



# Radiation Monitoring



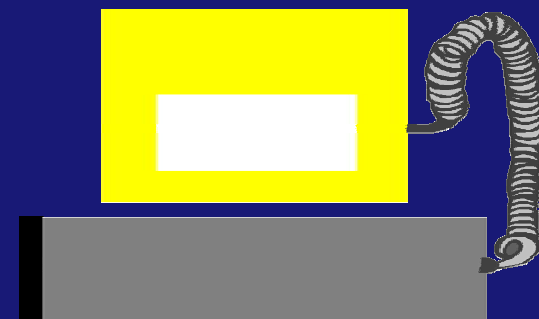
# Introduction

- Why monitoring is done
- Types of monitoring
- Monitoring Instrumentation



## Why monitor?

- Early warning of an accidental release
- Basis for advice on countermeasures
- To avoid the spread of contamination
- To control dose from exposure
- Information for evaluation of exposures
  - Public information
  - Reassurance
- Routine monitoring





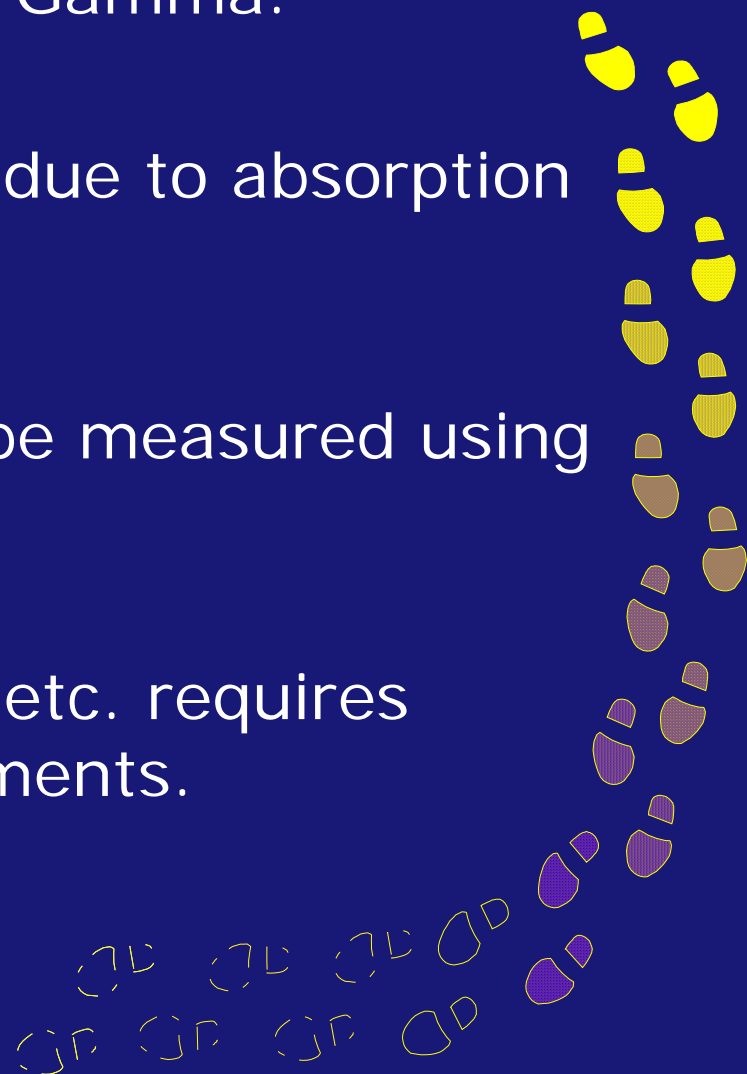
## Types of monitoring

- Contamination
  - Surface, Air, Soil, Water, Foodstuffs
- External Doserate
  - Gamma radiation
- Ingested Radioisotopes
- Personal Dosimetry
- Biological Dosimetry



# Contamination

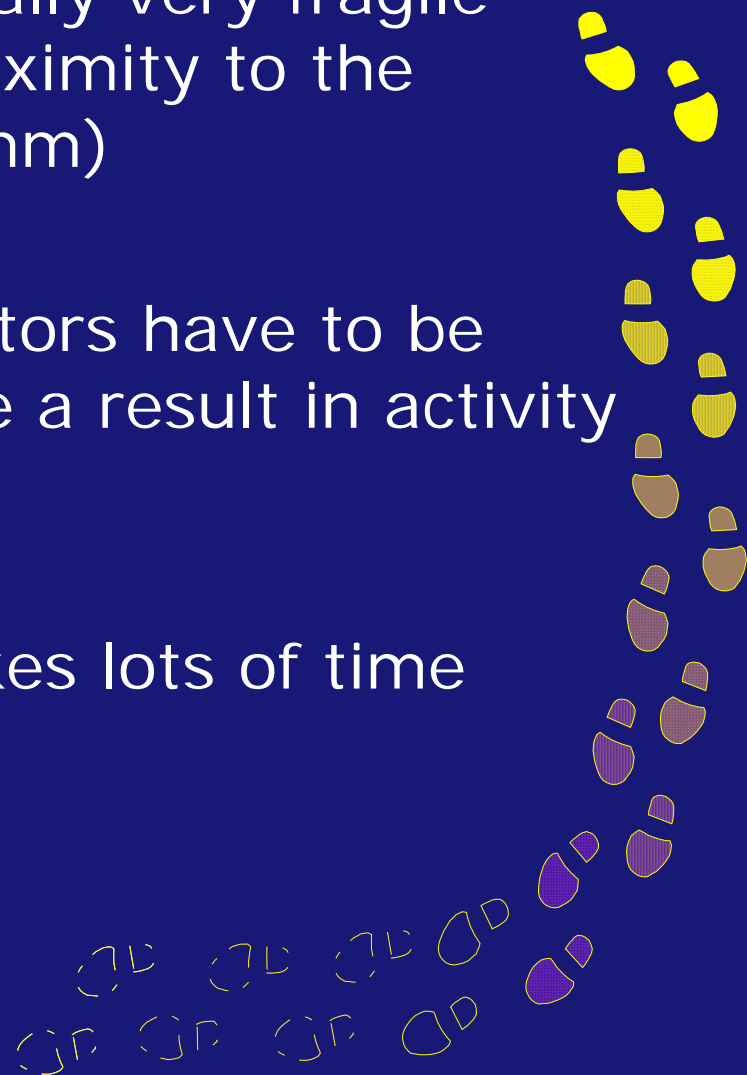
- Can measure for Alpha, Beta, or Gamma.
- Very difficult for Alpha and Beta due to absorption by contaminated material itself.
- Contamination of a surface can be measured using a fairly simple monitor.
- Contamination of foods, soil, air etc. requires sampling and complex measurements.





