Nuclear and Radiological Emergency Guidelines

Preparedness, Response and Recovery

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of Red Cross and Red Crescent Societies

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Nuclear and Radiological Emergency Guidelines: Preparedness, Response and Recovery – 1296000 E 50 10/2015

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Preparedness, Response and Recovery

The International Federation of Red Cross and Red Crescent Societies (IFRC) is the world's largest volunteer-based humanitarian network. Together with our 189 member National Red Cross and Red Crescent Societies worldwide, we reach 97 million people annually through long-term services and development programmes as well as 85 million people through disaster response and early recovery programmes. We act before, during and after disasters and health emergencies to meet the needs and improve the lives of vulnerable people. We do so with impartiality as to nationality, race, gender, religious beliefs, class and political opinions.

Guided by *Strategy 2020* – our collective plan of action to tackle the major humanitarian and development challenges of this decade – we are committed to 'saving lives and changing minds'.

Our strength lies in our volunteer network, our community-based expertise and our independence and neutrality. We work to improve humanitarian standards, as partners in development and in response to disasters. We persuade decision-makers to act at all times in the interests of vulnerable people. The result: we enable healthy and safe communities, reduce vulnerabilities, strengthen resilience and foster a culture of peace around the world.

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Foreword

"Preparing for the unexpected and impossible"

Some may ask, given the wide and growing number of natural and man-made crises that we are preparing for and responding to, why the Red Cross Red Crescent is devoting time and resources to preparing for nuclear emergencies, events that are historically rare.

The Fukushima crisis was a painful reminder of how devastating nuclear accidents can be, and of how ill-equipped we, as a global community, are to respond. It would be easy, even comforting, to write off this experience as unique, and unlikely to ever happen again.

However our experience in disaster management – experience that goes back to the founding of our Federation in 1919– has taught us to appreciate the inevitability of accidents and emergencies, and the importance of planning and preparing for the unexpected and the impossible.

← *IFRC Secretary General Mr. Elhadj As Sy paying tribute to the victims of the Great Eastern Japan Earthquake and Tsunami (GEJET) in the contaminated area near the Fukushima Daiichi Nuclear power plant. (October 2014)*

The frequency of 'high impact, low probability' or so called "Black Swan" events in recent years has signalled the emergence of a new 'normal'. Apparent one-off large scale emergencies such as Hurricane Katrina, the Deepwater Horizon oil spill and the Japanese earthquake and tsunami were all mega-disasters requiring rapid responses at a global level, testing our preparedness for extraordinary emergencies.

The International Red Cross Red Crescent Movement has a history of responding to nuclear and radiological emergencies. We can draw on the lessons we have learned from our response to the accidents at the Three Mile Island Nuclear power plant in the United States of America, the Chernobyl Nuclear Power Plant, and the Fukushima Daiichi Nuclear Power Plant. We can draw from the experiences of our volunteers and staff who worked alongside affected communities, even as they faced challenges to their own safety and health. In order to deliver the most urgent humanitarian relief, and in order to accompany communities on the road to recovery, very specific knowledge and equipment is required.

These guidelines draw on these lessons. We hope they will help National Societies to think through the various scenarios they may have to deal with should they face a nuclear or radiological emergency. With this publication and other knowledge and training tools available within the Movement, the next step is to strengthen our expertise and incorporate nuclear and radiological emergency preparedness into our domestic and regional plans.

Elhadj As Sy
Secretary General

Acronyms

BSS	Basic Safety Standards
FACT	Field Assessment and Coordination Team
FAO	Food and Agriculture Organisation of the United Nations
IACRNE	Inter-Agency Committee on Radiation and Nuclear Emergencies
IAEA	International Atomic Energy Agency
ICRC	International Committee of the Red Cross
ICRP	International Commission on Radiological Protection
IFRC	International Federation of Red Cross and Red Crescent Societies
ILO	International Labour Organization
MCDA	Military and Civil Defence Assets
OCHA	Office for the Coordination of Humanitarian Affairs
OECD NEA	Organisation for Economic Co-operation and Development - Nuclear Energy Agency
PRIS	Power Reactor Information System
REMPAN	Radiation Emergency Medical Preparedness and Assistance Network
SOPs	Standard Operating Procedures
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
VCA	Vulnerability and Capacity Assessment
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organisation
WPNEM	Working Party on Nuclear Emergency Matters

1. IFRC programme on Nuclear and Radiological Emergencies

1. Background

The unprecedented complex disaster that struck East Japan on 11 March 2011 involving the Fukushima Daiichi nuclear power plant raised substantial concern around the world. The Red Cross Red Crescent Movement regarded this event as one of the utmost gravity. In a year that coincidentally marked a quarter of a century since the Chernobyl disaster, the international community was once again confronted by a major nuclear emergency with transnational humanitarian consequences.

When such events occur, people worldwide expect a prompt, comprehensive and effective response. They anticipate action by the Movement, in accordance with its mission to reduce human suffering.

Action regarding nuclear and radiological issues is not new to the Movement, which responded to the humanitarian consequences of the atomic bombs on Hiroshima and Nagasaki in 1945. On the diplomacy and policy front, the Movement has engaged with governments and has adopted a number of resolutions to emphasize the intolerable humanitarian impact of nuclear detonations. During the Cold War, several National Societies, in their role as auxiliary to their governments and as part of national civil protection systems, established a range of preparedness activities centred on radiation protection for the public. The activities also addressed scenarios of accidents resulting from the civilian use of nuclear technology. As a consequence of the nuclear accident in Chernobyl, the International Conferences of the Red Cross and Red Crescent in 1986 and 1995 adopted resolutions – formal commitments made jointly with government states parties to the Geneva Conventions – regarding disaster relief in the case of technological and other disasters.[1]

Radiological and nuclear emergency preparedness is in alignment with the International Federation of Red Cross and Red Crescent Societies (IFRC) Strategy 2020[2], which identifies three strategic aims designed to ensure that the organisation remains relevant and effective.

1 *http://www.icrc.org/eng/resources/documents/article/other/57jmdq.htm*

2 *https://www.ifrc.org/who-we-are/vision-and-mission/strategy-2020/*

These three aims are:

- Save lives, protect livelihoods and strengthen recovery from disaster and crisis;
- Enable healthy and safe living; and
- Promote social inclusion and a culture of non-violence and peace.

At its 2011 General Assembly, the IFRC adopted a resolution, referring to the decisions and actions it had taken in previous years and urging the national and international components of the Movement to take on a greater role in preparedness and response for radiological and nuclear emergencies.

The guidance in this resolution defines three basic actions:

- Reaffirm the commitment of the IFRC to continue to develop and improve the response plans to assist populations in coping with the humanitarian consequences of nuclear accidents, along with relevant procedures to protect staff and volunteers.
- Increase knowledge of the potential humanitarian consequences of nuclear accidents; to further clarify the roles and responsibilities of the National Societies, the IFRC Secretariat and International Committee of the Red Cross (ICRC) as part of the contingency planning; to work with local communities in the proximity of nuclear facilities to ensure their awareness of and preparedness for possible accidents; and to coordinate with other stakeholders to ensure access to victims in the event of nuclear accidents.
- Pursue greater international cooperation for nuclear emergency planning, preparedness and response; work with the ICRC, other humanitarian organisations, the International Atomic Energy Agency (IAEA) and other relevant United Nations system organisations to prepare for and respond to nuclear and radiological emergencies.

Additional information and details on IFRC efforts to operationalize the 2011 General Assembly decision are provided in the document: *IFRC Nuclear & Radiological Accidents Preparedness Program, Strategic Action Plan 2013*[3].

2. Purpose

The purpose of this document is to assist National Societies to plan, prepare for, and respond to a range of nuclear and radiological emergencies, and as a result reduce the human suffering such incidents may produce.

Nuclear and radiological technologies increasingly are being adopted and used in electricity generation, industry, agriculture and medicine throughout the world. Nuclear technology used for military purposes is also prevalent in many countries. Most technologies come with direct and indirect risks. A basic function of society and a responsibility of government is to recognize and acknowledge such risks and to maximize benefits while minimizing negative consequences. The decision to adopt and use radiological and nuclear technologies is made by the government authorities in accordance with the economic goals and circumstances of each nation.

This document will assist National Societies in their efforts to address the risks of nuclear and radiological technologies, to enable the safety and security of staff and volunteers, to assure business continuity during nuclear and

3 *https://fednet.ifrc.org/nuclearpreparedness*

radiological emergencies, and to fulfil its mandate of providing humanitarian assistance to those in need. It provides basic background information on nuclear and radiological risks, some examples of scenarios that illustrate the range of possible emergency events, and potential services and assistance that may be needed following such events. The document addresses collaborative and cooperative actions that a National Society can take with its government and non-government partners, and provides guidance with respect to a radiological emergency operating environment. Guidance is also offered on how National Societies can access support through IFRC and other Movement components, when needed. It is important to underline that each National Society that takes up this specific topic needs to create its own country-specific guidelines to be able to address specific national and regional contexts.

This document does not duplicate the wealth of information otherwise readily available through IFRC on disaster management. It instead seeks to connect with and complement these materials while bridging to the unique characteristics and aspects of radiological and nuclear risks and emergency events. As this document is considered as framework for National Society nuclear and radiological emergency preparedness, a number of supplementary items like technical guidance, international norms, templates, training material and case studies shall complement the specific topic.

The information supporting the development of these guidelines was collected from various sources within and outside of the International Red Cross Red Crescent Movement (from here on referred to as the Movement). In order to keep the information and procedures in these guidelines up to date, we foresee regular revisions as relevant data and procedures evolve and change, prompted by the findings of new research, analysis and relevant expert opinions.


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2. Guiding Principles and policies

1. Focus and Scope

Core components of the Movement mission are to reduce human suffering and strengthen resilience of at risk communities and vulnerable populations. Based on this mission and extensive past disaster response, there is a widely-held expectation by people and governments that the Movement will prepare for and respond to the humanitarian consequences of natural and technological disasters, including radiological and nuclear emergencies. Recognising this expectation and following up on discussions after the Fukushima-Daiichi accident, the General Assembly of the IFRC adopted in November 2011 Decision 11/46, which addresses the need to better prepare for the humanitarian consequences of nuclear emergencies. The full text of the resolution is found in Chapter 2.2.

This document provides guidance on how to prepare for handling the characteristic consequences of nuclear and radiological emergencies. It is intended to be used in conjunction with the considerable body of IFRC disaster management information, technical guidance, and other available tools. The document, together with supportive instructions, tools, templates and training, seeks to guide National Societies in reaching a level of awareness and competence in radiological and nuclear emergency preparedness. The guidance can support National Societies in extending their roles as auxiliary to their governments and enable them to play active parts in national nuclear response plans as core partners and service providers. When so engaged, individual National Societies will, in return, enhance the ability of the Movement as a whole to contribute to nuclear and radiological emergency preparedness worldwide.

> Like any global document, these guidelines have certain general descriptions and recommendations. Its application should therefore be weighed against the situation and circumstances of each National Society. Moreover, while the subject matter and focus of this document is on planning, preparedness and response actions for radiological and nuclear emergencies, such activities should be pursued and integrated within a National Society's all hazards disaster program framework. **In short, the radiological and nuclear emergency planning and preparedness should not be treated as an isolated or stand-alone activity. Instead, it should be subsumed, and become a subset of the National Society's overall disaster preparedness and capacity building efforts.**

Learning from the human impacts of the Hiroshima and Nagasaki nuclear weapons detonations, as well as from the nuclear accidents in Chernobyl and Fukushima, the document also makes reference to the long term recovery aspects and the role a National Society may assume.

2. Reference Document – General Assembly 2011

International Federation of Red Cross and Red Crescent Societies
General Assembly Decision 11/46
23-25 November 2011, Geneva, Switzerland

Preparedness to Respond to the Humanitarian Consequences of Nuclear Accidents

Gravely concerned about the hazard and the perceived risks that the 2011 Fukushima nuclear power plant accident posed to the health, safe and sustainable livelihood, and socio-economic status of the affected people of Japan;

acknowledges the lasting challenges faced by the Japanese Red Cross Society and its untiring efforts in responding to the humanitarian consequences in Fukushima, as well as the extraordinary solidarity demonstrated by sister National Societies, their IFRC Secretariat and the International Committee of the Red Cross (ICRC);

recalls the widespread suffering caused by the Chernobyl disaster 25 years ago and its lingering impacts on individuals and communities in countries across Eastern Europe to this day;

commends the efforts of National Red Cross Societies of Belarus, Russia and the Ukraine to provide life-saving medical screening, social and psychosocial support in the framework of the Chernobyl Humanitarian Assistance and Rehabilitation Programme, with continued support from the Irish Government, and the Japanese and Icelandic Red Cross Societies;

considers the Fukushima and Chernobyl tragedies as serious reminders of the reality that accidents are possible wherever there are nuclear facilities such as nuclear power plant and therefore call not only for the most exacting precautionary measures but also thorough preparedness for disaster response;

recalls resolution 21 of the 25th International Conference of the Red Cross in 1986 on the role of the components of the Movement in providing assistance in response to technical and other disasters and resolution 4 of the 26th International Conference of the Red Cross and Red Crescent in 1995, which took note of the "Guidelines on the role of the Red Cross and Red Crescent Societies in response to technological disasters";

reaffirms the commitment of the members of the International Federation of Red Cross and Red Crescent Societies (IFRC) to continue to develop and improve their response plans to assist affected populations in coping with the

humanitarian consequences during and after a nuclear accident, as well as their procedures to protect staff and volunteers;

affirms that the response to nuclear disasters is an important part of the IFRC's overall disaster management framework as derived from Strategy 2020 adopted by the General Assembly in 2009;

welcomes the efforts of the ICRC to build competence and operational response capacity in relation to nuclear, radiological, biological and chemical events and acknowledges ICRC's preparedness to make this capacity available to National Societies and the IFRC Secretariat, as it could be a key supportive component during the first phase of a National Society response to a nuclear accident.

considers that more international cooperation is needed in responding to nuclear emergencies and therefore *expresses* our willingness to work with the ICRC, other humanitarian organisations, the International Atomic Energy Agency (IAEA), the other UN system to prepare for and respond to nuclear emergencies;

commits to increase our knowledge of the potential humanitarian consequences of nuclear accidents, to further clarify the roles and responsibilities of National Societies, the IFRC Secretariat and ICRC as part of our contingency planning, to work with local communities in the proximity of nuclear facilities to ensure their awareness of and preparedness for possible accidents and to coordinate with other (non-Movement) stakeholders to ensure access to victims in the event of nuclear accidents;

calls on the Secretary General to – in consultation with National Societies and the ICRC to establish appropriate ways for facilitating the sharing of such internal and external knowledge and evidenced based data and information and to consolidate those knowledge resources to assist National Societies to plan better for nuclear emergency preparedness;

invites the IFRC Secretariat to extend its research, support and advocacy in the area of International Disaster Response Laws, Rules and Principles (IDRL) to include international law issues of particular relevance to work of the Red Cross and Red Crescent in nuclear accidents;

invites the Secretary General to consult with National Societies and on how to most effectively extend our humanitarian diplomacy work to influence governments to implement safety mechanisms and commit resources to preparedness including at the community level and promotion of preparedness.

invites the Secretary General to give a progress report on the implementation of this decision to the next General Assembly in 2013.

3. Moving forward

This document focuses on preparing for the potential range of emergencies prompted by the use of nuclear and radiological technologies. While National Societies are specifically encouraged here to plan and prepare for these possibilities, they are also urged to consider other technological risks which can produce emergencies and human need. As with all disaster planning and preparedness, this additional consideration should be in coordination and cooperation with appropriate civil authorities.

Experience demonstrates that most technologies produce both benefits and risks. As mentioned earlier in this document, states and societies, usually through civil and economic authorities, decide on the adoption of technologies after evaluating and balancing the envisioned benefits against potential risks to the public health and general welfare. In this process, actions are usually taken by civil authorities to regulate adopted technologies with the intent of reducing or containing their risks and allied negative consequences. An example is the use of automobiles with government requirements for licensing, safety inspections, posted and enforced speed limits, and medical accident response resources. All of these actions are designed to limit the number and severity of road accidents.

Nuclear and radiological technologies are aligned with a range of other rapidly-evolving technologies. While natural disasters will continue to occur, experience demonstrates that the increasing use and reliance on technology can exacerbate the impact of natural disasters through cascading and sequential effects as it happened in March 2011 at the Fukushima-Daiichi Accident. Moreover human error, system failure and unintended consequences of technology use create their own emergencies. One such case example is the effect on climate change through the use of hydrocarbon fuels, for automobiles, electrical power generation, and industrial production.

Technological emergencies are often referred to as human-caused or man-made events or anthropogenic disasters, as a way of differentiating them from events produced by natural forces such as floods, typhoons and earthquakes. Technological emergencies often involve accidents caused or exacerbated by human error, judgment or omission.

The following are some examples of technological emergencies. As global forces such as increased urbanization, international trade and the reliance on technology continues, the nature and frequency of such events will undoubtedly increase in the future.

Year	Incident	Location	Human Impact
1917	Ship Explosion	Halifax, Canada,	2,000 fatalities
1932-68	Industrial release of Mercury compounds	Minamata Bay Japan	birth defects & other health issues
1960-63	Pharmaceutical Thalidomide	Global	Unintended consequence causing birth defects
1960-90	Asbestos Ban	Global	After extensive use for centuries as a heat insulator, found to cause a form of lung cancer
1962	Radiation Contamination, unidentified radioactive material,	Mexico City	4 dead
1979	Uranium Contamination	New Mexico, USA	Uranium tailing pond dam breach, 80 miles of Puerco River contaminated

Year	Incident	Location	Human Impact
1984	Liquid Gas Explosion	San Juanico, Mexico	500 – 600 fatalities and 5.000–7.000 suffered severe burns
1984	Toxic chemical release	Bhopal Chemical Disaster	over 3,000 fatalities
1984	Radiation contamination; lost Iridium-192 source	Morocco	8 fatalities
1985	Dam collapse	Val di Stava, Italy	268 fatalities
1986	Fire at a nuclear plant produces wide-spread radiological contamination	Chernobyl Accident, Former USSR, today Ukraine	See details in next graphic
1987	Radiation Contamination from abandoned hospital equipment	Goiânia, Brazil	4 fatalities, 249 others contaminated, 110.000 people screened
1989	Oil Tanker Collision	Atlantic Express & Aegean Captain near Tobago	26 fatalities, 185 million litres of oil released
1994	Estonia Ferry		Swedish Ferry Lines sinking with 867 fatalities
1995	Electric Power Failure – Blackout	Northeast USA	Electrical power grid failure for 30 Million people over 207,200 Sq. Km
1998	Train Derailment	Eschede Germany	101 fatalities
2000	Concord Jet Crash	Paris, France	Plane crash at take-off, 113 fatalities
2000	Radiation Contamination, radiological equipment	Samut Prakan Thailand	10 hospitalized, 3 dead, 1.872 others contaminated
2000	Explosion, fireworks detonation	Enschede, Netherlands	23 fatalities, 400 homes destroyed, 1.500 buildings damaged
2011	Nuclear Power Plant; Tsunami causes plant failure and radiological contamination of the surrounding area	Fukushima, Japan	See further details below
2012	Factory Fire	Karachi, Pakistan	257 people killed and more than 600 seriously injured
2013	Savar building collapse; Factory Fire	Dhaka, Bangladesh	1.129 people killed and more than 2.500 injured
2013	Train Derailment, Fire in City; extensive damage to town	City of Lac Magantic, Canada	46 fatalities

4. The role of the Red Cross Red Crescent Movement in technological disasters

The nature, form and definition of potential disaster agents has continued to evolve since establishment of the Red Cross Red Crescent Movement. In addition to recurring natural disaster risks, expanding economic and industrialization forces world-wide have increasing added risks associated with the development, application and reliance on a wide variety of technologies. The increase of population concentrations in urban areas and the expanding, integrated world economy have also served to enhance the impact of both natural and technological risks.

The accompanying chart presents a brief summary of the Movement's policy discussions and resolutions related to technological emergencies that present the risk of significant humanitarian consequences.

International Conferences Resolutions 1986 and 1995

Following the recognition of increasing numbers of technological accidents and disasters, accompanied by deaths, material losses and dangerous environmental pollution, which could lead to a further increase in the vulnerability of populations to technological disasters, the Red Cross Red Crescent Movement adopted several resolutions to address these specific hazards.

At several international meetings (e.g. the International Conferences of the Red Cross in 1986 and 1995 and the Regional Conference of European National Red Cross and Red Crescent Societies in 1992), the Movement recommended participation of National Societies in relief activities for the victims of technological disasters.

Technological disasters were defined as resulting from the release of chemical or nuclear material or ionizing radiation into the environment (disasters as a result of the use of chemical or nuclear weapons were not considered) .

Although every disaster – be it natural, technological or conflict – is unique, technological disasters may create an extra dimension. In almost every country in the world chemical and/or radioactive material is used, yet the probability of technological disasters occurring is heavily dependent on human factors. Unlike many natural disasters, the occurrence of technological disasters cannot be predicted. This type of disaster can happen everywhere and at any time. Minor technological incidents can suddenly turn into major accidents and disasters. In an instant, communities – even in countries far from the actual disaster site – can be impacted. The Bhopal chemical disaster and the Chernobyl nuclear disaster are striking examples.

The resolutions raised relevant questions that should be addressed further by the Movement: What should be the local, national, regional and global role of National Societies and their Federation in future accidents with global cross-border impacts? What can National Societies do and what can they not do? For instance, are National Societies able to work in contaminated areas? Do National Societies have to limit themselves to their traditional roles or are they able to take up new roles? How should National Societies prepare themselves for technological disasters, and what kind of support can be given by the IFRC secretariat?

It was and still is recommended that National Societies should only work in sectors where they have, or can build competence, and where they can provide auxiliary support to their national disaster response system.

2. Why should the Movement be concerned with technological disasters?

In 1986, the 25th International Conference of the Red Cross and Red Crescent adopted the resolution "Disaster relief in case of technical and other disasters" (Resolution 21[4]). In this resolution, the participants of the Conference recommended that “the League and the Henry Dunant Institute undertake a study concerning the possibilities and the necessities of improved assistance from the Movement in case of technical and other disasters". After the 1989 General Assembly, a "Study on the role of the National Societies in the event of technological disaster" was initiated and became an Annex to the Resolution 4 of the 26th International Conference of the Red Cross and Red Crescent 1995“Principles and action in international humanitarian assistance and protection”.

The recommendations in the resolution ask all agencies that would be called upon for assistance to take immediate and preventive action. Immediate action may prevent a (major) accident from becoming a real disaster. The effects of major accidents and disasters may – independently of where they occur in one state – spread to the territory of other states. These kinds of accidents and disasters require special and additional measures of prevention, assistance and mutual information and support, which must be planned and carried out both by states and by (inter-)national organisations.

Rapid industrial growth in developing countries, combined with (often imported) new technology, lack of legislation, inadequate supervision of safety procedures by public authorities and the lack of or insufficient training of local workers are some conditions for an increasing risk for technological disasters. Developed countries are faced with outdated nuclear and chemical installations, and in industrial states with rapidly changing social and political systems there is often little chance of these installations being renovated or rebuilt.

In almost all countries, people live in close proximity to chemical or nuclear installations, often forced to do so due to poverty or ignorance of the danger. Moreover, millions live near rivers, railways and roads, along which chemical or nuclear materials are transported.

