ATTN Betsy ULLRICH 1 of 7

HERE Are the plateaus we got by using different sources.

Do you think this is ENOUGH to start using our proportional counter?

Thanks
Martha

The pages I am sending you (besides the plateaus) are From Safety Lights Updated HEALTH & SAFETY Program Rev. 12 From 2003 -

This page is telling the NRC what for sources are available for use with the Eberline MS-2 And these are the sources that we used.

10.2.0 LIQUID SCINTILLATION COUNTER

10.2.1 Description - Packard Model 4530 Tri-Carb Programmable Liquid Scintillation System.

10.2.2 Uses - Determination of tritium concentrations in personnel urine, stack monitor and environmental sample impingers, liquid effluents, etc.

10.2.3 Calibration - This instrument was calibrated initially at the manufacturer's (Packard Instrument Co.) plant prior to shipment. However, validation of the instrument's performance is done periodically on a routine basis, or as required if malfunction is suspected (for instrument validation procedures, etc. refer to the MC4530 Tri-Carb Operation Manual on file in the Health & Safety Office). Calibrated internal standard solutions (HTO) and a set of 10 sealed (quenched) 3H standard, purchased from Packard Instrument Co., are used in calibration and equipment performance validation. Equipment maintenance is performed, as required, by Packard service personnel.

10.3.0 SWAB MONITORING SYSTEM

10.3.1 Description - This system consists of a three-well gas flow internal proportional counter manufactured by Atomic Development and Machine Corp., and an Eberline Instrument Corp., Model MS-2, Mini Scaler.

10.3.2 Uses - Loose surface contamination surveys and radioactive materials source leakage tests.

10.3.3 Detection - This instrument is used to detect beta (beta-gamma) and alpha contamination.

10.3.4 Instrument Checks - These are performed as follows:

a. Quarterly determination of alpha and beta operating 'plateaus' with the THRESHOLD control set a 2.50 and the WINDOW IN-OUT switch set at OUT.

1. With the appropriate alpha, beta or alpha/beta source in the counting chamber, increase the HV adjust setting step-wise over the range 4.0 - 9.0 (1200 - 2800 V). Record HV adjust setting values and corresponding count rates.

2. Remove source from counting chamber.

3. Plot a curve of counts/min. vs. corresponding HV adjust setting.



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4. From curve, determine the appropriate respective operating voltages for the counting of alpha or of (Alpha + Beta) particles. Record these values.

5. Set operating voltage as required, based on above.

6. The instrument is now ready for operation.

10.3.5 Calibration Standards - The following calibrated reference sources are available for use with this instrument:

| SOURCE NO. SUPPLIER | NUCLIDE | | RADIATION |
|---|---|---|---|
| NES-9048 | Nickel-63 | Beta | New England Nuclear Corp. |
| B14-73 | Carbon-14 | Beta | Baird-Atomic Inc. |
| 3504 | Radium D+E | Beta/Alpha | NBS |
| AMR23 R400 | Americium-241 | Alpha | Radiochemical Centre (U.K.) |
| 10235 | Thorium-230 | Alpha | Eberline Instrument |

10.4.0 ALPHA SCINTILLATION COUNTER

10.4.1 Description - This instrument is an Eberline Instrument Corp. Model PAC-4S Alpha Scintillation Counter.

10.4.2 Uses - This instrument is used to monitor alpha contamination levels residual from past operations conducted on the plant site; it can also be used in short-term monitoring of $Rn^{222}$ in air by HVAS methods, if required.

10.4.3 Detection - This instrument detects the presence of alpha particles being emitted from contaminated surfaces. It has a sensitivity of 100 cpm.



