29.38	477	83	122,193	55	232	14,812	1.1712
28.88	478	113	122,481	54	46	13,870	1.1324
27.88	460	228	117,988	51	60	13,116	1.1111
26.88	452	107	113,819	46	170	11,946	1.0314
25.88	446	208	114,384	41	108	10,604	0.9270
24.88	444	192	113,856	36	252	9468	0.8316
24.38	448	253	114,941	36	236	9452	0.8223

Selsyn	B_7		Fission		Ratio Fiss/B_7
23.88	462	169 118,441	39	98 10,082	0.8512
22.88	465	241 119,281	54	244 14,068	1.1793
21.88	465	140 119,180	63	137 16,265	1.3647
20.88	455	109 116,589	62	102 15,974	1.3701
20.38	458	69 117,317	58	98 14,926	1.2722
19.88	466	156 119,452	53	160 13,228	1.1492
18.88	476	25 121,881	34	104 8808	0.7226
17.88					

up Position Selsyn #1 = 22.30

VDT #3 = +10

Positive period — 129.2 Sec

8.05 *

12-5-62

INSTRUMENT CHECK

Time 10:25 ~~PM~~ AM Source Pu Be + γ

Range	F	$\frac{10}{1000}$	opr	10^{12}	$\frac{10}{1000}$	1000
Source Dist.	OK	9"	0"	4"	2"	2"
% F.S. Trip		85	OK	100	80	100+

Ctr #2 - OK

C.A. _____ Expr. _____ Run 37

Sheet _____ Date 11-5-62 Time _____ AM PM

Purpose Fast Exposure

Refl { 6" Bottom, 9" Top, 7½ Radial } Center fuel tube out, 5 radial plexiglas (½" dia) Vertical plexi

Position (CM)	#1	#2	#3
0.0	V-1		
0.5		@ V-6	V-9
2.0	V-2		
3.5			V-10
5.0	V-3		
6.5			V-11
8.0	V-4	@ V-7	
13.0	V15	@ V-8	

Vertical $2\frac{3}{8}$" - V-12

Crit: Selsyn #1 = 22.19° Log N = .015

#2 = 22.38° A = 52 @ $\frac{1000}{200}$

Time: 20 min D = 60 @ $\frac{1000}{200}$

S.A. _____ Expr. _____ Run _____
Sheet _____ Date _____ Time _____ AM PM
Purpose Reactivity Measurement of
7.5" Radially reflected assembly
All holes plugged

Al tube only in top hole
146 second period Two measurements
142 second period

S.A. _____ Expr. _____ Run _____
Sheet _____ Date _____ Time _____ AM PM
Purpose Reactivity Measurement of 9.5"
Radially reflected assembly. All
holes plugged except the source hole

Al tube in top hole and source hole

Positive Period + ~~785~~ sec
343 seconds

Core tank wt 3.387 Kg

					Avg
ID	10.024	10.024 (10.0225)	10.021	10.024	10.023
OD	10.220				
H					
t (side)	.103	.101 .100	.100	.100	.099
t (bottom)	.146	.143	144	141	

Al lid wt

t

SS lid wt

t

Normal grid plate 2 weigh 278 gms

Lower graphite reflector 17.207 gms

H	9.00	9.001
DIA.	10.008	10.008 in

4 SS guide tubes = 150 gms

12 al clips = 27.551 gms
10 washers = 0.725 gms
10 adj screws = 3.841 gms
10 3/8 set screws = 1.607
10 1/4" set screws = 2.210 gms

Graphite Weights

Donut 6435

3-14-63

INSTRUMENT CHECK Pu B.

Source δ

Time 1:45 ~~AM~~ PM

		Channel A	B	C	D	E
Tables O/C						
Light O/C	F					
Range	O/C	10/1000	apn	X	10/1000	1050
Source Dist.		4"		2'	1"	8"
% F.S. Trip		100		100	70	100

3 BF_3 cnts operating satisfactorily

VDT #3 = 5.25 22.32 up on selsyn #1

#4 = -6.75 22.31 #2

C. Source # 563 Expr. II Run 1

in ½" Radial hole

Sheet Date 19 Time AM PM

Purp. Initial Loading of UO_2 core with 10" Radial reflector - except for 3" at top of core - no top reflector 9" Bottom reflector

2 min cts

cts #1 = 5+6

#2 = 0+198

#3 = 3+74

	#1 (x256)	#2 (x256)	#3 (x256)
2 min	10 + 247	1 + 126	6 + 21
	11 + 10	1 + 204	5 + 158

Run 2 10" Radial Reflector; 9" Bottom Reflector; No top reflector.

14 + 189	2 + 113	8 + 201

Run 3 Add 3" top reflector

29^{+79} 4^{+124} 13^{+193}

Run 4 Removed 3" top reflector added 6" top reflector

Pulled off magnet just about closure.
moved plunger up ~ 15 mils.

Run 5 added an additional 1" top top

122^{+18} 18^{+29} 50^{+69}

INSTRUMENT CHECK P.B.

Time 8:15 AM ~~PM~~ Source 2

Tables OK
Light OK
Range

Channel	A	B	C	D	E
F	$\frac{10}{1000}$	opr	X	$\frac{10}{1000}$	1050
OK					
Source Dist. SCRAM	2"		2'	2"	10"
% F.S. Trip TEST	90		100	60	100

C.A. _____ Expr. _____ Run 6

Sheet _____ Date _____ 19 ___ Time _____ AM PM

Purpose: Added 2 more in top reflector
9" Top 10" Side 9" Bottom

~3 mil before closure weight of top reflector pulled table off magnet. Up position of table lowered 10 mils.

I 1" Radial reflector Added. 11" RADIAL Reflector

I Added one inch of top reflector

Removed large source 10^7 and replaced with 10^5 source.

Assembly supercritical ~ 20 sec period
11 radial refl
10 top reflector
9 bottom reflector.

C.A. 7
Sheet Date Time AM PM
Purpose Top reflector 9.5" Axial hole open
Side reflector 11."
Bottom reflector 9"

All radial holes filled except the source hole
Center fuel element in
Super critical ~ 20 sec period 60 mil separation

Removed center fuel element
Positive period T =

UOT #3: 9.0 Silver #1 = 22.29
#4 = 7.0 #2 = 22.27

E.A. _____ Expr. _____ Run 8

Sheet _____ Date _____ 9 Time _____ AM PM

Purpose 9 1/4" Top reflector

11" Radial 9" Bottom

Center fuel tube out. All holes plugged except one radial + axial.

Slightly negative period.

A	D	C
$\frac{45}{40}$ in 650 sec	$\frac{61}{57.5}$ in 500 sec	$\frac{72}{68}$ in 300 sec

3-18-63

INST

Time 8:45 AM PM — R.B.

Tables OK

Light OK

	A	B	C	D	E
Range	F	$\frac{10}{1000}$ opr	X	$\frac{10}{1000}$	1050
	OK				
Source Dist.	8"	OK 3'	1"		6"
% F.S. Trip	60	100	80		100

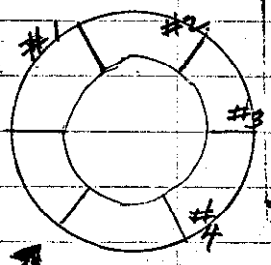
9

C.A. _____ Expr. _____ No. _____

Sheet _____ Date 3-18-1963 Time 9:00 AM PM

Purpose Foil Exposure, Bare
5/16" dia; .004" thick; U 233

Radial 3/16" dia. Holes



Soure Entrance

Tube #1 [E-N] Hole 1

Position	#
½ Cm	U-4
8.5	U-7
17.0	U-10
26.5	U-20

Tube #2 [E-S] Hole 2

Pos.	#
3.0 Cm	U-2
11.7	U-13
20.7	U-11

Tube #3 [W-S] Hole 4

6.5	U-6
14.5	U-14
24.5	U-12

Vertical [Top Reflector]

8.75	3.44"	U-8
11.75	4.63	U-17
14.75	5.81	U-22

Log N = 1001 → 0036

Exposed = 13 min

C.A. _____ Expt. _____ Run 10

Sheet _____ Date _____ 19 ___ Time _____ AM PM

Purpose Foil Exposure, Bare + Cd Covered, .295" dia.; .004" thick; U^{235}

Tube #1 (Hole 1)

