

10.2. PROTECTION FROM IONIZING RADIATION

The probability of mixed radiations (*e.g.* X-rays and neutrons) co-existing makes servicing hazardous and all maintenance should be performed under the supervision of the RSO.

10.2.3. Ionizing-radiation protection – unsealed radioactive materials

The most common controlled situation in which unsealed radioactive materials is used is in the construction of samples for use in Mössbauer experiments, NMRON experiments, and radioactive tracer experiments. Uncontrolled situations can occur, for example, whenever maintenance is being carried out on particle accelerators and neutron generators where radioactivity might be induced in the materials being handled by the particle beams. Great care should be taken to avoid the radioactive material being taken into the body by inhalation, ingestion or absorption through the skin or a wound.

Factors that influence the manner in which unsealed radioactive materials are handled include: its radiotoxicity, its volatility, the external radiation level, the nature of the work, and the design of the equipment and ultimately the design of the laboratory.

The decision concerning the manner of handling unsealed radioactive materials is the responsibility of the RSO and the safe implementation is that of the worker.

A great many rules exist concerning the handling of this material, but in the final analysis the worker should:

(i) think the problem through, rehearsing his actions where possible;

(ii) use his common sense by minimizing the risk of breathing, eating or absorbing on his skin the radioactive material. In particular, eating, drinking or smoking in radioactive environments is to be avoided;

(iii) exercise caution and wear the appropriate protective clothing at all times;

(iv) be fully cognisant of the rules and regulations pertinent to the laboratory in which he is working. It is the duty of the RSO to ensure that this is so;

(v) ensure that he carries the appropriate radiation monitor and the RSO records his levels of exposure regularly;

(vi) have ready access to handbooks and textbooks on radiation safety, *e.g.* Brodsky (1982) and Stott (1983).