

## BOOK76R

*Notes:*

"Aberdeen Pulse Reactor (APR) Book No. 1" on front

"Aberdeen" on spine

"1967" on spine

Blank pages: page opposite page 1, 4, 8, 10, 50-52, 60, 66, 112, 122, 173, inside back cover sheets

- page 5 has 2 pictures glued
- page 6 has 2 pieces of paper taped
- page 14 has 1 graph sheet (re-taped)
- page 18 has 1 (8.5x11) graph sheet and 1 sheet of paper taped
- page 23 has 1 sheet taped to it
- page 24 has 1 (8.5x11) graph sheet taped
- pages 30, 32, and 33 have 1 sheet taped each
- page 40 has 1 photo taped
- page 60 has 1 (8.5x11) graph taped
- page 61 has sheet glued
- page 72 has 3 small graphs glued to page
- page 74 has 3 small graphs glued to page and 2 graphs taped
- pages 78/79 has sheet of paper between pages
- page 96 has 1 small paper taped down
- page 100 has 1 small graph taped
- page 102 has 1 small graph taped
- page 118 has 1 (8.5x11) sheet taped
- page 122/123 has 1 sheet between pages
- page 127 has photo glued to it
- page 128 has paper glued to it
- page 205 has 3 photos taped to it
- pages 212/213 has index card between pages
- pages 218/219 has 2 sheets with 3 pictures each between pages
- page 219 has 1 (8.5x11) sheet taped
- pages 268/269 has 1 (8.5x11) sheet between pages
- page 300 has 1 (8.5x11) copy of graph sheet taped to it
- 4 sheets are paper clipped to inside back cover sheet
- 4 sheets are loose between 2 back cover sheets

*Scanned by:*

*Sheila Finch*

*RSICC /Oak Ridge National Lab.*

*August 26, 1999*

E-17

3-1592



# Standard Blank Book

No. 38

Journals Double \$ and Cts. no Units

S. E. Ledgers " " "

D. E. Ledgers Full Page Form " "

Records with Margin Line

In 150 and 300 Pages

Made in U.S.A.

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

A BOORUM & PEASE PRODUCT

Fuel, 10 wt% Maly.

	#	net wt		
Bottom Plate	0007	12,559 <sup>o</sup> gms		1.09"
1 <sup>st</sup> Lower	} L.H.	4	14,600 <sup>o</sup>	1.282"
2 <sup>nd</sup> "		5	14,552 <sup>o</sup>	1.281"
Center Plate	16	13,701 <sup>o</sup>		1.254"
1 <sup>st</sup> upper	} R.H.	6	14,603 <sup>o</sup>	1.282"
2 <sup>nd</sup> "		1	11,983 <sup>o</sup>	1.053"
3 <sup>rd</sup> "		3	10,444 <sup>±</sup>	0.918"
4 <sup>th</sup> "	(0.195")	10 <sup>±</sup>	2,168 <sup>±</sup>	0.195"
Top Plate	88	3,542		0.312"
Safety Plug	11	16,718 <sup>o</sup>	8.56" long	4.0" OD 2.68" ID
Mass Adj. Rod	51	1,964 <sup>o</sup>	9.0" long	
Regulating Rod	52	753 <sup>o</sup> ✓	9.0" "	
Burst Rod	53	1,551 <sup>o</sup>	12.68" "	PR #1
Core Bolt	13	1,772 <sup>o</sup> ✓	10.78" long,	.787" dia
" "	14	1,776 ✓		
" "	15	1,768 ✓		
" "	40	1,773 <sup>o</sup> ✓		
" "	41	1,773 <sup>o</sup>		
" "	42	1,775 ✓		
" "	43	1,774 <sup>o</sup>	to be cut off	(over) 9-16-66
" "	44	1,774 ✓		
" "	54	1,776 ✓		
" "	55	1,771 <sup>o</sup> ✓		
" "	56	1,773 <sup>o</sup> ✓		
" "	57	1,774 <sup>o</sup> ✓		

	#	Net wt	
Core Balts	58	1,774	gms ✓
	59	1,776	✓
	63	1,774	✓
	64	1,773	0 ✓
	65	1,773	✓
	66	1,773	0 ✓
Thermo Plug (1/4" dia X 2")	35	49	
"	36	49	
"	37	50	} 197 gms
"	38	49	

151,257 Total

Balt # 43 9.71" 1761.8 gms 9-23-66

1761.8 gms

143.6 gms

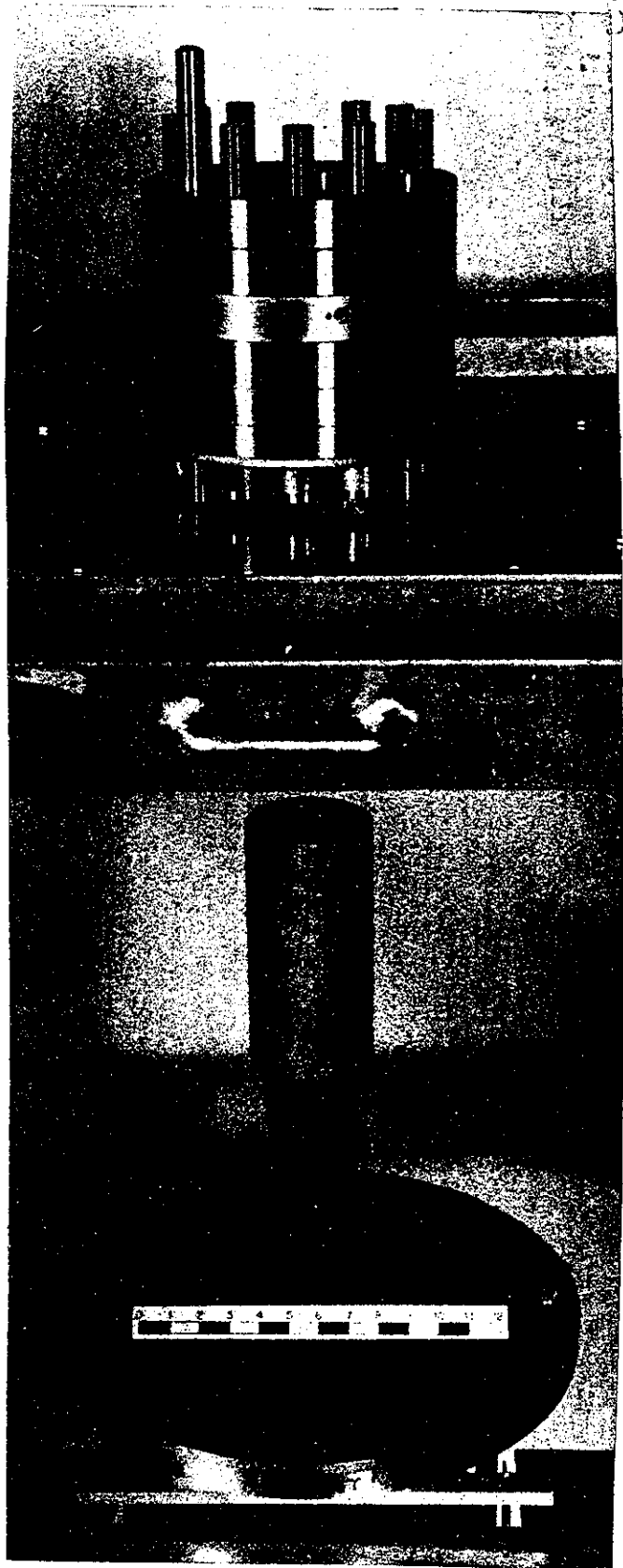
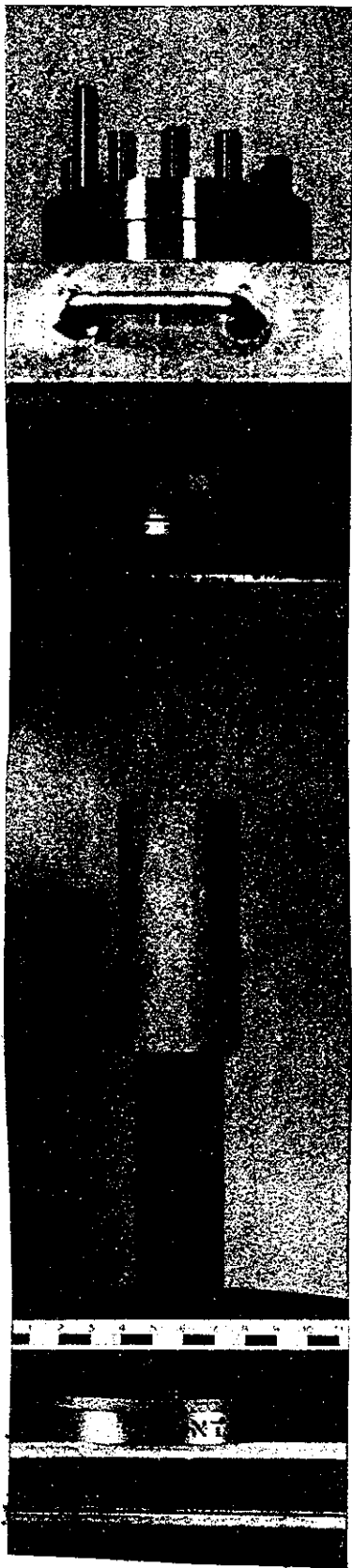
17 Balts avg wt = 1773.35 gms.

See p. 47

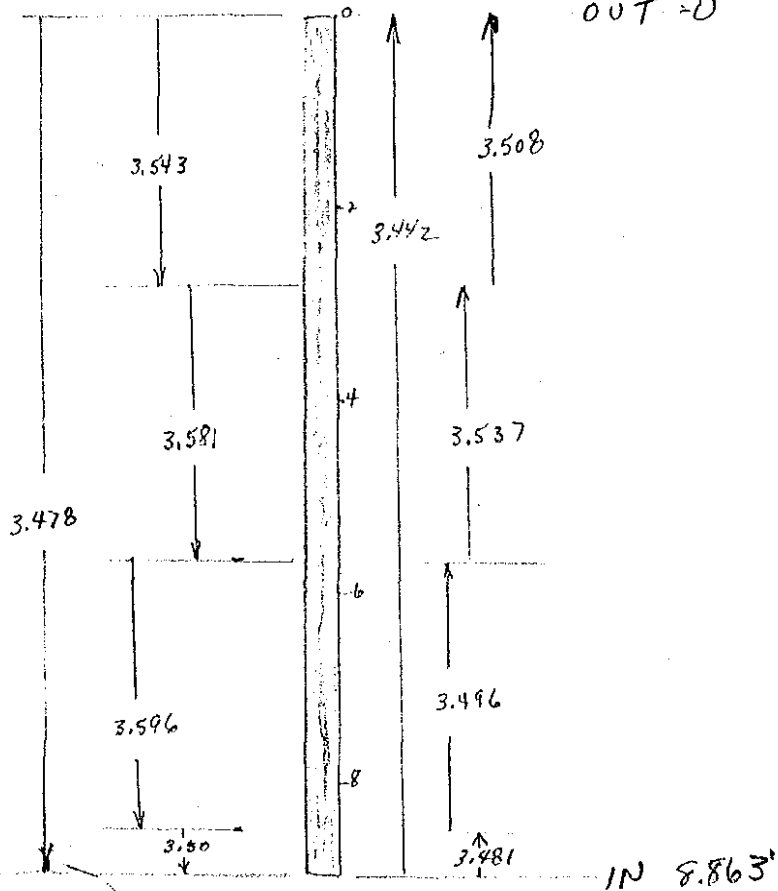
S.S. pcs.	#	wt
Safety plug Hanger,	0003	6,323 gms.
Mass adj. sleeve	4	50.58 "
Reg. Rod "	5	32.05 "
Burst " "	6	37.64 "
Reg. sleeve Retainer	7	21.93 "
Mass adj. " "	8	30.64 "
Burst " "	9	28.06 "

3-66

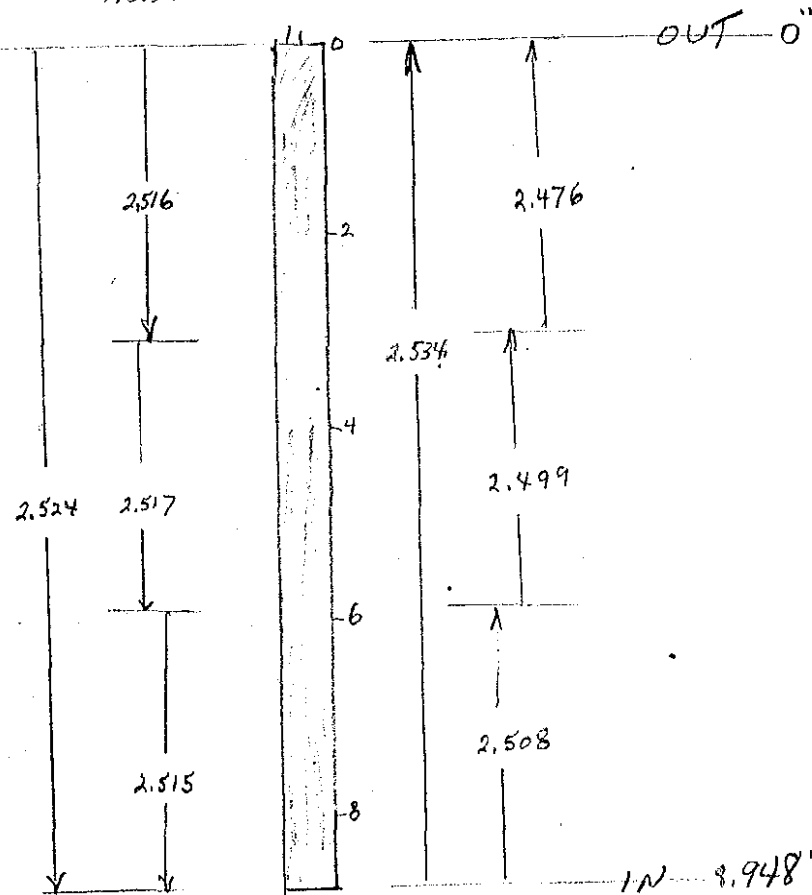
5 Kg



6 Jan 67 VRT  
 REG. ROD  
 TRAVEL RATE (IN./MIN)



6 Jan 67 VRT  
 MASS ADJUST (IN./MIN)  
 TRAVEL RATE



6

Safety Block from in to out 2.82" / min

1.2  
1.4

SB	2.83" / MIN
RR	3.55" / MIN
MA	2.52" / MIN

11.513" TRAVEL = L =	4.07 MIN.
8.948"	= 2.52 MIN.
8.333	= 3.31 MIN.

S. F. #1 = 17" from Part  
 #2 = 55"  
 #3 = 81"

BR STROKE = 10.125" AS DETR AS LUNDIR

1 Jan 67 WPT

6 Jan 67 WPT



Pulse	Page	Pulse	Page
1	1-139	26	1-188
2	141	27	192
3	141	28	194
4	142	29	196
5	143	30	197
6	144	31	200
7	146	32	281
8	147	33	282
9	148	34	283
10	149	35	284
11	151	36	285
12	152	37	286
13	154	38	287
14	156	39	288
15	159	40	289
16	162	41	290
17	164	42	291
18	166	43	292
19	168	44	294
20	170	45	298
21	171	46	2-6
22	174	47	2-8
23	177	48	2-10
24	178		
25	1-182		

[p- 125 for Mass)

E-2

DATE		SAFETY CHECK					
TIME	9:15	AM	BY TAYLOR & MIHALCZO				
CHANNEL	A	B	C	D	E	F	
RANGE	1000	OPR	2-15	1000	900	750	
SOURCE DIST.	4'	OK	30"	1"	10"	AT	
% F. S. TRIP	90	-	100	90	100	-	
BLDG. ALARM	✓	✓	✓				
AUX CTRS.	✓	✓	✓				
SOURCES USED	PBE & J			MAGNETS		✓	
TABLES	✓	LIGHTS		✓	AREA CLEARED		

CA: \_\_\_\_\_ Expr: \_\_\_\_\_ Run: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ AM/PM

Purpose: PRELIMINARY CRITICAL HEIGHT  
OF ABERDEEN REACTOR

REACTOR loaded up side down on 1/4" AL PLATE WITH HOLE FOR SAFETY BLOCK PLATES RESTING ON SPACERS WHICH SIT ON BOLT HEADS. SAFETY BLOCK ON RAMP (see 505)

UP POSITION #1 21.000 #2 21.004  
 #3 +1 #4 +3

Bottom of safety flush with bottom of stack when up

1st LOADING

9 BOLTS  
 TOP PLATE # 10 on Dr # 15864 (24-0008)  
 TOP SECTION # 7 " " (19-0003)  
 TOP SECTION # 5 " " (21-0001)  
 ROD LINKERS W NO RODS

Time 2 min count

	# 1	# 2	# 3
2 min	0 26	0 51	0 25
<del>4.5</del> 5 min	0 61	0 128	0 48
	1.0278	1.0352	1.0385

2nd LOADING

ADD 3 RODS  
 ADD TOP SECTION # 5 on Dr # 15864 (19-0006)

5 min.	# 1	# 2	# 3
cts	0 58	0 162	0 58
	0 97	0 159	0 53
	1.0143	1.00729	1.0227

3rd LOADING

ADD CENTER SECTION (18-0016)  
 5 min # 1 # 2 # 3  
 0 86 0 197 0 75  
 0 98 0 209 0 69  
 1.0119 1.00762 1.0164

4<sup>th</sup> LOADING

ADDED BOTTOM SHEET #3 Dn # 15864 (17-0005)

5 min #1 0 126 .002833 #2 1 53 00227 #3 0 125 .00292  
 0 130 .002833 1 40 .00358 0 120 .00292

5<sup>th</sup> LOADING

ADDED BOTTOM SHEET #3 Dn # 15864 (17-0004)

5 min #1 1 22 1 01 .00317 #2 2 223 .00145 1 53 .00326  
 2 185 .00140 1 69 .00326

6<sup>th</sup> LOADING

ADDED MI-PARTED #9 ON DRAWING # 15864 (23-0010) 0.195"

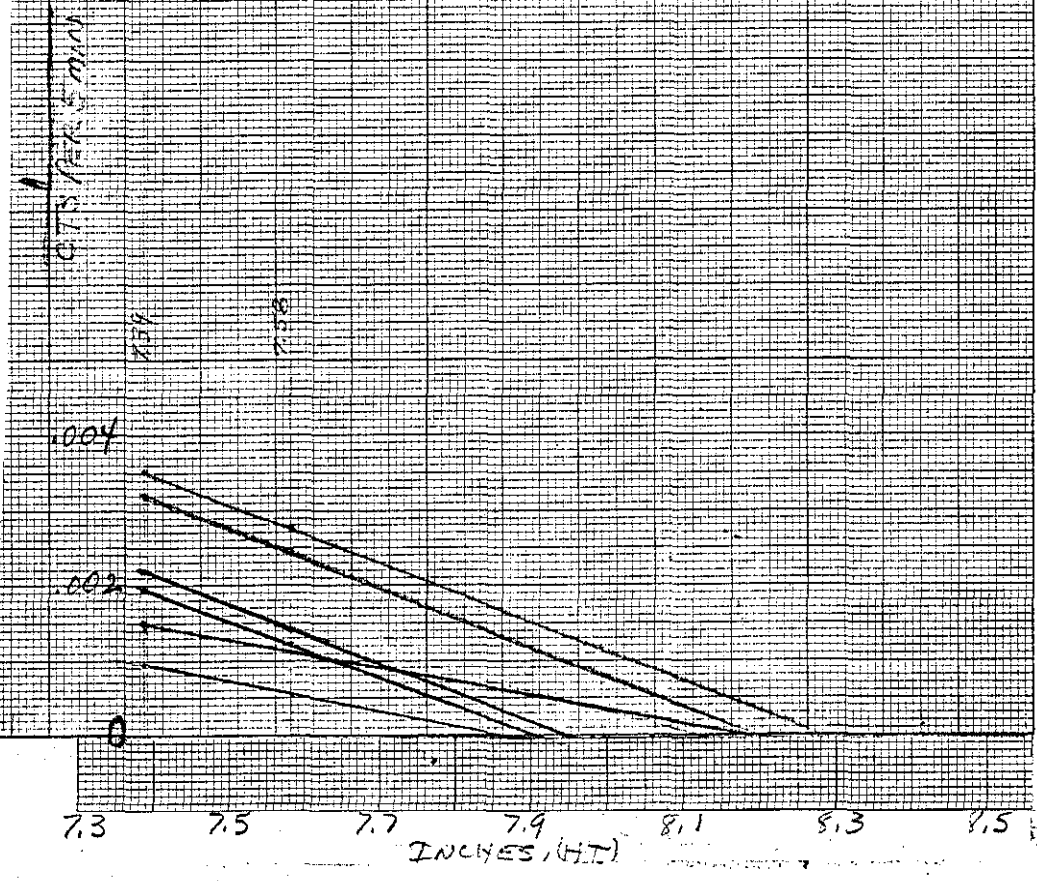
5 min. CTS. #1 1 187 1 129 .00246 #2 3 166 3 234 .00106 #3 1 173 1 120 .00239

Inst. background ct

5 min. #1 0 5 0 10 #2 0 24 0 23 #3 0 8 0 14

EXTRAPOLATED		CRITICAL HEIGHT (IN)	
#1	#2	#3	Average
8.20	8.20	8.28	Ave = 8.22
7.92	7.88	7.95	Ave = 7.92

Feed = No. 1  
 Penet = with steel in  
 safety blocks



5 MIN.

5 MIN.

5 MIN.

7<sup>th</sup> Run.

-S.S.

ADDED REFLECTOR TO INSIDE OF LONG. S.S. SHAFT. SCREWED THIS ASSEMBLY INTO INSIDE OF SAFETY BLOCK.

5 MIN. CT.

$$\begin{array}{r} \#1 \\ 3 \underline{114} \\ 3 \underline{25} \end{array}$$

.00120

$$\begin{array}{r} \#2 \\ 7 \underline{39} \\ 7 \underline{3} \end{array}$$

.00056  
.00055

$$\begin{array}{r} \#3 \\ 2 \underline{228} \\ 2 \underline{240} \end{array}$$

.00136

- Lower safety block till ram seley. #1 = 20.380  
this is near maximum reactivity position.

5 MIN. CT. #1 = 6 <sup>161</sup>/<sub>—</sub> .00059

#2 = 14 <sup>140</sup>/<sub>—</sub> .00027

#3 = 6 <sup>44</sup>/<sub>—</sub> .00064

8<sup>th</sup> LOADING.

REMOVED #9 PIECE OF DRAWING #15864 (23-0010)

5 MIN. CT.

$$\begin{array}{r} \#1 \\ 1 \underline{230} \\ 2 \underline{41} \end{array}$$

.00195

$$\begin{array}{r} \#2 \\ 4 \underline{88} \\ 4 \underline{77} \end{array}$$

.00040  
.00073

$$\begin{array}{r} \#3 \\ 1 \underline{235} \\ 1 \underline{196} \end{array}$$

.00217

DATE	JUL 29 1966					
TIME 3:20			BY Taylor + Lynn			
CHANNEL	10	B	G	D	E	F
RANGE	1000	2-16	1000	900	750	
SOURCE DIST.	3" OK	3'	0	5" OK		
% F. S. TRIP	90	100	90	100		
BLDG. ALARM	✓	✓	✓			
AUX. STNS.	✓	✓	✓			
SOURCES USED	Pu Be + 8		LACETS		✓	
TABLES	✓	LIGHT	✓	✓	✓	

CA APR Expt. II Run 1  
 Date JUL 29 1966 Time 3:20 PM  
 Purpose Multiplication  
 assembly against diaphragm  
 Pu Be (M-226) - 2" off diaphragm

I. Fuel Now loaded. up #1 = 19,185  
 Bottom, 0007, 0004, 0005, #3 = 0  
 0016, 0006, 0001, + 0003. Ht = 8,154" ✓  
 all (3) Rods in. ✓  
 6 Bolts in - Sub. Crit.

2. added 1 Bolt -  
 2 min cts

#1	#2	#3
2 + 214	7 + 66	2 + 174
2 + 218	7 + 103	2 + 148
	7	2

3. added 1 more bolt.

2 MIN. CTS

$$\frac{\#1}{6 \underline{205}}$$

$$\frac{\#2}{15 \underline{141}}$$

$$\frac{\#3}{5 \underline{189}}$$

4. all bolts in. (9)

$$\#1 = 18.85$$

Pos Period.

?



18

AUG 1 1966

Mihalczko, J.T.  
Taylor, J.  
Lynn, J.  
(Watson)  
(from Aberdeen)

DATE	AUG 1 1966		SAFETY CHECK			
TIME	8:30	AM	BY	Taylor & Lynn		
CHANNEL				G	D	E F
RANGE	$\frac{10}{1000}$	1000	1-16	$\frac{10}{1000}$	900	750
SOURCE DIST.	4" OK		5'	0	5" OK	
% S. S. TRIP	90	-	100	90	100+	-
BLDG. ALARM	-----					
AUX CTRS.	-----					
SOURCES USED	-----			MAGNETS		
TABLES	LIGHTS		AREA CLEARED			

CA	APR	Expr.	II	Run	5
	8.157"	Date	AUG 1 1966	Time	8:40 AM
Purpose	Crit. Check				
	with operating source				

5. Same Loading.

#1 = 19.18 up.      Poo Period = +7.2¢  
19.02                      ∞

6 Safety Block Calibration (no core)

2" x 2" x 1" plexiglass shim on

Selsyn #1 = 19.38	Period -	+16.98¢	+6.81¢
18.815		-0.17¢	-10.34¢
18.501		-31.82¢	-41.99¢
17.975		-#1.11	-#1.21
18.08		-93.73¢	-#1.04
15.978		-#5.84	-#5.94

8-1-66

APR SAFETY BLOCK

No steel in Block

10 X 10 TO THE INCH  
KEUFFEL & ESSER CO.  
MADE IN U.S.A.  
359-5DG

+ \$1.0

- \$1.0

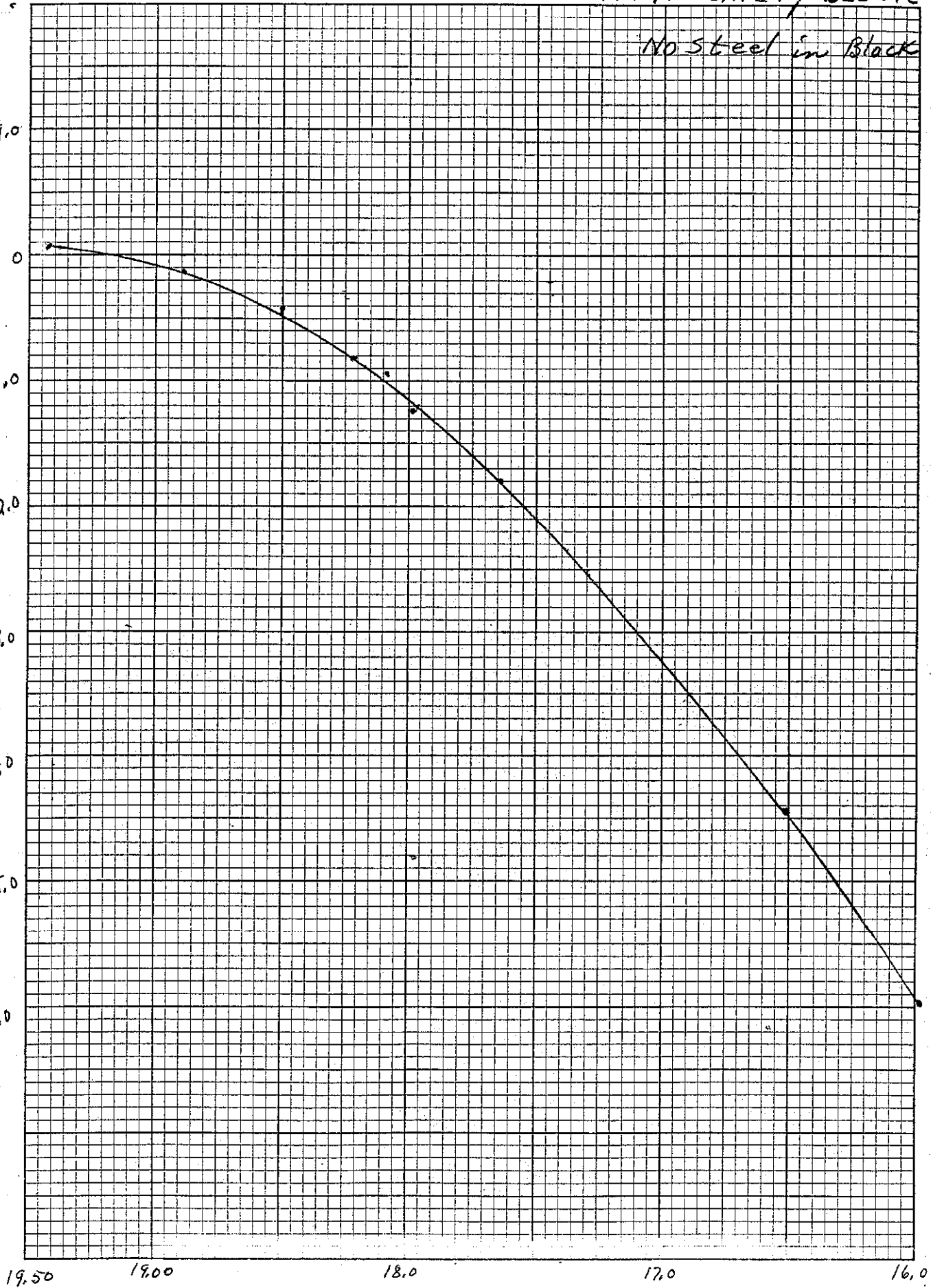
- \$2.0

- \$3.0

- \$4.0

- \$5.0

- \$6.0



19.50

19.00

18.0

17.0

16.0

Rm	Fuel Ht	MA	BR	RR	Shroud, Henge, Tube	Excess & change
1	7.749"	in	out	out	on	+32
5	7.749"	out	out	out	Tube off, Bond on	-8
		-1.80			-.60	-40 \$2.80
	<span style="border: 1px solid black; padding: 2px;">-1.507"</span>					
7	7.242"	out	in	in	on, Bond on	+10
		-1	+1.10	+1.74	+1.60	+18 2.60
8	"	in	in	out	off, on	+41
7		+1.85	-	+1.74	-60	+30 1.40
		-	out	-	-	-70 1.11

6 Selsyn # 1 = 17.64  
 18.218  
 19.13  
 16.512  
 19.38

Period = \$ 1.80  
 -1.70  
 -70.78 \$ 80.9  
 +16.48 \$ 6.31  
 -4.33 \$ 4.43  
 +16.98 \$ 6.91  
 +6.81 \$

Pull Shim

Shim = 10.17

19.38

6.81 EXCESS

Dropped Block (magnetic) - 9.733 (x2)  
 -19.47

Block = 19.54

7. Safety Block Hanger added

Selsyn #1 = 18.17

Period = +18.17 \$

18.04

+ 0.42 \$

17.285 - 2.55

- \$1.29

SB Hanger = 1.26

8. Safety Block Hanger Core added

# 1 = 17.505

+ 22.86 \$

17.378

+ 0.25 \$

16.895 - 3.50

- 96.15 \$

SB Hanger + Hanger Core = \$2.54

9. Mass adjustment Rod worth

Back to Run to condition

# 1 = 19.38

+ 9.98 \$

Pulled mass adj Rod = - 1.663

Mass Adj. Rod = 1.76

6.81 \$  
 10.34 \$  
 11.99 \$  
 1.21 \$  
 1.04 \$  
 5.94 \$

20

12:40 PM 10

### Regulating Rod worth

Selwyn #1 = 19.38 + 7.39¢

Reg Rod out - 63.88¢

Reg Rod = 71.27¢

### 11. Burst Rod

#1 = 19.38 + 7.29¢

Burst Rod out - 98.47¢

Burst Rod = 105.76¢

### 12. Added Top Plate (3,542 gms)

Ht = 8.46" 0.312"

#1 = 18.135 ∞

Top Plate = ~ ~~1.00~~ 1.00

.195"

.312

.507"

# 2.47  
- .54

3 1.93

- .07  
\$ 1.86

AUG 2 1966

21

DATE	AUG 2 1966		SAFETY CHECK	
TIME	8:50	AM	BY	Taylor + Hymn
CHANNEL	10	B	F	F
RANGE	1000	opr	L-16	1000 900 750
SOURCE-DIST.	3" ok	4'	0	5" ok
S. EXP	90	-	100	90 100 -
BLDG.	✓	✓	✓	
AL	✓	✓	✓	
SUB	Pa	Be	+ 8	WASKETS ✓
TABLET	✓	LIGHTS	✓	AREA CLEARED ✓

C.A.	A PR	Expr.	II	Run	13
Date	AUG 2	1966	AM	Time	9:00 PM
Purpose	Crit check with bolts screwed in, with bolt spacers in place, assembly now 1/4" off diaphragm.				

13. Pos Period + 7.1¢

14. Added - S.S. Rod Liners + Retainers (3 ea.)

Selsyn #1 = 20.44, #2 = 20.439

Pos Period = +15.52¢

∞ #1 = 19.89

Ret + liners = 8.¢

15. Lower assembly to diaphragm.

Removed Mass adj. and Reg. Rod (-2.47)

Added Top plate + Thin adj. plate (+1.70)

use Plyfigoo Shim to get power. -77¢

Selsyn #1 = 19.38

Period = -54.20¢

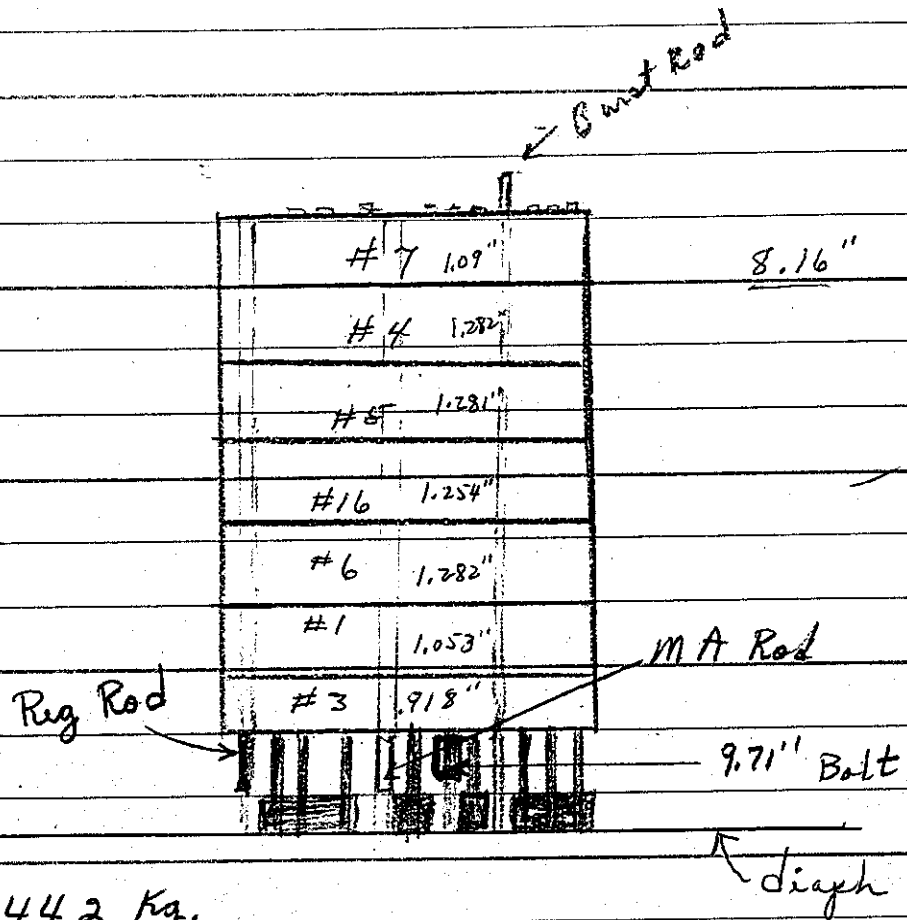
+7¢

16. added Regulating Rod:

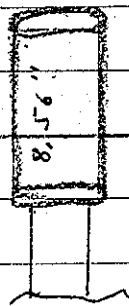
#1 = 19.38      Period = +19.19 ¢

Reg Rod = 73.39 ¢ ←

16 SEPT 1966      Received most all of the Aberdeen  
Reactor and associated "gear". Van  
was unloaded and left at 1<sup>00</sup> PM.



92.442 Kg.



4.0" OD  
2.68" ID



OCT 3 1966

E-3

23

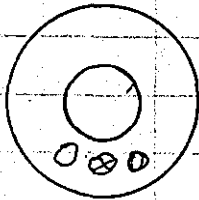
Mihalcz  
Lynn  
Taylor

DATE	OCT 3 1966	SAFETY CHECK	
TIME	9:20 AM	Taylor & Lynn	
CHANNEL			
RANGE	$\frac{10}{1000}$	oper L-14	$\frac{10}{1000}$ 900 730
SOURCE	4" OK	3'	0.4 OK
%	90	-	100 90 100+ -
BLDG ALARM	✓	✓	✓
APC	✓	✓	✓
SHIELDING	SEE M-226 + 8		✓
TABLES	✓	LIGHTS	✓
		AREA CLEARED	✓

CA. APR III Expt. III Run 1  
 8,160" Date OCT 3 1966 Time 2:00 PM  
 Purpose Parts evaluations,

Inverted Core

1. Loading - Belt heads against diaphragm.  
Belt spacers in place. Rod sleeves in.  
 pos # 3, #1, #6, #16, #5, #4, & #7  
 from diaph. up. 1 Belt = 2 pos.  $9.71''$   
 $0.991''$   
 No Rods in. Safety up position  
 even with bottom of fuel.  
 up #1 = 20.95 sub Crit.



2. Added M.A., Reg. & Burst Rods.  
 $\text{Log } N = 10.25\phi$ ;  $\text{P}_{\text{the}} = 9.82\phi$   
 $\#1 = 20.65 = +11.94\phi$   
 $0.971''$  Belts Away =  $9.56\phi$  or  $-2.4\phi$

$20.10\phi$   
20.80

Run 2  
cont'd

Safety Block Pos.

Reactivity

up. 20.95	+ 3.50 $\phi$
20.76	+ 10.35
20.59	+ 11.52
20.28	0.00
19.93	- 31.09
19.64	- 67.18
19.18	- 136.62
18.46	- 276.80
20.4	+ 6.26
20.24	- 3.07
20.11	- 13.10

# ABERDEEN SAFETY BLOCK POSITION VS. REACTIVITY VALUE

NOTES:  
 20.95 =  
 S.B. IS EVEN  
 WITH BOTTOM  
 OF FUEL



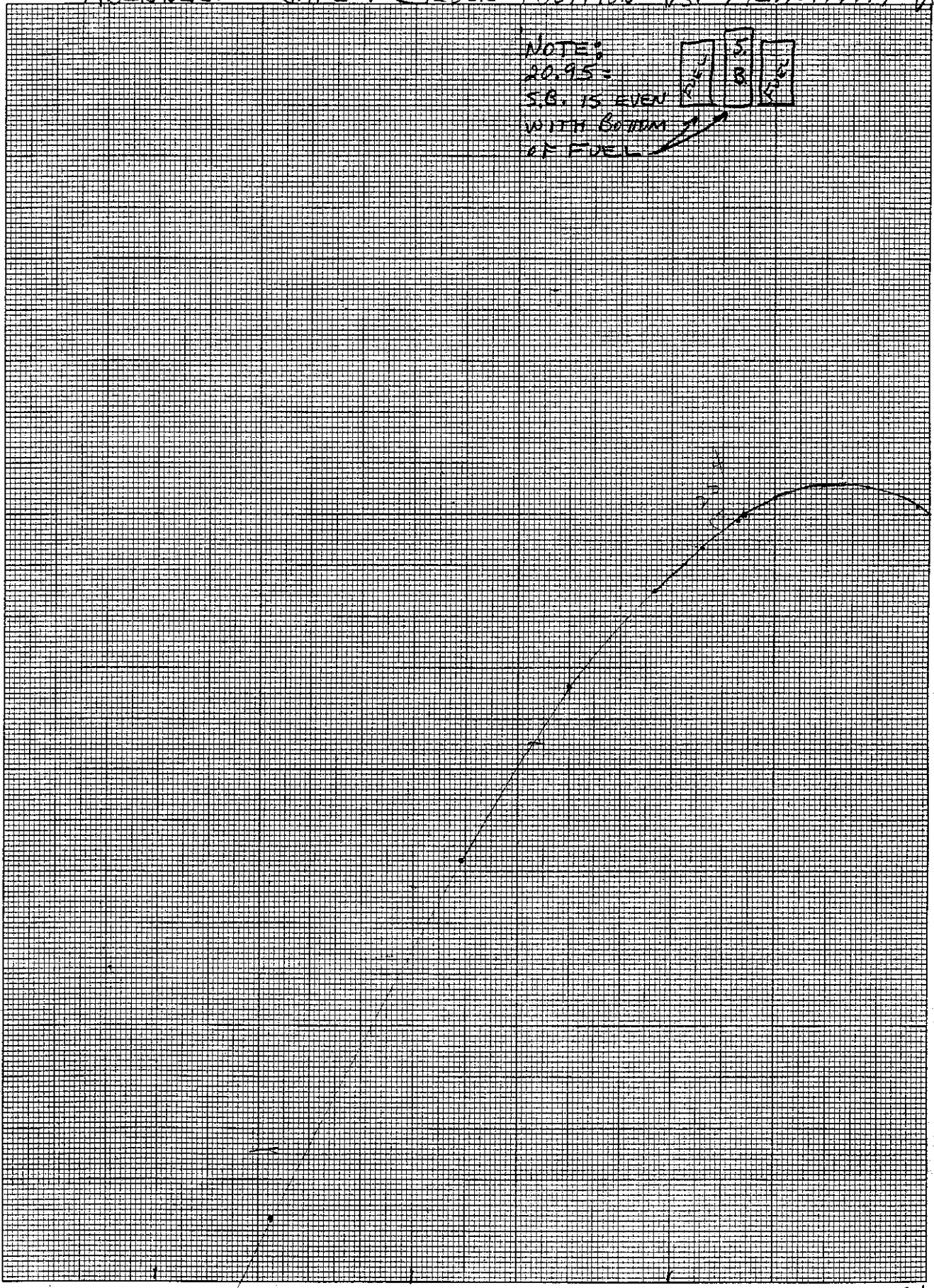
EUGENE DIETZGEN CO.  
 MADE IN U. S. A.

NO. 340-M DIETZGEN GRAPH PAPER  
 MILLIMETER

# REACTIVITY —  
 — I —  
 — 0 —

-2

-3



18                      19                      20                      21  
 — Selsyn Reading (in.) —

OCT 4 1966

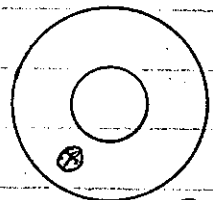
25

DATE	OCT 4 1966					
TIME	Taylor Lynn					
CHANNEL						
RANGE	$\frac{10}{1000}$	8yr	L-4	$\frac{10}{100}$	900	750
SCALE	4"	OK	24"	0	4"	OK
% F.	100	-	100	90	100	-
ELONG.	✓	✓	✓			
ADJ. S.	✓	✓	✓			
SO. NUTS USED	M-226 x 8					✓
TABLES	✓	LIGHTS	✓	✓	✓	✓

C.A. APR. Expr. III Run 3  
 8.160" Date OCT 4 1966 Time AM  
 Purpose Evaluation of 0.971" bolt  
pc at different locations  
on core.

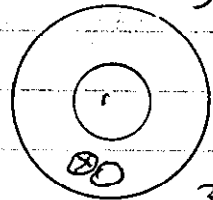
3. pc on MA Rod.

Pos Period #1 = 20.95  
 + 6.17  $\phi$



3.73  $\phi$

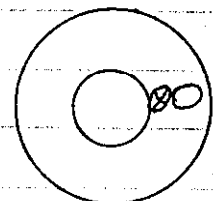
pc against Normal bolt  
 #1 = 20.95  
 + 6.37  $\phi$



3.93  $\phi$

4. pc inside Normal bolt.

#1 = 20  
 + 7.30  $\phi$



4.86  $\phi$

pc pulled away.  
 + 2.44  $\phi$

base for the 3 values

C.A. APR Exp. III Run 5  
 8.16" Date 10-4-66 Time 10:50 AM  
 Purpose Air Shroud in place.