Pos	#	
½ cm	U-3	Bare
12 "	U-18	"
24 "	U-1	"

Tube #2 (Hole 2)

Pos	#	
6 cm	U-16	Bare
18 "	U-21	"

Tube #3 (Hole 3)

½ cm	U-14	Cd Covered
12 "	U-15	"
24 "	U-23	"

Tube # (Hole 4)

6 cm	U-5	Cd Cov
18 "	U-24	"

Log N = .001 → .005'

Exposed = 15 min

74

3-19-63

INSTRUMENT CHECK

Time 9145 AM PM Source Pu Be + γ

	Channel A	B	C	D	E
Range F HV = 8	~~10~~ 1000	opn	X	~~10~~ 1000	1050
Source Dist. OK	9"	0	22"	2.5"	6
% F.S. Trip Ctr #12 OK	70	OK	100	85	100+

C.A. _____ Expr. _____ Run 11

Sheet _____ Date 3-19-1963 Time 11:00 ~~AM~~ PM

Purpose Fission Counter Traverse

U 235 Fission Counter

Gain 1 - 32 Rise 0.2 ms Min 8.0

VDT #3 = 8.25 Delays #1 = 22.29

Δ4 = 5.5 #2 = 22.271

Graphite nuts

Top 3,2925

4 - 20" dia ; 3¼" Thick — 28.5 Kg.

6.003 6.004 6.002 1 - 30" dia 6" " — 124.1 Kg

Bolts + Washers — .5 Kg.

for lifting in during exp.

Side Refl

10.291 I.D.

3.000 3.003 3.004 3" Thick ; 30" O.D. 55.0 Kg.

5" " inside Refl. 127.4 Kg

2" " " + plugs 73.2 Kg

2" " " + plug 87.2 Kg.

2" outside Refl. 100.8 Kg.

Reflector I.D = 10.288"

Thickness = 10.998 10.985 10.960

11.015 10.960

11.000 10.960

10.9825

INSTRUMENT CHECK

Source: Pu Be + γ

8:45

6-7-63

	F	A	B	C	D	E
MIHALCZO						
LYNN	KN = 8	$\frac{10}{1000}$ cpm	x	0	1050 V	
TAYLOR	OK	12"	0	30"	4	8"
		75	OK	100	T	100+

Ctr #2 = OK

C.A. Snap Expr. III Run 1

Sheet Date 6-7 19-63 Time AM PM

Purpose To obtain Crit Assembly with Be Refl.
3" Be Refl. Top and Bottom
2" Be Radial Reflector

VDT
#3 = +4
#4 = +9

Selsyn #1 = 22.573
#2 = 22.405

Source on top of top Be.

1 Min. ctr #2 = 5^{+194} (x256)
5^{+192}

Run 2 3" Be Refl. Complete.
ctr #2 = 2 min 8^{+5h} (x256) 7^{219}
VDT #3 = +3 Selsyn #1 = 22.479
#4 = +8 (?) #2 = 22.335

Run #3 | 3" Be TOP, 3¼" AROUND CAN, 3" Be BOTTOM | 2 min ctr #2 (x256) = 8 +156, 8 +88

VDT's & Selsyn's Same as #2 Run

Run #4 | 3" Be TOP, 3¾" Be around can, 3" Be BOTTOM | 2 min ctr #2 (x256) = 15.25, 15.01

VDTS & Selsyns near same

Run #5 | 3" Be TOP, 4" Be around can, 3" Be Bottom | 2 min ctr #2 (x256) = 19.80, 20.15

VDT #3 = +3.2 ; #4 = +9.1 (?)

Selsyn #1 = 22.455 #2 = 22.318

Run #6 | 3" Be TOP, 4½" Be around can, 3" Be Bottom | 2 Super Crit #2 = 22.35-

Run #7 3" Be on Top
4½" Be around can
Center fuel tube removed
Using small "control panel" source.
3" Be on Bottom

Measured Positive period:

Log N	60 / +40.5 sec	40.5	+ 18.8¢	17.57¢
Counter	75.4 / 2e.9 in 48 sec	48	+ 16.6¢	
A	60 / 50 in 50	45.5	+ 17.3¢	

Run #8 2¾" Be on top
4½" Be around can
3" Be on Bottom
all fuel tubes used

VDT #3 = +2.2 #42 +5 (5) Site on Delayn #1 = 22.433 #2 = 22.295

* Measure Positive Period

Log N = 4.25(21.7147)	92.3	+92.3	+ 10.45¢	10.1¢
Ch #2 =	92.5 sec	+92.5	+ 10.4¢	
Chan A = 91/37.5(100)		+112.6	+ 8.95¢	9.47
80.5/29.2(100)		+98.5	+ 10.0¢	

84 * Stainless Steel Reactivity Coeff.

Run #9 2¾ on top; 4½ around can; 3" on Bottom; all fuel in; # 46 SS. tubes distributed in core.

VDTs = off scale
Selsyn #1 = 22.385 #2 = 22.246

Measure Positive Period:

ctr #2 = 74 sec	74.0	+ 12.4¢		
Log N = 3.33 x 21.7147	72.3	+ 12.6¢		12.47¢
Chan A = 59/31 (50)	82.0	+ 11.4¢	12.4	
72/41.5 (50)	67.0	+ 13.3¢		

Run 10a Removed 46 SS Pins from core
Measured Positive Period Selsyn 1 22.433
#2 22.2945

Report of run 8

Log N 4.3 (21.7147)	93.4	+ 10.4¢		
Counter 103.2 sec	103.2	+ 9.62¢		11.2¢
A 50.5/3.7 (50)	57.9	+ 14.7¢	13.44	
53.5/24 (50)	70.6	+ 12.7¢		

10b Measure Positive period #1 22.38
#2 22.245 V

Log N ~~100/41~~ 10.8 (21.7147)	= 235 sec	+ 4.82¢		
Counter 100/41 in 270. sec	4.26¢	+ 4.26¢	4.55¢	
A 83/12.5 (~~480~~)	253	+ 4.56¢		

Run 10 b vs Run 9 = 7.92¢ for 46 SS Rods

* Reactivity of 1/16 AL Lid

Run 11a 1/16 AL Lid in Place. Lid Typed in most down tight

Measure Positive Period

#1 22.378
22.246

Log N +71 sec	+71	+ 12.7¢		
Counter +	70.35	+ 12.8¢		12.4¢
A 85/28 (100)	90.3	+ 10.7¢	11.7	
65.5/32.5 (100)	71.1	+ 12.7¢		

17¢

Run 12a Reactivity of 1/8" AL Lid

Measure Positive Period

#1 22.385
#2 22.245

Log N ~~32.6 sec~~	30.76 sec	+ 22.2¢		
Counter 32.6 sec	32.6	+ 21.5¢		20.88¢
A 100/33 in 50	45.1	+ 17.5	18.95	
98/24 in 50	35.6	+ 20.4		

12b AL Lid : Removed

Positive Period

Reference run
#1 = 22.390 · #2 = 22.246

Log N = 201.9	201.9	+ 5.5¢		
Ch #2 = 66/14.5 in 420 sec	~~420~~ 277	+ 4.16¢	4.26¢	
Chan A = 92/36.5 (350/~~375~~)	329	+ 3.12¢		

55¢

Run 13a 1/8" Steel Lid

Log N = 3.3(21.7147)
CH_2 -
Chan A - 66/38(50)
90.5/23.5(100)

71.6 + 12.6
74.2 + 12.4
90.2 + 10.6 } 11.7
74.2 + 12.8

} 12.23

90 Columbium Rods = 1050 gms

Wright of Reactivity Samples

23 Graphite Rods = 82 grams
8 CH_2 Rods = 18.42 grams
46 SS Rods = 871 grams
46 W Rods = 2110 "
1/16 al lid = 226 "
1/8 al lid = 464 "
1/8 SS lid = 1290 "

#3 - wt of cylindrical core can = 13,372 grams
#2 - " " " (with crack) = 13,500 gms
#1 - WT. OF EMPTY SNAP CYLINDER 2125 grams
- TOP AL Be Container (5" side) EMPTY 4381 "
+3" Be + 28 TIGHTENING BOLTS 23350 "
- WT. OF 28 TIGHTENING BOLTS - 304 " (0.010857 kg per bolt)
- BOTT. Container and 8 bolts before slight alteration 5597 "
- WT. OF BOTTOM after alteration +3" Be + 28 bolts + Empty Snap cylinder 26610 "

NOTE: More wt Pg 11

6-10-63

INSTRUMENT CHECK

Time 8:20 AM ~~PM~~ Source Pu Be + S

		Channel A	B	C	D	E
	F	10				
Range	Hv = 8	1000	Opr	X	0	1050 V.
Source Dist.	ok	14"	ok	30"	4	12"
% F.S. Trip		80	1	100	T	100+

Ctr #2 = ok

C.A. Snap Expr. III Run 14

Sheet ____ Date 6-10-1963 Time ____ AM ~~PM~~

Purpose Reactivity Measurements.

