Safe Handling of Radioactive Sources

Several types of radioactive sources are used for the experiments in this manual. The simple rules given in this section will assure safe handling of these sources.

Never eat, drink, or smoke in the laboratory counting area. Wash your hands at the end of each laboratory experiment. In Experiment 22 liquid sources are used; therefore, special clothing and gloves should be worn.

Source Kits SK-1G, SK-1X, and SK-1B contain sealed sources. These sources contain activities <1 μCi and can be safely handled with your fingers. It is good practice to always handle these sources by the edge of the disk.

All of the alpha sources (Source Kit SK-1A) used in this manual are unsealed and should be handled very carefully to avoid wiping any of the radioactive spot onto hands, clothing, or equipment. Any source that has an activity >10 μCi should be handled with tongs.

Experiments 16, 17, and 18 require the use of a 1–3 Ci Am-Be neutron source. These sources are quite dangerous if not handled properly. Tongs or a 1-meter length string should be used in handling these neutron sources. For Experiment 17, the neutron source can be transferred to the Activation Howitzer and locked in position for safe activation. The complete techniques for handling neutron sources are usually included with the shipping container of the source.

Survey meters should be available in the nuclear counting laboratory to monitor all sources of activity >5 μCi.

Measurements in Health Physics from a Practical Point of View

In order to use isotopes in a counting laboratory, it is necessary to understand and use good health physics practices. Most of the sources used in this AN 34 series of experiments are sealed, low-activity sources and hence present no real health physics problems. In many industrial, medical, and research laboratories, high-activity unsealed sources are frequently used. If a liquid source is accidentally spilled, the procedures for determining the types of radiation and the activity of the smears that are taken from the area are exactly the same as those outlined in the preceding experiments. For added safety, however, consult the local health-physics authorities for specific instructions.

If in the course of research it is necessary to use a "hot" source, it is wise to minimize exposure by: (1) staying in the area of the source a minimum amount of time; (2) staying as far away from the source as is practical for the indicated measurement; and (3) using the proper shielding material between yourself and the source.

With a knowledge of the activity of the source and a wise compromise between shielding, distance, and time, we can safely use radioisotopes in all actual laboratory situations.

Handling of Sources

1.	Source Kits SK-1X, SK-1G, SK-1B	~1 μCi	May be handled with fingers.
2.	Source Kit SK-1A and all weak alpha sources	~1 μCi	May be handled with fingers but care must be taken not to touch the radioactive spot.
3.	Any sources sealed or unsealed	>10 μCi	Use tongs or other devices. Do not handle directly.
4.	Neutron sources	1–3 Ci	Use tongs. Follow the instructions provided by the manufacturer or those required in the license appli- application.