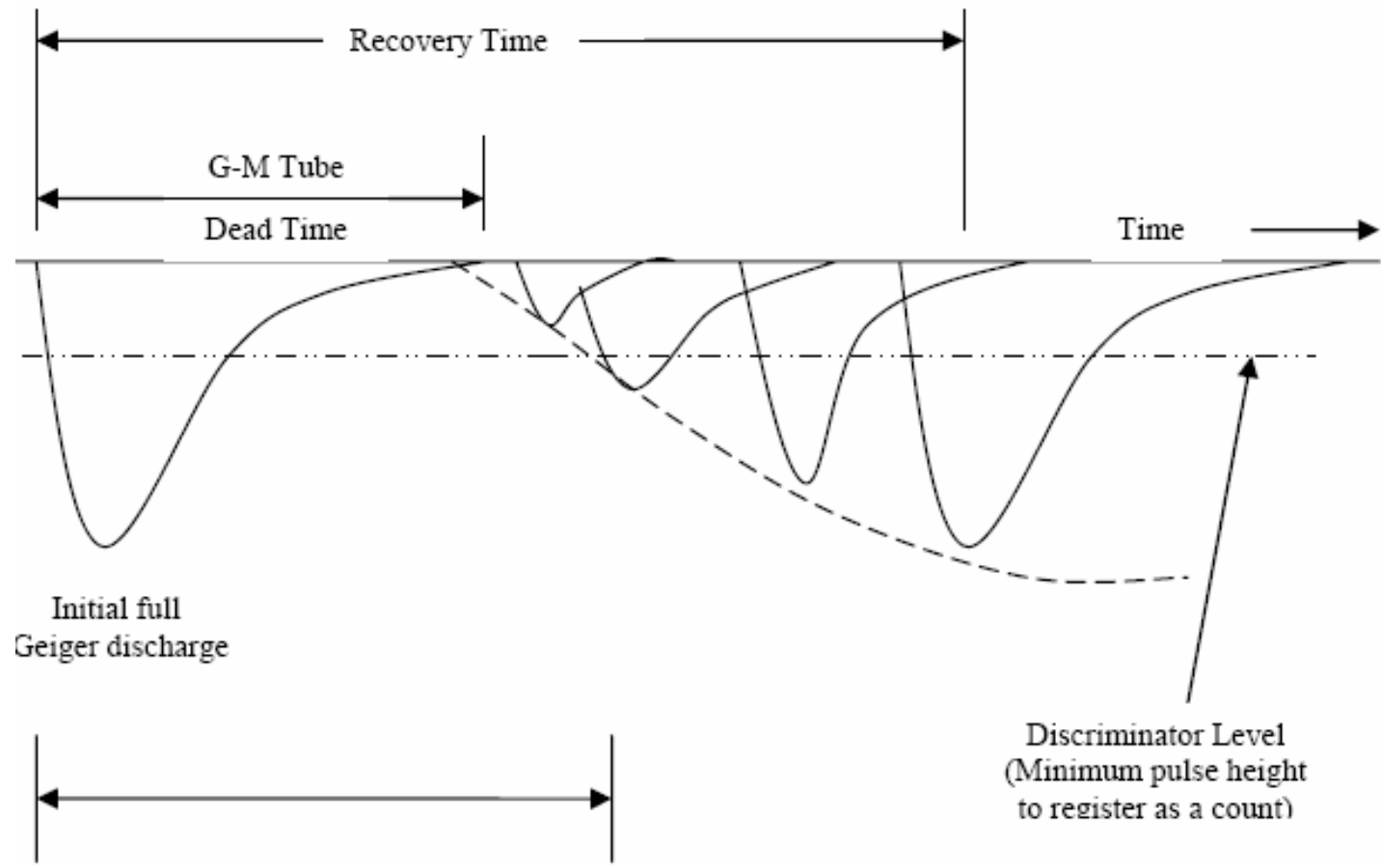


Why do GM (sometimes) instruments fail at high dose rates?