Nuclear and chemical disasters are "cross-border" disasters. People living in neighbouring countries (and sometimes even in countries that are much further away) may become victims of technological disasters. Any of these conditions may lead to an increasing vulnerability of the population to technological disasters.

Based on the Fundamental Principles, the Movement endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found.

From the humanitarian perspective, the cause of any disaster – be it technological, natural or conflict – is of secondary importance. What is important is that Red Cross Red Crescent actions, as described in various strategic work plans, should seek to assist the most vulnerable and reduce their future vulnerability. Furthermore, like any professional organization, the Movement should work in sectors where it has, or can build, competence, and where it can provide auxiliary support to the disaster response system.

Photo: Jean Pierre Rivet

4 *http://www.ifrc.org/docs/idrl/I411EN.pdf*

5. The Fundamental Principles and ethical considerations in CBRN response[5]

Response to chemical, biological, radiological and nuclear (CBRN) emergencies may raise serious ethical questions and considerations. Many are similar to those encountered with other types of technological emergencies such as those that involve hazardous chemical and biological materials. Considerable work has been directed toward identifying these issues and general guidance has been developed to assist National Societies for these incidents and issues. This section recaps the framework of the Fundamental Principles[6] and the Code of Conduct[7] in the context of response activities in CBRN scenarios for staff and volunteers of IFRC secretariat and member National Societies. It shall provide guidance for the work of the Movement, however it cannot provide definitive solutions for humanitarian dilemmas a relief team or a National Society might face in the context of a response operation.

Looking at CBRN emergencies from a human rights-based approach can be useful when such events constitute serious threats to life, health, and a society's way of life. In extraordinary circumstances, exceptional measures may be acceptable – including the restriction of some fundamental rights. On an individual level, basic questions an authority and first responder might pose to themselves when faced with a decision could be: (a) Are someone's human rights affected by the decision? and, if so, (b) Is it legitimate to interfere with them? Decisions having an even wider impact (e.g. political decisions, higher level tactical or strategic decisions) raise the same concerns.

From the point of view of a National Society, however, the priority will be to identify activities that are based on identified needs in the context of a CBRN event. In these guidelines, we stress the primary precondition to ensure the safety and security of staff and volunteers before addressing the possible needs of affected communities. Without doubt, this counsel will lead to a number of different views, however the humanitarian principles that guide all our activities should help to frame decision making in such scenarios.

Members of the Red Cross Red Crescent Movement shall be guided by the Fundamental Principles.

The table below considers how the Fundamental Principles guide CBRN response.

CBRN events can lead to a number of dilemmas that organisations and individuals will have to face:

- Decisions may have to be taken on whether to risk the lives or health of first responders to save the lives of others. The question of what would be an acceptable level of risk to expose responders to is, at least in part, the question of how to balance responders' rights against the rights of members of the general public. It is the aim of all components of the Movement to ensure that all possible measures are taken to protect our staff and volunteers against possible risks.
- Decisions may have to be taken on whether to prioritise resources in such a way as to advantage one group of people at the possible expense of another. Will responders be given priority access to anti-virals as prophylaxis, for instance?

5 *This section is based on an Article "Ethical decision-making in CBRN events" in Rebera & C. Rafalowski (2014)*

6 *http://www.ifrc.org/who-we-are/vision-and-mission/the-seven-fundamental-principles/*

7 *http://www.ifrc.org/en/publications-and-reports/code-of-conduct/*

Fundamental Principles of the International Red Cross and Red Crescent Movement	Definition	Implications for CBRN emergencies
Humanity	The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace amongst all peoples.	In working to prevent human suffering, it is necessary to devote attention to raising awareness of the risks related to the use of CBRN agents, and the need for preparedness to meet potential emergencies resulting from the use of such. All people should be treated humanely and with respect, and effort should be made to limit exaggerated fear and stigma of populations affected by CBRN emergencies.
Impartiality	It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.	Victims of CBRN emergencies should be treated without discrimination based on their role in the event (citizen, responder, suspected perpetrator, etc.). Medical triage systems for chemical, biological, or nuclear and radiological emergencies respectively, should be used in situations of limited resources.
Neutrality	In order to continue to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.	In order to avoid controversy, essential planning, response, and recovery should be driven by the needs of victims and of the wider community, not by ideological or political views. This principle requires us to maintain the confidence of all stakeholders – authorities, communities and victims alike. Good communication, openness, and accountability will all help to build trust between different CBRN stakeholders. Trust is very important, both from an ethical and societal perspective and in a practical sense.
Independence	The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.	Overall preparedness and response planning in states benefit greatly from integrated approaches with National Societies, who complement the governments in their role as auxiliary in the humanitarian field and can help raise awareness about humanitarian needs in general, and the needs of vulnerable populations in particular. This is also true for CBRN emergencies. It is important to resist any commercial and political influences that may impact the role, actions and recommendations of the government agencies with which National Societies cooperate. There are often powerful lobbies advocating for the commissioning and operation of nuclear power plants and defence facilities.

Fundamental Principles of the International Red Cross and Red Crescent Movement	Definition	Implications for CBRN emergencies
Voluntary Service	It is a voluntary relief Movement not prompted in any manner by desire for gain.	National Societies have a responsibility to provide their volunteers with relevant training for CBRN emergencies, to enable understanding the nature of the work and risks involved. The voluntary service must not be coerced.
Unity	There can be only one Red Cross or one Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.	National Societies will ideally have access to any affected location within their countries where the CBRN emergencies occur, and be able to reach affected communities.
Universality	The International Red Cross and Red Crescent Movement, in which all Societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.	Recognizing that CBRN events can quickly have cross-border effects, we all have an obligation to help one another. It is vital that National Societies are in a position to assist one another in the event of such accidents, and preparedness and education is therefore a vital step.

Such problems and decisions should never be taken lightly and are likely to be controversial. They often require careful weighing of values, duties, rights, and reasonable expectations; these cannot be identified accurately without close attention to contextual factors. Therefore in most cases generic approaches are offered that require further context-specific input and information from the decision-maker on the ground. Only with this supplemental information can an appropriate solution be found.

On the other hand, some actions can, independently of context, be identified as absolutely required or forbidden. Responders must always act for the best; they must never intentionally cause needless suffering. A risk based approach will raise these kind of questions and ensure that the response will be adapted to the situation.

The ethics of humanitarian action have been articulated further in the Code of Conduct for the International Red Cross and Red Crescent Movement and NGOs in Disaster Relief. The Code of Conduct was developed by IFRC, ICRC and six other leading aid agencies to set standards for the conduct of disaster relief operations. It reasserts the basic humanitarian principles of humanity, impartiality and independence and incorporates concepts such as respect for culture, participation, sustainability, accountability and dignity in images.

The Code of Conduct's ten principles highlight, among other things, the right of disaster-affected populations to receive humanitarian assistance without discrimination and the crucial role played by women in disaster-prone communities. Emphasis is also placed on protecting and preserving the dignity of beneficiaries.

Further important issues that are addressed in discussions on ethical considerations are:

- **Accountability:** Actors, stakeholders, responders and decision makers are responsible for their own actions. It is important to ensure that they are accountable for their actions and decisions (paying due attention to the stressful nature of CBRN contexts). Procedures should be in place to ensure accountability. Accountability is a multi-faceted issue and includes all actors from donors and governments to the final beneficiaries.
- **Communication / Information:** The community's right-to-know is an increasingly-recognized and promoted principle. Important information should be communicated to victims and the public in a timely and responsible manner. The media should report CBRN events responsibly. Realism is important: difficulties or uncertainties should be communicated clearly and without causing false alarm. Information on what decisions and actions have been taken, are currently underway or in preparation, and will later have to be taken or performed, should be widely disseminated.
- **Do no/less/minimal harm:** Interventions should aim at reducing suffering and saving lives. They should not cause harm – or at least, if some harm is unavoidable, it should be minimised as much as possible. All actors should understand that some restrictions on their freedoms may be necessary in order to protect others.
- **Duty of/to care:** Responders have duties to provide care, protection, and support in CBRN events. These duties could be understood to arise in different ways (e.g. from the voluntary decision to accept a role as, e.g., volunteer or staff as a (first) responder; or from their greater capacity to provide relief as an organisation). These duties should be discussed in advance of events occurring. Duty of care to staff and volunteers should lead to the highest level of safety possible. Each component of the Movement must be aware of the responsibility to ensure the safety of its own staff and volunteers.
- **Evidence-based decision-making:** As far as possible, decisions should be taken on the basis of solid, reliable evidence and available facts and information.
- **Responsiveness and Flexibility:** Preparations and decision-making procedures should be made in advance. They should be flexible enough to be adjusted in response to whatever circumstance might arise. Plans should be adapted in response to emerging factors and information.

6. Legal issues related to National Societies' nuclear emergency preparedness

This section provides some basic legal considerations that National Societies may wish to take into account in developing their preparedness for CBRN emergency response. The section is indicative only – it should not be seen as exhaustive and cannot replace legal advice by a competent domestic lawyer.

Legal issues for emergency response at the domestic level

Clarity of National Societies' role in law, policy and plans

Many National Societies see themselves taking on a number of potential tasks in response to nuclear accidents in their own countries. The areas in which they might be involved are often removed from the site of the accident and the technical activities required to contain radioactivity, but they may have significant impacts on the well-being of persons affected (especially those displaced by a disaster). These range from early warning and information dissemination to evacuation management, shelter, psychological support, distribution of protective gear, restoring family links and long-term health monitoring. As in the case of natural disasters, it is suggested that National Societies encourage governments to include reference to their expected role in a nuclear accident in the applicable law and policy and particularly in contingency plans. This can be done as part of the role established for the National Society as auxiliary to the public authorities in the humanitarian field.

Reducing liability and reputational risks

There exists a fairly complex series of treaties concerning third party liability for nuclear accidents. The 1960 Paris Convention on Nuclear Third Party Liability and the 1963 Brussels Supplementary Convention on Nuclear Third Party Liability (as well as 2004 protocols to both instruments not yet in force) make up what is known as the "Paris/Brussels regime." These instruments were negotiated under the mantle of the OECD and currently concern only European states. An additional series of instruments (1963 Vienna Convention on Civil Liability for Nuclear Damage and its 1967 protocol) relate to the "Vienna regime," negotiated under the mantle of the IAEA and with a more geographically varied set of member states. In 1988, a joint protocol was negotiated to extend mutual rights between parties of the two regimes and to clarify which would apply for states that had signed on to both. An additional IAEA instrument, the Convention on Supplementary Compensation for Nuclear Damage, was adopted in 1997, but is not yet in force.

The various regimes share common aspects: they set out strict liability for nuclear plant operators in the event of an accident, but channel all liability to them. In other words, any third parties are immune from any claims. In states parties to these treaties, this should mean that liability for mistakes by National Societies or their volunteers responding to such an accident would be excluded. However, National Societies are strongly encouraged to confirm this to be the case through local legal advice. Moreover, there are still many nuclear states that are not parties to any of the above instruments. In any event, even if legal liability is excluded, the National Society's reputation could still be

at substantial risk in the case of negligent behaviour related to their role in responding to a nuclear accident.

National Societies should therefore consider in particular whether they have:
- provided adequate training to relevant staff or volunteers concerning specific safety issues related to nuclear accidents;
- obtained informed consent from staff and volunteers for any likely exposure to danger in the course of their duties; and
- developed protocols for receiving and (if appropriate) disseminating safety-related information from the relevant authorities.

Insurance coverage

The Fukushima incident brought to the fore common exclusions in insurance policies for nuclear events. National Societies are encouraged to examine whether there are such gaps in their own policies and to seek alternative sources of coverage if necessary. They may wish to refer to the Movement's Volunteer Toolkit[8] which recommends to reduce the impact of such claims, establishing an internal fund for the purpose of liabilities, as well as consider liability insurance (including for Board members or Directors, in case liability extends to them according to the legal system).[9]

Rules related to international response in the event of a nuclear disaster

In the case of a nuclear disaster requiring support from National Societies outside the affected country, the rules and procedures that apply would likely be very similar to those that apply to other kinds of disasters. However, some of the special legal concerns mentioned above with regard to domestic response will also apply to their international personnel.

Internally, the main governing instruments would be the Principles and Rules for Red Cross and Red Crescent Humanitarian Assistance, the Seville Agreement and its Supplementary Measures. These instruments set out the primary role of the host National Society and describe the approved measures for joint planning, coordination and delivery of international disaster assistance among members of the Movement.

There is a specific global treaty on assistance in nuclear disasters: the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency[10]. It sets out a mechanism for requests and offers of assistance, rules for the coordination and control of international aid, privileges, immunities and other legal facilities for aid providers, provisions on costs and liability, and a particular mandate for the IAEA as an international coordinating body and clearinghouse for information. However, it only applies to assistance by states and the IAEA, thus does not directly apply to Red Cross Red Crescent relief.

The IAEA has taken a number of steps to improve information-sharing and to establish links and plans between states that may be affected and those willing to provide help. These include the establishment of an Incident and Emergency Centre (IEC), the Response Assistance Network (RANET) – intended as a repository of information on types of assistance available – and the creation of the Inter-Agency Committee on Response to Radiological and Nuclear Emergencies (IACRNE), consisting of 17 intergovernmental organisations from the United Nations and Europe, and a number of organisations with observer status, including IFRC as corresponding member, to ensure coordinated

8 *https://www.ifrc.org/PageFiles/91936/1207900_Volunteering-in-emergency.pdf*

9 *Legal issues related to volunteering – Toolkit for National Societies can be found at https://fednet.ifrc.org/PageFiles/92312/Legal%20issues%20related%20to%20volunteering%20-%20Toolkit%20for%20National%20Societies%20-%20En.pdf*

10 *https://www.iaea.org/publications/documents/treaties/convention-assistance-case-nuclear-accident-or-radiological-emergency*

and harmonized international response to nuclear or radiological incidents and emergencies.

IACRNE has developed a "Joint Radiation Emergency Management Plan of the International Organisations"[11] (Joint Plan), setting out roles and responsibilities of the committee's members (only) with regard to disasters of differing levels of severity. It does not, however, describe or recommend particular procedures for facilitating or regulating their aid at the country level. Inclusion of IFRC in future simulation exercises, on the other hand, may provide an opportunity to raise legal issues related to international response.

Separately from the Joint Plan, the IAEA has also produced a guidance document (General Safety Requirements GSR part 7) on "Preparedness and Response for a Nuclear or Radiological Emergency"[12] (2015) (Preparedness Standard), meant to provide non-binding guidance to member states for voluntary incorporation into their own laws. The Preparedness Standard focuses mainly on domestic arrangements to prepare for and respond to nuclear emergencies, but also includes some reference to international support.

An international response to a nuclear emergency may involve many of the same elements as other major international disaster response operations, e.g., movement of personnel, relief goods, equipment and transport, across borders. In countries where IFRC has a status agreement, it generally receives "privileges and immunities" equivalent to those offer to United Nations agencies, including privileges related to customs, visas, tax and registration and immunities from liability. In some cases, it is able to offer "integration agreements" for the personnel of foreign National Societies, so that they can benefit from the same rights. In other cases, foreign National Societies are able to rely on the legal status of the host National Society for certain legal facilities.

Consistent with the commitments they have undertaken in the Principles and Rules for Red Cross and Red Crescent Humanitarian Assistance and in resolutions of the International Conference of the Red Cross and Red Crescent, National Societies are encouraged to support their governments to make use of the "Guidelines for the domestic facilitation and regulation for international disaster relief and initial recovery assistance" (also known as the "IDRL Guidelines") to strengthen their preparedness for addressing regulatory barriers to effective assistance in nuclear disasters.

In addition, a number of specific concerns have been identified with regard to export controls of equipment for rapid response teams, including certain types of respirators that are considered "dual use" (i.e., they might also be used by combatants). National Societies may wish to encourage their governments to examine whether such controls can be relaxed for approved actors in favour of emergency assistance.

11 *http://www-pub.iaea.org/books/IAEABooks/10523/Joint-Radiation-Emergency-Management-Plan-of-the-International-Organizations-EPR-JPLAN-2013*

12 *http://www-pub.iaea.org/MTCD/publications/PDF/Pub1133_scr.pdf*

3. Basic nuclear and radiological concepts

1. The civil use of nuclear technology

Nuclear and radiological technology has increasingly been adopted for civil use, and has prominent functions in electrical power generation, medical diagnostics and treatment, industry, agriculture and certain commercial products. IAEA indicates that 30 countries operate 438 nuclear power generating reactors in its report Nuclear Power Reactors in the World 2015[13] and in the online source Power Reactor Information System (PRIS)[14]. Also, while a number of countries, following the Fukushima accident, are examining their adoption or continued use of nuclear power, 29 other countries are considering, planning or constructing new reactors for nuclear power in 2014: ten from the Asia and Pacific region, ten from the African region, seven in Europe (mostly Eastern Europe) and two in Latin America. According to IAEA, 67 reactors in 15 countries were under construction as of 30 June 2015.

Many technologies come with risks and potential consequences that are considered acceptable by the adopting governments and consumers. Taking into account a low probability for some events even if they were to have a high human impact on humans, the environment and the economy and infrastructure of a country or region, decisions are taken and frameworks for risk governance established. The technical advancements and the improvements in regulatory measurements have addressed this very specific balance of acceptable risk versus consequences. As an example, air travel is part of everyday life and considered as one of the safest transportation methods. When high impact accidents do occur, authorities undertake in-depth analyses that are intended to lead to enhanced preparedness for future events.

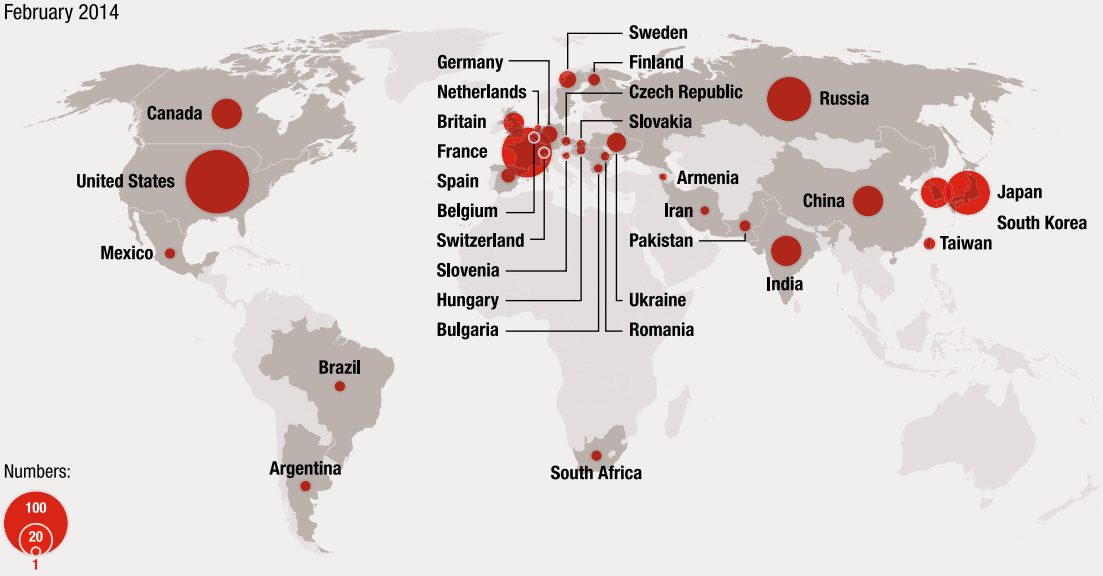
As a consequence of the Fukushima-Daiichi nuclear power plant accident and other recent emergencies, governments and private sector enterprises are taking action to create a culture of safety in order to reduce the risks and consequences of such emergencies. Still, the probability of future incidents can be counterbalanced by adopting policy options to reduce, aging nuclear power plant infrastructure, the number of nuclear reactors and other use of nuclear technology for commercial, medical and research purposes, as well as to slow climate change, which can trigger related events like tsunamis.

13 *http://www-pub.iaea.org/books/IAEABooks/10903/Nuclear-Power-Reactors-in-the-World-2015-Edition*

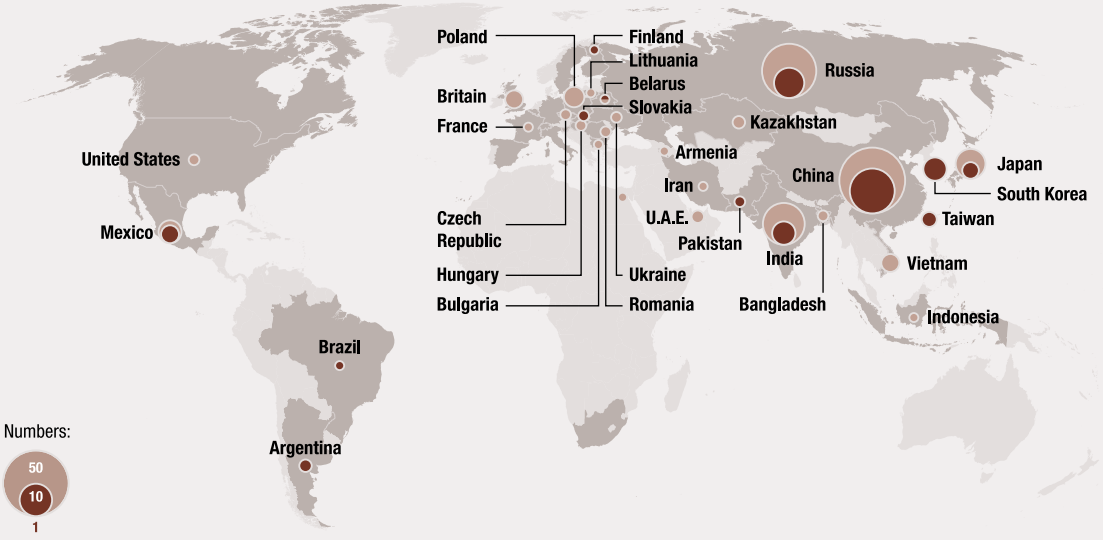
14 *http://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx*

NUCLEAR POWER

Operable reactors
February 2014



Reactors under construction (●) and planned (●)
February 2014



Source: World Nuclear Industry Status Report
economist.com/graphicdetail

Examples of Civil Use of Nuclear / Radiological Applications

Based on Japanese Atomic Energy Agency JAEA" Research report on market size for uses of nuclear technologies"

Industry/ Manufacturing	Irradiation	Measurements devices	Non destructive testing
	Sterilization	High molecule processing	Semiconductor processing
Agriculture	Irradiation	Mutation breeding	Isotope/Analyses
Medical	Inspection	Image diagnosis	Radiation therapy
Energy	Generation of electricity	Process heat systems in chemical plants	Nuclear-powered ships

2. Terminology: nuclear, radiological and emergency

The terms nuclear and radiological are used in tandem throughout this document to cover the broad array of a somewhat different but related set of risks and hazards. Generally, the term nuclear applies to the involvement of either atomic fission or fusion. At a very basic level, fission is a process for splitting of atoms while fusion prompts the melding of atoms. Fission and fusion are associated with the generation of electrical power by nuclear power plants, scientific research by government and universities, and as a function of nuclear weapons. The term radiological as used in this document generally refers to equipment containing radioactive materials that are used in medical and industrial applications. Some examples include medical and dental X-rays, cancer treatment regimens, food sanitation and preservation [irradiation], and a variety of industrial tracing and material scanning applications.

