BOOK77R

Notes:
"Aberdeen Pulse Reactor (APR)  1967  Book No. 2" on spine

Blank pages:  page opposite page 1, 1-3, 20, 36, 52-152, inside back cover sheets

-page 4 has 1 paper taped to it
-pages 4/5 has sheet between pages
-page 20 has 1 (8.5x11) sheet taped
-page 25 has 1 photo taped
-page 27 has 2 photos taped
-page 28 has 2 photos taped
-pages 30/31 has 1 (8.5x11) sheet between pages
-page 32 has 1 photo taped
-pages 52/53 has 1 (8.5x11) sheet between pages

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

No. 5149

No Units

Journal . . . . .
Ledger, Single Entry .
Ledger, Double Entry
Record Ruled (27 Lines)

Made in 150, and 300 Pages

TO REORDER, SPECIFY NUMBER, RULING AND THICKNESS INDICATED ON BACKBONE OF THIS BOOK.
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Pulse Red</strong></td>
<td>3-21-69</td>
<td></td>
<td></td>
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<tr>
<td><strong>Dates from Waybills</strong></td>
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<td></td>
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<tr>
<td>7881 - 0053</td>
<td>Received 7-18-66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1 (93.2%)</td>
<td>15.51 gms</td>
<td>To 7-12</td>
<td>10-24-66</td>
</tr>
<tr>
<td>7882 - 01 - 0001</td>
<td>Received 12-18-66</td>
<td></td>
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<tr>
<td>#3 (97.8%)</td>
<td>1652 gms</td>
<td>To 7-12</td>
<td>1-24-67</td>
</tr>
<tr>
<td>#4</td>
<td>1337 gms</td>
<td>Received 2-2-67</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pulse #1 made 2-20-67</td>
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<tr>
<td>7881 - 0053</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>Received 3-22-67</td>
<td></td>
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</tr>
<tr>
<td>1219 gms</td>
<td></td>
<td></td>
<td></td>
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<td>#2 and #4 Stored (7-12) 6-13-67</td>
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<tr>
<td>BR#</td>
<td>#3 - Rec'd</td>
<td>12-8-66</td>
<td>Long</td>
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<td>------------</td>
<td>---------</td>
<td>------</td>
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<tr>
<td>#4</td>
<td>Rec'd</td>
<td>2-3-67</td>
<td>Short #3</td>
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<td></td>
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<tr>
<td>#1</td>
<td>Rec'd</td>
<td>7-28-66</td>
<td>18</td>
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<tr>
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<td>Rec'd</td>
<td>3-22-67</td>
<td>Short #1</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td></td>
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<td></td>
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</tbody>
</table>
26 May 67

Torrays: #11 45 13 = 6°; 44 = 1°; 58 = 1°; 23 = 1°, all others needed more.
Bolt measures: #44 60.9
#15 47.0
#14 40.3
#13 58.2

DATE 26 May 67  SAFETY CHECK
TIME 8:30 AM  BY Lynn Taylor, DeWane
CHANNEL
A  B  C  D  E  F
RANGE
SOURCE DIST.
% F.S. TRIP
OK
BLOD. ALARM
AUX GRS.
SOURCES USED Y 226  V  MAGNETS
TABLES V LIGHTS  V  AREA CLEARED

0900  Core = 1 R @ 14 ft.
       Surface: #1 = 264  #2 = 265  #3 = 266
       Center plate crack (NW) same larger.
09:42  SB in (11.498) (Changer due to track circuit
       BR in: RR out  being added)
MA = 4,198

09:52  withdrew BR  -101.9°
**P-46**

- **SB in**: (11.498)
- **MA in**: (8.466)
- **BR out**
  - **RR = 3.153**
  - **Plate #: 9

- **RR = 4.300 (+14.994)
- **RR = 4.24**

**11:05** **SB out**

**11:32** **SB Started in**

**11:36** **Fixed BR in**

<table>
<thead>
<tr>
<th>Temp</th>
<th>Wait</th>
<th>After</th>
<th>ATC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1200 C</td>
<td>17</td>
<td>465</td>
<td>448</td>
</tr>
<tr>
<td>449 C</td>
<td>225</td>
<td>8128.3</td>
<td></td>
</tr>
<tr>
<td>0-2000 F</td>
<td>71</td>
<td>840</td>
<td>427.2</td>
</tr>
<tr>
<td>HP F</td>
<td>(82) 38 (76°)</td>
<td>400 (800°)</td>
<td>402.2</td>
</tr>
<tr>
<td>8c 1 F</td>
<td>61</td>
<td>352</td>
<td>162</td>
</tr>
<tr>
<td>2 F</td>
<td>48</td>
<td>770</td>
<td>401.1</td>
</tr>
<tr>
<td>3 F</td>
<td>72</td>
<td>300</td>
<td>127</td>
</tr>
</tbody>
</table>

**MA travel rate:** 251"/min

**8.837"** **MA = 8.463 to 0.126 in 3.32 min**

**8.986"** **RR = 9.086 to 0.134 in 3.26 min**

**Avg + 14.19**
Bolt measurement: after P46 = #13 only checked
Dial = - 1.382 in

Bolt torque: 2 bolts only checked.
#13 needed 14°
#44 needed none.