5. #1 = 18.00 ~~18.00~~ Begin Multiplication

6. Lower Slow Speed Switch 1 1/2"  
 #1 = 19.26 + 20.51 \$  
 #1 = 19.135 ∞

Safety Block @ 19.135 = -1.46  
 Safety in Run #4 = +.024  
 air shroud = \$ 1.48 ✓

7. MA Rod evaluation. #1 = ~~19.135~~ 19.135 Safety Position  
 ∞  
 Pulled MA Rod = -1.676

8. Slow Speed switch back to Normal position  
 MA Rod out =  
 used shim to get Power. #1 = 20.95  
 Period = -20.5 \$

Shroud #1.48 ←

E.A. <u>APR</u> - Expt. <u>III</u> No. <u>9</u>
<u>8.16"</u> Date <u>10-4-1966</u> Time <u>3:10</u> <del>AM</del> <u>PM</u>
Purpose <u>Safety tube Evaluation</u>
<u>Base Run</u>

9. Same fuel pcs. Bed sin.  
 Bolts screwed out ~ 1", Spacers placed between bolt heads and normal Spacers. moving fuel away from up #1 = 21.77 diam ~ 1" more  
 #2 = 21.674  
 Period = - 3.98¢

10. Safety tube in place.

$$\begin{aligned} \# 1 &= 21.10 & + 25.46 \text{¢} \\ \# 2 &= 21.001 \end{aligned}$$

$$\begin{aligned} \# 1 &= 20.867 \quad \text{D} \\ \# 2 &= 20.769 \end{aligned}$$

Fuel = 8.16"

Shroud on

M.A. = out

R.R. = in  
 Burst = in

Shroud  
 #1 + 8

OCT 5 1966 SAFETY CHECK  
 8:45 AM Taylor + Lynn

RANGE	$\frac{10}{1000}$	op	L-4	$\frac{10}{1000}$	900	200
SOURCE DIST.	5"	OK	2'	0	4"	OK
	80	=	100	90	100 <sup>+</sup>	=
		✓	✓	✓		
		✓	✓	✓		
SOURCES USED	M-226 + 8					✓
TABLES	✓		✓		RECORDED	✓

OCT 5 1966

C.A. APR Expt. III Run 11  
 8.16" Date OCT 5 1966 Time 9:00 AM  
 Purpose Safety Tube Evaluation

\* Zero shift Channel "D" - Scram Log N = 0.00

11. Cond same as p. 27.

up Period = -1.94 #  $\lambda = 21.77$

Pulled ~~Reg~~ Rod = -71.95 # ✓

Reg Rod = 70.01 #

12. Placed Safety tube in place. Regulating Rod out up #1 = 21.77

Period = -16.57 #

Fuel = 8.16"

RR = out

MA + BR = in  
 Safety tubes on

Safety tube = 55.38 # ✓

\* Inst. repaired 2:00 PM 5 OCT 66. by Jim Ellis

13. Reg. Rod out -  
Top Plate (0.312") on.

~~Reg~~ Bolts about  $\frac{1}{16}$ " into top plate.  
Burst Rod - only rod thru plate

Pos Period = +29.84

312" = Top Plate = 101.8  $\phi$  ✓

or 0.3205  $\phi$  / mil

3N=005	Safety Block	# 19.54	p. 19
	MA Rod	1.76	19
17	Reg Rod	0.71, 73	20, 22
	Burst Rod	1.06	20
	0.507" fuel	1.86	21
01 $\phi$	0.971" bolt pc	.024	23
rd out	"	.037	25
	"	.039	25
	"	.048	25
	air Shroud	1.48	26
	MA Rod	1.68	26
	Reg Rod	0.72	28
	Safety Tube	0.55	28
	0.312" Fuel	1.02	29



30  
OCT 10 1966

DATE	OCT 10, 1966					
TIME	11:30 AM Taylor & Lynn					
CHANNEL	A	B	C	D	E	F
STAGE	10 1000	off	L-16	1000	900	750
SCORER	5"	ok	6'	0	4"	ok
%	90	-	100	90	100	-
ELDG. STAY						
AUX. STAY						
SOURCES USED						
TABLES	LIGHTS		AIR CLEANED			

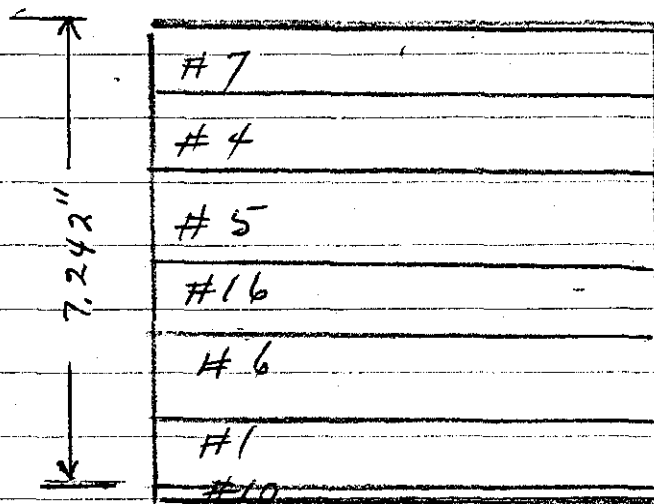
C.A. APR Expt. IV Run 1  
7.437" Date OCT 10 1966 Time 11:40 AM  
 Purpose Crit Cond. with  
~~extra~~ extra pos on.

up #1 = 22.73  
 #2 = 22.64  
 #3 = 0  
 #4 = -4

1. Fuel - From diaph up  
 #0010, #0001, #0006, #0016, #0005,  
 #0004 & #0007.

Belt heads on diaphragm, belt  
 spacers raised against fuel by use  
 of other al. tubing spacers, air  
 shroud in place, safety tube on,  
 safety block fringes complete in  
 place. three thermocouple fuel  
 plugs in (49 gm each).

No Rods - Sub critical



	Net wt
#7	12.559 Kg
#4	14.600
#5	14.552
#16	13.701
#6	14.603
#1	11.983
#10	2.168
	<hr/>
	84.166

7.437" Fuel Ht.

11,317 gms/in }  
plates only }

8 Balts	14.186
1 Salt	1.618
3 Thermo Plug	1.47
MA Rod	1.964
Buret Rod	1.551
	<hr/>
	103.632

15,709 gms/in.  
except rods

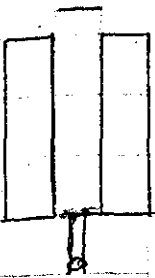
SAFETY Block 16.718

---

120.350 Kg

16,183 gms/in total

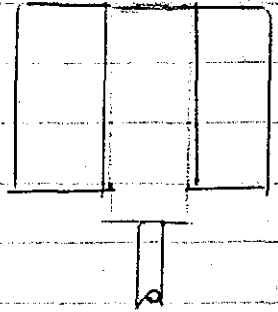
2. Burst Rod added - Sub crit
3. Reg Rod added - Sub crit.
4. MA Rod added, Reg. Rod Removed



up - bottom of safety at bottom of fuel  
 $\log N = -78.2 \text{ sec}^{-1} ? < -30 \text{ } \phi$

#1 = 22.3	+86.8 pc	+10.8 $\phi$
#1 = 22.1	+41.2 "	+18.2 $\phi$

5. Set stops so that top of Safety is at top of fuel



up #1 = ~~20~~ 21.554  
 #2 = 21.429  
 #3 = +2  
 #4 = -6

up = +12.44  $\phi$

#1 = 21.380  
 = 21.15  
 = 20.76  
 = 20.27

- 21.42  $\phi$   
 - 73.17  $\phi$   
 - 159.92  $\phi$

Fuel = 7.437"	Air Standard = on
MA = in	Safety tube = on
Burst = in	Safety Hanger = in
Reg = out	

22.73  
 22.64  
 0  
 -4

CA. APR	Expt. V	Run 1
8.16"	Date 19	Time AM PM
Purpose To determine Crit Ht with extra parts on.		

1. Fuel - Same as p. 23

Shroud on

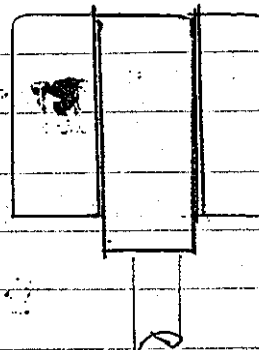
3 Rods  
#3.53

Safety ~~rod~~ Hanger in.

No Rods in.

up #1 = 21.556

Sub Crit,



2 Added Safety Tube

#1 = 21.556

#2 = 21.429

Pos Period = 18.26 s

$\omega$  = #1 = 21.07

Fuel Ht = 8.16"

#7
#4
#5
#16
#6
#1
<del>#10</del>
<del>#8</del>

net wt

12.559 Kg

14.600

14.552

13.701

14.603

11.983

2.168

3.542

87.708

Fuel Ht = 7.749"

11,318 g/in }  
plates only

8 Balts

14.186

1 Balt

1.618

MA Rod

1.964

105.476

3 Therm Plug

1.47

105.623

SAFETY BLOCK 16.718

~~120.20~~

15,534 gms/in

~~120.341~~

all except rods

122.341

Kg.

gm/in. Ht	Bottom		Net wt
11,522	#7 "	1.09"	12,559 gm
11,389	#4	1.282"	14,600
11,359	#5	1.281"	14,552
10,926	#16	1.254"	13,701
<del>11,397</del>	#6	1.282"	14,603
11,390	#6	1.282"	14,603
11,379	#1	1.053"	11,983
11,377	#3	0.918"	10,444
			<u>92,442</u>

Fuel Ht. = 8.16"

11,328 g/in plates only

8 Bolts 14,186

1 Bolt 1,618

3 Thermo Plugs 147

108,39

SAFETY BLOCK 16,71

15,332 gms/in

125,11

all pcs except Rods

OCT 11 1966

33

DATE OCT 11 1966

TIME 9:45 AM

PRECK Taylor & Lyman

CHAMBER	10	20	4-16	10	900	250
PISTON	1000	OK	21	0	5"	OK
VALVE	4"	-	100	90	100	-
EL. 2	90	-	-	-	-	-
ADJUST	✓	✓	✓	-	-	-
SO. ROD	Mr 226 + 8	-	-	-	-	-
TABLES	✓	✓	✓	-	-	✓

C.A. APR

Exp. VI

Run 1

7.749" Date OCT 11 1966 Time 9:55 AM

Purpose Crit Cond.

1. Fuel From diaph. up.

#0008, #0010, #0001, #0006, #0016,  
 #0005, #0004, #0007.

Air Shroud on	MA Rod	in
Safety tube on	B R	out
Safety Hanger in	R R	out

Pos Period = 31.78 # #1 = 21.570  
 0 #1 = 21.115

7.75  
 + 3.2 #

DATE		SAFETY CHECK				
TIME	2:10	PM	Taylor + Lynn			
BRANSEL						
GRADE	$\frac{10}{1000}$	opt	2-6	$\frac{10}{1000}$	900	750
DEPTH	5"	OK	3'	0	4"	5R
%	90	-	100	90	100	-
DISC. MARK	2	✓	✓			
AUX. S.	✓	✓	✓			
SOURCES USED	M-226 + Y					✓
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

CA	APR	Exp.	VI	Run	2
	7.749"	Date	10-17-66	Time	2:15 PM
Purpose	Boral Evaluation				

2. HE = 7.749"      Safety hanger in  
 MA Rod in      Shroud on  
 RR + BR = out      Safety tube off

Boral sheets  $\frac{1}{4}$ " Thick 9" long,  
 used to wrap air shroud  $\frac{1}{4}$ " from same.  
 ~ 95% of the area covered. [~ 11.5" O.D.]

Super crit       $\infty$  #1 = 20,140

3. MA Rod out      Pos #1 = 20.87  $\infty$  #1 = 20.72  
 RR Rod in

- 4 RR out (No Rods)

up #1 = 21.570      Sub crit



5.  $H^* = 7.749''$

Air Shroud on

No Rods

Safety tube  $\frac{3}{4}$

Boral as Run 2.

Safety hanger in.

Neg Period -  $\log N = -8 \#$

$BF_3 =$

VS Run 1

mA out = -1.76

Safety Tube off = -0.55

32 # pos = -0.32

-0.08

#2.65



Boral I.D. = 11"

$A = 311 \text{ in}^2$

292  $\text{in}^2$  covered

D.]

.72

36  
OCT 18 1966

DATE		SAFETY CHECK					
TIME	11:15	AM BY Taylor + Lynn					
CHANNEL		A	B	C	D	E	F
RANGE		$\frac{10}{1000}$	opr	46	$\frac{10}{1000}$	900	250
SOURCE		5"	ok	31	0	44	ok
% F. C.		90	-	100	90	100	F
BIBB. PLATE		✓	✓	✓			
AUX. CHS.		✓	✓	✓			
SOURCES USED	M-226 + X						✓
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓		

CA	APR	Exp.	VI	Run	6
	7.242"	Date	OCT 18 1966	Time	11:30 AM
Purpose	Crit. Ht. Determination				

6. Ht of Fuel = 7.242" Samas p.32 less .918" for  
 Air Shroud on  
 Safety tube on MA Rod out  
 Safety hanger in Reg Rod out  
 Borol as p.34 Burst Rod in ✓  
 Sub Crit.

7. Added Reg. Rod. up #1=21.380 ✓  
 #2=21.283  
 Pos Period = +10.06 # #3 = +3  
 #4 = -5

MA Rod out  
 B Rod in ✓  
 Reg Rod in

C.A. APR	Exp. VI	Run 8
7.242"	Date 10-18, 1966	Time 1:45 PM
Purpose: Burst Rod Evaluation		

8. Ht. = 7.242"

Air Shroud on ✓

MA Rod in ✓

Safety tube off:

Burst Rod in

Safety Wauger in

Reg. Rod out ✓

Boral on

$$\text{Pos Period} = + 40.96 \text{ } \phi \leftarrow$$

$$\text{Pulled Burst} = - \frac{69.81 \text{ } \phi}{110.77}$$

$$\frac{110.8}{105.7} = 1.048$$

$$\text{Burst Rod} = 1.11 \text{ } \checkmark$$

$$\text{Then MA Rod} = 1.84$$

$$\text{Reg. Rod} = 0.74$$

OCT 19 1966

DATE		SAFETY CHECK					
TIME	10:00	BY Taylor + Lynn					
CHANNEL							
RANGE	$\frac{10}{1000}$	ops	276	$\frac{10}{1000}$	900	750	
SCOUT	5"	OK	5'	0	4"	OK	
90	90	-	100	90	100	+	
BLED. ALARM		✓	✓	✓			
AUX. DT.S.		✓	✓	✓			
SOURCES USED	M-226 + 8						✓
TABLES	✓	LIGHTS	✓	AREA CLEARED			✓

C.A. APR Expr. VI Run 9  
7.242" Date OCT 19 1966 Time 10:20 AM  
 Purpose Boral Evaluation

4.25"  
 2  
 S.S.  
 A =

9.  $HY = 7.242"$

Air Shroud on M A Rod in  
 Safety Hanger in Burst Rod in  
 Safety tube on Reg. Rod out  
 Removed 44.6% of Boral, every  
 other piece (about).

Pos Period = +.34,48 \$ ←

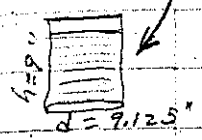
I.D. of Boral = 11.0"     $A = 292 \text{ in}^2$   
 162  $\text{in}^2$  Covered  
 130  $\text{in}^2$  off.

C.A. APR Expr. VI 10  
7.242" Date 10-19-66 Time 1:20 PM  
 PURPOSE: Boral Evaluation

10.  $Ht = 7.242"$

Air Shroud on  
 Safety Hanger in  
 Safety Tube on

MA Rod in  
 Burst Rod out  
 Reg. Rod out



at shell of air shroud removed,  
 S.S. Shroud  $\sim 54.2\%$  of stainless Area Covered  
~~55.4%~~  
 $A = 258 \text{ in}^2$  with boral.  $140 \text{ in}^2$

$$\frac{258}{140} = 54.2\%$$

$$\frac{258}{.95} \sim \text{sub crit.}$$

2.45 in

11 Added Reg. Rod Sub Crit-

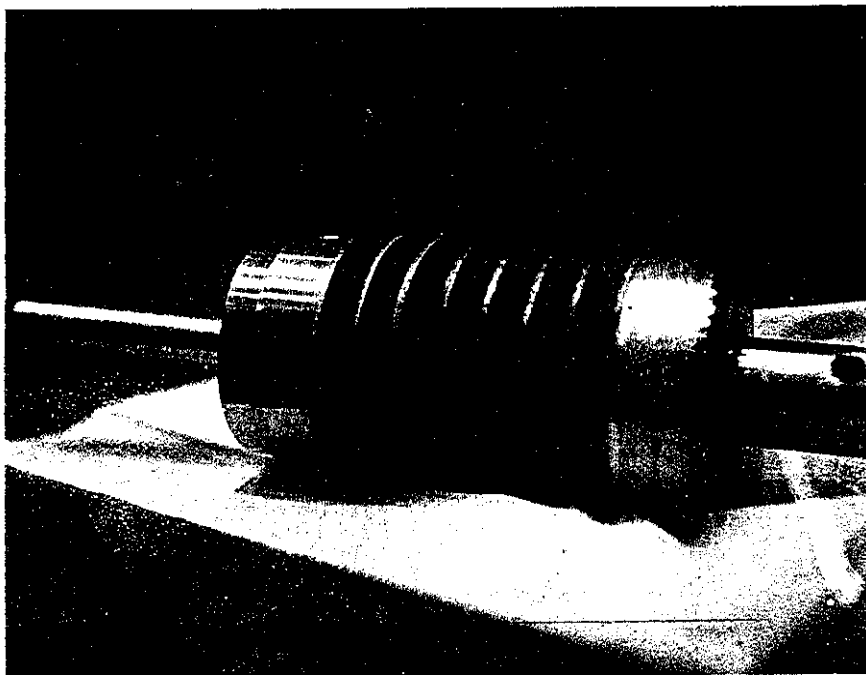
12 Removed Reg Rod. Added Burst Rod  
 Same cond. as Run 9, except boral change.

$$\text{Pos Period} = 25.67 \text{ } \phi$$

13. Removed remaining boral.  
 Added Reg. Rod. (+0.74)

$$\text{Neg Period} = -31.77 \text{ } \phi$$

$$\text{Boral} = 1.06$$




Safety Block shock absorber  
(ref 11-15-66)

The absorber actually used during  
entire experiment was with the rubber  
shaped in an overall conical shape  
ref Pg 45 5 Dec 66

10-24-66 - Fuel returned to 7-12, except for 4 pcs.

11-15-66 - Removed Safety Block assembly for purpose of recharging shock absorber. Assembly removed consisted of  $2\frac{3}{4}$ " OD soft sponge rubber + 3" OD,  $\frac{1}{16}$ " brass shims. ID. of Tube = 3.380"

 brass shims

11-16-66 - New assembly, of  $3\frac{19}{64}$ " OD x  $1\frac{1}{32}$ " ID hard rubber and  $3\frac{23}{64}$ " OD x 1.01" ID x  $\frac{1}{16}$ " brass ~~shims~~ shims, returned to reactor for test. Some jamming. Removed same. Tube for magnet + shock assembly found to be rough inside. Sent to 7-12 for machining inside of tube.

ker  
pe

11-17-66 Starrett Gauges mounted to read "0" for the "in" positions of the Mass Adjuster and Regulating Rod.

M A Rod			Reg. Rod.		
Out	In	Gauge (mils)	out	In	Gauge (mils)
—	8.754"	0	—	8.754"	0
0.247"	8.754"	0	0.244"	8.754"	0
.247	8.754"	0	.244	8.754"	0
.247	8.754"	0	.244	8.754"	0
.247	8.754"	0	.244	8.754"	0
.247	8.754"	0	.244	8.749"	-6
.248	8.754"	0	.245	8.754"	0
.248	8.753	-2	.247	8.751	-4
.248	8.754	0	.245	8.754	0

up and down on way out cont. in to out

Jogged at "in" kite  
Cont. "out" to "in"  
up + down on way "in"  
Cont. out to in

23 No  
25 No

Intermediate positions of rods.		Repeating a position	
3.670	0	3.638	0
"	0	"	-1
"	+1	"	-1.5
"	-1.5	"	0
"	-1	"	-3
.247	-1.5	.244	0
Below then back	+1	"	-3



11-21-66 Magnet housing tube returned from shop.  
 Began remounting. ID of tube 3.411" @ top  
 3.407" @ Bot

11-22-66 Finished mounting tube and safety block  
 drive assembly for check, using same  
 shock assembly as 11-16-66. Still had  
 ~ 1 1/2" bounce of safety block. New  
 shock assembly started. Removed  
 magnet + shock assembly -

23 Nov 66 Shock assembly checks continuing

25 Nov 66 Took 15 mils off the brass rings and put rubber gaskets  
 in pairs. Still have over 1 1/2" bounce.

Replaced rubber in bottom cup with brass and  
 put all rubber together, brass at ends only.  
 Bounce now 1" or less.

Made some checks of horizontal shock  
 to the assembly:

- ① Source in or out gives 5 mils NE & 3 mils SE.
- ② SCRAM S.B.  $\approx$  30 mils. all components on.
- ③ " " =  $\pm$  20 mils SW ; 30 mils NE.
- ④ " " = 30 mils SE ; 40 mils SW ; 15 mils NE.
- ⑤ " " = 30 mils SE ; 10 mils SW ; 20 mils NE ; 10 mils NW.

about 1" bounce.

- ⑥ SCRAM S.B. < 45 mils SE ; > 40 NE.

High flux safety channel #1 annunciator light is not activating. It does however assist a SCRAM. Ans is that the recorder needed to "see something" i.e. be upscale some.

28 Nov 66 Scope bounce measurement show the bounce to be 2" and not 1" as "eyed" on 25 Nov 66.

after several safety block drops - latches to safety chambers #1 + #3 released.

### Neutron Generator Check -

107 Insts.	"C"	L-19	0	Max.		
3:45 PM	7.5'	L-20	3.8	43	1st	2
	"E"	1250V	5	33	2nd	
	13'		5	14	1st	
	"A"	$\frac{10}{500}$	17.5	15	2nd	
				20	2nd	

29 Nov 66 Removed Magnet assembly, including tube. New shock assembly to be made. Solid Al for cup,  $\frac{1}{16}$ " brass,  $1\frac{3}{32}$ " rubber,  $\frac{1}{16}$ " brass,  $1\frac{9}{32}$ " rubber +  $\frac{1}{16}$ " brass. Removed and adjusted assembly with "up" position indicators for safety block.

30 Nov 66 Installed assembly as above. Still 2" bounce

1 Dec 66 Removed one of the  $1\frac{1}{32}$ " rubber and replaced with metal (al or brass).  
2" bounce -

Tried assembly with  $\frac{3}{8}$ " thick rubber only and the remaining metal. The rubber ~~located~~ at different locations in the assembly, and in some cases rubber in bottom of magnet tube.  
~ 2" bounce in all cases.


Tried coned shaped assembly solid rubber. ~ 1 1/2" bounce.  
Inverted. ~ 2" bounce.



2 Dec 66 Tried 2 cones.  
More than 2".



Went to the shock that was in reactor when received. 4" bounce.

5 Dec 66 Back to cone shaped.  2" bounce.  
magnet end, 2-1/16" brass, rubber + al in cup.

6 Dec 66 Removed burst rod cylinder. To check the cushioning arrangement of needle valves + check Vanlin.

7 Dec 66 Continued adjustments and fastening of Rods.

sed.

at  
nd  
at  
nd  
nd

be.

l

"up"

14 Dec 66 ABERDEEN'S Pu BE SOURCE was checked by Hilian and found all smears were clean. This includes source and container. Floor in 108 also OK.

12-8-

15 Dec Check accelerator - got 250  $\mu$  on target

12-13

Fission Sample  
Thermocouple plugs.

		net wt	$\mu$
12-13-66	7882-2-0017	57.5 gms	52 gms
	18	57.3	52
(Solids)	19	57.6	52
	20	57.0	51

Thermo Couple plugs -

7881-30-0035	49	44
36	49	44
37	50	45
38	49	44

Fuel 235 U, 10% Maly - after Coasting -

air

get

Date	Part	Part No.	Net wt (-10%) = <sup>22</sup> 1203	PR #
12-8-66	Burst Rod	7882-01-0001	1,652 gms	#3
	Mass adj. Rod	7881-26-0051	1,964 gms	
	Reg Rod	-27-0052	753 gms	678
12-13-66		-21-0001	11,983 "	10,800
			<del>10,800</del> "	<del>9,720</del>
		-19-0003	10,441 "	9,397
	Lower	-17-0005	14,550 "	13,105
	Center Plate	-18-0016	13,701 "	12,335
	lower	-17-0004	14,595 "	13,135
		-19-0006	14,599 "	13,139
	Bottom Plate	-16-0007	12,559 "	11,303
	Top Plate	-24-0008	3,542 "	3,188
	.195" Plate	-23-0010	2,168 "	1,951
	Safety Plug	-25-0011	16,718 "	15,046
	Short Bolt (9.5")	-29-0013	1,586 "	1,427
		-0040	1,586 "	1,427
		-0041	1,586 "	1,427
		-0043	1,587 "	1,428
		-0055	1,586 "	1,427
		-0056	1,586 "	1,427
		-0057	1,587 "	1,428
		-0064	1,587 "	1,428
		-0066	1,585 "	1,427
	.206" Plate	-99-0009	2,310	2,079
	2nd Bottom Plate	7882-03-0022	14,918	13,426

02 67964

48

solid plugs.

	net wt	u
7882-02-0002	57 gm	51 gm
3	57	51
4	58	52
5	58	52
6	57	51
7	57	51
8	57	51
9	57	51
10	57	51
11	57	51

19 Dec 66

20-25 3-of 3 CONTACTS MADE ~15 MILLS SUBSTANTIAL  
 BLOCK ABOUT 50 MILLS FROM TOP OF CORE  
 MTR-R ROD ADJUSTED SO THAT TOP OF ROD IS AT TOP  
 OF CORE.

Began torquing bolts [50 → 100 lbs].  
 #66 OK. #59 loosened and ~~it~~ tightened  
 ~ 20 times, when ready to remove  
 found that threads had apparently  
 galled or stripped. Sent to Y-12 to  
 be removed.

20 Dec 66. #59 removed. Threads in #7 (bottom plate)  
 ruined. #59 riveted. #64 to replace it.  
 Remaining bolts to stressed at Y-12.  
 Mike Lindin to supervise.

23 Dec 66. Received 8 bolts + bottom plate.

E-4

53

DATE	DEC 23 1966					
SAFETY CHECK						
TIME	1:20 PM	AM	BY	Lynn, Mihak & Dickinson		
CHANNEL	A	B	C	D	E	F
RANGE	1000	800	1-18	1000	900	750
SOURCE GIST.	8"	OK	3"	7"	OK	OK
% F. S. TRIP	90	-	100	90	-	-
BLOC. ALARM	✓	✓	✓			
AUX. CTNS.	✓	✓	✓			
SOURCES USED	M-226 + Y		WAFENETS		✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

DEC 23 1966

CA. APR 00<sup>00</sup> Expt. A Run 1  
 5.14" Date DEC 23 1966 Time 1:20 PM  
 Purpos: Partial loading  
 Bottom plate thru center  
 plate + Top plate - MA +  
 RR ~~rods~~ rods + bolts. BR rod out.

#8	3,542	gms wt	MA =	1,964	gms wt
16	13,701				
5	14,550		RR =	753	
4	14,595				
#7	12,559		9 bolts =	14,274	
	58,947	+	16,994		= 75.94 Kg
			Safety =	16,718	16.72
					92.66 Kg

Safety Block inserted - slight indication  
 on "C" + Counter



DATE		SAFETY CHECK					
TIME	8:40	BY TAYLOR-MITALCZO, DEKENSOW					
CHANNEL		A	B	C	D	E	F
RANGE		10/1000	OPR	L-15	10/100	900V	750
SDS		12"	OK	2"	3"	3"	OK
%		90	-	100	90	-	-
BLDG. ALARM		✓	✓	✓			
AUX. DEE		✓	✓	✓			
SOURCES USED	M226 & b						✓
TABLES	✓						✓
			✓				✓
							✓

See detector positions Pg 60

EX. APR	EXT. A	NOTED
PURPOSE	Critical determinations of various configurations.	
		AM DN

2 rhottes OK

Bolts "finger tight" until Pg 69

DEC 27 1965

TOP

BOTT

92.656 Kg (46)

55

107.224 Kg

fuel = 8, 6, 16, 5, 4, 7 = ~~14599~~ + 14599 = ~~14599~~  
ht. = ~~6.42~~ 6.50"

(2) B.R. = INSERTED, MA = OUT, RR = OUT, SOURCE AT EAST reactor frame, SAFETY TUBE = OFF.

Insert S.B. & BF<sub>3</sub> #2 gives: (1 min-scale 16)

- = 25

- = 30

9 1/4" = 32

9 1/2" = 28

9 3/4" = 30

10 = 28

10 1/4" = 30

10 1/2" = 34

10 3/4" = 38

11 = 29

11 1/4" = 32

11 1/2" = 34

11.530 = Inserted

Channel "C" saw the BF<sub>3</sub> increases, i.e. a small div. total increase on "charlie".

Source placement on reactor is visible on "C".

(3) fuel 8, 1, 6, 16, 5, 4, 7 = 107255 + ~~11983~~ = 118055 gm  
ht. = 7.56"

Bolts tightened hand tight. conditions same as (2) above

6" = 20 CPM X 16, 7" = 22, 7 1/2" = 25, 8" = 27, 8 1/2" = 31, 9" = 38, 9 1/4" = 40, 9 1/2" = 50, 9 3/4" = 50, 10" = 56, 10 1/4" = 55, 10 1/2" = 68, 10 3/4" = 80, 11" = 80, 11 1/4" = 100, Inserted = 108

Now insert MA @  $\left( \begin{array}{l} 2.0'' = 126 \\ 7 \end{array} \begin{array}{l} \times 16 \\ \times 256 \end{array} \right)$

MA @ Inserted = 20 ( $\times 256$ )

Now insert RR to inserted = near critical

SB = 11.530"
MA = 8.966"
RR = 9.075"
BR = Inserted

hw = .00032, C = L-25 @ 70, E = 0, D =  $\frac{10}{510}$  @ 65,  
A =  $\frac{10}{510}$  @ 60

(4) add 4 thermal c. insert plugs and  
add the safety tube,

mass =  $\frac{119238}{118055} + 228 = \frac{119435}{118287}$  gms  $ht = 7.55''$  ✓  
 BB = in, MA =  $7\frac{3}{4}''$  gives 56 sec period + 14.8¢  
 Get SCRAM @ APR control. (hw Period meter),  
 Room 109's hw read 0.032

Now repeat (4)

MA =  $7\frac{3}{4}'' = +14.8¢$

∞ MA 6.476", RR out, BR in,

hw = 0.039, C: H26 @ 44, D  $\frac{1000}{500}$  @ 54, A =  $\frac{1000}{500}$  @ 41  
 E. just on

diab  $\downarrow$   
 $RR = .232$   
 $MA = 6.470$  }     

$RR = 1.006$   
 $MA = 6.470$  } 3.65¢

SB 10.5350  $\frac{\#}{-1.20}$   
 took 35 sec. in time to withdraw to this point.

(5)

Log N  $10^{-6}$  APR control.  
 use accelerator and attempt to by-pass  
 the period SCRAM.  
 attempt is successful. But highest power  
 is only 0.002 on Rm107 kW.

(6) BR out

SB in (2 of 3 inserts) 1¢.3

MA in

RR in

Turn on accel. LN = 0.038

accel. off & Rhoette = -14.5¢

Rm107  $\frac{\#}{-12¢}$

Run (5) now confirmed at "full" .05 Ln  
 Now SCRAM SB.  
 rhoette = 20.00

(7) add al plated 207 mil disc of fuel;  
~~119466~~ gm + 2168 = ~~120451~~ Kg ~~120.593~~ Kg  
 ht = 7.76" measured

using accel. "low" as source  
 fuel = 8-10-1-6-16-5-4-7, safety tube off.

BR out -  
 SB in -  
 MA in 8.966"  
 RR in 9.075" ) Rhoette = +5.94

Make RR calib using Rhoette  
 9.075" - 0.234" in 2.56 min.

8.841 Tot  
 3.45351 per min  
 0.0287793 pul/sec

7MA Make MA calib using Rhoette  
 8.966" - 0.222" in 3.57 min.

8744  
 0.0204108 pul/sec

The MA & RR are "now" flush with top  
 of core when all way in.

(8) BR evaluation:

9-10-11-12 "jumped" so BR can be moved out during S. State.

BR in

Using accel. as source.

$$\infty : L_N = .042, C = H_{25} @ 84, A = \frac{1000}{500} @ 44,$$

$$D = \frac{1000}{500} @ 58$$

$$MA = 5.461''$$

$$K1 = 3 \times 10^{-8} \text{ scale @ } 1.5$$

$$\text{Pico Counter} = 3 \times 10^{-9} \text{ scale @ } 1.2$$

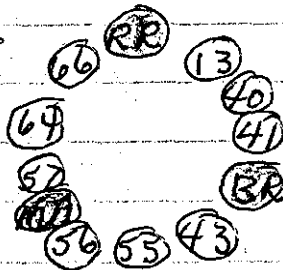
$$\text{Rhoette} = \infty$$

$$\text{RR} = \text{out}$$

Withdraw BR for Rhoette = -1.023

Jumpers have been removed. (See pg 61 for description)

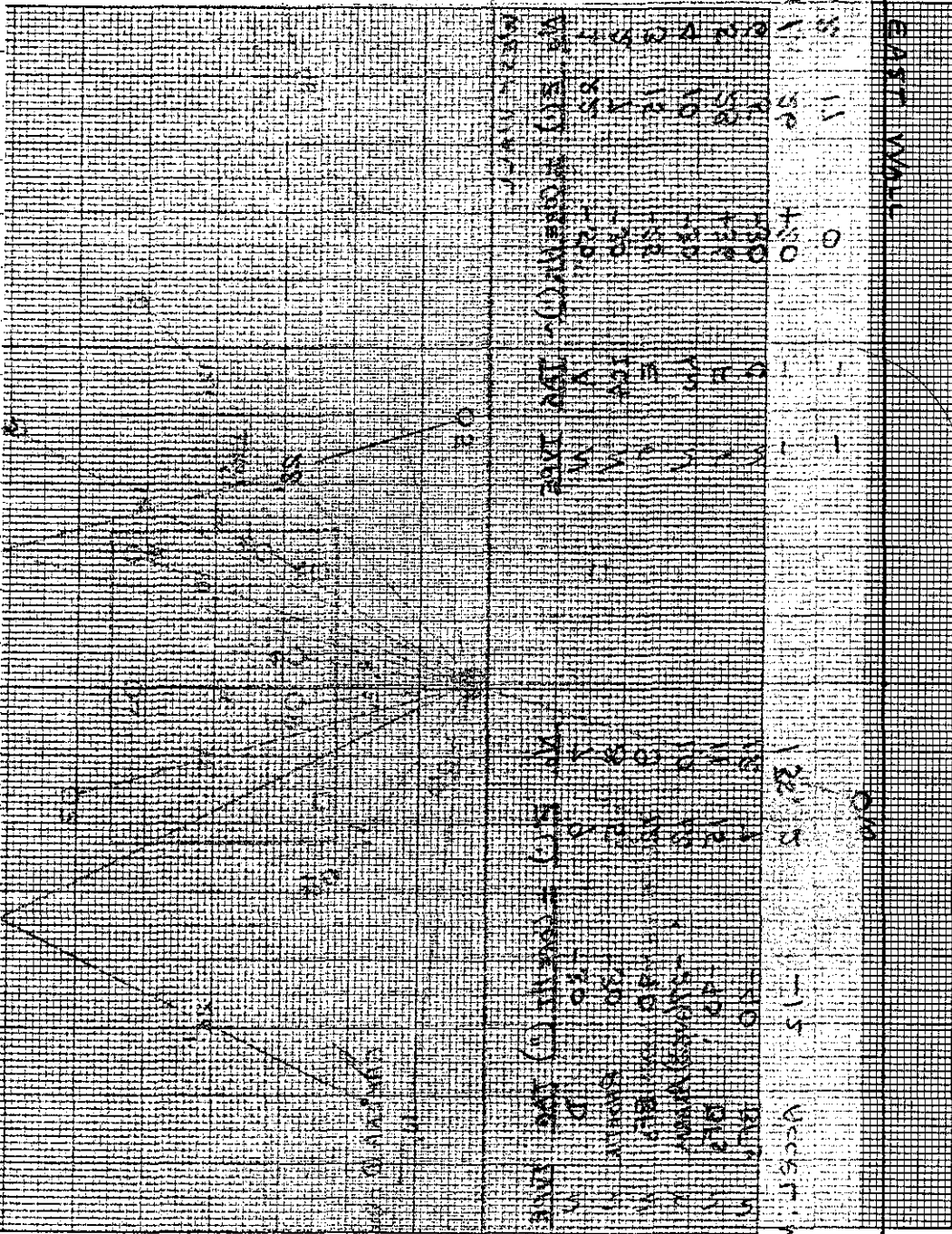
TOP VIEW OF BOLTS AS USED



This good thru 6 Feb 67 only.

East Wall

01



DETECTOR

POSITIONS

SOUTH WALL

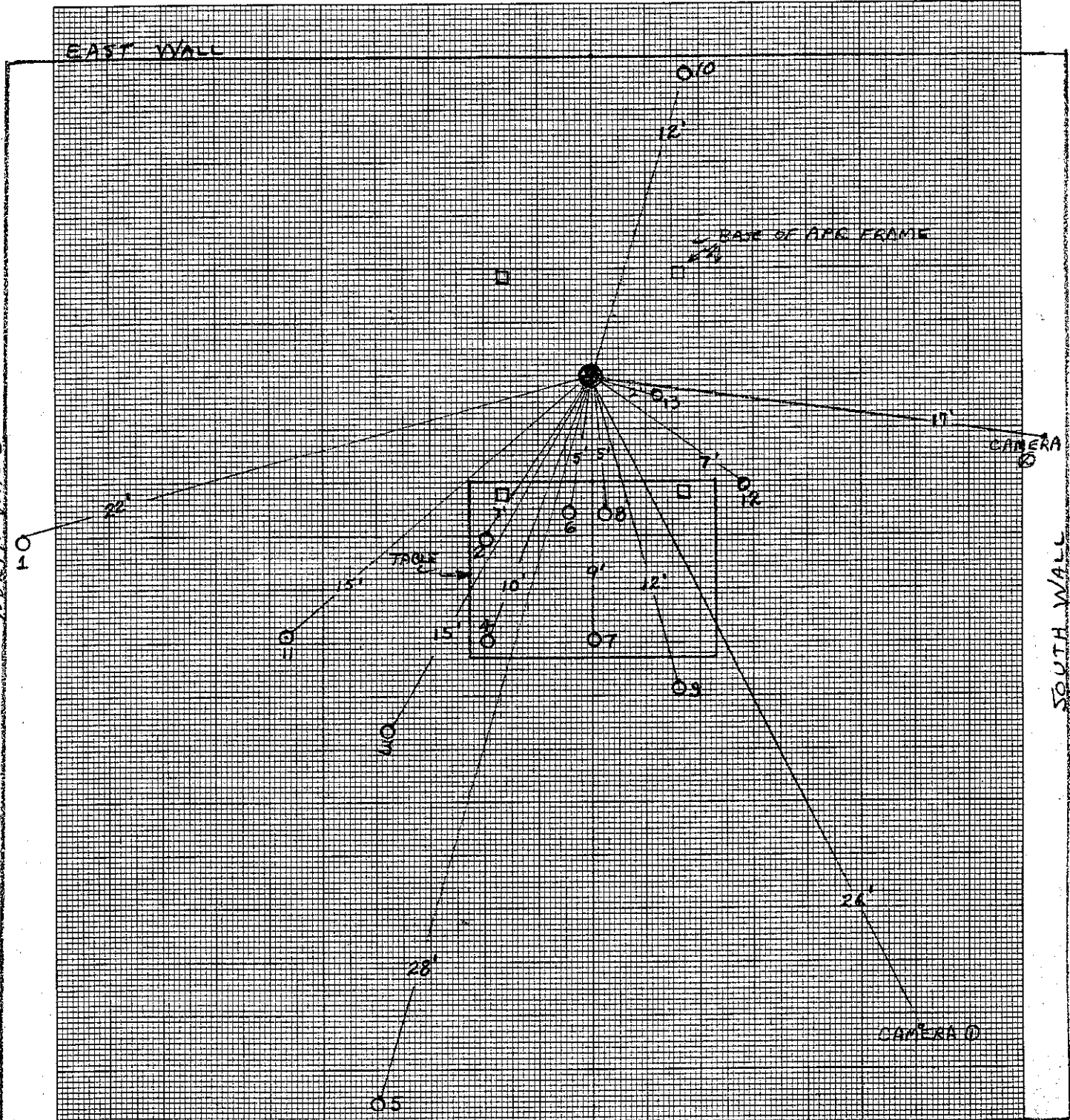
# DETECTOR POSITIONS

EUGENE DIETZGEN CO.  
MADE IN U. S. A.

NO. 340-M DIETZGEN GRAPH PAPER  
MILLIMETER

NORTH WALL

SOUTH WALL



WEST WALL					EAST WALL				
No.	Z(U)	Core Ht. (")	IDG	TYPE	No.	Z(U)	Core Ht. (")	IDG	TYPE
1	22	-50	A	N	7	9	-30	D	N
2	7	-30	104	N	8	5	-30	RHOIDE	N
3	15	-25	E	C	9	12	-40	BFS	N
4	10	-30	LW	N	10	12	-27(ING)	ALARM	N
5	28	+36	F	C	11	15	-40	BFS	N
6	5	+30	C	N	12	7	-40	BFS	N
CAMERA 1	26	+20	-	-	13	2	-12	ACCEL.	N
CAMERA 2	17	0	-	-					



# Free Movement of Burst Rod

IN

## Steady State Mode of Operation

A. Connect Following Jumpers

1. IPTB-6 (17D to 17E) PRT O' Secs

2. RPTB-10 (11D) to RPTB-12 (17A) Mode Switch

3. RPTB-12 (17A to 17B) Control B

4. RPTB-12 (17B to 16A) Mode Switch Off

### Procedure

Connect Jumpers As Shown Above

Mode Switch to Steady State

Control Block INSERTED

Manual Burst Switch Manual Burst To ENERGY

Control Switch Latch #2 Withdrawn

Burst Rod Position Slw. INSERT

Latch #2 has been latched

Free Movement of Burst Rod is Possible

Control B.R. - SS 10-7 To Manual Burst

Control B.R. - SS 8-1 to Withdrawn

		SAFETY CHECK					
DATE	28 Dec 66						
TIME	9 <sup>00</sup> AM	AM	BY	TAYLOR - MIHALICZ	DICKERSON		
CHANNEL		A	B	C	D	E	F
RANGE		$10/1000$	ORR	L-15	$10/1000$	90V	750
SOURCE DIST.		12"	OK	2"	4"	3"	OK
% F. S. TRIP		90	-	100	90	-	-
BLDG. ALARM		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AUX CTRS.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SOURCES USED		N & H		MAGNETS		<input checked="" type="checkbox"/>	
TABLES		<input checked="" type="checkbox"/>		LIGHTS		<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>		AREA CLEARED		<input checked="" type="checkbox"/>	

2 chatters - OK

## SPECIAL NOTE:

Rods are rearranged in order to measure a B.R. traverse,  
 i.e. RR is on MA drive  
 MA is on B.R. drive  
 BR is on RR drive  
 and core is rotated  $120^\circ$  for physical reasons. Using accel. as source of neutrons.

S.B. in (2 of 3) (2 & 3) lights  
 $\infty$   $h\nu = 0.032$ ,  $C = 1725 @ 68$ ,  $A = \frac{1500}{500} @ 35$

BR in @ 2.136" @ 9" top of rod over top of core  
 RR out  
 MA in  
 SB in 11.532"

(9) evaluate SB  
 trav. out and use Rhoette

11.532 - 9.180" 0.83 min

$\frac{9.180}{2.352}$

Now proceed back to power but  
 Got SCRAM.  $h_N @ 0.15 @ u + 28^\circ$   
 Scram button was pushed in APR control.

(10) { M.A. out  
 { SB in (2 of 3) (243 lights)  
 { BR in 9.00"  
 { RR in 8.967"

$h_N = 0.014$  with accel. on.

Accel off =  $-83^\circ$  (? low power ( $h_N = 0.001$ ) Rhoette)

(11) Group withdraw.

Jumped (see pg 61)

MA latched in.  $29/32$ " thru bottom of core.  
 and  $10/32$ " protrudes out the top.

SB in (2 of 3) (243 lights)

partial BR <sup>calit</sup> 4.25" - 0.234" in 1.15 min <sub>40/6"</sub>  
 started @  $h_N = 0.05$

RR out

64

conditions same as (11) except:

(12)	RR @ 5.5 "	reactivity = +17.1 ‰
	6.0 "	+22.1
	5.0 "	+5.35
	4.0 "	0.0

Rhett's

Then <sup>(jerk)</sup> pull out MA all way.  
Rhett's = -1.75

(13) added safety tube [fuel remains as (7)]  
MA out  
SB in (2 of 3) (2 #3 lights)  
BR in  
RR in @ 8.967  
accel. on & off for Rhett's measurements.  
gives 2 ‰

BR calib started  
9.00" - not good  
need shim.

added 1" x 4" x 4" plastic shim to side of fuel and "pull off" assembly.

MA out

SB in (2 of 3) (243 light)

BR in

RR @ 4.95"

± 20 sub

BR calib start in 0.05TOTAL TRAVEL = 10.903" in 3.1 min.NPE  
(14) ↓∴ shim = 1.38"

(14) MA out

SB in (2 of 3) (243 light)

BR in 9.50"

not goodUse smaller shim 1" x 2 1/4" x 2 1/4"  
at same position.