Although some argue that anything other than a nuclear detonation is a radiological emergency, the most common definition is that events involving or emerging from nuclear chain reactions (as is the very idea behind energy generation in power plants) are categorized as nuclear emergencies. Radiological emergencies, on the other hand, involve all other sources of radiation, such as radiography machines, radioactive material for use in industry and more. While radiological emergencies tend to occur more often in the form of misplaced, misused or "orphan" radioactive equipment, the potential impact and scope of the less frequent nuclear events tend to be greater.

Based on the IAEA nuclear safety glossary the terms of emergency and nuclear or radiological emergencies are defined as follows. An *emergency* is a non-routine situation that necessitates prompt action, primarily to mitigate a hazard or adverse consequences for human health and *safety,* quality of life, property or the environment. This includes *nuclear and radiological emergencies* and conventional *emergencies* such as fires, release of hazardous chemicals, storms or earthquakes. It includes situations for which prompt action is warranted to mitigate the effects of a perceived hazard.

A nuclear or radiological emergency is an occurrence or an event in which there is, or is perceived to be, a hazard due to:

(a) The potentially harmful energy from a nuclear chain reaction or the decay of the products from a chain reaction; or
(b) *Radiation exposure.*

Points (a) and (b) approximately represent *nuclear and radiological emergencies,* respectively. However, this is not an exact distinction. *Radiation emergency* is used in some cases when an explicit distinction in the nature of the hazard is immaterial (e.g. national *radiation emergency* plan), and it has essentially the same meaning.

As sources of radiation are used in various fields, including commerce, industry, medicine, research and power generation, radiological emergencies may occur in a wide variety of locations and settings. The emergencies can be of varying magnitude depending on the type and amount of radioactive materials involved and the proximity of surrounding populations and critical civil infrastructure elements.

Major radiological emergencies involving nuclear power plants garner significant public attention. Yet industrial, commercial and medical accidents involving radiological materials also occur, albeit usually on a smaller scale. While often their impact may be limited in terms of property and numbers of people affected, such incidents can produce consequences prompting the need for humanitarian assistance and other remedial actions. Recurrent commercial and medical radiological accidents or emergencies include:

- Misuse, improper maintenance, and poor management controls of gamma sources in industrial radiography and production control;
- Improper maintenance or poor management controls of gamma sources in the sterilization and preservation of foodstuffs;
- Misuse of ionizing radiation or misadministration of radioactive substances for diagnostic radiology, nuclear medicine and radiotherapy (gamma ray sources, particle accelerators, and sealed or unsealed radionuclide sources); and
- Negligent or unregulated disposal of radiation sources or radioactive waste.

The accompanying table presents a spectrum of potential nuclear and radiological emergencies that National Societies may face along with a brief explanation of their characteristic and potential consequences.

3. Nuclear and radiological emergency scenario examples

Nuclear and radiological emergencies can occur in a variety of forms and degrees of severity and magnitude. As with all disasters and emergencies, the response required will be determined by the nature and impact of the event. While not all-inclusive, the following chart outlines a range of potential events, their impact and allied likely responses.

Emergency Type	Impact	Response and Recovery Actions
Defective or incorrect use of medical equipment	Generally limited to the exposed patients and perhaps the operating technicians. Some exposure may extend to others who may have come in close proximity to the equipment.	Defective medical equipment is removed or repaired. Patients, technicians and others given medical care according to exposure extent and duration.
Lost, stolen or otherwise improperly discarded radioactive commercial and medical equipment	Contamination risks and possible debilitating and fatal radiation burns possible for to those unknowingly and directly handling the equipment. Possible contamination to others who come in close proximity of the equipment. Contamination will spread as equipment is moved from its discovered site.	Decontamination and medical treatment issued in accordance with the nature and duration of exposure for those handling the equipment. Decontamination and medical examination/treatment for individuals coming in close proximity or the equipment. Identification and decontamination of all sites where the equipment was taken, along with proper equipment disposal.
Radioactive materials transportation accident with possible fire (including fuel rods, medical and commercial gear, military ordinance, etc.) **Conventional explosion with spread of radioactive material – accidental or intentional**	Accident site contamination, plus allied risks to bystanders and unaware emergency responders. Potential additional contamination to surrounding communities by wind and water flowing through the contaminated area, and potential smoke carrying contamination. Potential heat and blast damage to people and infrastructure in the case of heavy fire or explosions. Possible panic amongst members of public in the case of intentional explosion. Public concern and anxiety as to radiation risk and health implications.	Medical treatment of victims and emergency responders according to radiation exposure and trauma due to blast and fire. Moderate decontamination effort including the accident site and surrounding areas affected by water and/or wind driven contamination. Psychosocial support and public information campaigns may be necessary, alongside medical follow-up of victims.
Nuclear Power Plant Accident	The threat of or release of radioactive contamination extending beyond the facility to a limited or wide geographic area – that may cross international boarders – as driven by prevailing weather systems. Operators of the power plant may	Public safety information and protective action guides are issued by responsible civil authorities. As deemed appropriate by the nature and scope of the event, decontamination processes may be initiated by government along with

Emergency Type	Impact	Response and Recovery Actions
Nuclear Power Plant Accident	receive life-threatening doses of radiation if unable to evacuate in time. The overall impact varies given the perceived threat and scope of the event, ranging from temporary and precautionary safety guidance for adjacent areas to protective actions for severely contaminated zones. Local or regional commerce and agriculture enterprises may be impacted on either a short-term or protracted basis. Residential and government initiated precautionary and protective evacuations may ensue. Early detection, effective power plant response procedures and prompt action within the area of impact dramatically reduce the consequences.	the issuance of potassium iodine as a prophylactic measure. Decontamination efforts of varying scope and duration may be required for affected areas. If so, housing is arranged and managed for the dislocated populations that will vary in number and duration given the facility's adjacent population density and the event's severity. Compensation processes may be initiated to address property loss and the disruption of affected income and economic activity. An array of medical, psychosocial and public information services are engaged to address public concern and anxiety as to radiation risk and public health implications.
Nuclear detonation, accidental or intentional	Blast and heat leaves inner circle in total destruction, with no possibility for human survival. Potentially fatal radioactive contamination beyond the blast area. Lack of containment can result in contamination potentially far beyond the detonation area due to prevailing weather, rivers and streams. Contamination area businesses and residents are displaced for months/years. There is high public anxiety as to radiation risk and health implications	Difficult for first responders to mobilize, as personnel and equipment are likely to suffer from the impact of the blast. Also challenging to reach seriously injured due to destroyed infrastructure. Public safety information and protective action guides are issued by responsible civil authorities. Protracted decontamination and disposal efforts are engaged, including the eventual razing of damaged and contaminated homes and businesses within the blast area. Medical and other responders require personal protective equipment, and many injured need complicated joint trauma and decontamination treatments. Complicated funeral arrangements for the fatalities might be necessary. Dislocated populations and businesses must be relocated and compensated for losses. Significant psychosocial impacts, including in non-immediately impacted populations ("worried well").

4. Scale and magnitude of radiological emergencies

The International Nuclear and Radiological Event Scale (INES or the Scale)[15] is a tool for communicating in consistent terms the safety significance of nuclear and radiological events. By categorizing the events, the Scale seeks to provide common reference and understanding between the technical experts, the news media and the general public. The scale was designed in 1990 by the IAEA and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD- NEA), who engaged international experts to jointly develop a scale and accompanying criteria for nuclear and radiological accidents and emergencies. This was configured to reflect the experience gained from the use of similar scales in France and Japan as well as from several other countries.

The Scale was initially developed and applied to classify incidents at nuclear power plants. It has since been extended and adapted for application to other events involving radioactive materials including transportation accidents with radioactive materials. The IAEA reports that the Scale is now being used by over 60 countries.

The events are classified on the Scale at 7 levels. The upper levels [4 thru 7] are termed accidents while the lower levels [1 through 3] are termed as incidents. A level 0 (below scale level) indicates no safety significance.

Please note that the Scale does not replace the criteria already adopted nationally and internationally for the technical analysis and reporting of events to safety authorities. Furthermore, because the Scale is developed primarily as a tool for communicating the safety significance of events to the public, it should not be used as a basis for emergency planning and response actions. The Scale is presented here as a point of information and reference. National Societies should check with their civil authorities to determine and verify the scale and criteria used within their country for nuclear and radiological emergencies, and how this fits in with their emergency preparedness planning.

15 *IAEA detailed leaflet about INES (also available in French, Spanish and Russian): https://www.iaea.org/sites/default/files/ines.pdf*

The International Nuclear and Radiological Event Scale (INES)

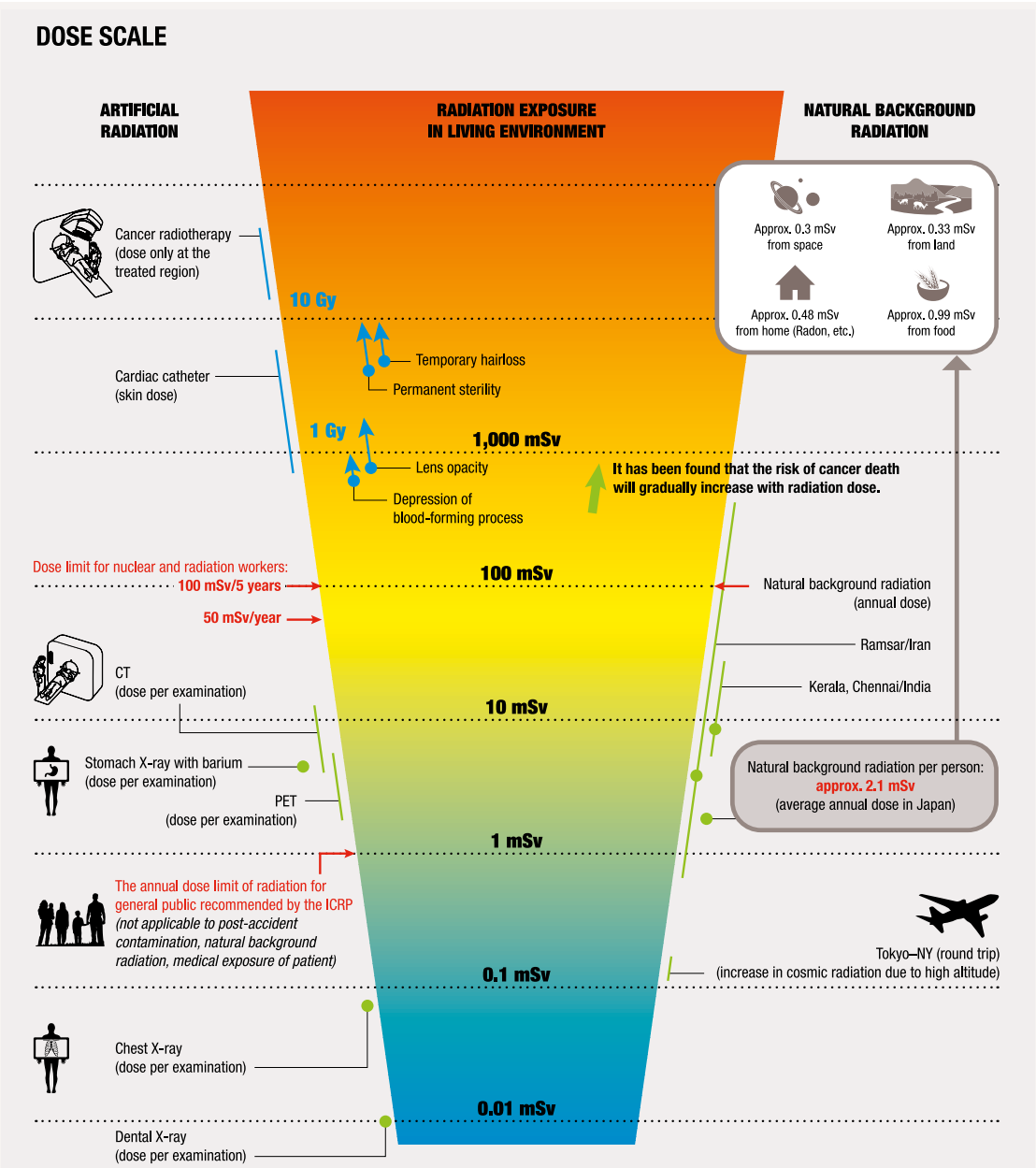
	LEVEL/ DESCRIPTOR	NATURE OF THE EVENTS	EXAMPLES
ACCIDENTS	**7** **MAJOR ACCIDENT**	External release of a large fraction of the radioactive material in a large facility (e.g. the core of a power reactor). This would typically involve a mixture of short and long-lived radioactive fission products (in quantities radiological equivalent to more than tens of thousands of terabecquerels of iodine-131). Such a release would result in the possibility of acute health effects; delayed health effects over a wide area, possibly involving more than one country; long-term environmental consequences.	Chernobyl NPP, USSR (now in Ukraine), 1986 Fukushima-Daiichi, Japan, 2011
	6 **SERIOUS ACCIDENT**	External release of radioactive material (in quantities radiologically equivalent to the order of thousands to tens of thousands of terabecquerels of iodine-131). Such a release would be likely to result in full implementation of countermeasures covered by local emergency plans to limit serious health effects.	Kyshtym Reprocessing Plant, USSR (now in Russia), 1957
	5 **ACCIDENT WITH OFF-SITE RISK**	External release of radioactive material (in quantities radiologically equivalent to the order of hundreds to thousands of terabecquerels of iodine-131). Such a release would be likely to result in partial implementation of countermeasures covered by emergency plans to lessen the likelihood of health effects. Severe damage to the installation. This may involve severe damage to a large fraction of the core of a power reactor, a major criticality accident or a major fire or explosion releasing large quantities of radioactivity within the installation.	Windscale Pile, UK, 1957 Three Mile Island, NPP, USA, 1979
	4 **ACCIDENT WITHOUT SIGNIFICANT OFF-SITE RISK**	External release of radioactivity resulting in a dose to the critical group of the order of a few millisieverts.* With such a release the need for off-site protective actions would be generally unlikely except possibly for local food control. Significant damage to the installation. Such an accident might include damage leading to major on-site recovery problems such as partial core melt in a power reactor and comparable events at non-reactor installations. Irradiation of one or more workers resulting in an overexposure where a high probability of early death occurs.	Windscale Reprocessing Plant, UK, 1973 Saint-Laurent NPP, France, 1980 Buenos Aires Critical Assembly, Argentina, 1983

The International Nuclear and Radiological Event Scale (INES)

	LEVEL/ DESCRIPTOR	NATURE OF THE EVENTS	EXAMPLES
INCIDENTS	**3** **SERIOUS INCIDENT**	External release of radioactivity resulting in a dose to the critical group of the order of tenths of millisievert.* With such a release, off-site protective measures may not be needed. On-site events resulting in doses to workers sufficient to cause acute health effects and/or an event resulting in a severe spread of contamination for example a few thousand terabecquerels of activity released in a secondary containment where the material can be returned to a satisfactory storage area. Incidents in which a further failure of safety systems could lead to accident conditions, or a situation in which safety systems would be unable to prevent an accident if certain initiators were to occur.	Vandellos NPP, Spain, 1989
	2 **INCIDENT**	Incidents with significant failure in safety provisions but with sufficient defence in depth remaining to cope with additional failures. These include events where the actual failures would be rated at level 1 but which reveal significant additional organizational inadequacies or safety culture deficiencies. An event resulting in a dose to a worker exceeding a statutory annual dose limit and/or an event which leads to the presence of significant quantities of radioactivity in the installation in areas not expected by design and which require corrective action.	
	1 **ANOMALY**	Anomaly beyond the authorized regime but with significant defence in depth remaining. This may be due to equipment failure, human error or procedural inadequacies and may occur in any area covered by the scale, e.g. plant operation, transport of radioactive material, fuel handling, and waste storage. Examples include: breaches of technical specifications or transport regulations, incidents without direct safety consequences that reveal inadequacies in the organizational system or safety culture, minor defects in pipework beyond the expectations of the surveillance programme.	

5. Radiation exposure

Radiation exposure occurs on a regular basis for most people. The accompanying graph presents examples of exposure from both natural and man-made sources.



Illustrated by NIRS (National Institute of Radiological Sciences), Japan.
Reference:
- UNSCEAR 2008
- ICRP 2007 Recommendations
- The Guidelines for Medical Exposure by Japan Association of Radiological Technologists
- Radiation in the living environment, new version (Radiation Safety Research Association, 2011)

Notes:
- *The numerical values are approximate figures based on significant digits.*
- *The scales shown by the dotted lines are a logarithmic display. Each step up on the scale represents ten timess more than the previous step.*
- *This chart is subject to revision without notice.*

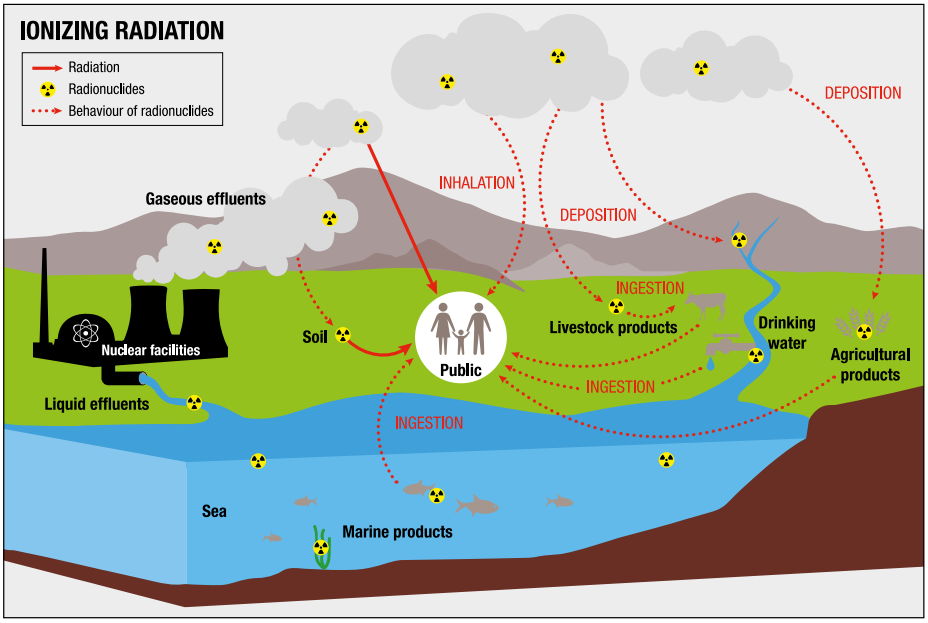
6. Impact of radioactive contamination

The severity of radiation health risks depends on the amount of radiation exposure (acute or protracted low dose) and duration. Based on the nature and amount of radiation, prevailing weather conditions and typography, radiation exposure can vary significantly within an affected area. Generally, public authorities identify three basic types of exposure with the following accompanying characteristics.

There are several ways one can be exposed to radioactive materials:

a. **External contamination –** This happens when airborne radioactive materials such as radioactive dust and aerosols come in contact with skin or clothes. This type of contamination can be countered by finding shelter, removing clothes and washing skin and hair.
b. **External irradiation –** This happens when the body is exposed to ionizing radiation from radioactive material outside the body. The way to counter this is to shelter behind/in constructions of strong materials, such as iron and concrete or to distance oneself from the radioactive source.
c. **Incorporation of radioactive material –** This happens when a radionuclide is inhaled, ingested or otherwise enters the body, for instance through tears in the skin. Internal exposure can to some extent be countered with appropriate medical treatment.

The illustration below describes in detail the different ways ionizing radiation can enter and affect the body.



The effects may be seen immediately [acute radiation poison syndrome] in the case of very high exposures. Symptoms may emerge within days or weeks at moderate exposures, and symptoms could be delayed by several years or decades at low exposure levels.

4. Roles and responsibilities

1. Government

Governments are ultimately responsible for the health, welfare and safety of their resident population and environment. Nuclear safety is the responsibility of every nation that uses nuclear technology and covers all aspects of the nuclear fuel cycle (from uranium mining to final storage). This function involves establishing safety standards and regulations that govern the handling of nuclear materials, including uranium mining and ore processing, and for safety at nuclear facilities. It also involves the development and implementation of emergency response and recovery actions, monitoring the releases of radiological substances to the environment, regulating the transportation of nuclear and radiological materials, regulating the decommissioning of nuclear facilities and disposal of radioactive waste.

Governments, usually through a Nuclear Regulatory Authority (NRA), hold the owners and operators of facilities that use radiological and nuclear technologies and materials accountable for the safety of their facilities and the surrounding communities. These nuclear regulatory authorities also develop and exercise emergency plans for nuclear and radiological emergencies that define roles, responsibilities, and performance expectations during emergencies.

Example of protective measures from authorities to be considered during the early and the intermediate phase of an emergency.

Population and emergency workers	Foodstuff, water and other goods	Environment and industry
Sheltering indoors or partial sheltering indoors	Protection of Food production	Management of waste containing contaminated items
Iodine Prophylaxis	Protection of commodities (Raw Materials), goods and production plants	Decontamination of indoor areas, built up environment (roads, houses, parks), vehicles, goods
Evacuation	Restriction of Trade of foodstuff and goods	Restrictions on use of areas for recreation or non-food production
Access control	Restrictions on Foodstuff and water	
Protection of Emergency workers	Restrictions on foodstuff production, processing and the use of untreated water	
Decontamination of people		

Source: Nordic Guidelines and recommendations 2014

2. National Society Auxiliary Role

National Red Cross and Red Crescent Societies, as auxiliaries to government, should be focused on helping to deal with the humanitarian consequences of nuclear and radiological accidents. National Societies, staff and volunteers do not need to become radiological or nuclear experts, but should have a basic working knowledge of the risks and humanitarian consequences of radiological and nuclear emergencies, and about the plans of government authorities to respond to such emergencies. It is advisable that National Societies recruit and retain advisors with expert (technical) knowledge who can judge situations and act accordingly including a risk based management approach. National Societies without suitable candidates are encouraged to engage and cooperate in regional and global Movement networks to ensure access to this knowledge and expertise. Moreover, National Societies should not take on tasks and responsibilities that fall within the purview of government, and particularly its technical response agencies.

National Societies should be prepared to undertake actions designed to assist governments to address common legal problems related to disaster response in general, and to radiological and nuclear emergencies in particular. As part of the IFRC International Disaster Response Laws, Rules and Principles Programme (disaster law), National Societies, in conjunction their IFRC secretariat, should promote international guidelines to help government strengthen their domestic laws and policies. Using the Guidelines for the domestic facilitation and regulation of international disaster relief and initial recovery assistance (IDRL Guidelines), governments can avoid needless delays in securing and delivering humanitarian assistance while at the same time ensuring better coordination and quality of the provided assistance.[16]

It is essential that the National Societies develop and maintain pre-event working relationships with appropriate government officials and agencies. This includes both the National Society and those branch units or offices in communities adjacent to or near facilities that use significant radiological materials and technologies. Government officials and agencies must clearly and accurately understand the nature of Red Cross Red Crescent work, along with the value of the National Society that is providing service and assistance following a radiological or nuclear event. Relationships are required with each level of government:

- National government (policy, strategic)
- Regional/provincial government (operational)
- Local government (tactical)
- Applicable government disaster response and health agencies

When available, the National Societies should participate in government-hosted radiological and nuclear accident trainings, as well as in local, regional, national and multi-national government exercises.
National Societies should be prepared to promptly act in accordance with a number of possible government-issued protective action guidelines dealing with public health and safety. The issuance of *protective action guidelines* by responsible government authorities may include:

- Evacuation orders/recommendations,
- Public health measures,
- Immediate shelter in-place guidance,
- In-place sheltering followed by evacuation order /recommendation,
- Administration of potassium iodine,

16 *IDRL Guidelines: http://www.ifrc.org/en/what-we-do/idrl/idrl-guidelines/*

- Food and water safety guidance, and
- Decontamination (centres and/or self-initiated action)

These guidelines apply to both beneficiaries under the care of the National Society and to National Society staff and volunteers.