(P-47)
14:25
BR out
SB in (11.427)
MA in (8.463)
PR = 3.398
RR = 4.300 + 11.80° on 3-BF3
SB withdrawn

14:48
Room observation - no additional crooks.

15:00 SB started in
RR = 4.600

Sulfur 267, 269, 269

\[
\begin{align*}
\log N &= \frac{1}{3} \\
BF3 &\approx 15.7^\circ \\
2 &= 15.57^\circ \\
3 &= 15.56^\circ \\
F-C1 &= 15.5^\circ \\
2 &= 15.56^\circ \\
\end{align*}
\]

Over
SB in  BR out
MA in
RR = 4.544

16:13 SB out (0.034)
16:59 SB started in
16:04 Fill BR in

\[ \log N = 14.5 \]
\[ BE_1 = +18.06 \]
\[ 2 = +16.17 \]
\[ 3 = +16.03 \]
\[ Fe_1 = +14.81 \]
\[ 2 = +14.99 \]

Aug = 15.02

<table>
<thead>
<tr>
<th>Temp.</th>
<th>Wait</th>
<th>After</th>
<th>ATC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1200°C</td>
<td>20</td>
<td>535</td>
<td>535</td>
</tr>
<tr>
<td>49°C</td>
<td>21</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>0-2000°F</td>
<td>75</td>
<td>970</td>
<td>497.2</td>
</tr>
<tr>
<td>HP</td>
<td>40 (80°F)</td>
<td>471 (942°F)</td>
<td>478.8</td>
</tr>
<tr>
<td>SC</td>
<td>77</td>
<td>415</td>
<td>188</td>
</tr>
<tr>
<td>2°F</td>
<td>45°</td>
<td>350</td>
<td>170°</td>
</tr>
<tr>
<td>3°F</td>
<td>73</td>
<td>0°F</td>
<td></td>
</tr>
</tbody>
</table>
30 May 67
Bolt Measurement

# 44 = 92.0 6 61.5
# 16 = 42.5 6 56.0
# 14 = 46.2 6 41.5
# 13 = 51.820 2 35.0

Torsion: # 13 = 6
# 12 = 2
Others none.

Observations: Thermo-couple "held-in"
screw on NE was on floor.
The crack on NW appears to be
slightly larger.

Check On: @ 8:1 = # 2:7, 2:27, 3:2:7

---

DATE 30 MAY 67 SAFETY CHECK
TIME 10:15 AM BY TAYLOR, BURNS, DICKSON

CHANNEL A B C D E F
.Range | 1000 APP 4000 GPP 750V
Source-Dist. | V C C C C C
% F. S. Trip | V C V C C C
Bldg. Alarm | C C C C C C
Aux-Grps. | C C C C C C
Sources Used | K N K F F Magnets | ✔
Tables | ✔ | ✔ |
Lights | ✔ | ✔ |
Area Cleared | ✔ | ✔ |
(235)  BR in,  RR out
10:30  SB start in (11.978)

MA = 4.850 ~ 30 sec period
MA = 4.370 ~

MA = 4.198 = 55 ~ see p. 5

11:06  Withdraw  BR = 102.2$

(P-48)  BR out
SB in

MA in (8.466) ~ (8.15$

RR = 3.766 ~ 4.14$

RR = 3.398 ~ 8

11:40  RR = 4.08  P = 15.787$

12:  RR = 4.952  P = 15.04$

12:30  RR = 4.950  P = 15.136$

12:45  RR = 4.940  P = 15.28$

13:00  RR = 4.950  P = See top of 11.
Lin: __________  
Rhett: +14.40"  14.55"  
Th 1: 15.47  15.05  
2: 15.52  15.56  
3: 15.43  15.44  
Fc 1: 15.64  15.52  
2: 15.73  15.36  
Avg +15.558 -0.162 +15.396  
Avg of 2 try: 15.422"  

Time: Wait AFTER ΔT°C  

0-200°F 17 605 588  
2°C 25.5  off chart  
0-200°F 71 1110 577.2  
3/8" HT F 30 (X1) 550 (100°) 667.1  
5c1 F 70 520  
2 F 43 >800  
3 F 70 355  

14:03 SB in  
14:03 Fired BR in  
\(2.24^\circ\)  

Red Checks:  
15:28 RR travel = 3.350"/min

MA Travel = 2.5038"/min  
BR apparently clicking...but after a few intervals got out light
12

(236) BR out
SB in
15:50 MA in (8.468)
RR = 4.674

Temp:
0-1200 = 28°
#9 = 25.5°
0-2000 = 70°
31 May 67

all bolts which needed no torquing were loosened ± 10° and re-tightened.