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# SAFETY LIGHT CORPORATION

## PLATEAU DETERMINATION DATA

DATE: 1-25-08

BY : ZL

INSTRUMENT: Eberline MS-2 NO.: MS-2-1 STD. SOURCE USED : AmR 23

THRESHOLD SET AT: 2.50 SOURCE NO. : R 400

WINDOW IN-OUT SWITCH: OFF RADIATION TYPE : α

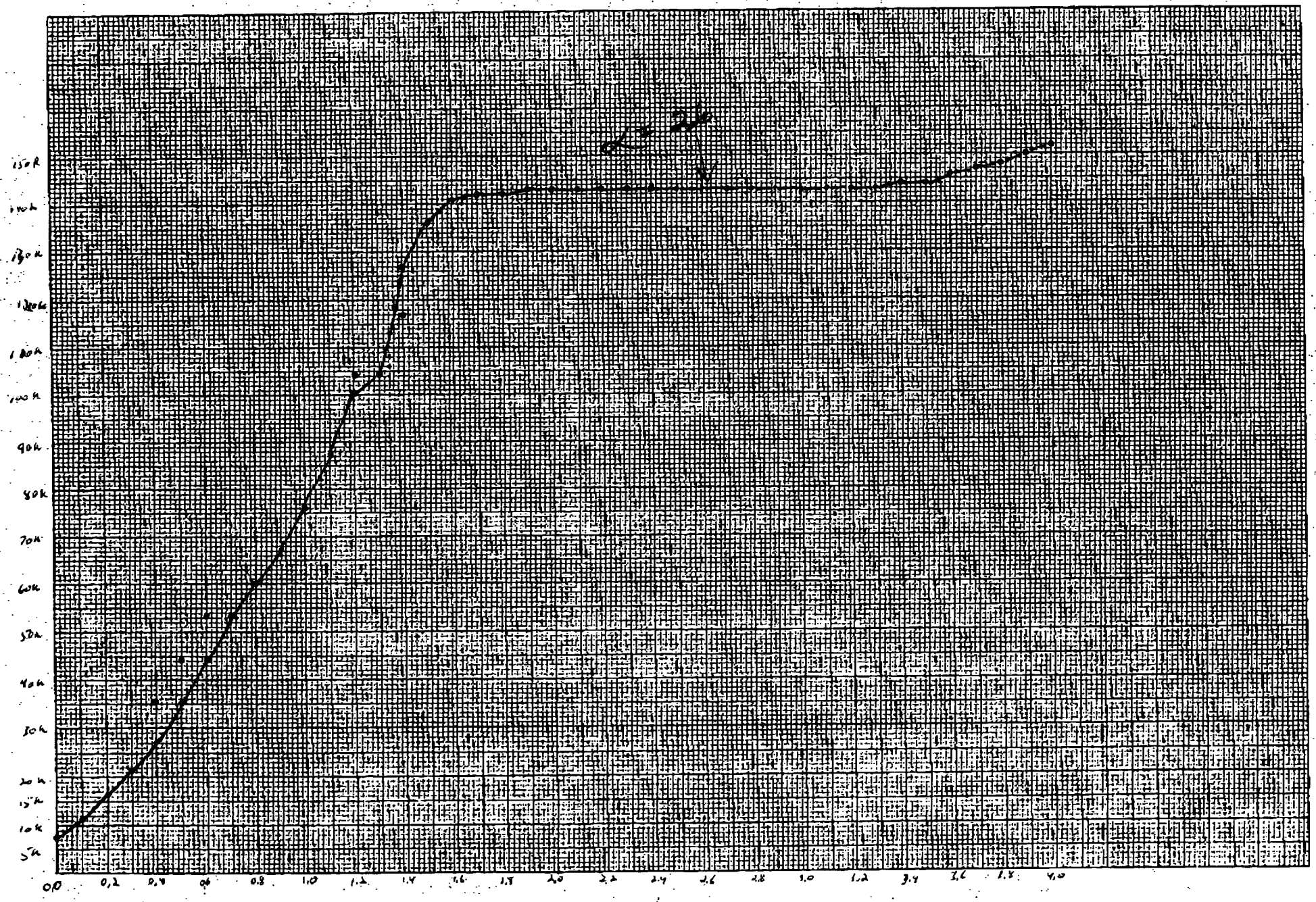
3-WELL COUNTER NO.: 2 COUNT TIME (Min.): 1.00