Pete Burgess

- GM units sometimes fail to danger at high dose rates.
- Causes include
 - Wrong counting threshold
 - Inappropriate detector
 - Amplifier paralysis
 - Insufficiently stiff HT supply

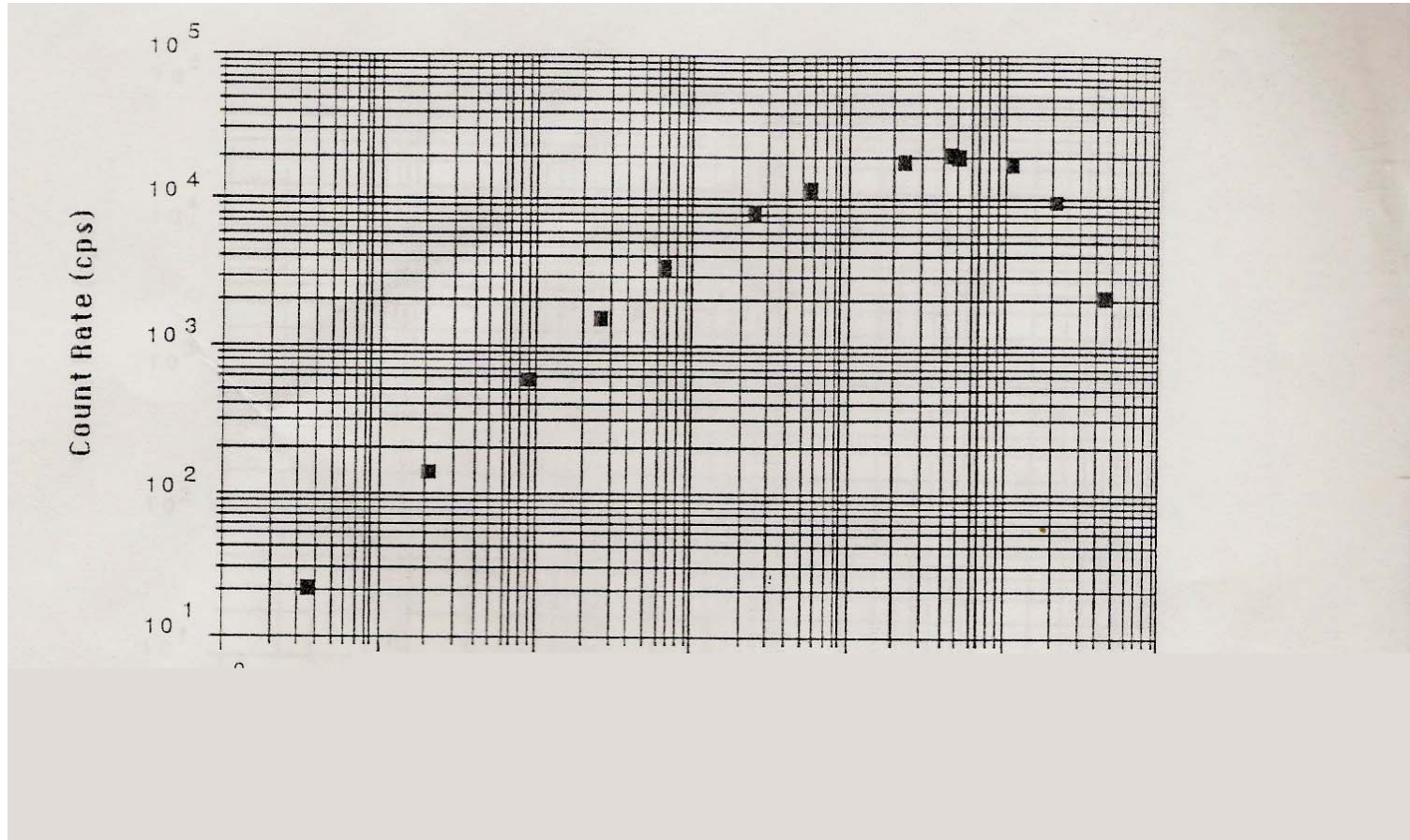
Wrong threshold



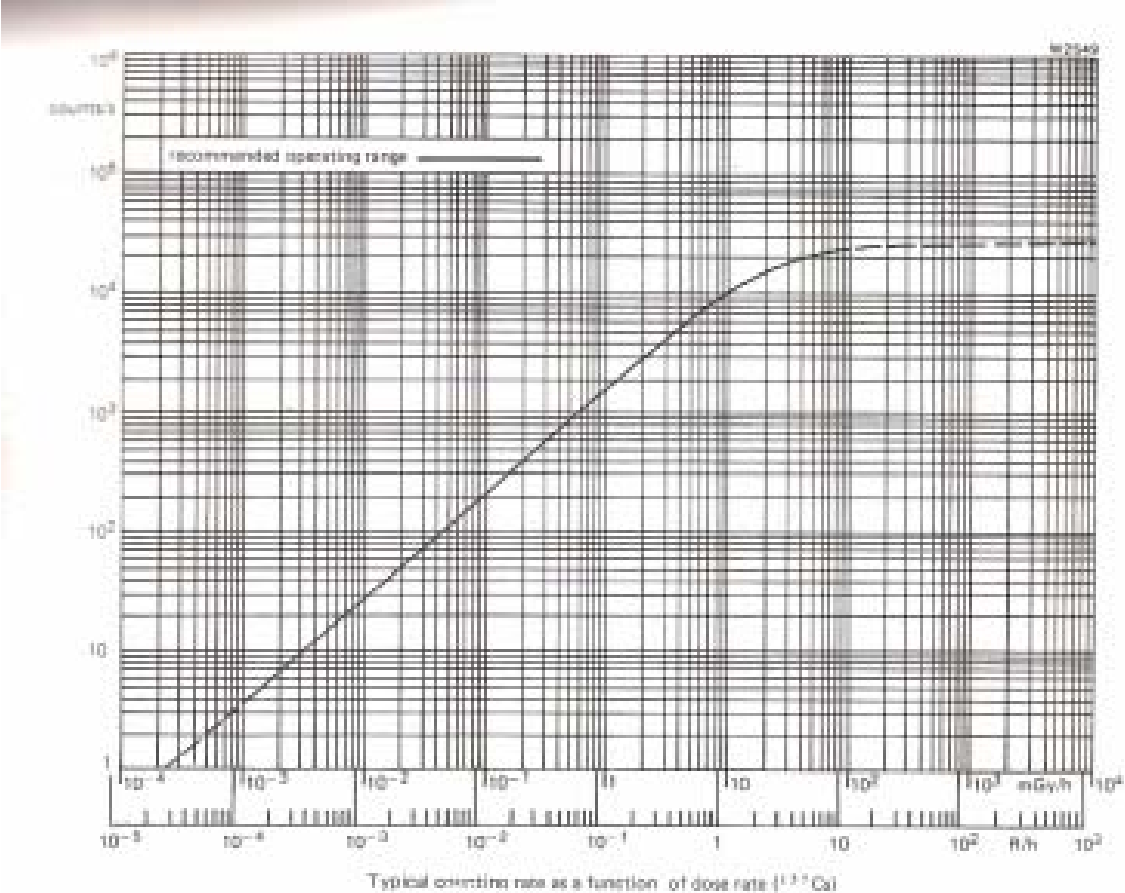
Problem?

- Some of the pulses at high count rates fall below the set counting threshold
- As the dose rate gets higher, mean pulse size decreases
- Eventually, at very high rates, all pulses are the same and an oscilloscope trace looks like RF.
- Good GMs have a pulse minimum about 20% of the low dose rate size.
- Se set below that, all are counted and no problem

Inappropriate detector.



Reliable detector



ZP1200

- Maximum pulse rate = $1/\text{dead time}$
- Can be as high as 220k per second (ZP1310 series as fitted to many GM dosemeters)
- Dead time = 4.5 microseconds
- If amplifier and pulse generator are slower than this then dead time can be extended
- Old fashioned cure = current trip

- At high count rates, current can be up to 130 microA
- If HT drops, pulse size drops and may fall below threshold.

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