MA out

SB in

BR in flush top of core

RR in

BR calibtravel = 10.903" in 3.135 min

0.0289819" per 1/2 sec

{ 2" from centre of core 20 min after shut  
down = 100 m/hr.

DATE		SAFETY CHECK					
TIME	8 <sup>45</sup> AM	BY TAYLOR-MINALCZO-DICKERSON					
CHANNEL		A	B	C	D	E	F
RANGE		10/1000	OPR	L-15	10/1000	900V	750
SOURCE DIST.		12"	OK	18"	12"	OK	OK
% F. S. TRIP		90	-	100	90	-	-
BLOB. ALARM		✓	✓	✓	✓	✓	✓
AUX CTRS.		✓	✓	✓	✓	✓	✓
SOURCES USED	N/A	✓	✓	✓	✓	✓	✓
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓	✓	✓

Rhoette 1 = OK  
 " IC4 = OK 1'

RR on MA; MA on BR; BR on RR drives & NOTE

→ Rods & core are still rotated 120°  
 BR = 4.770" dial reading when bottom is flush with bottom of core.  
 Safety tube is on.

- (15) BR calib & begin traverse with rod flush with ~~bottom~~ of core bottom.
- MA out
- SB in (2 of 3) (243)
- BR in (as noted) (4.770" dial)
- RR in 8.968" dial

Run (15)  
 not used  
 rec (16)

Using  $1 \times 2\frac{1}{4} \times 2\frac{1}{4}$  plastic shim to "get up".  
 Rhette data started @  $L_N = 0.045$   
 ~~$4.770 \rightarrow 10.903$  in min.~~  
 use  $4.77 + 1.904 = 6.674$  travel in 1.9 min

(16) BR calibr - this time "get up" with accel.  
 start data @  $L_N 0.045$  } [ - 2.8" for conf (15) ]  
 $BR_{in} = 9.074$  } 74 miles below top of core  
 $10.903$  travel in 3.1 min .029509 per 1/2 sec

(17) Run BR back in and make repeat return

$BR_{in} = 9.074$  top is 74 miles below top of core -  
 start data @  $L_N 0.045$   
 $10.903$  travel in 3.075 min .029547 per 1/2 sec  
 avg. time (16) + (17) = 0.029428 per 1/2 sec

NORMAL ORIENTATION

(18) Rearrange core and rods back to normal orientation.

→ Put 50# torque on each U Bolt.

BF<sub>3</sub> at #3 is moved to within 50" of core.  
Jumpers (ref Pg 61) are still on.  
Safety tube is off

10:55

BR in

SB in

MA @ 5.33-2 = ∅

RR out 0.128

to get critical  
(5.46 gave +20#)

Fire BR out

rhoette → #1.031 ref # (8)

Now add a jumper to #8

11:15

BR out

(19) SB in (2 of 3) (2 of 3)

MA in

RR in

ref run # (7)

rhoette = ① + 9.78 #

check reproducibility by lowering SB 1/2" Back

(lights 2 of 3) out-in # rhoette: ② + 9.95

(lights 3 of 3) ③ + 9.87

(3 of 3) ④ + 9.82



light 3 of 3 @ +9.82  
2 of 3 @ +9.64

11:30

BR out  
SB in } @ h<sub>0</sub> = 0.03  
MA in }  
RR 6.103 }

~~MA withdrawn~~ Now withdraw MA

have been down 19 minutes  
go back to delayed critical (no source)  
by inserting MA

12:01	start inserting after 19 minutes	charlie = 46	(2)
12:02	very few BF <sub>3</sub> cts.		1:1
12:04:45	charlie responds sharp = 48	MA lacks 1/2" being in	1:2
12:05	charlie now slow increase = 49		1:2
12:09	charlie = 60		1:4
12:11	C' = 57		1:5
12:12	= 56 ; 12:13 = 62 ; 12:14 = 62		1:6

to be rerun — see (20)

SCRAMMED WITH ACCELERATOR by  
"Doc". Was @ 0 (zero) Power

(20) BR out  
 SB in  
 MA in  
 RR = 6.103

Power  $hN = 0.032$   
 $C = H24 @ 76$   
 $D = \frac{1000}{500} @ 41$   
 $A = \frac{1000}{500} @ 32$

12:37 STAY AT THIS POWER 10.0 MIN.

12:37 START WITHDRAWING MA

12:40:30 MA out (-#1.75 from prev. meas.)

12:57 START MA IN TO GET DELAYED CRITICAL (no source)

12:57 "C" = L-12 @ 51 c = 51

12:59:50 Charlie indication c = 52

1:00:30 MA inserted c = 54

1:02 c = 56

1:04 c = 60

1:05 c = 61

See Pg 72  
 for "C" print

cc)

2)

end of run

(21) same as (20) but using SB.

1:10 BACK TO POWER FOR 10 MIN.  $hN = 0.040$

1:20 START WITHDRAWING SB

1:24:10 SB out ( $u = \frac{\#}{20,000}$ )

1:40 START SB in to get delayed critical (no source)

1:40 "C" = L-12 @ 58 c = 58

1:43 c = 56

1:44:10 SB in c = 54

1:46 c = 55.5

1:48 c = 58

1:49 c = 60

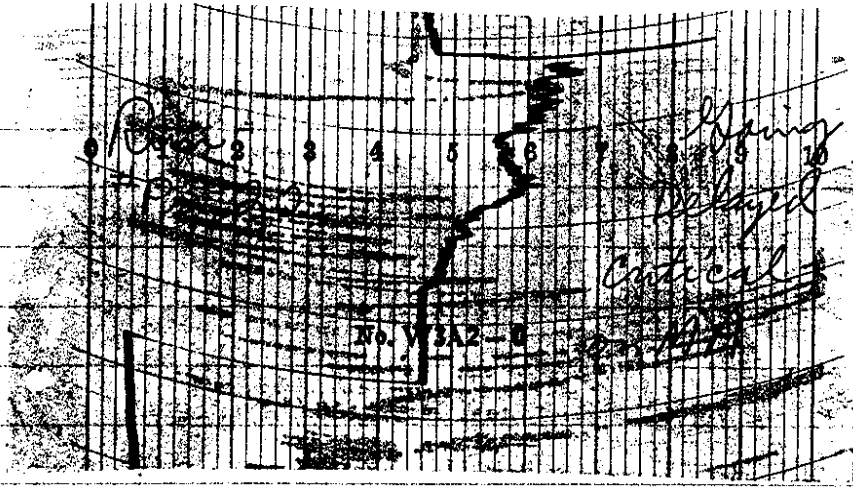
See Pg 72  
 for "C" print

ing in

ry.

end of run

Data Pg 70



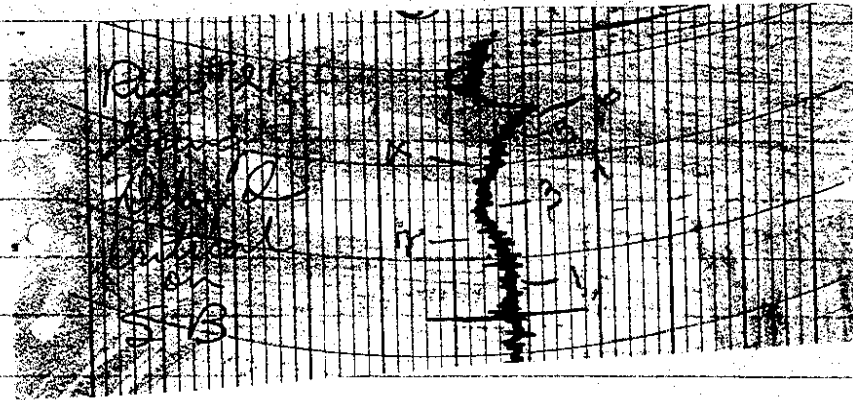
622

Data Pg 71



X

Data Pg 71



Channel "C" indications.

(22) Evaluate "Poly" at fission chambers.

Removed poly. - Got to power with accel.  
~~Removed~~  $h\nu = 0.038$

conf. same as (20) except the poly.

$$\text{Rhoette} = \underline{-2.3^\#}$$

SCRAM SB

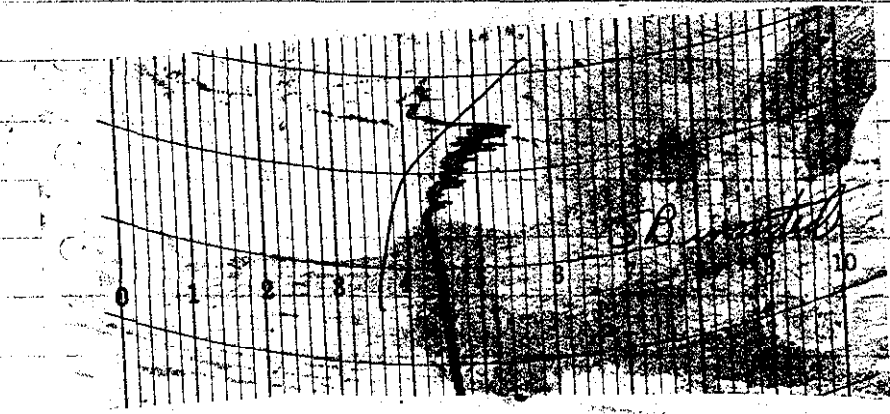
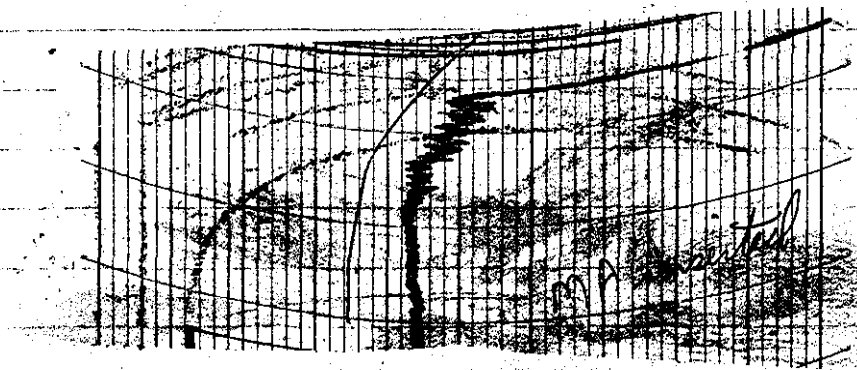
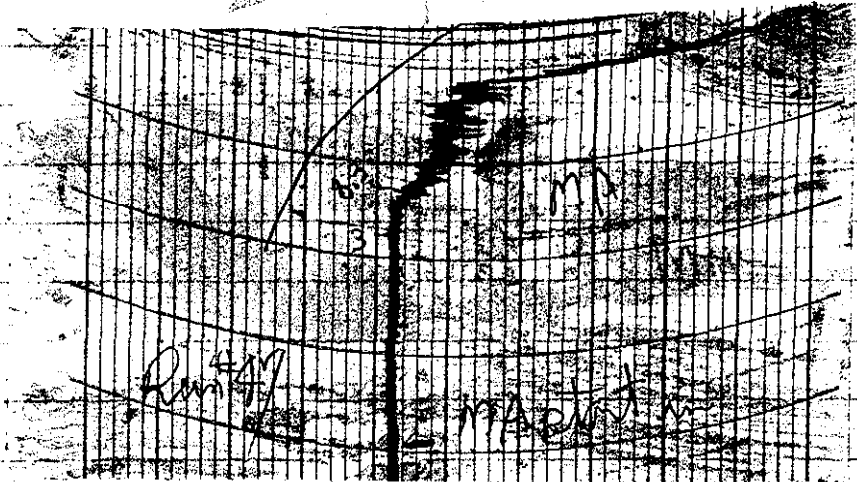
$$\text{Rhoette} = \underline{\underline{-22.00^\#}}$$

Received one U-M bolt 7881-29-0065  
 way bill #14



74

6 June 67  
Data on  
Pg 93



9  
(2)

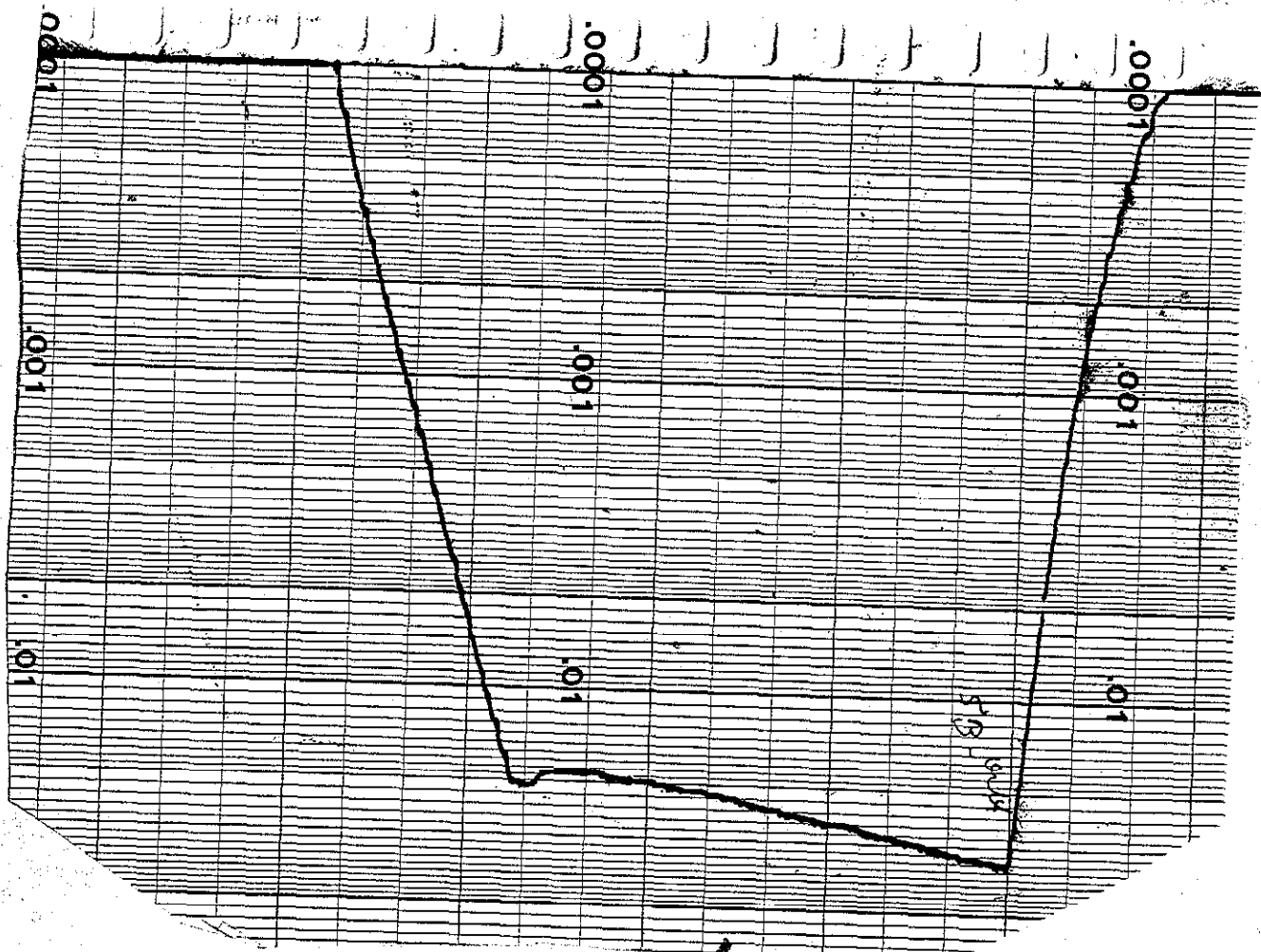
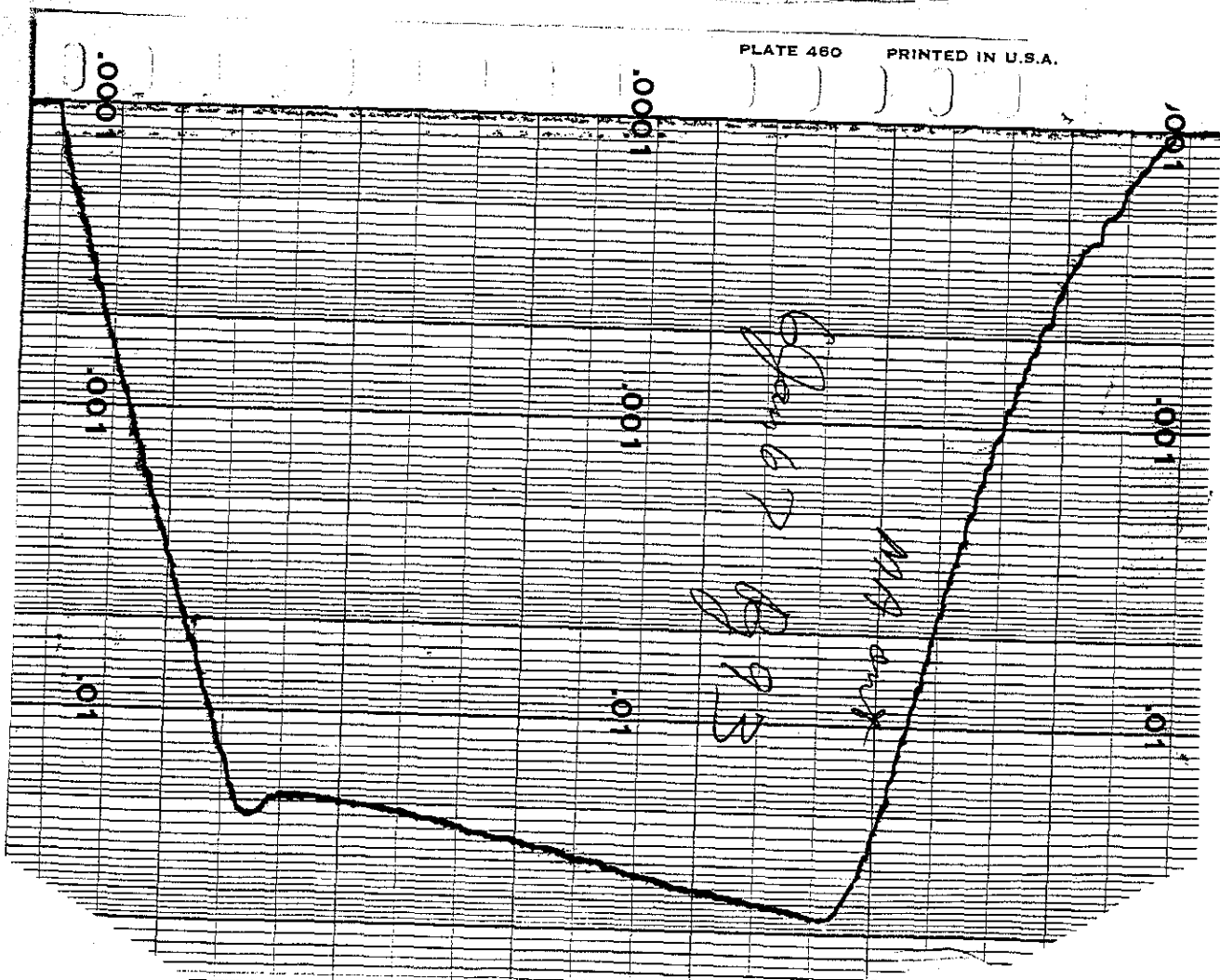


PLATE 460 PRINTED IN U.S.A.



DATE		SAFETY CHECK					
TIME	9:00 AM	BY TAYLOR, MIHALCZO-DICKENSON					
CHANNEL		A	B	C	D	E	F
RANGE		$10/1000$ OPR	L-15	$10/1000$	900V	750	
SOURCE DIST.		12" OK	12"	12"	OK	OK	
% F. S. TRIP		90	-	100	90	-	-
BLDG. ALARM		✓	✓	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED		M226 & h		NAENETS			✓
TABLES		✓		LIGHTS	✓	AREA CLEARED	✓

Rhetter OK (2)

9:14 START UP accel. as source.

Rossi - A

(23) SB in 11.531 SAFETY TUBE OFF.  
 MA in 8.968 2 (NE102) DET. IN PLACE.  
 BR out -  
 RR in 9.025 + 19¢

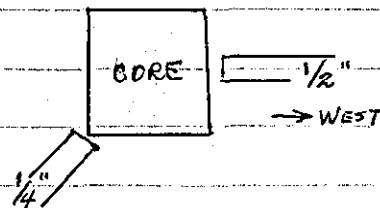
RR = 5.125 for  $\infty$  &  $L_N = 0.03$   
 Withdraw MA to bring power down to desired level.

$L_N = .0005$  FOR THE RUN RR 5.178 =  $\infty$

C = L27@60

A =  $10/1000$  @37

D =  $10/1000$  @38



START: 9:47 AM

STOP 12:05 AM

143 min run

76

(24A) Evaluate Bolt #64 <sup>(ref pg 59)</sup> by removing same. all other conditions same as (23) except:

12:17

BR in  
SB in (20/3)  
MA in  
RR 5.178

} Put jumper between IID #18D and this allows us to move the SB when rods are located "anywhere".

shuttle = Bolt = -85¢

(24B) BR in  
SB in  
MA in  
RR in

ref (23) <sup>-0.5¢</sup> → Bolt = -8.4¢

12:36

SCRAM SB = -21.50

Jumper removed from (24) all other prev. jumpered conditions still same.



DATE	SAFETY CHECK					
TIME	3 JAN 67	AM	BY	TAYLOR - LYNN - DICKERSON		
CHANNEL	A	B	C	D	E	F
RANGE	10/1000	OPR	1-12	10/1000	900V	750
SOURCE DIST.	12"	OK	12"	4"	OK	OK
% F. S. TRIP	90	-	100	90	-	-
BLDG. ALARM	✓	✓	✓	✓	✓	✓
AUX CTRS.	✓	✓	✓	✓	✓	✓
SOURCES USED	M226 & t			MAGNETS		
TABLES	✓	✓	✓	✓	✓	✓
LIGHTS	✓	✓	✓	✓	✓	✓
AREA CLEARED	✓	✓	✓	✓	✓	✓

2 Rhoettes ✓

9:26 SAFETY Tube QW START UP, accel. source.  
 (24) BR IN WITH  $\frac{5}{16}$ " PROTRUDING ABOVE TOP OF CORE.  
 all bolts are in; ~~2 detectors in position (R/R 45)~~  
 — Evaluate BR → det. are not in position

jumper between 11 D & 18 D  
 (ref) # (24A) is being used

BR in (see above)  
 SB in (203 & 3 light) 11.531  
 MA → 3.426 = +19¢  
 RR out

MA @ 3.365 = ∞ { C = 1724 @ 66  
L = 0.019

Withdraw BR → - \$ LOS rhoette

Safety Tube Calc. Value (Ran <sup>#14</sup> 13-12-19 used)  
 = ~ 48¢

78

(25) SB traverse:

10:00

Now insert MA & go critical again

BR out

SB in

MA in 8.968

RR @ 2.612 =  $\approx +18^\circ$

RR 0.230  $\infty$  h<sub>w</sub> 0.026

now make SB traverse

11.531 to 8.706 in 1 min.

$2.825''/\text{min}$   
 $0.023608''/2\text{ sec}$

11/8

(i)

10:00

10:5

11:0

~~94842~~

6408

90434

4706

330

4376

~~11~~

116386

6410

122

2775 gms

$$\begin{array}{r} \# 18 = 6431 \\ \# 11 = 6575 \\ \hline 12936 \end{array}$$

$$\begin{array}{r} 116,386 \\ + 2,936 \\ \hline 103,450 \end{array}$$

(27) BR out  
 RR 0.230  
 MA in  
 SB in

"get up with accel.

turnoff accel  $\rightarrow$  -12.2 ‡

(28) Set critical ‡ level with  
 RR 1.984  $\rightarrow$              
 MA in  
 SB in  
 BR out

(29) Go higher in power with accel to  $h\nu = 0.036$   
 now reduce power with MA to 0.034  
 MA in  
 SB 11.532  
 BR out  
 RR 1.984

SB traverse  
 11.532 - 8.478

Calib Curve  
 1.075 min

2.84093/min

(30) Go back in with SB  
SB in (203) (out)

settings same as (29) "get up" with accel  $hV = 0.027$   
Push CIU SCRAM button

SB value =  $\frac{\#}{-21.2}$  rhoette

(31) SB in 11.532  
MA in 8.968  
RR 1.984  
BR out

"get up" with accel

$hV = 0.026 \phi$

accel. off  $\phi$  rhoette =  $\underline{+0.064 \phi}$

(32) SB in 11.531  
MA 8.968  
RR 1.984  
BR out

Four (4) Thermo plugs  
removed.

accel. off =  $\underline{-36.5 \phi}$   
4 Thermal plug =  $\underline{-36.56 \phi}$

197.0 gms

(33) SB in  
 MA in  
 BR out  
 RR 4.412 → ~~\_\_\_\_\_~~

~~SB in 11.532 -~~

(34A) Assemble Sandia mounting plate to reactor frame.

13:07

Plate = 27" OD

BR out

13" I.D.

MA in

1" Thick

RR 4.412

SB 10.950

~~∞~~  $h_v = 0.012$ MTNG Plate = +50"

(34B) BR out

→ SB in 11.532

MA 4.966

→ RR 4.412

~~∞~~  $h_v = 0.015$ MTNG Plate = +48"

ang 49d

(35) Evaluation of mtng plate, with the polyethylene around chambers returned to its position.

SB in (11.530)

BR out

MA 4.965  $\uparrow$

RR 3.230  $\downarrow$

Pos Per = 15.09  $\uparrow$

$\infty$  Log N = .0165

Poly. = 10  $\uparrow$

~~mtng Plate~~

(35) vs (34B) Poly = 15.5  $\uparrow$

(36) Safety Block Insert ~~Case~~ evaluation

→ Four (4) Thermo plugs in. (+36.6  $\uparrow$ )

SB in (11.530)

BR out

MA ~~4.965~~ 6.912

RR in (9.074)

Insert ~~Case~~ = 1.20

$\infty$  Log N = .0185

Pushed CTU Scram 1448 o'clock

Safety Block = -20.64



84

(37) Removed Sandia mtng plate.  
added Safety Block insert core.

SB in (11.531)  
BR out  
MA in (8.967)  
RR 0.396  $\infty$   $h_{ov} = .018$

(38) Safety Tube evaluation (off)  
(mtng bolts out)

SB in (11.5311)  
BR out  
MA in (8.967)  
RR 5.953  $\infty$   $h_{ov} = .028$

Safety tube: ~~60~~ <sup>58.5</sup>  $\neq$

(39) Evaluate Air Shroud. Put on same.

BR out

SB in

MA 1.828

RR 5.953

vs (38)

$$\infty 0.018 = \ln$$

$$\text{AIR Shroud} = \frac{\#}{\#}$$

$$\text{use} \rightarrow 1.43$$

Withdraw all rods & SB and secure.

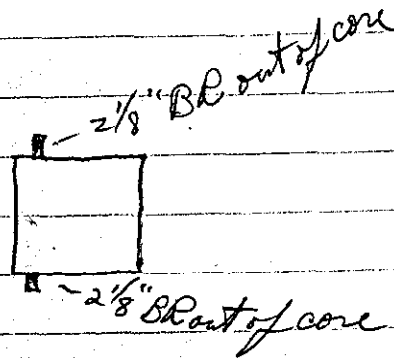
DATE <u>4 Jan 67</u>		SAFETY CHECK					
TIME	<u>8<sup>50</sup></u>	BY <u>TAYLOR-LYNN-MIHALCZO</u>					
CHANNEL		A	B	C	D	E	F
RANGE		<u>10/1000</u>	<u>OPR</u>	<u>L-12</u>	<u>10/1000</u>	<u>900Y</u>	<u>750</u>
SOURCE DIST.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
% F. S. TRIP		<u>90</u>	<u>-</u>	<u>100</u>	<u>90</u>	<u>-</u>	<u>-</u>
BLDG. ALARM		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
AUX. CTRS.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
SOURCES USED	<u>M226 &amp; h</u>	MAGNETS					<u>✓</u>
TABLES	<u>✓</u>	LIGHTS	<u>✓</u>	AREA CLEARED	<u>✓</u>		

(A)

2 rheotets OK

(40a) BR EVALUATION

Sandria mtg plate off  
 Safety tube on  
 Plugs in (thermal)  
 Core insert in  
 shroud off  
 all poly in back on.  
 all bolts in @ 50<sup>th</sup> torque  
 BR is symmetrically placed in core. ↑



(A)

BR in (as noted)

SB in 11.530

MA 3.250 ∞ hv = 0.038 actually <sup>+</sup>0.24<sup>+</sup>

RR out 0.138

Pull BR = <sup>#</sup>-1.238

BR = <sup>#</sup>-1.24

(41A) SB reproducibility check (pro. vs value)

BR out

MA in 8.968

SB in

RR 2.582  $\infty$  h<sub>w</sub> 0.020

\*at this point none of the rods can be inserted. Fuse in fission recorder had blown.

(40B) REPEAT run (40A):

SB 11.533

MA 4.000  $\rightarrow +23.4\%$

BR in

RR out

MA 3.217  $\infty$  h<sub>w</sub> = 0.030

Fine DR out = -1.257

Got SCRAM. withdraw switch was held too long and reduced air pressure.

(40c) Repeat run (40A):

SB in (11.532)  
 MA 4.000 + 23.4  
 BR in  
 RR out

MA 3.223  $\infty$  Ln .036  
 Fire BR out = -124.75  $\phi$

(40D) BR VS MA+RR

SB in (11.532)  $\phi$   
 MA in (8.968)  
 BR out

RR 3.00 Pos Per +5.4  
 Moving safety block out and in (~ -30  $\phi$ )

MA in (11.532)	465	11.532	447	11.532	448
11.532	449	.531	456	.535	473
11.533	450	.534	465	.531	455
11.531	455	.533	464	.534	475
11.531	446	.532 (2)	461	.533	455
11.533	454	.531 (2)	468	.534	459
11.534	444	.532 (2)	469	.537	475
11.531	457	.534	441	.532	459
11.531 (2)	461	.532	448	.533	456
11.531	454	.536	465	.534	450
				.533	+449

$P_{\text{the}} 1.3 \times 10^{-8}$   
 Log N  $\rightarrow$  .012  
 D22  
 Avg = 4.572  $\phi$   
 + 0.178  $\phi$   
 - 0.162  $\phi$

MA Rod Traverse

(42) SB in (11.532)

MA in (8.968)

BR out

RR 2.600

2.572

$\infty$

$\infty$

LN = .036

LN = .044

9.578

2.4

6.474

252/min

8.836 " travel

0.21038

MA withdrawn for calibration  
 MA = <sup>(out)</sup> 0.132 from in (8.968) 3 1/2 min.

(42A) RR in (9.078)

MA 4.964

$\infty$

8.768

4.964

4.112

9.274

5.33

3.743

(42B) RR Traverse

RR out (<sup>0.129</sup>~~0.144~~) from in (9.078) = 2.57 min

8.949 " travel

302.4 1/2 sec

0.29017 1/2 sec

(42C) MA in (8.968)

RR 2.596

$\infty$

Safety Block Traverse

SB in (11.532) → 8.258 = 1.155 Min.

#

4.48

4.73

4.55

4.75

4.55

4.54

4.75

4.54

4.56

4.50

4.49

DATE <u>5 Jan 67</u>		SAFETY CHECK					
TIME	<u>8<sup>30</sup></u>	AM	BY	TAYLOR	LYND	MILAKOZO	
CHANNEL		A	B	C	D	E	F
RANGE		<u>10/1000</u>	<u>OPR</u>	<u>L-12</u>	<u>10/1000</u>	<u>900V</u>	<u>750</u>
SOURCE DIST.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
% F. S. TRIP		<u>90</u>	<u>-</u>	<u>100</u>	<u>90</u>	<u>-</u>	<u>-</u>
BLOG. ALARM		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>-</u>	<u>-</u>	<u>-</u>
AUX CTGS.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>-</u>	<u>-</u>	<u>-</u>
SOURCES USED	<u>M226 &amp; h</u>				MAGNETS	<u>✓</u>	
TABLES	<u>✓</u>	LIGHTS	<u>✓</u>	AREA CLEARED	<u>✓</u>		

2 sheets OK.

(43A) Safety Block Traverse. Jumper #7 on  
 Fuel Ht = To permit apr of MA+RR  
 Burst Rad = in (p. 86) without 2 of 3  
 Safety Tube = on  
 Air Shroud = on

BR = ~~in~~  
 MA = out  
 RR = out + 20.3 ¢  
 SB = 10,850

(43B) BR = in RR = in  
 MA = in SB = 9,500 → 6,470 in 1.075 in  
 3.03" travel .02349" / 1/2 sec  
 + 4.1 ¢

Fig 1

(43B) BR = in SB = 10,689  
 MA = out  
 RR = out Fixed BR out = - \$1,258

no air (spring fired)

(43C) BR = out  
 MA = 2.425 (or 6.543 from in as ref pg 89)  
 RR = out SB = in (11,532) (-#)  
 → ∞

Fig #6

SB Traverse SB = 11,532 → 8,438 in 1.10 min.  
 3.094" travel .02343" / 1/2 sec

RR  
 44 Evaluation of outer shell (AL) of the  
 air shroud. (now off)

SB = in (-#)  
 BR = out vs 43C (Low Power on little)  
 MA = 3,930 ∞ AL = ~ 60¢  
 RR = out AL shell = 44¢

45A air shroud removed.

SB = in (11,532)  
 BR = out 6.422  
 MA = in (8,968) → 0.132 out in 2.71 min.  
 RR = 6.422 6.836

0.0205285 per  
 point  
 or 2.52/min

MA Trav.

NOTE full trav pg 89 took 3 1/2 min  
 " AND "AH"



92

0.0205837"  
per print

(45B) SB in  
BR out

MA ~~in~~ (~~6.968~~) = 4.928  $\infty$

RR = ~~6.922~~ ~~7.922~~ in (9.078)

MA Trav. 4.928  $\xrightarrow{0.132}$  out in 1.91 min

(Use 0.0205561 for 45A & 45B  $\checkmark$ )

46

Sandia Mounting Plate Evaluation  
located 2 1/2" from bottom of Core.

US Run 35 p. 83

~~30~~

1500  
oclock

SB = in

BR = out

MA = 4.965

RR = 3.23

RR = 1.775  $\infty$

+ 15.9  $\phi$

Scram (CTU pushed)

(at "max" position) M.T.B. Plate = (46)  $\phi$   $\left( \begin{smallmatrix} 34A \\ 35 \end{smallmatrix} \right)$  = 65.9  $\phi$

9:0

9:51

DATE	6 Jan 67						SAFETY CHECK					
TIME	9:10						BY TAYLOR - LYNN - MIHALCZO					
CHANNEL	A	B	C	D	E	F						
RANGE	10/1000	OPR	L-14	10/1000	900V	750						
SOURCE DIST.	✓	✓	✓	✓	✓	✓						
% F. S. TRIP	90	-	100	90	-	-						
BLDG. ALARM	✓	✓	✓	✓	✓	✓						
AUX CTRS.	✓	✓	-	✓	✓	✓						
SOURCES USED	M226 & h			MAGNETS			✓					
TABLES	✓	✓	✓	✓	✓	✓	AREA CLEARED ✓					

2 sheets OK

Measured MA & RR rate of travel (see pg 6)

(47) Sandia off (reference to 41A)

S.T. on

Plugs in

Core insert in

shroud off

all poly on

all bolts in

fuel ht. = 7.76" ←

9:45

RR 2.582

no source as such.

MA out

9:51

SB in 2 of 3 (-2)

BR out

counting with TMC (JM). - No power

next pg -

- 10:01 Start in with MA 11
- 10:04 MA @ 8.348 "charlie" shows slight increase.  
like 3 divisions. "C" start =  $h=13@43$  11:
- 10:08 Print out TMC count. 11:
- 10:10 Now add 1" on RR = 3.582 11:  
Put RR @ 4.000  $\approx 20. \text{¢}$  (rhoette) 11:  
hN @ 0.02 11:
- 10:16 Put RR back to 2.582 (original no.)  
rhoette = +2.2 ¢
- 10:24 Start out with MA hN = 0.045  
Dose =  $\frac{1000}{500} @ 87$   
rhoette @ saturate.
- 10:26:30 MA out hN 0.0004 and falling.
- 10:35  $\approx$  level @ Dose =  $\frac{10}{200} @ 47$  (A)
- 10:41 JM took bkg. <sup>print out</sup> count on TMC. "C" @  $h=13@43$
- 10:44 Start in with MA
- 10:46 6.0 dial shows very slight increase "C". 13:0
- 10:47:15 MA @ 8.348
- 10:52 print TMC 13:0  
Go in RR
- 10:54 RR 4.000  $\approx 20. \text{¢}$  rhoette
- 10:57 RR to 2.582 (orig. no.) rhoette = +2.1 ¢  
hN @ 0.02 and rising.

cont →

11:05 start out with SB  $hN = 0.035$   
 $DoG = \frac{1000}{500} @ 75$   
 11:08 SB out  $C = L-13 @ 72$  and falling.  
 11:14 start obj at TMC STOP 11:18:15 Print out.  
 11:24 start in with SB  $C = L-13 @ 43$   
 11:28 SB in "C" some slight increase.  
 11:32 Print out TMC.

Withdraw "all" - End of Run 47.  
 - "Charlie" prints on pg 74.  
 Apparently no difference in build-up  
 whether you wait overnight or for  
 only 20 minutes. (JM)

(48) A segment of (47) repeated, but with  
 2 detectors in place.

R.R. 2582  
 13:00 BR out  $C = L-13 @ 43$   
 SB in 273(-2)  
 13:05:30 MA 8.348

SB travel time from 11.000 to 11.532 = 0.185 min.

(49)

SB in  
BR outSafety tube on  
2 (ME102) det. in place.MA ~~8.139~~ 6.500RR ~~out~~ 2.410

LN = 0.0005 for the run

C = 128 @ 82

A = 10/1000 @ 51

D = 10/1000 @ 54

START 13:17 detectors as pg 75

STOP 16:00

163 min. run

SEE BOTTOM Pg 97

1967:

Blow fuse <sup>Co. pt</sup> → rate channels recorder

To permit operation:

#5 Jumper 140B to 140D at IPTB 46

#6 Jumper 145B to 141B at rear of recorder

#4 Jumper 18D to 18F at RPTB 11

ROSSI-ALPHA

DATE	9 Jan 67						SAFETY CHECK						
TIME	8:45						AM	BY TAYLOR-HYND-DICKENSON					
CHANNEL	A	B	C	D	E	F							
RANGE	10/1000 DPR		K-15		10/1000 900Y 750								
SOURCE DIST.	✓		✓		✓		✓		✓		✓		
% F. S. TRIP	90		-		100		90		-		-		
BLDG. ALARM	✓		-		✓		-		-		-		
AUX CTRS.	✓		✓		✓		-		-		-		
SOURCES USED	M226 & h						MAGNETS						
TABLES	✓		LIGHTS		✓		AREA CLEARED		✓		✓		

2 sheets of.

(50) Rossi-Alpha with all poly removed.  
Other conditions same as run #49.

BR out  
5 Bin (2 of 3) (-2)  
MA 6.500  
RR 3.817

∞ stay level with RR.

Poly value from Curve = 18%

Not Used {  
START 9:24  
STOP 9:49  
~~START 11:04~~  
START 11:28  
STOP 14:12  
164 min run.

hw 0.0005; C = 428 @ 82; A = 10/1000 @ 51  
"Go down" for South Cell to move something  
had same trouble as 41A\* so jumped  
the problem (see R. Rubin)

(51) RR traverse

BR out

SB in

RR in and traverse

MA 4.970  $\infty$

9.068 — 0.130 in 2.55 min  
 315 prints = 8.938" or 0.0283746" per print.

Gilley "borrowed" his core loader for a few days.

Put "poly" back on.  
 Take SS Core Insert out.  
 Leave Safety Tube On.

Rod readjustment read from curves:  
 Run(50) vs (51) = MA - 36.5¢  $\neq$  RR = + 36.5¢

DATE	10 Jan 66		SAFETY CHECK			
TIME	8 <sup>15</sup>	AM	BY TAYLOR-HYUN-MIHALCZO			
CHANNEL	A	B	C	D	E	F
RANGE	$10/1000$	OPR	4-15	$10/1000$	90V	750
SOURCE DIST.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
% F. S. TRIP	90	-	100	90	-	-
BLDG. ALARM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AUX GTRS.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SOURCES USED	M226 4 h		MAGNETS		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TABLES	<input checked="" type="checkbox"/>	LIGHTS	<input checked="" type="checkbox"/>	AREA CLEARED		<input checked="" type="checkbox"/>

2 sheets OK

(52) Rossi-Alpha (Insert out) <sup>Steel Core</sup>  
 BR in (symmetrically)  
 JB in [20/3(-1)]  
 MA 6.500  
 RR 2.410 - 2.380  $\infty$

$hN = 0.0007$

$C = 128 @ 90$

$A = 10/1000 @ 51$

$D = 10/1000 @ 53$

(52) vs (49) vs  $\begin{pmatrix} 40A \\ 40B \\ 40C \end{pmatrix} = \text{Insert @ } \# 1.25$

START TMC 8:51

STOP TMC 11:28

157 min. run.

7



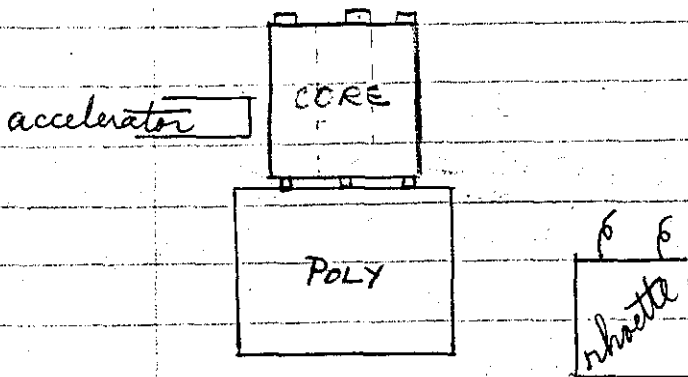
(53) BR out  
 SB is off  
 MA 7.50  
 RR 7.50

Measure result of fuel sitting on floor without SB. by simulation.

Simulate the floor with Poly mounted onto the SB drive shaft. We can only "get up" to .001 g with the accelerator.  
 Size of Poly roughly 12" x 13" x 11."

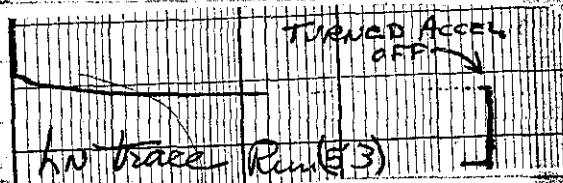
Now move accelerator to 1" from fuel.  
 Also move rheostat to within 2 feet of fuel.

(5



$L_n = .003$

Power too low for rheostat data, but roughly

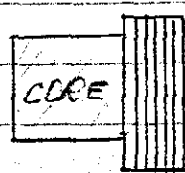


DATE		SAFETY CHECK					
TIME		TAYLOR-HYNN-DICKERSON					
	A	B	C	D	E	F	
RANGE	10/1000	OPR. K16	10/1000	960V	700		
SECURITY	14"	✓	24"	2"	4"	✓	
% I. S. T.F.	90	-	100	90	-	-	
BLDG. ALARM	✓	✓	✓				
AUX CTNS.	✓	✓	✓				
SOURCES USED	M226 & d			WRENCHES	✓		
TABLES	✓	LIGHTS	✓	AREA CLEANED	✓		

2 rhoettes OK

(54A) Add a (1" x 14" x 16") piece of plexiglass at touch to side of fuel. Other conditions same as (40A) except rods.

BR out  
 MA out  
 RR out  
 SB 10,578



1" pieces of plex (54A) thru (54D)

SCRAM # rhoettes = \$19.7

(54B) 2 pcs plexiglass (added one (1))

Rods out  
 SB = 10,2

SCRAM # Titte = \$17.38

46

(54C) 4 pcs Plexiglas (added 2)

Rods out

SB = ~~9.082~~ 9.082 ∞

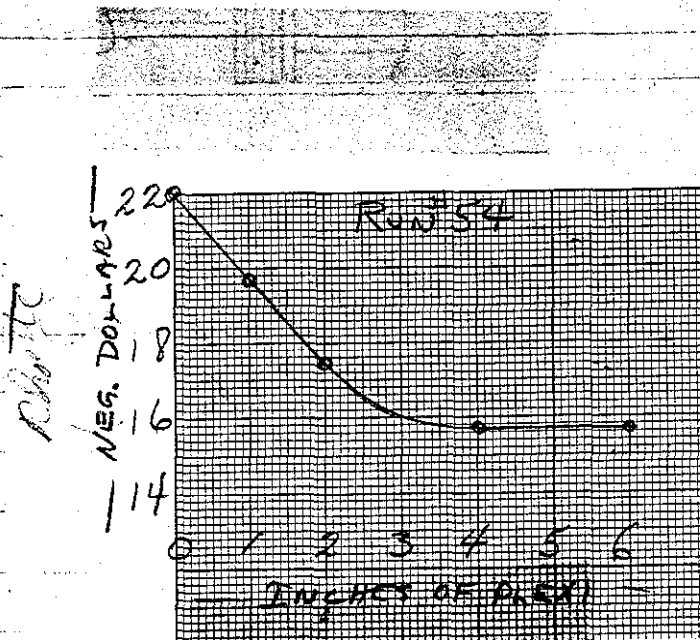
SCRAM & rhoette =  $\frac{\$22}{63} = \underline{\underline{\$15.72}}$

(54D) 6 pieces TOTAL (or 6")

Rods out

SB = 9.022 ∞

SCRAM & rhoette =  $\frac{\$22}{63} = \underline{\underline{\$15.69}}$



DATE	SAFETY CHECK					
TIME	9:30	BY TAYLOR - LYNN - DICKENSON				
CHANNEL	A	B	C	D	E	F
RANGE	$10/1000$	OPR	h-16	$10/1000$	950	700
SOURCE DIST.	16"	✓	24"	1"	4"	✓
% F. S. TIME	90	✓	✓	90	100+	✓
BLDG. ALARM	✓	✓	✓			
AUX CTRS.	✓	✓	✓			
SOURCES USED	M226 & d			MAGNETS		
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

IC4 scale  $10^{-10}$  @ 100 = 4"

Installed APR's regular source on the assembly.