Loading: See Run 8

Run 14a Placed 46 Tungsten Rods in core distributed same as S.S. (Run 9)

UDTs = off Selsyn #1 = 22.365

#2 = 22.241

Measured Negative Period 1237 at Shutdown

Log N	= -1097	-1.23¢	1.11¢
Ctr # 2	= -1199	-1.12¢	
Chan "A"	= -1358	-0.99¢	

* Forty-six W Rods = -4.27¢

Run 14 b Base Run.

UDTs = off Selsyn #1 = 22.38
#2 = 22.241

Measured Positive Period.

Log N =		391 sec pd	+ 3.04
Ctr #2 =	$\frac{4}{1}$ (850 sec)	375 sec pd	+ 3.16
Chan "A" =	$\frac{45.4}{68.5}$ ($\frac{150}{75}$)	= 456 " "	+ 2.66
	$\frac{79}{24.9}$ ($\frac{450}{225}$)	= 293 " "	+ 3.98
Chan "C" =	$\frac{98.2}{45.0}$ (300)	= 387	+ 3.02

> 3.32 → 3.12

14 c Distributed twelve (12) polythelene rods through out Core.

Super Crit. (No Measurement)

14 d 8 pieces of polyethylene

Counter 1	+ 20.7 sec	+ 27.9
Log N	+ 21.7	+ 27.2

> 27.55

* Eight (8) CH_2 Rods
27.55 − 3.12 = 24.43 +

C.A. Shop Expr III Run 15
Shift Date 6-10-1963 Time 2:15
Purpose Reactivity Measurement
Base Run
Loading: Same as Run 8

Run 15a Base Run -

Measure Position Period
VDT #3 = +2.1 #4 = +5 (?)
Selsyn #1 = 22435 #2 = 22935

Log N	= x 21.7147	93.4 sec = 10.3¢
Ctr #2	=	93 sec 10.3¢
Chan A	= $\frac{71.5}{31.6}(100)$	133
	$\frac{71.5}{23}(150)$	132 Avg = 10.3¢

15b Removed adjusting screws and pulled fuel tubes to edge of Core.

VDT #3 = +3.5 Selsyn #1 = 22,430
#4 = +5.5 #2 = 22.2905

Measured Position Period: Avg = 2.11¢

Log N	=	= 586 sec pd 2.18¢
Ctr #2	=	= 558 2.18¢
Chan A	= $\frac{49.5}{15.4}(750)$	= 643 ~~2.41¢~~
C	= $\frac{67.2}{39.8}(300)$	= 585 2.08¢

* Moving Fuel Tubes to edge of Core = -8,22

11 June 63

INSTRUMENT CHECK

Time 8 50 AM PM Source Pile # 1

	Channel F	A	B	C	D	E
Range	HV 8	1/1000	OPR	X	01	1050V
Source Dist.	OK	12	OK	24	U	12
% F.S. Trip	CTR #2 - OK	80	1	100	I	100

C.A. Snap Engr. TT Run 16a

Sheet ____ Date 6-11-1963 Time 1:30 PM

Purpose Reactivity Measurements

Loading: Same as Run 8, except center fuel tube replaced with a tube of B_4C. (30.5 gms)

Net wt = 77.5 g.
tube + Cap = 47.0
30.5 g.

Sub critical

selsyn #1 = 22.435
#2 = 22.295

Run 16b Add ¼" Be to top reflector.

Measured Positive period. selsyn #1 = 22.435
#2 = 22.295

Log N = 47.8 sec pd 16.7 ¢
Ch #2 = 41.7 sec " 18.2 ¢
Ch A = $\frac{97.5}{34.2}(50)$ 134.9
$\frac{66.5}{30.}(50)$ 63 sec 117.5 ¢

Run 16c Removed the tube of B_4C and replaced with empty tube and cap.

Measured Positive Period.

Log N = 25.2 sec Pd = 25 ¢
Ctr #2 = 28.2 sec. = 23.2 ¢
Chan "A" = $\frac{60}{23.2}(25) = 26.4$ = 24.2
$\frac{52}{27}(25) = 38.3$ 3 ⌊ 72.4 ⌋ 24.1 ¢

* B_4C = 6.65 ¢

Run 16d Placed Cd lid 26 mils thick on Core.
wt = 286.5 grams.

Sub crit. Selsyn #1 = 22.432
#2 = 22.294 ¢

Run 16e Removed empty tube at Center of Core and replaced with fuel tube.

Measured Positive Period

Log N = 93.3 sec Pd = 10.35 ¢
Ctr #2 42.5 sec = 10.4 ¢

Chan A = $\frac{85}{25.6}(150) =$ ~~76 sec~~ =
$\frac{46}{27.2}(50) = 95.4$ sec = 10.2 ¢
3 ⌊ 30.95 10.32 ¢

16f Removed cd lid and ¼" Be from top reflector. added 8"x8"x½" plexiglas as side reflector.

Measured Positive Period

Log N = 28.9 sec pd = 22.7
Ctr #2 = 28.7 sec = 22.5
Chan "A" = $\frac{60}{24.6}(25)$ 28.0 sec = 23.3
$\frac{59}{31.8}(25)$ X 3|68.8[22.9¢

16g Removed center fuel tube.

Measured negative period:

Log N = −185 sec pd = ~~9.5~~ ¢ 9.0¢
Ctr #2 = −175 sec pd = ~~6.12~~ ¢ 9.7¢
Chan "A" = $\frac{82.6}{55}(100)$ X

Value of large shim 9.7¢ + 9.2 = 18.9¢

$\frac{61.2}{35.5}(100) = -185$ sec pd = ~~9.5~~ 9.0

27.7
3 8 23
¢ 9.2

* Center Fuel Tube = 32.1¢
* 26 mil Cd lid = −45.7¢
* 30.5 gms B4C = −6.6¢

6-12-63

INSTRUMENT CHECK

Time ~~AM~~ PM Source Mz28 ¢ d

	Channel F	A	B	C	D	E
Range	1+~~2~~	10/1000	OPR	X	Σ	1050
Source Dist.	61<	contact	01<	2"	Σ	12
% F.S. Trip		80	1	100	Σ	100

C.A. Snap Expr. III Run 17

Sheet ____ Date 6-12-1963 Time 9:50 ~~PM~~ AM

Purpose Reactivity Measurements

Run 17 2 3/4" Be on Top — Ninety (90) 55 1/8" dia,
4 1/2" Be Radial — 12" long distributed
3" Be Bottom — through out core.
All fuel tubes in
VDTs = 0 ft — Selsyn #1 = 22.369
#2 = 22.230

Positive Period

CTR #2 + 44.7 sec = 16.6 ¢
Log N ÷ + 44.5 sec = 16.6 ¢ Avg = 16.6 ¢
Chan A 93/35 (50) = + 51.3 sec = 16.0 > 16.5
88/30 (50) = + 46.5 sec = 17.0

Run 17 b Removed 55 Rods added for Run 17a.