Torque:
- #13 = 5°; 44 = 0°; 54 = 65 = 0°;
- 59 = 0°; 23 = 0°; 63 = 0°; 14 = 0°; 15 = 7°

Bolt mess:
- #14 drill = +64.0 on "Crane Mike"
- #16 = ±50.0
- #14 = ±40.0
- #13 = ±30.0

Other observations: The center piece now has a large (½") crack across on the S.E. The already existing crack on N.W. is now somewhat larger than before (½"). Most likely extends from the piece.

Rod travel checks:

- MA = 2.505"/min.
- BR = OK
- RR = 3.236"/min.
<table>
<thead>
<tr>
<th>DATE</th>
<th>31 May 67</th>
</tr>
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<tbody>
<tr>
<td>SAFETY CHECK</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>9:10 AM</td>
</tr>
<tr>
<td>BY</td>
<td>TAYLOR - LYNN - DICKENSON</td>
</tr>
<tr>
<td>CHANNEL</td>
<td>A B C D E F</td>
</tr>
<tr>
<td>RANGE</td>
<td>1000 vac A - 1000 vac B - 750V</td>
</tr>
<tr>
<td>SOURCE DIST.</td>
<td>1 1 1 1 1 1</td>
</tr>
<tr>
<td>% F. S. TRIP</td>
<td>0 0 0 0 0 0</td>
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<tr>
<td>BLDG. ALARM</td>
<td>0 0 0 0 0 0</td>
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<tr>
<td>AUX. CTRLS.</td>
<td>0 0 0 0 0 0</td>
</tr>
<tr>
<td>SOURCES USED</td>
<td>276 276</td>
</tr>
<tr>
<td>MAGNETS</td>
<td>✓</td>
</tr>
<tr>
<td>TABLES</td>
<td>LIGHTS</td>
</tr>
</tbody>
</table>

Put channel F & A back in cell at 9:20.
Having F "jearing" problem. Corrected and
Trip checked @ 9:50. OK. Fix done
on floor under stairs.

(237) BR in 5c. Rods.
SB in
MA 5.678 received inhibit -> +3.05 ft/sec.
RP out
+25.30 flt/sec.

MA 4.074
MA 4.074
Fic BR out 102.35 flt/sec 5c. Rods.

(238) BR out
SB in 11.50 b
MA in 8.146
OR 4.608

a = 0.009, 0.044 w/s²
(240) B.R. out 50 shaft unit
SB in
MA in
PR — 4.658

Shaft value from curve 3-1.54

PR 3.766 — 10.974, renette
PR 4.658 = withdraw Fission Chambers

Time = (1 min. 39 see)

10:35 MA & SB out

(241) B.R. out
10:39 SB
11:00 PR 5.842
11:01:15 MA in

Reette + 13.0

PR = +13.874

BE 2 = +13.90

Fission Ch 2 = +13.80

2 = +13.76

11:11 SB going out to 10:00

All Avg +13.664

11:18 SB out

Wait 20 min

(242) B.R. in (1024)
PR 5.842
MA in

SB start in and continuously driven

Ch A Trip & SB = 11.176 dial. Lm = 0.07

est. 1B remaining of SB at this point

*1.16 - 0.2B = 0.9B & lead period at 50c/min

Half no. temp. change Rate = 200/min

of the SCR/M4 alteration
(243) Repeat of run (241).

<table>
<thead>
<tr>
<th>BRout</th>
<th>L</th>
<th>13.69 $</th>
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<tbody>
<tr>
<td>SB in</td>
<td>Ψ</td>
<td>+13.29 $</td>
</tr>
<tr>
<td>13:35</td>
<td>MA in</td>
<td>BF3</td>
</tr>
<tr>
<td></td>
<td>RR 5.842</td>
<td>F.C</td>
</tr>
<tr>
<td></td>
<td>RR 4.658</td>
<td>2 + 13.21</td>
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</table>

13:53 SB start out

(244) Repeat of run (242)

<table>
<thead>
<tr>
<th>BR in</th>
<th>RR</th>
<th>5.842</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MA in</td>
<td>14:05 SB start and drive continuously</td>
</tr>
</tbody>
</table>

ch #4 tripped @ Lm -0.68 SB dial 11.160 |
can't read a diff. from curve. Do same as run (242) maybe +96 |
est 20° remaining on SB
19:41 S/B start in etc.

"A" trip @ LN = 0.056 11.218 S/B dial
"D" was @ 20% full scale.

Est. 15% remaining on S/B.

Rate of addition of reactivity = 7.15/min

A & D scram levels set at 160% on the maximum scale so these S/B insertion checks.

15:10 S/B start in etc.

"A" scram @ LN = 0.025 11.210 S/B dial
"D" @ 20% full scale.

Est. same as (245).

15:33 S/B plant wide. E & F @ 750V.