12:30 -

(55) SB in  
 @ R in  
 MA out  
 RR 5.258  $\infty$

Poly, C. Insert, S. Tube  
 are on. DETECTORS SAME

hw = 0.0006  
 c = 228 @ 80  
 A  $10/1000$  @ 51  
 D  $10/1000$  @ 52

START TMC ~~13:00~~ 13:00  
 STOP TMC 14:46  
106 min run

(56) SB in  
 BR out  
 MA out  
 RR 5.258 sub-critical (BR amount) <sup>N#1.25</sup>

(Jumper 6 which is contact  
 K 46A so can  
 "go up" without source in place)

Small source placed on top of Core.

START TMC ~~15:00~~ 15:15 STOP 16:18  
63 min run

$$L_m = 0.00010$$

$$C = L_{20} @ 62$$

$$A = 10/500 @ 45$$

$$D = 10/200 @ 65$$

(5)

ASSEMBLY 15 ROTATED 120° 105

DATE 13 Jan 67		SAFETY CHECK					
TIME 9:05	AM PM	BY TAYLOR-HYNN-DICKENSON					
CHANNEL	A	B	C	D	E	F	
RANGE	10/1000	OPR	6-14	10/1000	950	700	
SOURCE DIST.	15"	✓	2'	1"	4"	✓	
% F. S. TRIP	90	✓	✓	90	100+	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	NaCl & h			MAGNETS		✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓	

2 Rhoettes OK.

ROTATED FUEL ASSEMBLY ON APR FRAME AS ON PAGE 62.

i.e. RR is on MA drive.  
 MA is on BR drive.  
 BR is on RR drive.

(57) BR dial reading with top of rod flush with top of core = 8.760 dial reading. This is the inserted reading.  
 BR with bottom of rod flush with top of core = 8.806 dial reading i.e. withdrawn (note dial has passed around neg).  
 Same jumpers as yesterday.

SB in  
 BR in  
 MA out  
 RR in

⤵ @ LN 000022  
 need more reactivity to "get up"

Put NE102 <sup>touching</sup> near core opposite BR.

Now go back up in power.

Det @ Core North = +16<sup>+</sup>



SB in

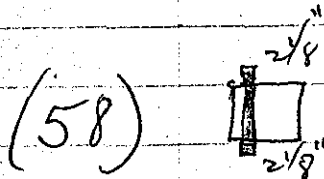
MA out

BR in (for traverse) see sketch

RR 5.503

$\infty$   $h_v = 0.035$

Flush TOP TO TOP — "flush" Bottom TO TOP  
 430 prints = 11.918 inches or 0.0277162" per print



BR traverse from symetric pos.

12" length of BR  
 Det = 7.26"

BR "in" = 6.640 (see sketch)

SB in

MA out

RR 5.332

$\infty$   $h_v = 0.035$

symetric pos. — "flush" bottom to top  
 347 prints = 9.803 inches or 0.0282507" per print

# NORMAL ORIENTATION & FUEL ADDED

- (59) - Reorient the assembly to normal.
- ADD fuel disc # 10; th = .195"; MASS = 2168gms
- Core ht. = 7.96" total
- Core Mass (with all rods except burst, with "thermal" insert pins, 9 bolts, & discs # 8-10-9-1-6-16-5-4-7  $\rightarrow$  123.913 Kg <sup>included S.B. also</sup>)
- Bolts (U-Mo) protrude from bottom of core = 6.056 inches  $\pm$  .003
- Top surface of safety tube is from the bottom of fuel disc = 0.17 inches

Safety tube on  
 Core insert (S. steel) out  
 BR out  
 SB in (11.535)  
 MA in (8.968)  
 RR ~~in~~ (8.50)  $\rightarrow$

Period =  $\frac{380 \text{ sec}}{+ 3.1 \text{ } \phi$

RR 7.330  $\rightarrow$

(57) vs (59) vs (PREDET. VALUES)

$0.195 \text{ FUEL} = \approx 82 \text{ } \phi$

$\approx 0.42 \text{ } \phi / \text{mil}$

$\approx 38 \text{ } \phi / \text{Kg}$



DATE		SAFETY CHECK					
TIME	2 <sup>00</sup>	BY TAYLOR-LYNN DICKERSON					
CHANNEL		A	B	C	D	E	F
RANGE		10/1000	OPR	L-17	10/1000	900V	750V
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED	MA26-A				MAGNETS	✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓		

2 rheotets OK.

(60) Conditions same as (59) except the SANDIA plate has been put into place.

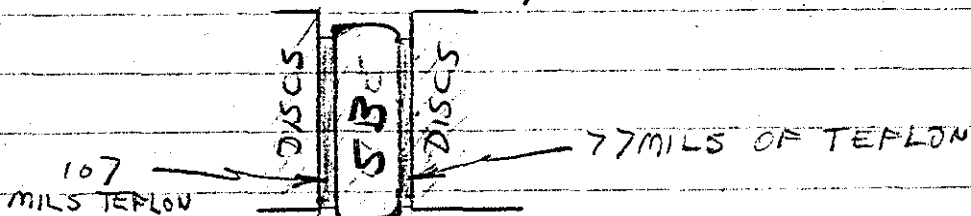
15:36  
 BR out  
 SB in 11.530  
 MA in 8.968  
 RR 2.944

SANDIA Plate = +46<sup>+</sup> from curve

DATE		SAFETY CHECK					
TIME	1:15	PM	BY TAYLOR-HUNW-DICKENSON				
CHANNEL	A	B	C	D	E	F	
RANGE	1% <sub>1000</sub>	OPR	h-17	1% <sub>1000</sub>	900V	750V	
SOURCE DIST.	✓	✓	✓	✓	✓	✓	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M226 A A			MAGNETS		✓	
TABLES	✓	LIGHTS		✓	AREA CLEARED		

2 sheets OK

(6/A) Measure effect of horizontal displacement of core inside of fuel discs.



BR out

SB 11.385

13:39

MA in

RR 2.443

 $k_{eff} = 0.017$ 

Not good (some of teflon came off.)

(6/B)

Safety Block has string attached <sup>so as</sup> to be able to pull it to the side for observation of ~~power~~ reactivity change.

- cont next pg -

Safety Tube off  
 BR in  
 SB 11.252  
 MA 5.387  
 RR out

First, go up to power SB is free hanging.  
 Set a 50¢ neg. period. Then pull  
 block to side. Saw no effect. So  
 now go back up and level and  
 pull and release SB.

Had Planned SCRAM

The difference in reactivity is not ~~significant~~  
 i.e. none. actual No.'s = free hang =  $-0.1\%$   
 $\rightarrow$  Pull to side =  $-0.56\%$

(6/c) Go to power ~~of~~ for the instrument people  
 to make some check outs at console.

ST off

BR in

15:03

SB in

MA 4.634

$\approx -2\%$

$L_m = 0.055$

RR out

Planned SCRAM

(6/d) Reduce sensitivity of A, D, C, ~~so~~ <sup>sheet</sup> so  
 a higher power can be attained.  
 These are now out of their "pig"

$L_n = 0.10$  SCRAM by console hN (APR) cause by inst. being "checked out."

DATE <u>18 Jun 67</u>		SAFETY CHECK					
TIME <u>11<sup>00</sup></u>		BY <u>TAYLOR-HYNN-DICKERSON</u>					
CHANNEL		A	B	C	D	E	F
RANGE		$10^{1000}$	OPR	1-14	$10^{1000}$	900V	750V
SOURCE DIST.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
% F. S. TRIP		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BLDG. ALARM		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AUX CTRS.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SOURCES USED	<u>M226 &amp; h</u>	MAGNETS		<input checked="" type="checkbox"/>			
TABLES	<input checked="" type="checkbox"/>	LIGHTS		<input checked="" type="checkbox"/>			
		AREA CLEARED <input checked="" type="checkbox"/>					

2 shuttles OK

ent.  
56  
6  
6

(61E) More APR console inst. checks. "Power up" for same. 107 inst same as (61D) except that channel A is now out of trip circuit to permit higher power.

11:32 ST off; BR in; SB in; ER out; MA ~~4.279~~ 4.719  $\infty$

when hN = 0.20 Bldg' alarm A = 2.2 K  
others less than 0.5 K.

hN = 0.27; C(H-20): 62; D  $\frac{1000}{110}$  85; IC4 (10<sup>8</sup>): 83;  
Pico Ann (Servo) @ 3x10<sup>-8</sup> = 35

DATE	19 Jan 67						SAFETY CHECK					
TIME	10:45			AM	BY TAYLOR-HUN-DICKENSON							
CHANNEL	A	B	C	D	E	F						
RANGE	$10^{10}$	OPR	h-14	$10^{10}$	950V	700						
SOURCE DIST.	✓	✓	✓	✓	✓	✓						
% F. S. TRIP	✓	✓	✓	✓	✓	✓						
BLDG. ALARM	✓	✓	✓	✓	✓	✓						
AUX CTRS.	✓	✓	✓	✓	✓	✓						
SOURCES USED	MAG 6 A h			MAGNETS			✓					
TABLES	✓	LIGHTS		✓	AREA CLEARED		✓					

2 sheets OK

(62) Fuel change: Remove dice # 1.

$\therefore 8-10-9-6-16-5-4-7 = 6.90''$  ht.

Mass = 111.930 Kg

AIR SHROUD (COMPLETE) ON

SAFETY TUBE ON

S.S. Core Insert IN

SANDIA PLATE OFF

"Thermal" plugs IN

All BOLTS PROTRUDE OUT OF BOTTOM  $\frac{1}{2}''$

BR IN (SYMMETRICALLY)  $2\frac{1}{32}''$  protrusion on each side

RR IN

SB IN (2 of 3) (-3)

MA IN

$h\nu = 0.10026$  using accel.

accel. off =  $\frac{\#}{-1.50}$  (APPROX.)

(63A) FUEL CHANGE: (TAKE OFF # 8-10-9) (P.T. ON # 1)  
 ∴ 1-6-16-5-4-7 = 7.24" ←

TOTAL MASS = 115.893 kg except BR

All conditions same as (62) BR is  
 still symmetric in this fuel ht.  
 ie. 2.36" above & below.

BR in  
 SB in  
 MA 6.758  
 PR 0.402

note: these do not apply to basic curves because fuel ht. directly causes it.

hn = 0.032

withdraw BR = -\$1.182

(63B) Repeat hn = 0.032 BR out = -\$1.178

MA 6.342

PR 1.902

(64A) Make "high" power for inst. people.  
 Same as (63A), except

A out of trip circuit.

D moved near wall + covered with 38 mil cd.

A, D, C, & sheets out of pig.

This is really more of the (61) inst. checks.  
made on APR console.

$h_u = 0.18$  (in <sup>nearby</sup> saturated area)      Bldg  $\left\{ \begin{array}{l} 2.1 \text{ K on A} \\ 0.350 \text{ K on B} \\ 0.200 \text{ K on C} \end{array} \right.$  alarms  
 C 1124 @ 44  
 D ~~1000~~ / 1000 @ 10  
 A TRIPPED  
 F 700V @ 0.2 of 1.0  
 E 750V @ 1.6 of 10.0

15:30 Increase power and got SCRAM during 15<sup>th</sup> period due to flux level 0.9 on Ln (107) considered a planned SCRAM as per "new" identification standards. SCRAMMED by an APR console det. "A" bldg alarm was at 15K.

(64B) Go Back Up To Power for likewise.

$h_u = 0.15$

withdraw BR sheets  $\rightarrow$  - #

MA 5815

RR 2500

Pull BR - 119.7 #

116

DATE <u>23 Jan 67</u>		SAFETY CHECK					
TIME	<u>9<sup>00</sup></u>	AM	BY <u>TAYLOR-HYUN-WATSON-DICKENSON</u>				
CHANNEL		A	B	C	D	E	F
RANGE		$10/1000$	OPR	L-14	$1/1000$	900V	650V
SOURCE DIST.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
% F. S. TRIP		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BLDG. ALARM		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AUX CTRS.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SOURCES USED	<u>M26 &amp; h</u>				MAGNETS	<input checked="" type="checkbox"/>	
TABLES	<input checked="" type="checkbox"/>	LIGHTS	<input checked="" type="checkbox"/>	AREA CLEARED	<input checked="" type="checkbox"/>		

RUN FOR APR INSTRUMENTS CHECKOUTS.

(65A) AIR SHROUD (COMPLETE) = ON; SAFETY TUBE = ON; S.S. CAP  
 INSERT = IN; SANDIA PAATE = OFF; "THERMAL" PLUGS = IN; ALL  
 BOLTS PROTRUDE OUT OF BOTTOM  $\approx 1/2$ "; FUEL SAME AS (63A);  
 DETECTOR SITUATION SIMILAR TO RUN (64A).

→ BR IN (SYMMETRICALLY)

SB IN

MA 5.608

RR 3.000

$hN = 0.12$ ; A = OFF SCALE; C =  $124 @ 60$ ;  
 $D = 1000/100 @ 20$ ; E = ZERO; F = 0.08 OF 1.0; BA#1 = 5.0K; BA#2 =  
 $0.32K$ ; BA#3 = 0.18K;  $IC^4 (10 \times 10^{-8}) = 54$

Various small adjustments in power level and using  
 servo on RR during the several minute run.

(65B) Go to Power again after some APR inst. "switches"  
 otherwise this is a REPEAT.

BR in; SB in  $2 @ 3 (-2)$ ; MA = 5.000; RR = 4.326  $hN = 0.10$



(65c) more APR inet. changes. otherwise REPEAT.  $\infty$   
 13:55  $L_n = 0.18$  BR in; SPW; MA = 4.75; RR = 4.93

24 Jan 67

APR pieces # 7881-19-0003 disc  
 -21-0001 disc  
 -26-0051 MA  
 -27-0052 RR  
 -29-0064 Bolt

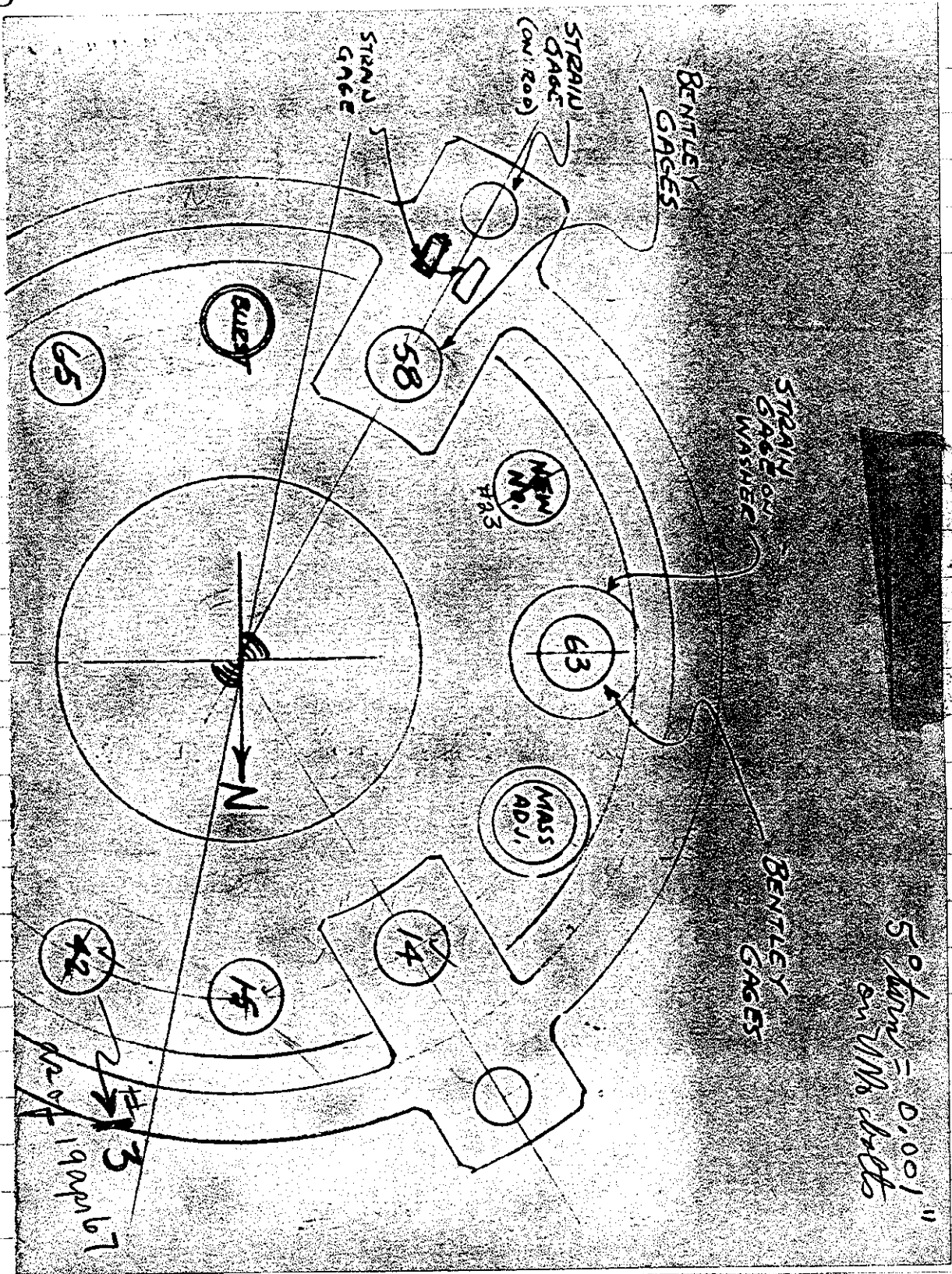
To Dick Bell 9202

↓  
 To J. R. Rapp 9215 7882-01-0001 BR

31 Jan 67 Received from Bell pieces (discs) # 1 & # 3.

3 Feb 67 Magnet housing & assembly was centered (with screw shaft) and pinned with tapered pins, i.e. the magnet and shaft are aligned parallel at  $\pm$  of the screw shaft.

6 Feb 67 checked for fitting the new pieces to be used for strain gauge assembly. all pieces fit except the aluminum center piece of the fuel holder. That is, the al. piece of APR will not fit <sup>on</sup> the new S.S. fuel holder piece.



6 Fe

10 Fe

13 Fe

50 form = 0,001" on 1/16" bolts

12  
13  
1999167



6 Feb 67 cont - several pieces of al coated fuel was sent to Y-12 to be "heat treated."

10 Feb 67 Above pieces returned. Pictures being taken of all pieces. The al plating is peeling off. That is the outside segment of the plating only is peeling. It was plated <sup>with</sup> ~~with~~ segments. ~~SORM is now bolted to floor and secured in a stationary manner. The pulse arm (Bc) clears both side of the housing by about 0.25"~~

13 Feb 67 Vibration check of SB, MA, RR vs BR.

No other fuel up.

FIRE BR in GUAGE MTD. ON		FIRE BR ent GUAGE MTD ON	
N	W	N	W
3 MILS S	3 MILS E	2 SOUTH	2 EAST
4	5	2	2
5	7	2	3
3	8	2	4
4	9	±1	3
3	9	±2	3
3	9	±2	±2
3	5	±2	±2
2	5	±2	2
±2	5	—	—
5	7		

SB check

NOTE: The entire structure rocks somewhat E & W. NOT N or S.

Make similar check of MA rod.

<u>Fire BR in</u>		<u>Fire BR out</u>	
<u>gnage on N</u>	<u>W</u>	<u>N</u>	<u>W</u>
± 1	0	1	5
1	0	0	1
± 2	2E	1N	1
—	—	1	1
2	1	1	1
3	2	1	2
2	2	1	1
2	2	1	1

Make similar checks on RR.

<u>Fire BR in</u>		<u>Fire BR out</u>	
<u>N</u>	<u>E</u>	<u>N</u>	<u>E</u>
8-N	0	3-S	1
8	2	0	2
7	2	1	1
7	7	1	2
5	4	1	2
5	5	1	2

New attempt to screw U-Mo bolts  
into bottom plate. All good  
good except #15 & #42. These two  
would not screw in. Had "Y-12" ers  
over and they "reamed" same. Also  
tapped the hole for these bolts. They now seem  
to work loosely enough. However it  
would seem reasonable to assume that  
more ab will come of later and  
possibly cause the threads to bind.  
(see bottom pg 127)

14 Feb 67 # 22 in  $14^{\circ} = 7.96$  P=125

(66)

DATE	14 Feb 67					
TIME	10 <sup>00</sup> → TAYLOR-HYNW-MIHALCZO					
CHANNEL						
RANGE	1% <sup>1000</sup>	OPR	6-14	1% <sup>1000</sup>	900V	650V
SHROUD	✓	✓	✓	✓	✓	✓
SAFETY TUBE	X	12"	OK	2'	3"	OK OK
BLEB. ALARM	✓	✓	✓			
AUX CTNS.	✓	✓	✓			
SOURCES USED	M226 & h			M226 ✓		
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓	

2 cassettes OK

(66) FUEL LOADING: <sup>TOP 0.315</sup> 8-10-9-1-6-16-5-4-2-2 = 8.16" HT.

- SANDIA PLATE ON
- SAFETY TUBE OFF
- PLUGS IN
- CORE INSERT OUT
- SHROUD OFF

{ #22 (Bottom Plate) }  
14,918 gms U-Mo

NEUTRON SOURCE SITS ON TOP OF SANDIA PLATE AT THE INNER EDGE ON THE EAST SIDE.

JUMPERS 9 THRU 12 IN AS Pg 61

JUMPER #8 (K-46A). This allows operation with the APR source in the out position.

- BR in (symmetrically)
- SB in 11.574
- RR out 0.130
- MA 3.863

$\log N = 0.002$ ;  $C = h-12(54)$ ;  $D \frac{100}{200} @ 43$   
 $A \frac{100}{100} @ 70$



124

(67) ALL SAME AS (66) EXCEPT LOADING:

(70)

LOADING: 8-1-6-16-5-4-22 = 7.76"ht.

BR IN (SYMETRICALLY)

12:20 SB IN 11.574

MA 8.50

RR 5.44  $\infty$

(68) New loading: 8-10-1-6-16-5-4-22 = 7.96"ht.

BR IN (SYMET.)

13:18 SB IN

MA 6.465

RR OUT:  $\infty$

FIRE BR OUT  $\rightarrow$  - 112.2<sup>¢</sup>

FUEL DISC #9 (68) VS (66) = 68<sup>¢</sup>

FUEL DISC #10 (66) VS (67) = 70<sup>¢</sup>

(69) BR OUT

MA 8.46

RR 8.522

SB IN

(71)

$L_m = .00013$   $\rightarrow$  on source only,

OTHERWISE  $\rightarrow$  SUB Crit

(70) Swap # 9 for #10 (this adds 142 gms <sup>Wg</sup>)

FUEL: <sup>TOP</sup> 8-9-1-6-16-5-4-22 = 7.96" ht. (lined)  
 ALSO ADD THE 3 STAINLESS STEEL RETAINERS FOR THE 3 RODS.

MASS OF ALL DISCS = 90.198 Kg

SAFETY BLOCK = 16.718

4 Thermal phys = 0.197

9 BOLTS = 14.223

3 RODS = 4.054

alloy TOTAL  $\rightarrow$  125.390 Kg

(all rods in  $\approx$  #1.19)

Also three al safety tube brackets & One al Bentley gauge bracket is added. Jump #7 in (between 11D & 18E) to allow insertion of SB.

BR in (Cym)

Using accel. as source

15:25 SB in (2 of 3) (-1) 11.572

MA 5.178

RR OUT  $\infty$   $L_m = 0.06$

FIRE BR out  $\rightarrow$  - 113.84

(71) Now go in with MA rod & RR

BR out

SB in

MA in 8.458

RR in = +5.24

RR = 6.875  $\infty$

out

in SCRAM SB

7.528

8.528

- #19.57

15 FEB 67 SANDIA PERSONNEL ARE "SETTING UP" THEIR TRAILER  
 RIG FOR THEIR PART OF THE PULSE MEASUREMENTS.  
 New "safety tube" being installed which  
 extends to the floor.

DATE 15 Feb 67		SAFETY CHECK					
TIME 3:50		BY TAYLOR-LYNN DICKENSON					
CHANNEL		A	B	C	D	E	F
RANGE		1000	0.12	2-14	1000	900V	750V
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓	✓	✓	✓
AUX CTNS.		✓	✓	✓	✓	✓	✓
SOURCES USED	M226 & 1	MAGNETS				✓	
TABLES	✓	LIGHTS		✓		AREA CLEARED	

2 sheets OK

Only jumper used is K-46A (source  
 insert limit).  $\neq$  jumpers as run #66

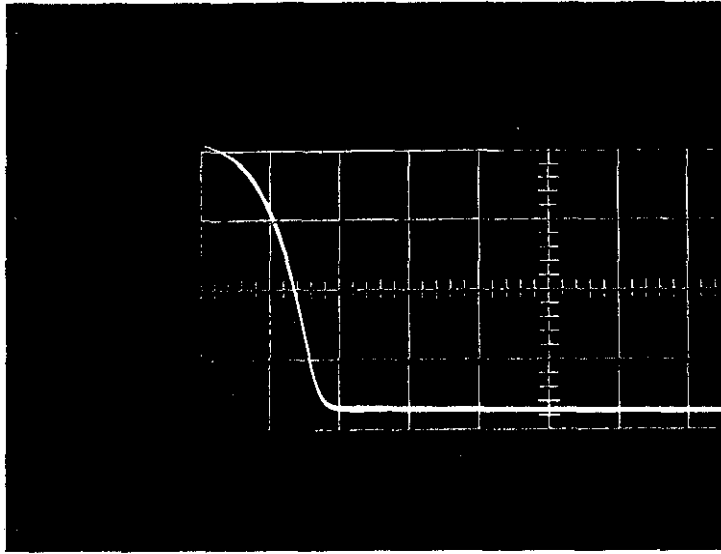
(72) Configuration same as (70).

BR in (sym) MA =  
 16:11 SB in RR = out  
 Scram APR Log N

(73) Repeat Run 72, MA = 5.162  $\infty$   
 withdrew BR =

Inserted MA = 8.46 + MA = 8.46  $\infty$   
 RR = 8.53 RR = 6.93

17 Feb 69 Burst Rod. time measurements made  
with substantial range of air pressures.  
Final "mid-point" (optimum pressure)  
shown below. 73 PSI & 50 ms/cm



all bolts as well as the bottom plate  
threads were "scrubbed" with caustic  
and steel brush yesterday. This got  
rid of most of the "non-plated" al.  
Reassembled the fuel today in  
preparation for runs.

Caustic experience suggested and observed  
by HITMAN (metallurgist) ph 3-7033

## STRAIN GAUGE LOCATIONS: (thru P-31)

CHANNEL	LOCATION
1	CORE SUPPORT ROD - SE (-) IS COMPRESSION, (+) IS TENSION
2	MASS ADJUST ROD ADAPTER
3	WASHER #1 UNDER BOLT NEAR (#54) BENTLY ch. 8 SE (-) IS TENSION, (+) IS COMPRESSION
4	WASHER #2 UNDER BOLT WITH (#63) BENTLY ch. 4 & 2 SW (-) IS TENSION, (+) IS COMPRESSION
5	SUPPORT FINGER SW (-) IS DOWNWARD, (+) IS UPWARD.
6	STRUCTURAL SUPPORT ROD ON THE LEVEL ABOVE THE CORE SUPPORT RODS NW (-) IS COMPRESSION, (+) IS TENSION

DATE	SAFETY CHECK					
TIME	7 <sup>30</sup>	BY TAYLOR-HYUN-DICKENSON				
CHANNEL	A	B	C	D	E	F
RANGE	1 <sup>000</sup>	OPR	L-14	1 <sup>000</sup>	900V	75V
SOURCE DIST.	✓	✓	✓	✓	✓	✓
% F. S. TRG	✓	✓	✓	✓	✓	✓
BLOC. ALARM	✓	✓	✓	✓	✓	✓
AUX CTRS.	✓	✓	✓	✓	✓	✓
SOURCES USED	M276 & R			MAGNETS		✓
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

2 rhodettes

As per R Rohrer  
the Voltage Output  
is now 35.

(74) Preparation made for Rossi Alpha runs.  
 Jump #12 used between K35A & K26A. This  
 permits insertion of RR with the MA out.  
 Used accel. as neutron source.

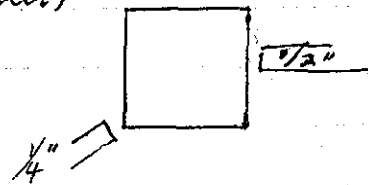
Sandia Plate On; all Sandia gauges <sup>pg 128</sup> in place;  
 safety tripod in place, 2 detectors in place.  
 Fuel as run #70; Cooling fan in place. Core  
 insert out. Air strand motor on; Rod liners in.

BR in; SB in; MA out; RR 7.12 ± for ∞

LOG N = 0.00066; C = 2.27(50); A <sup>10</sup>/<sub>1000</sub> (23); D <sup>10</sup>/<sub>1000</sub> (24)

START TMC DATA @ 8<sup>32</sup> AM

STOP 11<sup>00</sup> AM (5 min)



~~SB~~ Withdraw SB

- (75) Take BR out  
 Put  $\approx 10^5$  BBe source against RR.  
 Reinsert the SB  
 Readjust inst. voltages

Start Time 11  $\frac{46}{AM}$   
 Stop 13  $\frac{14}{PM}$

hv 0.0001 ; C = L19(55) ; A  $\frac{10}{100}$ @40 ; D  $\frac{10}{100}$ @52

(76) Soil exposure run

BR in  
 SB in 2 of 3 (-3)  
 MA @ 0.65  
 RR 8.500  $\infty$   $L_n = 0.1$  C = H28(60)

Start run @ 13  $\frac{54}{PM}$  (1/2)  
 Stop run @ 14  $\frac{24}{PM}$   
 Run time = 30 minutes.

"Able" and "Doc" were out of their paraffin for  
 this "higher than usual" run.

Fuel disassembled to remove foils.  
Then reassembled and 25 foot lbs.  
torqued on each bolt.

Sulfur Positions #1 = 17" from <sup>center</sup> surface  
of center plate

#2 = 45" from surface  
of center plate

#3 = 81" same

(60)



DATE 19 Feb 67		SAFETY CHECK					
TIME	1:30 PM	AM	BY	JRT-JLH-RD-JMM-JE			
CHANNEL		A	B	C	D	E	F
RANGE		1/1000	OPR	L-16	1/1000	900	900 ✓
SOURCE DIST.		15"	✓	30"	10"	✓	✓
% F. S. TRIP		90	✓	✓	90	100+	100
BLDG. ALARM		OUT	OUT	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED	M226	h		MAGNETS	✓		
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓		

rhouette-off

NOTE Special instrumentation placement as below for above check & below run.

- (77) Bldg. alarm A & B are set to be out of the trip circuit as per approval of RR & DC.
- C is 5 feet from APR
- BF<sub>3</sub> 1-2-3 OK near same as usual.
- A in upstairs hall, out of pig, near gate.
- D on horiz. table, out of pig magnet trip button - OK
- Log N on and behind SORA platform.
- E in large Ph pig near NW corner of 108
- F out of pig <sup>at point</sup> ~~midway~~ of hallway to 107.

BR IN ; MISC. same as #74 except detectors not up.

SB IN of 3 (-1) 11,580

MA 3.516

RR out

$E = 0.06 @ 700 V$

$IC4 = 3 \times 10^{-6} = 30$

$R_{un} = 1.3$

Curti Pie =  $\approx 10$  mm/hr on CTV console  
 90 mm @  $\frac{1}{2}$  of hall 107  
 10 mm/hr @ window

$F = 0.04 @ 800$  Volts

C bldg alarm - 50K

now increase power to  $\Delta n$  of 1.6 and SCRAM  
 via APR console (planned)

5.8 min at top power of 1.3 (M says maybe  
 $\frac{1}{2}$  a degree rise on outer surface of fuel.

(78) Move "A" <sup>(ref. to run??)</sup> around corner and put in hall  
 in front of Ellis' work shop, i.e. the way  
 behind the 5' thick wall. (5' inside door)  
 Some cd over & under same.  $\approx 100$  mils.

Add a few Pb bricks around F

→ Fission products sample # 7882-02-0005  
 in NE hole.

BR in

SB in 2 of 3 (-1)

Using F @ 1000V  
 until power is  
 visible.

16:16

SCRAM @  $\Delta n = 0.007$  on  $\approx +15$  period  
 BX APR 209 N

Now try again run # (78)

BR in; SB in 2 of 3 (-D);

SCRAM via "E". @  $L_n = 3.0$

Plan was to flip E out, but got to it too late.  $\approx +20$  period.

"E" out of circuit also "D"

BR in; SB in 2 of 3 (-D); MA 3.678; RR out

17:04 level @  $L_n = 7.0$

E, C, D off scale out of circuit; C also

F = 650V @ 0.1

A = 1000/100 @ 51

Bldg alarm C tripped

MR/hr readings:  
110 @ Window of 107  
1700 @ control panel  
1400 @ hall barricade  
28 @ center of wall 107.

17:25 Now go up in power  $L_n = 8.5$  and have planned SCRAM  
F° temp increase on O-2000 brown = 195°F  
Turn on fan @ 1726

→ The run cost the MA from 3.678 to 4.626  
→ 39 \$ (from MA curve)

17:40 { Put Bldg alarm A & B back in trip circuit.

17:50 → A = 32 K; B = 3.5 K; C = 1.6 K.

Power estimate 1-2 kW (GMM)

Two Sulphur foils to John Foster

#5 - One UMo Fusion Products Sample to Ed Wyatt

20 Feb 67 0800 hrs "cutie pie" readings in 108  
 8 mV/in @ the door.  
 100 mV/in @ ~ 6 ft.  
 1000 mV/in @ ~ 2 ft.  
 10000 mV/in @ ~ 3 in.

(79A)

DATE 20 Feb 67		SAFETY CHECK					
TIME 10 <sup>50</sup>		AM	BY JRT-JE-RD				
CHANNEL	A	B	C	D	E	F	
RANGE	1/1000	OPR		1/1000	900V	850V	
SOURCE DIST.	10"	✓	12"	4' 3"	✓	✓	
% F. S. TRIP	90	✓	✓	90	100+	✓	
BLDG. ALARM	✓	✓	✓				
AUX CTRS.	✓	✓	✓				
SOURCES USED	M226 & D			MAGNETS		✓	
TABLES	✓	LIGHTS		AREA CLEARED			

IC 4 reads 80 at contact.  
 Rhett checked OZ. (minor adjustment.)  
 A, B, C, D, F in original condition.  
 D out of pig  
 E in pb pig in NW corner 108

In limit lights checked for:  
 MA = bottom is  $\frac{7}{8}$ " below bottom of core.  
 RR = bottom is  $1\frac{3}{4}$ " below bottom of core.  
 Yesterday's run "lost" ~2 about 10<sup>7</sup> torque  
 on the bolts. (foot lbs)

Now install thermal couples (see  
 Pg 137). Again put 2.5 # torque on Bolts.  
 (foot lbs)

BR in  
 SB in 20/3 (-1) (4 min 11 sec) travel time  
 MA OUT  
 RR IN (slightly pos. +2.07)

12:15 Partial RR trav. In - 2.83 1.8 min  
 = 6.248" @ 20 pmt

(79 B) Partial RR trav. RR 2.830 - out 0.80 min  
 MA 2.800 ~ 2.70" @ 95 pmt

use 0.0284" per pmt

(80) BR calibration

BR in;  
 SB in "Line" BR out = -114.8¢  
 MA 3.518  
 RR out ~

(81A) MA calib.

BR out → 8.968 to 4.673 1.7 min  
 SB in 4.295" in 237 cts = .018123/ct  
 MA 8.968  
 RR 2.448 ~ use .017914 per ct

A <sup>1000</sup>/<sub>500</sub> (52); C H27@50; Lr 0.06.

As of 20 Feb 67 12<sup>00</sup> noon, the following thermal couples. Their read outs are in 107 (RB30-033)

# 2	W	BOTTOM	
12	SE	BOTTOM	
9	NW	SIDE	
6	NE	SIDE	
1	TOP NE	BOLT	(west of RR).
4	TOP SW	BOLT	(N 2 bolts from support ring).

TOP means under bolt head.

Side means under screw at plug.

Bottom means against bottom of fuel "enugged" by the safety tripod screws.

Bolts # 15, 42 and 54 were removed and examined - no noticeable change. These three were measured to be 9.5".

138

(81B) Brent

Bin

RL ~~out~~ <sup>in</sup> 9.078

MA 5.780  $\rightarrow +20^{\circ}$

MA 5.780 to out ~~4.078~~ <sup>0.132</sup>

5.648" travel

(2.23  
min)

(81c) new search for maximum reactivity  
position of MA. = 8.59 dial reading

(81d) Safety Block evaluation:

SCRAM  $\rightarrow$  - #19.97

Enke-1 ←

~~P 82~~

The "top of hill" and 9213 road gates are closed and locked. (D)

BR out  
 15:20 SB 2 of 3 (-1)  
 15:26 RR in 9.078  
 MA 5.502 →  $\Delta +14\%$   
 15:37 MA 5.024  $\infty$

RR 2.308 =  $\Delta -55\%$  sheets  
 15:39 SB started out  
 15:43 SB out  
 15:57 SB started in  
 16:01 SB in

all people accounted for in area.

16:05 BR FIRED IN

LOG N CTU = MAX .01 when SB dropped.  
 Health Physics made survey. all OK.



DATE 2-21-67 SAFETY CHECK

TIME 9:10 BY Lynn, Watson, Dickerson

	1000	opr H	1000	900	750
✓	✓	✓	✓	✓	OK
✓	✓	✓	✓	✓	✓
OK	✓	✓	✓	✓	✓
SEARCHED	M-226 + 5	INDEXED	✓		
TABLES	LIGHTS	AREA CLEANED	✓		

Parker

(83) Burst Rod Calibration

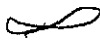
MA<sub>in</sub> = 8.468

BR in

SB in

MA = 3.488

RR out



Fired BR out = -115.7 #

BR out

SB in

MA in

RR 2.448

(Pur

BF <sub>3</sub>	1	= 20 (x256)	} hv = 0.075	1/2 min etc
	2	= 39		
	3	= 137		

Recheck (81c) max. react. position of MA.  
8.59 dial

✓ now withdraw MA enough to enable insertion of RR to "in".

(Pulse 2)

SB in

RR in

BR out

MA 5.059

∞ actually +0.08¢

10:35 RR 2.138

(-55¢ from curve.) (-56.4¢ shuttle)

10:35 SB start out

10:40 SB out

10:54 SB start in

10:58 SB in

(expected)

10:59 FIRE BR in

"DOG" SCRAMMED KON @ 3.0

11:15 SB reads 6000 MR/m @ 2 inches.

TMC plot shows period = 2.75 sec + 62.33¢

(Pulse 3) Channel A & D now out of trip circuit.

BR out

11:44 SB in

TMC = +1.69 sec = +70.5¢

11:52 RR in

MA 5.045

RR 3.135

∞ (-42¢ from curve) (-46¢ shuttle)

12:08 SB out

12:14 SB start in

12:18 SB in

12:19 FIRE BR in

no scram like however magnet released.  
FIRE SCRAM @ 3 KON @ 10.0 CTU

NOTE: "F" was just at full scale.

142 ✓

(P-4) BR in

13:13

SB

RR ~~7.269~~ 7.225

MA out  $\rightarrow$  actually  $+0.13^{\circ}$

13:29

BR fired out =  $-115.2^{\circ}$

BF<sub>3</sub> etc 1/2 min 1=136, 2=clobbered; 3=140 (x256)

while Log N @ 0:08 These BF<sub>3</sub>'s are each out of their puriffin and wrapped with cd sheet.

BR out

SB in

MA 5.062

RR in  $\infty$

RR 3.877 (-33 $^{\circ}$  from curve) (-36.3 $^{\circ}$  shuttle)

13:41 SB start out

13:45 SB out

13:51 SB start in

13:55 SB in

13:55 FIRED BR in "F" dropped the SB as in (P-3)



144

(P-6) BR out

16:00 SB in

MA 5060

RR in

RR 5.097

16:24 SB start out

16:29 SB start in

16:33 SB in

16:33 FIRE BR in

SCRAM By F.

$-18 \text{ } \phi$  from curve  
 $-21.2 \text{ } \phi$  shafts  
 $-21.8 \text{ } \phi$  Log N  
 $-26.4 \text{ } \phi$  BF<sub>3</sub> 1  
 $-24.3 \text{ } \phi$  BF<sub>3</sub> 2  
 $-24.3 \text{ } \phi$  BF<sub>3</sub> 3  
 $-24.3 \text{ } \phi$  FC # 1 ←

Avg = -23.72 $\phi$

$\approx 93 \text{ } \phi$  +

TMR

977 m/sec

22 Feb 67 APR reads 1000 m/sec @ 5"

most Bolts needed additional torquing.

# 42 44 54 65 58 23 63

All are now @ 25 ft lbs. once again.

DATE		SAFETY CHECK				
TIME	9:05	BY TAYLOR - HYUN - DICKENSON				
CHANNEL						
RANGE	10/1000	OPR	L-16	10/1000	900	750
SOUND BELL	✓	✓	✓	✓	✓	✓
% F. S. TRIP	—	—	—	—	—	✓
BLOO. ALARM	✓	✓	✓			
AUX CTRS.	✓	✓	✓			
SOURCES USED	M226 & 2	MAGNETS				✓
TABLES	—	—	—	AREA CLEARED		—

rhoette OK

(04) BR in  
9:58 SB in

RR 7.052

MA out  $\infty$   $L_n = 0.06$   $C = 227 @ 50$  <sup>actually</sup>  $\pm 1.3 \Phi$

10:10 FIRE BR out  $-116.9 \Phi$  rhoette.

BR out		PF3 1	-15.7 $\Phi$
SB in		2	-14.6 $\Phi$
MA in 8.468		3	-16.6 $\Phi$
RR 2.494		FC 1	-14.8 $\Phi$ ( <del>-95.700</del> )
RR out (-16.0 $\Phi$ )	→	2	-15.2 $\Phi$ ( <del>-97.200</del> )
		hm	-16.2 $\Phi$
		Rhoette	-16.0 $\Phi$
		avg	-15.87 $\Phi$

146

(P-7) BR out ←

11:16 SB in 11.775

11:20 MA in 8.468

RR 2.462 (slightly neg.)

RR out

MA 7.528 →

Rhette = -21.4 ¢

Lin = -23.5 ¢

BF<sub>3</sub> 1 = -24.9 ¢

2 = -22.7 ¢

3 = -22.3 ¢

FC 1 = -22.0 ¢

2 = -22.3 ¢

avg -22.72 ¢

11:38 SB start out

11:42 SB out

11:58 SB start in



12:02 SB in


12:02 FIRE BR IN

SCREAM BY "F"

683 msec TMC =

Still no seeable temp change.

