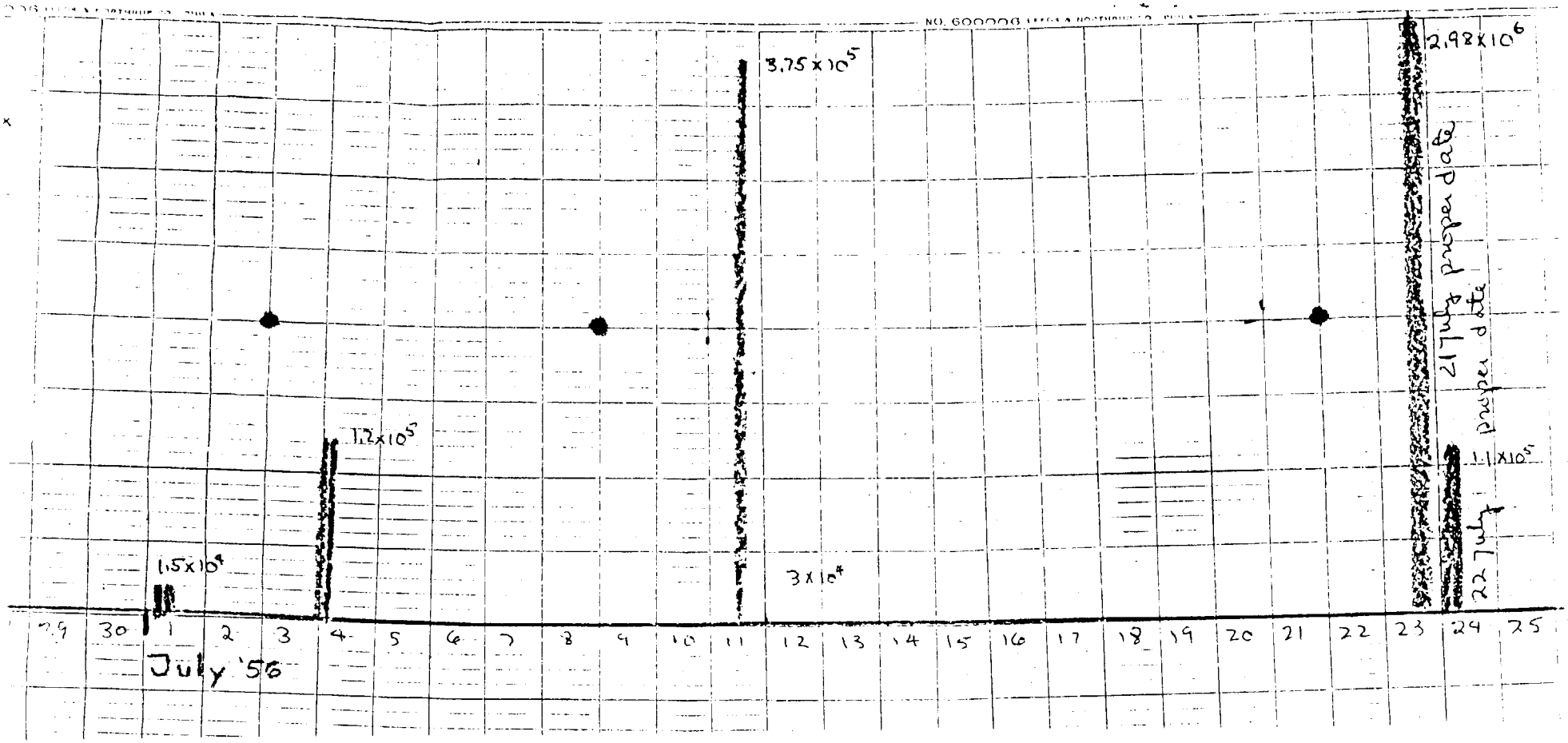


Source	EFFICIENCY (%)
2.22×10^5	11.25 – 10.45
6.57×10^5	9.72 – 7.65
1.11×10^6	~~7.76~~ – .06

The above figures were arrived at by using a scaler to count monitor's pulse shaped but unintegrated output. No attempt to show coincidence loss etc. was made.

Conversion Factor

$$d/m/meter^3 = (net\ count)\left(\frac{1}{EFF}\right)\left(\frac{1}{ft^3}\right)\left(\frac{ft^3}{m^3}\right)$$

$$= c/m \times d/c \times \frac{1}{ft^3} \times \frac{ft^3}{m^3}$$

$$= c/m\ \ (8.9)\left(\frac{1}{2.7}\right) \times 34.3$$

$$= c/m\ \ (113)$$

It is felt however that the efficiency is considerably higher at low levels than indicated, a conversion factor of 75 was used in all works.

the resolution time of the instrument at a tape speed of one foot per hour is about 12 minutes. Many of the 'spikes' appearing on the records were undoubtedly caused by one or two hot particels. Filter tape cutting proved this too be true in a small number of cases checked.

There is also a lag of from 20-30 minutes @ 1 ft/hr. filter speed between sampling time and counting. In high level cases the rise in back ground may signal the operator to increase the tape speed and shorten the time lag.

I J K L M N O P Q R S T U V W Y Z

AIR MONITOR

Recommendations

a. Size

b. Weight

c. Filter rewind clutch (redesign)

d. Overload protection for the main drive transmission.

e. Hinged doors rather than snap on fasteners.

f. Scale selector for remote operation.

g. The original logarithmic amplifier?

h. Possibility of using short, end window detector tubes - Anton Lab #100IT (low background & reduction of pig size)

i. Future units to record background level (mr./hr.)

j. Pump oiling requirements every 2 days - not satisfactory for field use.

k. Laboratory determination of the unit's physical constants and incorporatio of the data into the instruction manual - detector efficiency, number of cubic feet of air whose residue is seen by the detector etc.

l. More light in the pump compartment.

m. Brass stack locking nut unsatisfactory due to corrosion.

n - External plug for recorder

o - Weather shield for filter screen (or

the size and weight of the present air monitors is very unhandy for field use. the necessity of oiling every two days is also not suited to a unit which may be remoted in the field. the filter tape re wind clutch does not work well and mechanical over load protection should be provided for the drive transmission. the Anton Laboratory - 100 - 1T alpha - beta tubes claim low background and due to their small length to diameter ratio would reduce the pig size considerably. It is hoped that the logarithic amplifier originally planned for the monitors may be incorporated - if not then remote scale selection is necessary.

It was noticed toward the end of the operational period that rain was often followed by periods of fall out. Rain information was obtained from the weather station on Fred. How closely the start and stop times coincide for the two islands is not known. Cases of coincidence are shown on the summary at the front of the record and covered more carefully at the rear.

No record of rainfall has been procured for Bikini Atoll

After procurement of the data it was noted that both the amount of data and accuracy of readings did not lend themselves to a detailed correlation. It is not difficult to conject that if various layers of air above us are somewhat active - that rain will or perhaps will bring a certain amount of it down - It is believed that that may be taken as conclusion for this brief attempt. The data is enclosed hoping that further information may prove useful.

Q
R
S
T
U
V
W
Y
Z

NAN

Time base
- 2 divisions per hour

Scale
- reads directly in counts per minute Times the scale factor

range	Scale factor.
1K	X 100
10K	X 1000
100K	X 10,000

the small conversion scale to be found at the beginning of this record will enable quick conversion to d/m/m.^{3} using a factor of 75. (Discussed earlier)

9

~2210

AVERAGE BACKGROUND
29 MAY + 1300 TO 2300 4.5
200 c.p.m.

1740
1730
1710

200 c.p.m
1900 ~~may~~ 29

1740

1710

1700 29 may

1626 29 may

1400 29 may

1530 29 may

1500

1445

1430

1345

1315

1295

1130 29 May

1030

945 AM 29 May

945 AM 29 May


1.5x10⁴
1.2x10⁵
3.75x10⁵
3x10⁴
2.98x10⁶
1.1x10⁶
17 July prepared date
22 July prepared date
30 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
July '56

Operation began:

Elmer sampler	–	24 May 1956
Ainsworth "	–	29 May 1956
Sta. # 70 "	–	29 May 1956

All three units were calibrated at the shop (Elmer) before being put in operation. A calibration chart will be found in the rear of this record. The units were found to be quite linear for evenly spaced pulses.

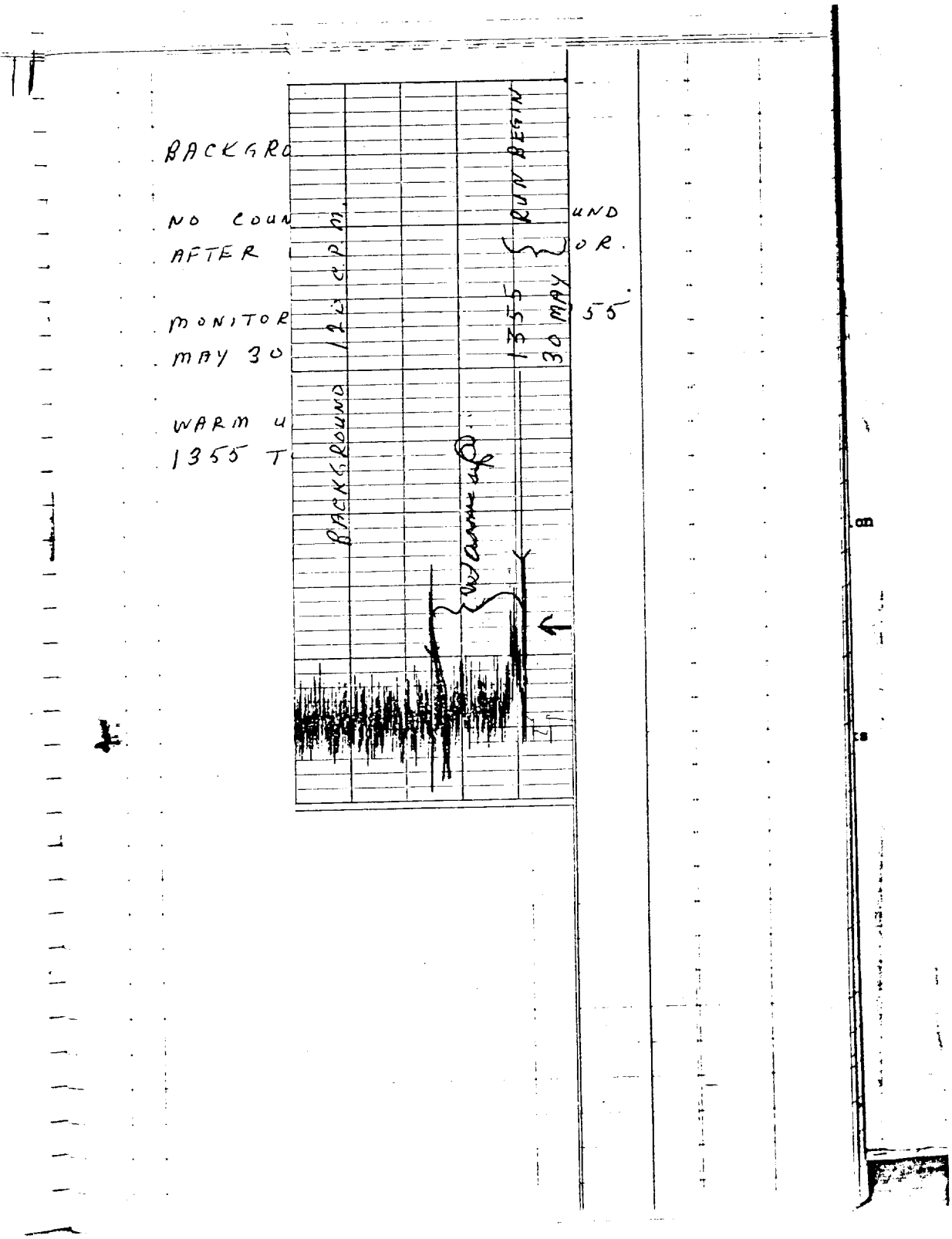
The following may be used to calculate the number of cubic feet of air whose residue is seen by the detector at any given time.

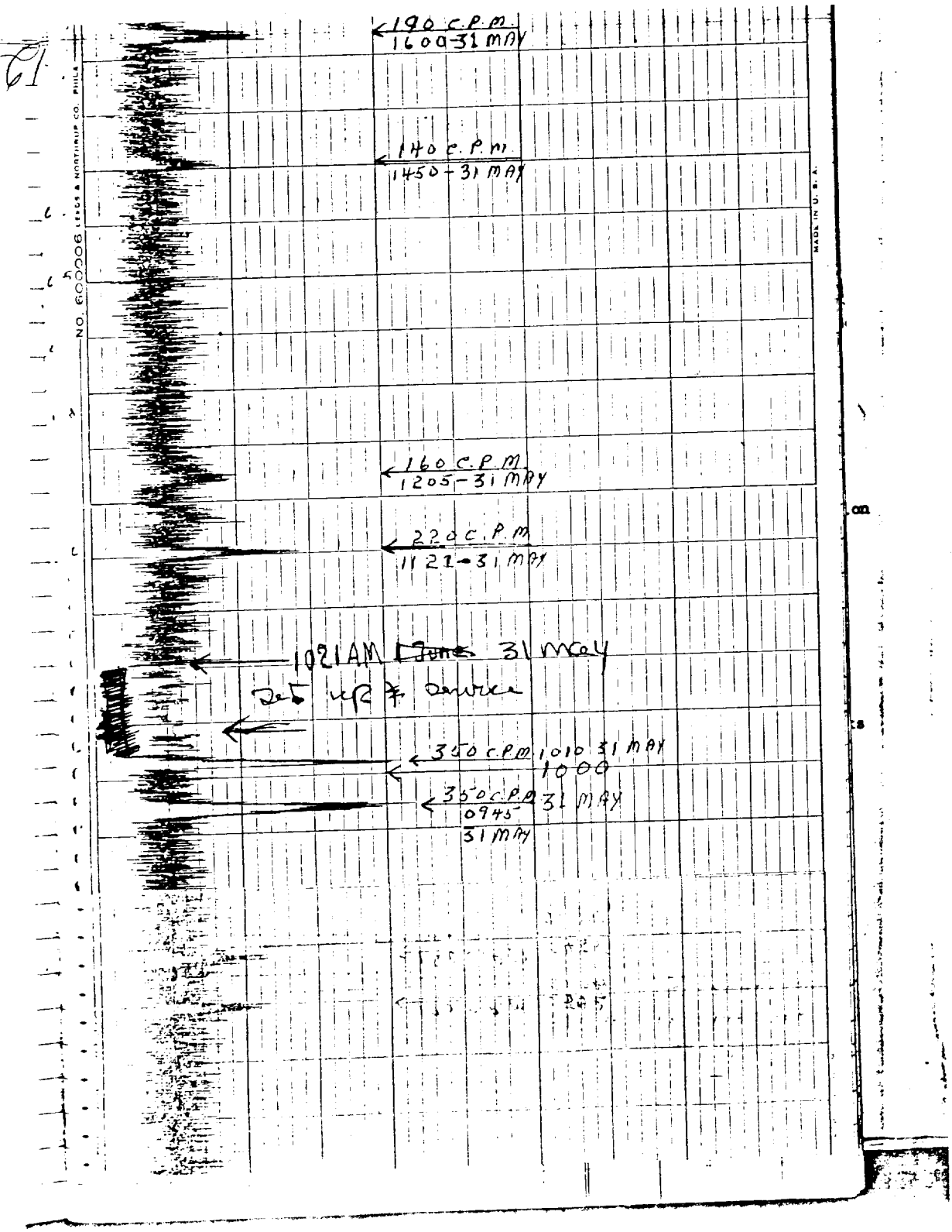
$$N = 3.06 \frac{A}{B}$$

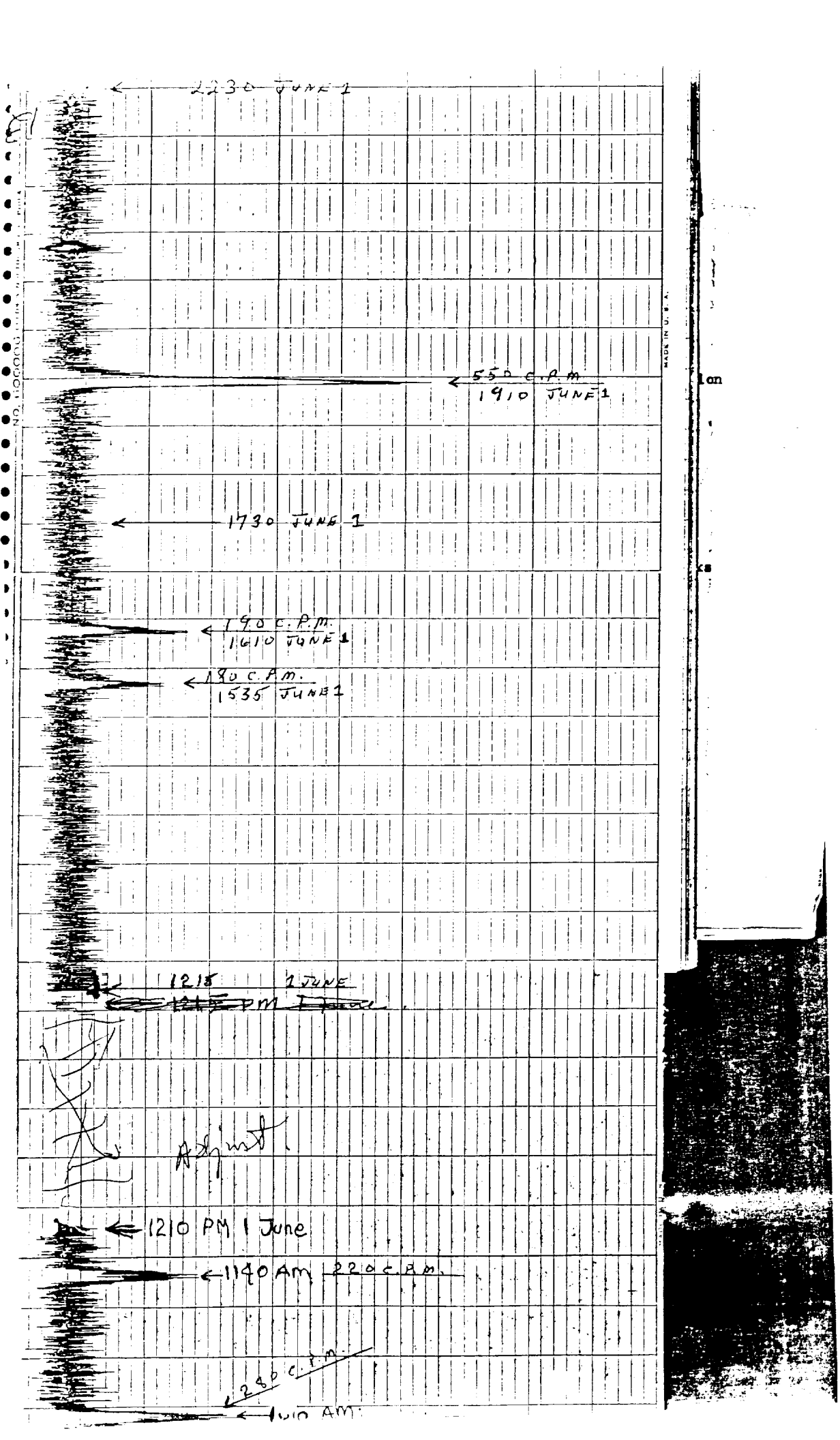
Where:

N = number of cubic feet
A = air flow rate, ft^3/minute
B = filter paper speed, ft/hour

Detector efficiency values taken using the sources supplied with the unit follow.



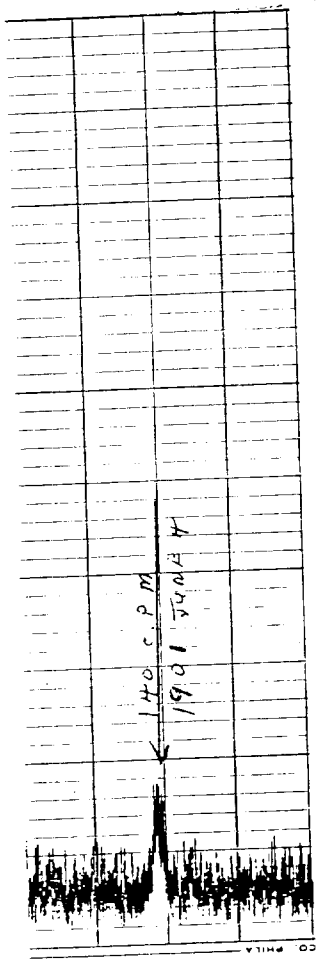

190 c.p.m.
1600-31 MAY
140 c.p.m.
1450-31 MAY
160 c.p.m.
1205-31 MAY
220 c.p.m.
1122-31 MAY
1021 AM 31 May
350 c.p.m. 1010 31 MAY
1000
350 c.p.m.
0945
31 MAY


2230 JUNE 1
550 c.p.m
1910 JUNE 1
1730 JUNE 1
190 c.p.m.
1610 JUNE 1
180 c.p.m.
1535 JUNE 1
1215 1 JUNE
Adjmt
1210 PM 1 June
1140 Am 220 c.p.m.
240 c.p.m.
1110 AM

NO. 600006 LEEDS & NORTHRUP CO. PHILA.
710 C JUNE 3
340 C.P.M.
0705 JUNE 3
0315 JUNE 3
200 C.P.M.
0115 JUNE 3
NO. 600006 LEEDS & NORTHRUP CO. PHILA.