| 'HV ADJUST' SETTING | GROSS CPM | 'HV ADJUST' SETTING | GROSS CPM |
|---|---|---|---|
| 0.0 | 7365 | 2.00 | 143,383 |
| 0.10 | 11295 | 2.10 | 143,217 |
| 0.20 | 16925 | 2.20 | 143,470 |
| 0.30 | 21521 | 2.30 | 143,401 |
| 0.40 | 27363 | 2.40 | 143,751 |
| 0.50 | 35552 | 2.50 | 143,796 |
| 0.60 | 44469 | 2.60 | 143,954 |
| 0.70 | 53820 | 2.70 | 143,668 |
| 0.80 | 60024 | 2.80 | 143,603 |
| 0.90 | 67698 | 2.90 | 143,125 |
| 1.00 | 76074 | 3.00 | 143,566 |
| 1.10 | 87875 | 3.10 | 143,748 |
| 1.20 | 100474 | 3.20 | 143,476 |
| 1.30 | 113802 | 3.30 | 143,886 |
| 1.40 | 127167 | 3.40 | 144,635 |
| 1.50 | 136,953 | 3.50 | 144,873 |
| 1.60 | 141,252 | 3.60 | 146,097 |
| 1.70 | 142,500 | 3.70 | 147,201 |
| 1.80 | 142,583 | 3.80 | 148,465 |
| 1.90 | 143,134 | 3.90 | 150,290 |
| | | 4.00 | 152,770 |

REMARKS:

K+E 10 X 10 TO THE CM. 359-14
KEUFFEL & ESSER CO. MADE IN U.S.A.

AMR 23



# SAFETY LIGHT CORPORATION

## PLATEAU DETERMINATION DATA

DATE: 1-25-08

BY : ZL

INSTRUMENT: Eberline MS-2 NO.: MS-2-1 STD. SOURCE USED : Ni 63

THRESHOLD SET AT: 2.50 SOURCE NO. : NGS - 9048

WINDOW IN-OUT SWITCH: OFF RADIATION TYPE : β⁻

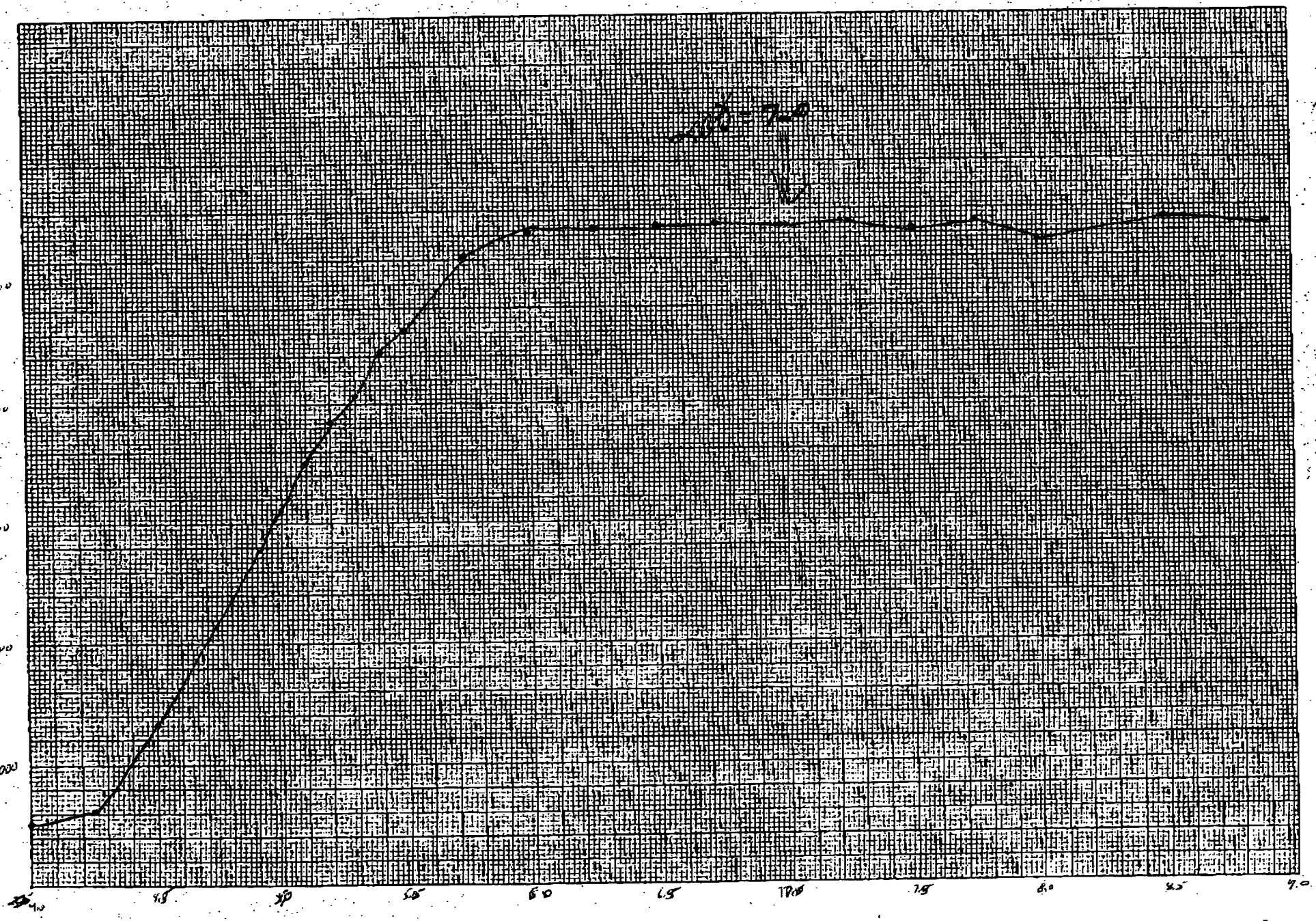
3-WELL COUNTER NO.: 2 COUNT TIME (Min.): 1.00

