

**Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident:
A new ICRP publication taking into account the lessons learned from the Fukushima accident**

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This new ICRP publication provides an updated framework for the protection of people and the environment in the case of large nuclear accidents, drawing on the feedback experience of the Fukushima accident. In this publication, the Commission makes a distinction between the early and intermediate phases considered as an emergency exposure situation and the long-term phase considered as an existing exposure situation. An additional distinction is introduced between on-site and off-site to differentiate activities at the damaged installation and in the affected areas. It is acknowledged that besides the urgent protective actions to be implemented, characterisation of the radiological situation on-site and off-site is essential to guide protective actions, and should be conducted as quickly as possible.

Among the main points presented, it is worth mentioning the discussion on the selection of the reference levels for the different phases and categories of people. For protection of people, the reference level should not generally exceed 100 mSv for the duration of the early and intermediate phases. It is also emphasized that responsible organisations in cooperation with stakeholders should review and adopt a lower reference level whenever possible. For the long-term phase the reference level should be selected in the lower half of the recommended band of 1–20 mSv for existing exposure situations, taking into account the actual distribution of doses in the population and the societal, environmental and economic factors influencing the exposure situation. In addition, it is stated that the objective of optimisation of protection is a progressive reduction in exposure to levels close to 1 mSv per year or below.

For protection of responders, it is recognised that the people involved in directly managing the consequences of a nuclear accident are diverse in terms of their status, degree of preparation and training with respect to radiation, i.e. emergency teams (firefighters, police officers, medical personnel, etc.), workers (occupationally exposed or not), and other people such as elected representatives or voluntary citizens. For their protection on site, the reference level during the early phase should not generally exceed 100 mSv, while recognising that higher levels may be permitted to responders in exceptional circumstances to prevent further degradation leading to catastrophic conditions or to save lives. Lower reference levels may be selected based on the situation in accordance with the severity of the accident. During the intermediate phase, the reference level should not exceed 100 mSv per year. For the long-term phase, reference level should not exceed 20 mSv per year with possible special arrangements limited in time. The Commission recommends responsible organisations to take all practical actions to avoid unnecessary accumulation of exposures for responders involved in both the early and intermediate phases. For protection of responders off-site, the Commission recommends selecting a reference level not exceeding 100 mSv for the early phase and 20 mSv/year for the intermediate phase. For the long-term phase the reference level should be selected within the lower half of the 1 to 20 mSv per year band.

Another important issue is the integration of non-radiological factors when applying the principles of justification and optimisation such that living and working conditions of all those affected are preserved or restored. This includes decent lifestyles, livelihoods and quality of the environment. It is recognised that the management of the protection of people and the environment in affected areas in the intermediate and long-term phases is a complex process involving not only radiological factors, but also societal, environmental and economic considerations. This process includes actions implemented by national and local authorities and self-help protective actions taken by the residents. In these phases, radiation exposure of people living and working in affected areas are largely depending on individual lifestyles. It is proposed that authorities, experts, and stakeholders should

work together in a co-expertise process to share experience and information, promote involvement in local communities, and develop a practical radiological protection culture to enable people to make informed decisions. Individual measurements with suitable devices, together with relevant information, are critical to implementing the process. For the protection of the environment, the reference is made to the ICRP framework for the protection of fauna and flora based on Reference Animals and Plants together with Derived Consideration Reference Levels. In addition, it is emphasized that the impact of protective actions on pets and livestock as well as on the environment in terms of sustainable development, conservation, preservation and maintenance of biological diversity should also be addressed.

For preparedness, it is important that plans should be prepared in advance. These will comprise a set of consistent actions, adapted to local conditions and infrastructure at nuclear sites, that account for the societal, environmental, economic, logistical and other factors that will affect the impact of the event and its response. Finally, authorities should involve key representative stakeholders to participate in the preparedness process as well as in the management of the successive phases of the accident. It is the role of the authorities to implement radiation monitoring and health surveillance and to provide the conditions and means for sharing information and expertise to enable individuals developing a radiological protection culture and making informed decisions about their own protection.