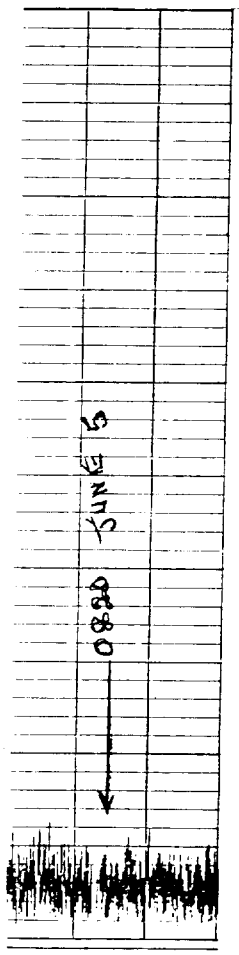
BACKGROUND - 70 C.P.M.

1901 140 C.P.M.



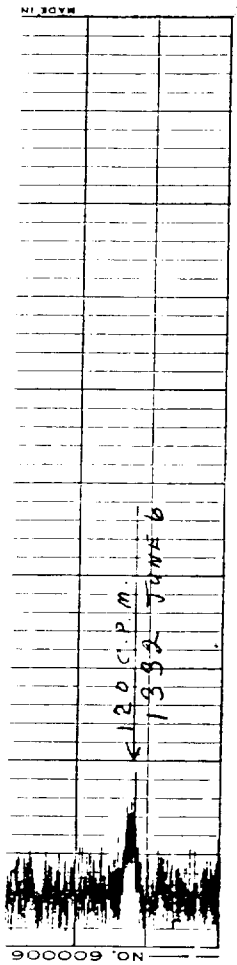
BACKGROUND - 60 C.P.M.

NO COUNTS ABOVE BACKGROUND



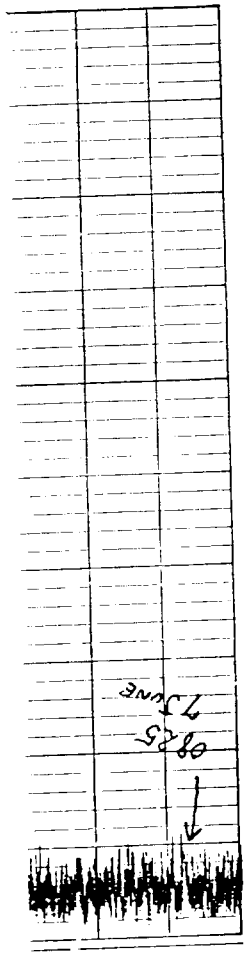
BACKGROUND - 60 C.P.M.

1332 120 C.P.M.



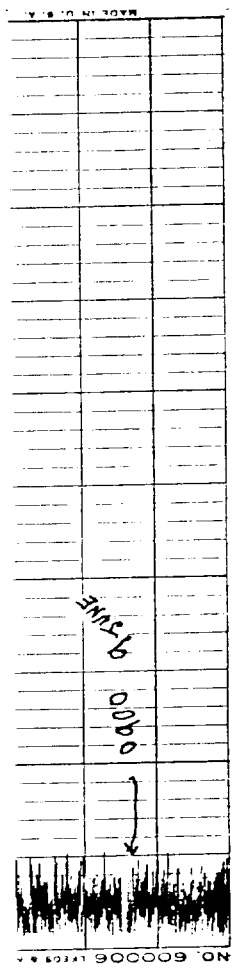
BACKGROUND - 55 C.P.M.

NO COUNTS ABOVE BACKGROUND



BACKGROUND - 50 C.P.M.

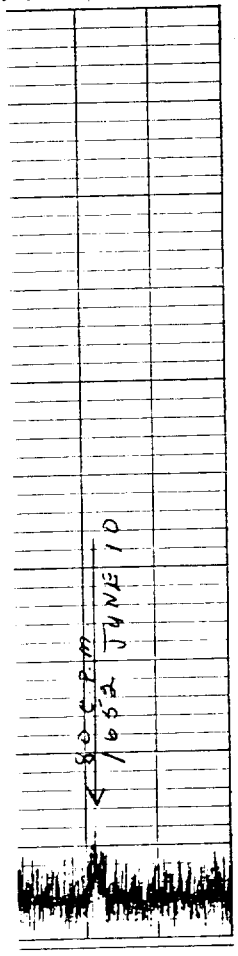
NO COUNTS ABOVE BACKGROUND.



20

BACKGROUND - 50 C.P.M.

1652. 80 e.P.M.

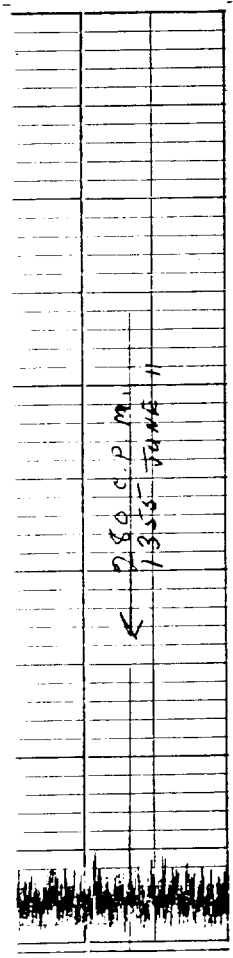


2A

BACKGROUND - 40 C.P.M.

1355 980 C.P.M. (CHECK GRAPH)

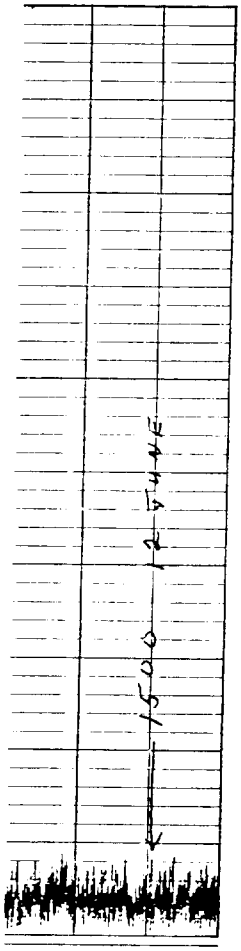
(May have been automatic recorder balance)

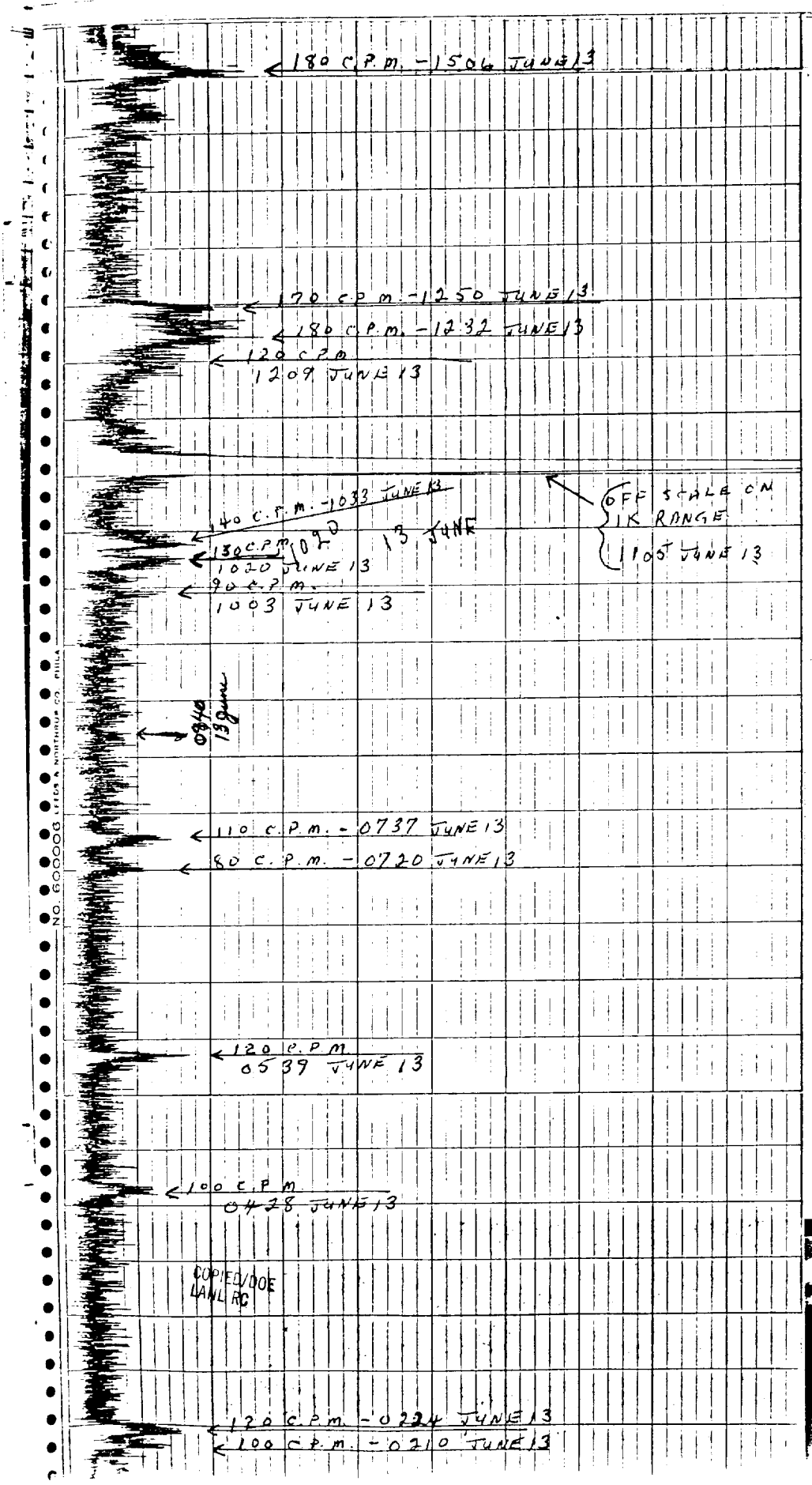


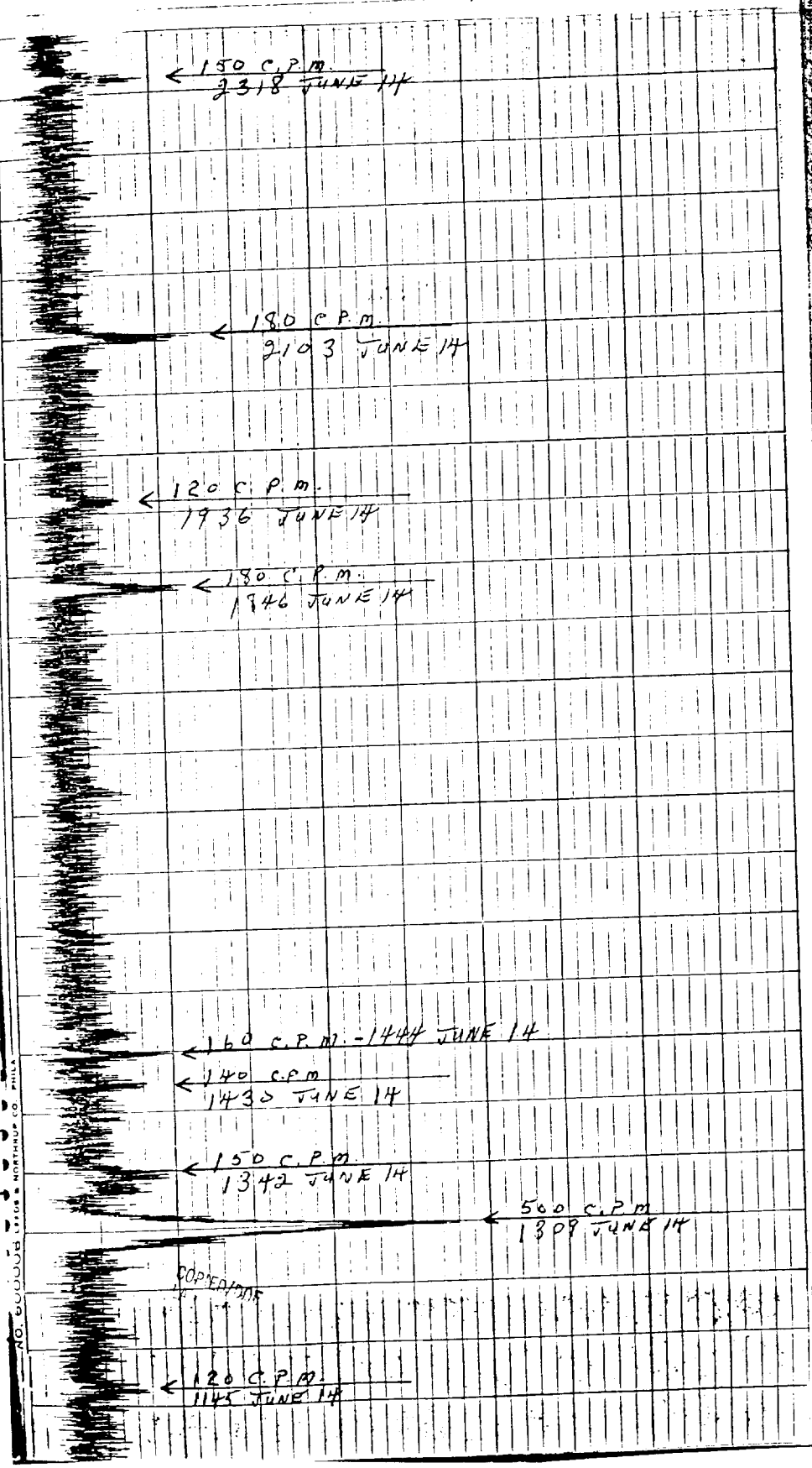
12 JUNE 1956 29

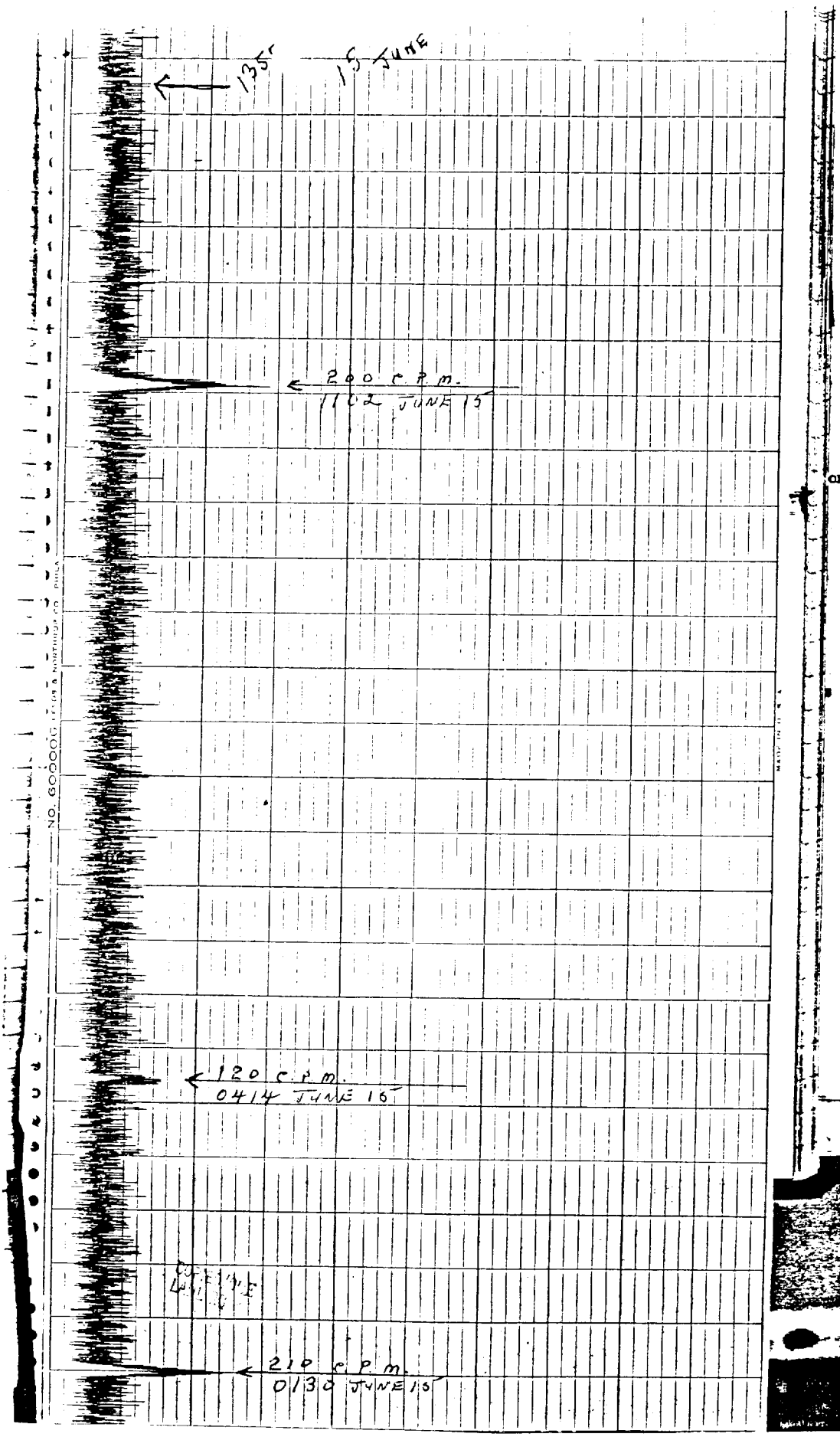
BACKGROUND - 40 C.P.M.

NO COUNTS ABOVE BACKGROUND.





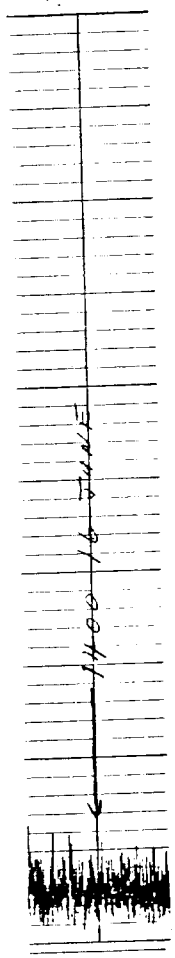

150 C.P.M.
2318 JUNE 14
180 C.P.M.
2103 JUNE 14
120 C.P.M.
1936 JUNE 14
180 C.P.M.
1846 JUNE 14
160 C.P.M. - 1444 JUNE 14
140 C.P.M.
1430 JUNE 14
150 C.P.M.
1342 JUNE 14
500 C.P.M.
1309 JUNE 14
COPENHAGEN
120 C.P.M.
1145 JUNE 14


135°
15 JUNE
200 c.p.m.
1102 JUNE 15
120 c.p.m.
0414 JUNE 15
210 c.p.m.
0130 JUNE 15

BACKGROUND - 70 C.P.M.

NO COUNTS ABOVE BACKGROUND.

MONITOR WAS TURNED
OFF AT 1540 JUNE 16
TO 0846 JUNE 17.



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aks

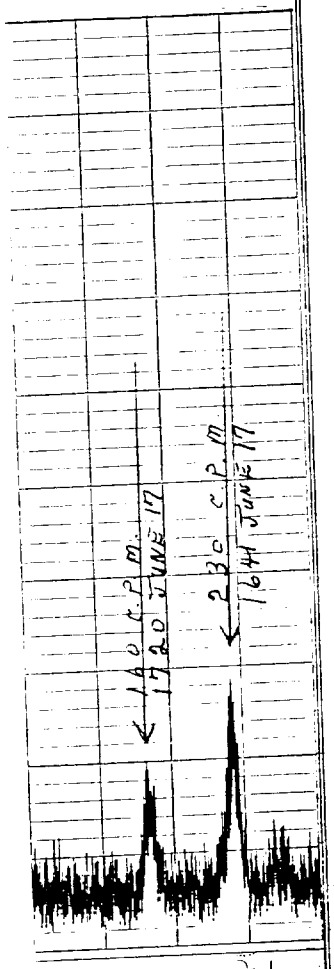
-27

BACKGROUND - 60 C.P.M.

0845 MONITOR WARM UP FOR 45 MINUTES

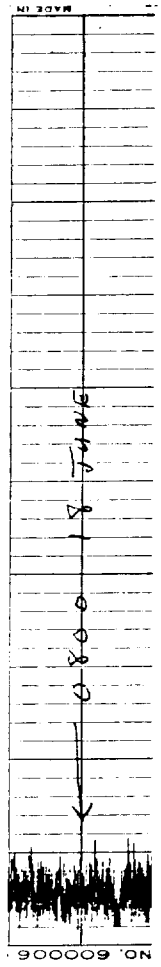
1641 230 c.p.m.