# Contamination

- Contamination monitors are usually very fragile and have to be used in close proximity to the surface being monitored (3-10 mm)
- The reading given by most monitors have to be interpreted by calculation to give a result in activity per unit area ( $\text{Bq}/\text{cm}^2$ )
- Monitoring for contamination takes lots of time
  - Do you need an exact figure?





# Surface Contamination Monitors

Electra with Alpha/Beta contamination Probe

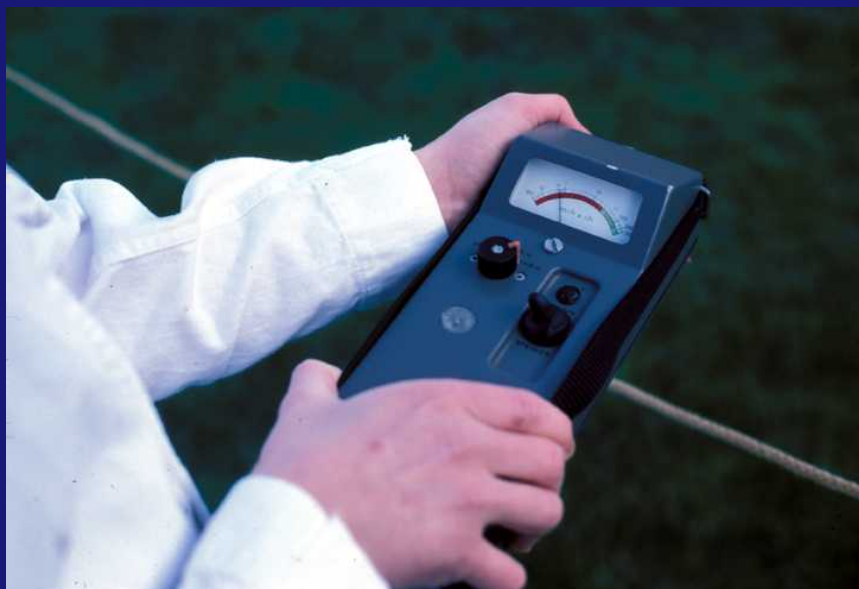


Mini 900 with EP-15 Beta/Gamma Probe



## External Doserate

- Monitors give a reading directly in terms of dose rate, usually in  $\mu\text{Sv h}^{-1}$  or  $\text{mSv h}^{-1}$
- Instruments read Ambient Dose Equivalent Rate
  - i.e. the doserate to your whole body from any direction

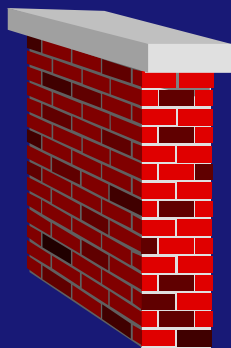


Wallac RD8 Universal Survey Meter



## External Doserate

- Switch instruments on before entering a suspect area, and always make sure the batteries are fully charged.
- Move quickly but methodically to 'map out' an area
- Make good use of any available shielding
- Most doserate instruments are NOT directional





# Personal Dosimetry

- Two main types of Personal Dosimetry

- Passive E.g. Film Badge, TLD's...
  - Read dose after exposure
  - No active indication of doserate



- Active E.g. QFE, Electronic Personal Dosimeter (EPD)...

- Active display of dose received
- Some instruments show doserate





# Biological Dosimetry

- Samples taken for post incident analysis of inhaled and ingested radionuclides
  - Blood
  - Urine and Faeces
  - Saliva
  - Perspiration
  - Mucus
- Whole Body Monitoring
  - Sensitive equipment looks at gamma emissions from radionuclides in the body



Transportable Body Monitor



## Summary

- Monitoring instruments are your best source of information, if used wisely;
  - Select an appropriate monitor
  - Switch on BEFORE entering an area
  - Always check the battery
  - Set any alarm to a sensible level
  - Protect against contamination
- Interpret results with care

