Area Contamination Monitoring by Wipe Testing

General

As will be evident from the notes above, tritium contamination cannot be detected with any hand-held instrument, and "wipe tests" are therefore necessary. In laboratories not equipped with hand-held monitors, other isotopes may also be monitored via this method (e.g. 14C) by selecting an appropriate programme on the scintillation counter. Note that in each series of wipes an uncontaminated sample should be counted as a control in order to obtain a "background" count.

Active Area Monitoring

All areas where unsealed sources of 3H are used ("active areas") must be monitored both before and after each work session. The term "area", in this instance, also includes any equipment that could have been contaminated (e.g. centrifuges, hybridisation ovens, and heating blocks). Wipes taken prior to starting work will indicate whether any contamination was left by a previous user.

If an area is found to be contaminated prior to undertaking work, the Radiation Safety Unit must be informed and the incident investigated. Minor spills or splashes which occur during an experiment should be cleaned up by the user in accordance with the Local Rules. If it is impossible to remove the contamination, the RPS should be contacted for advice. Following the monitoring procedure, all contamination measurements must be recorded (as Bq/cm2).

Laboratory Monitoring

Once per month (or as otherwise decided, and stated in the Local Rules), the entire laboratory (including inactive areas) should be surveyed for contamination. Reference to a schematic diagram of the lab may be helpful in demarcating all the areas to be surveyed, and to identify the points at which wipe tests should be taken. All results should be recorded, and any levels of contamination above the working limit should be reported to the RPS.

Procedure for Monitoring

1. Moisten a suitable wipe, such as a glass-fibre disc small enough to fit into a liquid scintillation vial, with
water or other solvent in which the contamination is soluble.
2. Wipe a known area of surface, normally 100 or 1000 cm2.
3. Place the wipe into a scintillation vial with 10 cm3 of liquid scintillant.
4. Count the activity in a liquid scintillation counter.
5. In the absence of any more accurate information assume that 10% of the activity on the wiped surface has been transferred to the wipe.
6. Calculate the contamination level using the formula:

$$\text{contamination level (Bq.cm-2)} = \frac{C}{A} \times \frac{100}{Eff} \times \frac{100}{T}$$

where:

C = count-rate in cps, corrected for background

A = area wiped in cm2

Eff = percentage counting efficiency for isotope in question

T = percentage of contamination picked up (normally 10%)

Working Limits (Bq.cm-2)	**3H**	**14C**
Active Areas	300	30
Inactive Areas	30	3