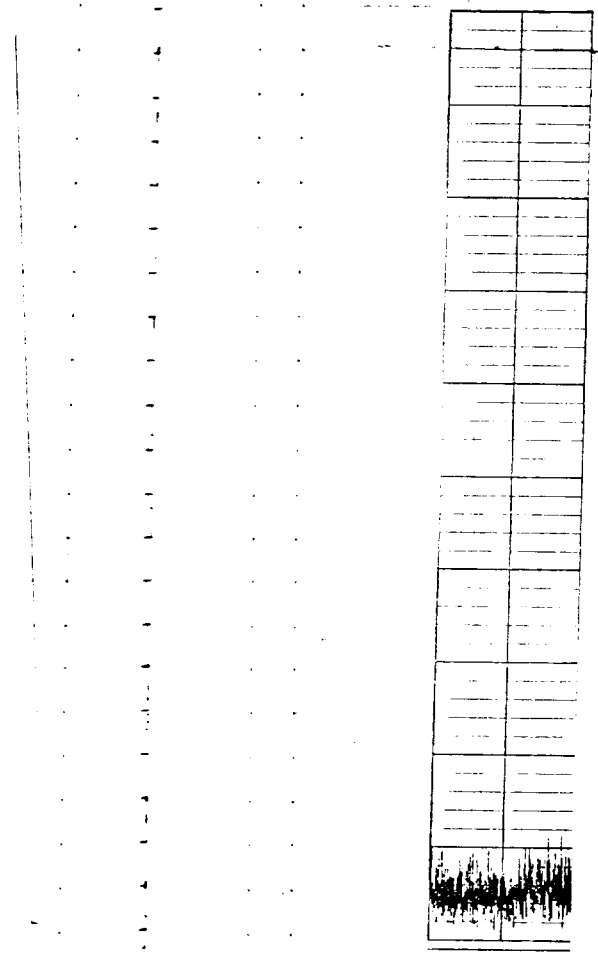
1720 160 c.p.m.

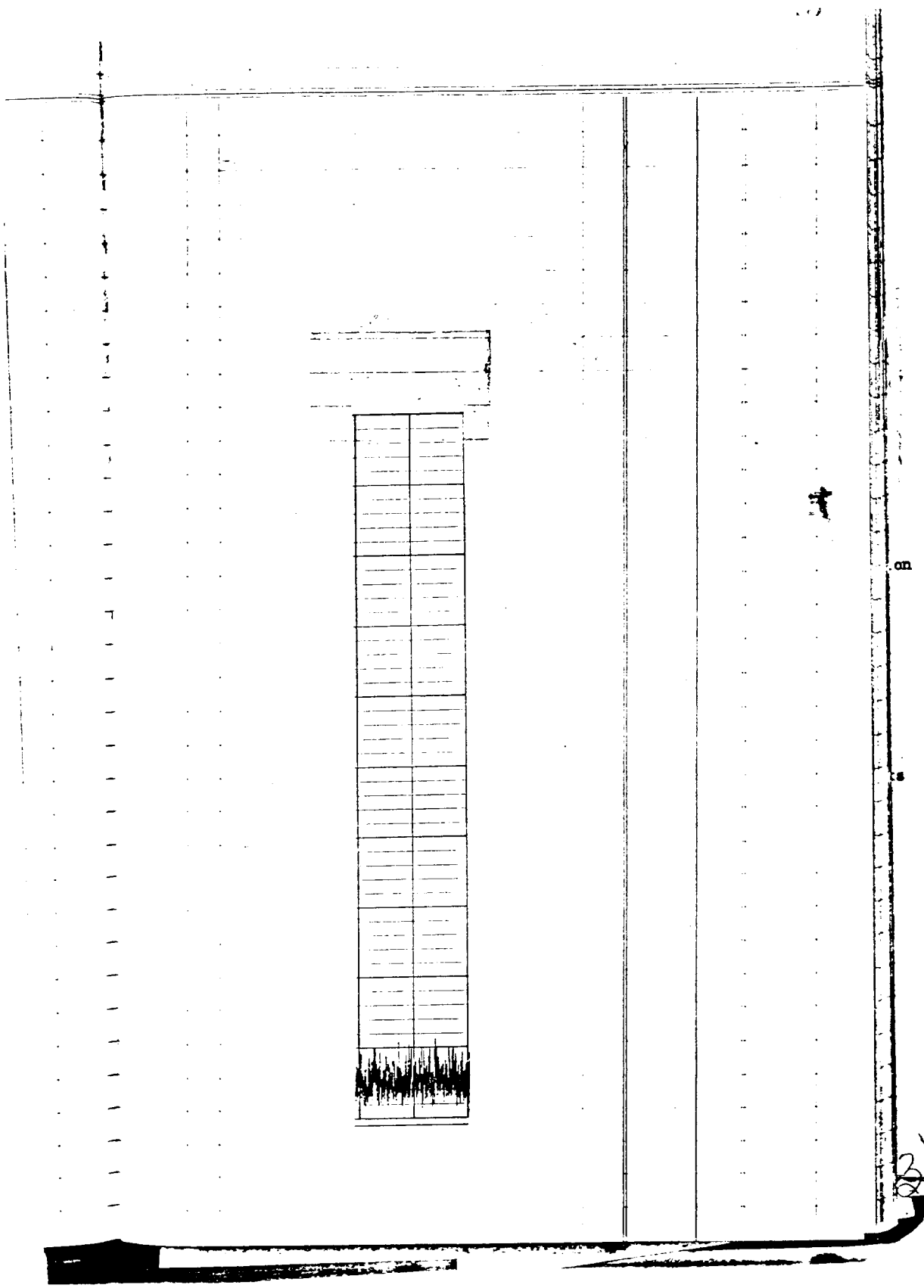


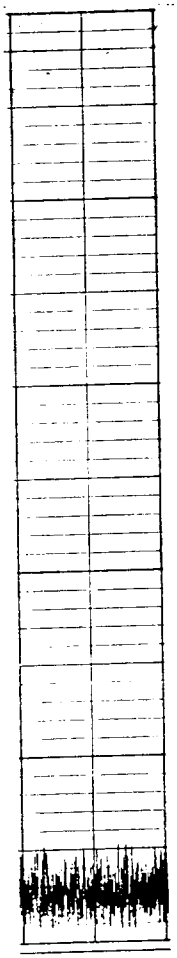
BACKGROUND - 60 C.P.M.

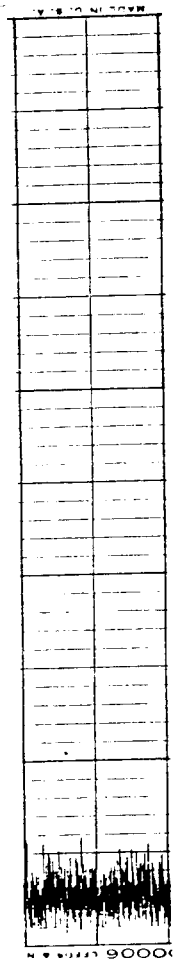
NO COUNTS ABOVE BACKGROUND

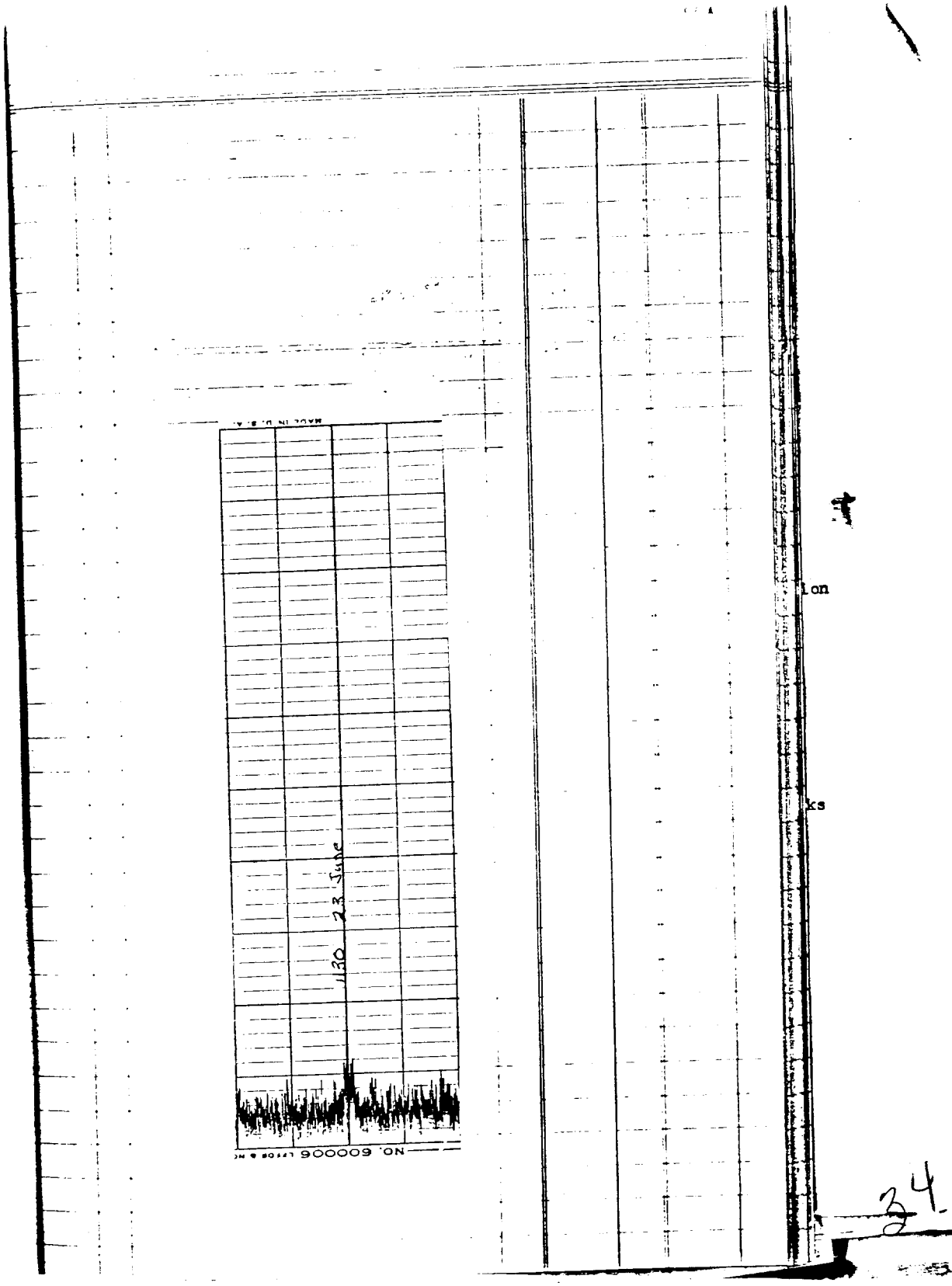












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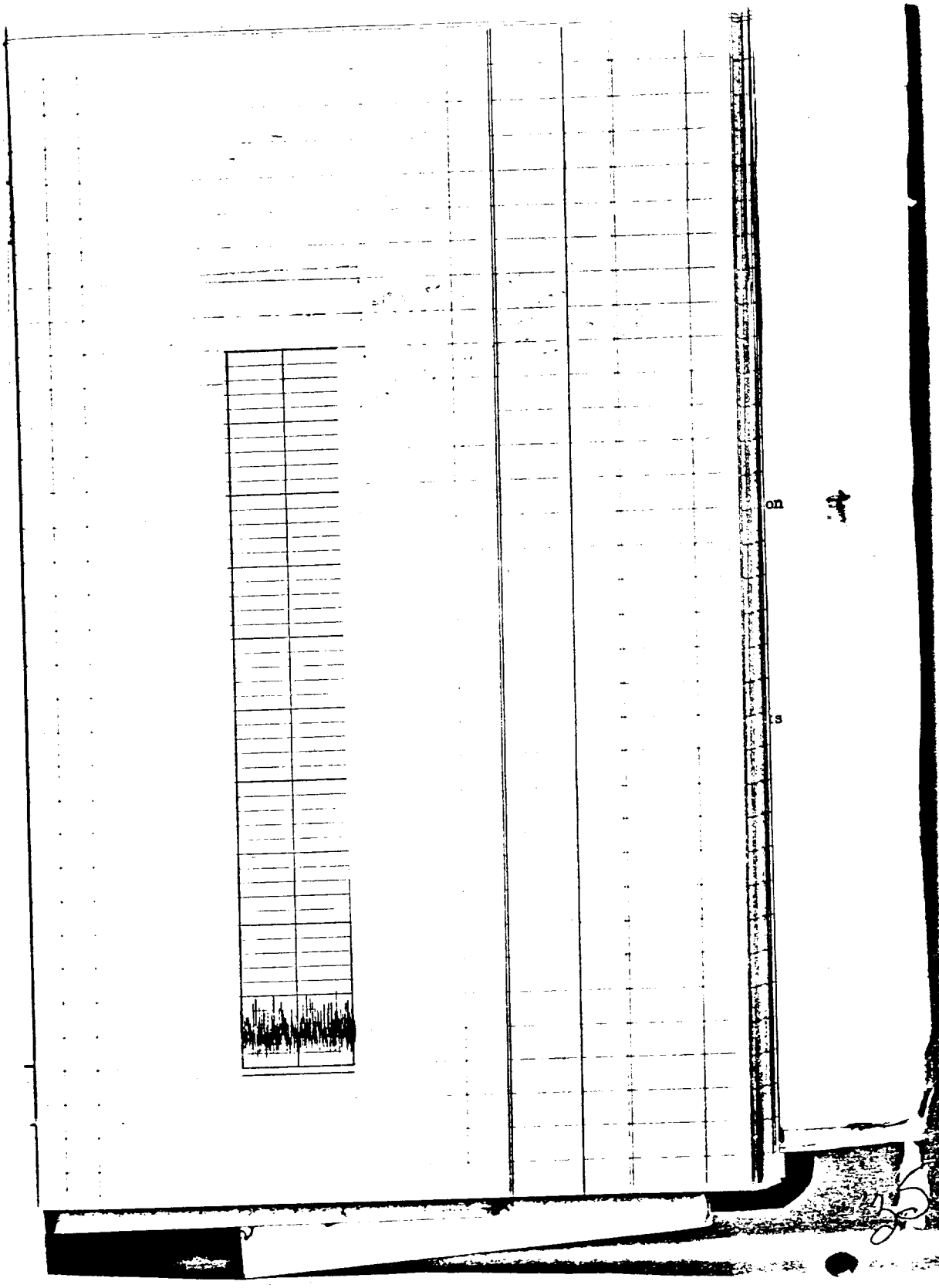
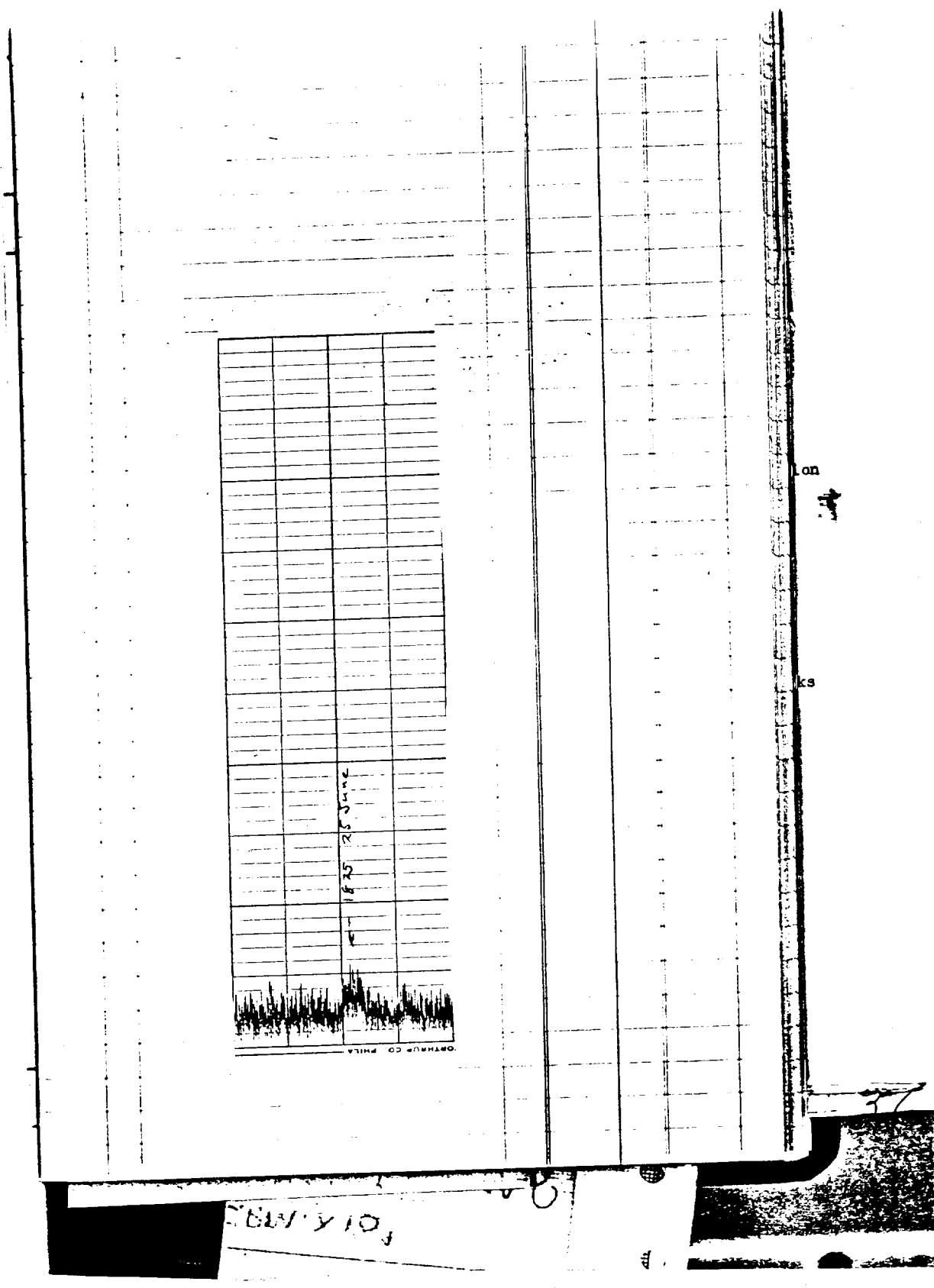
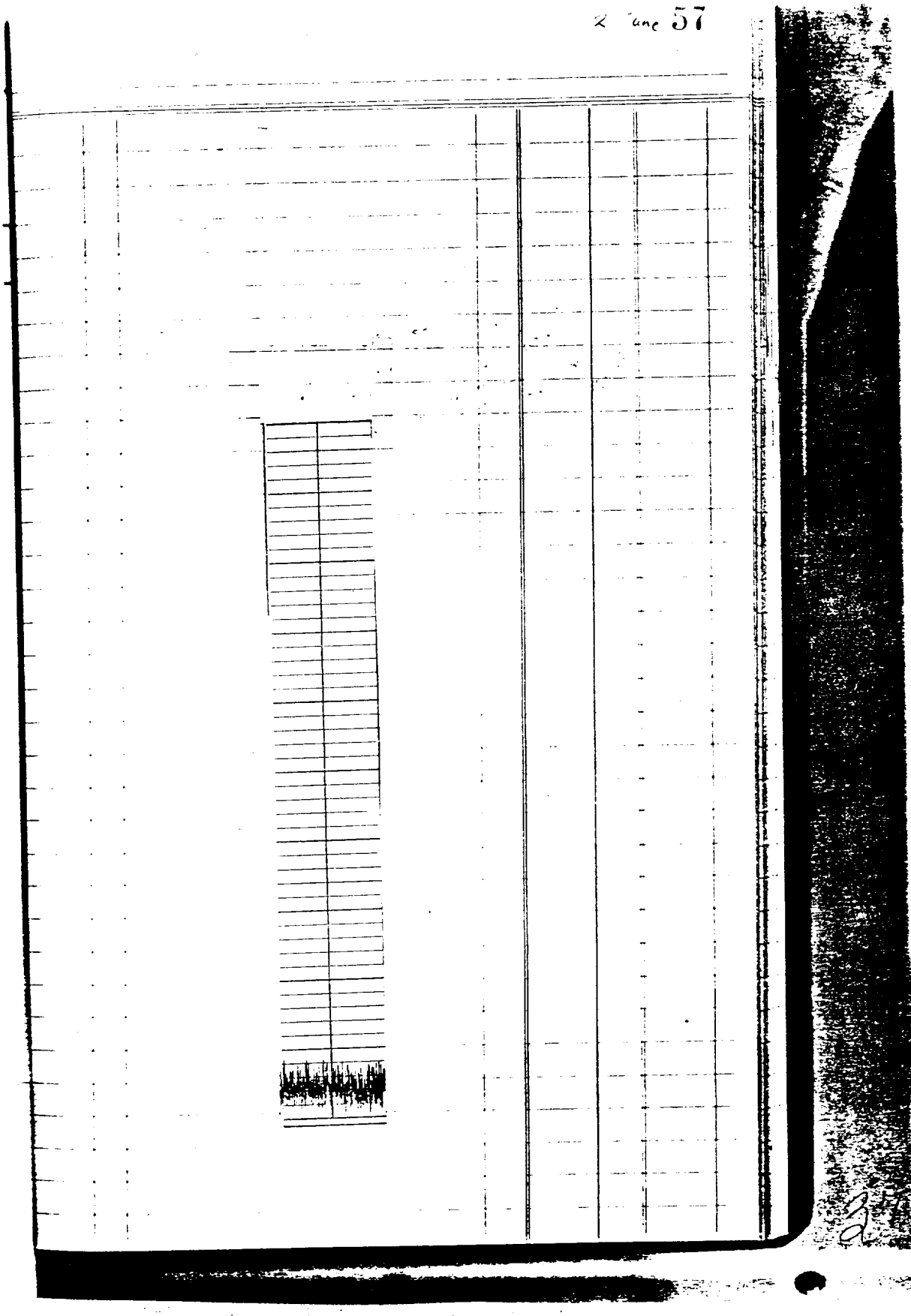
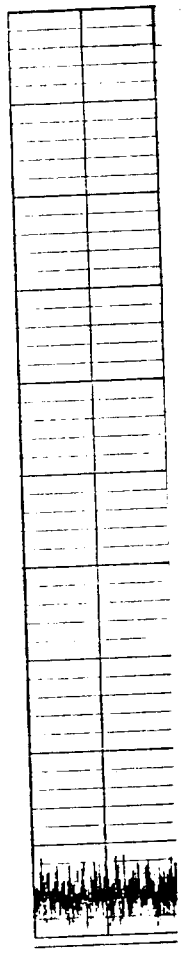
34





