CHAPTER 42

IONIZING RADIATION

Characteristics of ionizing radiation: X-radiation . . . gamma radiation . . . beta particles . . . alpha particles . . . neutrons . radioactive decay . . . units of radiation measurement ——— 42-2

Biological effects of radiation: types of injuries . . . relating dosage to damage . . problems in evaluating previous dose ——— 42-9

Operating experience of the atomic energy industry: external radiation exposure of personnel . . . internal radiation exposure of personnel . . . contamination of personnel . interruption of operations . . . transportation incidents fires and explosions . . . reactor incidents . . . losses ——— 42-12

Identify your radiation safety problems: consider the type of work involving radiation . . . consider the sources of radiation . consider operational factors . . . consider employee exposure potential . . . calculate degree of risk . . . guide doses ——— 42-15

Radiation safety program: 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 ——— 42-30

Functions of a radiation safety staff: establishing safe distances and times . . . detecting and measuring external radiation. instruments . . monitoring, surveying, and personnel monitoring contamination surveys decontamination . inspection and investigation special services records and reports . . . information service laboratory facilities or services ——— 42-38

Operating costs for radiation safety ——— 42-44

Evaluation of performance: exposure guide levels exposure rates rate calculation and improvement ——— 42-45

This chapter should 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 should provide a frame of reference with-

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