F tripped main @ 1.219 S/B dial
magnet drop but did not give scram
done. F was @ 100% when scram
occurred. Dog A did not trip. Did not get
LN = 0.09 an indication on E.
(248) repeat again
SB start in etc. 11/19 SB dial
all else same as (247)

(249) Move F inside just around corner
of Rm 107. It is surrounded by
2.5 of Pb except on ends.
Check E & F with same - 05
repeat again
16:08 SB start in etc. 11:20 SB dial
SCRAM via E
Lm = 1.4 or corrected Lm = 3.0
E was not being observed.
A & D (out of circuit) gave SCRAM late enough
otherwise same as (242)
No temp. change.

(250) Remove E from SCRAM circuit. For only
trip circuit in 107. repeat same
16:23 SB start in etc. 11:21 0 SB dial
SCRAM APR (2#3 ch). Lm = 6.0 but is
automated.
No temp. change

End of Experiment as such!
JUNE 67

08:05 15 mg/hr @ 100 deg.
10 mg/hr @ 8" from block.

08:20 Had 108 bell & fan 108 moped. Some surface contamination on 108 floor. Some "fatimex".
Some show generally on tables, frames, etc
about 5 X tolerance. More near reactor and
very much more on APR frame.

Torsion check -2 bolts only: #44: 0°; #13: 4°

Begin to remove core from frame:
- 3 bolts holding up core were tight.
- SB was loose on its hanger. (ref #1-225)
- ts, cm, ca, came out easy except 0-720°
- It was hammered out.

Hanging core on the shaft and measure bolts:
- checked the standard (9.2165) used for the dial readings against 3 micrometers as 9.21655" - OK.
**Do Not Last**

**BOLT MESS**

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
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</tbody>
</table>

Additional notes:
- Also measure line solids
- Also measure line offsets
- Bolt diameter and (units)
2 Jun 67

- Starting disassembly of wiring. Ray Dickerson
- Having photo made of core.
- Take core track down and with vault.
- Remove the 3 nodes.
- Rinsing, washing down, wiping down items which are contaminated somewhat.
- Setting gobs of measurements.

Core ht meas: (ref pg 2-33)
@ BR = 7.962"
@ MA = 7.953" 1/2
@ BR = 7.965"

Mean between top 2 thin pieces = 5 mils.
between 2nd & 3rd piece = 6 mils.

Core dia meas: (ref pg 2-152)

<table>
<thead>
<tr>
<th>Disc</th>
<th>7</th>
<th>9</th>
<th>11</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>6</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>(AB) Top</td>
<td>8.985</td>
<td>8.902</td>
<td>8.902</td>
<td>8.811</td>
<td>8.9302</td>
<td>8.877</td>
</tr>
<tr>
<td>(CD) Top</td>
<td>8.931</td>
<td>8.946</td>
<td>8.60</td>
<td>8.893</td>
<td>8.866</td>
<td>8.896</td>
</tr>
<tr>
<td>Bottom</td>
<td>8.946</td>
<td>8.946</td>
<td>8.804</td>
<td>8.804</td>
<td>8.886</td>
<td>8.896</td>
</tr>
</tbody>
</table>

Ref: 2 Jun 67 assembled H.L. & A. Stein. Red: 12 Jun 67, not assembled. YL
Now start preparation to remove the bolts. Set up a heater beneath a pan which contains enough oil (SHELL DONAX P, a petroleum base, graphited, penetrating oil) to cover the bottom fuel pipe.

Now move core (or crane) over and dip once into the oil. Bring out and start to turn bolts clockwise. Any bolt which tightens, allow it to tighten (clockwise) 30-40° before:

- 63 70° or 1 turn
- 13 loose after 2 turns
- 44 3 turns (minor tightness)
- 15 4° tightened some
- 54 free. Others loosened some.

Quite a bit of haste involved due to last field. NIM observed this procedure.

Now suspend core in the oil as mentioned above. Temp. constant at 75°C. Allow to set until Monday morning.

5 Jun 07: Took core to horizontal table and bolted at Owen, B.C. B.T., M.L. and others continued efforts at removal of the bolts.
#54 bolt is out and is visually corroded.

Sort of sloppy S shape.

Just about 8 times (Sanria gauge) to

#4 refer to be packaged and shipped to

Sanria Corp.

15:00

Bolts still in oil, were worked in

and out a little a few times.

16:05

"Worked" with the tight bolts, remember.

16:20

Turn heater off.

Tomorrow assembly to be bolted to

horizontal table as (ref pg 1-235)

for removal of all bolts.
Twist amount of bolts which had to be broken off:

- #23 = 180°
- #63 = 150°
- #65 = 200°
- #44 = 165° (spoke at bottom)
All bolts were removed either "field" or deliberately broken off. #23-63-65 and #44 had to be broken (near center of bolt). Others came out OK. (See photo).

Dismantling the core piece at a time and photographing each step (each piece). Taking photos of each piece or dice on each side also linear-bolt and knots. Center piece came out in 2 pieces. (broken)

Other pictures of this group Pg 2-27 10-28.
Red lines were hard to remove due to the fuel dice (esp. center piece) having shifted to sides. RR liner was cramped at the top. BE liner was sanded off at top and hammered out from the bottom. M. liner was snug but came out OK.