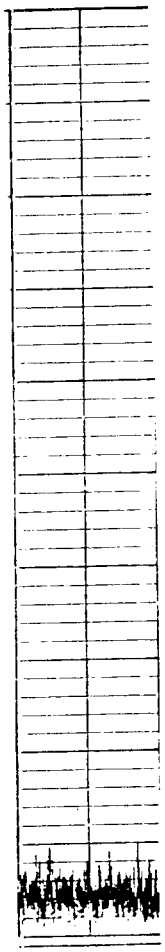


29 June 59

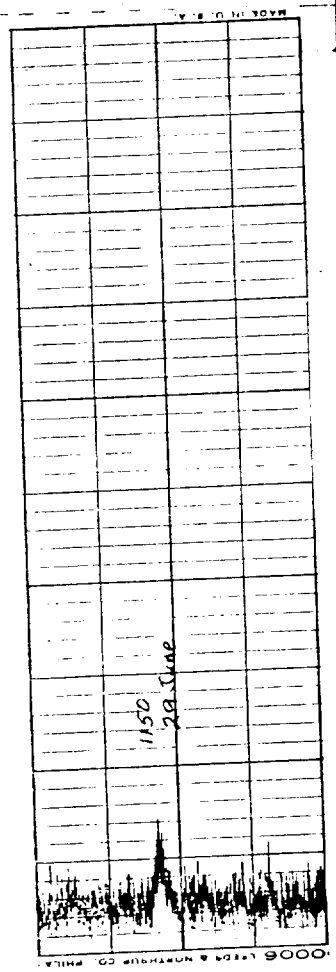


38

28 June 61



29 June 63



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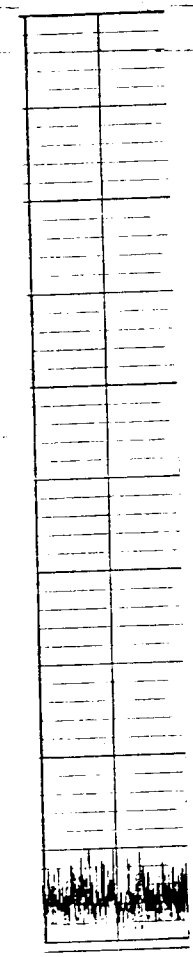
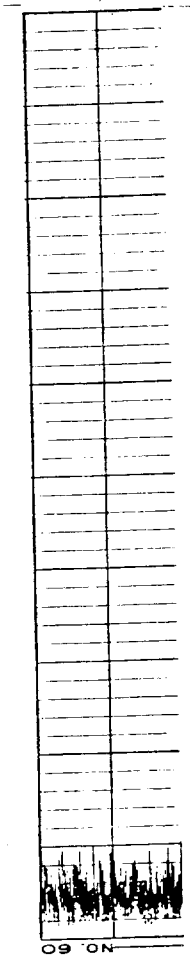
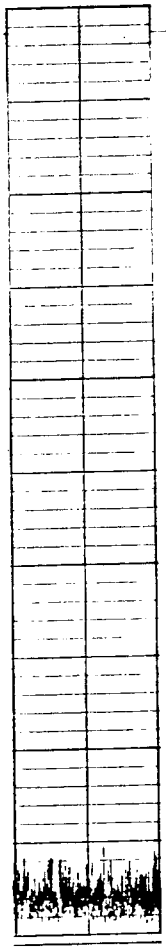


NO. 6 GROUND

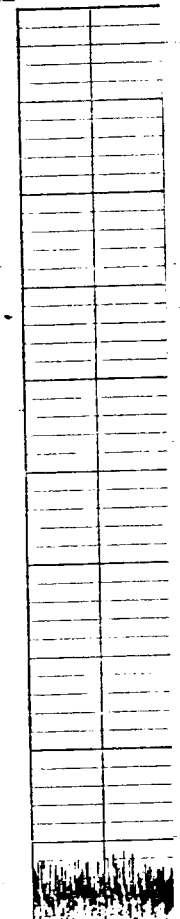
1535 2 5 4 2



3 July 71

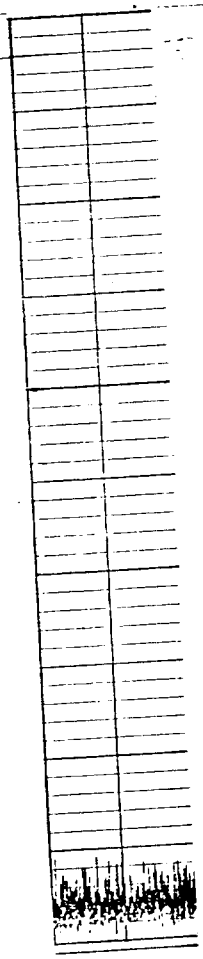


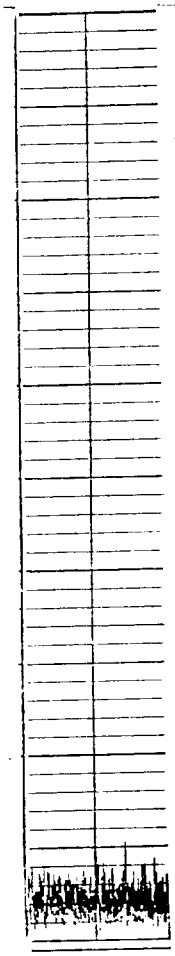
4 July 73

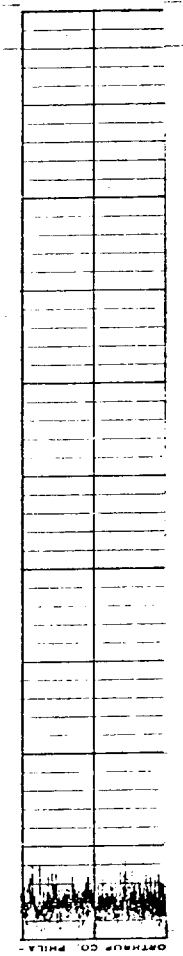


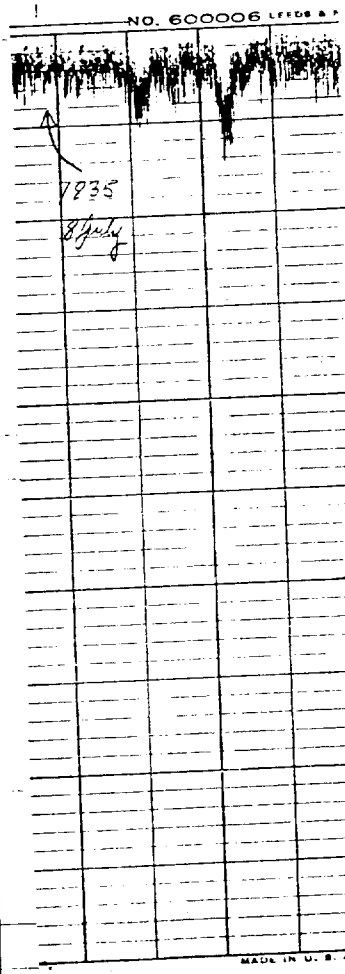
45

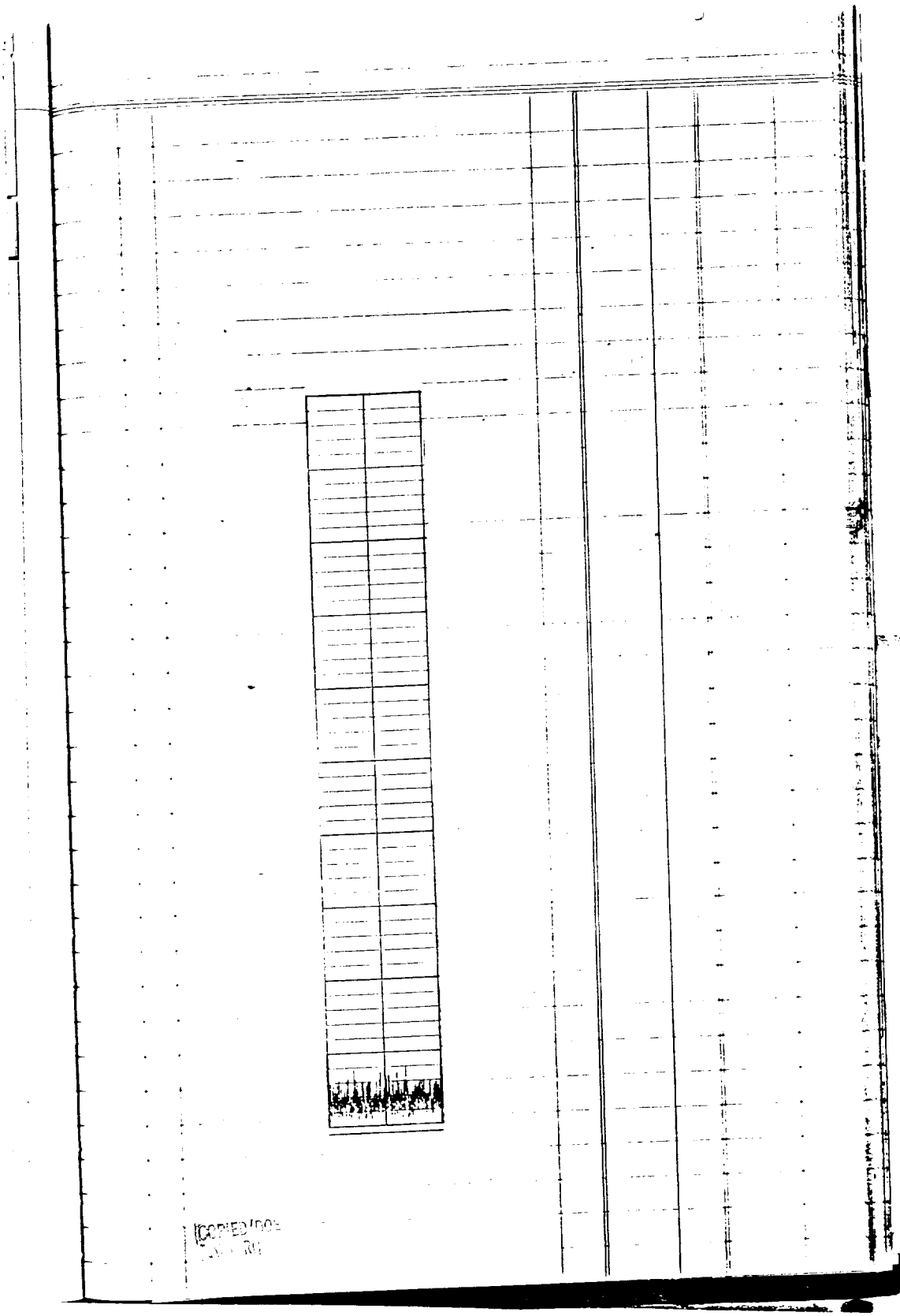
5 July 75

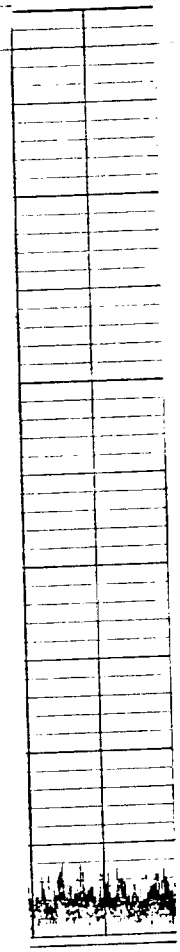




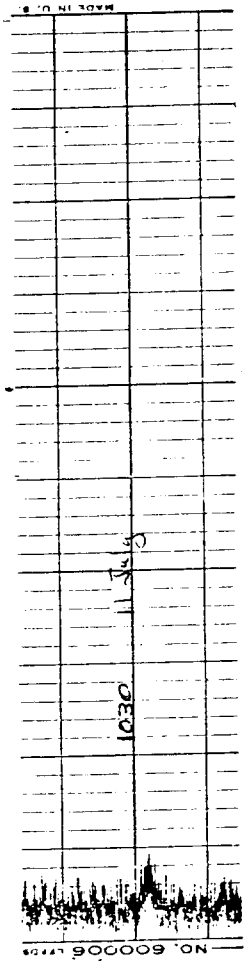








11 July 87



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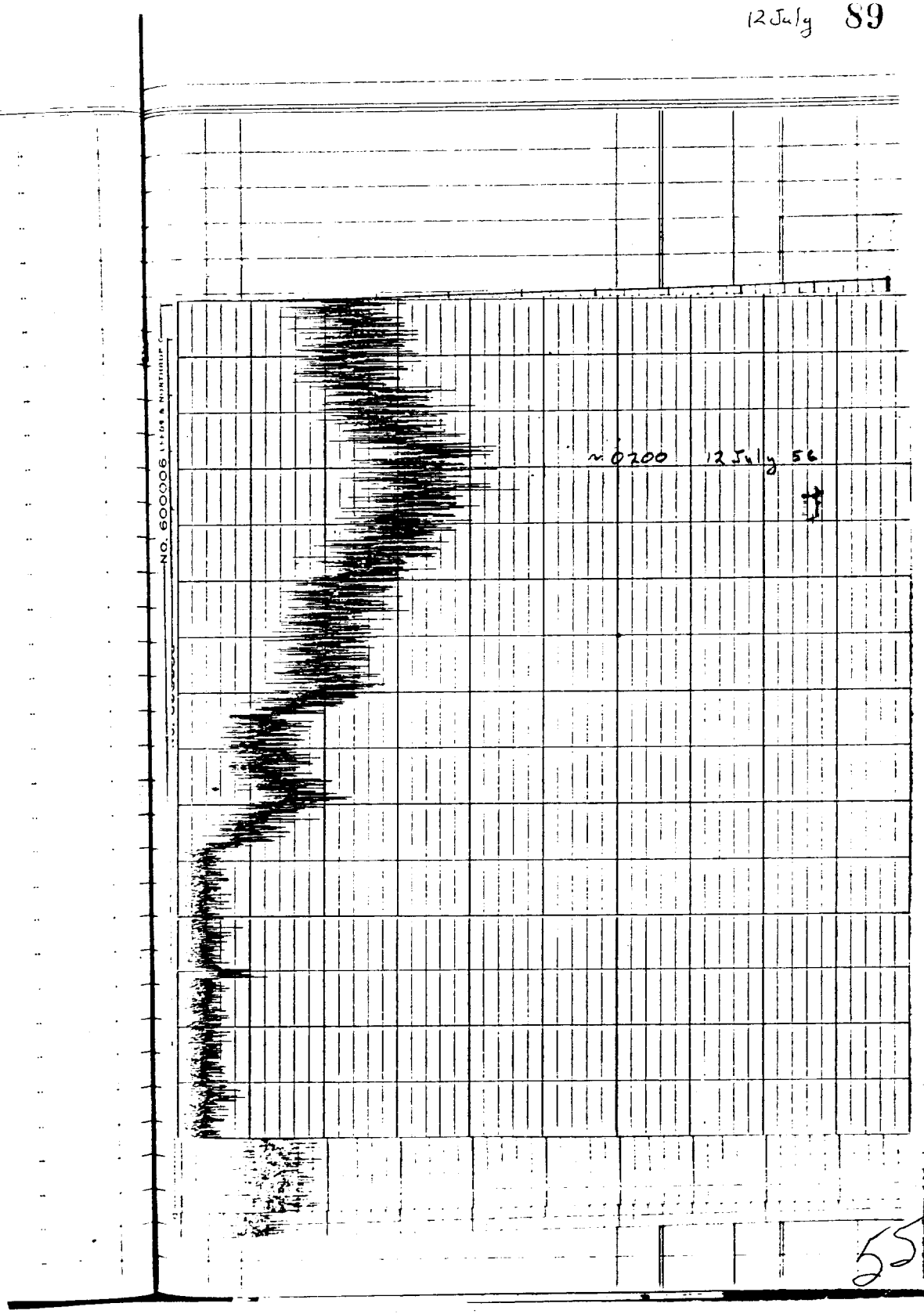
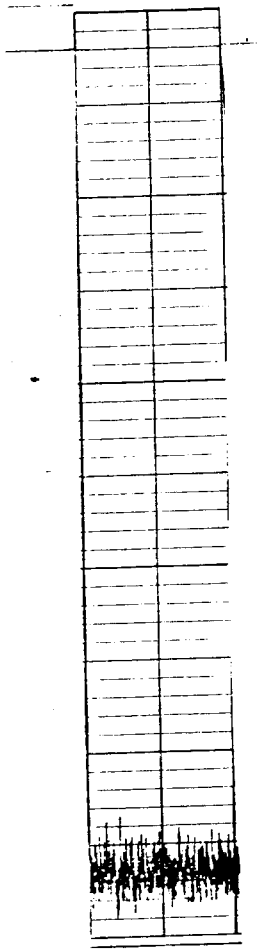
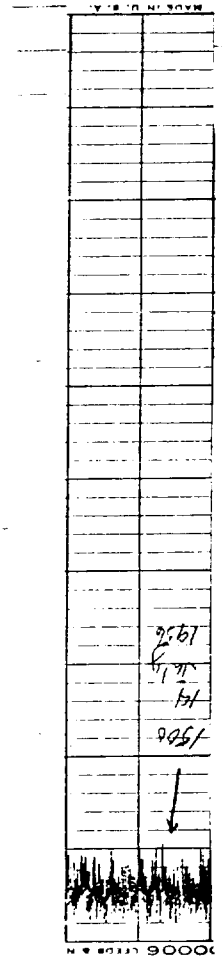
12 July 89





14 July 93



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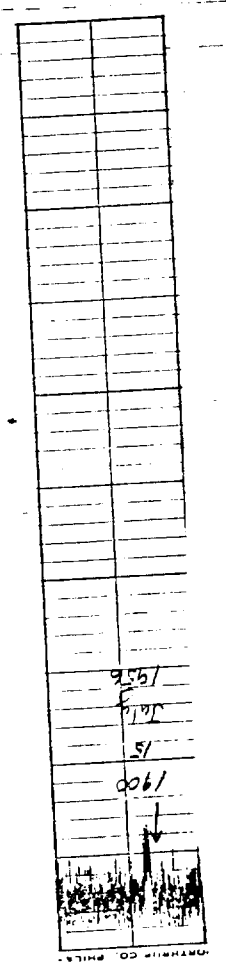
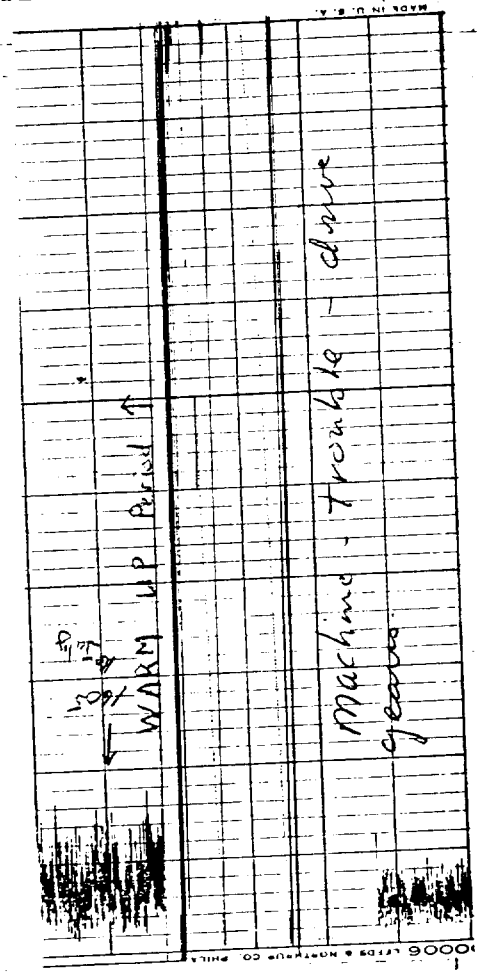
LANL RC