After the Chernobyl accident, measures were implemented to avoid certain problems in the event of future nuclear disasters. The lack of full and prompt warning and notification by the Soviet Union showed the need for better communication, and the confusion concerning reference values for emergency measures led to the development of European guidelines.[17]

3. Synergies and cross over with nuclear weapons and ICRC engagement

While the subject matter is related, this guidance does not address armed conflict situations or other malicious acts involving the detonation of nuclear weapons. Conflict situations and situations of violence with nuclear weapons detonations and other radiological devices are addressed by ICRC.[18] ICRC's international mandate is to assist and protect victims of armed conflict and other situations of violence, including in circumstances where there may be chemical, biological, radiological and nuclear (CBRN) hazards.

ICRC emphasises the need for determined and long term action by states to ensure that chemical and biological weapons are never again used. Nevertheless, ICRC also recognises the potential risk from CBRN weapons, and in 2007 it published a global risk assessment regarding their use. This led to a conclusion, at that time, that an international response to assist the victims of use of these weapons was not feasible.[19]

Derived from its mandate to assist victims and its duty of care to the safety and security of its staff, including colleagues from the International Red Cross and Red Crescent Movement, ICRC has created a dedicated CBRN response capacity. This decision forced a sober acknowledgement of the real needs of an international humanitarian response and how, in reality, these needs might be met given the many and varied constraints.[20]

ICRC's work to develop a limited CBRN response capacity, involving both preparedness and response, is still in progress. The response framework has been developed and stipulates three objectives in order of priority:
- Minimise the risks to health, safety and security of people to whom ICRC has a duty of care;
- Ensure the integrity of ICRC's operations and continuation of its activities; and
- Provide assistance to affected people, to the extent possible.

To achieve these objectives in the context of a CBRN event, ICRC is developing:
- Systematic management processes, including risk assessment and decision-making;
- Standardised operational practices; and
- Access to adequate resources, including people, information and materials.

17 *European legislation on radiation protection: http://ec.europa.eu/energy/nuclear/radiation_protection/legislation_en.htm*

18 *For issues related to RC mandates and lead organizations please refer to the Seville agreement and related Movement coordination documents.*

19 *Loye D and Coupland R (2007) Who will assist the victims of use of nuclear, radiological, biological or chemical weapons – and how?* International Review of the Red Cross, *No. 89, pp. 329-44.*

20 *Coupland R and Loye D (2009) International assistance for victims of use of nuclear, radiological, biological and chemical weapons: time for a reality check?* International Review of the Red Cross, *No. 91, pp. 329-340*

ICRC is developing this CBRN response capacity according to its working modality and the Movement principles. The response is designed for the management of risks from CBRN events, which may include prevention, preparedness and response elements. Preventive efforts include recalling states' obligations under international humanitarian law.

Due to recent world events, the nascent CBRN capacity has been deployed in relation to the use, alleged use and threat of use of chemical weapons in North Africa and the Middle East since 2011, and in relation to the nuclear emergency in Fukushima in March 2011.

The CBRN response capacity is managed by the CBRN sector in the Weapons Contamination Unit, and has support from a multi-disciplinary CBRN advisory group, including specialists from the legal and logistics departments. A medical advisory group comprising a range of health care professionals has been established to consider the complexities of health protection, including treatment following exposure to CBRN agents.[21]

Whilst ICRC has advanced its CBRN response framework, ensuring protection for its staff and operations, this does not imply that ICRC has any kind of "lead" in responding to CBRN events or outbreaks of disease. However, in response to a CBRN event that results from an intentional act, ICRC emphasizes:

- an international humanitarian response to assist the victims of use of CBRN weapons would prove to be an extremely complex exercise;
- in case of alleged use of CBRN weapons, a response to assist the victims may be perceived as a verification of use; and
- there are political and security implications for any organisation or agency that, whilst responding to CBRN events, comes into possession of information pertaining to whether the event resulted from a deliberate release. The relevant questions are: Who gathers this information? To whom is it reported? Who analyses it? Who "owns" it? Who makes the judgement about whether an epidemic results from an intentional act or not? Who breaks the news? To what extent is patient confidentiality at stake? To what extent does an organisation such as ICRC have to compromise on its traditional policy of confidentiality?

The complexity of mounting an international response to assist victims of use of CBRN weapons, and the potentially limited impact of any response, underscores the vital importance of continued preventive work by States Parties to the Geneva Conventions. States must continue to aspire, as articulated in the preamble, "for the sake of all mankind, to exclude completely the possibility of use of CBRN weapons."

4. Government requests for international assistance and role of IFRC

When a major nuclear or radiological emergency occurs or threatens, a national government may request technical, material and other assistance from another state directly, or as stipulated in the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) through IAEA. Other United Nations agencies, of which a few are mentioned here, may

21 *Malich G, Coupland R, Donnelly S, and Baker D (2013) A proposal for field-level medical assistance in an international humanitarian response to chemical, biological, radiological or nuclear events.* Emergency Medicine Journal *2013, No. 30, pp. 804-08.*

engage: the Office for the Coordination of Humanitarian Affairs (OCHA) coordinates humanitarian response; World Health Organisation (WHO) deals with health related issues; Food and Agriculture Organisation of the United Nations (FAO) and World Food Programme (WFP) address the consequences for the food chain; and United Nations Development Programme (UNDP) addresses the recovery and long term consequences. IFRC has the ongoing responsibility for coordinating and liaising with these international organisations, and will, as a result, be engaged if and when the UN organisations are activated and deployed. Additional details on this subject are provided in Chapter 12: IFRC support and assistance.

5. Humanitarian diplomacy

As mentioned in previous sections of this document, collaboration and coordination with government is a critical task for National Red Cross and Red Crescent Societies in preparing for and responding to radiological and nuclear emergencies. In addition to these preparedness and operational actions, National Societies should use humanitarian diplomacy tools, practices and resources when dealing with national, regional and local governments. In short, humanitarian diplomacy seeks to persuade policy and decision makers and opinion leaders to act, at all times, in the interests of vulnerable people, and with full respect for fundamental humanitarian principles. In the case of radiological and nuclear emergencies, humanitarian diplomacy centres on four core issues or areas:

- **Public Education** to ensure that people at risk are accurately and adequately informed of potential risks and protective actions they should take in the event of an emergency.
- **Oversight and Monitoring** of nuclear power plants and the medical, research, commercial and industrial users of radiological materials to ensure that appropriate security and safety measures are in place and practiced.
- **Emergency Response Capacity** to ensure government planning, preparedness and response mechanisms are in place and routinely exercised to enable a rapid and appropriate response whenever accidents and emergencies occur.
- **Recovery Capability** developing and making available plans, resources and programmes to handle both the acute and long term impacts and disruptions of nuclear and radiological accidents and emergencies.

Only through the establishment of humanitarian diplomacy as an integral part of the day to day National Society work, with the necessary capacities in place, can these humanitarian objectives be realized.

5. Preparedness

"It is important to recall that, although the IFRC itself is certainly a part of the international humanitarian system, the member National Red Cross and Red Crescent Societies are not. In turn, owing to the special status of auxiliary to their respective governments, the National Societies may have a key role as part of the national disaster management system. In particular, as demonstrated by the American, Japanese, German, Ukrainian, Belorussian, Russian and Austrian Red Cross, there is also a considerable opportunity for the National Societies to play a useful and important role, in agreement and under contract with the national authorities, in evacuation management, psychological support, distribution of protective gear, restoring family links and above all – long term health monitoring. The IFRC, in turn, can play a key role in linking this vast network of resources available at the national level with the international response coordination mechanisms."

Linking Humanitarian And Nuclear Response Systems: A study by the United Nations Office for Coordination of Humanitarian Affairs, pp. 18-19

1. All hazards approach

Efficient disaster response planning, preparedness and readiness can be enhanced by matching organizational mission with an all-hazard approach. This approach is designed to ensure preparedness for a large range of possible emergencies by addressing the challenges that are similar for most of them such as warning, evacuation, medical services and community recovery. By identifying the response actions, capabilities, capacities and resources that are common to all hazards (i.e assessment, resource deployment, service delivery, government and partner liaison, etc), a certain level of preparedness is achieved.

It is, however, also important to narrow the focus from the all-hazards approach and define accommodations, procedures, or protocols to address the specific demands and unique circumstances of particular hazards. Nuclear and radiological emergencies will indeed require specific response and recovery measures, and will almost certainly require specific prevention and mitigation measures.

All hazards planning approach example

2. National Society nuclear emergency response planning aid

The following material is designed to be used for both developing and conducting periodic updates and revisions of the radiological and nuclear emergency response component or annex for a National Society's "All Hazards Disaster Response plan".

While the nature, scope and characteristics of each radiological emergency will greatly influence response actions, National Societies routinely should examine basic and important concepts regarding their readiness to respond to radiological and nuclear emergencies.

- ❑ Nuclear power plants and medical, commercial and industrial enterprises that use radiological technologies are identified, mapped, and shared with the local Red Cross Red Crescent branch office.
- ❑ Residential areas within 20 km[22] of such facilities are identified and mapped, along with their key demographic characteristics and shared with the respective Red Cross Red Crescent branch offices. This information

22 *Following the HERCA-WENRA approach, http://www.wenra.org/media/filer_public/2014/11/21/herca-wenra_approach_for_better_cross-border_coordination_of_protective_actions_during_the_early_phase_of_a_nuclear_accident.pdf*

may be generated and received from government or through Red Cross Red Crescent efforts.

- ❑ Vulnerability and capacity assessments (VCA) are conducted by/for the branch offices near radiological and nuclear facilities in cooperation and coordination with appropriate government offices and agencies.
- ❑ Emergency notification Standard Operating Procedures (SOPs) by appropriate external authorities are defined to include notification of the branch offices. Moreover, internal National Society notification distribution SOPs are detailed for staff, volunteers, management and program units, and for external National Society partners.
- ❑ The duties and responsibilities of National Society staff and branch units in response to radiological and nuclear emergencies are defined and detailed.
- ❑ Health standards and procedures for assigning National Society individuals and teams are defined.
- ❑ Safety standards for staff and volunteers responding to radiological and nuclear emergencies are defined and made widely available.
- ❑ Assignment information, briefing materials and allied presentation formats are defined and available for prompt distribution to response staff and volunteers.
- ❑ A concept of operations is developed, concisely describing how the National Society will respond to radiological and nuclear incidents, how that response will be structured, which services that are to be delivered, and where liaison will be established with appropriate government agencies, authorities and officials.
- ❑ Operating procedures for developing an emergency plan of action following a radiological or nuclear emergency exist.
- ❑ Status reporting and briefing schedules for National Society senior management are identified, along with the format, and the issuance of general internal and external situation reports.
- ❑ Services to be rendered by the National Society following a radiological or nuclear emergency are defined. This includes services from the preventive stage to the emergency and recovery phases of an incident.
- ❑ Standard operating procedures are articulated for informing IFRC of the incident, actual and planned National Society response actions, and any anticipated resource or other assistance needed by the National Society.
- ❑ Equipment, instrumentation and maintenance requirements needs to be identified and SOPs defined.
- ❑ Staff competency requirements need to be mapped out.
- ❑ Training schedules must be agreed.
- ❑ State of readiness/response times need to be agreed and verified through (joint) exercises.
- ❑ Liaisons to relevant other acting bodies shall be established (national emergency response, CBRN forces, etc.).

3. National Society leadership strategic issues

Radiological and nuclear accidents are relatively rare, unlike recurring natural disaster like floods and typhoons. Maintaining an appropriate level of readiness and volunteer engagement for these rarer incidents presents major challenges. Still, many planning, preparedness and readiness actions undertaken for recurring disasters can also be applied to nuclear and radiological accidents.

Strategic National Society considerations are used here in the context of policy positions and decisions made by the senior leadership to define and enable the preparedness and response for radiological and nuclear emergencies.

They include:

- Enabling the National Society management structure to be flexible and adaptable in order to meet the extraordinary demands of major radiological and nuclear incidents that exceed the scope of a business as usual approach.
- Managing human resources, both staff and volunteers, to ensure prompt and effective service delivery, while maintaining staff and volunteer safety, and adhering to the Red Cross Red Crescent Code of Conduct.
- Ensuring continuity of the National Society's critical corporate functions, and the provision of ongoing programmes and services to areas of the nation not directly impacted by the incident.
- Determining who will be the face and the voice of the National Society for:
  i. Representation with the government, news media and other key external audiences;
  ii. Maintaining staff and volunteer morale; and
  iii. Communicating and collaborating with IFRC and other Movement partners.
- Ensuring the conduct of an emergency plan of action or needs assessment, which can in turn define the National Society response services and actions in conjunction with those of government and other appropriate and engaged parties.
  i. Immediate assessment – within 72 hours
  ii. Rapid assessment – one week
  iii. Detailed assessment – one month
  iv. Continual assessment – ongoing
- Maintaining high level coordination, with competent authority (i.e. national competent authority), national disaster response authorities, civil protection and technical agencies, and medical authorities.
- effective liaison and collaborative relationships to plan and coordinate efficient service delivery and to obtain timely and accurate information about prevailing risks and government actions.
- Considering and accommodating potential legal issues that may complicate or hinder Red Cross Red Crescent response and service delivery. Please refer to the Chapter 2.G in the operational guidelines.

- ❏ Cooperating with other responding organisations and NGOs, including foreign and United Nations organisations that may be requested to assist by the national government.
- ❏ Integrating radiological and nuclear accident response training with ongoing National Society preparedness actions and staff/volunteer training and development.
- ❏ Ensuring that National Society branch offices and units in close proximity of nuclear power plants and facilities that use radiological materials and technologies are fully integrated in the National Society response plan and preparedness activities, and that they have clearly defined duties and responsibilities and performance expectations. Moreover, that branch staff and volunteers receive the full array of the National Society's radiological and nuclear training. (Basic awareness, specialized response and communications in nuclear emergencies.)
- ❏ Developing and sustaining operational logistics and transportation capabilities and capacity.
- ❏ Establishing and sustaining IT and telecommunications systems to support response and allied service delivery to beneficiaries.
- ❏ Monitoring and evaluating overall National Society performance.
- ❏ Ensuring National Society service delivery adherence to Sphere Standards.[23]

5. Programme management issues

Nuclear and radiological emergencies can cover a wide spectrum of events, ranging from contamination from misplaced radiological medical equipment to nuclear power plant accidents. Please refer to Chapter 3 for additional details on range and scope of potential emergencies.

Nuclear and radiological emergencies may be rooted in human or technological error, sabotage or other adverse use, or be prompted by natural disasters that further complicate the response planning and actions. Unlike many natural disasters (e.g. floods, typhoons etc.), nuclear and radiological events may present risks of contamination and consequently harm to humans and the environment long beyond the initial emergency phase.

The following information is provided to assist National Society programme level directors and managers responsible for implementing and overseeing preparedness, response and recovery to/from nuclear and radiological emergencies:

1. Nuclear and radiological emergencies are relatively rare events, thus presenting challenges and a different frame of reference for sustaining an appropriate level of preparedness and readiness. It is important that radiological and nuclear emergencies are included in an overall multi-hazard approach by the National Society – covering the full spectrum of potential risks facing the National Society and its nation. As opposed to an approach on the more traditional actuarial risk focus that to a large degree is on the frequency and scope of past incidents, this entails a full risk based approach.

23 *http://www.sphereproject.org/*

2. Nuclear and radiological emergencies may cause radiation risks beyond the borders of the incident site. Multiple nations and National Societies may therefore be called upon to respond to a single event.

3. Radioactive contamination is invisible, and this poses an added health and safety threat to both responders and local populations. Detection and the implementation of safety measures during the immediate or emergency response phase will likely require specialized information, training and instruments/equipment. Moreover, uncertainty about the long-term impact of radiation exposure can produce substantial anxiety and personal concerns both immediately and during the later recovery phase.

4. Depending on a nation's legal system, nuclear and radiological accidents can have legal (criminal negligence) and liability (compensation law suits) implications that can complicate the assistance and relief provided and offered by Red Cross Red Crescent. Generally, the owner and/or operator of facilities using nuclear or radiological technologies is held accountable for the consequences of any accidents and impacts on surrounding populations and the environment. The legal details and implications of radiological and nuclear emergencies should be researched and accommodated during the planning process.

6. Planning for the response phases

While the nature and magnitude of radiological and nuclear emergencies and the pace at which they evolve vary depending on the nature of the event and characteristics of the impacted area, most response actions tend to follow a general, but broad pattern. The phases detailed below provide a useful framework for program level directors and managers in anticipating planning, preparedness, and readiness and response actions. These phases should not, however, be considered in terms of precise periods of time, but instead in terms of the sequence of events, and related actions.

Early Phase or Pre- Alarm Phase – This period extends from any precautionary warnings/notifications about threatening accidents, to the hours or sometimes days immediately following the onset of an actual event. The status of the accident, along with its impact and prognosis for future developments, may be based on preliminary and partial data of varying accuracy. Protective emergency guidance and actions may be issued by responsible government authorities based on best estimates of the nature and magnitude of the incident. For major incidents; evacuation, decontamination sites and sheltering may be recommended or ordered (depending on national law) as key protective actions for public health and safety.

Experience from past radiological emergencies has shown that the general public and affected population expects a prompt and effective response. Such a response, however, may prove difficult given the nature of the event; making it challenging to secure reliable and accurate information, and technical and scientific resources needed for analysis immediately following the event. This recurring pattern is shared by the accidents of Three Mile Island, Chernobyl and Fukushima.

Intermediate Phase – During this period, the source of the release is brought under control, but not necessarily stopped. Reliable environmental measurements are now available and applied by authorities for decisions on protective action guidelines. Geographic areas and any populations at risk are better defined, and protective action guidelines are issued or adjusted accordingly.
As in this phase significant confusion may exist due to conflicting measurements and available information, usage of own instruments is highly recommended.

Late Phase – This period begins with the commencement of recovery actions designed to reduce radiation levels in the environment to acceptable levels, and extends to when these recovery actions have been completed. Depending on the nature and extent of the emergency, this phase may extend from weeks to years to decades.

7. Securing resources

Preparedness actions for radiological and nuclear emergencies require special considerations for the nature and characteristics of such events and their related risks [e.g. special staff and volunteer training, response SOPs, supplies and equipment]. Yet these actions can and should be linked and integrated with the National Society's overall disaster preparedness and readiness strategy. Some support and assistance can be provided through IFRC for radiological and nuclear emergency preparedness, yet the prime responsibility and burden for these activities rests with the National Society. To this end the National Society will need to plan for, acquire and allocate sufficient resources to build and retain the capability and capacity it needs to appropriately and successfully respond to those nuclear and radiological events that are likely to produce human need.

While the decision to adopt and use nuclear technologies is beyond the purview and mission of the Red Cross Red Crescent Movement, a National Society can and should make its value known to civil authorities as they consider public safety implications of such technologies, and the need to address likely humanitarian consequences of related accidents or emergencies. This includes not only participating in emergency planning, training, and exercises sponsored by the civil authorities, but also receiving material and financial support to ensure an appropriate level of National Society preparedness and readiness. This support may come from civil authorities responsible for the health and safety of the public and also from the private sector enterprises engaged in the application of nuclear technologies.

In pursuing such initiatives the National Society should take appropriate measures to ensure that it is not viewed as supporting or opposing the adoption of nuclear technologies, nor ensuring their safety.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6. Response

"Instead of providing one standard type of sector-based assistance, we aim to tailor our assistance to meet the varied needs of individual and communities in a manner which is holistic and contemporary to the efforts of the local authorities, international agencies and local civil society organisations."

The Red Cross and Red Crescent Approach to Disaster and Crisis Management, International Federation of Red Cross and Red Crescent Societies, 2011

The variable circumstances and unique characteristics of an emergency at its onset usually require prompt accommodating adjustments to predefined response plans and underlying assumptions. Still, emergency and disaster risks along with appropriate response, actions and resource requirements can be identified in a general and accurate manner.

During the planning and preparedness phases of the emergency or disaster response cycle, a number of tools can be employed to assess an organization's overall capability and capacity to respond to emergency and disaster risks, and also to judge the organization's readiness – its ability on a given day to respond to an incident. The accompanying Response Checklist is such a tool. It can be used to assess the capability and capacity of a National Society to respond to a nuclear or radiological emergency, and to identify areas where additional work and attention should be focused. This checklist can also be used, with minor adjustments, to assess and judge National Society preparedness status for a spectrum of emergencies and disasters.

1. Response checklist

National Society Checklist for Radiological and Nuclear Emergency Readiness and Response

This checklist is a tool to be used by the senior officials and programme managers of a National Society to review and assess the readiness of their National Society's capability and capacity to respond to radiological and nuclear emergencies.

- ❑ Current national, regional and local government response plans for radiological and nuclear emergencies are reviewed regularly with particular attention to the role, responsibilities and expectations ascribed to the National Society and its units/chapters/ branches.

If the National Society is not included or referenced in the government plans, then efforts should be directed to have this done.

- ❑ Ongoing liaison is conducted with the appropriate national, regional and local government officials and agencies facilitating open and ongoing communication and ensuring an accurate understanding of the National Society capabilities and services in response to a radiological or nuclear emergency.
- ❑ Rosters of individuals designated to serve as liaisons to the national, regional and local governments are reviewed and updated regularly and routinely. Note: These same individuals may also be accessed for other types of emergency responses.
- ❑ Radiological and nuclear emergency readiness and response SOPs are integrated in the National Society's master or all hazards disaster response plan. This plan's component is also reviewed and updated annually with staff, volunteers and chapters/branches.
- ❑ The National Society SOPs for radiological and nuclear emergencies is exercised with the branch offices annually.
- ❑ Staff and volunteer radiological exposure standards and limits are defined, verified by appropriate medical authorities, and detailed in the National Society response plan.
- ❑ Nuclear power plants and other enterprises [commercial, medical, industrial, mining] that use significant amounts of nuclear and radiological materials are identified, mapped, and distributed to the National Society branches.
- ❑ Individuals are designated for liaison with IFRC regional office concerning nuclear and radiological preparedness, readiness and response.
- ❑ Individuals are designated and trained as spokespersons for the National Society regarding radiological and nuclear emergencies.
- ❑ Personal safety guidance, training and orientation material for the staff and volunteer responders are reviewed on a regular basis (suggested every 1-3 years) and kept up to date and readily available.
- ❑ Radiological and nuclear emergency response trainings and briefings are provided on an annual basis to management and leadership personnel of the National Society.
- ❑ Equipment for response to radiological and nuclear emergencies is inventoried and checked as to functionality on a quarterly basis.
- ❑ Response personnel rosters for staff and volunteers training to respond to radiological and nuclear emergencies are maintained and updated as necessary.

