# Ionizing Radiation

**Radiation Safety Program** 1487
Notification Regulations and controls Preliminary planning of operating functions New functions and requirements Evaluation of needs Formation of policies Medical examinations Educational and training activities Personal protective equipment Fire prevention and extinguishment Operating costs

**Nonionizing Radiation from Electronic Equipment** 1494
Microwave safety Laser beam safety Laser hazards controls

**References** 1504

This chapter will introduce the safety engineer to the problems of radiation safety, to the methods for safe control of ionizing radiation, and to the considerations needed for safe handling of radioactive materials It will provide a frame of reference within which the safety of such operations can be evaluated It is directed to the safety engineer who wants a master checklist of the items which he must consider, information on current standards of radiation safety performance, and a guide to help him tailor his own efforts or get technical help to fit his specific problems

Radiation safety is part of a company's total safety program and is related to other phases of that program Plant modification may call for the introduction of radiation devices, radioactive materials require radiation safety reviews as well as engineering studies Traffic patterns for pedestrians and moving equipment may need to be altered to prevent or control the spread of radioactive material throughout the plant

In the absence of a health physicist, the company considering use of radiation sources or devices should consult the safety professional in order that adequate control measures be established Because of his experience in company activities, he will recognize the need for further precautions to make sure that the work is done safely

The accident experience and basic safety problems of an organization should not change much before or after the introduction of even extensive work with radiation Frequency and severity rates will rise or fall predominantly from the conventional accidents and injuries However, the control of chronic radiation exposures of personnel lends itself to effective accident prevention techniques, and some radiation hazards can be handled with common safety measures For other cases, the safety professional will have to consult a qualified expert in order to obtain guidance Thus, the safety professional should assume the initiative in making plans to handle radiation problems in the plant

Review and discussion by the safety professional and supervisors of material in this chapter will point up difficulties which supervisors and employees may encounter in working safely with radiation, and will hopefully point out what management must provide in plant facilities and in items of extraordinary expense It should enable the safety professional to integrate basic radiation safety into his present overall safety effort and to point out areas where his program may need additional emphasis

This chapter provides the safety professional with rough yardsticks to measure the magnitude of his problem and to help him determine when he will need technical advice for the specific situation being faced Many radiation safety problems, as is the case with safety problems, will require the experience and advice of an expert in the field

Several highly complex subjects—the characteristics of radiation, the physics of the interaction of radiation and matter, and the

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This chapter was revised by Harold J Moe, Health Physicist, Argonne National Laboratories, Argonne, Ill, and Julian B Olishifski, P E, of the N S C Staff, based upon reviews by selected members of the National Safety Council