15 July 95



58

16 July 97



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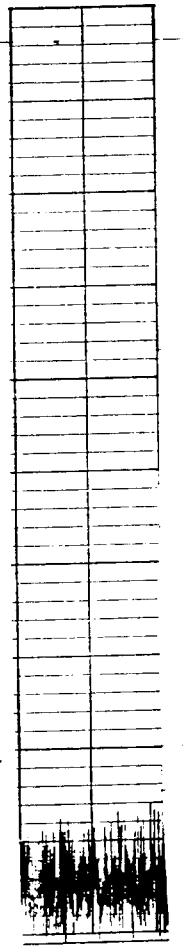
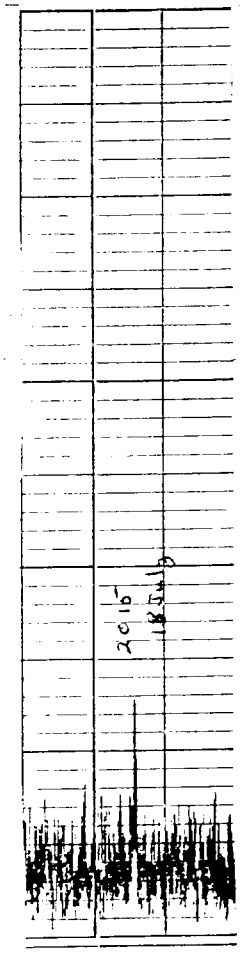
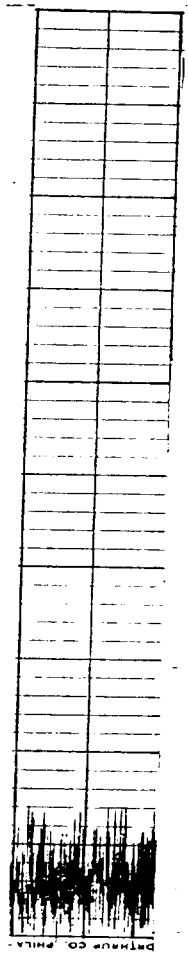
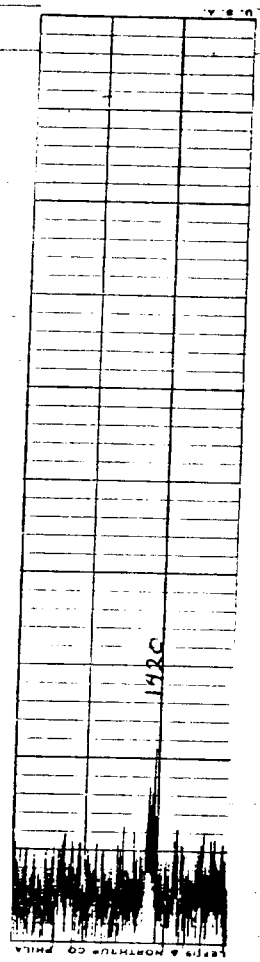
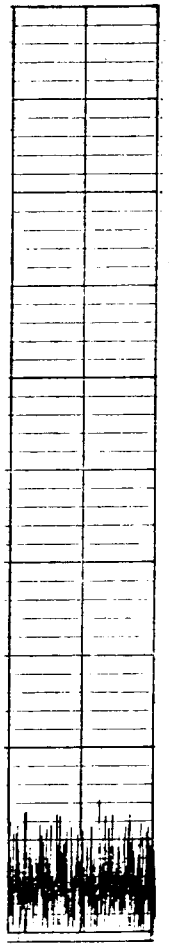
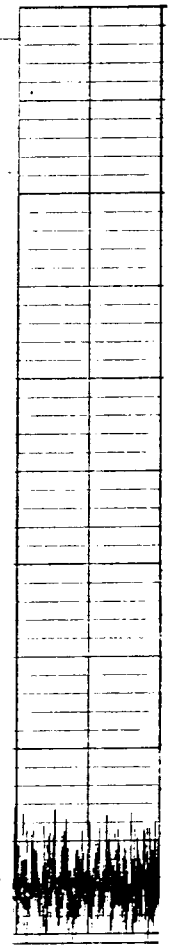


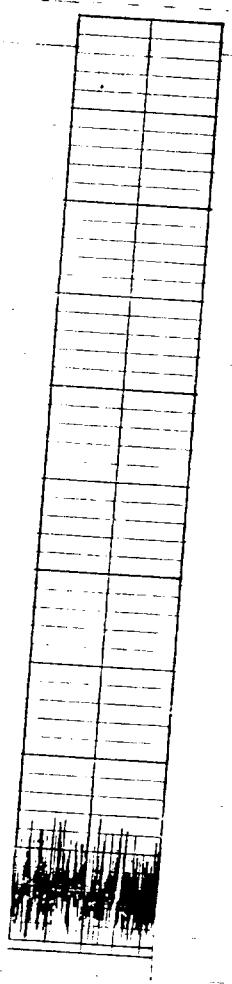

2016
1854/9

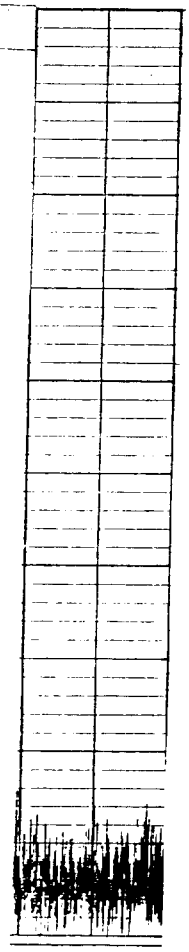


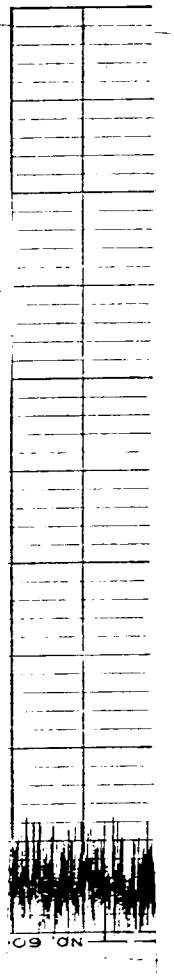


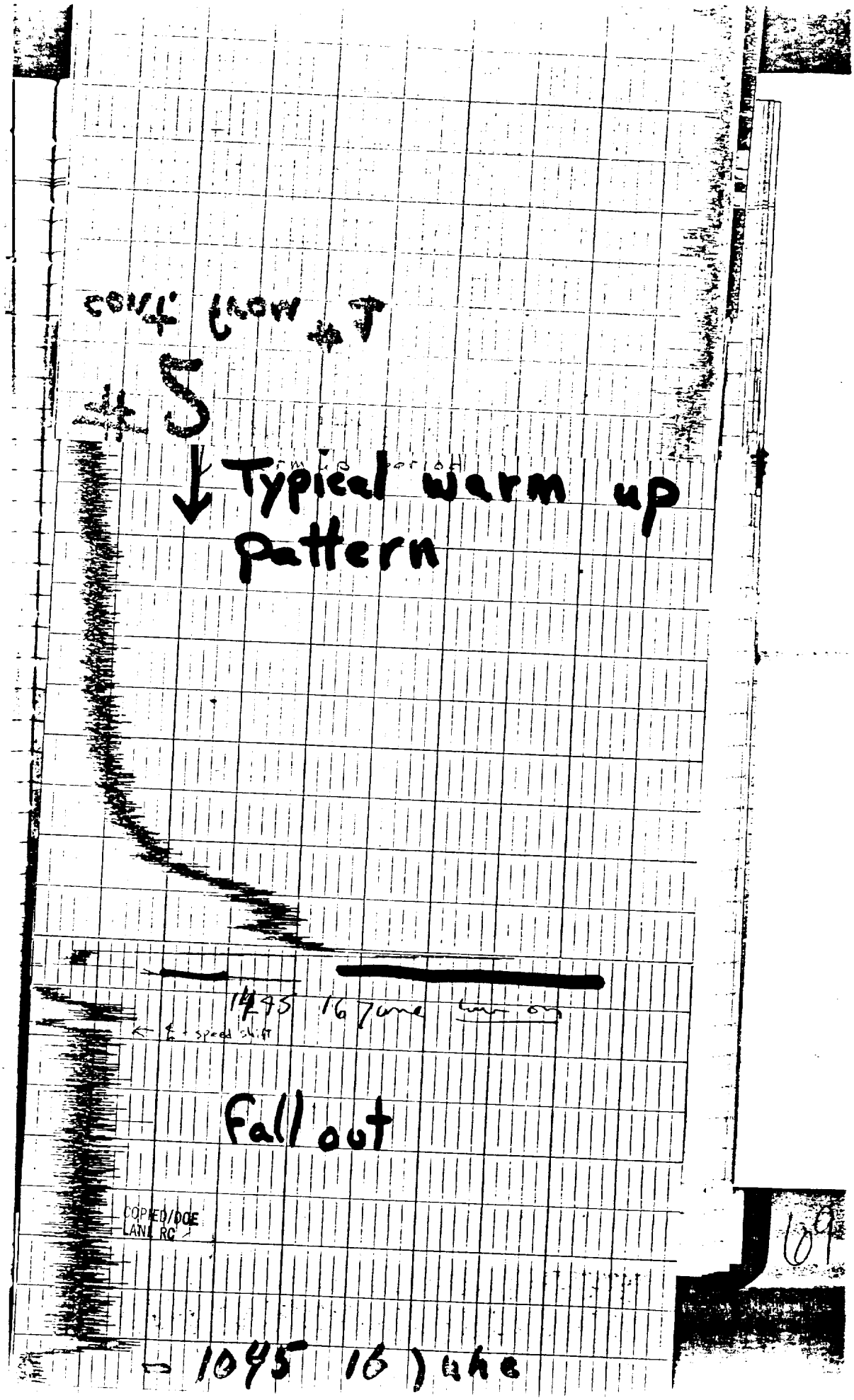











cool flow + T
+5
↓ Typical warm up pattern
1495
16 Tune
← E - speed shift
Fall out
COPIED/DOE LANL RC
1045 16) 4hc

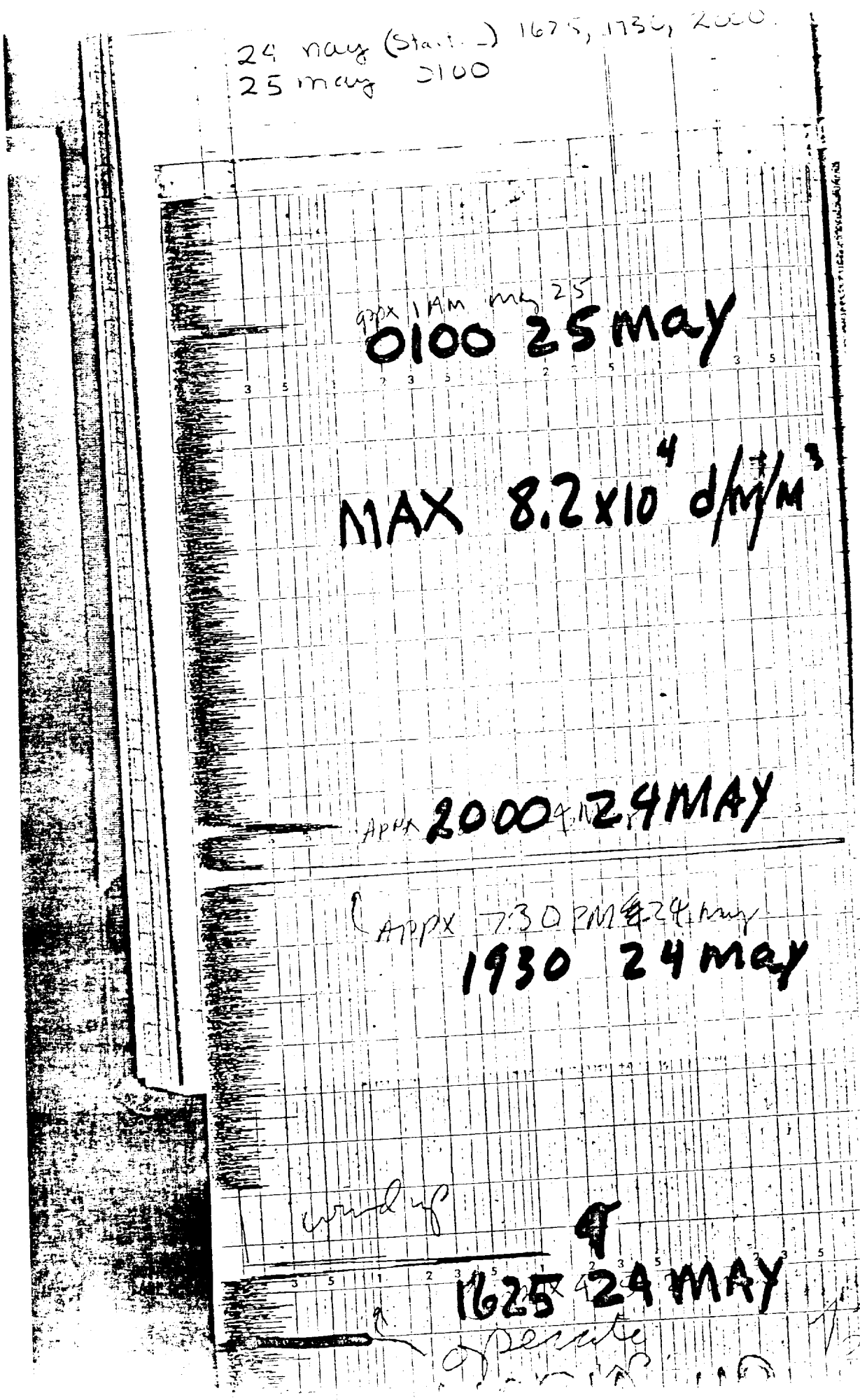
#1

Typical Source
back grounds during
the earlier portion
of the operation

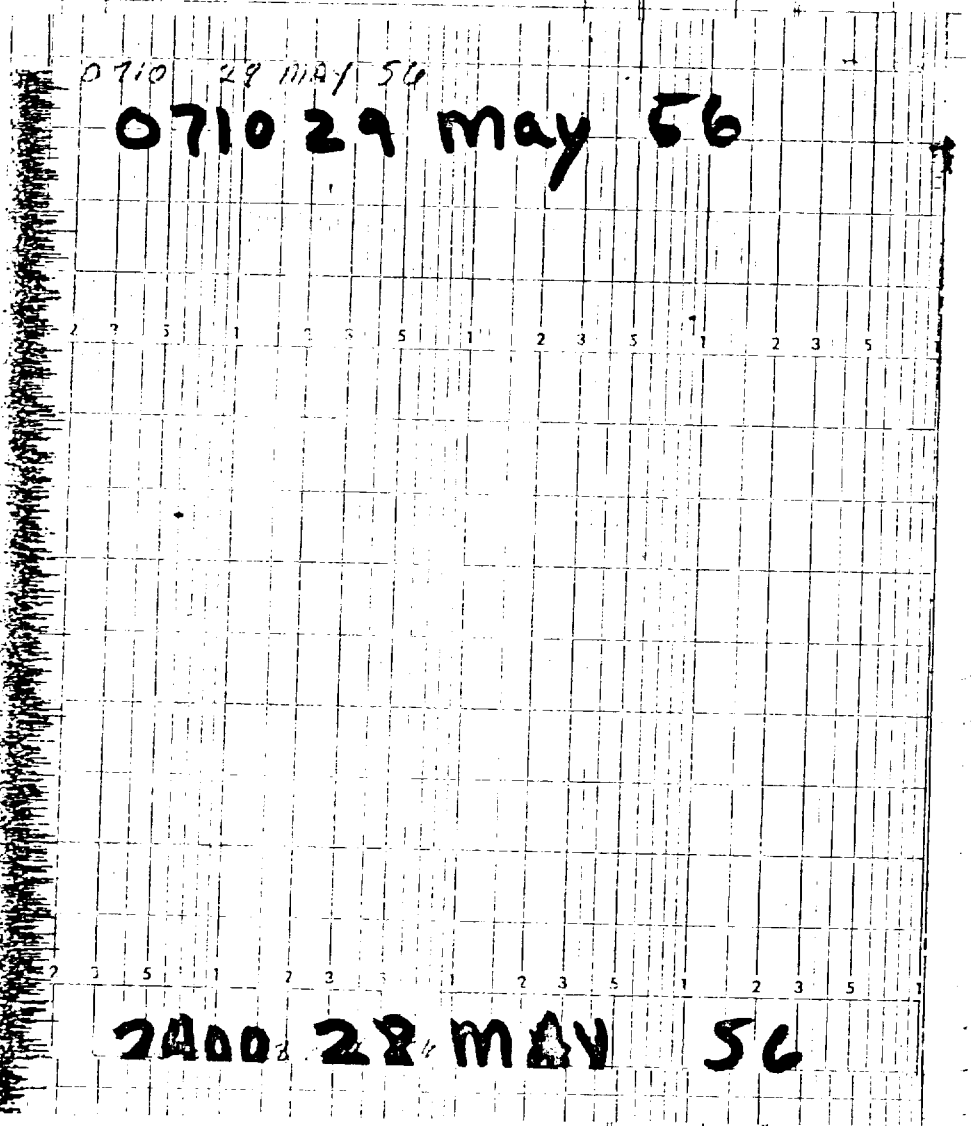
DER 1 curie →

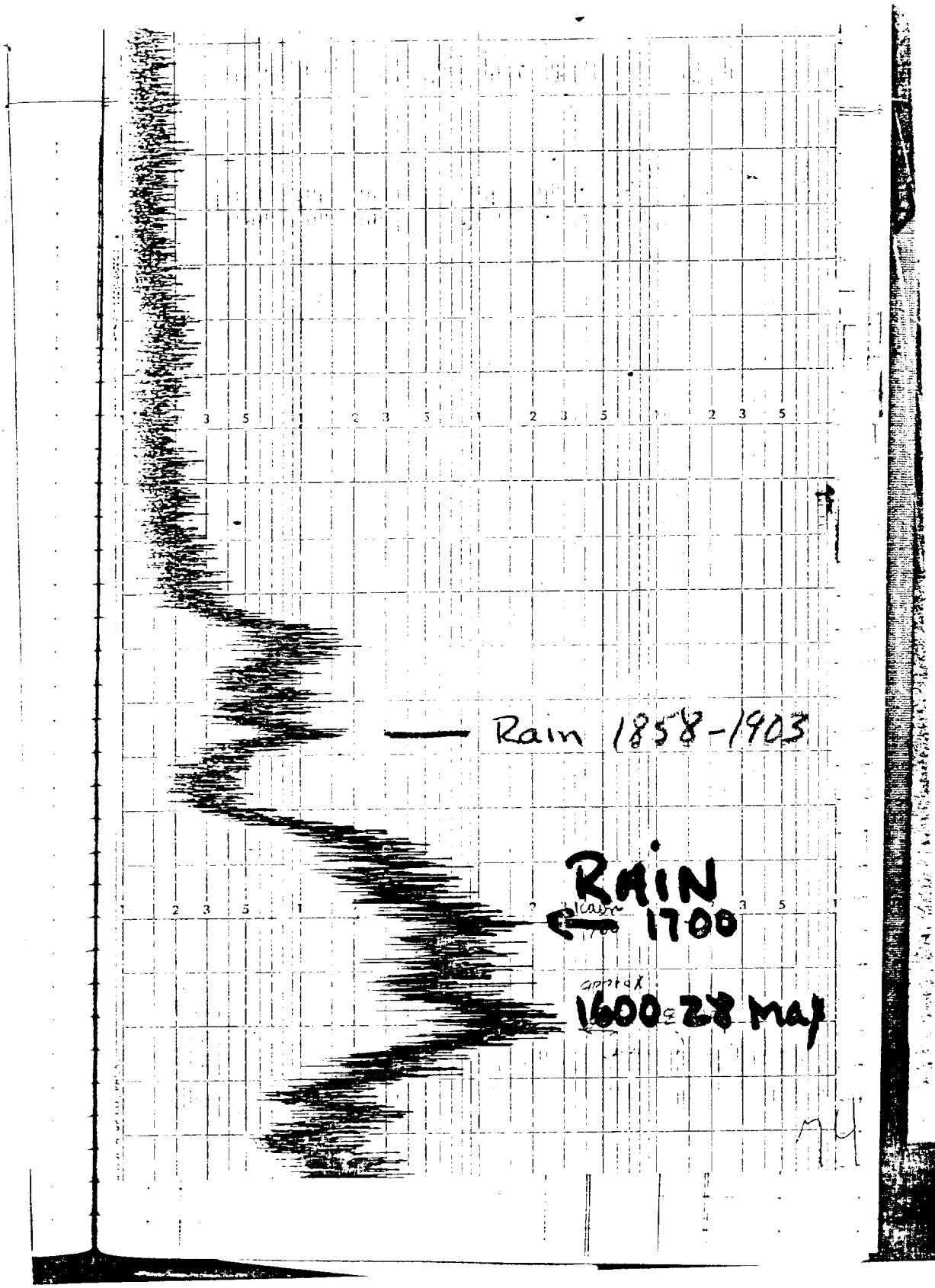
J-Div 287 curie →
located about 120 yds
North east.

