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**Radiological protection — Radiological monitoring of emergency workers and populations following nuclear/radiological incidents — General principles**

*Radioprotection — Surveillance radiologique des intervenants en situation d'urgence et de la population après des incidents nucléaires/radiologiques — Principes généraux*

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 85, Nuclear energy, nuclear technology, and radiological protection, Subcommittee SC 2, Radiological protection.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

Nuclear accidents and major radiological events, referred to herein as nuclear or radiological incidents, can occur and may release large amounts of radioactive materials to the environment and affect large populations. Their consequences may differ across space and time and should be considered both at the emergency exposure situation and during long term recovery within the existing exposure situation. In these circumstances, screening, triage, monitoring and assessing radiation exposures for populations would be a key issue for managing the situation. More precise measurements and associated dose assessments need to be undertaken in support of, and according to, different objectives, including: identification of people potentially subject to internal/external contamination, health assessment, epidemiological follow-up, public information and reassurance and regulatory compliance. Furthermore, not only physical measurements but also biological estimation methods are useful for estimating exposures.

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## Radiological protection — Radiological monitoring of emergency workers and populations following nuclear/radiological incidents — Part 1: General principles

### 1 Scope

This document presents general principles for preparedness to conduct individual contamination screening, triage, monitoring and assessing radiation doses received by people exposed during and/or in the aftermath of a nuclear or major radiological incident. The document mainly focuses on the early response phase, which requires rapid actions to be undertaken for achieving the goals in support of, and according to, national or international guidelines on emergency response.

It addresses general requirements for members of the public — this includes adults, vulnerable populations (such as children and pregnant women and people with special needs (such as the elderly and disabled) as well as emergency workers. This document provides general procedures for screening, triage and monitoring these two categories of people. It deals with individual monitoring for potential external contamination, internal and external exposures and dose assessment. It also gives principles for organizing and managing a population screening centre and for registering and reporting the results of individual monitoring. This document is applicable to most exposure situations following a nuclear or major radiological incident affecting a large number of people, including:

- significant release of radioactive materials (e.g. from a facility, transportation or nuclear power plant);
- radiological dispersal device (RDD);
- improvised nuclear device (IND);
- nuclear weapon.

Radiological incidents for which there is no release of radioactive substances in the environment but only external exposures (e.g. linked to a Radiation Exposure Device (RED)) are outside the scope of this document<sup>1</sup>. However, some information given by this document may be of interest for this type of event.

The aim of document is to ensure that the appropriate parties are prepared in advance. This document advises how to obtain and collect data quickly and accurately in order to inform decision makers. It does not specify the parties or individuals who are responsible for undertaking the actions.

This document is intended to give guidance to those in charge of monitoring and assessing doses received by populations in emergency exposure situations involving a large number of people potentially subject to internal/external contamination (and subsequent radiation doses). It can also serve as guidance to regulatory bodies.

<sup>1</sup> Incidents resulting from RED exposure are excluded from consideration in this document because they do not result in contamination that would be detected by a portal monitor or handheld device. Identification of victims with only potential external exposure are determined by means such as evaluation of clinical signs and symptoms, biodosimetry, EPR, etc.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain ~~terminological~~terminology databases for use in standardization at the following addresses;

— ISO Online browsing platform: available at <https://www.iso.org/obp>~~https://www.iso.org/obp~~

— IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1 activity

*A*  
quotient of  $-dN$  by  $dt$ , where  $dN$  is the change in the number of radioactive nuclei, at a particular energy state and at a given time, due to spontaneous nuclear transformations in the time interval  $dt$

[SOURCE: ICRU 85, 6.2, October 2011, modified by changing the order of the phrases, by deleting the word “mean”, by adding the word “radioactive”.]

Note 1 to entry: It is expressed as  $A = -dN/dt$ . Activity can be calculated as  $A = \lambda N$ , where  $\lambda$  is the decay constant and  $N$  is the number of present radioactive nuclei.

Note 2 to entry: The special name for the unit of activity in the International System of Units is Becquerel (Bq), where  $1 \text{ Bq} = 1 \text{ s}^{-1}$ . The use of the former unit Curie ( $1 \text{ Ci} = 3,7 \times 10^{10} \text{ Bq}$ ), is also accepted in many countries and in BIPM.

### 3.2 contamination

radioactive substances on surfaces, or within solids, liquids or gases (including the human body), where their presence is unintended or undesirable, or the process giving rise to their presence in such places

[SOURCE: IAEA Safety Glossary Terminology used in Nuclear Safety and Radiation Protection – 2018 Edition]

### 3.3 decontamination

complete or partial removal of *contamination* (3.2) by a deliberate physical, chemical or biological process

Note 1 to entry: This definition is intended to include a wide range of processes for removing contamination from people, equipment and buildings, but to exclude the removal of radionuclides from within the human body or the removal of radionuclides by natural weathering or migration processes, which are not considered to be decontamination.

[SOURCE: IAEA Safety Glossary Terminology used in Nuclear Safety and Radiation Protection – 2018 Edition]

### 3.4 committed effective dose

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