Continuing the photo taking of component.

The Safety Block tightening at 1 turn (coming off). Using lubricant and DB in vice, not off hanger yet.

Also bottom plate (22) showing broken studs and bolt pieces by its corresponding piece. #22 was "washed down" before picture was made.

Aleha Pool 8
Smear show floor generally 2x tolerance
At level of side lights OK of 108,
Rm 109 & tolerance,
Rm 107 clean
One other picture on pg 2-25 of this group.
8 June 7

Diving "everyone" who is interested in to observe the fuel price before the prices are carried away.

<table>
<thead>
<tr>
<th>Length</th>
<th>Dia. 1/4&quot; Below Pin Hole</th>
<th>Dia. 1/4&quot;</th>
<th>1/2&quot; From Bottom</th>
<th>Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR:</td>
<td>9.0065&quot; 0.6310&quot; 0.6320&quot; 0.6315&quot; 0.012&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.0059 0.6309 0.6314 0.6315</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.9985 0.6310 0.6315 0.6314</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>8.9986</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>9.0024&quot; 0.6310&quot; 0.6316&quot; 0.6315</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA:</td>
<td>9.0018&quot; 1.0052&quot; 1.0068&quot; 1.0066&quot; 0.009&quot;</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>8.9975 1.0058 1.0060 1.0054</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.9960 1.0052 1.0058 1.0052</td>
<td></td>
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<tr>
<td></td>
<td>9.0013</td>
<td></td>
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<tr>
<td></td>
<td>8.9992&quot; 1.0054&quot; 1.0062&quot; 1.0057&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measurement by individual.

Please sign your initials on

- W.R.L.

- used from P-32.xarm P48

| BR:   | 10.022" 0.7552" 0.7561" 0.7560" 0.016" |
|       | 10.01 0.7553 0.7555 0.7553 |
|       | 10.002 0.7558 0.7560 0.7556 |
|       | 10.003 |
|       | 10.002" 0.7554" 0.7559" 0.7559" 0.016" |
The cylindrical surface of this rod line was still parallel with the rest of the rod which was straight but it was displaced 0.035 in.

The regulating rod lines were directed similarly but to a lesser degree and were found with the inner edge not being too high.
<table>
<thead>
<tr>
<th>Length</th>
<th>Dia.</th>
<th>@ 4</th>
<th>@ 1/2 from Plane</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.494&quot;</td>
<td>0.7874&quot;</td>
<td>0.7875&quot;</td>
<td>0.7870&quot;</td>
</tr>
<tr>
<td>9.495</td>
<td>0.7873</td>
<td>0.7872</td>
<td>0.7870</td>
</tr>
<tr>
<td>9.494</td>
<td>0.7874</td>
<td>0.7873</td>
<td>0.7871</td>
</tr>
<tr>
<td>9.495</td>
<td>0.7874</td>
<td>0.7874</td>
<td>0.7870</td>
</tr>
<tr>
<td>9.4943&quot;</td>
<td>0.7874&quot;</td>
<td>0.7874&quot;</td>
<td>0.7870&quot;</td>
</tr>
</tbody>
</table>

Again check 12" calip. against BT standard (9.2160"
\[1 = 9.2160 \quad 2 = 9.2160 \quad 3 = 9.2160\]

Rod Linere: also (ref pg 2-26)

\[
\text{BR} \\
\downarrow \\
0.035"
\]

Area of broken piece #16.

\[
\text{RR} \\
\downarrow \\
0.036"
\]

MA is essentially straight.

Photo taken of the 4 broken bolts again.

APR consist and support items being packed for shipment.
9 Jun 67  Begin "tearing down" APR support devise it BP was removed from its hanger.
          removed penetrating oil with peels.

12 Jun 67  Continue measuring fuel pieces,
          put fuel with plastic bags and into
          "bird cages." Ready to go to Y-12.
          Had photo made of desc 22 with "stick" also 4 broken bolts and dp safety block.
          Had a Y-12 decontamination crew working on the Aberdeen rig.

Aberdeen
S. Block
12 Jun 67
BR used from start to P-31 = 1/4 R/F @ 1/2"
BR used from P-32 to P-49 = 2 R/Fs @ 1/2"

\[ \text{Screw} \]

\[ \text{S5 screw} \]

\[ \text{UF No. 1-22-7} \]

\[
\begin{array}{c|cc|c|c|}
\hline
& \text{Paralled to Axis of Screw} & \text{Perpendicular to Axis of Screw} & \text{Length} & \text{Diameter of fuel dike rechecked. In red} \\
4.002 & 4.012 & 4.035 & 4.009 & 4.003 & \text{OD} & 1 = 8.576" \\
2.684 & 2.696 & 2.698 & 2.665 & \text{ID} & 2 = 8.575" \\
2.685 & 2.688 & \text{ID} & 3 = 8.575"
\hline
\end{array}
\]

Photographer came and was sent back twice all fuel has been put into "oil cages" as per note.

