

RADIATION PROTECTION GUIDELINES
FOR RADIATION EMERGENCIES

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I will discuss the system of dose limitation and present guidance for emergency workers and for intervention on behalf of the public.

DOSE LIMITATION

There are three elements for the system of dose limitation: justification, optimization, and dose limits. The first element, justification, is basically a political process in this country. Justification is based on a risk-benefit analysis, and justification for the use of radioactive materials or radiation is generally not within the authority of radiation protection managers. Radiation protection managers typically assess detriments or harm caused by radiation exposure and have very little expertise in assessing the benefits of a particular practice involving nuclear material. However, there are a few practices that are easy to rule out, such as not permitting the use of a radioactive toy or radioactive jewelry. But outside of obvious practices that give little or no benefit, society generally performs the justification procedure through the political system.

The second element in the system of dose limitation is optimization. The optimization procedure follows the recommendation of the International Commission on Radiological Protection (ICRP) that all doses be kept as low as reasonably achievable, often termed "ALARA," which is synonymous with optimization. ALARA is simply weighing the cost of radiation detriment against the cost of a protective measure. There are many indirect costs aside from those of health costs, including those related to insurance, public relations, hiring and training personnel, and protective equipment. In the United States, we are willing to pay \$100 to \$10,000 to reduce one man-rem of detriment. This value judgment translates to between \$600,000 and \$60,000,000 per statistical life. Making such calculations might seem a bit cynical or inhuman, but remember that this cost-detriment analysis is not used in the justification process but in the optimization process. Society has justified the use, and radiation protection managers must ensure that the use leads to doses that are ALARA.

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