2. The critical value of Red Cross Red Crescent community presence

Disaster management work starts long before the onset of a radiological or nuclear emergency. National Society volunteers and staff at branch offices support communities by helping to identify potential vulnerabilities, as well as local capabilities and coping mechanisms. Based on this analysis, the communities, with National Society branch participation, develop initiatives to address risks, ensure local preparedness and response plans exist, improve early warning systems and when possible advocate for broader risk reduction measures through local governance processes. National Societies working through their local branches assist communities as they prepare their response by building local emergency stock and training community members in first aid and other skills. In short, the more prepared a community is, the more resilient it will be in the event of a radiological or nuclear emergency.

Following a disaster or emergency onset, the presence of Red Cross Red Crescent staff and volunteers is often the first sign to people affected that their call for help has been heard and that assistance is on the way. Local community and branch based response teams play a critical role as early responders. They understand local needs, capabilities and vulnerabilities. They provide timely assistance and are able to find locally driven, sustainable solutions. The volunteers can immediately take life-saving actions such as search and rescue, first aid and evacuation. This is reinforced with the provision of basic needs including food, emergency health care, shelter, and clean water and sanitation.

An accurate and robust needs assessment should ground the nature and scope of needed services and potential interventions by the National Society.

A response and service delivery plan should be developed based on prior planning, coordination with responsible government authorities, and in consideration of the scope, severity and variety of human need.

3. Government framing the auxiliary role

While the structure of governments and allied emergency management organisations may differ to some degree between countries, they tend to share a common focus of action and intent when confronted with major disasters, including radiological and nuclear emergencies.

The following is a set of high level, common and practical goals governments tend to pursue when confronted by such events. These can serve as a guide when National Societies consider what services they may provide to their fellow citizens as partners and auxiliaries to government:

1. Gain control of the event and its impact
2. Prevent and mitigate direct and indirect consequences at the incident site.
3. Prevent and limit the safety risks and health effects to both the impacted population and emergency responders.
4. Provide first aid and medical care to the directly impacted area's injured and otherwise at risk populations. In short, save lives and perform required medical procedures.
5. Limit or possibly prevent adverse health impacts spreading to the general population. This includes the initiation of focused public health actions such as prophylactic distributions, public awareness campaigns, warnings, precautions, counselling and information.
6. Protect and limit the damage and destruction to personal property and the general environment.
7. Restore disrupted infrastructure systems and life-lines (i.e. roads, utilities, and public sanitation, medical and civil function).
8. Enable the resumption of economic activities as soon as possible.
9. Conduct an objective analysis of the event's onset and impact, along with an evaluation of the effectiveness of the resulting emergency and recovery response.
10. Design and implement measures (structural and behavioural) to reduce the probability and impact of similar events in the future.

4. Assessments and risk management[24]

Accurately determining in a timely manner the nature, scope and magnitude of nuclear and radiological emergencies and the impact they can have on immediate and long-term health, has been challenging for governments and other responding organisations in the past. Accurate situational awareness is significantly enhanced by various assessment and risk management tools and strategies.

Radiological and nuclear site emergency preparedness categories[25]

The IAEA has developed a standard set of emergency preparedness categories for various types of sites and facilities that use nuclear and radiological materials. This can be a helpful reference to National Societies when conducting their radiological risk analysis for the nation, province or other specific geographic area.

24 *See IFRC Guidelines for Emergency Needs Assessments http://www.ifrc.org/en/what-we-do/disaster-management/responding/disaster-response-system/emergency-needs-assessment/*

25 *IAEA General Safety Requirements Part 7 (GSR part 7) Preparedness and Response for a Nuclear or Radiological Emergency*

Emergency preparedness	Description of where the category applies
I	Facilities, such as nuclear power plants, for which on-site events (including very low probability events) are postulated that could give rise to severe deterministic health effects off the site, or for which such events have occurred in similar facilities.
II	Facilities, such as some types of research reactors, for which on-site events are postulated that could give rise to doses to people off the site that warrant urgent protective actions in accordance with international standards, or for which such events have occurred in similar facilities.
III	Facilities, such as industrial irradiation facilities, for which on-site events are postulated that could give rise to doses that warrant or contamination that warrants urgent protective actions on the site, or for which such events have occurred in similar facilities.
IV	Activities that could give rise to a nuclear or radiological emergency that could warrant urgent protective actions in an unforeseeable location. These include non-authorized activities such as activities relating to dangerous sources obtained illicitly. They also include transport and authorized activities involving dangerous mobiles sources such as industrial radiography sources, radio thermal generators or nuclear powered satellites. *Threat category IV represents the minimum level of threat, which is assumed to apply for all States and jurisdictions.*
V	Activities not normally involving sources of ionizing radiation, but which yield products with a significant likelihood of becoming contaminated as a result of events at facilities in threat categories I or II, including such facilities in other States, to levels necessitating prompt restrictions on products in accordance with international standards.

Risk management approach[26]

Apart from non-action, fundamentally there are three approaches to risk management: systematic, dynamic and a balanced mix of both.

Systematic risk management seeks to gain as much information as possible about a potential situation as far ahead of expected events as possible then conduct as much mitigation as reasonably practicable with the aim of removing risk and where that is not possible reducing risk to as low as reasonably practicable. This is achieved by assessing the likelihood and consequence of a hazard event (see table), then using physical and social engineering to change either the likelihood of occurrence or the consequences, (or both). As an example it may be argued that this is the accepted approach to clearing large, static and stable CBR(N) agent contaminated fields, with resources in place, staff suitably qualified and experienced and all plans and procedures incorporated into a quality management system with structured management of change.

Dynamic risk management on the other hand takes the view that every situation is different and one needs to see the problem in order to fix it as it emerges from possible to actual. An extreme example of this would be to enter the same contaminated field as discussed above and deal with every step, every source of contamination and every situation encountered based on what happens next without plans, process and resources in position. The presumption in this case is that the 'experience will get us through, just do it and never mind the process' is a more creative and productive mind-set. When one is in the situation it is easy to be caught in this trap; when one reads this from a safety perspective, it seems impossible. One of the reasons this occurs is sometimes referred to as 'recognition primed decision making'. This is where individuals have experienced a set of circumstances they perceive as similar to past experiences, they develop a mental model of the situation that is based on a previous episode rather than the unique events unfolding at that point in time. If there was a positive outcome – even if it was a near miss in the previous episode – the mind-set defaults to that experience not the actual situation, and often this is when disaster occurs. The problems in this approach arise from the fact that it is virtually impossible for two events to ever be exactly the same, the gap between the events is a blind space in the risk management regimen and therefore the individual or group are not risk aware, they are potentially unconsciously increasing their exposure to risks.

Where controls are in place to make and check decisions as an emergent range of issues unfold, dynamic risk assessment and dynamic risk management are extremely important tools that allow pre-determined (systematic) preparedness to 'fit' the unique challenges of a specific situation and this is an essential aspect of all incident, emergency and crisis preparedness, response and recovery.

The mix of systematic and dynamic risk management is now an almost universally accepted approach to operational risk management in hazardous areas, including high-risk commercial operations, the emergency services (in particular pre-hospital critical care, fire service and security services).

It is essential in complex area risk management to create well-structured standard operating procedures (SOP). These SOPs need to be action oriented and provide a flexible system that is light in process and bureaucracy and heavy on the human capability to search for hazards and prioritize importance whilst developing and communicating a control strategy to the appropriate people. This means a system of constantly building an understanding of the key events,

26 *Based on ICRC CBRN Risk Management approach*

Example of a risk assessment table

There is a Risk that:				Likelihood				
				A. Very Unlikely	**B. Unlikely**	**C. Possible**	**D. Likely**	**E. Very Likely**
	RC Staff Staff exposed to CBRN hazards	**Operations** Operations disrupted due to CBRN hazards	**Civilian population** CBRN Hazards have an impact on Civilian population	No confirmed CBRN Agent No alleged use/release No known casualties No visible ground signs	No confirmed CBRN Agent No alleged use/release Effective governance No confirmed casualties No viable ground signs	Alleged CBRN Agents Ineffective governance Allegations of use / release No confirmed casualties No confirmed ground signs	Confirmed CBRN Agents Ineffective governance Regional hostilities Allegations of use/ release No confirmed casualties No confirmed ground signs	Confirmed CBRN Agents Ineffective governance Local hostilities Allegations of use/ release Confirmed casualties Visible ground signs
Consequence 5. Catastrophic	Life changing injuries and / or fatality	Stop operations and staff evacuation	Mass casualties and/ or mortality; Overwhelmed local medical capacities					
4. Severe	Contamination requiring specialist decontamination, evacuation and medical care	Operations cannot continue, all movement stopped	Serious injuries requiring clinical care and long-term rehabilitation					
3. Significant	Contaminated, requires decontamination and local medical care	Operations and staff limited to essential only	Serious injuries requiring clinical care with no long term disability					
2. Moderate	Contaminated and treatable onsite with no further medical care required	Operations continue with further consideration of Risk mitigation and protective measures required	Injuries requiring local treatment					
1. Negligible	Minor Contamination Minor Injury	No impact on operations	Minor injuries to one or few people requiring no medical attention					

current situation and escalating hazards. Procedures need to generate directions either to continue operations during heightened risk or stop and then generate actions to implement appropriate changes for on the ground activities following either new or pre-determined SOPs.

To put that into context, the modern fire service never goes to two fires that are the same. Every time a team arrives, the team leader conducts a dynamic risk assessment before committing people into high risk environments, selecting and implementing SOPs based on the unique situation in front of a scene. The teams may never have been to the location of the fire before, however they will always identify and use the correct levels of personal protection, entry and exit SOPs and select the most effective tools for the task. These tools are readily available either in a standard load-out on a fire engine or in a pre-deployed depot available on-demand. As the situation changes at the scene of the fire so does the application of SOPs. The entire team is conversant with the SOPs, and each person knows his or her role in the change of plan. The team makes changes quickly and with minimal fuss, including evacuation of the entire site and all resources if required.

Of course, all of the above pertain to corporate governance and duty of care and, if developed correctly, significantly improve governance of the activities undertaken by the organisation. This brings positive results to senior leadership, middle management and operational field staff, which in turn means a better longer and stronger service to those most vulnerable who benefit from the service.

Multi-sector assessments

Assessments are critical to all organisations seeking to provide assistance. In short, this is used to identify vulnerable populations, their location, and numbers, along with their immediate and longer-term needs. In addition, the assessment processes should bring to light what is being done by government and other non-government organisations to ensure coordination, and prevent both service oversight and duplication.

At the onset of major disasters, National Societies, as auxiliaries to public authorities, are often asked to participate in joint assessments. National Societies are also often invited to participate in assessments with external partners. While there are many potential benefits to collaborative assessments, it is important that government authorities understand the role of the National Society and its adherence to the Fundamental Principles of the Movement.

Opportunities for joint assessments should be evaluated along the following considerations:

- Are organizational values and operating principles compatible?
- Could collaboration jeopardize the Fundamental Principles, in particular neutrality and impartiality?
- Are the organisations and/or individuals perceived as being biased?
- Does the organisation have specific skills, experience, resources that would be useful for the assessment?
- Will partnering result in greater geographical or affected population coverage?

For major nuclear and radiological emergencies, multi-sector assessments are usually needed. This involves:

Multi-sector assessment Process

1. Defining the assessment objectives to include expected outputs
2. Gathering and analysing available secondary data
3. Planning and executing field visits to collect primary data
4. Collecting newly available secondary data
5. Combining secondary and primary data
6. Writing and disseminating assessment report
7. Repeating process with updated primary data

5. Service delivery plans

The National Society should consider providing those services for which it has the capability, capacity, and experience. This includes technical expertise along with available material and financial resources. Nuclear and radiological emergencies can readily put responders and volunteers at risk. The National Society must give thought to balanced protection of its workforce to ensure it is producing benefits to beneficiaries while not placing its service providers at risk.

Alone or usually in collaboration with government and other NGOs, National Society services may include:

↘ Search & Rescue	↘ Distribution of Relief Supplies
↘ Population Relocation	↘ Health Services
↘ Psychosocial Services	↘ Hygiene Promotion
↘ Sheltering	↘ Water Sanitation
↘ Restoring Family Links	↘ Food Security & Nutrition
↘ Protection, Safety & Security	↘ Relief – Cash Assistance
↘ First Aid	↘ Medical Care
↘ Ambulance Service	↘ Blood Services
↘ Radiation Detection	↘ Decontamination

When initiating these relief services, consideration should be given to the IFRC policy on integrating relief, rehabilitation, and development. Such an approach anticipates that relief activities will lay the foundation to rehabilitate livelihoods in such a way that they emerge more resilient to shocks in the future. Early recovery therefore takes place alongside relief by applying recovery principles and working methods to ensure the affected population and communities can participate in the recovery process.


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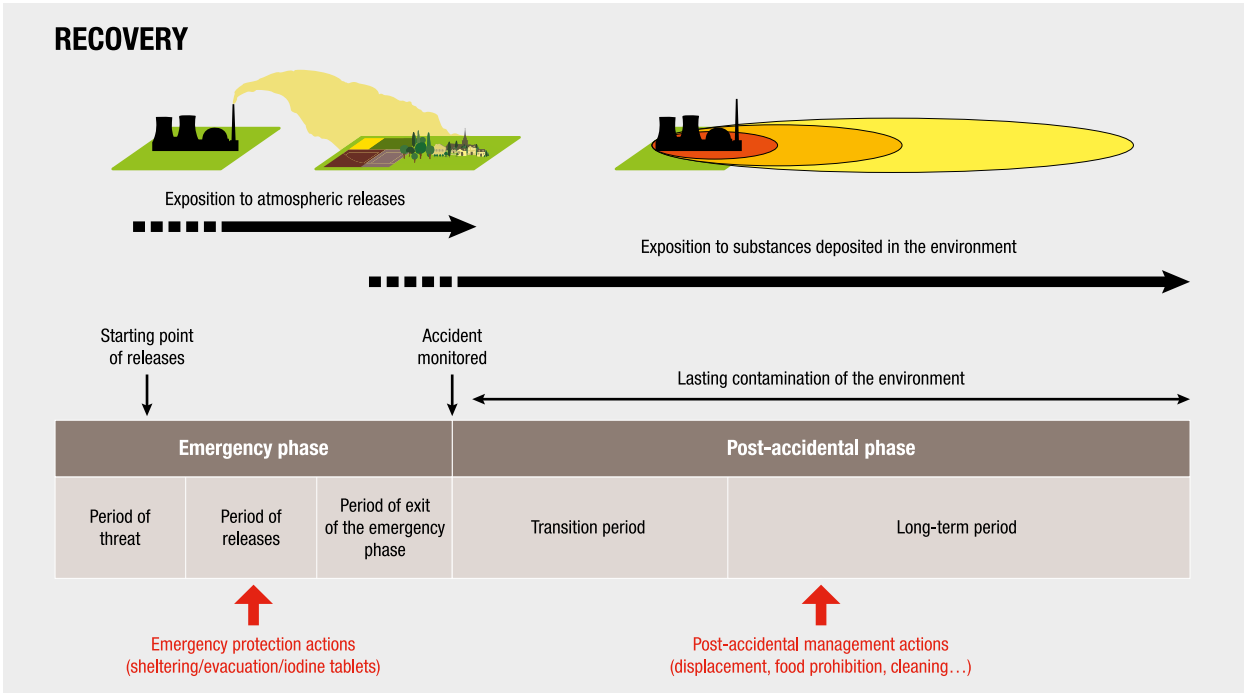
7. Recovery



Source: ASN France

1. Recovery programming overview

Red Cross Red Crescent assistance following disasters and emergencies often reaches well beyond the declared emergency period immediately following an event. Since Red Cross and Red Crescent volunteers and staff are part of the local communities, they continue to support the recovery of their communities. Recovery assistance builds on the emergency efforts initiated to meet critical and basic human needs. It starts early alongside the emergency response, seeking to assist people over the peak of the crisis, and continues to help people build more resilient lives. Recovery programming comprises well-linked action to re-establish pre-incident living patterns and to protect and restore livelihoods. These activities are undertaken in ways that reduce dependency, mitigate conflict, and strive toward meeting longer term risk reduction objectives.

Recovery is a multidimensional process that begins in a humanitarian setting. It is an integrated and coordinated approach, using humanitarian mechanisms, to gradually turn the dividends of humanitarian action into sustainable crisis recovery, resilience building and development opportunities. Recovery from a disaster is often a complicated and lengthy process.

In proceeding with recovery planning and programming, and in addressing the key recovery principles, the National Society must ensure that nine strategic issues are adequately addressed. Briefly, these strategic issues are:

1. Framing the programming within the Fundamental Principles of the Red Cross Red Crescent Movement.
2. Ensuring that programming strengthens resilience;
3. Building on an ongoing and systematic assessment and analysis;
4. Ensuring integrated or multi-sectorial programming;
5. Considering cross-cutting issues;
6. Making use of innovative approaches;
7. Building strong coordination within and outside the Movement;
8. Securing sufficient and realistic level of resources; and
9. Building on and contributing to the National Society's own development.

2. Recovery programming complicating factors

Recovery from a radiological or nuclear emergency will likely prove more complex than recovery from the many disasters and emergencies caused by natural forces. Moreover, while there are numerous case studies and after-action reports about the recovery efforts from natural disasters, experience with nuclear and radiological emergencies is limited. The following circumstances and conditions are likely to require thoughtful and effective attention for nuclear and radiological emergencies:

- Decontamination strategies and other recovery elements appropriate to the event and its impact will require research, vetting and discussion before selection and implementation. Thus, overt recovery actions such as the return of displaced populations and the resumed functioning of community economic enterprises and civil institutions may not be immediate. Moreover, competition and political complications may arise over the articulated recovery strategy and policy issues, governance and management, along with recovery action and funding priorities.
- The impact and accompanying contamination may not be limited to the immediate site of the event. Contamination may be spread to adjacent locals by evacuating people and weather conditions. Moreover, prevailing weather systems may spread contamination to adjacent nations. In addition, radioactive contamination will likely not be at a uniform level throughout the affected landscape. This will prompt different recovery actions for different areas that must be accurately, clearly and fully explained to the impacted populations.
- Extensive and long-term population displacement may occur. Moreover, permanent population relocation may occur due to the nature and level of contamination and projected prohibitive clean-up costs. Long-term population displacement or permanent relocation will require significant livelihood support, shelter and public infrastructure systems, and may also require dislocated population integration into new communities.
- Public trepidation (both informed and inaccurate) regarding possible acute radiation exposure will arise, along with latent health and medical effects of

protracted radiation exposure. The inability to provide scientific certainty to define long-term and multi-generational health risks will add to public uncertainty and trust.
- Due to health concerns, residents along with agriculture, industrial and commercial enterprises directly affected by the event may be negatively stigmatized and isolated by their communities.
- General public and commercial enterprise expectations and anticipation of compensation will surface for the event's impact on property, income and health.
- Protective measures for recovery workers may be necessary, along with measures to effectively address their immediate and long-term physical and areas by the movement of people and local weather conditions. Moreover, a major emergency event occurring in one country can have implications and cause concern in adjacent nations.
- The provision of prompt, clear and accurate information on the event's impact and on the progress of recovery efforts will remain a high expectation and priority for the affected population throughout the recovery process. This communication will be an essential factor for positive public perception and acceptance of the overall recovery effort.

While challenging, recovery programming offers the opportunity for a National Society to respond to important human and unmet needs that may be outside its core program areas as well as services within its pre-event programs. When well executed, effective engagement in recovery activities can reinforce the National Society's image and reputation before the general public, and donor community and can also concretely demonstrate its relevance and value as an auxiliary to its national government.

Recovery programming requires a detailed assessment at the community level to ensure a good understanding of vulnerabilities and needs. Collaboration and discussions are also needed with government and other service providers to determine how those needs can be met, and the areas where the National Society can address and provide added value to the overall recovery effort. Allied with these actions is an accurate awareness of the financial and technical capabilities and implementation capacity within the National Society along with any augmenting support available through IFRC and member National Societies.

3. Chernobyl: Red Cross and United Nations lessons learned

From lessons learned by Red Cross Societies and United Nations Agencies involved in the long term recovery activities following the Chernobyl nuclear power plant accident[27]:

- Implementation of recovery and development projects have highlighted **some distinct features in addressing the human dimensions of nuclear emergencies.** First, **in the short term,** the need to provide the population with **information** on the risks and impacts as well as **psychological support** and **counselling** aiming to ease fears of radiation, anxiety, helplessness and a feeling of abandonment. Second, **in the longer term,** the needs of individuals and communities are best addressed through a **developmental approach,** providing modalities for generating **economic and social opportunities**. In this context, community-based initiatives are most effective in promoting a spirit of activism, assisting in the restoration of **self-confidence,** adoption of a **forward-looking mentality** and reinforcing partnerships between the communities, civil society, and local authorities.

Experience in tackling the **human consequences of nuclear emergencies** suggests the following general **principles to guide the recovery programming**:

- Human consequences of nuclear emergencies can be deep-rooted and long-lasting;
- The "victim mentality" and culture of dependency are best tackled by promoting the spirit of activism and initiatives of self-help;
- Affected territories may become stigmatized and treated as "dirty and contaminated", and thus require additional efforts, such as support to marketing the products, keeping young people in the region, etc.;
- Assistance (especially financial) should be targeted and concentrate on the most vulnerable;
- Nuclear legacy-specific needs must be addressed in the framework of a holistic view encompassing all needs of individuals and communities; and
- Resilience strengthening measures should be built into the recovery process

4. Best practices example

The French Nuclear Safety Authority (ASN) established a steering committee in 2005 for the Management of Post-accident Phases of a Nuclear Accident (CODIPRA) which developed a document for consideration of a number of objectives and policy elements. The policy elements are based on the international principles of radiation protection.[28] They include a number of management objectives and a variety of actions through which these can be attained.

Beyond the health-related aspects, managing the consequences of a situation following a nuclear accident takes into account many issues, in particular economic and social, and involves many stakeholders, both at the national and local levels, covering a variety of areas of skill or concern.

27 *UNDP Knowledge product: Recovery from Chernobyl & other Nuclear Emergencies: Experiences and Lessons Learnt*

28 *http://www.french-nuclear-safety.fr/Information/News-releases/National-doctrine-for-nuclear-post-accident-management*

Three basic objectives

Taking these issues into account, three basic objectives have been set out as regards managing the post-accident phase of a nuclear accident:

1. To protect the populations from the dangers of ionising radiation;
2. To provide support to the populations affected by the consequences of the accident; and
3. To restore the territories affected, from the economic and social standpoint.

Key points in post-accident management

1. Immediate delineation of a post-accident zoning for the contaminated area, with an evolution during the transition period;
2. Medical and psychological care, radiation monitoring, financial support and compensation for those affected by the consequences of the accident;
3. Radiological characterisation and surveillance of the environment, food and drinking water;
4. Rapid implementation of a specific approach to management of foodstuffs and drinking water;
5. Sustainable waste management solutions in response to the rapid increase of the volume of contaminated waste; and
6. Emergence of new forms of governance and active participation of the affected population considered as a key point for economic recovery within affected areas.

5. IFRC recovery programming assistance and guidance

Effective recovery programme planning for nuclear and radiological incidents can be a demanding and complex process. Yet a National Society can proceed successfully with this effort through the application of *14 Key Recovery Program Principles* and as needed with the assistance of the expertise and resources available through IFRC. National Societies are rooted in communities and are a natural partner in community-based approaches. This makes National Societies well-placed to design and implement recovery programming.