| 'HV ADJUST' SETTING | GROSS CPM | 'HV ADJUST' SETTING | GROSS CPM |
|---|---|---|---|
| 3.5 | 74 | 8.50 | 5516 |
| 4.0 | 533 | 8.90 | 5451 |
| 4.25 | 628 | 9.50 | 5395 |
| 4.50 | 1328 | | |
| 5.00 | 3105 | | |
| 5.10 | 3530 | | |
| 5.20 | 3861 | | |
| 5.30 | 4096 | | |
| 5.40 | 4442 | | |
| 5.50 | 4608 | | |
| 5.75 | 5221 | | |
| 6.00 | 5439 | | |
| 6.25 | 5483 | | |
| 6.50 | 5545 | | |
| 6.75 | 5561 | | |
| 7.00 | 5490 | | |
| 7.25 | 5506 | | |
| 7.50 | 5458 | | |
| 7.75 | 5529 | | |
| 8.00 | 5382 | | |

REMARKS:

K+E 10 X 10 TO THE CM. 359-14
KEUFFEL & ESSER CO. MADE IN U.S.A.

N. 63



# SAFETY LIGHT CORPORATION

## PLATEAU DETERMINATION DATA

DATE: 1-25-08

BY : R

INSTRUMENT: Eberline MS-2 NO.: MS-2-1 STD. SOURCE USED : Ra D+E

THRESHOLD SET AT: 2.50 SOURCE NO. : 3504

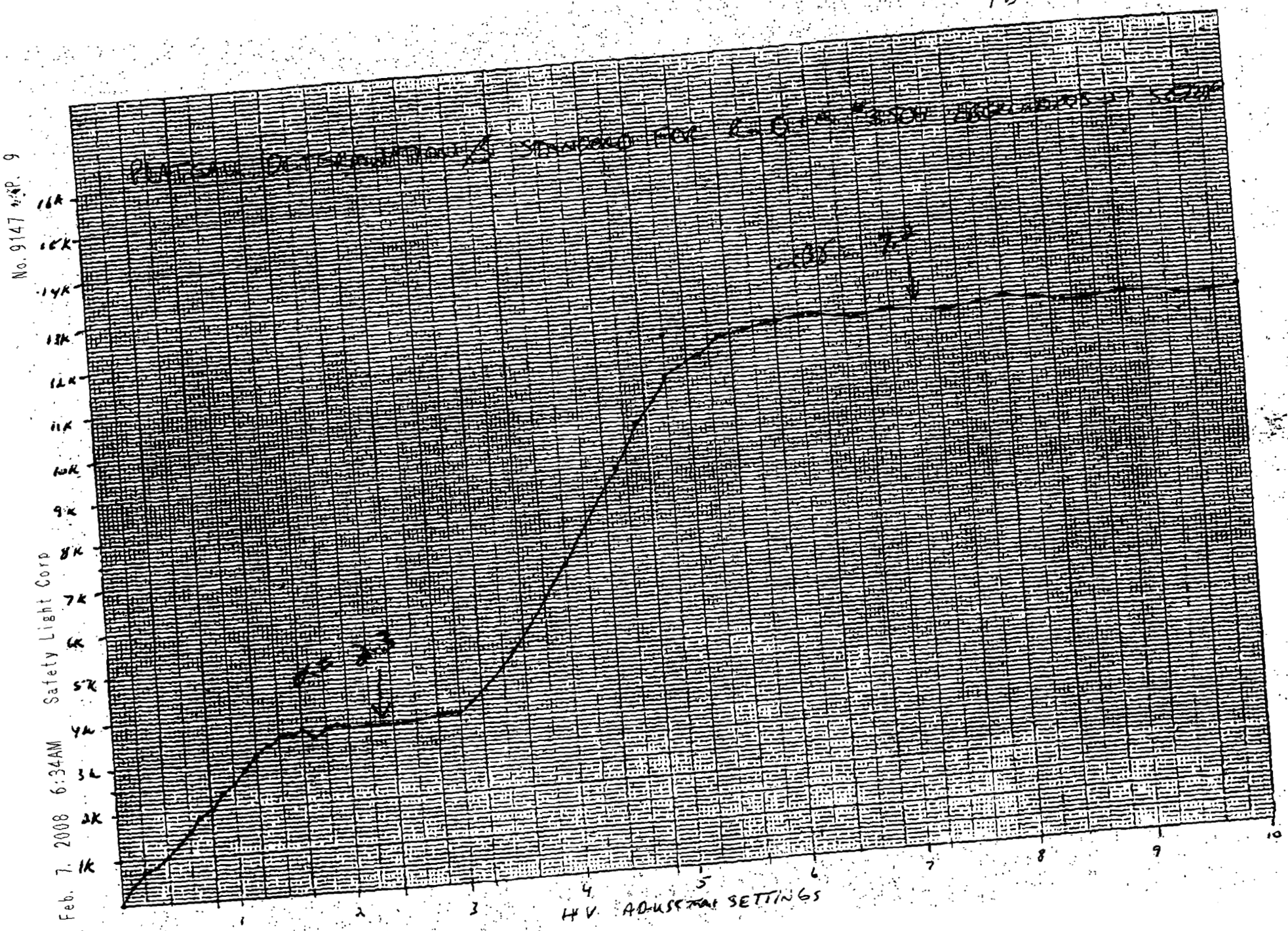
WINDOW IN-OUT SWITCH: OFF RADIATION TYPE : $\alpha\beta^-$

3-WELL COUNTER NO.: 2 COUNT TIME (Min.): 1.00