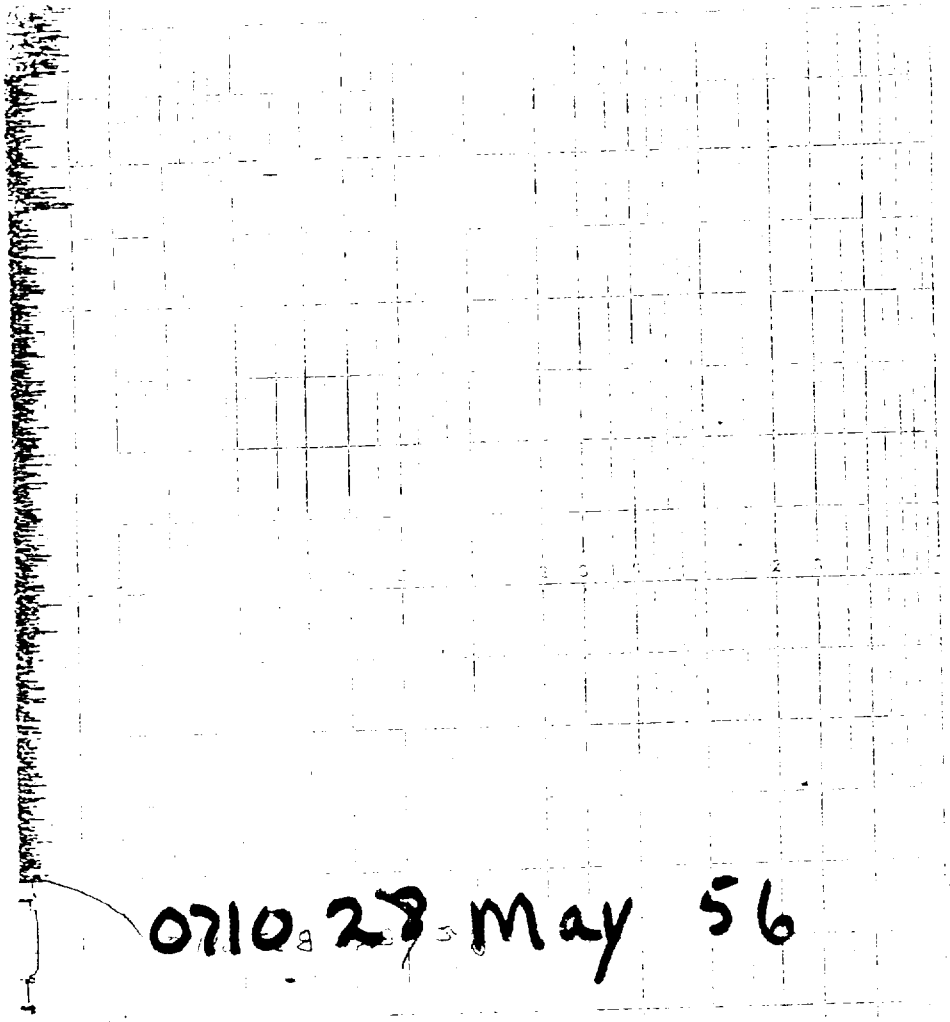
D&R or ESL —


24 may (Start -) 1675, 1730, 2000
25 may 0100
appx 1AM may 25
0100 25 may
MAX 8.2x10^4 d/ft³/M³
Appx 2000 24MAY
Appx 7:30 PM 24 may
1930 24 may
wind up
1625 24 MAY