Sent all fuel to Y-12 for storage in hold 85.

Fuel left @ 13:30 for the its destruction. Removed APP package from "A" frame onto its tripod base to make driving etc. accessible.
We again have 2 men from Y-12 who are continuing to decontaminate any and everything.

Note that the burst rod (used up thru P-31) was sent with the adapter still on it. It would not reasonably come off.

16 Jun 67: Misc. activities concerning cleaning up and preparing for APR to be taken out. Area now clean (no course needed). APR frame has been put into its shipping barrel.

19 Jun 67: Changing outlets in 108 from crew shop to "nema" Many of these at least 7' frames and 10" became sent to salvage.

20 Jun 67: Took two bussops to Mike Landrum office.

Returned the borrowed "portable shield" fan used to cool fuel was returned to Y-12 pump shop.
21 Jul 67 Loading of all APR equipment, etc. into
Transfer Van for shipment.
All parts shipped out.
27 Jul 67 All T.V. gear returned.

Copy p.22, book 1

16 Sept 66 Received most all of the
Aberdeen Reactor and associated
gear. Van was unloaded and left at 1700.
Reactor upside down on 4' Al plate

Critical Ht = 8.154

# 3, 1, 6, 16, 5, 4 + 7, 3 rods and 9 belt SB on Raw (#11)

SB Hanger = #1.36
SB Hanger + Hanger Core = #2.54
MA Rod = #1.76, RR = 0.71, BR = 1.06
Top Plate = #1.00
BR = 105.76

Rod Hafnium and Liners = 8.44

Air Shroud = #1.48, MA = #1.68

Safety Tube = #0.55

Top Plate (0.312") = #1.02

Fuel Ht = 7.437

# 10, 1, 6, 16, 5, 4 + 7

Fuel Ht = 7.749

# 8, 18, 1, 6, 16, 5, 4 + 7

Fuel Ht = 7.242

MA = 1.84, RR = 0.74, BR = 1.1
10-12-66

Bonal Measurements
To APR Machine

Fuel Weights

Loading: #8, 16, 16, 5, 4 + 7

Ht = 7.76

MA = #1.75 (Marked out while core were rotated 120°)
BR Calibration

BR = $1.03  12-29-66

Fission Chamber Poly = 2.3
SP = $22.00

Rossi Alphav.

Bolt #64 = 85
SP = $21.50

BR = $1.05  (in = 3/16" above core)

TR = Traverse

BR = $1.05

TR = Traverse

Thermo Plugs = 36.86  (1979m)

Sandia M+ng Plate = 50

Polv around Inst. = 15.5  Insert.

Safety Tube = 58.5

Air Shroud = $1.43

BR = $1.24  (symtric = core)

MA = Traverse

BR = $1

Al Shell g Air Shroud = 44

M.A. Traverse

Sandia Plate 2.5" from Bottom g Core = 65.9

Build up - No Source.
Roni Alpha

Inst Ply = 18 φ

SB Flange Core = 1.25

Simulated Flow - No Value

Fluxgus on Radial Surface:

\[
SB = -19.7/1'' \\
5B = -15.72/4''
\]

\[
= -17.4/2'' \\
= -15.7/6''
\]

BR Traverse

Core Ht = 7.95''

Sanda Plate = 46 φ

SB pulled to one side = .56 d

Core Ht = 6.9''

#8, 10, 9, 6, 16, 5, 4 + 7

Core Ht = 7.74''

#1, 6, 16, 5, 4 + 7

BR symmetrically located

Fuel Ht = 7.76''

Fuel Ht to 9. Repar

#22 Bottom Plate

Fuel Ht = 7.96''

#8, 9, 1, 6, 16, 5, 4 + 22

BR = 113.89

SQ = #19.57

BE air pressure optimum: 73.957

Roni Alpha THC

Foil exposure run #76

U Foils

High Power Study Start (F use, Prod. Sample & Sulfur foil)

Temp rate: 195°F.

Jumper rod to the system 59 φ
136. Boltz: needed 10 fit国内市场
BR. = 114.8°
MA transl. & RR transl.

137. Thermal couple locations.
Boltz 15, 42, & 54 removed: examined -0°

138. MA transl.
Maximum reactivity position of MA = 8.59 dial.
B = +19.97

139. P-1

140. BR. = 115.7°
Seek max. reactivity position again of MA - 9.89 dial

141. P-2 Inc 2.75 sec. period or +62.33°
P-3 Inc 1.69 sec. 78.5°

142. P-4
BR. = 115.2°

143. P-5 Inc 0.295 sec. or +90.5°
BR. = 117.1°

144. P-6 Inc 9.77 m sec.

145. BR. = 116.9°

146. P-7 Inc 683 m sec. no temp change.

147. P-8 Inc 40 m sec.

148. P-9 Inc 24.4 m sec.

149. P-10 Boltz measured. & torqued

151. BR. = 116.9°
P-11 had temp. rise.
Page 152
P-12 (c. 13 x 10^13 on Fia. Part. sample)

Page 153
BE: 117.1

Page 154
Retorque
BE: 114.6

Page 155
P-13

Page 156
BE: 114.9

Page 157
P-14 10 min after pulse, 108 dose makes 3 K/hr.
Bette measured. No additional torque needed.
BE: 115.9

Page 159
P-15

Page 160
Bette measured

Page 161
BE: 115.5

Page 162
P-16

Page 163
BE: 112.4  Some doubt due to gamma field beehive.