An overview of the key recovery programming principles is provided below. Additional details on the principles and their application can be readily obtained in the Summary of the IFRC Recovery Programming Guidance[29].

1. The IFRC-recommended recovery programming approach focuses on how things are done rather than on when they are done;
2. Recovery programming uses work approaches from long term development, and adapts them to working in the humanitarian context;
3. Recovery programming is based on working through the local community. It seeks working in a participative, inclusive and accountable way with the community
4. A detailed community based assessment of need, capabilities and capacities is essential;
5. The recovery planning and programming and decision making processes must be in accordance with the seven Fundamental Principles; and

29 *https://www.ifrc.org/PageFiles/41104/IFRC%20Recovery%20programming%20guidance%202012%20-%201232900.pdf*

6. Nine key strategic issues (enumerated in Chapter 7A) guide the recovery process;
7. A key outcome of recovery programing is strengthening resilience, a focus on an overall long-term view of disaster risks and vulnerabilities;
8. Recovery programme planning must be integrated with different sectors of the community. It must be in conjunction with other assistance rendered within the community to ensure that the full range of community needs are addressed;
9. Cross-cutting issues must be considered because it ensures that all population groups are involved in recovery planning and implementation;
10. Innovative approaches should be a focus of the recovery programme process to accommodate both community needs and interests and to take full advantage of a possible wide inventory of proven tools that can effectively and efficiently meet those needs;
11. Recovery programming offers a National Society the opportunity to respond to unmet needs outside its core programme area, thus increasing the civic utility and value of the National Society, and its recognition;
12. Recovery planning and programming should be realistically focused, by defining geographic area and specific populations to be addressed;
13. The three stages of vulnerability capacity analysis should be followed in the recovery assessment and planning. In short they are situation analysis, vulnerability, capacity and needs analysis, response proportion analysis to support realistic strategic choices about the scale and scope of the recovery programme; and
14. Consideration at the planning phase must be given to the three main options for eventual program transition and exit:
    - Retain community presence while passing down recovery activities;
    - Pass relationships and work to partners outside the Movement; and
    - Exit without sustaining a presence in the community.

Community is not always easily defined. Generally, it is understood to be a complex array of relationships, alliances and social structures. Members of a community may differ from one to another and generally have different life experiences. Communities can be described as differing groups that are united by a common experience such as their geographic location, religion, livelihood capabilities and vulnerabilities. Following a disaster, a community may change; some people may relocate, neighbourhoods may reform, tensions among groups may increase. Members of a community will experience the impact of a nuclear or radiological emergency in a variety of ways, just as their vulnerabilities, capabilities, capacities and personal resources differed before the incident.

6. Transition strategy options

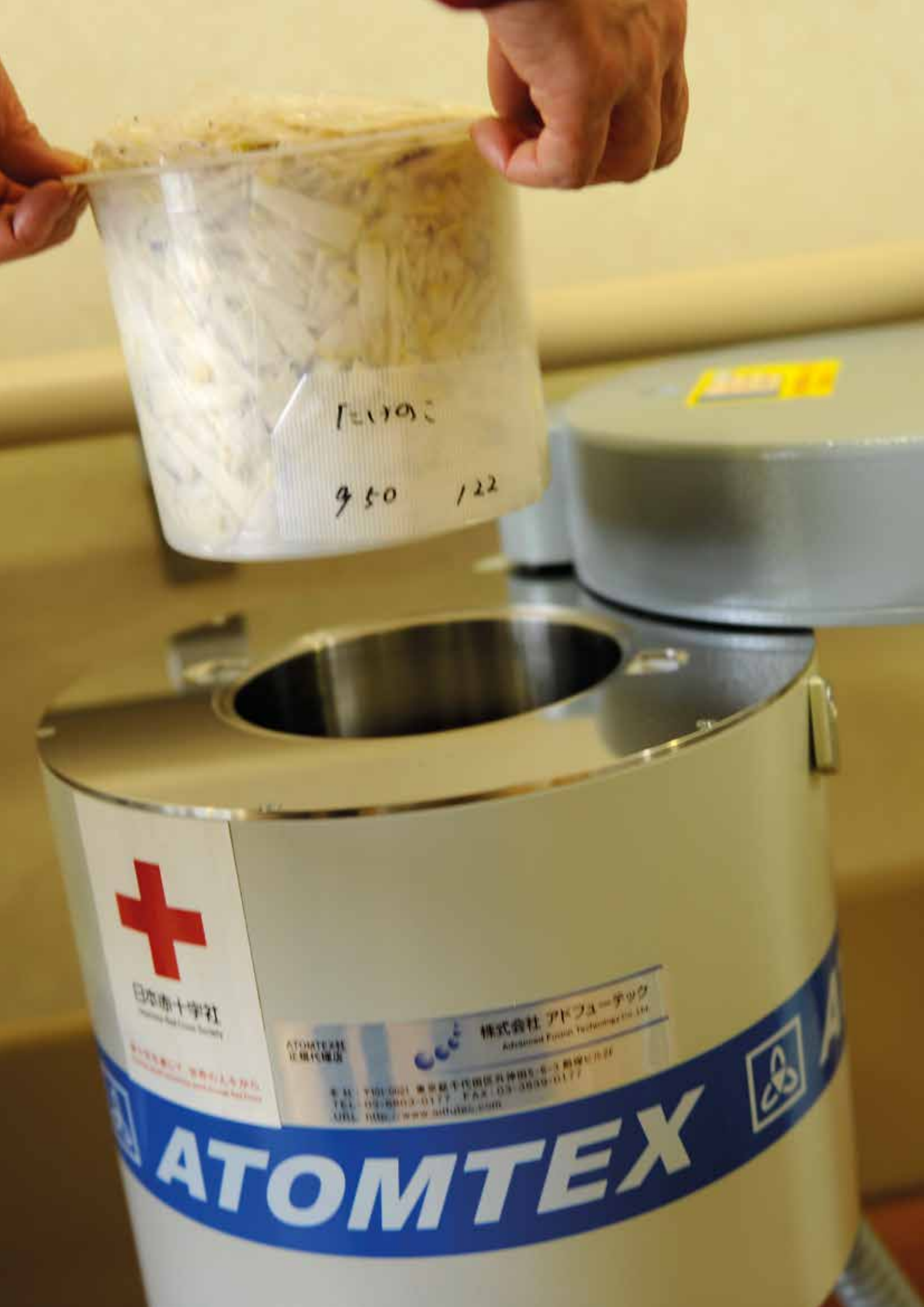
Scientific and public health opinion, along with real world experience, strongly suggest that the recovery period for a significant nuclear or radiological emergency can well exceed that encountered for most natural disasters. Therefore, it is important that a National Society considers not only how it will enter and manage any recovery period activities, but also how it will eventually bring such activities to a graceful close. While there are many challenges during this period of time, the National Society also has a fair amount of flexibility in determining its course of action.

Recovery programming generally has three main options for termination and exit or transition that should be planned for at its initial recovery programming strategy design stage:

A. **Phase down over time but retain a presence in the community –** In this approach the National Society may establish one or more recovery programmes with different timeframes for completion over time. In other cases the National Society may over time change from its role as direct service provider to one of beneficiary advocate and consultant to ongoing community service providers. This activity may also extend to underwriting certain community based recovery activities within the scope of available funds.

B. **Pass along work and relationships within the community to another partner either from within or outside the Movement –** It is not uncommon for communities and or civil authorities to establish long-term or permanent assistance programmes following a major disaster. In such cases the National Society may decide that it would be better for the beneficiaries to transfer or integrate its recovery activities. When considering such an option the National Society should exercise due diligence to insure that the transfer or integration is with an organisation that respects and accommodates the Fundamental Principles of the Movement.

C. **Phase out recovery program and activities and return to a focus on pre-emergency activities, services and programmes –** The essence of this option is establishing recovery programmes, according to resources and assessed needs, for a specific period of time, along with the defined target population and expected results. In the case of multiple programmes, different time periods may be assigned to the individual programmes. At the end of the defined period of time, the National Society ceases these programme activities but continues with its community presence but with a focus on permanent programmes or activities in place before the emergency or disaster occurred.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8. Staff and volunteer deployment and safety

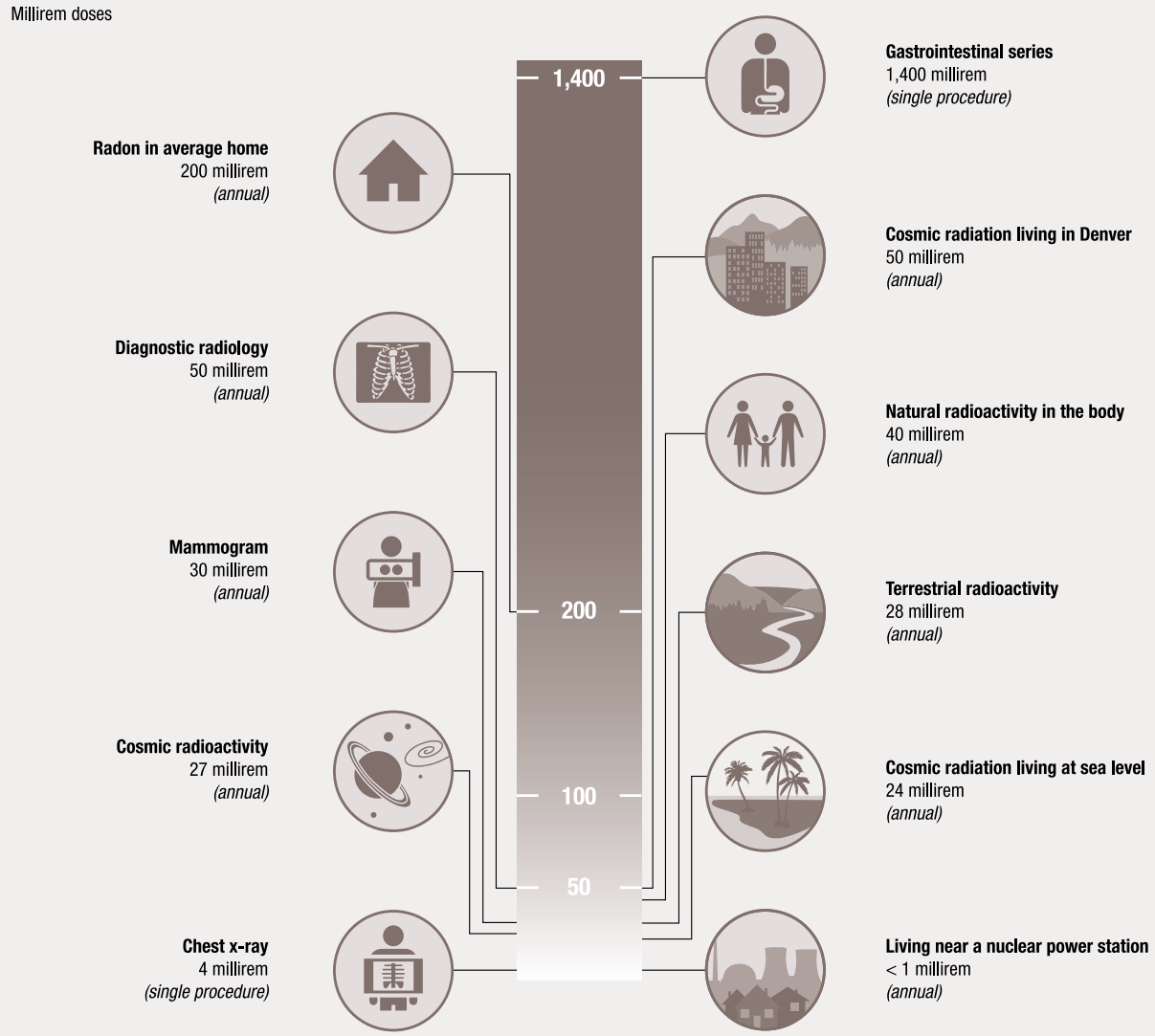
1. Radiation standards

No matter where we live, we are all exposed to several different types of radiation. Natural sources include cosmic radiation and radionuclides that surface from the earth's crust. The amount of radiation absorbed by the body is measured in units called microsieverts, millisieverts and sieverts. According to WHO, on average, a person is exposed to approximately 3,000 microsieverts annually.

International standards have been developed to limit the potential risks from exposure to radiation. In this context, "acceptable" means that the levels of risk are similar to the other risks we encounter every day. The International Commission on Radiological Protection (ICRP) recommends specific radiation protection, such as maximum permissible doses, based on radiation risks scientifically assessed with United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and ICRP standards, which take into consideration societal demands, ethics, and past experience in application of the standards. ICRP's recommendations are incorporated in the International Basic Safety Standards (BSS) of IAEA and in the national regulations of various regional and national entities.

2. Relative doses from Radiation sources

As mentioned in previous sections of this document, the governments of nations that have adopted radiological and nuclear technologies have also developed regulations and public health standards for the application and use of such technologies. In many cases the nature of this regulation and specifics of the public health standards vary between nations. This is in part due to how and when the technologies were adopted, along with real world experience with potential and actual nuclear and radiological emergencies.



Source: US Environmental Protection Agency (EPA) – Measurement Conversion Note: 1 Millisievert [1mSv] = 100 Millirem

As an example, the following chart outlines relative radiation dosage measures from different sources. The chart has been published by the US Environment Protection Agency, hence note that the unit of dosage measure is millirem as opposed to millisievert. National Societies are strongly encouraged to carefully research and determine both the standard of measurement and health related norms adopted and used by their state. This is critical when developing preparedness and response plans and in formulating related risk communications.

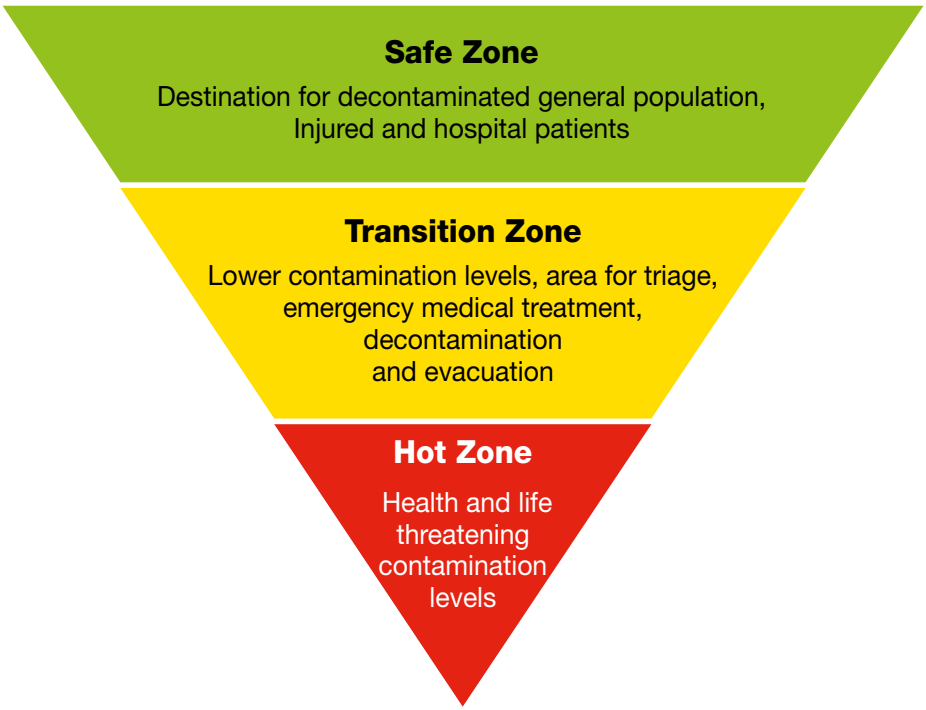
Radiation Conversion Table

Multiply	By	To obtain
gray (Gy)	100	rad
milligray (mGy)	0,1	rad
milligray (mGy)	100	millirad (mrad)
sievert (Sv)	100	rem
millisievert (mSv)	0,1	rem
millisievert (mSv)	100	millirem (mrem)
bequerel (Bq)	2,7 x 10–11	curie (Ci)
megabequerel (MBq)	2,7 x 10–5	curie (Ci)
megabequerel (MBq)	0,027	millicurie (mCi)
megabequerel (MBq)	27	microcurie (µCi)

3. Risk zones

The objective of Red Cross Red Crescent response and service delivery for nuclear and radiological emergencies is to help people and reduce suffering, while not becoming a part of the problem – as with contributing to public confusion over public health and safety advisories and by adding volunteers and staff to the contaminated population.

As a rule, National Society staff and volunteers should not operate in identified and suspected highly contaminated zones. They should not be assigned or take on roles as first responders in "Hot" or "Red" Zone environments, but instead should organize and provide services to people evacuated from such areas and as warranted for people residing in other areas.



4. Staff and volunteer deployment checklist

Communication with and management of staff and volunteers requires performance and behaviour monitoring, along with providing clear guidelines and related information on personal safety. The nature and health risks of radiological and nuclear emergencies require that prudent education and other preparatory actions be taken before the deployment of National Society staff and volunteers. Ideally, accurate and vetted information, support materials and personal protection equipment instructions, along with various presentation format options (i.e. field manuals, internet sites, group orientations, formal training classes and pre-deployment briefing formats) are developed, tested and made available beforehand. Activities based in or near radioactive contaminated

locations need to be clarified within each National Society against country-specific standards and requirements. Appropriate training on these national specifications is therefore also essential. These instruments and tools should also be configured in a way so they can be promptly modified and implemented to meet the circumstances and conditions of a particular emergency when it occurs.

Staff and volunteer checklist for deployment to nuclear and radiological emergencies

Items in this checklist cover important and basic aspects of personnel deployment readiness and operational assignment for radiological and nuclear emergencies. This checklist, however, is by no means complete. It can and should be enhanced over time as prompted by needs and circumstances of the National Society, its operating environment, or the conditions and characteristics of an emergency.

- ❏ The individual's name, residence, occupation, phone and email address, staff/volunteer status, along with emergency contact/next of kin information is completed and on file.
- ❏ A medical exam report and/or a self- declared statement of good physical and mental health by the individual is on file.
- ❏ A review concluding that the individual has the training, knowledge and skills needed for the assignment. (Note: Details to be listed here as specified by the National Society).
- ❏ The individual has been informed of and acknowledges, by signature, the maximum radiological exposure limits [stated here] established for this response.
- ❏ The individual is informed of and acknowledges as soon as possible in the situational context, by signature, the areas or zones currently defined by public authorities as contaminated and therefore restricted to entry by Red Cross Red Crescent personnel (i.e. red zones).
- ❏ The individual has been informed of and acknowledges as soon as possible, by signature, those areas or zones of designated for Red Cross Red Crescent operational assignment and service delivery (i.e. green zones).
- ❏ The individual has been informed of decontamination processes and procedures should he/she come into contact with evacuees or materials from radiological contaminated areas.
- ❏ The individual has received the protective equipment assigned for emergency response (Note: list the equipment i.e. protective suits, respirators, dosimeters, first aid kits, etc.).
- ❏ The individual has been tested and has demonstrated correct and appropriate use of the assigned protective equipment. [List equipment and last test].
- ❏ The individual has been briefed on the current operational status of the Red Cross Red Crescent response and the emergency plan of action as now known.
- ❏ The individual has been given a Red Cross Red Crescent operational table of organisation along with the name and contact information for his/her direct supervisor and of the health & safety emergency contact.
- ❏ The individual has been given a job description listing duties, responsibilities and performance expectations.
- ❏ A signed Red Cross Red Crescent Code of Conduct is on file for the individual.
- ❏ The individual acknowledges, by signature, the medical and other insurance provided or not provided by the National Society for deployment and assignment to this radiological or nuclear emergency.

5. Psychosocial support and caring for staff and volunteers

Staff and volunteers may be affected and may even expose themselves to danger through their work. Wearing protective clothing, masks and respirators may induce distress due to the constraints imposed by this equipment on the senses, breathing, movement and communication.
Emergency responders may have to delay own reactions to the situation and set aside grief and fear. Work can be overwhelming and anxiety provoking and may be experienced as very stressful. At the same time the humanitarian work can also give a sense of meaning and *raison d'être*.

Systems for staff support and for caring for volunteers need to be set up immediately. Responders stress levels and wellbeing as well as systems and interventions need to be monitored regularly.

9. Engaging and coordinating partners

Partnerships within the Movement and with external organisations enable a National Society to access a wide range of skills, competences and experiences to add value to its own capabilities and capacity. The Movement commitment to partnerships includes a willingness to lead when it is best able to do so. The National Society should seek partnerships to improve capacity in flexible programming needed for nuclear and radiological emergencies.

1. Partners

Generally, a National Society will over time have a set of partnership arrangements and ongoing relationships with non-government organisation partners but also with stakeholders from the civil protection side, the private sector and specialized agencies and the defence sector. In many cases the arrangements are formalized in a memorandums of understanding, signed by the leadership of each organisation and executed on an ongoing basis by program level directors and managers. Such arrangements usually outline areas of mission definition and service definition, and provide a framework for communication, cooperation and collaboration, mutual aid and other protocols for daily activities and for disaster response preparedness, readiness and response actions. In such arrangements, the National Society should extend these arrangements as applicable to cover radiological and nuclear events.

2. New and emerging organisations

The onset of major natural or technological disasters or significant radiological incidents may prompt the engagement of organisations with little or no prior relationship with the National Society. Some of these organisations may have been engaged in community work or civil protection activities before the incident occurred; others may have changed their mission focus in order to respond to the emergency. There may also be ad hoc organisations that arise as a result of the emergency. In any case, the nature of the relationships with the National Society and these organisations will be driven in large measure by the same considerations given to existing National Society partnerships. Is the organisation reputable in terms of mission, defined area of expertise and management? Are the organization's policies and practices compatible with the Movement's

Fundamental Principles? Can the relationship enhance service delivery to vulnerable populations and increase capability and capacity to meet humanitarian needs?

Relations with specialised services from the military or defence sector, that may have a strong expertise with chemical, biological, radiological and nuclear (CBRN) events, need particular consideration and protocols agreed upon before an emergency occurs. Specialised equipment for dual use might be available through entities linked to the military/defence sector. Resolutions from Red Cross and Red Crescent statutory meetings[30] and other internationally recognised guidelines (like the Oslo guidelines and the Military and Civil Defence Assets (MCDA) Guidelines[31]) provide solid guidance for relations with military or defence organisations and for the conditions in which those resources should be considered for use.

30 *"Guidance document on relations between the components of the Movement and military bodies" – Resolution 7 Council of Delegates Seoul 2005*

31 *Humanitarian Civil-Military Coordination: http://www.unocha.org/what-we-do/coordination-tools/UN-CMCoord/publications*

10. Managing public communication activities

Overall communication with the general public following the nuclear emergencies of Three Mile Island, Chernobyl and Fukushima was difficult, and widely believed not to have met the their needs and expectations. In short, this centred on the failure of the authorities, linked to their information flow with the relevant power plant operator, to clearly, accurately and on a timely basis inform the public as to the nature and scope of the incident and personal safety measures to take, along with the related public health risks. While actions have been taken on several fronts to improve public communication for future radiological events, the nature of such events, along with public perception of and emotions related to the risk of acute and delayed radiological health effects, will continue to make this a challenging effort. The widespread use of social media is adds complexity, with its array of both positive and negative, reliable and unreliable information that is easily spread in a viral manner following major emergencies.

