



Working in a Radiation Environment

Produced by the Canadian Nuclear Safety Commission for First Responders

**THE FOLLOWING ARE RECOMMENDATIONS ONLY.
LOCAL OR PROVINCIAL PROCEDURES AND PROTOCOLS MUST BE FOLLOWED.**

Recommended Practices

INITIAL RECCE AND LIFE SAVING TAKE PRIORITY OVER ZONE DELINEATION

Turn-Back Dose Rates and Maximum Permissible Dose (MPD):

Routine situation (non-emergency):	MPD: 0.5 mSv (500 µSv) Turn-back dose rate: 1 mSv/h*
Emergency situation:	MPD: 250 mSv (250,000 µSv) Turn-back dose rate: 1000 mSv/h* (1 Sv/h)
Life Saving:	Unlimited (volunteer basis)

* If any meter you are using goes off scale, turn back.

DECONTAMINATION: A reading that is twice the background level on a contamination meter is considered dirty. A full-body scan should take 5 minutes per person. Try to keep the meter less than 5 cm from the person and do not touch the person with the instrument.

COLD ZONE: Background level reading on a contamination meter and a gamma dose rate meter.

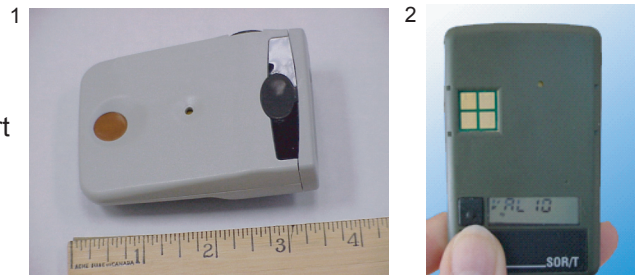
HOT ZONE: 5 µSv/h or 300 cpm (counts per minute), whichever comes first.
Note: 300 cpm is approximately six times the background level on a 15 cm² pancake contamination meter.

Radiation Instruments

Personal Alarming Dosimeter (PAD):

Used for turn-back dose rates and maximum permissible dose rate alarms. Dosimeters measure gamma radiation. Some models will also measure beta radiation. Dosimetry should be considered as part of your personal protection equipment (PPE).

1. Picture of a Siemens Mk2.3
2. Picture of a MGP SOR/T Personal Alarming Dosimeter



Surface Contamination Meter:

Used primarily for contamination checks on personnel and surfaces/objects in low-background gamma fields. Far more sensitive than a gamma survey meter and will respond to alpha (α), beta (β), gamma (γ) radiation. Not suitable for use in a hot zone. It is a yes/no instrument. Typical background is 50 cpm for a 15 cm² pancake contamination meter.

3. Picture of a Technical Associates TBM-3S contamination meter



15 cm² pancake contamination meter

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Canadian Nuclear Safety Commission 24-hr Duty Officer's number: (613) 995-0479



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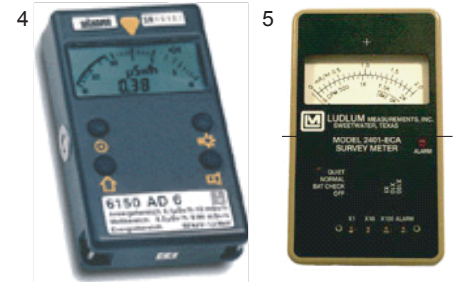
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Gamma Dose Rate Meter:

Measures gamma dose rate. It is the *only* instrument which should be used in the hot zone and should be placed in a plastic bag to avoid contaminating it. Typical background level is approximately 0.25 $\mu\text{Sv/h}$.

4. Picture of an Automess 6150 AD6

5. Picture of a Ludlum 2401-ECA survey meter



Gamma Spectrometer:

Calibrating the instrument with the supplied check source is the most important and first step when using a spectrometer. Can be used as a gamma dose rate meter (more sensitive, but less rugged than a standard dose rate meter). Most spectrometers (check the specifications) can only measure gamma dose rates up to 100 $\mu\text{Sv/h}$. Automatic isotope ID functions can easily induce a non-expert user into error. Typical background is 0.05 to 0.2 $\mu\text{Sv/h}$. Some meters also measure in units of cps (counts per second); however, the meter should not be used for contamination monitoring.

*The information provided in this document is not intended to single out or endorse specific radiation detection equipment suppliers.

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