3 Methods for Disposal of Chemical Carcinogens and Spillage Treatment

3.1 General Considerations on Methods of Treatment and on the Type of Waste or Spillage to be Treated

"Good laboratory waste management begins with preventive measures, that is, identification of steps that can be taken to reduce the volume of chemicals that enter the waste disposal process and to prevent unusual, difficult disposal problems." In this statement, Joyce (104) summarizes the first step to be taken when setting up an experiment to approach sensibly a disposal problem. Although written for the more general problem of laboratory chemicals, it applies strictly to that of chemical carcinogens.

While a number of books general guidelines and procedures for disposing of chemical waste and handling spillage problems (2, 105–109), none deals specifically with carcinogenic substances. Only a few references can be found in the Laboratory Waste Disposal Manual (107). In their review of the situation, Montesano et al. (24) recommended that "Research into methods for the destruction and disposal of chemical carcinogens is urgently needed".

Carcinogenic substances should never be disposed of through drains or by evaporation into the atmos-
phere, nor should they be buried since they might be released later.

Carcinogenic substances should be treated in such a way that:

- the degradation products are non-toxic and non-carcinogenic;
- the procedures involved for treatment and disposal do not result in exposure to these substances of personnel in charge of the work; and
- the procedures involved for treatment and disposal do not result in contamination of equipment or space.

Two main categories of waste can be envisaged:

- large volumes of lightly contaminated wastes, such as bedding from animal experiments, carcasses and disposable protective clothing not obviously contaminated; and
- small volumes of more highly contaminated wastes, such as residues of chemical synthesis and of solutions used in biochemical or biological laboratories.

For the first category of waste, incineration may be the only feasible method of degrading carcinogenic substances and those of their metabolites that might be harmful. However, there is a large range of incinerators, the performance of which differs widely; and, for comparable equipment, the efficiency of the incineration process differs in a number of parameters, such as retention time of the compounds, feed rate and air supply of the furnaces. Few studies have been done on the efficiency of degradation of chemical carcinogens and the resulting products. Some work conducted at the National Center for Toxicological Research, Food and Drug Administration, Jefferson, AR 72079,