28 may - 1230 thru 2300







MS

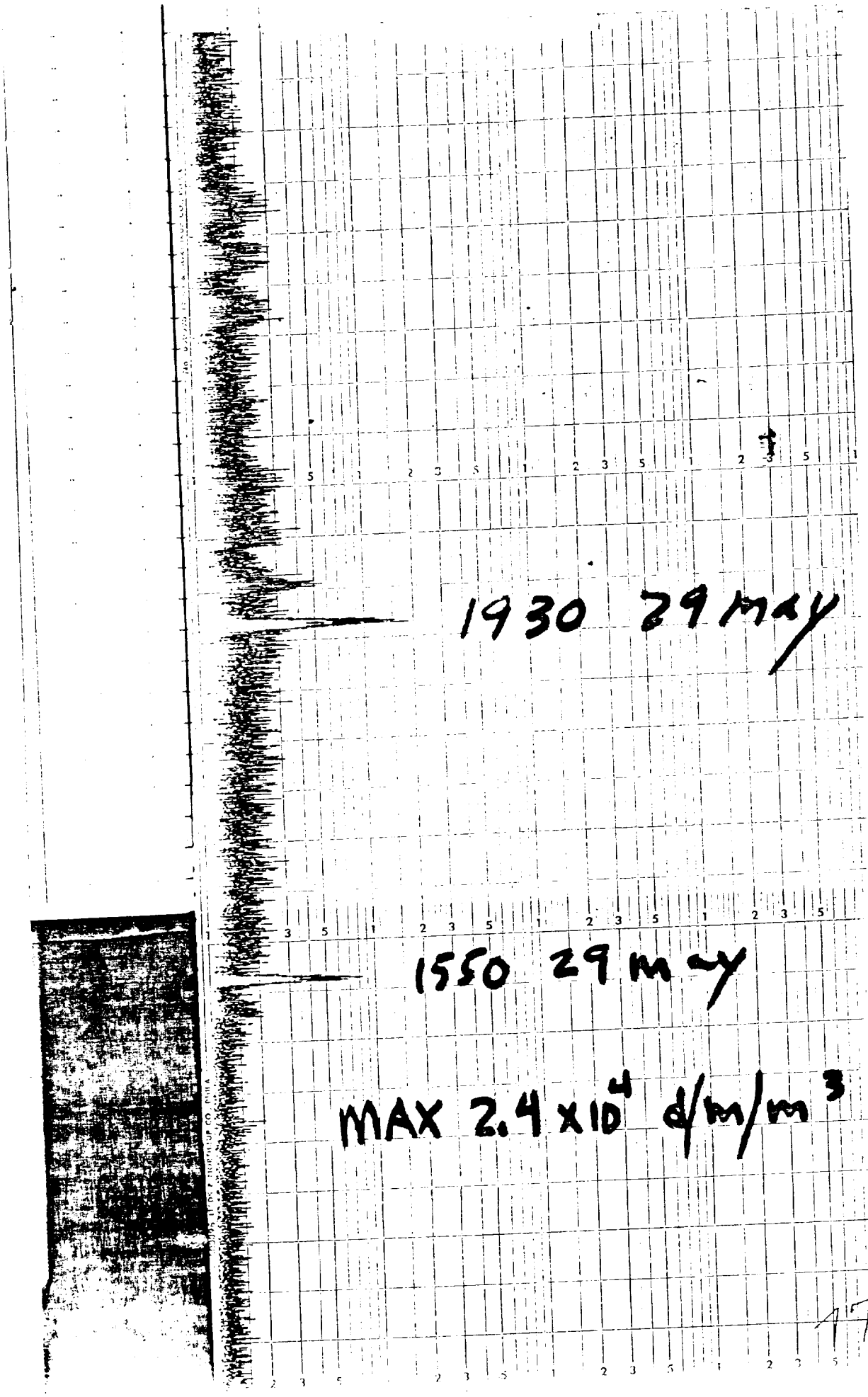
27 may 0130

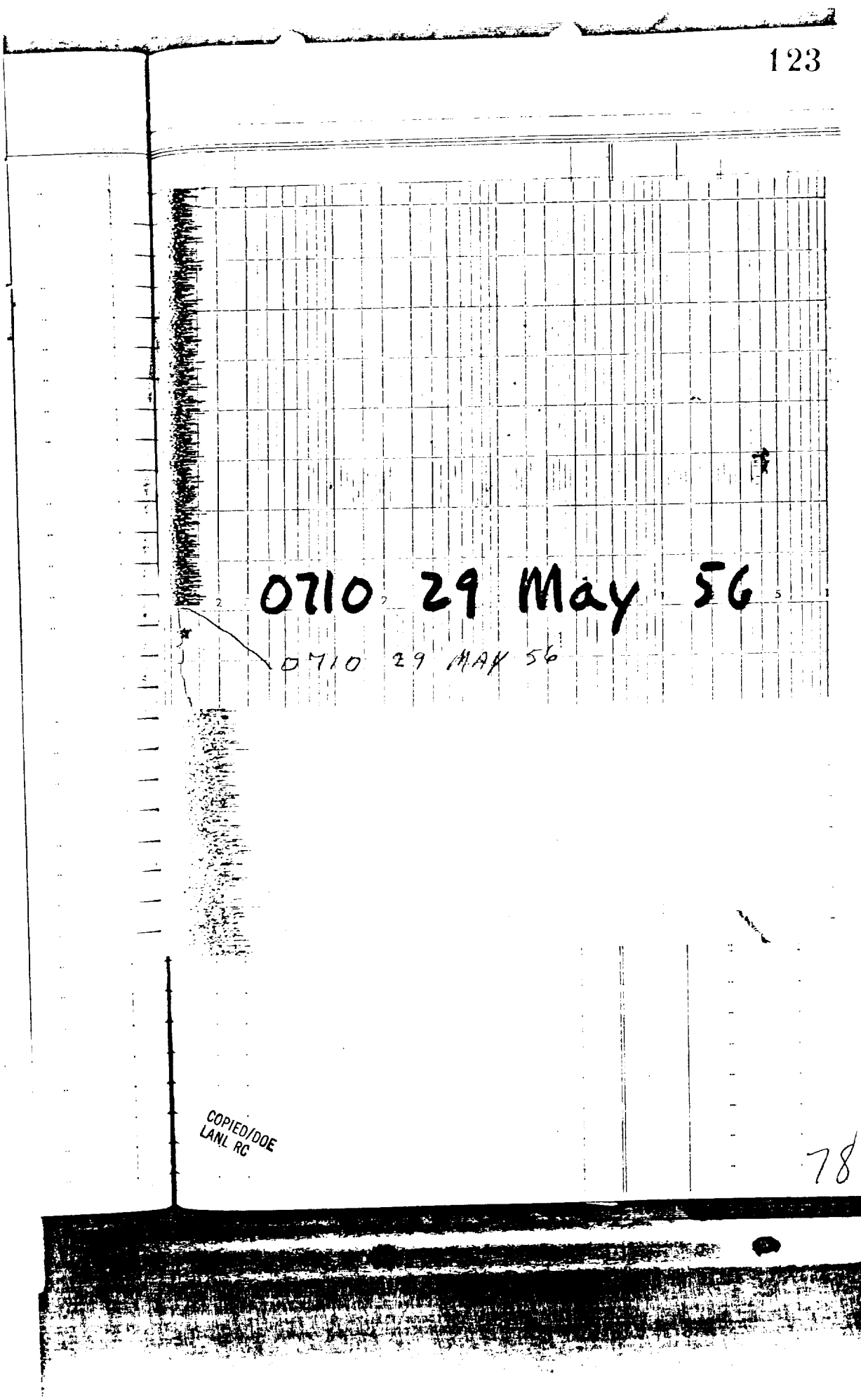
Run 0219 - 0223

after 0130 27 MAY

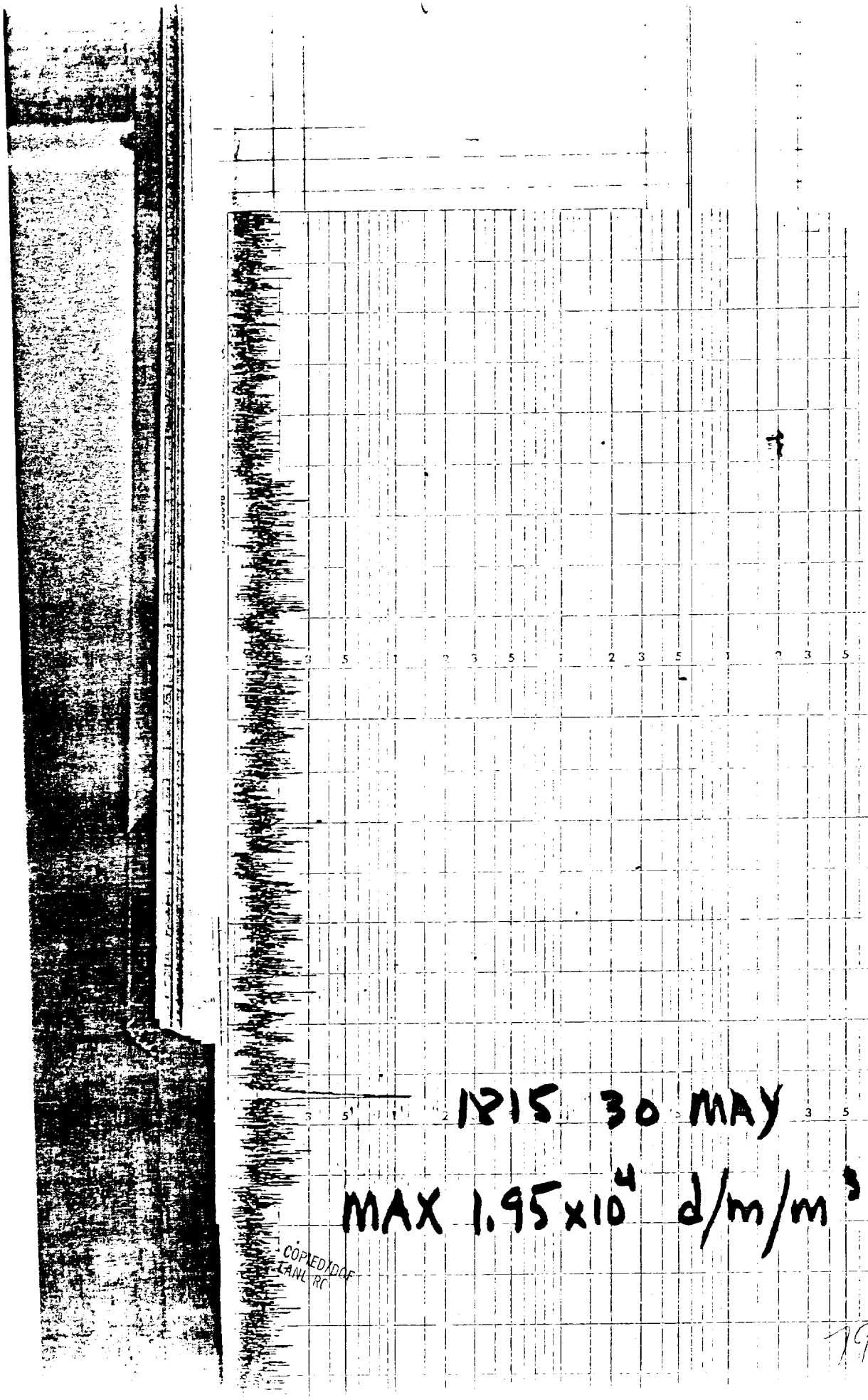
0130 27 MAY

MAX 1.87×10^4 d/m/m^3


1930 29 May
1550 29 May
MAX 2.4 x 10^4 d/m/m^3



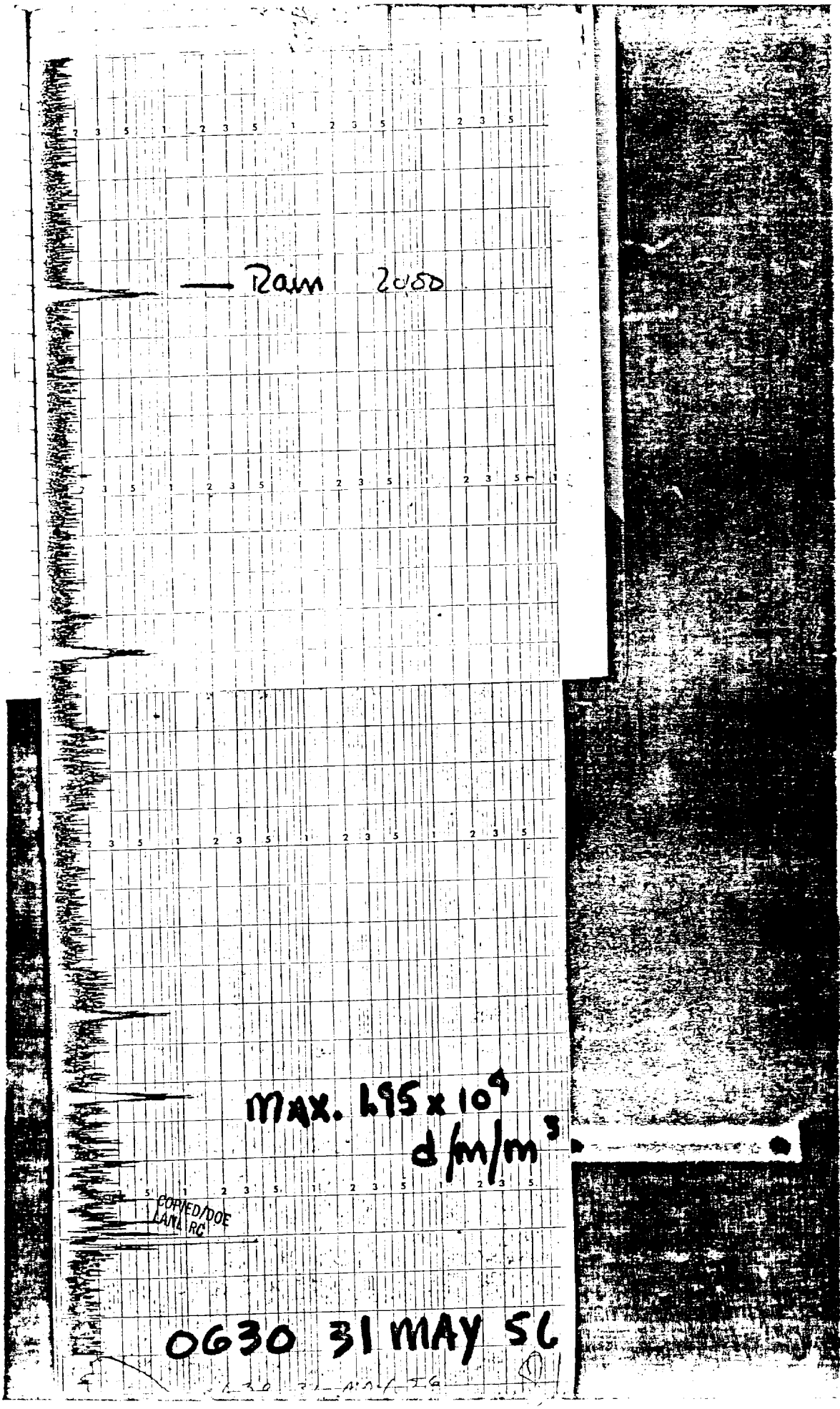
78

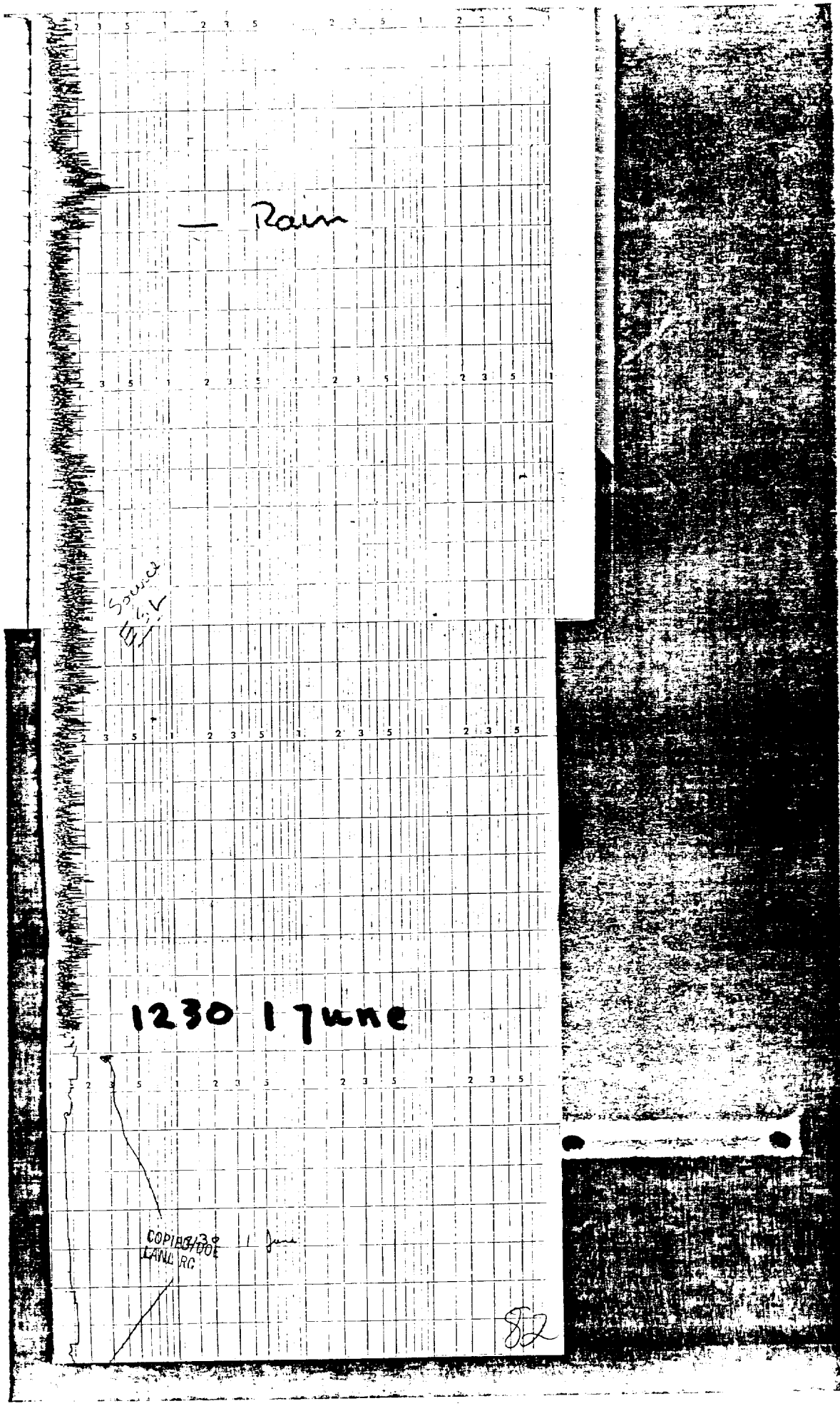


30 May 1600 thru 2330

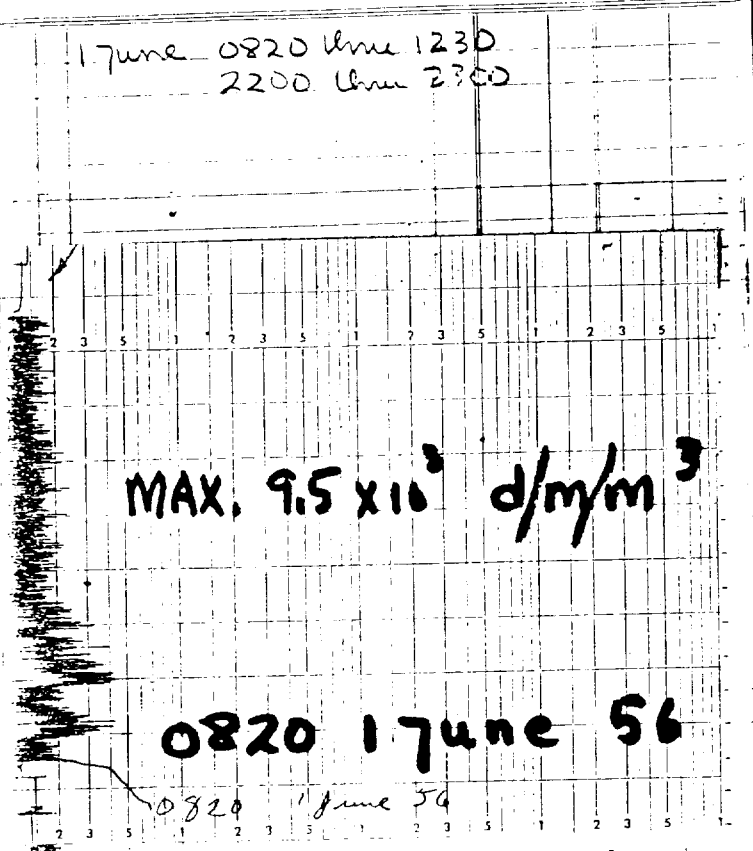
1330 30 MAY

1330 - 30 May 19[illegible]


Rain 2000
MAX. 4.95 x 10⁹
d/m/m³
COPIED/DOE
LANL RC
0630 31 MAY 56


— Rain
1230 1 June
COPIED 23 JUNE
LAND IRC

17 June 0820 thru 1230
2200 thru 2300



ERDA/DOE

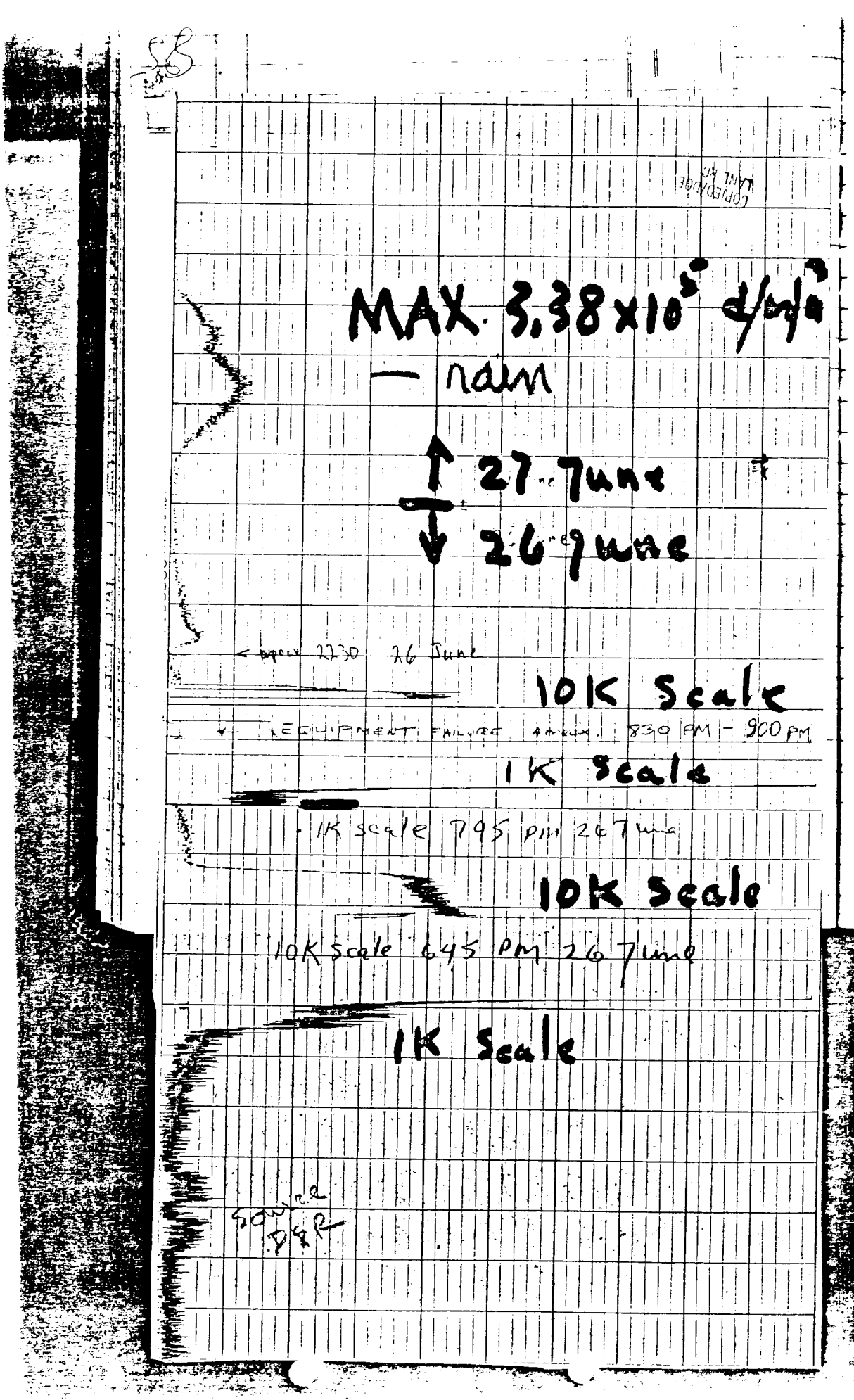
83

8 June 1345, 1530 thru 1630

MAX. 1.5×10^4 d/m/m^3
Rain

1345 8 June

84


MAX. 3.38 x 10^3 d/p/s
— rain
27th June
26th June
approx 2230 26 June
10K Scale
EQUIPMENT FAILURE 4 min. 830 PM - 900 PM
1K Scale
1K scale 795 PM 26 June
10K Scale
10K scale 645 PM 26 June
1K Scale
Saw D&R

17 July 0900

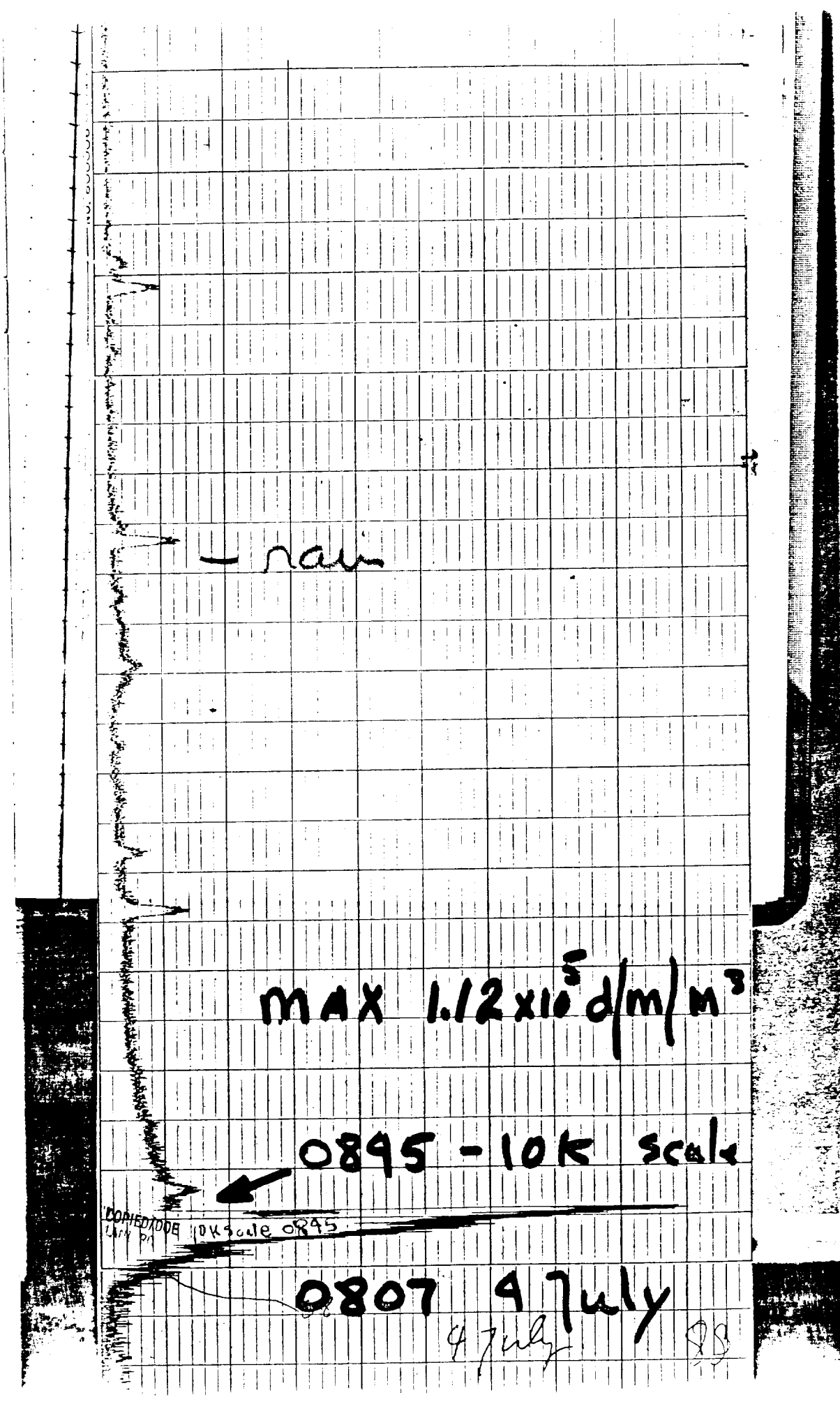
1030 17 July

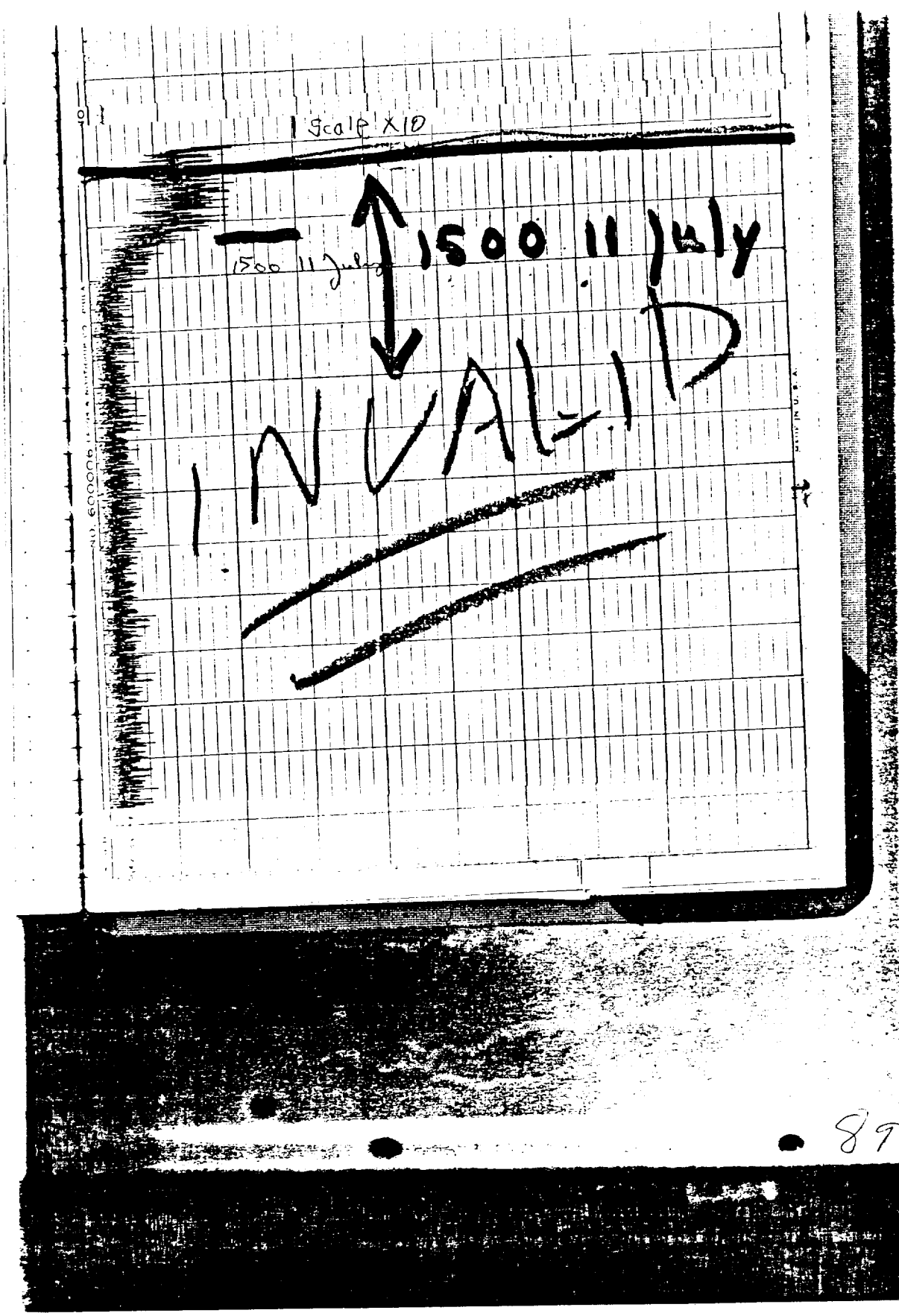
0900 17 July

Rain

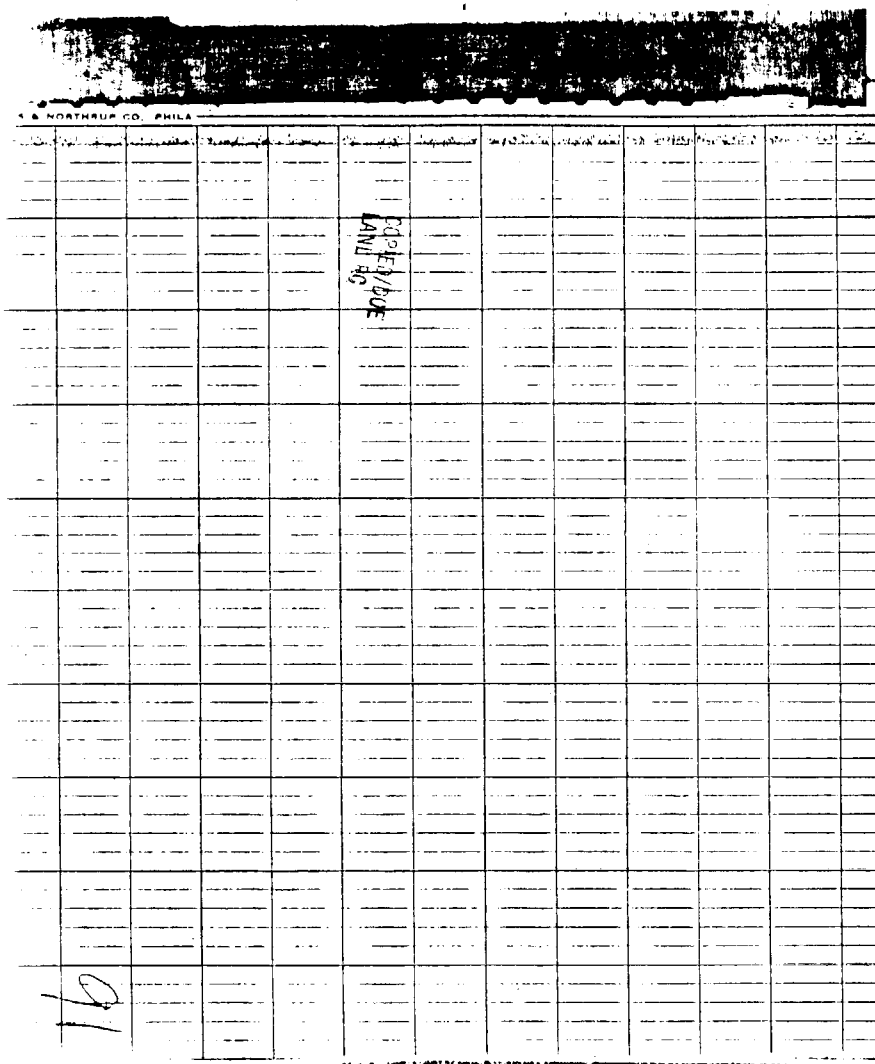
MAX 1.5×10^4 d/m/m^3

CORIBD/DOE
LANL RC


rain
MAX 1.12x10^5 d/m/m^3
0895 - 10K scale
COPIED FROM 10K Scale 0895
0807 9 July
4 July 88



NO. 60006 KEUFFEL & ESSER CO. PHILA.
COPIED/DOE
LANL RC
MAX 3.75 x 10^5 d/m/m²



Rains following heavy fallout 24 July.

Rain #1 2100 23 July - 5.5×10^{7} d/m/l

Rain #2 2230 23 July - 4.041×10^{6} d/m/l

Rain #3 0720 24 July - 3.6×10^{4} d/m/l

2300 sample down 33% 0720
1/2 life 14 1/2 hrs appx.