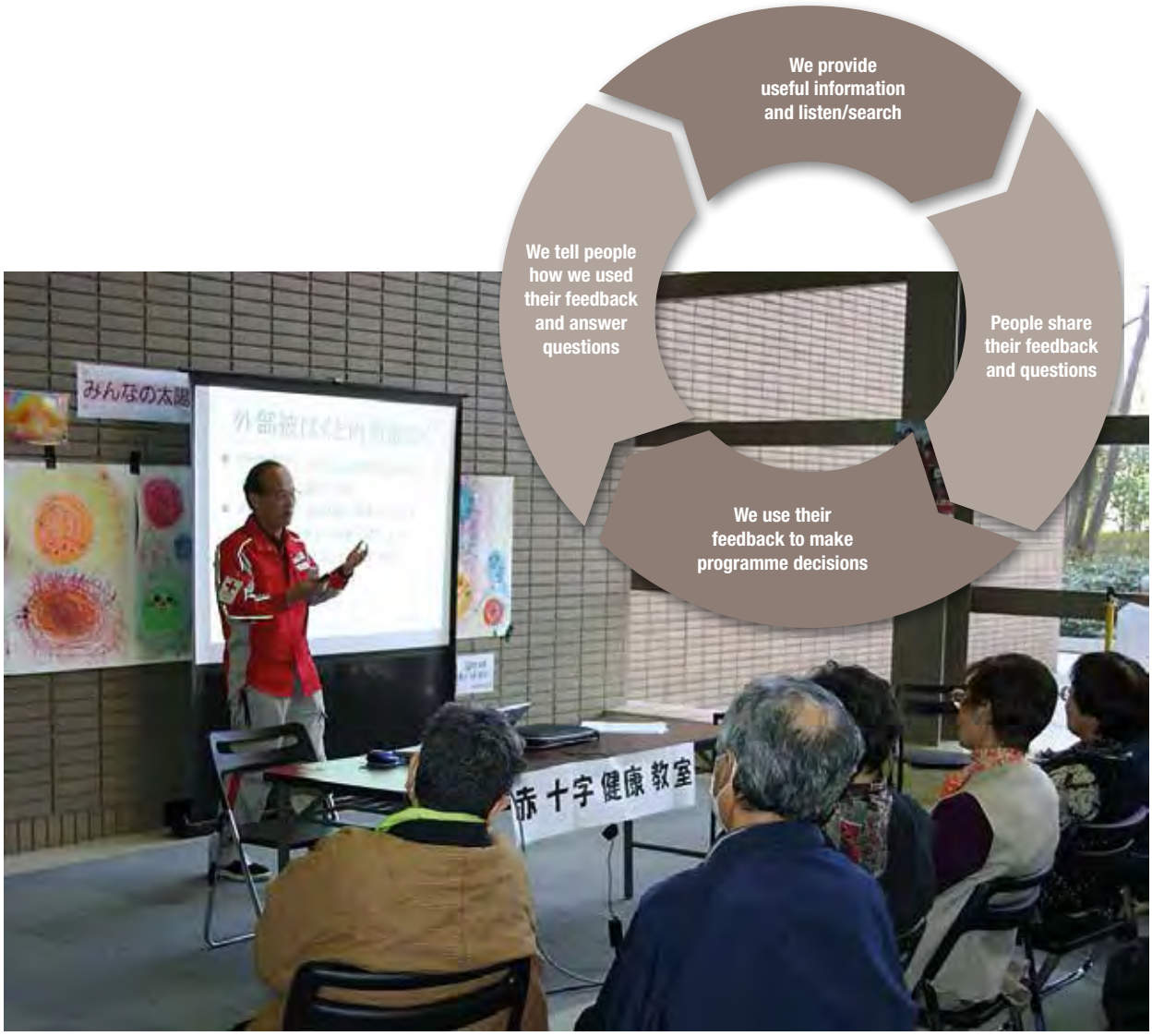
The capacity to inform the public during public health and other emergencies varies between states. In most states it is a government function, while a supporting role may rest with other entities, including National Societies. As previous nuclear emergencies have demonstrated, the public's trust in information provided by the relevant authorities and operators declines rapidly, particularly when conflicting messages are delivered. Decisions based on limited and conflicting information provided especially in the early stages of the

emergency (like designated safe locations for evacuation) have not always eased the situation of the affected population. As well, the public may feel distrust or anger toward authorities and operators, whom they may blame for the accident. Particularly in these cases, the public needs a trusted, neutral source of correct information.

Emergency communication must address the needs of various audiences: affected population; authorities (national, regional, local); other response organisations; donors; beneficiaries of Red Cross Red Crescent activities; and the global public outside the directly affected area.

For efficient and effective communication a number of different tools and channels may be used and are available. The aims are:

- **Reaching targeted audiences** by delivering information about the situation in across multiple channels and via multiple mediums, including mobile and social platforms.
- **Engaging in conversation** by providing safe guidelines, recommending protective actions, collecting feedback and enabling discussion.



1. Communication and psychosocial considerations

Information must be prompt and truthful and must increase people's ability to understand and manage their response and actions, whether they are directly or indirectly impacted: What is going on? What do I have to look out for? What should I do? Where am I safe? Where can I get further information and support? Where are my loved ones and how can I get in contact with them?

The prevalence of social media in many countries provides a challenge and an opportunity. Watching the news and following social media can be overwhelming and can even be stressful. For some people, social media provides human interaction and a degree of emotional support, and has been shown to be important to stakeholders dealing with crises. Reputable and knowledgeable organisations like National Societies can provide facts, preventive recommendations, opportunities to restore family links and opportunities to help; they can also identify and debunk myths and rumours.

Giving people something meaningful to do in response to a crisis can help them make sense of the situation. As a partner in the crisis response, the public can echo essential information from validated sources through social platforms. Those who are directly affected by the event can provide first person information about what they see and experience, which helps inform response actions and build understanding of the impacts. Through engaging in dialogue with the public, organisations like National Societies can understand trends, commonly asked questions, population movement and other issues and can both build that information into operational response and into better and more targeted communication. If there are actions individuals can take to reduce risks or assist in the recovery efforts, social media can be strong forums for reaching stakeholders with the directions needed. Even more, by simply forwarding, cross-posting, or retweeting the directions, users are taking action.

2. Target audiences

General public

Individuals not directly affected by the incident in the affected country but also on international level may nevertheless be concerned about the people directly impacted by the emergency. They will want detailed information about the event itself, and will want to see that the humanitarian consequences of the emergency are being adequately addressed. Many will seek to support the relief effort by volunteering and /or providing financial support.

As a general rule, National Societies outside the impacted area should address in their key messages the following points:

- Outline the humanitarian situation, the humanitarian needs and any Red Cross Red Crescent action taken. (What are we doing?)
- Highlight volunteers' work, the host National Society's auxiliary role, and Red Cross Red Crescent core activities and expertise. (Shelter, medical care, psychosocial support…)

- Build advocacy messages into the statements using the emergency to highlight humanitarian concerns and any measures that need to be taken.
- Use the incident to encourage individuals and communities to be prepared.
- Include messages about the need for resources, if appropriate.

Affected populations and authorities

As noted above, past major nuclear and radiological emergencies all demonstrated a significant general public concern for the safety and public health implications of the events, and protracted difficulties experienced by public authorities in providing such information in a timely and accurate manner. As a result, general confusion arose, along with scepticism about the public authorities' information, competency, intentions and actions.

Generally, civil health authorities have the responsibility for providing official emergency health and safety information to the general public and the affected populations. Many National Societies assist government authorities in this task, and are typically highly regarded for their ability to dispense accurate and timely health and safety information to the public. In some cases the National Societies have the resident expertise to evaluate the type and nature of information they should release to meet public need and expectations. Communicators should liaise with their public authority and operator counterparts to align messaging and recommendations. This avoids confusion.

Impacted communities and affected population have a range of specific issues that need to be addressed and which can be part of the services that are provided by a National Society. Some of the recurrent issues are:

- Evacuation or sheltering in place;
- Evaluating when and how to seek medical intervention;
- Staying informed; and
- Food and water safety.

The particular challenges of nuclear and radiological emergencies, plus the growing nature and influence of social media, present several hurdles to successfully disseminating such information. Lack of expertise, speed and coordination in disseminating information can negatively impact appropriate public action, and decrease trust in the ability of the National Society to handle both the present emergency and future crises and disasters.

National Societies have three options to consider in this area:

1. Because of the confusion, public scrutiny and associative misperception that follow such emergencies, National Societies do not assume a communication role and foster the expectation of dispensing health and safety information following radiological and nuclear emergencies.
2. During the onset and following an emergency, dispense health and safety information to the general public, via traditional and social media channels, but only information that can first be well-vetted and verified.
3. Directly assist public authorities in disbursing the best available information via traditional and social media following the onset of a nuclear or radiological event.

3. Communication channels

Traditional Media

Since print and broadcast media (also referred to as traditional media) can have a major influence on public perception of National Society response actions to the humanitarian consequences of nuclear and radiological emergencies, the National Society should facilitate coverage of the emergency by journalists, consistent with efficient conduct of its relief activities, and in accordance with any stipulations voiced by responsible government authorities. To achieve this, the National Society should, as part of its preparedness actions, designate appropriate individuals to serve as the National Society spokespeople throughout the course of the emergency. For coordination on this important issue and action, please refer to Chapter 5 C. National Society Leadership Strategic Level issues.

Social media

Global public reliance on social media and on Internet channels has grown significantly since the turn of the century. In many cases social media has become a principal means by which many individuals learn about and discuss world issues and local events that have a direct bearing on their daily lives. One of the greatest strengths of social media is the public's easy access to it, and therefore the possibility to rapidly communicate and share resources and information. However, its largely unregulated and unmanaged character can impact the accuracy and appropriateness of the information presented.

As with print and broadcast media, the National Society may consider actively using social media as a tool for emergencies and disasters within two broad categories. First, social media can be used somewhat passively to disseminate information and receive user feedback via incoming messages, wall posts, and polls. A second approach involves the systematic use of social media as an emergency management tool.

Systematic usage might include:

1. using the medium to conduct emergency communications and issue warnings;
2. using social media to receive victim requests for assistance;
3. monitoring user activities and postings to establish situational awareness; and
4. using uploaded images to create damage estimates, among others.

However, it is also important to think about how to counter misinformation that may be spread by others.

When a disaster situation attracts large-scale international interest like a nuclear or radiological emergency, a National Society may request that IFRC assign a delegate or delegates to assist the National Society in coping effectively with the requirements of the (international) media and the demands of social media, and responding to the public information needs of other National Societies and IFRC secretariat.

11. Psychosocial interventions[32]

"People need good, reliable information early. They need insight into what is going on, especially on nuclear issues. You cannot see radiation, and people's fear can be the fear of the unknown. When you can see what is wrong, you can take the appropriate action. What you cannot see is difficult to respond to."

Dr Toshiharu Makishima, General Director of the International Medical Relief Department of the Japanese Red Cross

The high level of anxiety, stress and the fear of potential health impacts following nuclear and radiological emergencies have also been encountered following other technological emergencies involving hazardous chemical and biological material. Similar implications are anticipated and have been encountered when such hazardous elements are present in acts of armed conflict and terrorism. These effects may be disproportionate to the biological significance

32 *This chapter is based on following sources:*

Mental Health of Populations Exposed to Biological and Chemical Weapons (2005) Mark van Ommeren, Shekhar Saxena, WHO, Geneva.

IFRC Psychosocial Centre (2011) Psychosocial guidance note on nuclear disasters

Juen, B., Nindl. S, Warger, R., Lindenthal, M, Olff, M, Thormar, S., Ajdukovits, D., Bakic, H. (2015) The comprehensive Guideline on mental health and psychosocial support in disasters, OPSIC-Project, Operationalising Psychosocial Support in Crisis, SEC-2012.4.1-2, http://opsic.eu/Action sheet number 50, p 202

IFRC Psychosocial Centre (2011) Caring for volunteers. A psychosocial support toolkit

of radioactive contamination. The adverse psychosocial effects may constitute a greater public health impact than syndromes resulting from exposure. Therefore, promptly and effectively addressing the psychosocial effects of such events is important in mitigating further human suffering and harm.

Public authorities, academic and mental health professional consideration of these events can be collectively referred to as CBRN (Chemical, biological, radiological and nuclear) emergencies. Moreover, after a considerable degree of reflection and analysis of these events, efforts have been made to develop general guidance on how to address resulting common psychosocial needs.

The term ”psychosocial” refers to the dynamic relationship between the psychological and social dimension of a person, where the one influences the other. The psychological dimension includes internal, emotional thought processes, feelings and reactions. The social dimension includes relationships, family and community networks, social value and cultural practices.

Five essential elements of providing psychosocial support have been identified: a sense of safety, calming, a sense of self-and community efficacy, connectedness and hope. Many of the psychological and social effects of a nuclear disaster are similar to those in other emergency situations. However, fear is even more likely to result when a nuclear threat is involved for several reasons:

- The nuclear radiation is invisible, therefore people cannot rely on their own senses to determine physical exposure and the effects of contamination may also persist for a long time after the event;
- Most health effects take at least five years to appear and fears with regard to cancer and the development of children may persist. Therefore, psychosocial effects are likely to persist for some time after the acute crisis;
- The CBRN materials may contaminate the environment in various ways, rendering it unsafe or unusable and this may necessitate evacuation. The perceptions of threat may also result in self-evacuation from areas of perceived danger in large numbers. Evacuation is an experience that is stressful and increases the risk of separation from social supports and breakdown of community support systems; this may have economical costs and psychosocial fallout;
- CBRN threats are rarely encountered. Uncertainty or contradictory public information with regard to health risks and the appropriate actions to take to mitigate risks may increase fear;
- Signs of autonomic arousal like rapid breathing, dilated pupils, and elevated heart rate are common among frightened persons, but may be misattributed as evidence of contamination and be expressed as medically unexplained symptoms. Frightened but physically healthy individuals may overwhelm the health care services constituting an epidemic of medically unexplained illness. Although most symptoms of CBRN contamination are quite unlike the signs of autonomic arousal, these may co-exist and will necessitate triage.

Despite high public fear and uncertainty historical evidence suggests that public panic is rare and is limited to situations when there are inadequate exits in confined spaces or there is a perception of limited access to essential, life-saving health services. The vast majority of people can be expected to cope quite well.

One important part of emergency planning for response and recovery to CBRN events is the acknowledgement that the public's reaction may be rather rapid and linked to the immediate sense of danger evoked by the threat. Even those too far away to be affected may believe that they and their families are at risk. Community-based psychosocial systems integrated with general health services may be more effective in addressing psychosocial issues during and after emergencies than responses centred on psychiatric institutions. Setting up vertical mental health services for subpopulations based on the level of exposure is discouraged; rather the integrated, community-based systems should be tailored to address the needs of different subpopulations.

1. Emergency phase and psychosocial support

It is important to include psychosocial planning and considerations from the start of the response. Psychological first aid is part of the acute emergency phase response and if trained caregivers are not available non-professional caregivers should be trained to provide psychological first aid (PFA). PFA should be made available in the community at general health care facilities and other locations where people seek help. Providing supervision and the possibilities of referral is important when providing PFA.

- Create natural opportunities for individuals to share their concerns and support each other.
- Single-session psychological debriefing is not recommended.
- Field officers should be briefed about issues of fear, grief, disorientation and active participation and measures to support the psychosocial wellbeing of health and relief workers should also be implemented.
- Telephone support and systems for communication and re-establishing links with family and social supports, are important particularly in evacuation situations.
- If the threat is perceived as a terrorist attack this is associated with a greater experience of threat to health and wellbeing.
- Spaces should be provided for religious, recreational and cultural activities and normal cultural and religious events should be re-established.
- Recreational and school activities for children and activities for vulnerable groups should be started. Adults and adolescents should be involved in concrete, purposeful, common interest activities.
- **In case of evacuation** The reasons for which an evacuation is necessary or even unavoidable must be clear. People in the impacted area should be actively involved in the evacuation and other processes as much as possible. Special focus has to be put on the loss by leaving behind loved belongings, animals or even deceased friends and family members. Give people a chance to "say goodbye" if this is in any way possible. Isolation, social distancing and quarantine measures may warrant specific guidelines of their own, since they could well exacerbate psychosocial issues

2. Post-emergency phase and psychosocial support

Affected communities are beginning to realize the consequences of the situation and the emotional impact.

- Relevant outreach activities and psychosocial interventions should be organized in order to facilitate help-seeking and promoting positive ways of coping and expectations of natural recovery. These may be combined with activities to promote economic development in cases of emergency-induced poverty.
- The interventions should include the dissemination of clear, simple, consistent and easily understandable information by trained community workers or volunteers.
- Community workers should be trained and supervised in conducting psychosocial support interventions and humanitarian workers and community members should be trained in the basics of psychosocial support knowledge and skills in order to raise awareness and promote help-seeking and referral.
- Building credibility and a relationship of trust with the community is paramount. Recruiting local staff and volunteers and including community members in planning and implementation is can make this easier.

- It is important to build functional referral systems. The creation of community-based, self-help support groups should be facilitated with a focus on problem sharing and solving, coping and emotional support. Collaboration with traditional healers may also be relevant.

3. Long-term psychosocial interventions

The consequences of CBRN events may only appear years after the emergency, and they are difficult to predict. Long term interventions may need to be implemented in the form of aftercare and community support.

- Many health effects may take at least five years to appear, and fears with regard to cancer and the development of children may persist. Therefore, psychosocial effects are likely to persist for some time after the acute crisis.
- Support groups, vocational activities, sports and physical activities, integrated health and psychosocial activities need to be available to support natural coping mechanisms and help build resilience.

12. IFRC support and assistance

"Recommendation 8: In light of the significant role National Red Cross and Red Crescent Societies can play in response to nuclear emergencies; it is recommended that their international umbrella organization, the IFRC join the Joint Radiation Emergency Management Plan (JPLAN) and the Inter Agency Committee on Radiological and Nuclear Emergencies."

Linking Humanitarian and Nuclear response Systems: A Study by the United Nations Office for Coordination of Humanitarian Affairs, page 5

1. IFRC Nuclear and Radiological Emergency Strategy

Following on the 2011 General Assembly resolution, IFRC seeks for the Movement to be recognized as a competent actor in nuclear and radiological and emergencies, through involvement in the relevant networks with other international organisations and relevant stakeholders. To achieve this level of acceptance, competence and specific operational capacity for domestic preparedness and response must be developed and maintained. Moreover, international support needs to be readily available when required or requested. In addition, advocacy should be focused on a strong framework for radiological and nuclear emergency response with an emphasis on humanitarian consequences and community based approaches.

The IFRC strategy for radiological and nuclear emergencies consists of three aims:

1. Save lives and livelihoods by responding to radiological and nuclear emergencies in an effective and coherent manner. This will be accomplished by strengthening National Society capabilities and capacities by providing specific operational guidance for a risk informed humanitarian response.
2. Invest in community preparedness and risk reduction.
3. Consider the long-term consequences in the areas of psychosocial support, health, social protection and livelihoods when implementing recovery activities following a radiological or nuclear incident. Place people at the centre of the Red Cross Red Crescent response and recovery actions.

2. Mobilizing Movement resources

Because of the Red Cross Red Crescent network of 189 National Societies, ICRC and a globally available response system, the Movement through IFRC and its different components is able to mobilize its collective resources and expertise from around the world to promptly and effectively respond to a wide range of disaster incidents. IFRC has a number of long-established and effective response capacities, tools and systems that can be activated and promptly deployed to support National Societies and their response to radiological and nuclear emergencies. They include Field Assessment and Coordination Teams (FACT), Regional Disaster Response Teams (RDRTs) and Emergency Response Units (ERUs), forming a seamless arrangement that connects global, regional, national and local capabilities. In order to have the relevant capacity readily available, ICRC and IFRC are developing a pool of experts. These Red Cross Red Crescent staff and volunteers have specific expertise and knowledge to provide technical advice and assistance for the specific emergency situations of nuclear and radiological emergencies. They are supposed to support the affected National Society and the deployed teams and units to take appropriate measures for their own safety and for an effective response.

IFRC disaster management resources also include relief and logistics hubs placed close to disaster prone areas, and an extensive network of pre-positioned

relief goods stored in warehouses that ensure people affected by disasters or crisis can be provided with life-saving assistance. Investments are made in information management tools, such as the Disaster Management Information System (DMIS), which provides timely disaster information and analysis to disaster managers.

3. Relationship management with International Organisations

IFRC has an ongoing role in establishing and maintaining cooperation with international organisations engaged in planning, preparing and managing radiological and nuclear emergencies. This includes the active engagement as mentioned above in the Inter Agency committee on Radiological and Nuclear emergencies (IACRNE), operational cooperation with the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD), the Working Party on Nuclear Emergency Matters (WPNEM) and with WHO and its well established network on Radiation Emergency Medical Preparedness and Assistance Network (REMPAN). In addition, there is regular information exchange with the OCHA / United Nations Environment Programme (UNEP) joint environmental unit.

The International Atomic Energy Agency (IAEA)

The IAEA is depository for two conventions: the Convention on Early Notification of a Nuclear Accident (Notification Convention) and the "Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency" – in short referred to as the "Notification Convention" and the "Assistance Convention". These conventions are binding for all parties and oblige governments to notify the IAEA and to provide sufficient information in case of nuclear and radiological emergency with possible consequences for other countries. The IAEA then passes this information to the other partner governments. The Assistance Convention includes a number of agreements to officially request assistance from other countries, to simplify the formalities and to avoid administrative or legal problems as much as possible. At several regional levels (like the European Union with the ECURIE system) there are also agreements to pass information to other member/participant/partner countries.

Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE)

The Inter-Agency Committee on Radiological and Nuclear Emergencies, formerly the Inter-Agency Committee for the Co-ordinated Planning and Implementation of Response to Accidental Releases of Radioactive Substances, which was established following a meeting of representatives of World Meteorological Organisation (WMO), International Labour Organisation (ILO), FAO, UNEP, UNSCEAR, WHO and IAEA at the Special Session of the IAEA General Conference in September 1986, is the coordination mechanism between relevant international intergovernmental organisations to ensure that coordinated and consistent arrangements and capabilities for preparedness and response to nuclear and radiological incidents and emergencies are developed and maintained.

Good preparedness in advance of an emergency can improve the response substantially. With this in mind, international organisations that are members of IACRNE develop, maintain and co-sponsor "Joint Radiation Emergency Management Plan of the International Organisations" (JPLAN). The IAEA provides the Secretariat for IACRNE and is the main coordinating body for the development and maintenance of the Joint Plan.

The Joint Plan (JPLAN)[33]

The JPLAN describes the inter-agency framework for preparedness for and response to an actual, potential or perceived radiation incident or emergency independent of whether it arises from an accident, natural disaster, negligence, a nuclear security event or any other cause.

The Joint Plan is the framework for the inter-agency preparedness and response coordination and describes common understanding of each participating organisation's response mandate. It provides the basis for a coordinated and harmonized international response, and ensures that coordinated and consistent arrangements and capabilities of relevant international organisations are developed and maintained.

In accordance with the Early Notification and Assistance Conventions, IAEA – as the leading organisation for response to radiation emergencies – has primary responsibility for activating the inter-agency response system. It receives reports of an incident or emergency from a designated competent authority in a state (or international organization) and verifies any unconfirmed reports. It

33 *More information and the full document can be found here: http://www-pub.iaea.org/MTCD/Publications/PDF/EPRJplan2013_web.pdf*

establishes primary functional links with the reporting state (or international organization) and any affected states, providing direct communication with competent authorities. It also establishes functional links with relevant international organisations. These organisations may establish links with other competent authorities, agencies, regional centres and programmes that are prepared to provide information, advice or assistance.