VDT=Off Selsyn # 1 = 22.369
# 2 = 22.230

Measured positive period -

Log N = + 738 sec pd = 1.67 ¢
ctr #2 = + 717 sec = 1.72 ¢
Ch A = $\frac{62.4}{32}(650)$ = 600 Sec 2.05 ¢
C = $\frac{55.8}{36}(300)$ = 685 sec = 1.80 ¢
4 | 7.24 | 1.81 ¢

* 16.6 − 1.8 = 14.8 ¢ for 90 55 Rods.

Run 17c Distributed twenty-three (23) graphite rods ⅛" dia, (.120" measured) 12" long through out core.
wt. of 23 graphite rods: 82 grams
Measured positive period -

Log N = + 108 sec pd = 9.3 ¢
ctr #2 = + 107 sec pd = 9.3 ¢
Ch "A" = $\frac{88}{17.6}(250)$ = 155
$\frac{88}{22.4}(200)$ = 146
$\frac{88}{29.6}(150)$ = 138
$\frac{88}{40}(100)$ = 127
$\frac{88}{60}(50)$ = 135

¢
Av. 9.3

* 9.3¢ − 1.8¢ = 7.5¢ for 23 graphite Rods

C.A. Snap Expr. III Run 18

Sheet Date 17 Time AM PM

Purpose Reflector Change study.

18a 3 3/4" Be Top
4" Be Radial
3" Be Bottom
all fuel tubes in.

VDTs Selsyn #1 =
#2 = 22.297

Sub Critical

18b Add 1" Be to top Reflector.

VDT #3 = +3,8 Selsyn #1 = 22,435⁻
#4 = +5.8 #2 = 22,297

Sub Critical

18c Added ½" Be. to top reflector.

VDT #3 + 4 up Selsyn #1 = 22,432
#2 22,298 5⁻

Sub critical.

18d added ½" Be to top Reflector

VDT # 3 = 2.5" Selsyn # 1 = 22.432
4 = 5.0 # 2 = 22.

Measured negative period -

log N = 138 sec pd = 13.7 ℓ
Ctr # 2 = 123 sec = 16.8 ℓ
Cha A = 200 sec = ~~15.25~~ ℓ
15.25 ℓ

6-13-63

INSTRUMENT CHECK

Time 100 ~~PM~~ PM — Source M226 ed

	Channel F	A	B	C	D	E
Range		1/1000	OPR	X		1050
Source Dist.	OC	10"	OK	30"		12"
% F.S. Trip		80	1	100		100T

C.A. Snap Expr. IV Run 1

Sheet ____ Date 6-13-1963 Time ____ AM PM

Purpose Critical Condition for Calandria Core. (#3)

1a Top = Bare
Radial - 4½" Be
Bottom = 3" Be

VDTS #3 = 2.2 #4 = 3.5

Sel/sys #1 = 22.429 #2 = 22.294

1 min cts = 0 +13

Sub critical

1b Top - 2½" Be
Radial - 4½" Be
Bottom - 3" Be

VDT #3 = 3 #4 = 3.5

Sel/sys #1 = 22.425 #2 = 22.2922

1 min cts = 0 +46

Sub Critical

Log N = .002 ctr #2 Jammed!

1c Top = 2¼" Be Radial = 4½" Be Bottom = 3" Be	VDT #3 #4	Selsyn #1 = 22.430 #2 = 22.290

1 min ∝A = 0 +76

Sub Critical

1d Top = 2½" Be Radial = 4½" Be Bottom = 3" Be	VDT #3 = 2.2 #4 = 3.0	Selsyn #1 = 22.430 #2 = 22.280

* measured Positive Period - +13.4 ₹

Log N = 66.2 sec pd.
ctr #2 = 66.7 sec.
Chan A = $\frac{72.6}{40.7}(50) =$ ~~87~~

$\frac{58.4}{28.}(50) = 67.8$

6-14-63

INSTRUMENT CHECK

Time 840 AM PM Source M226 & h

	Channel F	A	B	C	D	X
Range		10/1000	OOR	X		1050
Source Dist. OK		10"	OK	30"		12"
% F.S. Trip		80	—	100		100+

C.A. Snap Expr. IV Run 2

Sheet Date 6-14-1963 Time 8:48 AM PM

Purpose Critical Condition for Zero Calandria Core. (#2)

Top = 2 ½" Be
Radial = 4 ½" Be
Bottom = 3" Be
all fuel tubes in

VDT #3 } on did Not Read.
#4 }

22.445
Selsyn #1 ↑
#2 = ↓
22.310

Sub critical.

2a added ¼" Be to top. (2 ¾" Be on Top)

VDT #3 = +3.0
#4 = +2.0

Selsyn #1 = 22.445
#2 = 22.308

Measured Negative period -

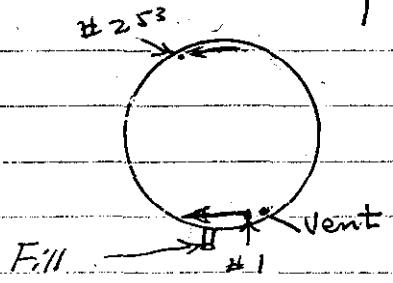
Log N = 759 sec = -1.8 ¢
Ctr #2 = 667 sec = 809 = -1.7 ¢
Chan A = $\frac{93.6}{66.7}$(500) = 875 sec -1.55 ¢
" C = $\frac{67.2}{43.2}$(300) = 740 sec = 1.85 ¢

Avg ¢ -1.72

$\frac{77.2}{60}$(250) " 1012

456.10

Fuel Tube loading for Calanderia Core



Tubes loaded in numerical order #1 → 253, as shown above, except as indicated below:

Tube # in	Hole #	Tube # in	Hole #
256 →	41	261 →	155
255	55	257 —	158
263	69	280	164
276	73	279	169
267	86	266	183
270	94	271	191
258	101	272	202
273	102	275	204
		260	207
262	119	278	210
264	120	254	216
274	123	269	220
277	147	268	242
		265	243
		259	225

C.A. Snap Exp. V Run 1

Sheet _____ Date 6-14-1963 Time 1115 ~~AM~~ PM

Purpose Critical Condition for Clustered arrangment of fuel tubes.

2 3/4" Be on Top
4 1/2" Be Radial
3" Be Bottom
all fuel tubes in (253)

Measured positive period – VDT #3 = 3.0
#4 = 3.0
Del #1 = 22.4
#2 = 22.3

Log N = 26.8 sec pd = 24¢
Ch #2 = ~~27.5~~ sec pd =
Chan A = 28.5 sec pd = 23¢ + 23.5¢

~~6-18-63~~
6-17-63

INSTRUMENT CHECK

Time 11:05 ~~PM~~ AM ← Source M-226 # 8

	Channel A	B	C	D	E
F	10				
Range	1000 Sec				1000 ✓
Source Dist.	12"	30"			8"
% F.S. Trip	85	SK	100		100 ✓

HV = 8
SK
CC # 2 - SK

C.A. Snap Expr. III Run 19
Sheet _____ Date 6-17 ~~18~~ 63 Time 11:40 ~~PM~~ AM
Purpose Foil Exposures, Vertical
@ 235°, 5/16", 4 mil thick

Foils Loaded vertical on Center fuel tube
#1 thru #8 = 4" → 11" (from bottom of core)
#9 horizontal on top of center fuel tube (12")
#10 thru ~~#14~~ #15 = 12¼" → ~~14¾~~ 15¾" spaced ½" in top reflector (Horizontal)

VDT #3 = 3.2 Selsyn #1 = 22,441
#4 = 3, #2 = 22,308

Log N = .01 → .012
Tim = 20 min
A = 58 1000/200

104

6-18-63

INSTRUMENT CHECK

Time 9:20 AM PM Source N-226 4 h

	Channel F	A	B	C	D	E
Range	O K	~~10~~ 1000	OPR	X	O	1050
Source Dist.		12"	O K	30"	6	8"
% F.S. Trip	O K	85	O K	100	T	100+
	CTR #2	O K				

C.A. Snap III 20

Sheet ____ Time ____ AM PM

Purpose Foil Exposure, Horizontal

U-235, 3/16", .#4" thick

Foils Loaded ~~Totally~~ Radially from Center of Core.

#29 thru #41, see drawing that shows location of foils needed for number + location

Foils oriented Vertical on Fuel tubes.

