

question-and-answer period

Personal protective equipment

Rubber gloves for handling radioactive materials, disposable clothing, suits with supplied air, and approved respiratory devices are some of the items of specialized personal protective equipment which may be needed. Conventional mechanical-type respirators are usually completely inadequate for concentrations a few times higher than RCG's. They may be useful if the collection efficiency of the filter media is known and if the exposure is predictably low. Leakage of contaminated air in between the face and the edges of the respirator is a problem.

Fire prevention and extinguishment

Fire or explosion in an ordinary industrial process may be much more troublesome if radioactive materials are released at the time of the incident. Even explosions within glove boxes can raise quantities of radioactive dusts from surfaces where the dusts have settled, thus creating serious inhalation hazards. Severe personal injuries, not only from fire and explosion, but also from wound contamination as well as inhalation, may be incurred, and cleanup work may be expensive and difficult. On the other hand, if only small amounts of radioactivity exist, a catastrophe probably would not be much more costly.

Each industrial process should be carefully studied in the light of what might possibly occur so that suitable measures for prevention and control of fire and explosion can be set up.

Warning systems for early discovery and control of fire are even more important when fires can involve radioactive materials. To cause large dollar-losses, it is not, of course, necessary that the radioactive materials themselves burn. Losses may also be serious if the materials are spread around as the result of damage to their containment vessel (or system) or scattered by high-pressure hoses and run-off water during fire extinguishing activities.

Fires in dry boxes containing radioactive materials must be anticipated. The spread of a fire to contaminated filters in ventilation systems must also be considered. In some cases, fires of pyrophoric radioactive metals must be fought with special extinguishment

methods.

A plant volunteer company or a municipal fire department should receive advance training in fighting these type fires. This will pay off in the long run by reducing the damage that can occur in fighting a fire that involves a large amount of radioactive material. (See *Radiation Hazards of Radioactive Isotopes in Fire Emergencies*, an Introductory Report, June 1950, and *Radiation and Monitoring Fundamentals for the Fire Service*, 1955 (International Association of Fire Chiefs), *Radiation Hazards in Firefighting*, Safety & Fire Protection Technical Bulletin No. 4, 1955 [AEC].)

Operating costs

It is difficult to estimate realistically the cost of radiation safety, since the estimate depends on what is included in the cost accounting system as actually being a "radiation safety cost." Much of the routine monitoring, for example, may be more properly charged as an operating cost especially where the work could not be done without concomitant monitoring. In some cases, it is almost impossible to draw a line between expense items that contribute to improvements in operational safety and those which are indispensable if any work at all is to be done with radiation.

Self-monitoring by operating personnel may be comparatively economical in some situations and, in others, more costly than hiring the services of an auxiliary radiation safety specialist. Training or learning costs for operating personnel are expensive and may be inadvertently overlooked.

The operating costs for the radiation safety program will be determined by the kind of risks and by the level of safety considered acceptable. Salaries and wages will constitute perhaps 85 per cent of these operating costs, so the problem is reduced to that of estimating how many men are required for the work.

One approach is to use ratios. A radiation survey of an item, operation, or event may require from one minute to an hour or more. The number of radiation surveys per month may range from 0.2 to 8 for every person who works with radiation, with an average of one to two such requests per month per employee not unusual. Along with his other duties,