Page 164
P-17  Eq. 167 Bette measured - all needed slight torque.

Page 165
BE: 116.0

Page 166
P-18

Page 167
BE: 111.9

Page 168
P-19

Page 170
P-20

Page 171
Bette meas. - loosened and retorque - none needed, torque.

Page 172
P-21  Core back to normal temp. 1 hr. 30 min.

Page 174
P-22  period = before pulse.

Page 176
Bette measured & retorque. Temp. ch. diaphragm.

Page 177
BE: 119.5 (?)

Page 178
P-23
178  P-24
180  Bolt & torqued. Temp. ch. changed.
182  BR = 118.2°F (?)

P-25
184  Screw holding WP cc & F. sample had popped off.
185  Bolt & torqued.
187  Drums removed, acid cleaned, reinstalled as diagramed
188  BR = 117°F

P-26
189  "Limit light" check made of valve.
190  Bolt & torqued.
    Bolts are stretching.
191  Pulse shock hits screw heads (on one side). $ bend them sideways.
192  BR = 116.7°F

P-27
193  Bolt & torqued.
194  P-28
196  P-29
197  P-30
198  Bolt & torqued.
Drilled out a broken "to hold in" screw.
SB scarred; Dark areas near center of core.
Reactivity less due to $P_{-50} = 3.1^+$

200 $P_{-31} = 1.70^+$

201 $P_{-31} = 1.70^+$

202 Peak 1.20 000.000.000 Watts ($885^\circ C$, $3.7 \times 10^7$ ions)

203 Rw glow on SB observed
Bolts measured & torqued

204 Cannot go critical. Inspection shows MA adapter broken off. MA is lying inside the cooling fan underneath the slide. Removed MA to table.

205 Made minor contamination clean up.

206 MA picture taken

207 APR's MA adapter used & MA installed on reactor.

208 $P_{-31} = 6.4^+$

209 Porta. shield in operation

209 Tried to remove V-bolt #42 - broke the wrench.

209 Bolts measured.

211 BR #7881 - 28 005.3 installed. This are used from new thru completion of experiment.

211 $BR = 102.6^+$

212 MA trav. - total value: 69$

213 $ST = 20.28$

214 $SB = 20.28$

213 MA trav. - total value: 170$

214 $ST = 20.28$

214 $SB = 20.28$

214 $ST = 20.28$

214 $BR = 102.2^+$

214 Rod dial reading: reproducibility check.
216 SB drop reproducibility checks.
218 SB (2" removed & book) reproducibility checks.
219 MA (in & out) reproducing check.
220 Bolt space & gap meas. & length meas.
221 Bore scope inspection.
New wrench made & bolts torqued.
Some rubbing of SB observed.
223 SB bulge inspection & Borescope check.
224 SB dia. meas.
225 SB & drive taken off & inspected. SB on hang.
Center plate of core is cracked.
Bolts torqued @ 30 ft-lbs.
226 Entire magnet assembly inspected - cleaned - OK.
Photos of SB & Core.
227 Complete SB dimensions.
228 I.D. of fuel dies. magnet assembly reassembled.
229 Source Companion check vs. M 238: 1.337. APR BBE.
230 Reproducibility checks of SB & bolts.
231 New" to hold in "evert" design to avoid bending.
232 O.D. of fuel dies.
233 Borescope inspection.
Bolts measured with core on Crane.
Calc. actual stetch listed.
Core HT. measured.
SB length meas.
   Some plate did at same time.

235. Description of bolt #41 removal from core.


238. Description of the removal of the broken piece of bolt #42 from the core.

Base.

Crack width on bolt #42 & #5 & #16.

241. Core back onto normal reactor frame.
   Bolt #13 now replaces #42.

   Bolts torqued.
   Sandia Van left.

243. Power run by I & C division people.

244. Chamber pulp thickness varied.

247. "Period inhibit" checked.

248. Bolt #42 sent out.

249. "Fact. read out relative to Power level" table.

250. APR source added 9.0 d.
   Insertion chamber added 1.0.
   N/E test.
APR source check: no source on drive; add more shielding etc.
Milliton being worked on.
BR value from curve - 111.4
Rossi-Alpha - FC in RR hole
Several 2A0-71 runs & check out.
SB chutts: #29.01, Milliton: 18.9
Many + 4 - periods inst. compenses.
More pump neutron decay meas.