VDT #3 = 2.5" Sol Sym #1 = 22.440

#4 = 2.75 #2 = 22.310

Radial distance from Center of Core.

Log N = .01 #29 = 1/4"

Ch A = 46 × 1000/200 30 = 1 9/32

31 = 2 7/16 #38 = 4 3/4"

32 = 3 23/64 39 = 3 29/32

Exposure = 20 min. 33 = 4 3/8 40 = 4 3/4

34 = 4 29/32 41 = 4 31/32

35 = 4 31/64

36 = 4 13/32

37 = 4 15/64

C.A. _____ Expt. TC Run 3'

Sheet _____ Date 6-18-1963 Time 1:30 PM

Purp. Foil Exposure

cd Covered & Bare

U235, 1/16" dia; .004" Thick

Radial distance from center of Core

Foils		Locations	
#16	1/4"	Center of Core	(Bare)
#17, 18, 19, 20, 21, & 22, in top reflector, 1/2" Separation (cd)			
#23	4 15/32	Tube #247	Bare } center of tubes
#24	"	" #7	cd
#25	4 3/4"	Tube #135	Bare
#26	"	#119	cd
#27	1 3/16"	#125	Bare } on top of Tubes
#28	"	#129	cd

Log N = 1.01

Ch = 48 $\frac{1000}{200}$

Exp = 20 min,

VDT #3 = 3.

#4 = 3

Subsyt #1 = 22145

#2 = 22.307

INSTRUMENT CHECK

6-19-63 Time 12:30 ~~AM~~ PM Source M-226 + 8

	Channel A	S	C	D	E
Range	F	10/1000	opr	X	0 1050 V.
Source Dist.	HV = 8	10"	OK	30	a 8"
% F.S. Trip	OK	8		100	T 100 +

Ch # 2 = OK

C.A. Snap Exp. III 22

Shot Date 6-19-63 Time ~~AM~~ PM

Purpose Reactivity Measurement

22a 2 3/4" Be — Top
4 1/2" Be - Radial
3" Be - Bottom
All fuel tubes in 1050 gms.
Placed Ninety (90) 3/32" dia, 12" long Columbium Rods in holes provided

UDT # 3 = 2.2 Sel sys # 1 = 22.44
4 = 5.2 # 2 = 22.30

Measured Positive Period -
Log N = + 42.8 sec pd = 18.0 ¢
Ch 2 = + 43.5 sec = 17.8 ¢
Ch A = $\frac{100}{20.5}(100) = \cancel{\text{OS.T}}$ 17.9 ¢
$\frac{64}{21.6}(50) = 46.1$

22b Columbium removed.

Base Run

VDTs = same

Selsyn #1 = 22,435

#2 = 22.3025

Measured Positive Period.

Log N = 69.5 rec Pd 12.95 ¢

Ctr 2 = 69.01 13.05 ¢

Ch A = $\frac{67}{24.5}(100) = \cancel{99.2}$ 13.0 ¢

$\frac{51.3}{25.8}(50) = 72.7$

90 Ch Rods = (17.9 − 13.0) = +4.9 ¢

23a Removed Center Fuel Tube

Add ¼" Be to Top.

VDT #3 = Same #4 = ? Selsyn #1 = 22,435

Measured Positive Period — #2 = 22.3025

log N = 22.25 rec Pd = 26.8 ¢

Ctr 2 = 24.05 rec = $\frac{25.6}{5\,24}$ ¢

Ch A = $\frac{50}{24.6}(25)$ = 26.2 ¢

$\frac{56}{21}(25)$ =

Center

23b Moved Tube # 109 from position 109 to position 127.
VDTs = Same Selsyn #1 = 22,435
#2 = 22,301
1 1/32"

Measured Position Period -

(2) log N = 22.9 sec rd = 26.5 ¢
ctr 2 = 23.9 sec 25.7
Ch A = 26.1 ¢

23c Returned Tube #109 to postion 109.
" Moved " # 91 from " 91 to position 127.
2 1/16

VDT #3 = Selsyn #1 =
#4 = #2 =

(3) Measured Position Period -

Log N = 21.3 sec = 27.5 ¢
ctr 2 = 21.8 sec = 27.2 ¢ 27.35 ¢
Ch A = $\frac{45.6}{22.5}$ (25)

23d Returned tube # 91 to pos. 91
Moved tube #73 from pos 73 to pos 127
3 5/64" VDTs = Same Selsyn #1 = 22,44
#2 = 22,301

(4) log N = 18.6 sec rd = 30.5 ¢
ctr 2 = 17.3 sec = 31.5 ¢ 31.0 ¢
Ch A =

23e Removed outer ring of 1/4" layer of Be from Top.
16 - 1 7/16" x 1 7/16 x 1/4"
8 - 2 7/8" x 2 7/8" x 1/4"

VDT #3 = 2.1 selsyn #1 = 22.44
#4 = 5.2 2 = 22.301

Log N = + 34.0 = 21.0 ¢ >
ctr 2 = + 37.0 19.9 ¢ 20.45

Ch A $\frac{82}{29}(50)$

23f Returned tube #73 to pos 73.
Moved tube #56 from pos 56 to pos 127.
VDT #3 > Same selsyn #1 = > Same
#4 #2 =
$4\frac{7}{64}$"
Measured Positive period -
(5)
Log N = 27.4 sec Pd - 23.6 ¢
ctr 2 = 28.8 sec pd - 22.8 ¢
Ch A = $\frac{20.5}{20}(50)$ = 23.2 ¢
$\frac{70}{30}(25)$ =

23g Returned tube #56 to pos 56.
Moved tube #256 from pos 41 to pos 127
VDTs - Same selsyn - Same
$4\frac{41}{64}$"
Measured Positive Period -
Log N = 23.2 sec Pd 26.2 ¢
ctr 2 = 23.6 sec = 26.0 ¢
(7)
Ch A = $\frac{27}{17}(50)$ 26.1 ¢

23 h Returned tube # 256 to pos 41
Moved tube # 71 from pos 71 to pos 127.
VDTs = Same Sel Sty = Same

(6) Measured Positive Period –

4 5/32" Log N = 28.2 sec rd = 23.2 ¢
Ch 2 = 28.5 sec rd = 23.0 ¢
Ch A" = 23.1 ¢

23 i Returned tube # 71 to pos 71
Base Run

Measured Positive Period –

Log N = 49.1 sec rd = 16.5 ¢
Ch 2 = 49.8 " = 16.8 ¢
Ch A = $\frac{785}{35.2}(50)$ 16.4 ¢

JUN 20 1963

INSTRUMENT CHECK

Time 12 40 ~~AM~~ PM Source M226 # h

JUN 20 1963 =

	Channel A	B	C	D	E
Range	1/1000 CPS	X			1050
Source Dist.	12"	OK	30		8"
% F.S. Trip	90	OK	100		100+

Ch # 2 OK

C.A. Snap Expr. ~~IBC~~ Run 3

Sheet ____ Date 6-30-1963 Time 12:40 PM

Purpose Critical Condition for Potassium filled Calandria Core. (Zero Run p. 98) (#3)

Run 3a
2 3/4" Be - Top
4 1/2" Be - Radial
3" Be - Bottom

Empty Core - 13,372 g.
Filled with K = 16,765 g. } 9213 Wts

3,403 g. of K as per X-10 [Hoffman]

Super Crit Selsyn # 2 = 22.135

Run 3b Removed 1/4" layer Be from Top.

VDT #3 = 5,3 Selsyn #1 = 22,430
#4 = 8,0 #2 = 22,294

Positive Period -

Log N = 16.8 sec pd. = 32 ¢
Inst Trip - Ch "A" on 100/500 [Too Low]

Run 3c Removed the outer ring of the top 1/4" layer of Be

8 pc - 2 7/8" x 2 7/8" x 1/4"
16 pc - 1 7/16" x 1 7/16" x 1/4"

VDTs = Same Selsyn #1 = 22,415
#2 = 22,291

Measured Positive Period -

Log N = 34.7 sec pd = 20.7 ¢
Ctr #2 = 35.2 sec pd 20.5 ¢

Ch A = 85/29 (50) 20.6 ¢

32.0 ¢
13.4 ¢
18.6 ¢

Run 3C Remove 8 pc Be - $2\frac{7}{8}$" x $2\frac{7}{8}$" x $\frac{1}{4}$".