IAEA shares information with all participating organisations (member organisations of IACRNE). If any other participating organisation receives credible information or a request for information, advice or assistance in case of a radiation incident or emergency, it informs IAEA and other participating organisations.

Info Box: Fukushima and Chernobyl Comparison

The explosions and fires at the Fukushima and Chernobyl nuclear power plants are the two largest major radiological emergencies. Due to a number of factors, including differences in protective measures of the nuclear facility and differences in government-led response, the consequences of the two emergencies are quite different. The accompanying chart compares significant details of each emergency.

Fukushima and Chernobyl compared

Category	Chernobyl, USSR (now Ukraine)	Fukushima Daiichi, Japan
Date of accident	26 April 1986	11 March 2011
Accident details	A sudden power output surge during a systems test caused a reactor vessel to rupture, leading to a series of blasts. An intense fire burned for ten days.	A magnitude 9.0 earthquake and resulting tsunami damaged the plant's power systems, causing cooling systems to fail. A series of gas explosions followed.
Severity rating (INES)	Level 7 – major accident	Level 7 – major accident
Number of reactors	Four; but only one reactor involved	Six; but only three of concern, plus pools storing spent fuel
Type of reactors	Graphite-moderated boiling water reactor. The graphite made it highly combustible. The reactor also had no containment structure and nothing stopped the trajectory of radioactive materials into the air	Boiling-water reactors. Japanese authorities stress that unlike at Chernobyl; the containment vessels at Fukushima remain intact. Also, unlike Chernobyl, the reactors at Fukushima do not have a combustible graphite core
Radiation released	5.200 petabecquerels*	370 – 800 petabecquerels* (estimate in 2014)
Area affected	Contamination of an area as far as 500 km (300 miles) from the plant, according to the United Nations. But animals and plants were also affected much further away	Officials say areas extending more than 60km (36 miles) to the north-west of the plant and about 40 km to the south-southwest have seen radiation levels exceed annual limits

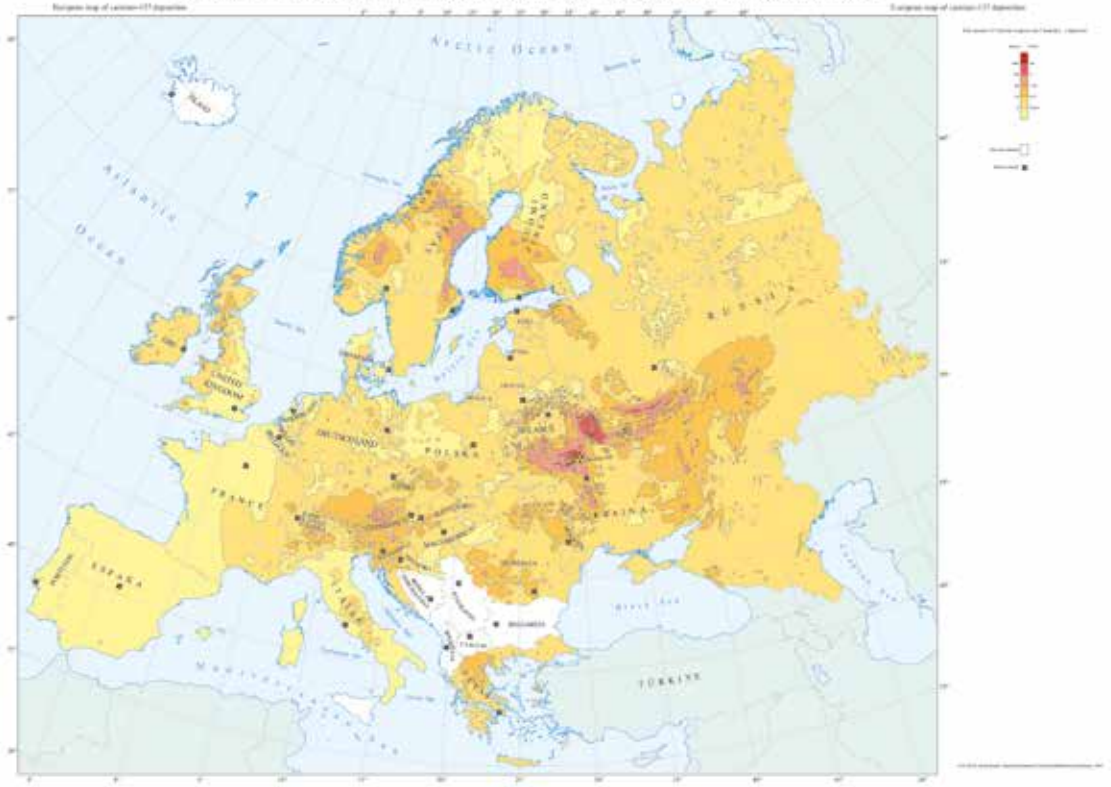
Category	Chernobyl, USSR (now Ukraine)	Fukushima Daiichi, Japan
Evacuation zone	30 km	20 km; 20-30 km voluntary zone. Five communities beyond the existing evacuation zone also were evacuated
People evacuated	The authorities evacuated, in 1986, about 115,000 people from areas surrounding the reactor and subsequently relocated, after 1986, about 220,000 people from Belarus, the Russian Federation and Ukraine	As immediate response, the Government of Japan recommended the evacuation of about 78,000 people living within a 20 km radius of the power plant and the sheltering in their own homes of about 62,000 other people living between 20 and 30 km from the plant. Later, in April 2011, the government recommended the evacuation of about 10,000 more people living farther to the north-west of the plant (referred to as the deliberate evacuation area).
Related deaths	A United Nations report at the Chernobyl forum in 2005 places the number or workers who died from acute radiation syndrome to 47. Disputes continue about how many will eventually die from effects of radiation	No radiation-related deaths or acute diseases have been observed among the workers and general public exposed to radiation from the accident.
Long-term health damage	Among the residents of Belarus, the Russian Federation and Ukraine, there had been up to the year 2005 more than 6,000 cases of thyroid cancer reported in children and adolescents who were exposed at the time of the accident, and more cases can be expected during the next decades[34]	Not yet known, but risks to human health are thought to be low.
Status as per Mid 2014	The damaged reactor is now encased in a concrete shell. A new containment structure is due to be completed by 2016.	Engineers have brought the plant to a "cold shutdown condition" in December 2011, a key milestone in bringing it under control. It will take decades to dismantle it completely, however.

*Source: Nuclear and Industrial Safety Agency, Japanese authorities, UNSCEAR. *Becquerels are a measurement of radiation – BBC*

34 *http://www.who.int/ionizing_radiation/chernobyl/backgrounder/en/*

This map shows the spread of Caesium–137 released in Europe after the Chernobyl accident and is an example of the potential cross-border effect of a nuclear accident.

Figure XI. Surface ground deposition of caesium-137 released in Europe after the Chernobyl accident [D13].



Source: UNSCEAR Chernobyl Report "Exposures and effects of the Chernobyl accident" (2000)

Glossary of Terms[35]

Absorbed dose The fundamental dosimetric quantity. The energy imparted by ionizing radiation to a suitably small volume of matter divided by the mass of that volume. The unit is gray, symbol GY. 1 GY = 1 joule per kilogram.

Acute Exposure Exposure received within a short period of time. Normally used to refer to exposure of sufficiently short duration that the resulting doses can be treated as instantaneous (e.g. less than 48 hours)

Acute Intake An intake occurring within a short time period, short enough that it can be treated as instantaneous for the purposes of assessing the resulting committed dose.

Alpha particles Helium nuclei that consist of two protons and two neutrons. This is intensely ionizing, but cannot penetrate skin. It is therefore primarily dangerous if incorporated in the body so that it is able to ionize tissue from within.

Annual Dose The dose due to external exposure in a year, plus the committed dose from intakes of radionuclides in a year.

Becquerel (symbol Bq) is the unit used to measure the activity of radioactive material.

Beta particles Electrons or positrons emitted by many different radioactive elements. It can penetrate human skin and create burns, but can be stopped by a few millimetres of aluminium, wood or glass.

Chronic Exposure Normally used to refer to exposures persisting for many years as a result of long-lived radionuclides in the environment.

Collective effective dose Frequently shortened to collective dose. The quantity obtained by adding the effective doses received by all of the people in a defined population, such as all those exposed to a radioactive source. The unit is man Sievert, with symbol man Sv.

Contamination Radioactive substances on surfaces, or within solids, liquids and gases (including the human body), where their presence is unintended or undesirable, or the process given rise to their presence in such places.

Contamination zone A zone in which special protective measures are necessary, owing to actual or potential air contamination or loose surface contamination in excess of a specified level. The outline of the Zones are determined by the relevant authorities, based on available information. The contamination zones

35 *Sources include IAEA "Safety Glossary", IAEA "Radiation, People and the Environment", and IFRC guidance documents.*

can be adjusted over time by more detailed information and situational and contextual assessments.

Conventional explosion Sudden and violent release of energy caused by chemicals, magnetic energy, electrical energy, pressure or vapour (as opposed to nuclear explosion/detonation). Conventional explosions can also spread radioactive material, for example if a reactor explodes from overheating or a bomb lined with radioactive material is exploded with intent. The latter is commonly known as radiological dispersal device or "dirty bomb".

Dispersal The spreading of radioactive material in the environment.

Dangerous Source A radioactive source that could, if not under control, give rise to exposure sufficient to cause severe effects. The categorization is used for determining the need for emergency response arrangements and is not to be confused with categorization of sources for other purposes.

Decay The process of spontaneous transformation of a radionuclide or the decrease in the activity of a radioactive substance as a result of this process.

Decommissioning (of nuclear power plant) Technical and administrative actions taken to allow the removal of regulatory controls from a facility. Decommissioning typically includes dismantling the facility.

Decontamination The complete or partial removal of radiological contamination by a deliberate physical, chemical or biological process. It is sometimes necessary to perform quick and simple decontamination at the scene of a radiation emergency, and leave further decontamination for a later stage. This preliminary procedure is called *field decontamination* and usually includes removal of outer clothing, washing of face and hands and covering the victim in a blanket.

Deterministic Effect a health effect of radiation that does not generally appear below a threshold dose, but over that threshold level the severity increases with the dose. Examples of deterministic effects are acute radiation syndrome (radiation sickness) and erythema.

Dose A measure of the energy deposited by radiation in a target.

Dose Assessment The assessment of the dose[s] to an individual or group of people.

Dosimeter a small portable instrument for measuring and recording the total accumulated dose of ionizing radiation a person receives.

Effective dose A measure of dose designed to reflect the amount of radiation detriment likely to result from the dose. Obtained by multiplying the equivalent dose to each tissue or organ by an appropriate tissue weighing factor and summing the products. The unit is Sievert, with symbol Sv.

Emergency A non-routine situation or event that necessitates prompt action, primarily to mitigate a hazard or adverse consequences for human health and safety, quality of life, property or the environment. This includes radiation and conventional emergencies such as fires, release of hazardous chemicals, storms or earthquakes. It includes situations for which prompt action is warranted to mitigate the effects of a perceived hazard.

(Nuclear or radiological) An emergency in which there is, or is perceived to be, a hazard due to:

a) The energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or
b) Radiation exposure

Emergency preparedness The capability to take actions that will effectively mitigate the consequences of an emergency for human health and safety, quality of life, property and the environment.

Emergency response The performance of actions to mitigate the consequences of an emergency for human health and safety, quality of life, property and the environment. It may also provide a basis for the resumption of normal social and economic activity.

Exposure The act or condition of being subject to irradiation. Exposure can be either external exposure (due to a source outside the body), or internal exposure (due to a source within the body). Exposure can be acute or chronic.

Exposure Pathway A route by which radiation or radionuclides can reach humans and cause exposure. It may be simple e.g. external exposure from airborne radionuclides, or a more complex chain, e.g. internal exposure from drinking milk from cows that ate grass contaminated with deposited radionuclides.

External Exposure Radiation exposure from a source outside the body.

Fallout Radioactive material that has become airborne, for example through accidents at nuclear power plants or nuclear detonations, and which is later deposited on the surface of the earth.

Fission (nuclear) The division of a heavy nucleus into parts with masses of equal order of magnitude, usually followed by the emission of neutrons and gamma radiation.

Fusion (thermonuclear) The merging of two light nuclei, resulting in the production of at least one nuclear species heavier than either initial nucleus, together with excess energy.

Gamma rays High energy beams that are emitted during radioactive alpha and beta decays. It is highly penetrating so there is need for thick shielding with heavy materials such as glass, water, concrete, lead or steel.

Gray (symbol Gy) is the unit of absorbed dose. This is the quantity of radiation energy that is deposited on a certain material. 1 gray equals an energy deposition of 1 joule per kilogramme.

Half-life The time required for the activity in a radionuclide to decrease by half, by a radioactive decay process. Biological half-life is the time taken for a quantity of a material in a specified tissue, organ or region of the body to halve as a result of biological processes.

Heredity Effect A radiation induced health impact that occurs in a descendant of an exposed person.

Intake The act or process of taking a radionuclide into the body by inhalation or ingestion or through the skin in a given period of time or as the result of a given event. Intake could be acute or chronic.

Internal Exposure Radiation exposure originating from a source within the body.

Iodine prophylaxis The administration of a compound of stable iodine (usually potassium iodide) to prevent or reduce the uptake of radioactive isotopes of iodine by the thyroid in the event of an event involving emission of radioactive iodine.

Ionizing Radiation For the purposes of radiation protection, radiation capable of producing ion pairs in biological materials. Examples are alpha particles, gamma rays and x-rays.

Irradiation The act of being exposed to radiation.

Isotope Nuclides with the same number of protons as the chemical element, but different numbers of neutrons. Examples of isotopes are uranium-235 and uranium-238, which both can be used in nuclear fission, for instance for power generation.

Mass Casualty Event Any event resulting in number of victims large enough to disrupt the normal course of emergency and health services

Natural Exposure Radiation exposure originating from natural sources, such as the sun and stars (cosmic sources of radiation) and rocks and soil (terrestrial sources of radiation).

Non-radiological consequences Effects on humans or the environment that are not the direct effects of radiation. These include effects on health or quality of life resulting from psychological, social, or economic impact resulting from the emergency or the response to the emergency.

Nuclear detonation Uncontrolled chain reaction splitting (fission) or joining (fusion) atoms, resulting in explosive power exponentially far larger than for conventional bombs, and massive release of heat and ionizing radiation. Nuclear detonations can only occur when a number of specific conditions are in place, such as is the case for nuclear weapons. It is possible to imagine that accidental nuclear weapon detonations could occur, but nuclear detonations cannot accidentally happen at nuclear power plants, as the conditions are such that uncontrolled nuclear chain reactions could not possibly be sustained.

Nuclear or radiological accident Any unintentional event involving facilities or activities from which a release of radioactive material occurs or is likely to occur, and the consequences or potential consequences of which are not negligible from the point of view of protection or safety. The INES scale, as explained in this document, differentiates between accidents and incidents. Incidents are there understood as safety breeches that are serious in their own right, but where spread of radioactive material is limited in terms of geographical area and/or doses received by affected persons.

Nucleus (of an atom) The positively charged central portion of an atom. It contains protons and neutrons.

Protective Action Guidelines Suggested or recommended actions by appropriate government authorities designed to prevent or reduce exposure to radiological contamination.

Psychosocial support The psychosocial concept relates to one´s psychological development in, and interaction with, a social environment. The purpose of psychosocial support following emergencies is to build resilience, and to help people cope with and recover from the events that have taken place. As highlighted in the IFRC´s Strategy 2020, IFRC defines psychosocial support as a key component of a holistic health and resilience approach.

Public Exposure Exposure incurred by members of the public from radiation sources, excluding any occupational or medical exposure and the normal local natural background radiation.

Radiation Ionizing radiation is often referred to only as "radiation" in the context of nuclear and radiological emergencies, although this is actually an umbrella term for ionizing and non-ionizing radiation.

Radiation Monitoring The measurement of dose or contamination to assess or control exposure to radiation or radioactive substances, and the interpretation of the results.

Radioactivity The phenomenon whereby atoms undergo spontaneous random disintegration, usually accompanied by emission of radiation.

Radionuclide Radioactive nuclide. Nuclide is a species of atom characterized by the number of protons and neutrons and the energy state of the nucleus.

Reactor (nuclear) A device in which a self-sustaining nuclear fission chain reaction can be maintained and controlled.

Recovery The process that results in people's lives returning to normal in such a way that they will be more resilient to future disasters. The extent to which people can recover after a disaster depends on the situation beforehand and how robust or resilient their resources are to withstand the effects of the disaster. For some, recovery will be relatively quick, while for others it may take years.

Resilience Defined by the World Bank as the ability of a system, community or society, exposed to hazards to resist, absorb, accommodate to, and recover from the effects of hazard in a timely manner, including through the preservation and restoration of its essential basic structures and functions. [Dickson et.al, 2012]

For IFRC, resilience is defined as:
The ability of individuals, communities, organisations, or countries exposed to disasters and crises and underlying vulnerabilities to anticipate, reduce the impact of, cope with, and recover from the effects of adversity without compromising their long-term prospects

Sievert (symbol Sv) is the unit that represents the health effects of ionizing radiation on man. The millisievert (symbol mSv), one thousandth of a Sievert, is more commonly used.

Stochastic Effect A radiation induced health effect that has a higher probability of occurring at a higher radiation dose, but which generally occurs without a threshold dose. The severity of the effect once it occurs is independent of the dose received. Examples of stochastic effects are solid cancers and leukaemia.

Somatic Effect A radiation induced health effect that occurs in an exposed person only, meaning that it is not hereditary.

Source Anything that may cause radiation exposure and can be treated as a single entity for protection and safety purposes.

Trans boundary exposure Exposure of members of the public in one State due to radioactive material released in another state. This is likely to occur in conjunction with transboundary release of radioactive material to the environment, which may necessitate protective actions, such as restrictions on food supply and commerce.

Transitory Exposure Exposure that is too protracted to be described as acute exposure, but does not persist for many years.

Trauma Damage to a human or other biological organism caused by physical harm from an external source (this definition relates to the term as it is used in physical medicine). When physical, thermal and/or chemical trauma is combined with radiation exposure this is called *combined injury*.

Triage Rapid method using simple procedures to sort persons into groups based on their injury and/or disease for the purpose of expediting clinical care and maximizing the use of the available clinical services and facilities.

Uranium Naturally occurring radioactive element.

Urgent Protective Action A protective activity in the event of an emergency which must be taken promptly, [usually within hours], in order to be effective, and the effectiveness of which will be markedly reduced if it is delayed. The most commonly considered urgent protective actions in a nuclear or radiological emergency are evacuation, shelter in place, decontamination of individuals, mass sheltering, respiratory protection, iodine prophylaxis, and restriction of the consumption of potentially contaminated food.

Whole Body Refers to all organs and tissues of the human body when they are uniformly irradiated. The term is used in dose assessment.

Worried Well A person who has received neither sufficient radiation exposure or been contaminated enough to warrant medical treatment or decontamination but who is concerned and wishes to be assessed for radiological exposure/contamination.

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CBRN crisis management, Architecture, Technology and Operational procedures (CATO) http://www.cato-project.eu/

CBRN Integrated Response Italy http://cbrn.netseven.it/?page_id=61

Centers for Disease Control and Prevention – Radiation emergencies
http://emergency.cdc.gov/radiation/index.asp

Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)
http://www.ctbto.org/press-centre/

European Commission – Fukushima nuclear emergency
http://ec.europa.eu/energy/node/1182

European Commission – Overview of EU radiation protection legislation
https://ec.europa.eu/energy/node/1219

European Community Urgent Radiological Information Exchange (ECURIE)
https://rem.jrc.ec.europa.eu/RemWeb/activities/Ecurie.aspx

European Union CBRN Risk Mitigation Centres of Excellence
http://www.cbrn-coe.eu/

European Platform on preparedness for nuclear and radiological emergency response and recovery (NERIS) http://www.eu-neris.net/

Heads of the European Radiological protection Competent Authorities (HERCA)
http://www.herca.org/

IAEA booklets library http://www.iaea.org/Publications/Booklets/RadPeopleEnv/radiation_booklet.html

IAEA Incident and Emergency Centre
http://www-ns.iaea.org/tech-areas/emergency/incident-emergency-centre.asp

IAEA Incident and Emergency Centre information material
http://www-ns.iaea.org/tech-areas/emergency/outreach-info.asp?s=1&l=5

IAEA Power Reactor Information System (PRIS) https://www.iaea.org/pris/

IAEA – What to do in a radiological emergency
http://www-ns.iaea.org/tech-areas/emergency/iec/frg/

IFRC e-learning tool: Public Health in Emergencies; Nuclear Emergency Module www.ifrc.org/learning-platform

IFRC Global Disaster Preparedness Center http://preparecenter.org/

IFRC – Plugging the Nuclear Information Gap
https://www.youtube.com/watch?v=hWfyflNP2cY

Institut de Radioprotection et de Sûreté Nucléaire (IRSN)
http://www.irsn.fr/FR/Pages/Home.aspx

International Commission of Radiological Protection (ICRP)
http://www.icrp.org

Japanese Red Cross Society (JRCS), Nuclear emergency resource centre Digital Archive http://ndrc.jrc.or.jp/?lang=en

National Council on Radiation Protection & Measurements (NCRP)
http://www.ncrponline.org

National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) http://naiic.net/en/

Radiation Emergency Assistance Centre/Training Site (REAC/TS)
http://orise.orau.gov/reacts

Radiation Emergency Medical Preparedness and Assistance Network (REMPAN) http://www.who.int/ionizing_radiation/a_e/rempan/en/

United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) http://www.unscear.org/
– Chernobyl
– Fukushima

United States Environmental Protection Agency – Library of radiation publications http://www.epa.gov/radiation/pubs.html

United States Federal Emergency Management Agency (FEMA) – Radiological emergencies resources
https://www.fema.gov/media-library/resources-documents/collections/22

United States Nuclear Regulatory Commission – Radiation basics
http://www.nrc.gov/about-nrc/radiation/health-effects/radiation-basics.html

WHO, radiation emergencies
http://www.who.int/ionizing_radiation/a_e/en/

Ionizing radiation and exposure, contamination and decontamination
http://www.who.int/ionizing_radiation/about/what_is_ir/en/index.html
http://www.who.int/mediacentre/factsheets/fs371/en/
http://www.ccohs.ca/oshanswers/phys_agents/ionizing.html
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http://emergency.cdc.gov/radiation/pdf/infographic_decontamination.pdf
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http://emergency.cdc.gov/radiation/screeningvideos/index.asp
http://www.remm.nlm.gov/
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http://www.unscear.org/unscear/en/publications.html

Health Effects of Ionizing Radiation
http://www.epa.gov/radiation/understand/health_effects.html
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The Fundamental Principles of the International Red Cross and Red Crescent Movement

Humanity The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace amongst all peoples.

Impartiality It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

Neutrality In order to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

Independence The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

Voluntary service It is a voluntary relief movement not prompted in any manner by desire for gain.

Unity There can be only one Red Cross or Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.

Universality The International Red Cross and Red Crescent Movement, in which all societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.

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