Rain #4. 0900 24 July - 4.06

Turn on 10K scale 4 ft/m
Tape speed 1030 22 July

← Shut OFF 1840

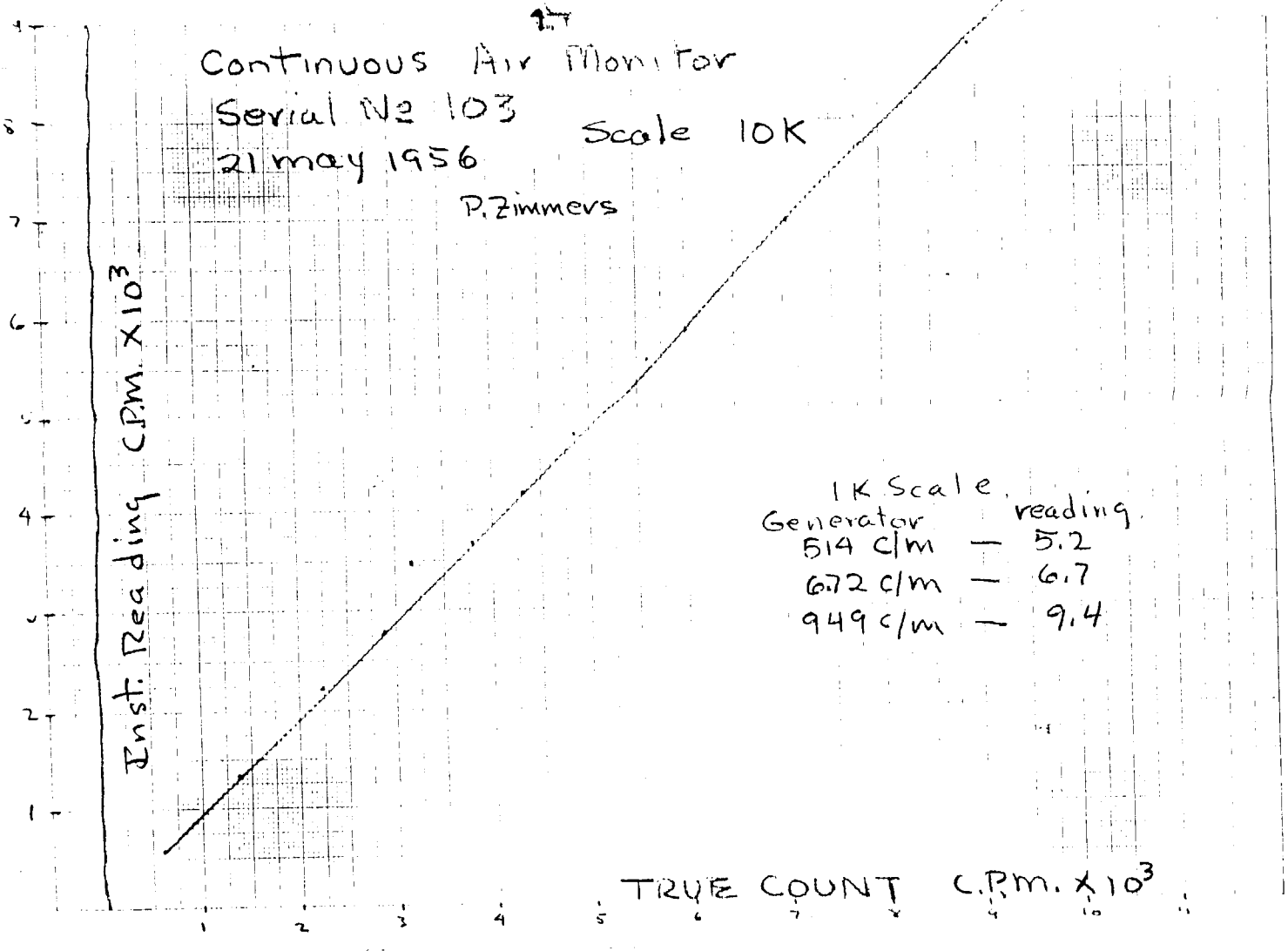
Filter tape not op.
← gamma background

1515

21 July

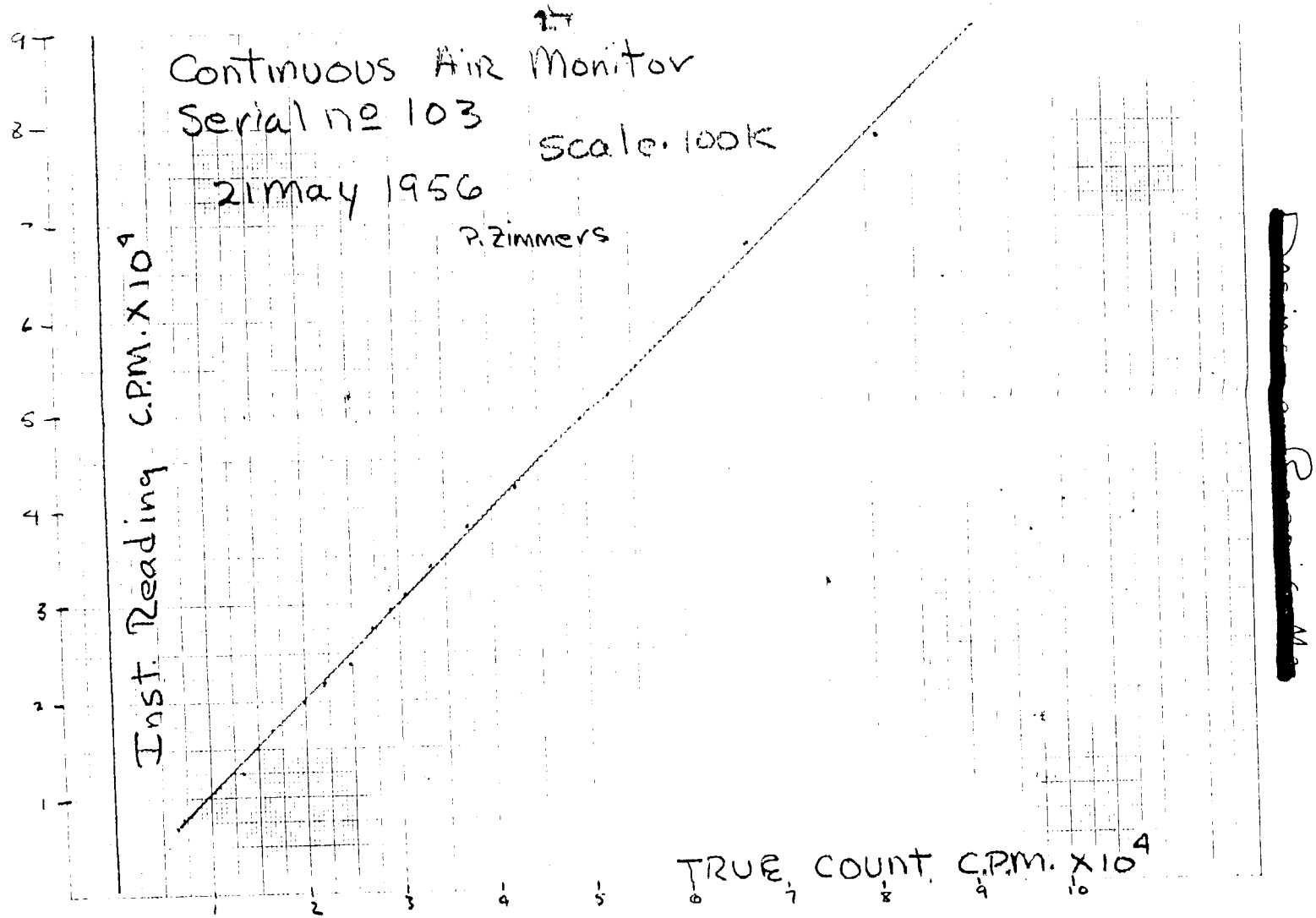
D & R Source
1145 21 July

Continuous Air Monitor
Serial No 103
21 may 1956
Scale 10K
P. Zimmers



1K Scale.

Generator		reading
514 c/m	—	5.2
672 c/m	—	6.7
949 c/m	—	9.4



95

AIR MONITOR

Recommendations

a. Size
b. Weight
c. Filter rewind clutch (redesign)
d. Overload protection for the main drive transmission.
e. Hinged doors rather than snap on fasteners.
f. Scale selector for remote operation.
g. The original logarithmic amplifier?
h. Possibility of using short, end window detector tubes - Anton Lab #100II (low background & reduction of pig size)
i. Future units to record background level (mr./hr.)
j. Pump oiling requirements every 2 days - not satisfactory for field use.
k. Laboratory determination of the unit's physical sonstants and incorporat of the data into the instruction manual - detector efficiency, number of cubic feet of air whose residue is seen by the detector etc.
l. More light in the pump compartment.
m. Brass stack locking nut unsatisfactory due to corrosion.
n. External plugs for remote hook up including the recorder.
o. Weather shield and filter screen for intake stack (bug intake often brea the tape)

Monitor all 3 prior to shipment to IE.

L-b

DENSITOMETER

Recommendations

(1) Light port in fromt

(2) Larger zero knob

(3) Badge holder that remains attached to unit.

(4) #3 - Possibility of a feed through holder for continuous or automatic proc

(5) Range selection - (0 - 1 full scale)

(6) Black on white read out register.

(7) Proper ventilation for projector lamp. (180°F-145°F)

(8) Possible use of concentrated arc lamp to accomplish #9.

(9) Reduction of hunting and over shoot.

(10) Parts mounted on power switches subject to damage in shipment.

(11) Mirror alignment difficult.

(12) Set screws in mechanical section often come loose and fall out.

(13) Zero adjust drive alignment subject to shipping troubles.

(14) Possibility of dynode by-pass capacitors as noise reduction measure.

(15) Drive speed & stability characteristics drift considerably on a weekly ba
requiring frequent adjustment.

(16) Present badge holders warp and often break directly behind the badge slot

8b

INTEGRON

These instruments were used little due to several factors.

(1) It was difficult due to time restrictions to advertise and aqua personnel with their operation and usefulness.

(2) Personnel generally dislike hauling around an extra piece of equipment, especially in hot areas where speed is necessary. The pocket dosi often provide enough information for the needs of the party.

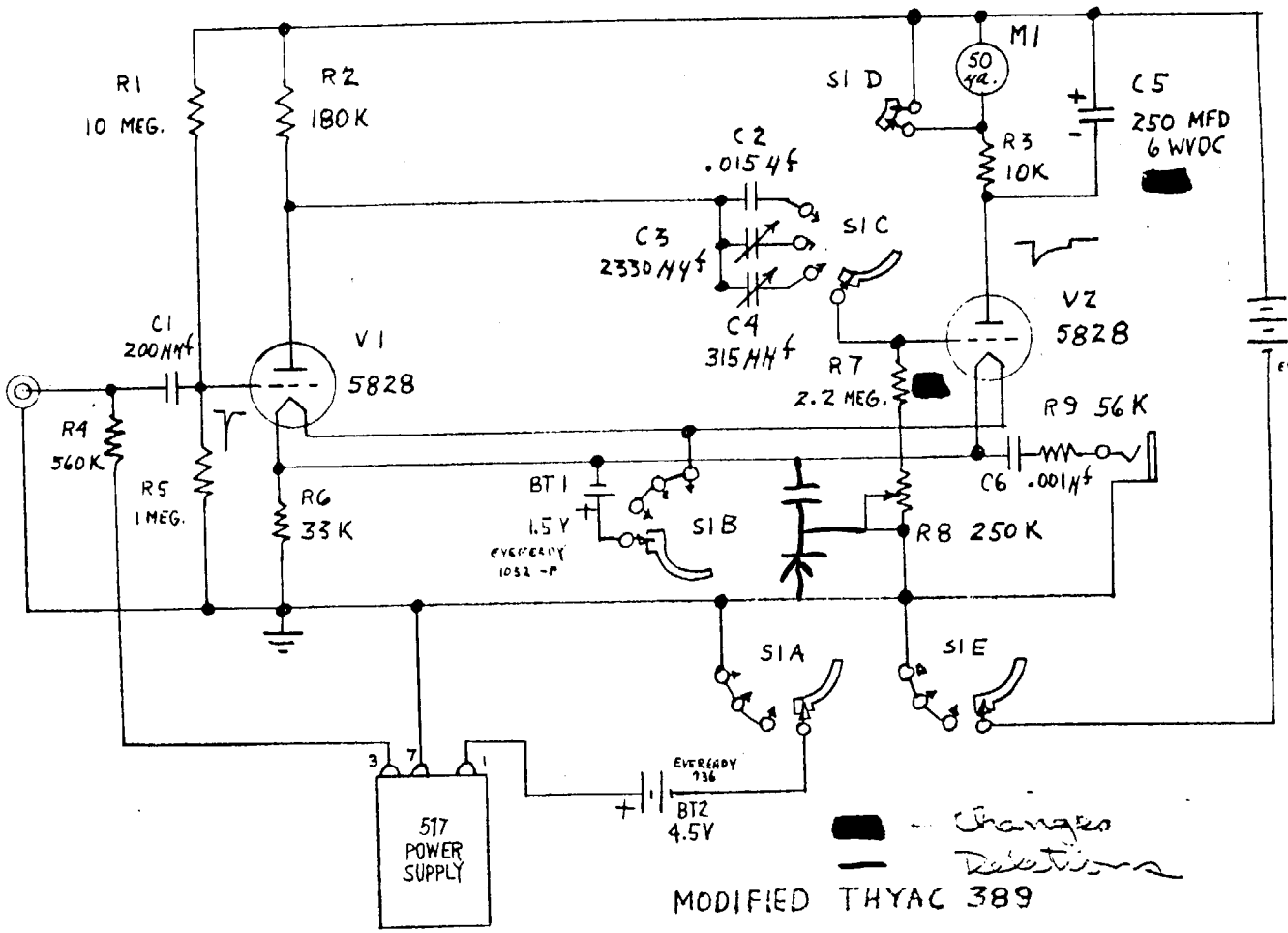
Upon arrival only four units were operable. The relatively heavy warnin system batteries are not adequately supported causing the whole chassis struc to bend. Chamber plug damage during shipping resulted. Moisture sensitivity noticed; it was however not of a really serious nature. Calibration was done every month with 20 - 25% corrections necessary.

The future usefulness of the integron will depend upon creating a need f such an instrument amongst project leaders etc.

THYAC (ALPHA CONVERTED)

The converted thyac with circuit changes to increase the trigger period and integration constant seems to be a very good field unit. It has not shown itself to be moisture or temperature sensitive. The probe must be handled gently and a rather high photo multiplier mortality rate has been noted. A guard ring should be added as further protection of the very thin mylar window. The probe may be used for short periods of time in any desired position due to the high viscosity of the silicone coupling compound and shape of its cavity in the light pipe.

The unit is capable of calibration to provide 4π readings with reasonable accuracy. Due to our lack of range in alpha sources they have only been checked at 400, 1800, 8800 and 3320 d/m.


R1
10 MEG.
R2
180K
C2
.015 μf
C3
2330 MMf
C4
315 MMf
C1
200 MMf
V1
5828
R4
560K
R5
1 MEG.
R6
33K
BT1
1.5 V
EVEREADY
1032 -P
S1B
S1D
M1
50 μa.
C5
250 MFD
6 WVDC
R3
10K
S1C
V2
5828
BT3
67.5 V
EVEREADY
467
R7
2.2 MEG.
R9 56K
C6 .001 μf
R8 250K
S1A
S1E
517
POWER
SUPPLY
EVEREADY
936
BT2
4.5V
Changes
Deletions
MODIFIED THYAC 389
FOR USE WITH ALPHA SCINTILLATION PROBE
DRAWN BY WHT INST. REPAIR, MT RSSU

RESISTANCE CALIBRATION OF AN-PDR-39's

The T1-B or PDR-39 instruments rely on the accuracy of their hi-meg or chamber load resistances for scale decading. A single calibration control (meter series resistance) performs calibration of all scales at once.

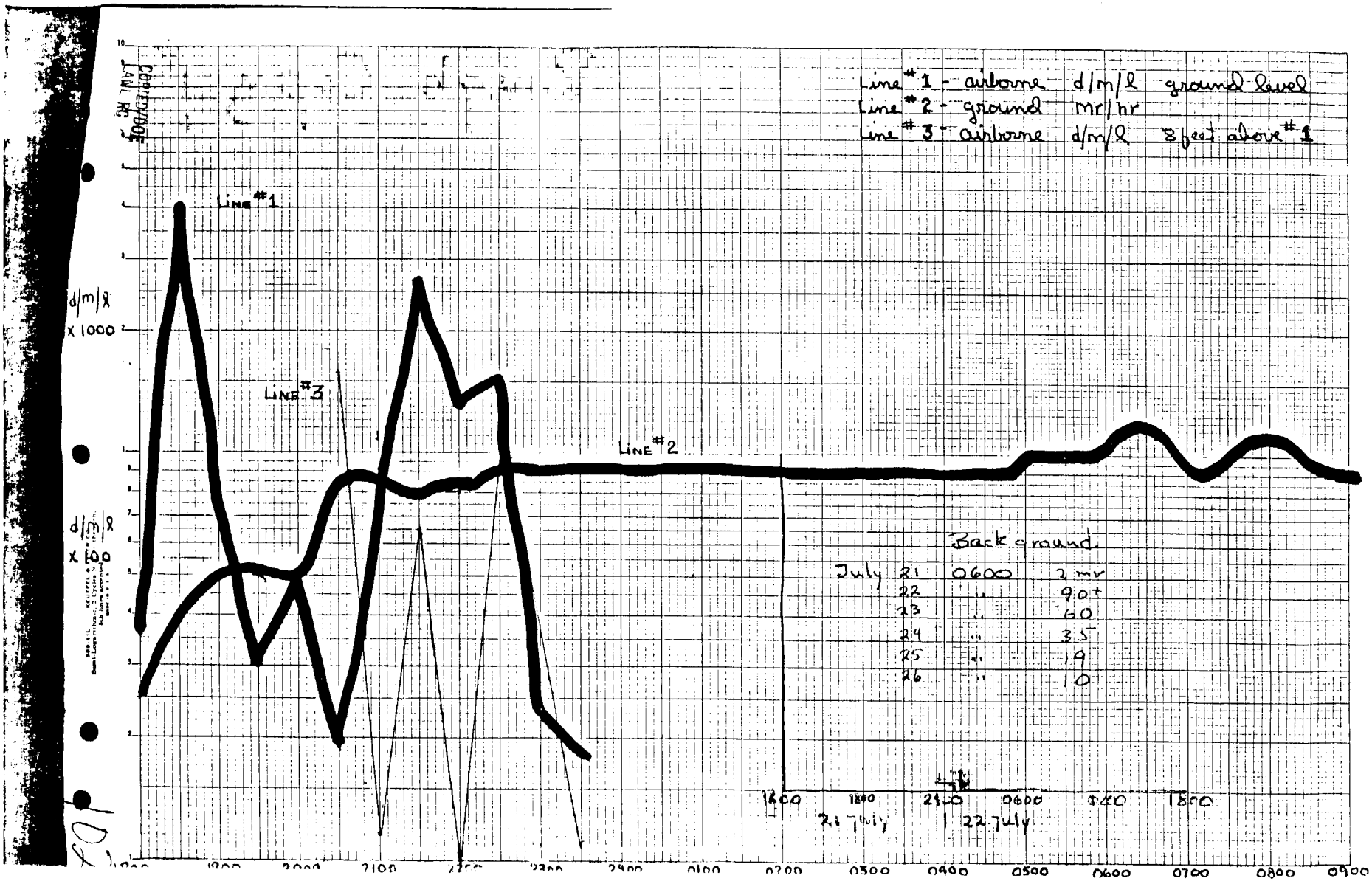
It was felt that some method of assuring hi-meg accuracy should be used to check all instruments before they met field use. It was also felt that the Victoreen deposited carbon hi-meg resistances might be highly voltage sensitive and should be checked under circumstances approximating their actual operating potentials. Commercial hi-meg ohm meters often use potentials up to 1000 volts making them unsuitable for this application. An Applied Physics Corp. vibratin reed electrometer was used to measure the potential across a 100 megohm standar resistance (calibrated to value ± .3%) in series with the unknown hi-meg (in pl in the instrument). All resistors varying more than 5% were replaced. No atte to calibrate the 0 to 5 mr. range was made.

The standard Bendix bridge and sub miniature tube tester supplied by the Army for u with the instruments uses a potential of 16 volts across the unknown resistance It is felt that the Bendix unit serves the purpose well - better perhaps than t electrometer technique which is of a laboratory nature.

For most accurate results each instrument should be calibrated on the scal representing the mean deviation (since each scale varies ± a few percent). Tim was not available for this purpose. Each T1-B carries within it a card giving the deviations for future use.

The PDR-39 schematic places the 5 mr and 50 mr scales in parallel. This re in a 10% deviation (low) it was noticed however that the 10% deviation was not always forthcoming when the instruemnt was radiation calibrated. Further study should reveal use-ful characteristic information.

The deviation percentage given on the cards in the instruments pertains to scale error when radiation is read.


Line #1 - airborne d/m/l ground level
Line #2 - ground mr/hr
Line #3 - airborne d/m/l 8 feet above #1
LINE #1
LINE #3
LINE #2
d/m/l x 1000
d/m/l x 100
Background
July 21 0600 2 mr
22 " 90+
23 " 60
24 " 35
25 " 9
26 " 10
1800
2100
0600
0900
1800
21 July
22 July
2000
2100
2300
2400
0100
0200
0300
0400
0500
0600
0700
0800
0900