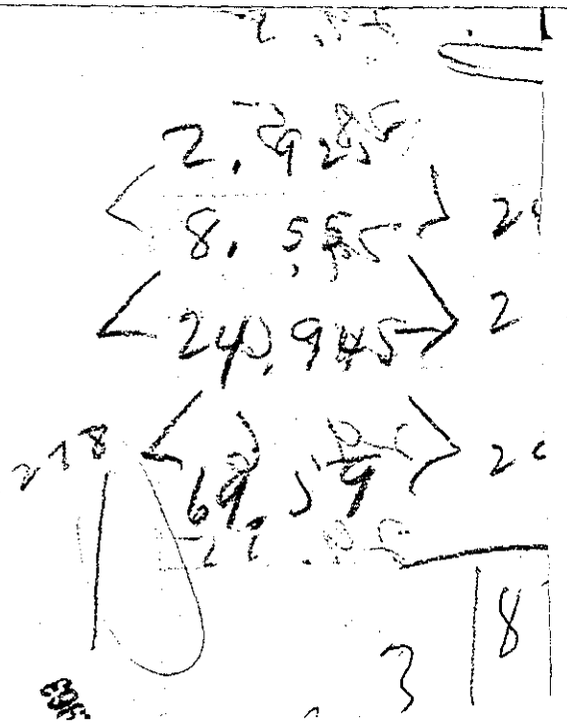
Top = $2\frac{1}{4}$" + [4 pc $2\frac{7}{8}$" x $2\frac{7}{8}$" x $\frac{1}{4}$" centered on top] = Be
Radial = $4\frac{1}{2}$" Be
Bottom = 3" Be

VDT #3 = 2.7 Selsyn #1 = 22,415
#4 = ? #2 = 22.290

Measured ~~Negative~~ ~~Positive~~ Period –

Log N =
Ctr 2 =
Ch A

Ctr #2
29.85
29.5
28.5
29.
28.6
29.6
29.55



JUN 2 1 1963

INSTRUMENT CHECK

Time 8 30 AM Source M226 # 1

	F	Channel A	B	C	D	E
Range	OK	1%/1000 OPR	X	0		1050
Source Dist.		12" OK	30	I		8"
% F.S. Trip		95 OK	100	Z		100+

C.A. _____ Exp. IV 4

Sheer _____ Date 6-21-63 Time 8:30 AM PM

Purpose Reactivity

Center Fuel Tube Vs Top Reflector.

Top = 2 ½" Be ; Radial = 4 ½" Be ;
Bottom = 3" Be ; Center Fuel Tube Out.

Sub Critical

WT. OF RADIAL 4½" BE. = 75.70 Kg ✓
K FILLED COLLANDRIA (No FUEL) = 16.77
3" BE + CONTAINER (BOTTOM) = 24.45
CONTAINER ONLY 5.75
∴ BE ONLY = 18.70 ✓

3" BE in TOP = 18.67
2¾" BE IN TOP (calculated) = 17.13 ✓

I.D. OF RADIAL BE = 10.299 ; .300 ; .302 ; .300 ; .3025 ;
.303 ; .300 ; .299 ; .300 AVG → 10.3006

O.D. SAME = 19.2495 ; .254 ; .251 ; .250 ; .2515 ;
.249 ; .250 AVG → 19.2507

10.301
8.950
2
4.475"

t.

DATE JUN 17 1965 SAFETY CHECK

TIME [illegible] CT

CHANNEL	A	B	C	D	E	F
RANGE	10/1000	sqrt	X	10/1000	200 V	810
SOURCE DIST.	7"	OK	3'	2"	6"	
% F. S. TRIP	95	✓	180	95	100 +	
BKGD. ALARM	✓	✓	✓			
AUX CTRS.	—	—	✓	—		

SOURCES USED M-226 + 8 MAGNETS ✓

TABLES ✓ LIGHTS ✓ AREA CLEARED ✓

C.A. Swap Expr. V Run 1

Date JUN 17 1965 Time PM

Purpose Reflector addition

Source Rabe - M-226

Core tank - mock up SS

Core = 149 fuel tubes

104 blank tubes

Reflector - Top and Bottom = 3 3/16" Be

Radial = 5" Be + ½" C

Fuel tubes would not go in core tank that is filled with K.

#3 sec cts -

26.5 x 16 =

26.5 x 16 =

DATE JUN 13 1965 SAFETY CHECK

TIME 8:15 AM BY JRT + JJL

CHANNEL	A	B	C	D	E	F
RANGE	10/1000	open	x	10/100	900V	850V
SOURCE DIST.	7"	✓	3'	2"	6"	✓
% F. S. DEP	95	–	100	95	100T	
BEAM WARM	✓	✓	✓			
A.A. CTRS.	–	–	✓			

SOURCES USED M-2264 8 MAG. CTS ✓

TABLES ✓ LIGHTS ✓ AREA CLEARED ✓

C.A. _____ Expr. V Run 2

Date JUN 13 1965 Time _____ AM PM

Purpose Continued Reflector additions

2 added 2½" Radial C Reflector [5"Be + 5/8" C]

43 sec cts – 27.0 X16
25.0 X16 400 cts
25.0 X16

3 added 2" Radial C Reflector [5"Be + 6" C]

43 sec cts – 22.9 X16
25.8 X16 400 cts
21.5 X16

4 Added 2" Radial C. [5" + 7 12/16" C]

Systems 36" OD

43 sec cto 20.0 X16
21.1 X16 320
19.0 X16

5 added 1" Be Top Reflector

43 sec cto 23.8 X16
22.0 X16
23.2 X16

6 added 13 fuel tubes, two center rows full of fuel [162 tubes]

1 min cto - 35 X16
34 X16
34.5 X16

7 added 13 fuel tubes, Center rows. [175 tubes]

1 min cto
46.5 X16 =
47.0 X16 =
47.4 X16 =

C.A. _____ Expr: I Run 8

Date 6-18-1965 Time 3:45 ~~AM~~ PM

Purpose Critical Condition.

M-226 on top Be

Core

8 Fuel - 208 Top Refl = 4 7/16" Be

Blank tubes - 45 Bottom " = 3 7/16 Be

Radial " = [5" Be + 7 13/16 C

Every 3rd tube in every 2nd row.

Source still present ~18 sec pd

Super Critical #1 = 23.44

9 Removed 1" Be from Top Reflector

Source M-228

Sub Critical

1 min cts 3.1 X 256 =

2.8 X 256 =

DATE JUN 21 1965 SAFETY CHECK

TIME 8:30 AM PM BY JRT & JJL

CHANNEL	A	B	C	D	E	F
RANGE	1/1000	OPR	X	1/1000	950V	850V
SOURCE DIST.	8"	✓	10'	2"	7"	✓
% F. S. TRIP	95	✓	100	95	100	100
BLDG. ALARM	✓	✓	✓			
AUX CTRS.	—	—	✓			

SOURCES USED Pu226 & RA 148 MAGNETS ✓

TABLES ✓ LIGHTS ✓ AREA CLEARED ✓

C.A. _____ Expr. I Run 10

Date 6-21-65 Time _____ AM PM

Purpose Crit Condition -

Pu-228 on top of Be

10. Added ½" Be to top reflector - [Top Be = 3 15/16"]
3313 g. of Be
Slightly Sub Critical #1 = 23.51

11. Installed operation source B Be
1" thick Be in bottom of snap fuel Containers
to achieve crit. Log N at base of CTR.

Neg Period - #1 = 23.510
Log = 208.5 sec = -7.60 + #2 = 23.551
BF_3 = 196.7 " = -8.20
-7.90 +

C.A. _____ Expr. V Run 12

Date _____ 19 ___ Time _____ AM PM

Purpose K Reactivity

12 Removed 45 blank SS tubes, 2370 g.
Added 45 K filled tubes, 3480 g.
K = 1110 g.

Be
Top = $3\frac{15}{16}$" = 25.09 Kg
Bottom = $3\frac{7}{16}$"
Radial = 5"
C = 7.88"

24.67 g K / tube

(45)

Neg Period – Log N = 134.6 sec −14.25¢
BF_3 = 129.6 " −14.15
−14.70¢

K = −6.80¢

13 Added ~ 1/8" Be to top reflector.
20 pcs (2 7/8" x 3") 8.625 in²/pc
172.5 in² ; 676 g.

Pos Period – Log N = 278. sec pd 4.08¢
BF_3 = 286.6 " 3.98
+4.03¢

Be = ~~+10.83¢~~
−18.73¢

14. Returned the 45 blanks for 45 K tubes exchanged in Run 12.

Pos Period - Log N = 80.1 sec = 11.43 ¢
BF_3 = 83.3 " = 11.20 ¢
+11.32 ¢
K = - 7.29 ¢

15. Removed 5/8" Be from Top
" 13/16" C (outer Ring) from Radial reflector
C = 7"
Added
Exchanged 10 fuel tubes for blanks, every other one from outside toward center.