| 'HV ADJUST' SETTING | GROSS CPM | 'HV ADJUST' SETTING | GROSS CPM |
|---|---|---|---|
| 0.0 | 24 | 2.00 | 3619 |
| 0.10 | 431 | 2.50 | 3589 |
| 0.20 | 720 | 3.00 | 3797 |
| 0.30 | 801 | 3.50 | 5615 |
| 0.40 | 1034 | 4.00 | 6854 |
| 0.50 | 1301 | 4.50 | 8960 |
| 0.60 | 1569 | 4.75 | 9940 |
| 0.70 | 1856 | 5.00 | 10896 |
| 0.80 | 2022 | 5.25 | 11416 |
| 0.90 | 2329 | 5.50 | 11792 |
| 1.00 | 2585 | 5.75 | 11875 |
| 1.10 | 2893 | 6.00 | 11940 |
| 1.20 | 3172 | 6.25 | 12080 |
| 1.30 | 3363 | 6.75 | 11999 |
| 1.40 | 3510 | 7.00 | 12026 |
| 1.50 | 3588 | 7.50 | 11954 |
| 1.60 | 3653 | 8.00 | 12159 |
| 1.70 | 3467 | 8.50 | 11961 |
| 1.80 | 3635 | 9.00 | 12089 |
| 1.90 | 3701 | 9.50 | 11931 |
| | | 10.00 | 12080 |

REMARKS:

PB-210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Feb. 7 2008 6:34AM
Safety Light Corp
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HV ADJUSTMENT SETTINGS