(P-8)  BR out  
 SB in  
 MA in  
 RR 2.577 

RR out  
 MA 7.750 


12:47 SB started out

12:51 SB out

13:08 SB start in

13:12 SB in

13:12 FIRE BR in SCRAM IS "F"

40 msec TMC 

Rhettie = -20.0¢  
 Lu = -22.7¢  
 DFs 1 = ? ?  
 2 = -20.7¢  
 3 = -20.2¢  
 F.C 1 = -18.7¢  
 2 = -18.7¢  


---

 Avg -20.17¢



148

(P-9)

1320

BR out

SB in

MA 8.468

RR 2.462

RR out

MA 7.900

Phatle = -18.3  $\phi$

Ln = -18.32

BF<sub>3</sub> - 1 = -20.4

2 = -19.7

3 = -19.47

FC - 1 = -19.0

2 = -19.0

Averg. -19.17  $\phi$

1346 SB started out → 1350

1350 SB out

1407 SB started in

1414 SB in

1414 Fixed BR in Scram "F"

24.4 m-sec T.M.C

(P-10) ←  
 1416 BR out  
 SB in  
 MA in  
 RR ~~2.470~~ ∞  
 2.504  
 RR out →  
 MA 8.218

Rhettie = -16.9 ¢  
 Lm = -17.19 ¢  
 BF<sub>3</sub> -1 = -19.47  
 2 = -18.68  
 3 = -18.6  
 Fc 1 = -17.95  
 2 = -17.95  
 Avg = -18.10 ¢

1447 SB start out  
 1451 SB out  
 1508 SB started in Low Level Scram (TIMER)

1520 BR out  
 SB in  
 MA in  
 RR 2.534  
 RR out →  
 MA in

Rhettie = -16.7 ¢  
 Lm = -18.84 ¢  
 BF<sub>3</sub> -1 = -19.7  
 2 = -16.6  
 3 = -16.2  
 Fc 1 = -17.8  
 2 = -18.1  
 Avg = -17.7 ¢

1552 Start SB out  
 1556 SB out  
 1612 SB started in  
 1617 Fired BR in Scram "F"  
 TMC

Sulfur Pos #1 = #98  
 #2 = #35

DATE	23 Feb 67	SARBY LINK			
TIME	08 <sup>05</sup>	TAYLOR-VAN-DICKENSON			
CHANNEL					
RANGE	1/1000 ore	L-16	1/1000	900	750
SOURCE DIST.	✓	30"	2"	✓	✓
% F. S. T.P.	✓	✓	✓	✓	✓
SIG. ALARM	✓	✓	✓	✓	✓
AUX STIC.	✓	✓	✓	✓	✓
SOURCES USED	M 226 & b	2.5.2.13	✓	✓	✓
TABLES	✓	✓	✓	✓	✓

reboette OK.

SB reads 1000 mm/hr @ 4-5 inches.

108 windows are covered by

}	1 (NORTH) = 1/2" steel
	2 (mid) = 1/2" steel
	3 (SOUTH) = 2 3/4" plexiglas

NOTE: 5° turn of UMo Belt = 0.001"

7 of 9 bolts had to be retorqued this morning.

Bolt measurement with BT gauge

#44	= 9.2160"
#42	= 9.3515"
#14	= 9.2010"

Sulfur Pos. 1 = #61  
2 = #66 } oriented with no. facing reactor.

(85) BR in To EVALUATE

11:22 SB in

MA 3.510

RR out → +0.1¢

FIVE BR out rhotette BR = -116.9¢



(P-11) BR out

SB in

MA in

RR 2.572

rhotette = -15.1¢

Lu = -14.10¢

BF3 1 = -17.55¢

2 = -15.62¢

3 = -15.62¢

FC 1 = -16.10¢

2 = -16.10¢

AVG = -15.74¢

MA in

RR 0.578

11:58 start out SB

12:02 SB out

12:18 SB start in

12:22 SB in

12:22 Fried BR in

12:26 Fan On

	60-112	Pass
0-2000 max rise =		52°F
# 2 = 26 to 29°C		3°C
# 12 = 26 to 29°C		3°C
# 9 = not printing		-
# 6 = 26 to 42°C		16°C
# 1 = 26 to 34.5°C		8.5°C
# 4 = 26 to 35°C		9°C
APR surface	64 to 100 F	31°F
APR under	74 to 118 F	44°F

ming

ug

152

Thermocouple #1 plugs - 4.475" from bottom of Core  
 3.485 " top

(Rend  
 15.2

P-12

Sulfur #1 = ~~#10/3~~ } 200  
 2 = ~~15/4~~ } 201  
 3 = } 203

1.3x10<sup>13</sup>

Fusion Products Sample # 0011 - 81" from center plate surface

(P-12)

	Temp before start	Temp @ wait	Temp after (20 min) Pulse
--	-------------------	-------------	---------------------------

2	25.5°C	25.5°C	41°C
12	25.5°C	25.5°C	41°C
9	—	—	—
6	24.0°C	25.0°C	25.0°C
1	25.5°C	25.5°C	55°C
4	25.5°C	25.5°C	54°C
0-2000	64°F	62°F	180°F
8	25.0°C	26°C	25°C
16	26.0°C	26°C	26°C

15.

15.

16

16

16

16

16

(Run 86) BR in Evaluate

15:24 SB in

MA 3.493

RR out

Fire BR out sheets = 117.1 \$

BR out

MA in

RR 2.542

SB in

sheets - 12.85 \$

Lin - 13.2

BF 1 - 14.32

2 - 13.47

3 - 13.74

RR 0.858 →

FC 1 - 13.44

2 - 13.78

avg - 13.54 \$

15:55 SB start out

15:59 SB out

16:29 SB start in

16:33 SB in

16:33 Fire BR in

16:53 400 m/hr @ 108 door ; 200 m/hr @ <sup>2nd</sup> level door

16:54 fan on

24 Feb 67

5 of 9 bolts needed torquing to assure  
25 ft. lb on each.  
Sulfur - 1 = #204  
          2 = 205  
          3 = 206

DATE	24 Feb 67						SAFETY CHECK							
TIME	9:30						JRT - WH - RP							
CHANNEL			B	C	D	E	F							
RANGE	10/1000		OPR L-20		10/1000		900	750						
SOURCE DISC.	✓		-		-		✓	✓						
% F. S. TRIP	✓		-		-		✓	✓						
BLOG. ALARM	✓		-		-		✓	✓						
AUX CTRS.	✓		-		-		✓	✓						
SOURCES USED	M226 & d						MAGNETS							
TABLES	✓		LIGTS		✓		AREA CLEANED		✓					

shoette  $\phi$

(87) BR in TO EVALUATE

10:35 SB in  
MA 3.520

RR out  $\infty$

10:42 BR fire out shoette = -116.6  $\phi$

Ready  
Before  
Wait  
AFTER

(P-13) BR out

SB in

MA in

RR  $\frac{7.538}{2.572} \infty L_m = 0.062$

↑

RR 0.905 →

11:19 MA start out

11:21 MA out

11:42 MA start in

11:46 MA in

11:46 Fire DR in

rhoette ⇒ -13.07<sup>†</sup>  
 L<sub>n</sub> = -13.88  
 BF<sub>3</sub> 1 ⇒ ⊙  
 2 ⇒ ⊙  
 3 = -13.65  
 - Fc 1 = -13.45  
 2 = -13.90  
 -----  
 Avg: - 13.59<sup>†</sup>

Temp. recordings in JTM notebook. actually see below  
 Increase on 0-2000 = 65.6°C or 118.1°F (ΔT)

11:48 10R @ 108 door

12:58 (low) F now coming down onto scale.

C = 149 @ 70

12:50 Temp. was back to "normal."

11:50 Fan On (cooling)

Read Out →	1	2	4	6	9	12
Before →	25.0	25.0	25.5	24.5	-	25.5
Wait →	25.0	25.0	25.5	24.5	-	25.5
AFTER (6 min)	48.0	39.0	48.0	24.5	-	35.0

0002-2000  
 149  
 5.24 #3  
~~100F 74F 100F~~  
~~35.5 41.5 56.6~~  
~~60F 74F 100F~~  
~~178 180 135~~  
~~58.9 100 150~~ removed.  
 AFTER PULSE

13:20 fan off.



156

(P-14) Sulphur pos 1 = 207  
2 = 208  
3 = 209

Read out →	1	2	4	6	12
Before (°C)	24.5	24.5	25.5	24.5	25.5
WAIT	✓	25.0	✓	✓	✓
AFTER (4 min)	54.0	38.0	65.0	24.5	37.0

RR02-0	NR	S. ch # 3
60.1F	74F	70F
<del>55.7</del>	<del>74</del>	<del>65</del>
60.6F	74	65
<del>55.7</del>	<del>74</del>	<del>65</del>
234	234	160
<del>130</del>	<del>130</del>	<del>80</del>

umped after P.

(88) BR in TO EVALUATE

13:30 SB in  
MA 3.588  
RR out

13:37 Fire BR out rhoette -114.8

BR out  
MA in  
RR 2.572  
SB in

BR out  
 SB in  
 MA in  
 RR 1.326

→

Enthalpy =  $-10.9^{\circ}$

Ln =  $-9.8$

BF<sub>3</sub> 1 = out

2 =  $-11.27$

3 =  $-11.13$

FC 1 =  $-11.27$

2 =  $-11.29$

Avg =  $-10.94$

(173.7)

med  
 WP  
 14:11 MA start out

14:14 MA out

14:38 MA start in

14:41 MA in

14:41 BR fire in

14:43 fan on

14:50 2 R/Ln @ 108 door.

15:26 Bldg alarm C = .6 R/Ln

15:40 temp. charts turned off (temp down to "normal").

15:43 Ln = .0003; CH 11 @ 95; A<sup>100</sup>/<sub>100</sub> @ 42; D<sup>100</sup>/<sub>200</sub> @ 50; F (high) =  
 2 of 20 scale, low still tripped.

16:47 100 mph at hall door 23-c

17:27 30 mph at upstairs corridor door.

25 Feb 67 Measured bolts (SB=1R@2')

(P-

	#44	42	14	15
"O" = 24 Feb 67	9.2160"	9.2100"	9.1995"	9.2075"
TODAY = 25 Feb 67	9.2160"	9.2090"	9.1995"	9.2020"

"Re Torque" check on all bolts. All bolts were tight i.e. to torque "8" on scales. (all were good without additional torque).  
ART-BT-DC

DATE 25 Feb 67		SAFETY CHECK	
TIME 9:02		BY ART-VJH-RD	
CHANNEL			
RANGE	10/1000 OPR L-22	10/1000	900 750
SCALES	✓	✓	✓
% F.S. TEST	✓	✓	✓
ELC. ALARM	✓	✓	✓
ALX STR.	✓	✓	✓
SOURCES USE M226 & d		WRENCHES	✓
TABLES	✓	LIGHTS	✓
		AREA CLEARED	✓

rhoette OK

F moved to 107 hallway.

Sulphur foils 1=210; 2=211; 3=212

(89) BR in To Evaluate

9:25 SB

MA 3510

RR out

rhoette = 115.9<sup>9</sup>

Re  
BE  
@  
ART

(P-15) BR out

5B in

MA in

RR ~~5.060~~  $\infty$   
2.506

9:41 RR 1,500  $\rightarrow$

9:59 MA start out

10:02 MA out

10:26 MA start in

10:29 MA in

10:29 Fire BR in

rhoette : -8.99<sup>+</sup>  
 Ln : -9.54 (-175.9<sub>rec</sub>)  
 BF<sub>3</sub>#2 : -9.54  
 3 : -9.39  
 FC#1 : -9.54  
 2 : -9.39  
 Avg = -9.40<sup>+</sup>

10:30 With "high field" I made checks (1 @ a time) of each bldg. alarm. Each trips properly. ~~VRT~~

10:35 4 m/hr @ 1.08 door

10:48 F still in hall in front of door shielded 2" pb = high scale  
 F @ <sup>near console</sup> hall corner (out of pig) = high scale = 2.5 of 20.0

Readout	1	2	4	6	12	0-2000	Δ	#3
BEFORE P.	25.0°C	25.5	25.5	23.5	25.0	<del>66°F</del>	74F	80F
@ Wait	✓	✓	✓	✓	✓	✓ 23F	✓ 266F	✓ 500F
AFTER	75.5	53.5	75.5	✓	51.5	<del>117</del>	<del>478</del>	111.0 <i>immed. after</i>

27 Feb-67 measured 1000 mph @ 14" away from # 5B. (0815)

ref. pg 158. Belt length measurement.

#44 = 9.2160"; #42 = 9.209"; #14 = 9.1995"; #15 = 9.207"

Torque check:

44	- torque OK - loosened - retorque to $\frac{25}{16}$ ft. lbs.		
54	- slightly tight -	✓	✓
65	-	✓	✓
58	- torque OK	✓	✓
23	- slightly loose	✓	✓
63	- torque OK	✓	✓
14	✓	✓	✓
15	✓	✓	✓
42	✓	✓	✓

APR Safety Ch #1 (in Core) ietc #3  
 #2 (in Core) ietc #4  
 NP (in Core) ietc #7  
 Safety ch #3 (Surface) ietc #5

815)

DATE	27 Feb 67					
TIME	9:20 AM BY Lynn, Watson, Dickerson					
TEMPERATURE	$\frac{10}{1000}$	OP	L-20	$\frac{10}{1000}$	900	750
	✓	OK	✓	✓	✓	✓
	95	-	100	90	100 <sup>T</sup>	-
STUDY READY	✓	✓	✓			
ALL DATA	✓	OK	OK			
REWORKS USED	M-226 +	✓		IMPACTS		✓
TABLES	✓			AREA COVERED		✓

rhoett & [signature]

Sulphur foils Pos<sup>#</sup> 1=213; 2=214; 3=215.

Readout	1	8	2	4	(9)	12	62F	74F	90F	65F	50F
Before P. =	25.5°C	24.5	25.0C	25.5C	25.0C	25.0C	62F	74F	90F	65F	50F
@ Wait =	✓	✓	✓	✓	✓	✓	✓	✓	62F	✓	40F
AFTER P. =	70.0	26.0	42.0	70.0	25.0	46.0	313F	304	205	300	260

*Annotations:*  
 - Above 62F: 62-2000  
 - Above 74F: 10P  
 - Above 90F: 5.0ch #3  
 - Above 65F: 85ch #1  
 - Above 50F: 95ch #2  
 - Below 313F: rimmed after.

(90) BR in TO EVALUATE

10:28 SB in

MA 3.507

RR out

Fire BR out rhoett → -15.5 ← withdrawing problem?

3  
4  
7  
5

(P-16) BR out  
 SB in  
 MA in  
 RR 2.485  $\infty$   
 RR 1.656  $\rightarrow$

rhoette = -7.22 \$  
~~Ln = -5.28~~  
~~BF<sub>3</sub> #2 = -5.384~~  
~~3 = -5.23 \$~~  
~~FC #1 = -5.23~~  
~~2 = -5.23~~  
 (of 5) Avg = -5.27 \$

11:05 MA start out

11:08 MA out

~~MA start in~~ Need nearer -7 \$ period.  
 because rhoette was in error. actually

BR out  
 SB in  
 MA  
 RR 2.478  $\infty$   
 RR 1.400  $\rightarrow$

rhoette =  
~~Ln =~~  
~~BF<sub>3</sub> #2 = -6.28 \$~~  
~~3 = -6.21~~  
~~FC #1 = -6.18~~  
~~2 = -6.17~~  
 Avg

11:59 MA start out

Start over on Pg 163

BR out  
 STS in  
 MA in  
 RR 2.420  $\infty$

RR 1.660  $\longrightarrow$

$\left\{ \begin{array}{l} \text{rhoette} = -7.05 \text{ \textcircled{f}} \\ L_n = -7.71 \text{ (206.2)} \\ \text{BF\# 2} = -7.86 \\ \quad 3 = -7.57 \\ \text{FC\# 1} = -7.77 \\ \quad 2 = -7.60 \\ \hline \text{Avg} = -7.59 \text{ \textcircled{f}} \end{array} \right.$

12:43 MA start out

12:46 MA out

13:10 MA start in

13:13 MA in

13:13 Fire BR via (did not get BR in light.)

13:15 fan on

13:25 2 R/M @ 108 door

15:00 fan off



(P-17) Sulphur fobs # 216 - 217 - 218 put in place

Temp checks

	1	8	2	4	9	12	0-2000	2	Sich #1	Sich #2	Sich #3		
Before P.	25.5°C	24.5	25.0	25.5	-	25.0	63°F	74°F	60°F	70°F	75°F		
@ Wait (+5 min)	✓	✓	✓	✓	-	-	✓	✓	65°F	38°F	60°F		
After P.	86	24.5	48	86	-	48	immed. AFTER		370°F	368	365	375	250
$\Delta T$ C°	→ 170.6		163.3	166.7									

(91) BR in TO EVALUATE (BR air press. is normal) RD.  
 15:12 SB in  
 MA 3.490  
 RR out  
 Sine BR out → rhoette - 112.4 \$ - ?

BR out } rhoette = -4.87 \$  
 SB in } Sin = -4.82 \$  
 MA in } BF<sub>3</sub> #2 = -5.27  
 RR NOT READ → ASSUMED TO BE NEAR TOP Rg163  
 RR 1.895 → } BF<sub>3</sub> #3 = -5.19  
 } FC #1 = -5.19  
 } 2 = -5.16  
 Avg = -5.08 \$

15:55 MA start out  
 15:58 MA out  
 16:21 MA start in  
 16:24 MA in  
 16:24 Fire BR in

16:27 fan on  
 16:30 4 hr/hr @ 108 door.  
 16:47 all bldg alarms in circuit.  
 18:49 fan off

28 Feb 67 1 R/hr at 3 feet. (0800 hrs)  
 200 m/hr @ the sheet's chamber  
 Sulphur foils # 219-220-221 put into place.

DATE 28 Feb 67		SAFETY CHECK					
TIME 8:30		BY JRT-JH-Sutton					
CHANNEL	A	B	C	D	E	F	
RANGE	10/100	OPR	L-1	10/100	900	250	
SOURCE DIST.	✓	✓	✓	✓	✓	✓	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M-26 & h			MAGNETS		✓	
TABLES	✓	LIGHTS		AREA CLEARED		✓	

sheet's off  
 in 200 m/hr  
 field

Use "B" bldg alarm only.

Temp. checks

	1	8	2	4	12	0-2000	NP	S.ch #1	S.ch #2	S.ch #3
Before P.	25.5	25.5	25.5	25.5	25.5	63F	74F	75F	100F	90F
@ Unit	✓	✓	✓	✓	-	✓	✓	65	50	70
AFTER P. (+10 min)	105	25.5	68	106	66	400F	386	390	360	270

(92) BR in to EVALUATE

9:12 SB in

MA 3.492

RR out  $\infty$

Fire BR out  $\rightarrow$  rhoetts = -116.0  $\phi$

(P-18) SB in  
BR out  
RR 2.375  
MA in  $\infty$

9:29 RR 1.973  $\rightarrow$

9:59 MA start out

10:02 MA out

10:24 MA start in

10:27 MA in

10:27 Fire BR in

10:35 fan on

10:37 2 R/hr @ 108 door

12:11 240 m/hr @ 108 door

12:15 fan off

rhoetts = -3.89  $\phi$   
BF<sub>3</sub> #1 = -4.34  
2 = -4.28  
3 = -4.18  
L<sub>m</sub> = -4.133 (3424)  
FC #1 = -4.20  
2 = -4.20  
Avg = -4.17  $\phi$

Measurement made at 08:30 (28 Feb 67)

Measurement made  
at 0830 (28 Feb 67)

Bolt measurements after run # P-17 :

<u>44</u>	<u>42</u>	<u>14</u>	<u>15</u>	
9.2150"	9.2090"	9.1995"	9.2070	(ref Pg 158)

All bolts (except #14) needed only slight additional torquing to maintain 25 foot lbs.

(P-19)

Sulphur fobs on # 222, 223, 224.  
Bldg. Alarm A only in trip circuit

Temp. Readouts

	1	2	4	12	20020	041	50	50	503
Before P	25.5°C	25.5	25.5	25.5	67F	74	65	50	75
On bit	✓	✓	✓	✓	66	✓	✓	✓	✓
After P.	100	55	105	52	442	435	410	400	outg

(93)

BR in TO EVALUATE.

12:29

SB in

MA 3460

RR out ∞

Fire BR out → rosette = -111.9 †

SB in

BR out

MA in

RR NOT READ ∞

RR 2.000 →

rosette = -3.08 †

Ln = -3.34 (-4 rope)

BF<sub>3</sub> #1 = -3.54

2 = -3.48

3 = -3.48

FC #1 = -3.46

2 = -3.43

Avg = -3.40 †

13:16 MA start out

13:19 MA out

13:42 MA start in

13:45 MA in

13:45 Fire BR in

13:48 fan on

14:02 3 R/hr @ 108 door

14:45 580 mv/hr @ 108 door

(P-20) Sulphur foils on # 225, 226, 227  
 Bldg. alarm C only in trip circuit.

	Temp. Readings				225-0	S	100	N	M
	26°C	26	25.5	26	70°F	75	60	48	62
Before P.	26°C	26	25.5	26	70°F	75	60	48	62
@ wait	✓	✓	✓	✓	68	✓	58	42	50
After P.	120	74	127	55	480	500	500	465	outy
			ΔT °C		229	236	246	235	—

~~(94)~~ BR = out  
 15:21 SB = in  
 MA = in  
 RR = 2.340

RR = 2.104 →

rhaitte = -2.02 \$  
 Ln = -1.93 (<sup>1095</sup>/<sub>706</sub> sec)  
 BF<sub>3</sub> #1 = -2.24  
 2 = -2.23  
 3 = -2.25  
 PC #1 = -2.19  
 2 = -2.17

Avg = -2.15 \$

16:04 MA started out

16:07 MA out

16:28 MA started in

16:31 MA in

16:51 Fire Burst Rod in

10.R entire Pie in shop

7.5R " at AP R console

80.R @ CTU console

16:46 Put (Keep Out) sign on hall door & gave green lite.

(P)

By  
 @  
 Dy

1 Mar 67 0800 = 1 R/m @ ~~4ft~~ 4ft.  
220 mm @ 108 door

(P-21)

DATE	1 Mar 67						SAFETY CHECK	
TIME	8:40		AM	BY TAYLOR-YON-DICKERSON				
CHANNEL	A	B	C	D	E	F		
RANGE	10/500	OR	L-28	10/1000	950	750		
SOURCE DIST.	✓	✓	✓	✓	✓	✓		
% F. S. TRIP	✓	✓	✓	✓	✓	✓		
BLDG. ALARM	✓	✓	✓	✓	✓	✓		
AUX CTRS.	✓	✓	✓	✓	✓	✓		
SOURCES USED	M226 4 ft			MAGNETS			✓	
TABLES	✓		LIGHTS		✓		AREA CLEARED	

rhettts in  
400 m/m field  
at check

- Bolt meas: (after run #8-20): 44 = 9.2160"; 42 = 9.2090";  
14 = 9.1990"; 15 = 9.2070" (ref pg 158)

- Torquing: All bolts loosened and retorqued to  
25 ft lbs each (one at a time). None of the  
bolts were loose.

- "Charlie" Brass reaches 40 m/m @ 1" using cutie pie.

- added ~ 2" of pb in front of rhettts.  
rhettts moved 10 ft farther away.

Temp Readouts

	①	②	③	④	0-200	DIA	SC1	N	N
Before P.	25.00	25.0	25.0	24.5	61	74	70	60	85
@ wait	✓	✓	✓	✓	✓	37	60	35	70
After P.	134	66	140	60	492	290	580	465	130
ΔT °C	→ 239.4 281.1 288.9 238.9 33.3								

DOUBTFUL



BR out  
 10:10 SB in  
 10:13 MA in  
 RR 2.318  $\rightarrow$   
 RR 2.216  $\rightarrow$

rhette = -0.98  $\neq$   
 hn = skip  
 BF<sub>3</sub><sup>#1</sup> = -1.08  $\neq$   
 2 = -1.08  
 3 = -1.08  
 FC<sup>#1</sup> = -1.12  
 2 = -1.08

avg = -1.088  $\checkmark$

NOTE: DO NOT INCLUDE  
 RHETTE OR HN IN AVG.

11:03 MA start out  
 11:06 MA out  
 11:28 MA start in  
 11:31 MA in  
 11:31 Fire BE in

at wait time shifted HP readout  
 0 to 1200 scale! (i.e. TO BE MULT. BY 2.0)

11:33 fan on

12:45 Large exhaust to Rm 108 on.  
 13:00 exhaust fan off.  
 13:05 Core temp. is down to normal.  
 13:08 410 m/hr @ 108 door  
 14:45 10 R @ 2 6 ft.

(P-22) Sulphur foils on # 40; 44; 101

Bldg alarm (Bonly) in circuit

Fission Products Sample # 7882-02-0009

	Temp. Readouts			AT°C
	Before P.	@ wait	After P.	
0-2000	62°F	62°	545 doubtful	268.3
HP	37	37	disconnected	
SC#1	50	60	675	341.7
SC#2	40	30	640	338.9
SC#3	80°F	61	115	30.0
tc#1	25°C	✓	off scale >150	>125
tc#2	25	✓	110	85
tc#4	25	✓	off scale >150	>125
tc#12	25°C	✓	115	90

{ BF<sub>3</sub> counts pre-start up; (counts per 2 min)  
 #1 = 39/2min    #2 = 35/2min    #3 = 55/2min.  
 { FC#1 = 5/2min; FC#2 = 9/2min

BL out

14:57 SB in

MA in

RR 2.350  $\infty$   $\rightarrow$  counters show the period  
 to be about +25000 sec. or less than  
 +0.1  $\phi$

15:53 MA start out

15:56 MA out

16:23 MA start in

16:26 MA in

16:26 Fine BR in

16:40 3.5 R/hr @ 108 door.

T°C

8.3

1.7

2.9

0.0

125

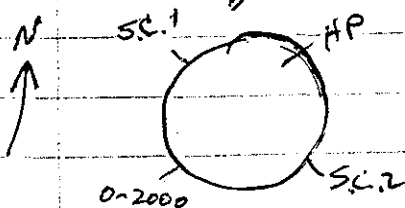
5

25

10

2)

2 Mar 67

1 R/hr @  $\approx$  5 ft.Sulphur foils via: # 8, 96, 102.  
Bldg alarm (Aonly) in circuit.

Bolt meas.: 44 = 9.2160"

42 = 9.2090"

15 = 9.2070"

14 = 9.1990"

all bolts retorqued to 25 ft/lb

	TEMP.	READOUTS:		$\Delta T^{\circ}C$	(Pm)
O-2000	72°F	72°F	640°F ?	299°C	11
HP	38°F	38°F	311°F (x2)	303.3	
SC1	70°F	60°F	615°F	308.3	
SC2	55°F	45°F	570°F	291.6	
SC3	80°F	<del>60°F</del> 57°F	253°F	607.2	
tc 1	25°C	25°C	123.5°F	65.8	(P-
tc 2	25°C	25°C	70		
tc 4	25°C	25°C	off scale		
tc 12	25°C	25°C	62.5		

PRE-START VP COUNTS (2 min ct.)

BF<sub>3</sub> 1 = 67

2 = 30

3 = 39

Fe 1 = 5

2 = 6

DATE		SAFETY CHECK					
TIME	10 <sup>10</sup>	BY TAYLOR-LYNN DICKENSON					
CHANNEL		A	B	C	D	E	F
RANGE		1000	OPR	5-8	1000	900	750
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓	✓	✓	✓
AUX CTRS.		✓	✓	✓	✓	✓	✓
SOURCES USED	m26 & h	MAGNETS		✓			
TABLES	✓	LIGHTS		✓		AREA CLEARED	

rhett (-6)

1/10

°C (Run 94)

C 11:17 BR in  
 3 SB in  
 3 MA 3,490 ∞  
 6 RR out Fired out Pette = -119.5

?

8 (P-23)

BR = out  
 SB = in  
 MA = in  
 RR = ∞  
 RR = 2.350 →

BF<sub>3</sub> 1 = -0.61  
 2 = -0.64  
 3 = -0.61  
 FC1 = -0.58  
 2 = -0.57  
 Avg. = -0.602

12:32 MA start out  
 12:35 MA out  
 12:57 MA started in  
 13:00 MA in  
 13:00 Fired RA in  
 13:11 3.2 R/h @ 108 door  
 13:12 Fan on in 108

178

2 mar 67

Sulfur pit in #82, #83 + #85

(P-24)

	Temp. Radents			$\Delta T^{\circ}C$
0-2000	70° F	68°	720° F	362.2
HP (1200)	38° F (x2)	38° F	-358° (x2)	355.5
SC 1	60° F	65° F	719° F	363.3
SC 2	44° F	33° F	720° F	381.7
SC 3	70° F	60° F	300° F	133.3
tc 1	25° C	25° C	off	—
tc 2	25° C	25° C	80° C	55
tc 4	25° C	25° C	off	—
tc 12	25° C	25° C	90° C	65

Pre startup Counts (2 min)

BF <sub>3</sub>	1	44
	2	67
	3	69
FC	1	9
	2	20

15:11 SB started in

BR out

MA in

RR 2,680 →

BF<sub>3</sub> 1 = +0.48¢

2 = +0.47

3 = +0.47

FC 1 = +0.45

2 = +0.42

Aug = +0.458¢

16:04 MA start out

16:07 MA out

16:29 MA start in

16:32 MA in

16:32 Fired BR in

16:35 Fan on 108

3 Mar 67 1 R/hr @ ~~5 ft of fuel~~  
 @ 800 hrs = 470 mtr/hr @ door of 108

Sulfur pits: # 2, # 3 + # 26  
 1600 hrs = Milk plotting.

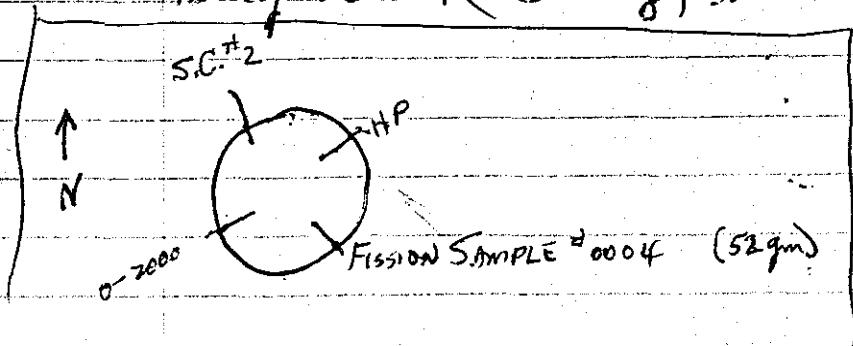
6 Mar 67 1 R/hr @  $\approx 2\frac{1}{2}$  ft

— Belts measured: #44 = 9.216"; #42 = 9.209";  
 #15 = 9.207"; #14 = 9.1995"

— All belts loosened (one at a time) and retorqued  
 to 25 ft lbs.

— Small Sulfur pits for Jim Watson  
 # 25-1, # 25-2 + # 25-3

— Bldg alarm (B only) in circuit.



30 mtr/hr @ boette.



DATE <u>6 Mar 67</u>		SAFETY CHECK					
TIME	<u>12<sup>20</sup></u>	AM	BY	<u>Taylor-Watson-Dickenson</u>			
CHANNEL		A	B	C	D	E	F
RANGE		<u>10000</u>	<u>OPR</u>	<u>1-18</u>	<u>1000</u>	<u>950</u>	<u>750</u>
SOURCE DIST.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
% F. S. TRIP		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
BLDG. ALARM		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
AUX CTRS.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
SOURCES USED	<u>M26 &amp; 0</u>	MAGNETS <u>✓</u>					
TABLES	<u>✓</u>	LIGHTS	<u>✓</u>	AREA CLEARED <u>✓</u>			

rhoette signal  
discon. for purpose  
of 'zeroing'.

Pre-startup counts (2 min)

BF # 1 = 26

2 = 21

3 = 36

FC # 1 = 5

2 = 8

Temp. Readouts

	BEFORE	AT WAIT	AFTER	$\Delta T^{\circ}C$
0-2000	70°F	70	790	400.0
WP (1200)	38°F	38	440 (1/2)	446.7
SC 2	33°F	35	750	397.2
SC 3 <sup>not in</sup>	<del>52°F</del>	—	—	—
tc 1	26°C	✓	off scale	—
tc 2	26°C	✓	74	48
tc 4	26°C	✓	off scale	—
tc 12	26°C	✓	70	44

182

(95)

13:21 BR in  
 SB in  
 MA 3.467  
 RR out  $\rightarrow$   
 Fire BR out shaft  $\rightarrow -118.2 \text{¢}$

(P-25)

BR out  
 SB in  
 MA in  $\sim +1.0 \text{¢}$   
 RR 2,500

13:59 Hot SCRAM on @  $+1\frac{1}{2} \text{¢}$  period @  $\Delta t = 0.00055$ .  
 due to transient noise on period of APR.  $\gg$

Start over  
 BR out  
 14:10 SB in  
 MA in  
 RR 2,550  $\rightarrow$

} BF3 1 =  $+1.77 \text{¢}$   
 2 =  $+1.68 \text{¢}$   
 3 =  $+1.69 \text{¢}$   
 FC 1 =  $+1.69 \text{¢}$   
 2 =  $+1.66 \text{¢}$   
            
 +  $1.698 \text{¢}$

14:37 MA start out

14:40 MA out

15:05 MA start in

15:08 MA in

15:08 Fired BR in

15:13 fan on (core cooling)

15:25 3 R/h @ 108 door

16:15 fan off (temp. down to within 15°F of room temp.)

184

7 Mar 67 30 mc/hr @ 108 door

08:00

1 R/hr @ 4 ft.

Inspection showed that the screw holding the fission sample and the screw holding the "HP" thermal couple had "popped off" during the last Pulse.

8 Mar 67 1 R/hr @  $\approx 2\frac{1}{2}$ '

Took Brown Recorder & converter kit to V-12 inst. shop 9737.

D. Brown changed out an ion chamber.

9 Mar 67 1 R/hr @ 2'

15 mc/uc @ rhett.

Put sulfur foil # 13, 92, 104 in neural positions.

BOLT Measurement 44 = 0; 42 = -6; 14 = -16 1/2; 15 = -9 miles.

Base or Zero Meas. = 9.2160'

DATE	9 Mar 67						SAFETY CHECK					
TIME	9:45						BY TAYLOR-MIHAILOZO-WATSON					
CHANNEL	A	B	C	D	E	F						
RANGE	1/1000 OPR L-17						1/1000 950 750					
SOURCE DIST.	6"	✓	2'	2"	✓	✓	rhett &					
% F. S. TRIP	✓	-	-	✓	✓	✓						
BLOS. ALARM	✓	✓	✓	✓	✓	✓						
AUX GTRS.	✓	✓	✓	✓	✓	✓						
SOURCES USED	M226 & D						MAGNETS ✓					
TABLES	✓	✓	✓	✓	✓	✓	AREA CLEARED					

NOTE: Thermal couples protrude from 1/8" to 1/4". Position therefore is not known exactly at time of Pulse. Walking screw hole is about 3/16" ~~of~~ of thread and 1/4" deep. Hole diameter = 5/16"

Torque bolts: # 42 = needed 4" (at end of 4' handle)  
 44 & 54 = OK  
 65 = needed 3"  
 58 & 23 = OK  
 63 = needed 3"  
 14 & 15 = OK.

Bought a "handful" of following screws.

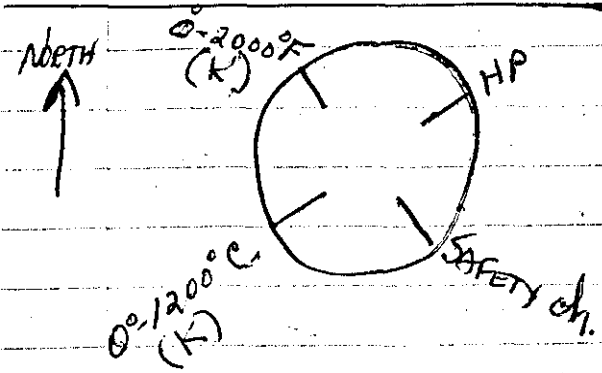
10-32 thread - 0.4" head.

Binding head screws.

S.S. and  $3/8$ " long.

Having considerable difficulty in putting in the "HP" thermal couple plug. Suspect plating has caused the tightness since the plating is coming off. So John wants all plugs pulled and inspected etc.

10 May 67 all plugs were removed and "acid cleaned." Were reinstalled as follows:



(1 part HCl acid  
4 parts Nitric acid  
Soaked for 10 min)

Now have 55 screws holding in the plugs.

DATE 10 May 67		SAFETY CHECK					
TIME	13:45	BY TAYLOR-HYUN-WATSON					
CHANNEL		A	B	C	D	E	F
RANGE		10000 cpm	1-17	1000	960	750	
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED	MAL 6 & h	MAGNETS		✓			
TABLES	✓	LIGHTS		✓			AREA CLEARED ✓

IC4 &  
Photo's OK

PRE START UP COUNTS (2 MIN): BF<sub>3</sub> #1 = 28 ; #2 = 13 ;  
#3 = 34 ; FC #1 = 7 #2 = 12

Bldg. alarm A only in circuit.

TEMP. READOUTS:

	BEFORE	@WAIT	AFTER	ΔT °C	
0-2000F	71°F	70°F	905°F	463.9	15:
0-1200°C	20.5°C	23°C	526°C	504.0	15:
HP(1200)	39°F	✓	454/2	482.8	15:
SCR	60°F	50°F	off scale	—	
tc1	25 1/2°C	✓	off scale	—	
tc2	25 1/2°C	✓	out	—	15:
tc4	25 1/2°C	✓	off scale	—	16:
tc12	25 1/2°C	✓	95	69.5	

(96) BR in

14:31 SB in

MA 3.602

RR out

True BR out  $\rho_{hoette} = -117.4 \phi$

(P-26) SB in

BR out

MA in

RR 3.000

$\left. \begin{array}{l} BF_3 \ 1 = + ~~1.27~~ \ 1.28 \\ \quad \quad 2 = + 1.29 \\ \quad \quad 3 = + ~~1.27~~ \ 1.265 \\ FC \ 1 = + 1.27 \\ \quad \quad 2 = + 1.24 \end{array} \right\} \begin{array}{l} \\ \\ \\ \\ \end{array} \phi$   
 Avg

Rod posi. different due to plugs are in slightly different etc. See Pg 187



15:13 MA start out  
 15:16 MA out  
 15:39 MA start in  
 15:42 MA in  
 15:42 ~~Fried BR in~~

Had bldg. alarm trip originating from Shop and also Rm 113.

15:47 Fan on Not a Pulse problem - Pulse was normal.  
 16:10 2.2 R/hr @ door Rm 108.

13 Mar 67 1 R/hr @ 2 1/2 ft. all thermal plug screws are still in but are loose. Each screw will "unscrew" 1/4 of a turn then "bind." Retightened all four. However (Sich) plug has 1/16" in-out "play" more on Pg 191

Rod Check: Clint lights

	in	out
MA	8.467	0.136 scale
RR	9.082	0.132
SB	-	-0.033

See Pg 135 (ref) also Pg 140

BR = 1.018" protrudes below dia.  
 MA 0.535" ?  
 RR 1.057"

190 3/13/67

BOLT MEASUREMENTS

# 44	9.217
42	9.226
14	9.201
15	9.2075

BOLTS TORQUES

54	SLIGHT	44	~ 5°
65	ABOUT 25°	42	~ 25°
59	SLIGHT	15	~ SLIGHT
23	~ 15°	14	~ 3-5°
63	~ 5°		

BOLTS ARE STRETCHING ✓

DATE	13 Mar 67	SAFETY CHECK						
TIME	10 <sup>05</sup>	AM	BY TAYLOR-HUN-DICKENSON					
CHANNEL		A	B	C	D	E	F	
RANGE		10/1000	DR	L-17	10/1000	900	750	rhett's #
SOURCE DIST.		✓	✓	✓	✓	✓	✓	J.C.Y. OK
% F. S. TRIP		✓	✓	✓	✓	✓	✓	
BLDG. ALARM		✓	✓	✓	✓	✓	✓	
AUX CTBS.		✓	✓	✓	✓	✓	✓	
SOURCES USED	M226	4n			MAGNETS	✓		
TABLES	✓	LIGHTS	✓		AREA CLEARED	✓		

Sulfur regular = 17 ; 23 ; 79  
 small = 27<sup>+</sup> ; 27<sup>-</sup> ; 27<sup>3</sup>


Pre-startup (2 min) counts: BF<sub>3</sub> #1 = 18<sup>4</sup> ; 2 = 16<sup>4</sup> ;  
 3 = 24<sup>9</sup> ; FC #1 = 6 ; 2 = 10

red = more area covered with cd.

Bldg. alarm C only in circuit.

Temp. Readouts:	Before	@ unit	after	$\Delta T^{\circ}C$
0-2000F	71 <sup>o</sup> F	✓	820 <sup>o</sup> F	416
0-1200C	22 <sup>o</sup> C	24 <sup>o</sup> C	450 <sup>o</sup> C	426
NP(1200)	39 <sup>o</sup> F/2	✓	414/2	417
SC 2	53 <sup>o</sup> F	33 <sup>o</sup> F	730 <sup>o</sup> F	387
tc 1	25.5 <sup>o</sup> C	✓	off scale	—
tc 2	25.5 <sup>o</sup> C	✓	25.5 <sup>o</sup> C	—
tc 4	25.5 <sup>o</sup> C	✓	off scale	—
tc 12	25.5 <sup>o</sup> C	✓	75 <sup>o</sup> C	49.5

cont from 189.

 Screw heads had bent like  
 so. Extra effort <sup>to</sup> permits screw to come  
 out. Shock hits washers and head  
 on one side causing same.

Now try same washers but with  
SOCKET CAP SCREWS.

14:38 MA start out  
 14:41 MA out  
 15:04 MA start in  
 15:07 MA in  
 15:07 Fire BR in

15:11 fan on  
 15:34 2.2 R/hr @ 108 door

14 Mar 67 1000 m/hr @ 4 1/2'  
 20 m/hr @ 108 door

DATE 14 Mar 67		SAFETY CHECK					
TIME 8:10	AM	BY TAYLOR-WATSON-DICKENSON					
CHANNEL	A	B	C	D	E	F	
RANGE	10/1000	0PR	L-22	10/1000	950	750	
SOURCE DIST.	✓	✓	✓	✓	✓	✓	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M226 4h			MAGNETS			
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓	

BOLT MEAS. #44 = 9.217 ; 42 = 9.216 ; 14 = 9.201 ; 15 = 9.207"  
 Sulfur pos #1 = #25 ; 2 = #39 ; 3 = #86  
 TORQUE NEEDED: BOLT #14 = 1° ; 15 = 0° ; 42 = 2° ; 44 = 0° ; 54 = 0°  
 65 = 0° ; 58 = 1° ; 23 = 2° ; 63 = 3°  
 Bldg alarm Bonly in circuit.

194

(98) BR in  
 9:01 SB in 11.574  
 MA 3.600  
 RR out 0.132  
 Fine BR out

shuttles = ~~—~~

TEMP REPORTS:	Before	@ Wait	after	$\Delta T^{\circ}C$
0-2000°F	70°F	71°F	269°F	110.0
0-1200°C	22°C	16°C*	170°C bad?	154.0
HP (200)	—	70° 39°F	264	105.0
SC 2	—	45°F	220	97.2
tc1	25.5°C	✓	60°C	34.5
tc4	25.5°C	✓	62°C	36.5
tc12	25.5°C	✓	35°C	9.5

(P-28) BR out

SB in 11.574  
 MA in 8.466  
 9:18 RR 2.945  
 RR 2.000

BF<sub>3</sub> # 1: -10.07¢  
 2: -10.28¢  
 3: -10.03¢  
 FC 1: -10.03¢  
 2: -9.95¢  
 -10.07¢

Log N = -9.75¢

\* tube was changed. wire cleaned.

9:37 MA start out

9:40 MA out

10:05 MA start in

10:08 MA in

10:08 Five BR in

10:11 fan on

10:55 330 m/hr @ 108 dbar

11:35 fan off (temp is down.)

Sulfur in Pae#1 = 43; 2 = 65; 3 = 88

Pre start up count: BF#1 = 8; 2 = 8;

3 = 14; FC#1 = 9; 2 = 6

## Temp Readouts:

	Before	@ Wait	after	$\Delta T^{\circ}C$
0-2000F	72°F	72°F	255°F	101.7
0-1200C	22°C	21°C	140°C	119.0
HP	75°F	74°F	260°F	103.3
5C2	55°F	33°F	205°F	95.6
tc1	25.5°C	25.5°C	63°C	37.5
tc4	25.5°C	25.5°C	64°C	38.5
tc12	25.5°C	25.5°C	36°C	10.5

196

→ repeat of P-28 (w/vals are same)

(P-29)

BR out

SB in 11.679

MA in 8.465

11:51 RR 2.946 ∞

RR 2.000 →

BF<sub>3</sub> #1 = -9.86¢

2 = -10.30

3 = -9.69

FC #1 = -9.83

2 = -9.95

Avg = -9.926¢

(P-

12:11 MA start out

12:14 MA out

50 me/hr @ door @ 12:35

12:38 MA start in

12:41 MA in

12:41 Eric BR in

12:45 fan on

12:50 1.6 R/hr @ 108 door.

12:53 1 min at BF<sub>3</sub> #3 = 12.67 (x256)

13:08 = 18 cts only

14:40 = 12 cts only

Sulfur in Pos #1 = 73, #2 = 74 + #3 = 75

Large exhaust in Rm 108 on 14:11

Fission product sample #7882-02 - ~~0019~~

(P-30) BR out

14:51 SB in 11.585

MA in 8.465

RR 2.894

RR 3.086

BF<sub>3</sub> #1 = +2.63

2 = +2.64

3 = +2.51

FC #1 = +2.38

2 = +2.38

all Avg = +2.51

Lm = +2.64

## Temp Readouts

	Before	@ Wait	After	$\Delta T^{\circ}C$
0-2000°F	71°F	72°F	1058°F	548
0-1200°C	22°C	✓	645°C	623
HP	38°F (1200)	38°F	525	541.1
SC <sub>2</sub>	35°F	not in	—	—
tc <sub>1</sub>	25.5°C	✓	>150	—
tc <sub>4</sub>	25.5°C	✓	>150	—
tc <sub>12</sub>	25.5°C	✓	75	49.5

16:04 MA start out

16:07 MA out

16:35 MA start in

16:38 MA in

16:38 Fire BR in

16:40 fan on

18:35 fan off



SIDE NOTE: Fission sample # 0006 was on floor under the reactor during P-30.