Pos Period - #1 = 23.24 (-300 mils)

16 Removed 1" Radial Reflector (C = 6")

Added
Exchanged 6 fuels tubes for blanks, every other one as above.

Pos Period - #1 = 23.02 (-500 mils)

1128

DATE JUN 22 1965 SAFETY CHECK

TIME 8:20 AM BY JRT + JJL

CHANNEL	A	B	C	D	E	F
RANGE	10/1000	opr	X	10/1000	900V	850
SOURCE DIST.	9"	OK	5'	2"	5"	OK
% F. S. TRIP	95	✓	100	95	100+	—
BLDG. ALARM	✓	—	—			
AUX CTRS.	—	—	✓			

SOURCES USED M-226 + γ MAGNETS 2

TABLES ✓ LIGHTS ✓ AREA CLEARED ✓

C.A. _____ Expr. ✓ Run 17

Date 6-22-1965 Time AM

Purpose Fuel - K exchange vs Reflector

Source M-228 on Top of Be

17 Removed 1" C Reflector - Reflecton -

Core Top + Bottom = 3 1/16" Be

Fuel = 224 tubes Radial = [5 Be + 5 C]

Blowers = 29 tubes

Pos Period - #1 = 23.13 [-350 mils]

18 Removed 2" C Reflector - [2" C]

Pos. Period - #1 = 23.43 [-150 mils]

19 Removed 1½" C Reflector: [1½" C]

Sub Crit. - #1 = 23.668

20 Added Exchanged 2 Fuel ~~Blank~~ tubes for Blank ~~fuel~~ tubes.

Sub critical

21 Exchanged 4 blank tubes for fuel tubes.

Core
230 fuel tubes
23 Blanks tubes

Refl - 3 7/16" Be Top + Bottom
[5" Be + 1½" C] Radial

Pos Period ~ 15 sec (32.3¢) #1 = 23.60

22 Exchanged 1 FUEL for 1 BLANK. (#18)

Pos Period ~ 130 ¢ (8¢) #1 = 23.60

Pos Period 18.7 sec 28.89¢ #1 = 23.66

23 Exchanged 1 Fuel for 1 Blank (#9).
(operating Source used)

Pos Period — Log N 389.0 sec 3.00
BF_3 = 359.5 " +3.23¢
+3.12

Core = 228 FUEL TUBES
25 BLANK "
REFL = 3 7/16" Be Top + Bottom
5" Be + 1½" C Radial

EXCESS

25

24. Removed 12 (over ½ of Core) blank tubes,

Pos Period – Log N = 693 sec = 1.75 ¢
BF3 = 562 " = 2.13 ¢
+1.94 ¢

12 Blank Tubes = -1.18 ¢

Removed

25 Exchanged 25 blank tubes for 25 K filled tubes (as Run 23)

Pos Period – Log N = 429. sec = 2.74
BF = 338.7 " = +3.41 ¢
+3.08 ¢

K = -0.04 ¢

26. Exchanged 6 K tubes for 6 fuel tubes.
Removed 1½" C" (0" C)

Sub Crit (M-228)

Exchanged 6 K tubes for 6 fuel tubes.

Close

(13)

27. { Core – 240 Fuel Tubes, 13 K Tubes } Refl = 3 7/16" Be Top + Bottom, 5" Be Radial

Neg Period – Log N = 162.9 = -10.65
BF_3 = 156.3 = -11.25
-10.95 ¢

28. Removed 13 K filled tubes.

Neg Period – Log N = 129.2 sec pd = 15.23 ¢
BF_3 = 115.9 " " 18.80 ¢
-17.02 ¢

13 K Removed = -6.07

29. Added 13 blank tubes.

Neg Period – Log N = 152.0 sec 11.75 ¢
BF_3 = 140.7 " 13.10 ¢
-12.43 ¢

13 blanks = +4.59 ¢

17.02
12.43

1132

DATE JUN 2 4 1965 SAFETY CHECK
TIME 10:30 — JJL + JRT

	10/1000 opr	x	10/1000 900V	850
Scram Circuit	8" OK	2'	2"	8" OK
% Rod Drop	90 — 100	90	100+	—
Bldg. Alarm	✓ ✓	✓		
Aux. Ckts.	— —	✓		

SOURCES USED M-226 + Y — MARKERS ✓
TABLES ✓ LIGHTS ✓ AREA CLEARED ✓

C.A. _____ Expr. V Run 30
Date JUN 24 1965 Time AM PM
Purpose Crit Condition with all (253) fuel tubes in Core.

30, Core - 253 fuel tubes
Reflector - 3 7/16" Be Top + Bottom
4" Radial

NO K

Sub Critical.

31. added 6 5/16" Be x 1/2" to radial refl.
18 11/16" OD x 18 3/16" ID
Sub Critical.

32 added 7/8" Be x 1/2" to radial reflector

Neg Period Log N = 118.3 sec 18.05
BF_3 = 113.2 " 19.70+
— 18.88+

Side reflector: Be $18\frac{3}{16}$" O.D. X $10\frac{1}{4}$" I.D. X $12\frac{1}{16}$" ht.
+ $18\frac{1}{16}$ O.D. X $18\frac{3}{16}$" I.D. X $6\frac{7}{8}$" ht.
(POCKET RULE MEASUREMENT).

$\frac{6.875}{12.063} = .57$

Can 1.11
$\frac{7}{16}$" Al Support Plate 50" X 44" with ~~36"~~ 76.2 dia hole = 29.1 Kg.
Top Be ($3\frac{7}{16}$") — Gross Wt (Be + Can) = 26.16 Kg
Can = 4.38 Kg.
Be = 21.78 Kg.

Be 19.25" I.D - 20.25" O.D = 11.32 Kg

Be (19.25" ID - 20.25" OD) X 5.187" = 4.61 Kg.

Be (18.25 ID - 19.25" OD) X 5.187 = 4.79 Kg
(19.25 ID - 20.25" OD) X 12.06 11.32
off for Run 32 = 16.11 Kg

Mock-up Calandria - 13,490 gms.

Top Can + $1\frac{7}{16}$" Layer + 1" Layer - 19,900 gms

$1\frac{7}{16}$" Layer Be - 8,944 g.