BR: Chutts: 104.5; Milliton: 95.4
MA trav.
RR calib. (accel + E-100-7)
Servo checks for TAC

RR value: Chutts: 69.4; Milliton: 68.5

Sprial Fision Chamber in MA hole worth 3.3
Many burst time and Nsup checks made.
BR - Chutts: 102.9; Milliton: 96.6
SB withdrawn 2.03"; chutts: $2.98
Milliton: $2.84
SB calib. point via (accel + E-100-7)
SB withdrawn 1.62"; chutts: $2.11
Milliton: $2.04
SB withdrawn 2.98" short = 4.92
Period comparison measurements of all detectors, i.e. several + & - variations of period.

Several more SB calk. points via (accel & Endo?)

Description of reactor and associated components, i.e. to gauge, etc. in preparation for the next pulsing to be done. APR source shielding checks similar to Pg. 251

Run #2122 begin approaching prompt critical

Run #213 = +44.0* BR value = 103.55*
Run #214 = +52.2* BR value = 104.16*

BR + SB value = #21.07 BR value = 103.8*

Run #215 = +63.44* BR value = 104.27*

Some checks similar to Pg. 275

Run #217 = +73.80* BR value = 102.4*

Run #218 = +81.66* short BR value = 101.25*

Run #219 = +93.33* TMC BR = 103.64*

Run #220 = +83.88* TMC BR = 101.47*
<table>
<thead>
<tr>
<th>Page</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
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<td>P-32</td>
</tr>
<tr>
<td>282</td>
<td>P-33</td>
</tr>
<tr>
<td>283</td>
<td>P-34 same temp, rise.</td>
</tr>
<tr>
<td>284</td>
<td>Operator test for Ray Dickinson (steady state) P-35 Operator Hank O'Reillyaki.</td>
</tr>
<tr>
<td>285</td>
<td>Steady state &amp; shut down (operator Don Williams) P-36 (operator Allen Stern)</td>
</tr>
<tr>
<td>286</td>
<td>P-37 (operator LR Taylor for several pulses)</td>
</tr>
<tr>
<td>287</td>
<td>P-38 (notion of program timer settings)</td>
</tr>
<tr>
<td>288</td>
<td>P-39 Period &amp; keep pulse</td>
</tr>
<tr>
<td>289</td>
<td>P-40 Note: P-32 then P-40 made with SB out for &quot;Die Away&quot;</td>
</tr>
<tr>
<td>290</td>
<td>P-41 Use MA for &quot;Die Away&quot;</td>
</tr>
<tr>
<td>291</td>
<td>P-42 Pulse may have precinicked (STM)</td>
</tr>
<tr>
<td>292</td>
<td>P-43 Use SB for &quot;Die Away&quot;</td>
</tr>
<tr>
<td>293</td>
<td>Cot rate mean &amp; stabilized. Control inhibit on MA experienced &amp; 21.89 ( \Phi )</td>
</tr>
<tr>
<td></td>
<td>BR = 102.0 ( \Phi )</td>
</tr>
</tbody>
</table>
Page 293

294 Newly noticed crack, wide on other side on OD of disc #16 (center).

295 "Serve Shaft only" value = 0.58^*  
Reactivity loss from P-44 = 2.82^*  
APR Sense checks made.

296 Bolt measured & torqued.

297 Check out of 9213 inst. by driving SB in and without inhibit "in". Driving SB in until SCRAM occurs. (around 85°F pos).

298 P-45

End of Book 2  Start Book 3

Book 2, Page 5

Bolt measurement & torqued.  
Disc #16 = crack (original on NW is larger).  
BPR value = 101.9^*.

6 P-46

Rod travel ratio checked.

7 #13 bolt measurement No. 13 & 44 torqued.

P-47
9 Bolts, wires, and torqued.
Center drill (4/6) or NW crack is longer.

10 BR = 102.2 ft

11 P-48 = 2.1 x 10^{-7} ft/min
Rod movement & rates checked.

12 Bolts, wires, and torqued.
Drill 1/6 has 1/6" crack across on SE.
Rod travel checks.

14 BR value = 102.35 ft

15 So. Shaft value from curve = 0.5 ft
Withdraw Frie. Chambers, time = 1 min 39 sec

16 More checks as pg 1-297
Regardless of period attained or power level reached, the SB is tripped @ 11.2 lid.
Insertion rate = 200/min.

19 Bolt # 44 & 13 torqued.
Remove core from frame onto Crane.

20 Measured bolts.
Core fit measured.
Core dia. measured.
Crack between top pieces (chias) measured.

22. Description of removal of all bolts.

25. Core disassembled core and took picture
of each "step."


29. Length, dia. & bow meas. of available bolts
and rods.

31. Rod Inner condition after removal.

32. Support drive removed and later inspected.

33. Complete SB measurements.

34. "Finishing" activities - Returned all Brecoopes,
Portable shield, cooking pan & etc.

35. All APR equipment loaded and shipped.

TV "gear" returned to Tom Cote.
BOLT LOCATIONS
ABERDEEN CORE

2/6/67
Tonelli