15 MAR 67 1 R/hr @ 5' : 40 m/hr @ 10.8 door 0800 hrs.

> 10 R/hr @ 1' FISSON SAMPLE # 0017 in place.

- Sulfur in Poo #1 = 76, #2 = 77, + #3 = 78

- Bolt meas. after P-30 - #44 = 9.2445; 42 = 9.237; 14 = 9.214; 15 = 9.218

- Hondan retorqued Bolts. all bolts except maybe (1), needed to be tightened about 60° avg.

- Radiation shared for following problem by Garrison, Reedy, Magnuson

- In attempting to remove all "hold in" screws and washers, one screw broke off inside the fuel plate. Intention is to put new washers under the head of each screw.

① drilled small hole near center of "broken piece"

② Tried easy out - (no) ③ Larger easy out (no)

could not go deep enough to tighten.

④ Cut off "easy-out" to solve ②. ④ This apparently <sup>most of</sup> got out. ⑤ Magnet drew <sup>very</sup> little from the hole. ⑥ Now try 10-32 tap - won't go in. still piece inside hole. Now use drill & motor. Some progress. Now use drill tap by hand and

complete the job.

- All screws and new washers in place.

- SB appears scorched. dark color near center area. other darkish areas observed.

- Usual Inst. Safety check Made OK  
Same as 14 Mar 67

(99A) <sup>2 min</sup> Pre start up counts BF<sub>3</sub> #1 = 4; #2 = 8;  
#3 = 5; FC #1 = 9; 2 = 5

All rods were left exactly as P-30 overnight. Now insert SB.

BR out

MA in 8.467

RR 3.090

12:02 SB in 11.575

$$BF_3 \#1 = -0.528\%$$

$$2 = -0.546\%$$

$$3 = -0.528\%$$

$$FC \#1 = -0.581\%$$

$$2 = -0.534\%$$

$$\text{Avg} = -0.543\%$$

{ Reactivity loss =  $\approx 3.1\%$  due  
to (?) & perhaps top plate warp.  
&/or other reasons.

12:37 now withdraw ~~SB~~ MA and RR

12:47 BR inserted

(99B) BR in  
SB in 11.525  
MA = 3.600  
RR = out

$$BF_3 \#1 = -1.758\%$$

$$2 = -1.782$$

$$3 = -1.700$$

$$FC \#1 = -1.679$$

$$2 = -1.700$$

$$\text{avg} = -1.724\%$$

200

(100) BR out in

SB in

MA = 3.647

RR = out

13:25 Find BR out sheets  $\rightarrow$  -117.0  $\phi$

(P-31) BR out

14:22 SB in 11.576

In & Out 6 times with fanal.

MA in 8.450 - 8.464

RR 3.200  $\rightarrow$  slight pos.

RR 3.385  $\rightarrow$

BF<sub>3</sub> #1 = +3.308  $\phi$

2 = +3.342

3 = +3.281

FC #1 = +3.251

2 = +3.234

Avg = +3.282  $\phi$

15:20 MA start out

15:23 MA out

16:06 MA start in

16:09 MA in

16:09 Trace BR in

16:14 fan on

18:15 0-1200°C chart @ 20°C fan off

240,000 Mg sheets.  
roughly 500

0-20  
0-12  
H.  
tc  
tc  
tc

\*

Temp Readouts

	<u>Before</u>	<u>@ wait</u>	<u>After</u>	<u><math>\Delta T</math></u>	
0-2000°F	71°F	✓	1385°F	730°	+33%
0-1200°C	19°C	16°C	835°F	816°	+31%
HP	38°F	✓	off scale	-	
tc 1	25.5°C	✓	off scale	-	
tc 12	25.5°C	✓	104°C	78.5°	
tc 4	25.5°C	✓	off scale	-	

Observed red glow (>3" @ ±) of Safety Block after pulse. → deep red with a purple tinge.

16 Mar 67

07:50 60 mm/hr @ 108 door. - 1 R/hr @ ~ 7-8 ft.

- Fission Sample # 0020

- Sulfur - Pos #1 = 50 #2 = 80 + #3 = 81  
taken down - not used.

- alpha smears (5) max. = 100 d/m

Smears taken on side of core. Particularly on the discolored disc (disc #4).

\* prep 209

- Bolt meas. - #44 = 9.274"; #42 = 9.306"; #14 = 9.260"; #15 = 9.253"

- Torquing: Bolt #14 = 0°; 15 = 90°; 42 = 195°; 44 = 0°; 54 = 120°;  
65 = 60°; 58 = 20°; 23 = 15°; 63 = 20°

202

- Hold in "screws": all were still tight.

DATE		SAFETY CHECK					
TIME	10 <sup>20</sup>	AM	BY JRT-JJL-RP.				PM
CHANNEL		A	B	C	D	E	F
RANGE		✓	✓	✓	✓	✓	✓
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED	M226 #1	MAGNETS		✓			
TABLES	✓	LIGHTS		✓			
		AREA CLEARED		✓			

S.B. was raised  $\frac{1}{4}$ " only once.

(101) BR out

MA in 8.460

RR 3.390

10:42 SB in =

SB out

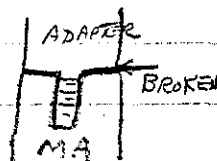
11:05 SB in (period too neg. to measure at this level.)

BR out

MA in

SB in

RR in still neg.



11:19 SB stat out

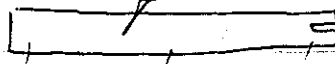
11:24 Take all rods out.

Inspection now shows MA is broken off <sup>at</sup> <sup>near top</sup> <sup>of fuel</sup> <sup>rod</sup>. The MA rod itself is apparently <sup>adapter</sup> stuck in the core. The male threads of the SS adapter has broken off inside the UMo. This particular adapter is Sandias. \* MA is not in the core. It is inside but under blade of fan. Let fuel decay until ~~later~~ later.

break looks about 20

17 MAR 67 0800 22 mR/hr @ 108 door



- Jurnell removed the MA from the fan.
  - MA = 20 R/hr @ contact or  $\approx$  3 R/hr @ 2-3 inches.
  - About 2" of Pb reduces general field near MA by a factor of 50.
  - Smears on MA: 
- alpha Dpm  $\rightarrow$  272 654 210

20 Mar 67 25 R/hr @ ~1", 10 mr/hr @ 108 door

— Smeas on 5B @ hole @ center = 11,286 d/m alpha.  
@ 1" above hole = 192 d/m alpha

— After having floor areas mopped to remove a small degree of contamination, all floors are considered clean except the SW area of room 108. This area to be cleaned before next operation or pulse. (This has been cleaned)

— Received a pb shield  $\approx 3' \times 5' \times \frac{1}{2}"$  on wheels.

— <sup>another</sup> Shield was made from pb bricks to put MA into while removing pin and broken threads from the MA.

— Three pictures were taken of MA rod. <sup>by JE</sup>

— Had photographer over for more pictures also.

Film & Dosi. TOTALS to date this quarter. <sup>(Jan 1 to Mar 20 67)</sup>

ITEM	FILM	Dosi	TOTAL
LYNN	800	50	850 mr
TAYLOR	700	0	700
MIHAJCO	680	0	680
DICKENSON	660	75	735
WATSON	780	10	790
CALKIN	560	95	655
TUNNELL	360	230 + 100	690

— Ellis, Rohrer, Elliott, Harrison & Johnson are all less than 150 total.



13:30

MA pin and broken threads of S. steel screw have been removed and APR adapter put on the MA. Don Williams (spt) is with us now and will work behind the shield to install MA to its drive. No difficulty was experienced in removing the pin & broken threads.

see P 206

\* Read out of MA drive movement shows it to be erratic. Now check hole dia. with a 1.005" S.S rod from the bottom up. Hole apparently good. Now make a full traverse and rate = 2.50" compared to original 2.52" min. This is OK.



DATE		SAFETY CHECK					
TIME	13 <sup>25</sup>	BY TAYLOR-HYNN-DICKERSON					
CHANNEL		A	B	C	D	E	F
RANGE		10/1020	OPR	1-18	10/1020	905	750
SOURCE DIST.							
% F. S. TRIP		✓	-	-	✓	✓	✓
BLOG. ALARM		✓	✓	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED	M226 & H	MAGNETS		✓			
TABLES	✓	LIGHTS		✓			
		AREA CLEARED		✓			

sheet OK.  
SB was raised slightly only once.

Put new bottle of D<sub>2</sub> on accel.  
Rods protrude below discs: (ref pg 189)

MA = 0.473"

8.463 in lite

RR = 1.022"

9.082 in lite

Try putting in BR by hand. It went about 1/2 way into core and when released the BR was "stuck" at that position. The BR has less overall clearance than other rods normally. (If one had a 10 mil warp for example, it probably would bind).

\* (As MA went in (Pg 205) ~~an~~ an observer noted the MA was moving sidewise "rhythmically". Had some difficulty getting BR out using air under same. It came out after several tries.

(102) BR out

15:07 SB (3 of 3) 11.576 in

MA 8.462 in

RR 3.385 →

(ref P-31) (Pg 200)

$$BF_3 \#1 = -3.13 \text{ \textcircled{d}}$$

$$2 = -3.15 \text{ \textcircled{d}}$$

$$3 = -3.11$$

$$FC \#1 = -3.03$$

$$2 = -3.11$$

$$\text{avg} = -3.106 \text{ \textcircled{d}}$$

Reactivity loss from  
run P-31 = 6.388 \text{ \textcircled{d}}

Received 2 pieces of steel from Bldg 9720-6  
~~to be~~ added to the photon wheels for  
extra shielding. This shield now reduces  
the general field by a factor of 10.

ated  
Dag  
80

veral

Mar 21 - Attempted to remove Bolt #42 and rotated approx 2 full turns at a uniform resistance in left hand direction (to loosen) before it seemed to stick solidly. The resistance to motion during the 2 full turns was estimated to be 50-75 ft lbs force.

After sticking solidly ~~it~~ during the backing out effort it was also stuck to move back in or tighter. Liquid Lubrol applied to space between bolt head & washer-spacer and efforts to move back & forth were slightly successful before the special torque wrench head broke open (at time of fracture a healthy spark was initiated). A new wrench will be modified -

This rod was full -  
 12.09" for all data  
 up to here pertaining to It

BURST ROD WHEN ROTATED MOVES FREELY IN AND OUT OF  
 CORE MANUALLY. BURST ROD LINER SCREWS LOOSE LINER  
 WILL NOT COME OUT MANUALLY. BURST ROD TACKLE OUT  
 BY DROPPING THROUGH THE CORE. SMALL DIAMETER STAINLESS  
 ROD PASSED UP THROUGH THE BURST ROD LINER FROM  
 BOTTOM. INSIDE OF LINER SEEMS TO BE SMOOTH.  
 TRIED TO REMOVE THE ADAPTER FROM THE BURST ROD SO  
 THAT THE ADAPTER COULD BE USED WITH THE NEW BURST  
 ROD. PIN REMOVED. ADAPTER WILL NOT SCREW OUT FROM THE  
 ROD - STUCK.



22 Mar 67 4 R/hr @ 6" of SR  
 25 R/hr @  $\approx 1\frac{1}{2}$ "  
 400 mv/hr @ 36'

Bolt meas. on 16 Mar 67 as per WCT (micrometer measures  $-.0025$ )

#44 = 9.274"; #42 = 9.306"; #14 = 9.253"; #15 = 9.260"

Bolt meas. on 22 Mar 67 WCT

#44 = 9.276"; #42 = cap't do; #14 = 9.256"; #15 = 9.262"

Bolt meas on 23 Feb 67

#44 = 9.2160; #42 = 9.209; #14 = 9.1995; #15 = 9.207  
 60                      97                      56.5                      55

23 Mar 67 Burst Rod 7881-28-0053 installed

1219 gms 21-Mo Wt, 1097 gms 21

0.757" dia x 10" long.

It is pinned in.

210

New screws and washers on thermal plug positions. All screws on rod sleeves have been tightened.

(10  
9

DATE		SAFETY CHECK					
TIME		AM	BY				
23 Mar 67			JPT - JNL - DD				
CHANNEL		A	B	C	D	E	F
RANGE	10/1000	OPR	6-17	10/H	900	750	
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓			
AUX CTRS.		✓	✓	✓			
SOURCES USED	M226 & h				WASNETS	✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓		

sheet of

(1

(10

(103) BR in (TO EVALUATE)

9:52 SB 2 of 3 (-1) in 11.578

MA 4.268

RR out 0.132 ∞

Fire BR out sheet → -102.6 †

(104) BR out

SB in 11.578

MA in 8.464

RR 3.371 ∞

MA traverse (in 8.464 to 4.979) TIME = 1.4 min.

\* cannot move RR as desired. See below for jumper situation as per Dick Rohrer.

(105) BR out

SB in 11.578

MA in 8.464

RR 3.372 ∞

SCRAM @ CTV BY HAND. EVAL. SB = -20.28 †

\* [ To permit motion of MA & RR with SB not fully inserted:

  Jumper #1 18Q → 21A permits insertion of MA.

  #2 Across MA 33A permits insertion of RR.

  Jumper SWITCH 4 up permits insertion of SB with BR out.

  MODE: BURST PREP

212

(106) BR in  
 SB in 2 of 3 (-) (hit again got all lights) 11.578  
 RR in 9.082  
 MA 1.577  $\infty$

RR trans (in 9.082 to out 0.132) 2.61 min

RR TOTAL value = 694

(107) BR in  
 SB in 11.578  
 RR out 0.132  
 MA 4.979 + 20.64  $\neq$

MA trans (4.979 to out (8.464)) 1.94 min

(108) BR in  
 SB in 11.578  
 RR  
 MA  $\infty$

MA trans (<sup>2.5</sup>2.500 to 8.464) 0.95 min

MA TOTAL value = 1704

Scale 256		Natural Log	
0	0.0	1.5	- 0.40547
13	0.05	2.0	- 0.69315
26	0.10	2.5	- 0.91629
39	0.15	3.0	- 1.09861
51	0.20	4.0	- 1.38629
64	0.25	5.0	- 1.60944
77	0.30	6.0	- 1.79176
90	0.35	7.0	- 1.94591
103	0.40	8.0	- 2.07944
115	0.45	9.0	- 2.19722
128	0.50	10.0	- 2.30259
141	0.55		
154	0.60		
167	0.65		
179	0.70		
192	0.75		
205	0.80		
218	0.85		
228	0.90		
243	0.95		



(109) BR in

RR 5.250

MA 4.979

SB 10.778  $\infty$ 

11:56 ~~SB 10.778~~ ~~MA 4.979~~ ~~RR 5.250~~

(110) BR in

RR 5.250

MA in 8.464

SB 10.384  $\infty$ 

~~SB 10.384~~ ~~MA 8.464~~ ~~RR 5.250~~

(111) BR in

RR in

MA in

SB 10.248  $\infty$ 

SB trav (10.248 to 8.695) 0.54 min

214

(112) Repeat of (103)  
same dials (all) &  $\infty$

SB trav (11.578 to 10.246) 0.48 min

(113) BR in  
SB in 11.578  
MA 4.268  
RR out 0.132  $\infty$

Fin BR out = -102.2¢

(114) MA reproducibility check. Run MA all way out then back in several times. RR dial did not change. MA dial varied only 1 mil or less.

5 checks were made and the "noise" gave us a 5. ch. #3 SCRPM. SB is dropped. Then went back to power. Once back to power the only rods which had been moved were the SB & the MA. No change in the RR dial.  
Rohm talked to inst. people about Sch. #3.

<u>Rhette</u>	<u>Log N</u>
+ 13.612 #	+ 14.07 #

13.655	14.25
--------	-------

13.597	14.25
--------	-------

13.627	14.33
--------	-------

13.645	13.85
--------	-------

SCRAM from "noise" via S. ch #3

13.172	13.45
--------	-------

13.155	13.51
--------	-------

13.207	13.57
--------	-------

13.247	13.51
--------	-------

13.167	13.03
--------	-------

13.037	13.51
--------	-------

13.227	13.19
--------	-------

13.323	13.03
--------	-------

27 Mar 67 R/hr @ 2 ft.

DATE	27 Mar 67					
SAFETY CHECK						
TIME	9:30	AM	BY TAYLOR-HYUN-WATSON			
CHANNEL	A	B	C	D	E	F
RANGE	1000	OPR	L-17	1000	900	750
SOURCE DIST.	✓	✓	✓	✓	✓	✓
% F. S. TRIP	✓	-	✓	✓	✓	-
BLDG. ALARM	✓	✓	✓			
AUX CTRS.	✓	✓	✓			
SOURCES USED	M276 A & B		MAGNETS		✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

Shuttle OK.

Installed CTU panel source near APR.  
 Accel. heater was off this morning. A  
 minor wiring repair hopefully.  
 New heater was installed about 4:00 PM - OK.

(115) Safety Block drop reproducibility check  
 Drop block by pushing magnet trip (107)

	SB	MA	RR	BR	Period	
					Sec	in
(116) a) in (11.581)	in (8.466)	4.462	out	81.07	11.24	
					10.78	
(117) b) in (11.582)	in (8.476)	4.676	out	57.54	14.54	
					13.43	
(118) 10:38 c) in (11.584)	Same	Same	Same	58.63	14.33	
					14.01	
(119) 10:55 d) in (11.586)	"	"	"	59.71	14.15	
					13.66	
(120) 11:09 e) in (11.582)	"	"	"	59.98	14.10	
					13.92	

	SB	MA	RR	BR	Log N	Pette
11:24 (121)	11.586	in (8.475)	4.676	out	58.35 sec 14.37 ¢	
SYSTEM SCRAPPED BY LOWERING TRIP POINT ON Dog so IT WOULD TRIP. 1000/1000 - 75 TRIPPED AT 85% FULL SCALE						
(122) 11.59	11.582	(8.475)	4.676	out	58.09 sec 14.43 ¢	13.89
(123)	18.581	(8.475)	4.676	out	58.09 sec 14.43 ¢	13.83
(124)	in (11.580)	"	"	"	60.25 sec 14.06 ¢	13.79
(125)	in (11.576)	(-1)	"	"	57.0 sec 14.63 ¢	13.84
luck (126) 12:40	in (11.577)	8.475	4.676	out	53.20 sec 15.34 ¢	14.06
(127)	in (11.576)	(-1)	"	"	59.71 14.15 ¢	14.36
(128)	in (11.575)	"	"	"	55.91 sec 14.82 ¢	14.28
13:26 (129)	in (11.580)	"	"	"		

Using Run 129 as base run for next page.  
Running safety block out ~ 2" then back in.

MA = 8.475 RR = 4.676 BR = out

1.34  
2.78  
3.54  
3.43  
4.33  
4.01  
6.15  
3.66  
2.10  
3.92

	SB	Rate Period
(130)	in (11.578)	14.30 $\neq$
(131)	in (11.578)	14.16
(132)	in (11.576)	14.16
(133)	in (11.575)	14.21
(134)	in (11.576)	14.20
(135)	in (11.575)	14.21
(136)	in (11.575)	14.19
(137)	in (11.577)	14.22
(138)	in (11.581)	14.17
(139)	in (11.580)	14.21
(140)	in (11.578)	14.24
(141)	in (11.576)	14.22
(142)	in (11.578)	14.19
(143)	in (11.578)	14.15
(144)	in (11.580)	14.29
(145)	in (11.580)	14.17
(146)	in (11.577)	14.25
(146)	in (11.578)	14.22
(147)	in (11.576)	14.20
(148)	in (11.577)	14.18
(149)	in (11.576)	14.20

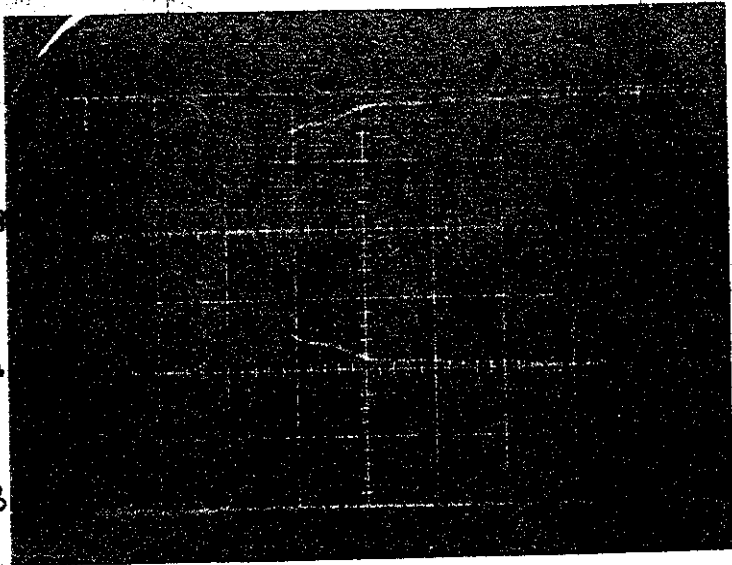
14:38 Moving MA from in to out

SB = 11.576

RR = 4.676

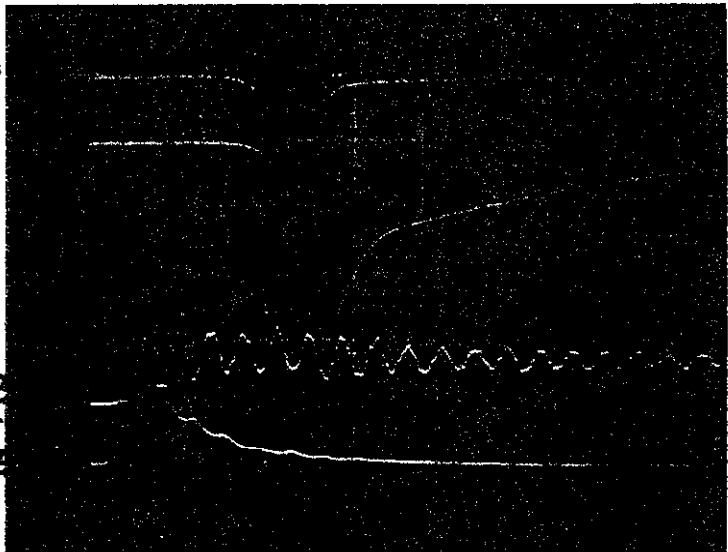
BR = out

2A  
2  
2B  
2  
3A  
1  
3B  
1



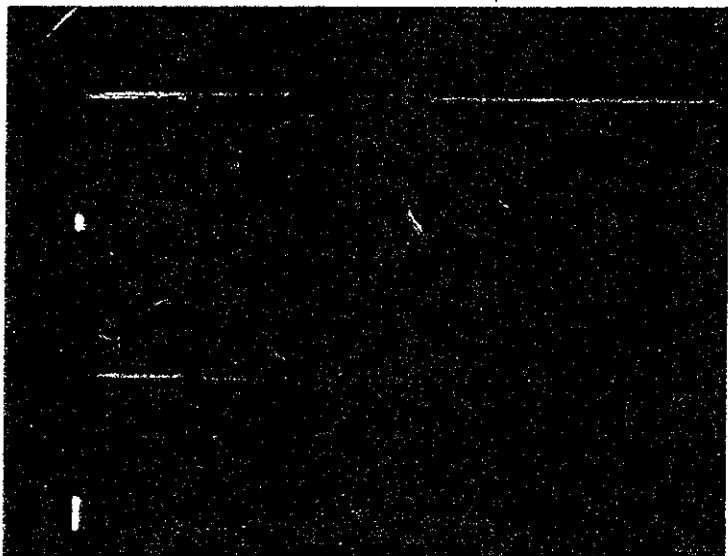
P17

1A  
2  
1A  
1B  
2  
1B  
1



P21

1A1  
1B1  
1A2  
1B2



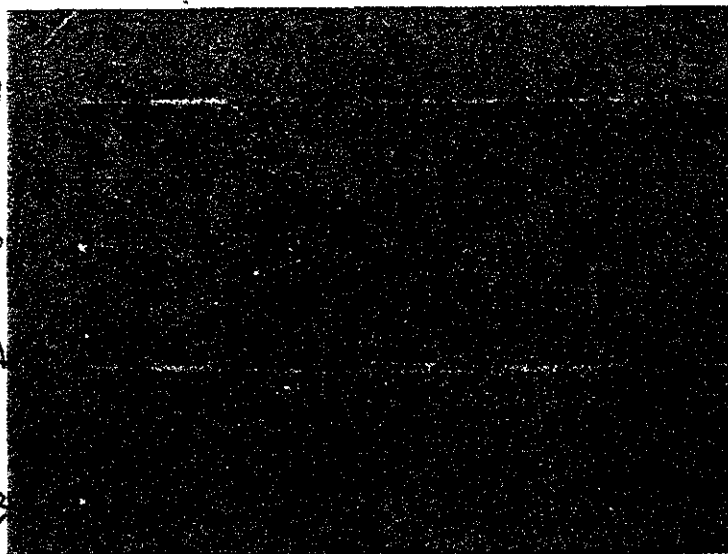
P19

3A  
2

3B  
2

3A  
1

3B  
1



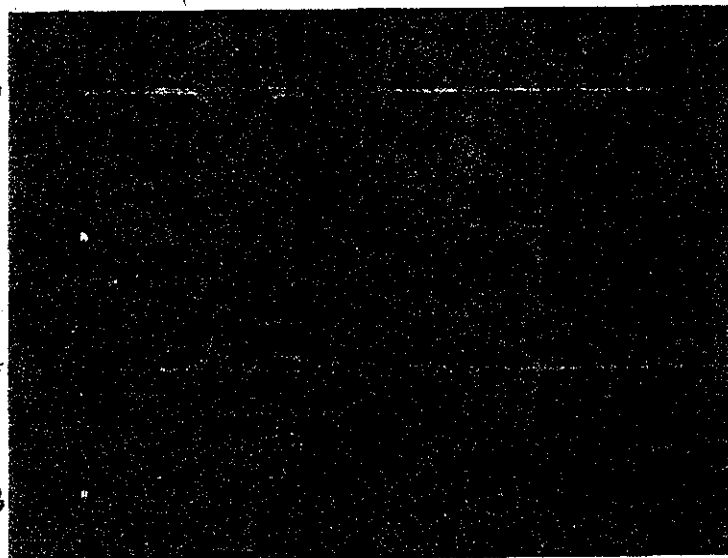
P22

3A  
2

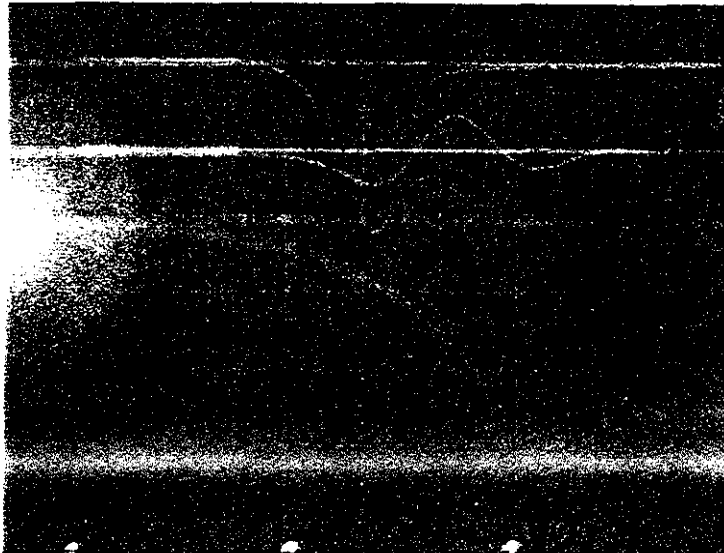
3B  
2

3A  
1

3B  
1



P22

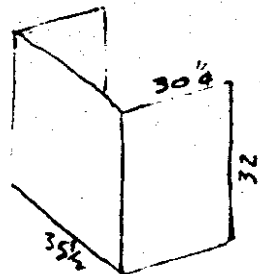


P22



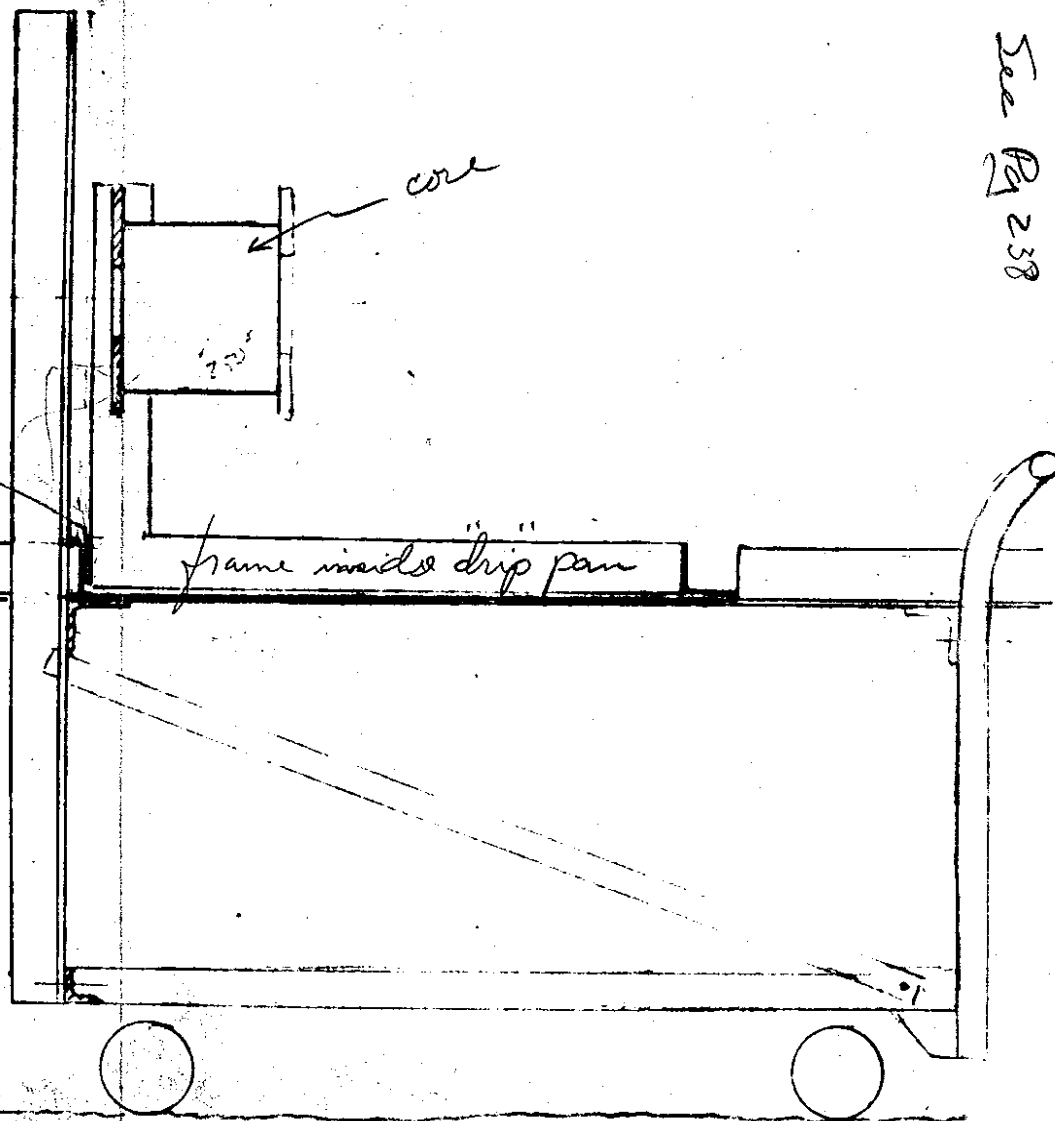
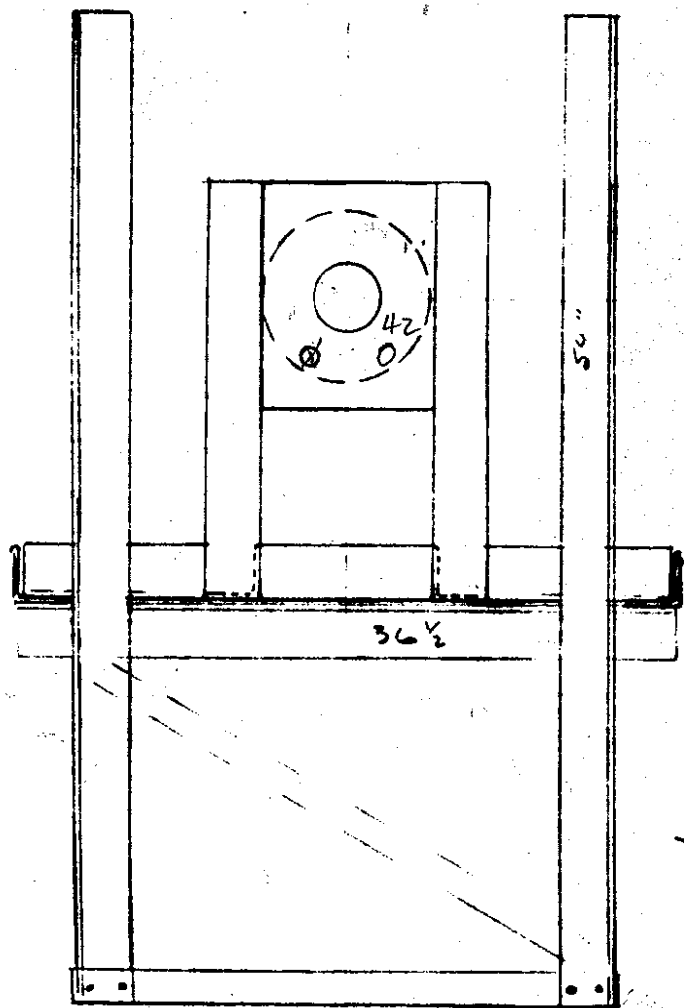
See Pg 238

Frame used to remove  
piece of bolt # 42



$$\begin{array}{r} 13\frac{1}{2} \\ 8 \\ \hline 13\frac{3}{4} \end{array}$$

$$\begin{array}{r} 42\frac{3}{4} \\ 13\frac{3}{4} \\ \hline 28\frac{1}{4} \end{array}$$



See Pg 238

	MA	Pette	Log N =
(150)	8.466	14.18 $\phi$	
(151)	8.466	14.17	
(152)	8.466	14.18	
(153)	8.466	14.12	
(154)	8.466	14.09	

March 28 (at O.D.)

A space between the top of core, and the support ring ears was observed and measured with a feeler gage: @ bolt #44 space .025+, @ bolt #14 space ~.015 .015, did not attempt to measure space @ bolt #58.

Bolts were re-torqued to 25 ft lbs - bolt #44 approx 120° movement, bolt #14 ~ 90°, bolt #15 ~ 40°, bolt #54 ~ 15°, bolt #65 ~ 8° - (these bolts are only one accessible to standard type torque wrench)

Bolts on vertical support rods (holding up support ring with ears) were <sup>only</sup> slightly tighter than finger tight - nut @ bolt #44 turned ~10° before being tight, nut @ bolt #14 turned ~5°, & nut @ #58 turned ~10° -

Will attempt to re-weld broken head to special torque wrench & continue torquing.  
2/2/4

BOLT MEASUREMENTS

BOLT MEASUREMENTS		actual length at instant bolt.	
# 44	+58	9.274	9.278 micrometer = -0.004
# 15	+45	9.261	9.265
# 14	38.5	9.254	9.258

Bore Scope inspection of fuel: Very little  
conclusive observations were made.

New wrench altered for torquing assembly.  
Retorqued all bolts  
#14 = 20°; 15 = 30°; 42 = X; 44 = 0°; 54 = 50°;  
65 = 50°; 58 = 60°; 23 = 135°; 63 = 150°.

Situation concerning SB rubbing: As best  
can be observed the SB is rubbing  
~~at~~ and the West side of the core at  
least near the bottom. Some of the  
"rippling" appearance on SB near center  
is being "smoothed" due to rubbing.

SAFETY CHECK						
DATE	28 Mar 67					
TIME	3:55	AM	BY	TAYLOR-HYND-WATSON		
CHANNEL	A	B	C	D	E	F
RANGE	10/100	OPR	h-20	10/100	900	750
SOURCE DIST.	✓	✓	✓	✓	✓	✓
% F. S. TRIP	✓	✓	✓	✓	✓	✓
BLDG. ALARM	✓	✓	✓	✓	✓	✓
AUX CTRS.	✓	✓	✓	✓	✓	✓
SOURCES USED	M226 #6			MAGNETS		
TABLES	✓	✓	✓	AREA CLEARED		

Reactor OK.

(155) Reactivity check after tightening bolts etc.  
BR out

1601 SB in 11.576

MA in 8.467

RR 4.676

RR 2.800  $\infty$

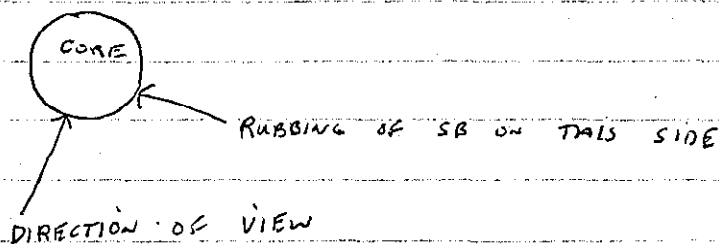
shuttle	Log N
+ 22.6 #	+ 21.2 #
14.2	14.2
8.4	

29 Mar 67

All rods out. Run SB in for <sup>BORESCOPE</sup> inspection of same at in position.  
Sufficient "poppers"; trips, sources, etc involved in this situation. Red light on.

SB rubs over the entire stroke of the traverse on the West side of the core.

## OBSERVATION WITH TELESCOPE



SAFETY BLOCK BULGED ~ 25 mils on each side in middle

SAFETY BLOCK APPEARS VERTICAL WHEN OUT AND WHEN PARTIALLY IN

THICK PLATES	TOP RIGHT		TOP LEFT	35 TO RIGHT
	0			30
	20	tilt		
	30	" "		-
	35	" "		0
	45	" "		0
	40	" "		0

224

NOW OBSERVING IN DIRECTION OF RUBBING

SAFETY BLOCK BULGED IN MIDDLE ~25 MILS

BOTTOM OF BLOCK TO LEFT BY 20-25 MILS WITH

BLOCK PARTIALLY INSERTED

WITH BLOCK OUT LEFT SIDE TOP APPROX 15 MILS TO RIGHT

TOP PLATE LEFT SIDE 0

0

30 MILS TO LEFT

25 MILS

25

35 TO LEFT

BOTTOM OF CORE HORIZONTAL

caliper meas. of SB. @ TOP = 4.002"

± = 4.039"

BOTTOM = 4.005"

also  
ref P

30 March 67

Removed Safety Block and drive,  
nothing obvious causing misalignment.

Looking in Safety Block hole, found the  
center plate to be cracked at SE + NW  
thermocouple insert holes.

Bolts torqued to 30 ft. lbs.

# 58 = 155°	# 44 = 20°	# 15 = 5°
23 = 25°	54 = 10°	14 = 15°
63 = 15°	65 = 15°	

13:45 Established: TOP OF CORE IS LEVEL.

BOTTOM OF CORE IS LEVEL.

Removed SB from s. steel holder. Some "blistering"  
near above threads. Threads look to be in  
pretty good shape. The SB "allen head holding  
screw" was loose when removed. The S.B.  
was not all way hand tight. Lacked  
 $\frac{1}{4}$  turn. Making new recess in s. steel  
so that handtight situation exists when  
allen head screw is into ~~same~~ <sup>new</sup> recess.

Vertical marks (which correspond to same  
S.B. position <sup>rubbing</sup> marks) were found on the  
2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> piece from the bottom  
of the core.

also  
ref B92-19

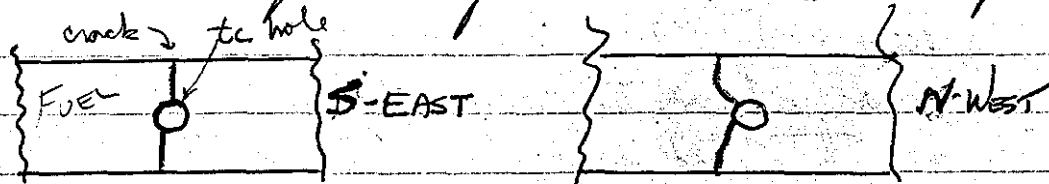


Entire SB & magnet assembly inspected, cleaned, all screws were still tight. It is being re-assembled.

Had photographer over ~~to~~ to take pictures of the inside of the SB and the inside of the core (particularly to show cracks in center fuel piece).

31 Mar 67 Photographer cont above.

cracks in  $\phi$  plate as follows: (On I.D. surface i.e.)



caliper meas: Hanger <sup>OD</sup> Vs Core ID

OD of S. steel hanger = 3.038"

clearance between hanger and

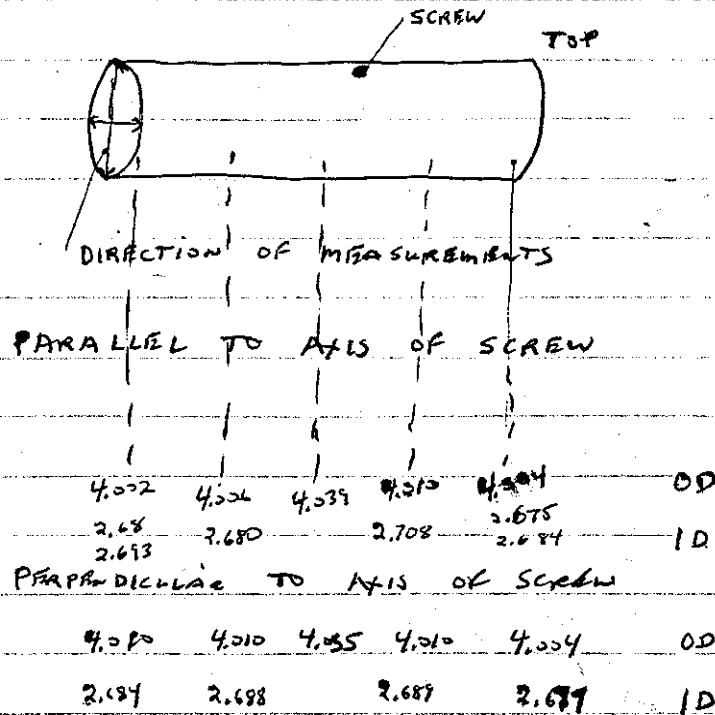
the core: West = 0.568"

East = 0.581"

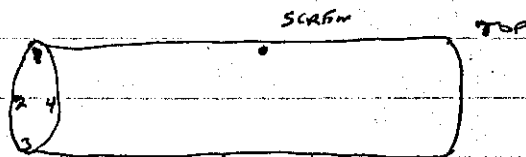
South = 0.599"

N = 0.543"

DIMENSIONS OF SAFETY BLOCK



LENGTH



see pg 233

1	8.874
2	8.870
3	8.883
4	8.887

also ref pg 2-33

Caliper meas. of fuel discs ID:

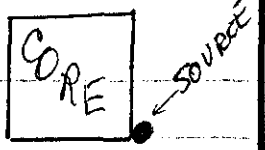
		one person	another person		
#22	BOTTOM PLATE	4.217"	4.220"		
#4	2 <sup>ND</sup> from Bott.	4.165 (4.169)	4.240	at bott. edge	in/2 thru
#5	3 <sup>RD</sup> from Bott.	4.147	4.183	4.172	at top edge
#16	4 <sup>TH</sup>	4.112	4.124		1.15
#6	5 <sup>TH</sup>	4.153	4.138		6.37
#1	6 <sup>TH</sup>	4.190	4.196		2.31
		avg 4.163	avg 4.182		

Safety Block and Magnet assembly has been reassembled. The SB now (by observation) & (as per bott. page 226) appears to be almost centered.

Made adjustments to allow 3 of 3 SB lites.

SB in lite now = 1.524

Source comparison check (5 min ct.)  
all rods out & SB out



in/sec  
this date:

		RFs ①	②	③	FC ①	②
1.15 x 10 <sup>6</sup>	M-228 PoBe U. (1.9 x 10 <sup>6</sup> m/sec)	198	345	395	1267	2175
6.37 x 10 <sup>5</sup>	Small TSF (K-387) (6.37 x 10 <sup>5</sup> m/sec)	123	198	261	637	1180
2.3 x 10 <sup>6</sup>	APR PoBe (1 curie) (2.3 x 10 <sup>6</sup> m/sec)	346	604	694	2379	4275
	Background count	40	72	79	15	37

Put Safety tri-pod back into position.

DATE		SAFETY CHECK					
TIME	11:20	AM	BY	TAYLOR - LYNN - DICKINSON - WATSON			
CHANNEL		A	B	C	D	E	F
RANGE		10000	OPP	517	10000	900	750
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓	✓	✓	✓
AUX CTRS.		✓	✓	✓	✓	✓	✓
SOURCES USED	M226 & J	MAGNETS		✓			
TABLES	✓	LIGHTS		✓			
		AREA CLEARED		✓			

Photo OK.