1" Layer Be, including 8 Δ Corner pcs - 6,303

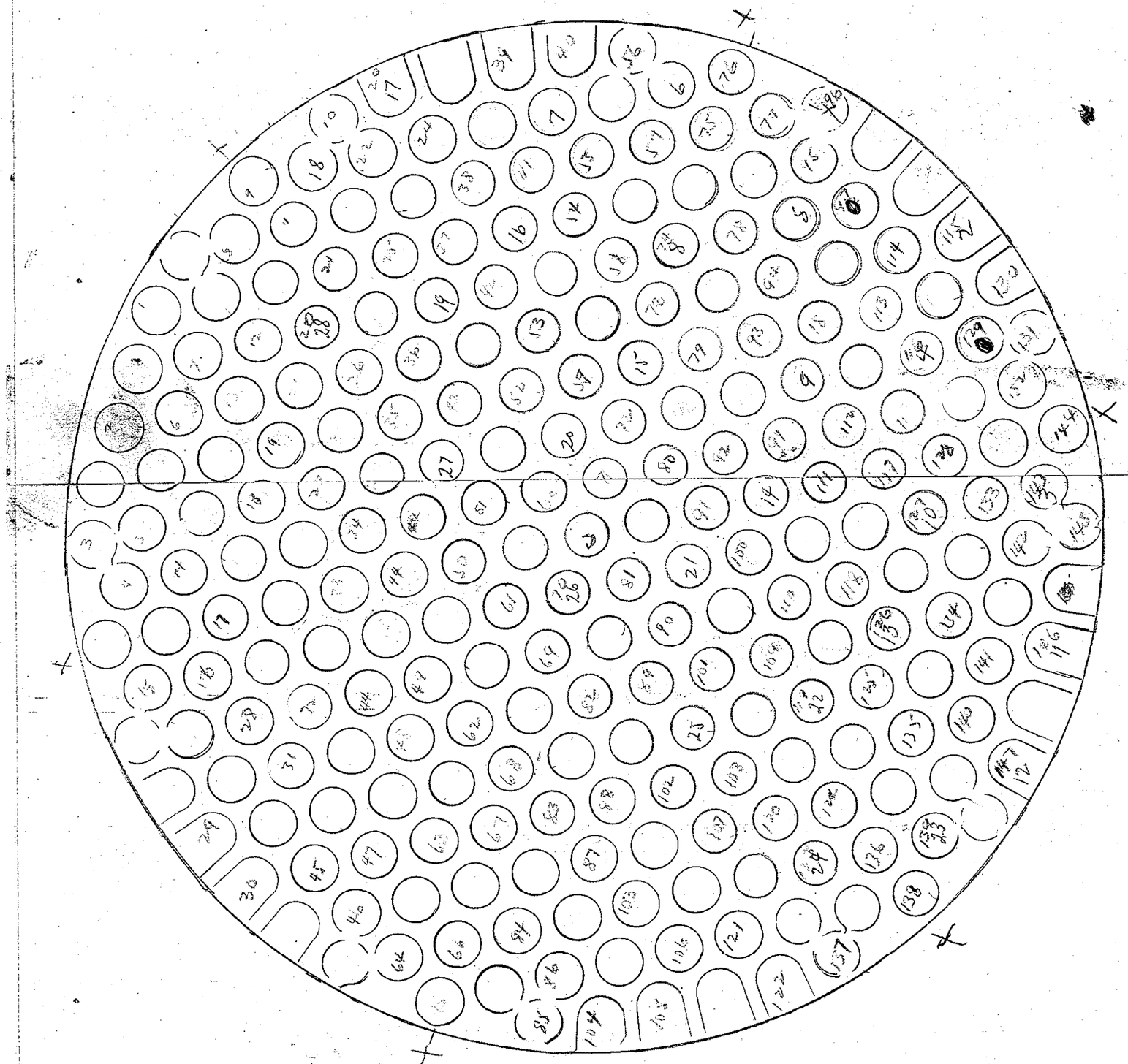
Top Can = 4,645 gms

Bottom Can + all Be = 26,500 gms

wt -

Graphite - O.D	- I D	wt
21.25"	20.25"	17.33 Kg.
22.25"		17.87 "
23.25"		18.04 "
24.25"		21.11 "
26.25"	24.25"	93.2 lb
28.25"		100.5 "
30.25"		109.0 "
32.25"		115.5 "
34.25"		128.0 "
36.0		113.5 "
		372.85 Kg
		807.27 lb

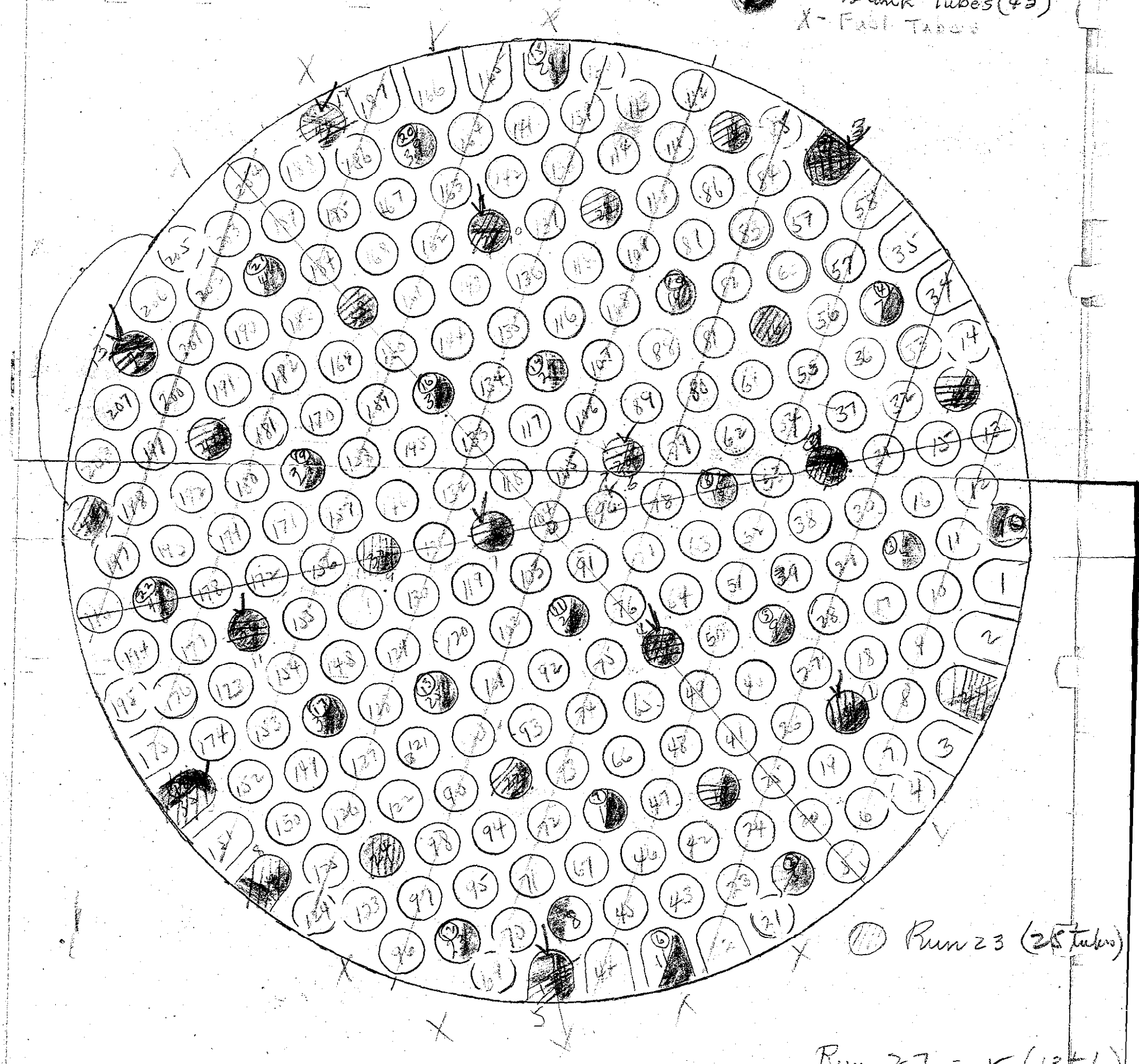
Plugs for 8" Thickness = 400 gms
" 1⅛" " = 50 gms.



Run 8

x - Blank Tubes (45)

X - Fail Tubes



Run 23 (25 tubes)

Run 27 = ✓ (13 tubes)

10 pc Rock = 676 g

½" = 3313 g.

2.54
30
76.20

DATE 6-17-65 SAFETY CHECK

TIME 3:00 AM PM BY JRT & JJL

CHANNEL	A	B	C	D	E	F
RANGE	20/1000 off	X	10/1000	960	88 ✓	
SPARK DIST	6" ✓	3"	2"	6"	←	
% F.S. TRIP	95 ✓	100	95	100	← ✓	
DIAG. ALARM	✓	✓	✓			
ACK BTN	—	—	✓			

MACHINES USED M-226 & 5 MACHETS ✓

FILMS ✓ UP ✓ AREA CLEARED ✓

C.A. Expr. II Run 1

Date 6-17-65 Time

Purpose