(156) BR out

(156) vs (155)

11:43 SB in 2 of 3 (-1) 11.520

MA in 8.468

RR 4676  $\rightarrow$  rhette +24.39<sup>+</sup> Log N + 25.9 (5)

Now make several SB SCRAMS (to check reproducibility and also core alignment rubbing potentials)  
Use "Dog" as SCRAM device. Use "AOLE" past time (15

(157-1)

	Rhette	Log N	MA	SB	RR	BR
	+15.328 <sup>+</sup>	+15.69 <sup>+</sup>	8.468	11.520	<del>3.968</del>	out
-2	<u>14.753</u>	<u>15.57</u>	8.468	✓	3.969	}
-3	15.311	15.84	8.477	✓	✓	
-4	15.565	16.07	8.476	✓	✓	
-5	14.914	15.71	✓	✓	✓	
-6	14.916	15.85	✓	11.524	✓	
-7	15.347	15.71	✓	11.522	✓	
-8	15.698	16.18	✓	✓	✓	
-9	15.677	16.64	✓	✓	✓	
(157-10)	<u>15.805</u>	<u>16.90</u>	✓	11.520	✓	

(15

(15

3

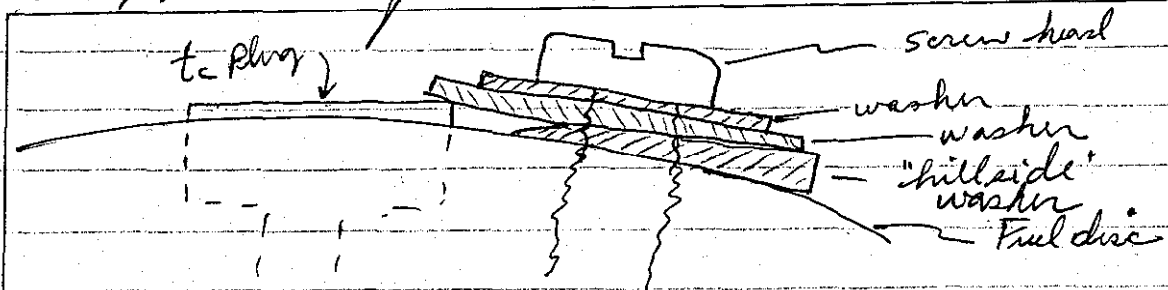
all bolts torqued 5° additional degrees  
for the 30 ft. lt. now being used.

now run MA out & in for reproducibility  
checks

	Rhoets	Log W	MA	SB	RR	BR
(158-1)	16.232 $\phi$	+16.69 $\phi$	8.477	11.520	3.968	out
-2	16.167 $\mu$	17.03	8.467	✓	✓	}
-3	16.303 $\mu$	17.23 $\phi$	✓	✓	✓	
-4	16.295 $\mu$	17.10	✓	✓	✓	
-5	16.254	17.03	✓	✓	✓	
(158-6)	16.221	17.03	✓	✓	✓	

(159) Same as (158-6) but run MA traverse.  
8.467 to 0.124 dial readings.  
TOTAL WORK FROM CURVE = -1.68

3 Apr 67 1 R/hr @ 14" from SB.

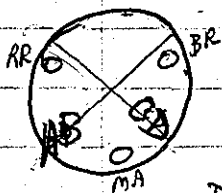


Design "hold in" screws as above to equalize  
pressure on each side of screw.

Discussion of the removal of the U-Mo Bolt which is galled. (Bolt #42).

4 apr 67. Removed enough gauges, etc. to enable removal of entire core from reactor frame onto "elevator table."

5 apr 67 Borrowed a 0.265" dia x 36" long bore scope from O. J. SMITH - BLDG 2000



Measurements by micrometer of the O.D. of the plates (top & bottom).

DISC # →	#8	#9	#1	#6	#16	#5	#4	#22
Position →	1	2	3	4	5	6	7	8
TOP A	8.916"	8.904"	8.899"	8.885"	8.859" 8.861"	8.878"	8.882"	8.895"
BOTTOM B			8.888"	8.872"	8.862"	8.882"	8.897"	8.903"
TOP C	8.917"	8.902"	8.900"	8.884"	8.899"	8.873"	8.880"	8.896"
BOTTOM D			8.887"	8.875"	8.892" 8.922"	8.878"	8.891"	8.901"

ref also 2-21

all bolts originally

15 mil rise in outside 2 1/2" of ear by RR + same for MA. <sup>DTM</sup>  
up as a disc



Boroscope observation shows entire area inside the thermal plug holes to be "cruddy". The crack on one side appears to extend from disc I D out to the thermal plug hole offset. Crack on other side appears to extend about 1/4" out.

6 Apr 67 Measured bolts. Core on hoist via I bolts.

All bolts originally measured 9.495 ± .001" as per Eddy Maysma.	#63 = 9.568" - 9.569"		.074"
	#23 = 9.556"		.061"
	#58 = 9.565"	9.563	.070"
	#65 = 9.570" - 9.568" - 9.572"		.075"
	#54 = 9.556"	9.554	.061"
	#44 = 9.554"		.059"
	#42 = still 1/2" out & "gaulled."	9.585"	.090"
	#15 = 9.559"	9.557	.064"
#14 = 9.555"	9.554	.060"	

Core ht:

- @ RR = 7.973"
- @ BR = 7.967"
- @ MA = 7.963" . avg 7.967"

ACTUAL STRETCHING

S.B. ht or length:

- @ screw = 8.577"
  - 180° of screw = 8.572"
  - 90° c/w screw = 8.577"
  - 90° c/cw screw = 8.575"
- Aug 8.575"

#22  
8  
'895"  
'903"  
8.896"  
8.901"  
7.57M



6 Apr 67 Belts before final heat treatment  
(not in core)

7881-29-0064 = 9.496" long

40 = 9.495"

57 = 9.495"

41 = 9.495"

56 = 9.496"

43 = 9.496"

13 = 9.494"

66 = 9.494"

55 = 9.495"

59 = 9.495"

Plates

0003 = 8.905" diameter

= 8.903" "

10 = 8.905" "

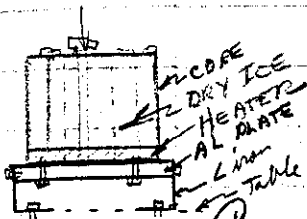
= 8.904" "

" 07 = 8.905" "

= 8.905" "

PoBE h-387 is inside MA hole at all times for 235  
below experience.

7 Apr 67 Observation of MA shows it to be  
one continuous but small bow.  
The BR shows to be bent in  
an overall S (ess) shape. Just visible.



Core is bolted on  $\frac{7}{8}$ " thick al plate and  
bolted to angle iron which is in turn bolted  
to the horizontal table. Al plate is  
 $\approx 1\frac{1}{2}$ " above table surface.

10:45 BF<sub>3</sub> # 3 avg 1 minute count = 473  
Heater element added to 180° of bottom plate  
circumference. Not turned on.

10:58 BF<sub>3</sub> # 3 avg = 474

13:06 Added dry ice to 90° of circumference at bolt  
in question. dry ice = 1" thick x  $6\frac{13}{16}$  ht x 90° arc.  
BF<sub>3</sub> avg = 571

13:52 all bolts and discs (except bottom disc) which  
is in dry ice area are frosting ID & OD;

14:03 Turned heater on - Keeping dry ice on also.

14:20 Started tightening the bolt. Two people on  
the end of an 8 ft. rod while another  
leather hammers the bolt.

40 ~~10~~

40 ~~10~~ 2 loud snap sounds

40 ~~10~~ 1 snap sound

40 ~~10~~ 1 snap

-cont next pg-

- 40 ~~100~~ 1 loud snap sound.
- 60 ~~150~~ 1 very loud
- 40 ~~100~~ 1 loud
- 20 ~~50~~ —
- 40 ~~100~~ 1 snap
- 8 ~~50~~ strong effort

15:5

10 At

Bolt broke leaving  $2\frac{1}{8}$ " of threads in the die.  
 The break is clean. A permanent 5° bend  
 was left in the 8 ft.  $1\frac{1}{4}$ " OD  $\pm$  1" ID; S. Steel rod.  
Estimate of torque for break = 1500 ft. lbs.

11 ag

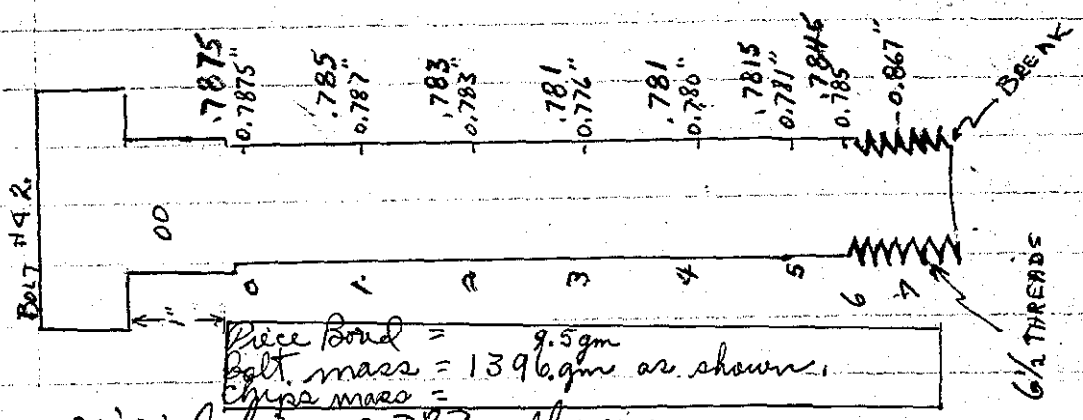
O.D. =  
0.062"

14:27 Dry ice gone, heater still in place (not on).  
 BF<sub>3</sub> avg ct = 490

13:55 Noticed an additional crack in center plate  
 on one of the other two holes (apparently small).  
 Crack could be seen amongst the frost.  
 This makes an apparent 3 cracks in dies.

DISE 16  
@ NE

15:30



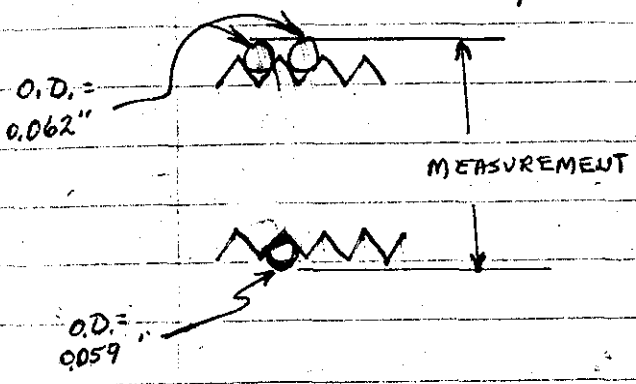
red measured  
19 Apr 67

original dia. = 0.787 all way.

15:58 Bolt reads 2 r/hr max. at surface with "cutie pie".

10 APR 67 3860 min BF<sub>3</sub>#3 ct = 510 cpm. Same conditions as 7 apr 67 @ 14:27 hrs.

11 apr 67 Measurement of V-Mo bolt threads:



BOLT #	NEAR BOTTOM	@	NEAR TOP
66	0.941"	0.944"	0.943"
13	.940	.941	.941
56	.940	.941	.9415
41	.940	.940	.941
57	.9407	.940	.9406
40	.9366	.9375	.9378
64	.9406	.940	.9409
43	.9399	.940	.941
55	.9395	.941	.9413

BROKEN BOLT #42

- 2<sup>nd</sup> valley from top = 0.942"
- 4<sup>th</sup> valley from top = 0.9436"
- 5<sup>th</sup> valley from top = 0.942"

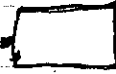
19 apr 67

Taps for bottom plate  
measured taps: Same method as bolts:

TAP #	near bottom	@ center	near top
1	0.940"	0.941"	0.940"
2	.9404	.9404	.9404
3	.941	.941	.941
4	.9407	.941	.941
5	.9427	.942	.941
6	.940	.941	.938
7	.941	.941	.941

Litman & Phillips looked at broken bolt #42,

12 apr 67 Had photo made of broken bolt.  
Bolt #13 "sent out" for heat treatment.  
Moved core back into "elevator table".

13 apr 67 Core = 1 Rln @ 6"  from side &.  
SB = 1 Rln @ 8" @ side & &.

3' x 3' x 3" stainless steel pan smeared, clean.  
17 apr 67 "Mounting framework" for core completed.  
To be used while drilling out bolt piece #42.  
See drawing on Pg 219. Removed core  
from elevator table and bolted it to the  
said framework.

Jim Withen leaving Aberdeen to join Carbide.  
Frank Durbyoski replaces him.

BF3  
10  
22  
cur → 01



14:30 Using a larger drill.

14:35 BF<sub>3</sub> #2 = 295

15:00 Stop for day. Sealed the pan and core with plastic and tape. Put all blotter paper, etc. in plastic bag. Few chips were picked up from area. W.P. ~~surf~~ survey shows OK.

15:10 Put core just inside room 908.

BF<sub>3</sub> #2 = 1276 (core near counter)

19 Apr 67

07:30 Spread blotter paper and moved core back outside for more drilling. Hole now getting close to plate hole threads. Tried to chip out a segment of 1<sup>st</sup> thread - no good.

10:30 Coit the chip out efforts as well as tapping a little at a time. Beginning to be able to chip pieces of threads.

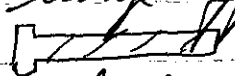
10:35 BF<sub>3</sub> #2 = 329

10:50 Crew left for lunch. Will tap all way thru after lunch.

11:50 Tapping little at a time

12:10 Tapped rest of problem piece out. Cleared the plate hole and then tapped it 4 mils larger than before.

Tried #13 bolt into bottom and is apparently OK.

Examination today shows bolt #42 to be cracked badly. (definitely was not visible before now). A spiral crack from large offset of bolt to the bottom.  4 ~~bolts~~ spirals.

Bottom also cracked 3 ways. See Pg 236 in red pencil the new dia. meas. this date.

#13 Bolt measures  $-38 \text{ mils}^{\text{=0}}$  for W.C.T. micrometer.  
O-length = 9.494" (see top pg 241 for other)

14:30 Core back onto normal reactor frame.

Bolt #13 dia meas. as pg 236

pos #00 = 0.889" ; #0 = 0.787, 1 = .787, 2 = .787, 3 = .787  
4 = .787, 5 = .787, 6 = 0.787, 7 = .8645"



Fuel dice #5 which is immediately under #16 (C. piece) has a new discovered crack which appears to extend down from one of the cracks on #16. Pictures shows this plainly #74439

Picture was made of bolt #42

Some people (other than NPD people) involved in bolt removal: Joe Cavanaugh, <sup>for man</sup> Chambers, <sup>mechanic</sup> Davis, Eddie <sup>material</sup> Marjans, Eddie <sup>HP</sup> Roberts, <sup>Safety</sup> Bill Mee.



242

MICROMETER CALIBRATED: 9.2160" = 0 on DIAL before each and/or any bolt measurement.

# 44	reads + <sup>57.0</sup> 58.5	which is actual length = 9.554"
# 13	- <sup>37.0</sup> 38.0	← this is zero or 9.494"
# 15	+ <sup>46.0</sup> 46.0	9.559"
14	+ 39.0	9.555"
54	+ 40.5	9.556"
65	+ 65.0	9.570"
58	+ 50.0	9.565"

Bolts torqued to 30 ft. lbs. each.

#14	5°
54	5°
65	10°
58	20°
63	5°
23	5°
13	new bolt

Pictures of inside of core made.

20 Apr 67 I & C working with instrumentation of APR.

21 Apr 67 Sandra Van is on its way back to Sandra.

		SAFETY CHECK					
DATE	21 Apr 67						
TIME	14 <sup>30</sup> hrs	BY TAYLOR-LYNN-DICKENSON					
CHANNEL		A	B	C	D	E	F
RANGE		$^{10}/_{100}$	OPR	6-18	$^{10}/_{100}$	900	750
SOURCE DIST.		10"	✓	18"	2"	✓	✓
% F. S. TRIP		✓	—	—	✓	✓	✓
BLDG. ALARM		✓	✓	✓	—	—	—
AUX. CTRS.		✓	✓	✓	—	—	—
SOURCES USED	Ma26 & h					MAGNETS	✓
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓	✓

Safety tri-pod in place. Some gauges back on.  
 Thermo-couples back in and ready for  
 low power run. No runs actually made.  
 Fusion sample hole (S.E.) is empty.

DATE	SAFETY CHECK					
TIME <u>8:45</u>	AM		BY <u>TAYLOR-HYUN-DICKENSON</u>			
CHANNEL	A	B	C	D	E	F
RANGE	$\frac{1}{1000}$ OP	2-17	$\frac{1}{1000}$	900V	750V	
SOURCE DIST.	✓	✓	✓	✓	✓	✓
% F. S. TRIP	✓	✓	✓	✓	✓	✓
BLDG. ALARM	✓	✓	✓	✓	✓	✓
AUX CTRS.	✓	✓	✓	✓	✓	✓
SOURCES USED	M226 & A			MAGNETS		✓ 35V.
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

1 R/hr 6" from SB & to shell of cutie pie.  
 2 R/hr 4 1/2" from Core to shell of cutie pie.  
 1 1/2 R/hr 0" from Batt 4 & to shell of cutie pie.  
 Having trouble with  $\mu$  ammeter at APR console.  
 PN-31 on APR drive @ 1.32 m/sec ( $\times 10^5$ ) today.

13:30 ammeter ready to go.

(160) Power runs for Safety Channel calibration J&C.  
 BR out

13:34 SB in (3 of 3) 11.507

MA in 8.467

RR 3.559  $\sim$  (very slight neg).  $L_m = 0.040$

-Holding - Cannot go in with RR.

Problem corrected 14:08 hr.

$\rightarrow$  C = 1.25 @ 61

A =  $\frac{1000}{100}$  @ 84

D =  $\frac{1000}{1000}$  @ 46

(161) Change chamber poly from  $1\frac{3}{16}$ " to  $5/16$ " thick.

BR out

SB 11.506 in

MA 8.465 in

14:40 RR 3.604  $\rightarrow$  slight neg.  $L_n$  0.040

(162) Add  $1/16$ " poly. =  $3/8$ " thickness around chamber.

BR out

SB 11.510 in

MA 8.465 in

15:08 RR 3.592

SCRAM - PLANNED.

$C = k-25 @ 61$  Core to  $C = 172$ "

(163) BR in

SB 11.513 in

MA 3.438

RR 3.192

- 3.2¢

Power level  
relation pg 299

$L_n$  0.040

1.5 watts

reactor to  $L_n = 256$ "

J&C.

246

DATE		SAFETY CHECK					
TIME	0900	AM	BY TAYLOR-LYNN-DICKENSON				
CHANNEL		E	C	D	E	F	
RANGE		$10/1000$	OPR	K-17	$10/1000$	900V	750V
SOURCE DIST.		✓	✓	✓	✓	✓	
% F. S. TRIP		✓	✓	✓	✓	✓	
BLDG. ALARM		✓	✓	✓	✓	✓	
AUX CTRS.		✓	✓	✓	✓	✓	
SOURCES USED	M226 & h					✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓	✓	

Make neutrons for I & E people.

(164) BR in

09:06 SB in 2073 11.513

MA 3.190

RR 4.000

- 0.5  $\phi$

09:42 On APP SERVO  $L_n = 0.034$

10:40 SCRAM VIA (ABLE) PHANNED  $h_n \neq 0.065 \approx 15^{\text{th}}$  PERIOD

Scram "A" @  $\approx 140\%$  full scale

13:00 Reduced sensitivity of A & D for next runs.  
More inst. & power level calibrations.

(165) BR in

13:26 SB in 11.313

MA 3.190

RR 4.300 (on servo)

15:15 MA out some and back in few times:  
 checking the "20<sup>th</sup> period inhibitor" (one  
 channel is disconnected),  
 1<sup>st</sup> try  $\approx$  20 sec period  
 2<sup>nd</sup> try  $\approx$  13 sec period  
 3<sup>rd</sup> try  $\approx$  10 sec period available but inhibitor  
 held near 20 sec.

15:32 "shut down" for purpose of preparing for  
 higher run.  
 Detector situation as in run # 78.

15:45 D out of circuit - E out of circuit (trip).  
 A moved from long hall to in front of J. E. shop.

(166) BR in

15:57 SB in

MA

RR 3,500

16:13 SCRAM planned via temp te APR console.  
 Bldg. alarm "A" & "B" out of trip circuit for run  
 and "C" was tripped.



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## INSTRUMENT READOUT RELATIVE TO POWER LEVEL

SERVO DEMAND	A	C 172"	**D 245"	E	F	LW 256"	APR POWER (WATTS)
(165) $1 \times 10^{-8}$ 50	$\frac{100}{500}$ 45	H-25 45	$\frac{100}{1000}$ 50	900V-0	750V-0	0.038 ✓	1.5
$3 \times 10^{-8}$ 50	$\frac{1000}{200}$ 34	H-28 63	$\frac{1000}{200}$ 77	900-4	750-0	0.11 ✓	4.0 ✓
13.5 $1 \times 10^{-8}$ 50	$\frac{100}{500}$ 46	H-25 46	$\frac{100}{1000}$ 51	900-0	750-0	0.038	1.5
(166) $1 \times 10^{-7}$ 43	$\frac{1000}{500}$ 38	OFF SCALE	$\frac{1000}{1000}$ 42	900-11	in-hall 750-4	0.24	10
16:05 $1 \times 10^{-6}$ 35.5	$\frac{1000}{500}$ * 48	OFF Scale	TRIPPED OUT OF circuit	675-6	* 750-1	1.5	100
26 apr 67 (167)	$\frac{10}{500}$ 20	—	—	675-2.5	—	1.1	100 ?
$3 \times 10^{-6}$ @ 60	$\frac{100}{500}$ 25	—	—	675-10	700V = .4	3.7	500
<del><math>2 \times 10^{-6}</math> @ 60</del>	$\frac{1000}{500}$ 10	—	—	—	625V = 1.0	11.7	3000

\*\* Dog is out of its pig lying on the floor wrapped in 51 mils of cd.  
 Charlie normal  
 Lynn normal

\* Set up as in run #78

(151)

2"

75V)



250

26 April 67.

(168) Neutron Generator Check.

13:15 "A" + "E" now in trip circuit, other inst. as 167.

SB = 11.510 in

MA = 8.464 in

RR = 4.212

← BR = out

Removing Source (APR)

≈ -9.0¢

Removing Fission Chambers ≈ -1¢

Probably should read 3.712

(169) withdraw MA + RR to get -80.2¢

SB = in

MA = 5.164

RR = out

BR = out

-80.2¢ Little

13:55 SB = out

14:18 SB started in

14:22 SB in - Small indication on "C" only.  
(L-19 (5 div.))

(170) 15:00 SB in

MA 5.164

RR out

BR out

15:09 SB out

15:18 SB in Fine generator. "C" only shows (12 div.)

A <sup>10</sup>/<sub>50</sub> shows 2.2 div. increase

15:22 Test N<sup>GEN</sup> all rods out "C" pipe = 8 dir.

(171) B.R. out

15:30 SB in

MA in 8.464

RR 3.672  $\rightarrow$  Source & FISS. Ch's. out.

Now get<sup>2</sup> - 50¢ as per rhwetter.

BR out

SB in

MA 6.334

15:46 RR 0.796  $\rightarrow$  - 49¢ 52¢ from curves

15:50 SB out

16:00 SB in Fine N<sup>GEN</sup> "C" gave 7 dir. pipe.

27 Apr 67. Source check APR ( $2.0 \times 10^6$ ) all 2 min. cts.

		avg = 3.6	Bkg. SUBTRACTED
① No Source in room 108	34-38		
② APR Source on drive exposed.	4635	463.5	4599
③ Source Withdrawn 280-250-326			
	256-279-258-296	278	242
④ Plexiglas added under the Source pig (fill 6" gap). Also 4" x 4" x 6" plexi on one side. 201-186-206-207			
	163-142-194	186	150
⑤ Add 1/2" board under Frame plate 7 cts avg			150
⑥ Remove 4" x 4" x 6" from Side of ④ = 7 cts avg			149

Returned to DOSAR, 5 extension cables after having them "green tagged".

N<sup>GEN</sup> test are being made.  
Still experiencing trouble with timer (APP)

28 Apr 67 Cont. of N<sup>GEN</sup> & timer checks by J & C <sup>people</sup> ~~person~~ all.

DATE	1 May 67						SAFETY CHECK					
TIME	1:15			AM				PM	BY TAYLOR-BYNN-DIXONSON			
CHANNEL	A	B	C	D	E	F						
RANGE	1000 DPP		L-17		1000 DPP		750V					
SOURCE DIST.	✓	✓	✓	✓	✓	✓						
% F. S. TRIP	✓	✓	✓	✓	✓	✓						
BLDG. ALARM	✓	✓	✓	✓	✓	✓						
AUX CTGS.	✓	✓	✓	✓	✓	✓						
SOURCES USED	M226 & d			MAGNETS			✓					
TABLES	✓		LIGHTS		✓		AREA CLEARED					

Chwells OK

"Millitron" wants neutrons for calibrations.

(172) BR in

13:28 SB in

RR 4,000

MA ≈ 3.23

But go down to make inst. checks inside Rim 108.

→ L<sub>n</sub> = 1.0025

"(WITHDRAW)"

Go Back to power.

(173) BR in

SB in

13:51 RR. 4.030 and moving (on Servo.) ~

MA 3.182

13:56 Withdraw So. ●

13:57 Withdraw F.C.'s

14:01 On Servo  $3 \times 10^{-9}$  @ 51 CTV  $L_m = 0.01$

14:19 Shut down "C" = 5.19 @ 61

(171) vs. (173): BR = 11.4  $\mu$  from curves.

2 MAY 67 Millitron still being worked on,  
making Eldorado-7100 Checks via F.C.

(174A) BR out

ELDO-71 SB out

MA in

RR 4.000

F.C. up into bottoms of RR hole touching RR.

Accelerator 1" from <sup># at</sup> center of core on South side.

Start accelerator 14:50 "C" = 1.22 @ 80;  $L_m = 0.002$

Stop accumulation @ 15:40

Restart : 15:45

Stop : 16:20

ch. width: 20 m-sec.

run time = 85 min.

DATE		SAFETY CHECK					
TIME	8:55	AM	BY TAYLOR-HYUN-DICKERSON				
CHANNEL			G	H	F	F	
RANGE	1/1000	OPR	L-17	1/1000	900V.	750V.	
SOURCE DIST.	15"	0"	24"	0"	0"	0"	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M26 & 6			MAGNETS		✓	
TABLES	✓	LIGHTS		✓	AREA CLEARED		✓

Rhoette OK.

(174B) SAME CONF. AS (174A).  $\sigma = H13 @ 65; \lambda N = .0030$

ELDO-71 checks:

Run 5-3-67-APR-SD-A 40 NS CH 30000 PULSING

TO DETERMINE OVER WHAT INTERVAL TO TAKE DATA

PEAK IN 2 - 28

FIRST PEAK DELAYS 2 → 25 THEN SEVERAL PEAK SPANS

TO BUILD UP  $24 \times 4 = .96 \mu\text{m}$

FOR 20 NS/CL CHANNELS

$32 \times 20 = .64 \mu\text{m}$  33 Delayed 50 NS/CL + 10 160 NS/CL WIDE

$.64 + .08 + .14 = .86 \mu\text{m}$

Run 5-3-67 APR-SD-B NO PULSING TO THE COLLECTOR

LUCIFER 10002

Rim 5-3-67-APR-SD-C

BACKGROUND COUNT WITH LOW SOURCE OFF

5-3-67-APR SD D PULSING

COUNT 1100  
1430

PRELIMINARY COUNT

5-3-67-APR SD E

PARTIAL PAINTOUT

5-3-67-APR SD F

S. FINAL PAINTOUT

5-3-67-APR SD G

RANDOM SIGNAL

450 KC TRIGGER

256

3.21

(175) BR out

SB in

1445 RR 4.000

MA in  $\rightarrow$  +13.26  
rhoette

RR 3.960

MA 6.712  $\infty$

make several (+) & (-) periods for comparison  
of Milliton & Rhoette.

Deep SB for value from Rhoette = \$20.01  
Milliton : = \$18.9

DATE	4 MAY 67						SAFETY CHECK						
TIME	10 50		AM	BY TAYLOR-HYNN-DICKERSON									
CHANNEL	A	B	C	D	E	F							
RANGE	1/1000		OPR	L-16	1/1000	900V	750V						
SOURCE DIST.	-	✓	✓	✓	✓	✓							
% F. S. TRIP	✓	-	-	✓	✓	✓							
BLDG. ALARM	✓	✓	✓	✓	✓	✓							
AUX CTRS.	✓	✓	✓	✓	✓	✓							
SOURCES USED	M226 & J			MAGNETS			✓						
TABLES	✓	LIGHTS		✓	AREA CLEARED		✓						

Rhoette OK.

PN (POBe) 31 on APP Source driver

Sent list of ORNL photo numbers of pictures of  
bolt #42 to Litman (4500).

(176) BR in  
 SB in  
 RR out

11:10 MA 4.042  $\infty$

Now make several (+) & (-) runs for comparison  
 of Rhodette-Millicron and Fission Chambers.  
 Conf. of reactor same for all except MA.

Run #	DIAL MA	CTU h N	RHOETTE	MILLICRON	FISS. CH #1	FISS. CH #2
176 A	-	+10.56 <sup>¢</sup>	+10.01 <sup>¢</sup>	+9.71 <sup>¢</sup>	+9.73 <sup>¢</sup>	+9.62 <sup>¢</sup>
B	-	-10.63 <sup>¢</sup>	-10.87 <sup>¢</sup>	-10.45 <sup>¢</sup>	-12.88 <sup>¢</sup>	-12.65 <sup>¢</sup>
C	-	+20.17 <sup>¢</sup>	+18.80 <sup>¢</sup>	+18.17 <sup>¢</sup>	+19.42 <sup>¢</sup>	+19.65 <sup>¢</sup>
D	3.535	-16.98 <sup>¢</sup>	-15.08 <sup>¢</sup>	-14.26 <sup>¢</sup>	<del>X</del>	<del>X</del>
E	4.782	+22.99 <sup>¢</sup>	+21.7 <sup>¢</sup>	+20.62 <sup>¢</sup>	+23.0 <sup>¢</sup>	+21.43 <sup>¢</sup>
F	3.178	<del>X</del>	-25.0 <sup>¢</sup>	-20.95 <sup>¢</sup>	-65.8 <sup>sec</sup>	-68.0 <sup>sec</sup>
176 G	MOV=B SB	<del>X</del>	-106.7 <sup>¢</sup>	-102.1 <sup>¢</sup>	<del>X</del>	<del>X</del>

Continuing to accumulate more data to that  
 already taken as per page 255.

(177) BR out  
 SB in  
 RR 4.000  
 MA 6.712

→ 1" In & Out for ELDO-71 checks  
 VIA. accelerator. i.e. prompt  
 neutron decay measurements.



DATE <u>5 MAY 67</u>		SAFETY CHECK					
TIME	<u>8<sup>20</sup></u>	AM	BY <u>TAYLOR-HYUN-DICKENSON</u>				
CHANNEL		A	B	C	D	E	F
RANGE		<u>1000</u>	<u>OPR</u>	<u>2.14</u>	<u>1000</u>	<u>900</u>	<u>750</u>
SOURCE DIST.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
% F. S. TRIP		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
BLDG. ALARM		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
AUX CTRS.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
SOURCES USED	<u>N<sub>2</sub> &amp; H</u>	MAGNETS				<u>✓</u>	
TABLES	<u>✓</u>	LIGHTS	<u>✓</u>	AREA CLEARED		<u>✓</u>	

Rhett's OK.

(178A) Continue prompt neutron decay measurements. all Fusion Ch. withdrawn. Accelerator reads 7 ramps when on.

Z. Dunn

9:06 BR out  
 SB in 11.512  
 RR 4.000  
 MA 6.744

\$007  
 ["into" 10.00 DIAL] many times for data collection on ELDO-71.  
 $L_n = 0.007$

BF<sub>3</sub> #1 = 245 (x 256) to  
 250 (x 256) over 15 min

C = H18 @ 58  
 A = 1000/500 @ 42  
 D = 100/200 @ 57

(178B) Check of same as above.

BF<sub>3</sub> #1 = steady for  
 12 (40 sec ct) @ 170 ± 2

$L_n = 0.007$   
 C = H18 @ 54  
 A = 1000/500 @ 42 from 44  
 D = 100/200 @ 55 from 57 (10 min)

Accel. reads 13 ramps when on.

11:46 Start new accumulation of data @ 11:46  
 98 runs

13:46 Restart a new accumulation of data.  
 47 runs

(178c) Recheck same as above (178A).

205 to 200 on BF<sub>3</sub>  
 FC = -14000 sec.

$L_n = 0.0070$  from .0075

C = H18 @ 52 from 56

A =  $\frac{1000}{1500}$  @ 47 from 50

D =  $\frac{100}{200}$  @ 59 from 62

10 min

(179) BR out.  
 SB in  
 RR 4,000  
 MA 8.464 in.

$L_n = +14.71\%$

BF<sub>3</sub> 1 = +14.34%

2 = ~~X~~

3 = +14.22%

FC 1 = +14.34%

2 = +14.03

avg = +14.33%

Rhette = +13.87%

(180) BR out.  
 SB in  
 RR 4,000  
 MA out 0.125.

Taking ELDO 71 data.

15:33 SB dropped via APR timer @  $L_n @ .0016$

runs  
 to.

44  
 27  
 10 min

SAFETY CHECK						
DATE	8 May 67					
TIME	8:30	AM	BY TAYLOR-LYNN-DICKENSON			
CHANNEL	A	B	C	D	E	F
RANGE	1000	OPR	1000	900V	750V	
SOURCE DIST.	✓	✓	✓	✓	✓	✓
% F. S. TRIP	✓	✓	✓	✓	✓	✓
BLDG. ALARM	✓	✓	✓	✓	✓	✓
AUX OTRS.	✓	✓	✓	✓	✓	✓
SOURCES USED	M226 d h			MAGNETS		
TABLES	✓	LIGHTS	✓	AREA CLEARED		

Rhette OK.

500  
3.2 E

~ 9:00 Tell Jim about "c" when he arrived.  
 (181) BR in Make neutrons for T&C for checks  
 13:37 SB in 16512 (Small fission chamber is now removed from inside RH hole.  
 RR 3986  
 MA 2.944 → Source Out  
 14:45 Shut down.

(182A) ELDO-T1 BR value

BR in  
 15:15 SB in  
 RR 4000  
 MA 2.805 →  
 JUMPERED AS Pg 61 for BR movement.  
 millitor # 095  
 Rhette # 104

40000  
1.6E-7

BR out → Start data 15:26. accel. on @ 314 ramp  
 $L_n = 0.002$ ;  $A = 1000/200 @ 31$   
 F.C.'s and source are out.  
 Stop data 15:58

(182B) Same except double the channel width.

50000  
3.2E-7

Start 15:59

16:05 printed out

16:08 restart data i.e. cont. accumulation.

16:20 Stop data.

DATE		SAFETY CHECK					
TIME	8:15	AM	BY TAYLOR - LYNN - DICKERSON				
CHANNEL		A	B	C	D	E	F
RANGE		1/1000	OPR		1/1000	900V	750V
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓	✓	✓	✓
AUX CTRS.		✓	✓	✓	✓	✓	✓
SOURCES USED	M276 & A	MAGNETS		✓			
TABLES	✓	LIGHTS		✓			AREA CLEARED ✓

Rhette OK

(183) BR out

08:31 SB in 11.514

MA in 8.464

RR 31838

MA out

Small Fusion Chamber is @ & inside the BR hole for ELDO-7 runs. F.C.'s & Source out.

JETHL

2. ←

TRAYVERSE 8.464 to 0.124 in 411 PRINTS

for ELDO Calit.

40000  
1.6E-7

START 08:50

STOP 09:20

262

(184) Make neutrons for I+C to make checks.

BR in

09:36 SB in 3.998

RR 4.000

MA 2.932

On Servo @  $\Delta t = 0.004$

Misc. small variations.

11:00 Shut down.

(185) RR Calibration [Accel. & Eldro]

BR: out

SB: in

Fission chamber in BR hole

RR: in

19 min run

MA = 5.166  $\infty$

RR out for Eldro meas.

50000  
5.7E-7

(186) Neutrons for I+C for Servo Check.

BR = in 1425  $\infty$  Log n @ .0035

SB = in 11.512

MA = 2.900

RR = 4.090  $\infty$

15:45 Shut down

DATE <u>10 May 67</u> SAFETY CHECK						
TIME	<u>0820</u>	<u>AM</u>	BY <u>Lynn Taylor &amp; Dickerson</u>			
CHANNEL	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
RANGE	<u>1000</u>	<u>400</u>	<u>out</u>	<u>1000</u>	<u>900</u>	<u>700</u>
SOURCE DIST.	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
% F. S. TRIP	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
BLEG. ALARM	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>-</u>	<u>-</u>	<u>-</u>
AUX CTRS.	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>-</u>	<u>-</u>	<u>-</u>
SOURCES USED	<u>M-226 + Y</u>			<u>MAGNETS</u>		<u>✓</u>
TABLES	<u>✓</u>	<u>LIGHTS</u>	<u>✓</u>	<u>AREA CLEARED</u>		<u>✓</u>

Rhoetto St.

(187) MA Calibration (Accelerator + Eldro)  
Spiral finism chamber in BR hole.

SB = in

BR = out

MA =  $\frac{1}{2}$  in (8.464)RR =  $\frac{2}{3}$  8.22  $\rightarrow$  0846 Log N = .005

MA out

start 0858 (0932)

stop 0950

(188) BR in RR WORTH VIA ELDO71  
13:16 SB in see #189

RR in

MA 1.340  $\rightarrow$   $L_m = .0095$ Millitron = -0.0354  $\rightarrow$  RR=0.5  $\rightarrow$  7268.5  $\phi$  MILE 70013:34 RR out  $\rightarrow$  69.4  $\phi$  pette~~Start ELDO DATA~~

not run (fusion ctr. not in place)

264

(189) BR in      Spiral fission  $\phi$  in MA hole.

13:54 SB in

RR in

MA 1.340 + 3.31 $\phi$  Source  $\phi$  F.C.'s out.

$\therefore$  Spiral FC worth = 3.31 $\phi$  (ref 188).

MA 1.124  $\infty$

14:10 RR out

14:24 Start EHD DATA

Accel gives  $L_n = 0.0046$

14:40 Stop data

Burst timer and  $N_{GEN}$  checks (not critical)  
(SB-MA-RR out)

(m-sec)	(m-sec)	<i>none</i>	TMC (#)	<i>none</i>
<u>BR</u>	<u><math>N_{GEN}</math></u>		<u>PEAK CH.</u>	
300	100		27	
300	100			
400	100	1	9	34
500	100	1	17	42
900	300	1	32	70
}	}	1	31	-
		1	32	71
		1	31	-
		1	31	-
		2	31	-
		1	31	71
		1	30	72
900	300	2	31	-
900	700	-	3	-
900	700		3	-
900	670			
900	670			
900	670			

*noisy*  
4 4 7 doubtful  
6

Intermittently Sequence A & B would be lost.

(190) BR in

SB in 11.512

MA 1.124  $\infty$  + 0.1  $\phi$ 

RR in 9.079

14:49 Fine BR out  $\rightarrow$  Millitron # -0.966  
 $\rightarrow$  sheet = -1.02 x 9

14:50 Start ELDO DATA COLLECTION ( $\neq$  accelerator)

15:23 Stop

15:25 Shut down

tical  
 RR out

(191) BR out special fusion channel in RR hole @ t.

SB in 11.512 (dial)

MA in 8.464

RR 2.818  $\infty$  - 0.1  $\phi$ 

SB out to 9.966 dial or 2.03" withdrawn from in position  
 sheet = -2.98 Millitron = -2.84

15:47 Start data @ ELDO  $\neq$  accel. @ 21 namps Lm @ 0.0011

16:20 Stop

A



Mihalczko, J.T.  
 Lynn, S.D.  
 Taylor, J.R.  
 Dubyoski, H.  
 Williams, D.

DATE		SAFETY CHECK					
TIME	0825	AM	BY Lynn, Taylor & Williams				
CHANNEL	A	B	C	D	E	F	
RANGE	1000	op	out	1000	900	750	
SCORING DIST.	✓	✓	✓	✓	✓	✓	
PREP. S. TRIP	✓	✓	✓	✓	✓	✓	
BLOCK ALARM	✓	✓	✓	✓	✓	✓	
AUX. DIRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M-226 + K			MAGNETS		✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓	

Photo OK

(192) SB Calibration points (~~≈ \$5~~) ~ \$2  
 Spiral finish in RR hole @ 2

0858 SB in (11.514)  
 BR out [Accel. + E1 dro]  
 MA = in (8.464)

0908 RR = 2.834 ~~0908~~ Log N = .0056

0917 SB = 9.896 Petle = \$-2.108  
 (Withdrawn 1.618") Millerson = \$-2.044

0927 Start > 1:11 Log N = .0014  
 1044 Stop

(193) (Withdrawn 2.91") ~ \$5  
 1046 SB = 8.602

1048 Start > 1:18 Log N = .00072  
 1106 Stop

1116 Start (after accelerator adj. J.T.M)  
 Stop > 1:46

1144 Start  
 1302 Stop

(194) BR out

13:13 SB in 11.512

MA in 8.464

RR 2.860  $\rightarrow$ SB 8.582 dial  
(withdrewn 2.93")

13:28 Shut down

Rhoette =  $\overset{\#}{-4.92}$   
Mulltron = No Print.

(195) BR in

14:09 SB in

RR in (9.078)

MA 1.785  $\rightarrow (+)$ 

spiral fissure ch. now out of hole.

 $L_m = +8.59$ 

Rhoette = +8.03

Mulltron = 7.38 X

BF<sub>3</sub><sup>#</sup> 1 = 8.43

2 = —

3 = 8.36

FC<sup>#</sup> 1 = +8.63

2 = +8.63

8.44

(196) BR in

SB in

RR 5.131  $\rightarrow (-)$ 

MA 1.785

 $L_m = -13.18$ 

Rhoette = -13.09

Mulltron = -12.69 X

BF<sub>3</sub><sup>#</sup> 1 = 15.34

2 = 13.76

3 = 14.45

FC<sup>#</sup> 1 = -14.40

2 = -14.40

-13.94

OK

56

7)

(197) BR in  
 SB in  
 RR 5.131  
 MA 2.634 → (+)

Ly: +6.88  
 Rhett: +6.30  
 Milliron: 5.61 X  
 BF<sub>3</sub><sup>#</sup> 1: 6.74  
 2: 6.63  
 3: 6.59  
 FC<sup>#</sup> 1: +6.84  
 2: +6.88  
 +6.69

(26)

(198) BR in  
 SB in  
 RR 4.088 → (-)  
 MA 2.634

Ly: -6.09  
 Rhett: -6.12  
 Milliron: 6.59  
 BF<sub>3</sub><sup>#</sup> 1: 6.61  
 2: 6.61  
 3: 6.43  
 FC<sup>#</sup> 1: -6.69  
 2: -6.69  
 -6.46

(27)

(199) BR in  
 SB in  
 RR 4.088  
 MA 3.218 → (+)

Ly: +10.08  
 Rhett: +9.45  
 Milliron: 8.61 X  
 BF<sub>3</sub><sup>#</sup> 1: 9.98  
 2: 9.87  
 3: 9.77  
 FC<sup>#</sup> 1: +9.91  
 #2: +9.93  
 +9.85

(28)

MA 6.68 to 5.33 = +20.63  
 5.83 to 5.25 = +16.31  
 5.25 to 4.27 = +31.26

KIC 0 - 3.95 = -22.38  
 3.95 - 4.99 = -13.15  
 4.99 - 7.17 = -27.48

pg  
 267-271

3.52 to 0 = 43.34  
 4.27 to 2.67 = 43.29  
 TOTAL

117 - 8.95 = -11.43  
 out  
 TOTAL = 74.44¢

RR

MA

in 9.078

1.785

+8.44

5.131

X

-13.94

X

2.634

+6.69

4.088

X

-6.46

X

3.218

+9.85

1.908

X

-17.63

X

4.202

+13.63

→ out 0.134

X

+2.20

4.610

in 8.464

+19.34

X

4.940

-24¢

in 9.080

5.798

+13.13

X

4.202

-30.16

(200) BR in  
 SB in  
 RR 1.908 → (-)  
 MA 3.218

Ln = -15.23  
 Rhett = -15.23  
 Millton = 15.46 X  
 BF<sub>3</sub> #1 = 18.77  
 2 = 16.85  
 3 = 17.97  
 FC #1 = -19.70  
 2 = -19.70  


---

 -17.63

(201) BR in  
 SB in  
 RR 1.908  
 MA 4.202 → (+)

Ln = +13.64  
 Rhett = +12.99  
 Millton = 12.07  
 BF<sub>3</sub> #1 = 13.86  
 2 = 14.04  
 3 = 13.50  
 FC #1 = +13.71  
 2 = +13.71  


---

 +13.63

(202) BR in  
 SB in  
 15:25 RR out 0.134 → (+)  
 MA 4.202

Ln = +1.72  
 Rhett = +2.22  
 Millton = 1.49 X  
 BF<sub>3</sub> #1 = 2.20  
 2 = —  
 3 = 2.25  
 FC #1 = +2.34  
 2 = +2.48  


---

 +2.20

(203) Same as (202)  
Five Brent  
(#1,05)

∴ (203) vs (202)

120

Rhett = 102.69 \$  
Milltron = 97.89 X  

---

103 \$

(204) BR out  
15.54 SB in  
MA in 8.464  
RR 4.610 → (+)

Ln = +20.40  
Rhett = +18.28  
Milltron = 17.17 X  
B<sub>3</sub>#1 = 18.98  
2 = 19.23  
3 = —  
FC#1 = +19.52  
2 = +19.62  

---

+19.34

(20)

(205) BR out  
SB in  
MA 4.940 → (-)  
RR 4.610

Ln = 75.2 sec  
Rhett = -23.73 \$  
Milltron = -27.59 X  
B<sub>3</sub>#1 = —  
2 = —  
3 = —  
FC#1 = —  
2 = —

16

-71.2 sec  
-70.8 sec

C  
M

---

23.7 \$

(206) Brent ✓  
 SB in  
 MA 5.798 → (+)  
 RR in 9.080 ✓

Ln = +12.20  
 Photo = +12.68  
 Millers = 11.84 X  
 BF<sub>3</sub> #1 = 13.01  
 2 = 13.23  
 3 = 13.12  
 FC #1 = +13.63  
 2 = +13.57  
 +13.13

(207) Brent  
 SB in  
 MA 4.202 → (-)  
 RR in

Ln = —  
 Photo = -30.16  
 Millers = -30.47 X  
 BF<sub>3</sub> #1 = —  
 2 = —  
 3 = —  
 FC #1 = —  
 2 = —  
 -76.44 X  
 -77.7 X  
 -30.16

16:22 Shut down

Composite Pg 267 thru 271

MA 6.68 to 5.83 = +20.63<sup>4</sup>  
 5.83 - 5.25 = +16.31  
 5.25 - 4.27 = +31.26  
 4.27 - 2.67 = +43.29  
 3.52 - 0 = +43.34  
 can't calc "straight out"

RR 0 - 3.95 = -22.38<sup>4</sup>  
 3.95 - 4.99 = -13.15  
 4.99 - 7.17 = -27.48  
 7.17 - 8.95 out = -11.43  
 TOTAL = 74.44<sup>4</sup>

134

1,34

4

X

1,200  
 -70.8  
 74

DATE <u>12 May 67</u>		SAFETY CHECK					
TIME	<u>0845</u>	AM	BY <u>Taylor, Lynn + Wilhoice</u>				
CHANNEL		A	B	C	D	E	F
RANGE		<u>1000</u>	<u>0yr</u>	<u>out</u>	<u>1000</u>	<u>900</u>	<u>250</u>
SOURCE DIST.		<u>✓</u>	<u>✓</u>		<u>✓</u>	<u>✓</u>	<u>✓</u>
95 F. S. TRIP		<u>✓</u>	<u>✓</u>		<u>✓</u>	<u>✓</u>	<u>✓</u>
BLDG. ALARM		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
AUX CTRS.		<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
SOURCES USED	<u>M 221 + r</u>	MAGNETS		<u>✓</u>			
TABLES	<u>✓</u>	LIGHTS	<u>✓</u>	AREA CLEARED	<u>✓</u>		

(208) SB calibration Bent (~ - \$8.00)  
Accelerator and Eldrs.

Spiral fissure = RR hole (4")

0958 SB in (11.540) ←

BR = out

MA = in (8.464)

RR = 2.864 ∞

Log W = .0085-

0920 SB = 7.504 (ie withdrawn)

Spiral fissure ctr should bent (~30°)  
due to over drive (more than 4") of RR



(209) Repeat (108)

0937 SB = in (11.512)

BR = out

MA = in (8.464)

RR = 2.832  $\infty$   $\log N = .0085$ 

0959 SB = 7.536

29000 GR

Start 10:20  $L_n = 0.0006$ 

Stop 11:17 37

Start 11:25

Stop 13:15 1:50 another run  $L_n = 0.0006$ 

(210) Same but SB @ 6.507 dial (with diaison) 5.005"

Start 13:19

Stop 15:15 1:56  $L_n = .00042$ 

10000 Stop 15:15

Same but EL70 = 20000

Start 15:17

Stop 16:15 2:58  $L_n = .00042$

274

DATE 15 May 67 SAFETY CHECK						
TIME	08:25	AM	BY	Lynne Taylor & Will Woods		
CHANNEL	A	B	C	D	E	F
RANGE	100	opr	Out	1000	900	750
SOURCE DIST.	✓	✓	-	✓	✓	✓
% F. S. TRIP	✓	✓	-	✓	✓	✓
BLOG. ALARM	✓	✓	✓	✓	✓	✓
AUX CTRS.	✓	✓	✓	✓	✓	✓
SOURCES USED	M-224 + R			MAGNETS	✓	
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓	

(211) SB calibration point @ (~#15:00)

BR out spiral fissure ctr = RR. ✓

0840 SB in 11.512 (Accel. + Eldro)

MA in 8464

10000 RR = 2.835 ∞ log N = .0085

0900 SB = 5.192 (<sup>withdrawn</sup> 6.320") ch.W. = 2.0E-8 sec

0905 start log N = .00024

1322 Stop

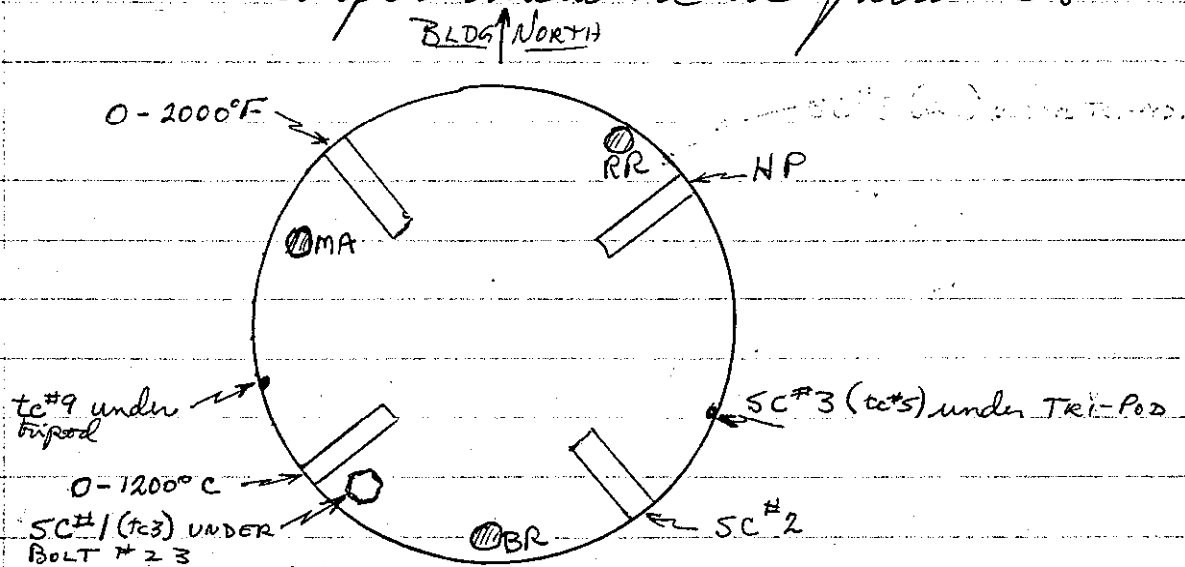
(211B) Same but @ 20000 or 4.0E-8 sec.

1413 start log N = 0.00024

16:14 STOP

16 May 67

- Safety tri-pod installed.
- All bolts torqued at 30 ft. lbs.
- W.C.T. checked accessibility of bolt meas. device as OK. Meas. rechecked as Pg 242.
- Calibrated the Bentley gauges.
- Thermal Couples installed as follows:



- Made APR source shielding checks similar to Page 251. Each number is avg. of 3-2 min. counts.
- |                                  |                              |
|----------------------------------|------------------------------|
| APR Source = 305                 | this no. is less the 38 bkg. |
| Cylinder plug on = 226           | "                            |
| Plug + Pig = 172                 | "                            |
| add 1/2" lead below pig = 170    | "                            |
| add lucite to sides of pig = 180 | "                            |

276

Miholczo, J.T.  
 Lynn, J.J.  
 Taylor, J.R.  
 Dickenson, R.  
 Dabyski, H.  
 Stowe, A.  
 Williams, D.

DATE	SAFETY CHECK						
16 May 67							
TIME	AM		BY				
	PM		Lynn, Taylor, Dickenson				
CHANNEL	A	B	C	D	E	F	
RANGE	$\frac{10}{1000}$	off		$\frac{1}{1000}$	900	750	
SOURCE DIST.	✓	✓	✓	✓	✓	✓	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTES.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M-226 + 8			MAGNETS		✓	
TABLES	✓	LIGHTS		✓	AREA CLEARED		✓

Bentley gauges set. PN 31 (PoBe) on drive.

(212) BR = out

1402 SB in (11.513)

MA in (8.464)

RR = 3.013  $\rightarrow$   $\log N = .01$

1418 withdrawn MA + RR to (-70¢)

1420 SB  $\rightarrow$  out

MA = 5.286

(44¢)

Pitl = -69.8¢

RR = 0.134 (out)

Curves = -63¢

2 Bldg Alarm out "A" + "D" out

1428 SB  $\rightarrow$  in

Burst Rod inserted.

Pitl = 33.75¢

1435 Serum  $\log N = .024$ ,  $A = 61 \frac{1000}{1000}$

P. + L<sub>2</sub>

= 10.85¢

= 37.7¢

Total

Pitl 103.85¢

(213) BR = out  
 14142 SB → in  
 MA in (8.464)  
 RR = 3.074 ∞ = log N = .008

1500 withdrawing MA = 5.643 (-60¢)  
 RR = 0.134 (out)  
 Pitte = -60.16¢

1506 SB → in  
 1510 BR in P = +44.0¢

1511 screamed (107) pushed. log N = .012  
 P<sub>1</sub> + P<sub>2</sub> A = 31.5  $\frac{1000}{1000}$   
 Total Pitte 104.16¢

(214) BR out  
~~1520~~ SB → in  
 MA in  
 RR = 3.~~025~~<sup>087</sup> ∞ = log N = .0082

withdrawing MA = 6.004 (-50¢)  
 RR = 0.134 (out)

1535 SB → out -51.6¢  
 1540 SB → in  
 BR in +52.2¢

1545 scream log N = .0085 A = 22  $\frac{1000}{1000}$   
 BR + SB = -21.04  
 (P<sub>1</sub> + P<sub>2</sub>) Pitte = 103.8¢

278

(215) BR = out

15:50 SB = in

MA = in

RR = 3,064  $\approx$   $\log N = .008$

1604 ~~SB~~ withdrawing MA = 6,523

1605 SB  $\rightarrow$  out

RR = (0.134 out)

1609 SB  $\rightarrow$  in

$P_1 = -40.78 \text{ \textdollar}$

1613 Free BR in  $P_2 = +63.49 \text{ \textdollar}$

$P_1 + P_2 = \boxed{104.27 \text{ \textdollar}}$

DATE 17 May 67		SAFETY CHECK					
TIME	0835	AM	BY Lynn, Taylor, Williams				
CHANNEL	A	B	C	D	E	F	
RANGE	1000	1000	1000	1000	1000	1000	
SOURCE DIST.	✓	✓	✓	✓	✓	✓	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
ALL CRTS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M-226	FX	MAGNETS				
TABLES	✓	LIGHTS	✓	AREA CLEARED	✓		

Pette = OK

78 F

(216) BR = out  
 0908 SB → in  
 MA  
 RR

2 min cts  
 No source - 108 = 68  
 APR Source <sup>withdrawn</sup> in place = 274  
 Extra pig below  
 bonded pig = 194

Withdraw Block  
 Prepare to do Run for I + C, to check source pig.

(217) BR = out  
 10:08 SB →  
 MA -

10:09 - system tripped - APR inst. with one SC out, checking 2<sup>nd</sup>.

10:07 SB = in <sup>11.515</sup>, MA = in <sup>8.466</sup>, RR = 3.007 ∞ Log N = .0085

MA = 7.214  
 RR = 0.134 (out) P<sub>1</sub> (Pette) = -29.62

10:38 SB out

10:40 SB →  
 BR inserted P<sub>2</sub> = +72.80 Log N = .009  
 "A" = 06 <sup>1000</sup>/<sub>1000</sub>  
 P<sub>1</sub> + P<sub>2</sub> = 102.4 F

280

(218) BR = out

10:50 SB in (11.514)

MA in (8.466)

RR = 2.998  $\infty$  Log N = .0085

RR = ~~0.671~~

$P_1$  (Little) = -19.57 \$

11:00 SB  $\rightarrow$  out

SB in

11:09 BR fired in  $P_2$  (Little) = +81.66 \$ Log N = .009

$P_1 + P_2 = \boxed{101.23}$  \$

(219) SB in (11.512) (11:17)

MA in (8.466)

RR = 2.996  $\infty$  Log N = .008

RR = 1.990

$P_1$  Little = -10.41  $\swarrow$

11:46 SB  $\rightarrow$  out

Log N = -~~10.98~~

12:06 SB  $\rightarrow$  in

BF<sub>2</sub>H1 = -11.86

12:09 BR fired in

$\Sigma = -11.28$

$P_2$  (TMC) = +92.33 FC 1 = -10.74

$\Sigma = -11.00$

$P_1$  (Little) +  $P_2$  (TMC)

Average = -~~11.49~~ \$

= 102.64 \$

-11.045 \$



(220) Repeat #218

13:12 SB in (11.514)

MA in

RR = 2.995

Log N = .009

RR = 0.671

$P_1(P_{itl}) = -19.82$

SB → 9.0

SB in

13:33.5 BR fired in  $P_2(P_{itl}) = +81.65$

$P_2$  [TMC = 83,88¢]

$P_1 + P_2 = 101.47¢$

P-32

13:43 SB in

MA in

RR = ~~2.154~~ 2.554

$P_{itl} = -4.86¢$

Log N = -4.37

14:02 SB out

BF<sub>3</sub> #1 = -5.26

14:26 SB → in

A<sub>2</sub> = -5.28

14:30 ~~BR~~ fired in

F<sub>C</sub> #1 = -5.51

A<sub>2</sub> = -5.45

Sc # 2, # 3, and "E" Scramed.

Aug = -5.12¢

282

50-80-81

(P-33)

~~14:39~~ SB in 11.314

MA in 8.466

RR = 2.980  $\infty$

RR = 2.754

15:07 SB  $\rightarrow$  out

15:29 SB  $\rightarrow$  in

15:32.5 BR fired in

Scram SC #1, 2 + 3  
"E" + "F"

Pitte = -2.69

Log N = -2.90

BF<sub>3</sub> 1 = 2.91

2 = 3.06

FC 1 = -3.36

2 = -3.16

Aug = 3.01  $\neq$

15:40 - 1 R @ 14" from SB.

DATE		SAFETY CHECK					
TIME	0740	AM	BY				Mihaloz, Lynn, Williams
CHANNEL		A	B	C	D	E	F
RANGE		10 1000	075	2	1000	900	750
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		2	✓	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓	✓	✓	✓
AUX. CTRS.		✓	✓	✓	✓	✓	✓
SOURCES USED	M-226 + Y				MAGNETS		✓
TABLES	✓	LIGHTS	✓	AREA CLEARED			✓

P-34

Sulfur fails - #50, #80 + #81.

0748 SB → in (11511) BR = out  
 MA in (8,466)  
 RR = 2,945 ∞ log N = .006

RR = 2,864

0834	SB	Started → out	Pette = -1.13 <sup>+</sup>
0906	SB	→ in	Log N = -1.07
0908		Holding	Bf <sub>3</sub> 1 = -1.16
0910		Fired BR in	2 = -1.22
		Temp.	FC 1 = -1.20
		Before	2 = -1.22
		After	Aug = -1.16 <sup>+</sup>
		ΔTC	
0-1200°C	20	50	30
0-2000°F	70	130	33
#9 C	25	25	34 <sup>+</sup> @ 10:24
HP F	74	129	30.5
SC #2 F			29.4

Door 150 MR @ 108 @ 0940

284

(221) Steady State for APR personnel Test  
 BR = out Burst Prep mode.

10:10 SB → in operator - Roy Dickerson  
 MA in

10:28 RR = 2.982 ∞ Log N = .007

10:35 RR = 2.864

10:36 shut down (normal)

Fission Sample # 0020 = 52g U-Mo

(P-35) Sulfur #1 = 231, #2 = 232, #3 = 233

11:55 SB → in (11.514)

MA in (8.466)

operator - H. Dubyoski

RR = 2.858

Temp. Readout:	Before	Wait	After	ΔTC
0-1200° C	15	18	62	44
HP E	74	74	132	32.2
SC#3 F	53	53	82	16.1
#9 F	25	25	34	5
SC#1 F	59	59	72	5
#2 F	38	38	88	27.8

11:45 SB → out

Pette = -1.15

12:16 SB → in

Log N = -0.94

12:20 Fired BR in

BF3 1 = -1.35

2 = -1.23

12:28 Fara on

3 = -1.29

Aug = -1.22

FC 1 = -1.28

2 = -1.27

(222) Sulfur  $\overset{A}{\curvearrowright} = 234$  #2 = 235 #3 = 236

13:32 SB  $\rightarrow$  in (11.512)

operator - D. Williams

MA in (8.466)

RR = 3.000  $\infty$  Log N = .0055 ~~Pette~~ =

13:52 Shut down (Normal)

~~Log N =~~

~~BF<sub>3</sub> 1 =~~

~~2 =~~

~~3 =~~

~~FC =~~

(P-36) Sulfur as in 222

14:02 SB  $\rightarrow$  in (11.513)

MA in (8.467)

operator - A. Stowe

RR = 3.000  $\infty$  Log N = .0065

14:24 RR = 2.864

Pette = -1.13

14:25 RR = 2.884  $\longrightarrow$

Log N = -1.14

BF<sub>3</sub> 1 = -1.24

2 = -1.24

3 = -1.43

FC 1 = -1.23

14:52 SB  $\rightarrow$  out

15:15 SB  $\rightarrow$  in

15:20 Fired BR in

2 = -1.30

Temp Before Wait After ATC Aug = -1.24  $\Phi$

Temp	Before	Wait	After	ATC
0-1200 C	78	18	55	37
0-2000 F	70	70	135	36
#9 C	25	25	34	-
HP F	74	74	125	28.3
SC 1	58	58	73	8.3
2	39	36	82	25.5
3	59	76	85	5

15:30 Fan on

286

DATE		SAFETY CHECK					
TIME	11:05 <sup>AM</sup>	BY Lynn, Taylor + Dickerson					
CHANNEL	A	B	C	D	E	F	
RANGE	1000	opr	0	1000	900	750	
SOURCE DIST.	✓	✓	✓	✓	✓	✓	
% F. S. TRIP	✓	✓	✓	✓	✓	✓	
BLDG. ALARM	✓	✓	✓	✓	✓	✓	
AUX CTRS.	✓	✓	✓	✓	✓	✓	
SOURCES USED	M-226 + Y			MAGNETS			
ATABLES	✓	LIGHTS	✓	AREA CLEARED		✓	

Sulfur #1 = 237, #2 = 238, #3 = 239

(P-37)

11:21 SB → in (11.512)

MA in (8.466)

11:39 RR = 2.994 → log N = .0085

RR = 2.878

Petite = -1.11 #

12:07 SB → out

log 70 = -1.07

12:30 SB start in

BF<sub>1</sub> = -1.5212:35 Fired BR in

2 = -1.41

3 = -1.36

TEMP- Before Wait After ATC

70 1 = -1.41

0-1200 C

18

18

60

42

2 = -1.35

#9 C

25

25

33

8

Avg = -1.324

0-2000 F

70

70

135

36

HP F

74

74

135

36

Sc 1 F

78

66

79

7

2 F

48

40

98

32

3 F

70

68

77

5

Possibility that  
Pulse pre initiated  
per J.T.M.

12:39 Fan on

(P-38) Sulfur #1 = 240, #2 = 241 #3 = 242  
 PN-31 - returned to T5F  
 No source present at Reactor

14:22:40 SB started in (in at 14:26:45) (11.513)

14:26:45 MA started in (8.466)

14:31 RR = 4.0

14:43 RR = 2.962  $\infty$   $\log N = .006$

RR = 2.878

Pette = -0.68  $\phi$

$\log N = -0.86$

$\log N = -0.97$

$\log N = -1.09$

2 = -1.09

3 = -1.09

Fc1 = -1.01

2 = -0.95

15:14 SB start out

15:44 SB start in

15:48 Fired BR in

Aug = -0.95

Temp.	Before	Wait	After	STC
0-1200°C	19	19	75	56
#9 C	25.2	25	38.5	13.5 7.5
0-2000 F	70	70	155	47.2
HP F	73.5	73.5	156	45.8
Sc 1	61	59	85	14.4
2	45	35	121	47.8
3	81	72	90	6.7

Program Times

SB = 4.06 min

Delay Tim = 1.1 sec

BR = 0.7 "

N Gen. = 0.5 "

Scram = 0.4 "

16:10 300 MR @ 108 door

16:38 Fam of

1.32  $\phi$   
 TM

DATE	22 May 67						SAFETY CHECK					
TIME							BY <u>Lynn Taylor + Dickerson</u>					
CHANNEL	40	B	C	D	E	F						
RANGE	1000	800	800	1000	900	750						
SOURCE DIST.	✓	✓	✓	✓	✓	✓						
% F. S. TRIP	✓	✓	✓	✓	✓	✓						
BLOO. ALARM	✓	✓	✓	✓	✓	✓						
AUX CTRS.	✓	✓	✓	✓	✓	✓						
SOURCES USED	M-256 + r			MAGNETS			✓					
TABLES	✓	LIGHTS		✓	AREA CLEARED		✓					

(P-39)

Sulfur #1 = 243 #2 = 244 #3 = 245  
Belts Torqued - all belts tightened 2° or 3°.

No Source present

(APR period inhibit @ RR = 5.2)

0922 SB started in (11.514)

MA in (8.466)

0931 RR = 5.2

+ Pette = 27.82¢

+ Log N = 36.6 sec; 30.74¢

RR = 2.987

∞ Log N = 1.0022

10:03 SB started out

(4)

→ Ch "A" = 70/66

10:25 SB started in

10:30 Fired BR in

~ -4000 sec

Temp.	Before	Wait	After	ΔTC
0-1200 C	18	18	91	73
#9 C	25	25	41.5	16.5
0-2000 F	80	80	190	61
HP F		73	181	56
SC F		68	95	15
2 F		40	142	56.6
3 F		68	85	10

Fan on 10:38



(P-40) Seefar #1 = 246, #2 = 247 #3 = 248

11:46 SB started in (11.511)

RR in (9.078)

11:56 MA = 6.007 +  $\frac{Pette = 19.13\#}{\log N = 20.40\#}$  (APR inhibit @ MA = 6.007)

MA = in (8.466)

RR = 3.110

Pette =             
 Log N = +1.46#  
 BE<sub>1</sub> = +1.55  
 2 = 1.55  
 3 = 1.52  
 FC 1 = 1.39  
 2 = 1.47

12:26 SB start out

12:49 SB start in

12:54 Fired BR in

Temp	Wait	After	ATC
0-1200 C	20	11.2	92
#9 C	25.5	48	22.5 <del>11.5</del>
0-2000 F	75	230	86.1
HP F	74	215	78.3
SCI F	57	113	31.1
2 F	32	173	78.3
3 F	68	95	15

Avg = +1.49#

((P-32 thru P-40 made with SB out for Die away))

290

USE MA for Die Away

(P-41)

S

#1 = 249

#2 = 250

#3 = 251

14:20 SB started in

MA in

RR = 5.119

RR = 2.983

RR = 3.400

MA

15:08:30 ~~SB~~ start cut

15:36 MA start

15:40 BR fixed in

$$Pette = 26.67 \phi$$

$$+ \text{LogN} = 28.53 \phi$$

(APR inhibit RR @ 5.119)

(5)

$$Pette = +4.91$$

$$\text{LogN} = +5.31$$

$$BF_3 1 = 5.38$$

$$2 = 5.22$$

$$3 = 5.24$$

$$Fc 1 = 5.20$$

$$2 = 5.38$$

$$\text{Average} = \underline{5.23 \phi}$$

Temp	Wait	After	ΔTC
0-1200 C	18	165	147
#9C	25.5	62.5	$\frac{37}{20.5}$
0-2000 F	70	325	141.7
HP F	74	303	127.2
SC1 F	68	156	48.8
2 F	39	262	123.9
3 F	63	110	26.1

16:00 650 MR @ 108 door

252-53-56

DATE	23 May 67					
TIME	0845		AM	BY Lynn Taylor, Dickerson		
CHANNEL	A	B	C	D	E	F
RANGE	$\frac{10}{1000}$	opr		$\frac{1}{1000}$	900	750
SOURCE DIST.	✓	✓	✓	✓	✓	✓
% F. S. TRIP	✓	-	✓	✓	✓	-
BLDG. ALARM	-	-	-	-	-	-
AUX CTRS.	✓	✓	✓	-	-	-
SOURCES USED	M-226 + r			MAGNETS		✓
TABLES	✓	LIGHTS	✓	AREA CLEARED		✓

5.119)

.91  
31  
8  
2  
24  
20  
38

(P-42)

Fission Product Sample # 0006, 52 g U-Mo.  
S #1 = 252 #2 = 253 #3 = 254

All belts good as for torque.

Measured Belts #44 = 60.0 Dial Indicator  
#15 = 48.0

BR in (8.466) #14 = 39.0

10:02 Started MA and R.R. in (9.077)

10:07 SB started in (10.430) Pette = 33.2 #  
Log N = 36.10 #

{ SB in, BR in + R.R. out  
MA = 4.077

10:19 withdrew BR - 101.7 #

SB in (11.505)

Pette = +7.55 #

MA in (8.467)

Log N = 7.60

RR = 2.891

BF<sub>31</sub> = 7.69

RR = 3.468

2 = 7.82

10:50 MA started out

3 = 7.69

11:22 MA started in

(Holding 11:23)  
4

FC 1 = 7.12

11:30 BR Fired in

2 = 7.12

Pulse pre initiated J.T.M.

Aug. +7.51 #

(P-42) Temp:	wait	After	ΔTC
0-1200 C	17	187	170
#9 C	25	204	45
HP F	74	343	149
SC1 F	66	170	57.8
2 F	38	300	145.8
3 F	75	130	36

*Fraction Sample out 12:50*

Be dia #4 #15 #14 #13

(P-43) S #1 = 255 #2 = 256 #3 = 257

13:01 SB started in (11.509)

MA in (8.467)

RR = 2.876  $\infty$  Log N = -0.05 Pitte =

RR = 3.468 Log N = +7.08 #

13:48 MA started <sup>out</sup> 13:48

14:14 MA started in (Holding 14:17 7.5)

BR Fired in

14:19 SB started out ~ 5.5"

MA inserted

BF<sub>3</sub> 1 = +7.46

2 = +7.39

3 = +7.52

FC1 = +7.34

2 = +7.43

Aug = +7.37 #

Temp	wait	After	ΔTC
0-1200 C	18	185	167
#9 C	25.2	68	<del>42.8</del>
0-2000 F	72	355	157.2
HP F	74	334	<del>144.4</del>
Sc1 67	67	160	51.7
2 40	40	300	144.4
3 72	72	125	29.4

14:27 SB started in

14:29 BR Fired in

DATE		SAFETY CHECK					
TIME	9:00	BY		TAYLOR - STONE - DICKENSON			
CHANNEL		A	B	C	D	E	F
RANGE		10/1000	OPR		1000	900	750
SOURCE DIST.		✓	✓	✓	✓	✓	✓
% F. S. TRIP		✓	—	✓	✓	✓	✓
BLDG. ALARM		✓	✓	✓	✓	✓	✓
AUX CTRS.		✓	✓	✓	✓	✓	✓
SOURCES USED		Mn & Fe			MAGNETS		✓
TABLES		LIGHTS		AREA CLEARED		✓	

Sample  
12:50

Bolt meas.  
dial readings  
#44 = +59.5  
#15 = +49.5  
#14 = +41.7  
#13 = 5643?

Rhetts OK  
all bolts  
retorqued.  
#65 needed 4°  
#13 needed 1°  
the rest more

(Ref 8 May 67)

.08 \$  
.46  
.39  
1.52  
34  
43  
1.37 \$

BR in no sense  
 SB in  
 ① RR in [ Drive MA continuously until  
 MA = 2.318 received control inhibit ]  
 → Rhetts = → +21.09 \$  
 MA = × ∞ (∞ ~ 1.43)  
 Withdraw BR → -102.0 \$  
 (P-44) MA = in  
 BR out  
 SB in  
 RR 2.811  
 RR 3.611 → +8.8 \$ → [ 5 ctr avg. = 8.6 \$ ]  
 RR 3.695 → (see pg 294) this one used

{ Sfrils = #1 = 258 #2 = 259 #3 = 260  
 Dia. Prod. = 0018 in NW hole  
 Dia. of F.P. sample was reduced by inserting it  
 into acid to allow it to fit into hole. (See pg 189)

from Pg 293 (RR=3.695)

10:45 SB start out

Rhoctb = +9.21<sup>4</sup>

Log N = 9.65<sup>4</sup>

BP<sub>3</sub> #1 = +9.63<sup>4</sup>

2 = +9.83<sup>4</sup>

3 = +9.67<sup>4</sup>

FC #1 = +9.83<sup>4</sup>

2 = +9.80<sup>4</sup>

AV6 = +9.73<sup>4</sup>

<u>P-44 Temp:</u>	<u>wait</u>	<u>after</u>	<u>ATC</u>
0-1200 C	<del>16.0</del>	270	254.0
#9 C	25.0	96	71.0
HP F	74	475	222.8
SC 1 F	80	230	83.3
SC 2 F	50	450	222.2
SC 3 F	70	110	22.2

11:06 SB start in

11:10 Fire BR in

A "new" crack is now visible on OD of center piece of fuel at NW sample hole.

↓  
not ? 5mm  
SF

21¢  
65¢  
63¢  
83¢  
67¢  
P3¢  
0¢  
73¢

Run # 223)

14:30 BR out  
SB in  
MA in  
RR 3.695

← reference

RR 3.082

Rhoette = +6.52¢  
Log N = +6.76¢  
BF<sub>3</sub> #1 = +7.07  
2 = +6.91  
3 = +6.97  
FC #1 = +7.02  
#2 = +6.97  
Avg = +6.95¢

Source shaft value =  $(7.10 \pm 6.52) = 0.58$ ¢  
as per Rhoette. (shaft only)

(224) RR 2.811 →

Rhoette = -3.07  
Log N = -2.71¢  
BF<sub>3</sub> #1 = -2.92¢  
2 = -2.75¢  
3 = -2.86¢  
FC #1 = -3.01¢  
2 = -2.92¢  
Avg = -2.86¢

Reactivity loss Avg.  
Run # 223 & 224  
is -2.82¢

hole.

- Made servo checks at low power level  
(I<sub>in</sub> = 0.0003) and servo works OK as  
per R. Dickenson.

15:40 Shut down for the day.

296 25 May 67

Torquing 30: <sup>##</sup> #13 needed 4°; #58 needed 1°; the others needed none.

Bolt measuring: #44 dial = +59.5  
(zeroed with standard) #15 +47.1  
#14 +41.8  
#13 5x670 ?

(Ch "F" in 108)

DATE	<u>25 May 67</u>					
TIME	<u>9:35</u>					
BY	<u>Taylor, Lynn, Williams</u>					
CHANNEL	A	B	C	D	E	F
RANGE	<u>1000</u>	<u>opr</u>	<u>6</u>	<u>1000</u>	<u>900</u>	<u>750</u>
SOURCE DIST.	<u>✓</u>	<u>✓</u>	<u>EA</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
% F. S. TRIP	<u>✓</u>	<u>-</u>	<u>-</u>	<u>✓</u>	<u>✓</u>	<u>-</u>
BLDG. ALARM	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
AUX CTRS.	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>-</u>	<u>-</u>	<u>-</u>
SOURCES USED	<u>M-226 + 8</u>			<u>MAGNETS</u>		
TABLES	<u>✓</u>	<u>LIGHTS</u>		<u>✓</u>	<u>AREA CLEARED</u>	

Pitte ok

Fission Product Sample 0019 (50.4 gms.)

(Run 225) BR out

10:05 SB started in  
MA in

10:12 RR started in

10:14 RR in + Pitte 44.59 + Lg = +50 +  
turned with SB.

} order of assembly

Purpose of these runs is to check  
2213 instrumentation



(R 226) B 2 min since last shut down

10:51 SB started in (11,502)

BR in (

RR out

10:55 MA started in

MA 6.818 ch "A" screamed (Log N > 3 sec)

(6)

$P = 63.5\%$

(R 227) 20 min since last shut down

OK 11:23<sup>30</sup> SB started in Repeating R-226

11:27<sup>23</sup> MA started in

MA 7.072 ch "A" scream (Ptte = +65%)

11:34 Rads out

(R 228) BR = in MA = in RR = 3.08

gms. 11:44 started in with SB

11:50 SB 11.150 ch "A" SCRAM @  $L_m = 0.055$

Rhoette = +73%

(229) Repeat (228) SB going in

12:05 SB 11.250 ch "A" SCRAM @  $L_m = 0.044$

Rhoette = +83% TMC = 87%

(230) Repeat (228) SB going in 7" and moving @ 12:14<sup>00</sup>

12:14<sup>1/2</sup> SB 11.300 SCRAM ch A @  $L_m = 0.039$

Rhoette = 86%

298

(231) repeat (228) SB going in @ 12:23 hrs.  
12:26 1/2 SB 11.300 ch "A" SchAM  $\log N = 0.039$   
Rhocto 86 $\phi$

(232) Repeat (228) SB started in 12:43  
12:47 SB = 11.39 ch "A" Serum  $\log N = 0.018$   
Rhocto. 90 $\phi$

(233) Repeat 228 SB  
13:29 SB started in  
13:33 SB = 11.32 ch "A" Serum  $\log N = 0.04$   
Rhocto = 85.9 $\phi$

S #1 = 261 #2 = 262 #3 = 263

(P-45) B Root Ch "F" in 107  
13:55 SB in (11.500) Piss in 0019  
Sample p. 286

MA in (8.465)

14:18 RR = 3.180  $\infty$   $\log N = 0.007$   
RR = 4.180

Pette = +12.27 $\phi$

14:50 SB out

$\log N = +13.26$

15:19 SB started in

BF<sub>31</sub> = +12.94

15:23 Fired BR in

2 = +13.13

3 = +12.94

FC 1 = +13.3 $\phi$

2 = +13.13

Aug = +13.11 $\phi$

Temp	Wait	After	$\Delta TC$
0 - 1200 C	17°	385	368
#9 C	25°	124	99.0
HP F	38(x2) 76°	338 (770)	385.6
SC 1 F	65°	338	150.0
2 F	40°	640	333.3
3 F	73°	635	312.2

18:58 1 R at 108 door.

See Book # 2

1019  
296)

7¢

26

94

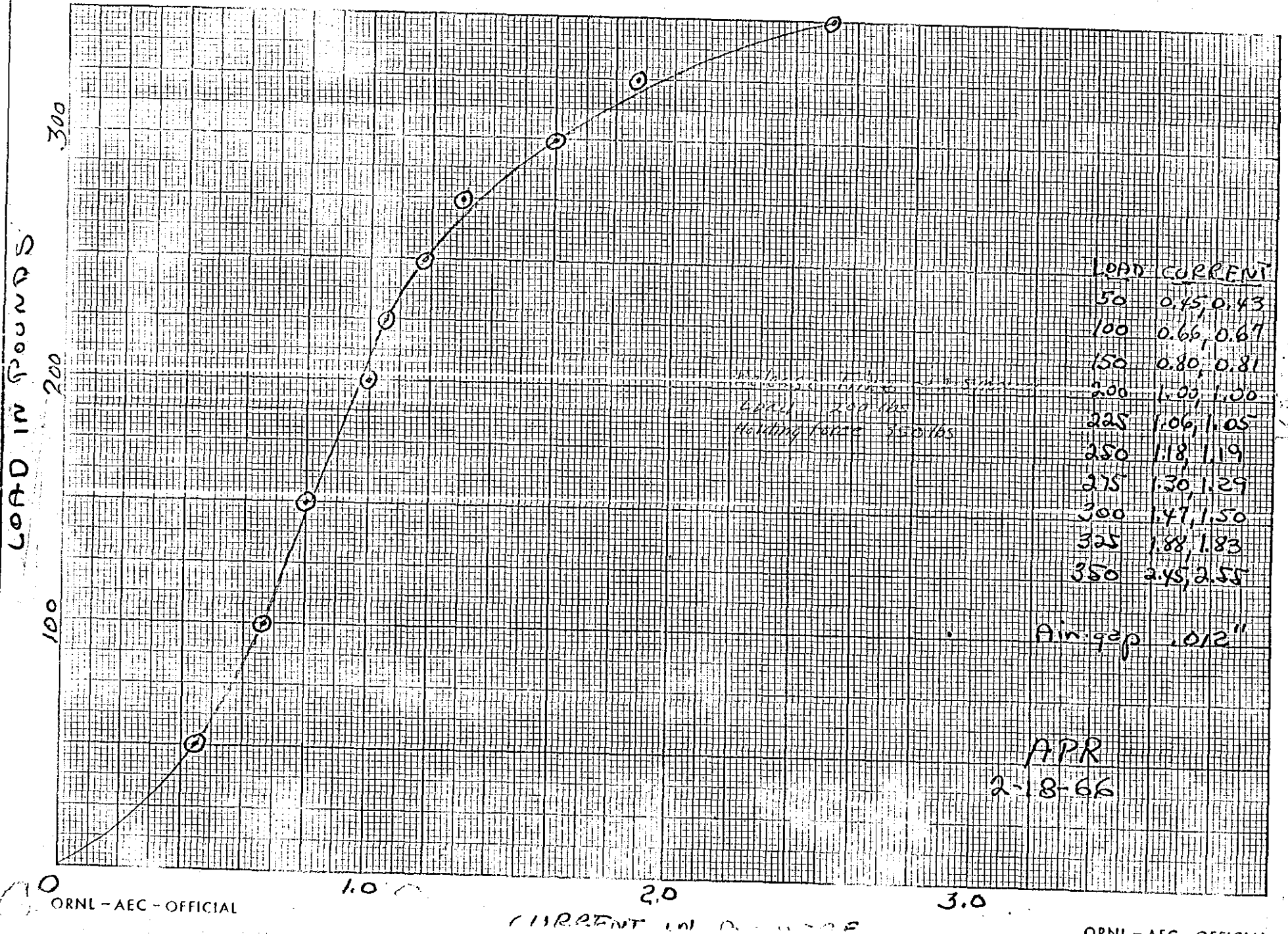
13

94

.3¢

.13

3.11¢



APR - Safety Channel Charts =  $2\frac{1}{2}$  min/div

SB - Traverses p. 78

80

89

90

91

95

437

Fuel H <sub>2</sub>	MA	BR	RR	Shroud	Hanger	Tube	Excess	
7.437"	in	in	out	on	in	on	12¢	
7.749	in	out	out	on	in	on	32¢	
8.16	out	out	out	on	in	on	18¢	
								Beral
7.749	out	out	out	on	in	off	- 8¢	95% off on
7.242	out	in	in	on	in	on	+10¢	on
"	in	in	out	on	in	on	+34¢	45% off 55% on
7.242	in	in	out	S.5 only	in	on	+25¢	43% off 57% on
7.242"		#1.11						
7.749								
8.16	#1.76	1.06	.72	-	-	.55		

.507" Fuel = \$1.86  
 .312" " = \$1.02  
 .195" " = .84?

7.749"

MA in +1.76

BR RR out -1.24

+32¢

PUT ROSS in  $\rho = +2.08$

REMOVING BOLTS L KERR -22¢

$\rho =$

LAKES 34¢

$$\frac{34}{102} \times .312 = .104''$$

7848

CH = 7.853"  $\rho = +2.20$  ROSS in

8.16"

NO ROSS in +3.52  
+3.52  
-22 Bolts  
+3.30

370  
3.30  
3.48  
-22  
1.20

$$8.16 - \frac{110}{102} .312 = 7.768$$

3915  
7.768

CH = 7.824"

7768

7.437

-159 RR out  
+71  
-22

+1214  
-1522  
+71

$\frac{159}{102} 312$

= .486

+61 220 - 61 = +83.4

CH = 7.923

$\frac{22}{61.4}$

amt			
5	$2 \frac{7}{16}$ "	$\times 9$ "	= 21.94
1	$1 \frac{1}{4}$	$\times 9$	= 11.25
2	$2 \frac{15}{16}$	$\times 7$	= 20.56
			109.70
			11.25
			41.12
			<u>162.07</u>

- 55.4%

(27)

3	$2 \frac{15}{16}$	$\times 9$	= 26.44	79.32
1	$2 \frac{15}{16}$	$\times 7$	= 20.56	20.56
1	$1 \frac{1}{2}$	$\times 5 \frac{3}{4}$	= 8.62	8.62
1	$2 \frac{7}{16}$	$\times 9$	= 21.94	21.94
				<u>130.44</u>

~~4~~  
~~14~~

~~2~~  
~~14~~  
~~14~~  
~~14~~  
~~14~~

292.51

Baral Removed = 44.6%

$$\frac{311}{292.51} = 94.05\% \text{ of } A$$

$$94.05 \times 55.4 = 52\%$$

$$B = 286 \times 52 = 148 \text{ in}^2$$





Fuel Ht.

Excess

out

8.16"

+18¢

# 3.50 All Rods

7.749"

+32¢

1.77 BR+RR

7.437"

+12¢

0.71 RR

Base Plate

p 25 → 27  
mounted on draft

- 1) Ht = 8.16" No Rods Sub
- 2) Add 3 Rods Pos  
Remove .97" Bolt - 3.7<sup>9</sup>
- 3) Add Air Sh. 5 B Curves 1.48<sup>4</sup>
- 4) ∞ 5 B Pull MA 1.68
- 5) Base - MA + Air Sh 1.48

1" off draft

- 1) Base 8.16" + Spacers for Bolts  
~~+~~
- 2) " - R R 72
- 3) (Base - RR) + Safety Tube 55
- 4) " + Top Plate 101

P 18 → 22

⊕

Ht = 8.16" Base Perm Rods in, + 19 ⊕

S.B. Hanger on S.B. curve - value 126  
G.W. Filter " " 128

M. A	Base Perm	Pull out	168
R R	"	"	72
B R	"	"	106

Top Plate (.312") Base Perm - BR - 150  
Ht = 8.46

Ht = 9.16 Base Perm + liners 8.4

Lowered Core Base Perm - (MA + RR)

Ht = 8.67" - 54 + BR = 73 ⊕

TABLE — SHUTDOWN DEVICE, DELAY TIME, DELAY TIME AND TIME OF OCCURRENCE OF PULSE

7

PULSE NUMBER	SHUTDOWN DEVICE	BEFORE PULSE	DELAY TIME <sup>a</sup> (MIN)	DELAY TIME <sup>b</sup> (MSEC)	TIME OF PULSE		
					TIME	DAY	MONTH
12	SB		38	3500	16:33	23	FEB
13	MA		27	100	11:46	24	}
14			30	1180	14:41	24	
15			30	1280	10:29	25	
16			30	557	13:13	27	
17			29	257	16:24	27	
18			28	471	10:27	28	
19			29	985	13:45	28	
20			27	200	16:31	28	
21			28	—	11:31	1	
22			27	286	16:26	1	
23			28	242	13:00	2	
24			28	—	16:32	2	
25			28	728	15:08	6	
26			31	800	15:42	10	
27			29	840	15:07	13	
28			29	1920	10:08	14	
29			31	1510	12:41	14	
30			34	130	16:38	14	
31	MA		49	628	16:09	15	MAR
32							
33							
34							
35	SB		34	767	09:10	18	MAY
36			35	1330	12:20	18	}
37			28	1050	15:20	18	
38			28	—	12:35	19	
39			34	—	15:48	19	
40			27	143	10:30	22	
41	SB		29	143	12:54	22	
42	MA		32	257	15:40	22	
43	MA		40	143	11:30	23	
44	SB		41	628	14:29	23	
45			25	—	11:10	24	
46			33	617	15:23	25	
47			31	571	11:36	26	
48			33	1360	16:04	26	
49	SB		30	642	14:03	30	MAY

a. THIS PART WAS WITHDRAWN TO ALLOW TIME NECESSARY TO DELAY AFTER REACTIVITY CALIBRATION RUN. SB VOTES TO SAFETY BLOCK, MA VOTES TO MASS ADJUSTMENT RUN

1 ADD (B) ON

b. TIME BETWEEN REACTIVITY CALIBRATION RUN AND START OF PULSE PRODUCTION RUN

ADD TO FOOTNOTE A

IN REACTIVITY CALIBRATION RUN FOR PULSE 12-31 TAKE

WICKERT WOLTON ACCELERATOR WAS USED AS A SOURCE ; PBR

PULSE 34-37 A  $1.5 \times 10^5$  M/AM P. B. SOURCE WAS PRODUCED ;

FOR PULSE 38-48 A SOURCE WAS USED

C. TIME BETWEEN START OF INSERTION OF PULSE ROD AND  
PULSE PRODUCTION.