

IAEA Safety Standards

for protecting people and the environment

Preparedness and Response for a Nuclear or Radiological Emergency

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FAO, IAEA, ICAO, ILO, IMO, INTERPOL,
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General Safety Requirements No. GSR Part 7



IAEA
International Atomic Energy Agency



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IAEA SAFETY STANDARDS AND RELATED PUBLICATIONS

IAEA SAFETY STANDARDS

Under the terms of Article III of its Statute, the IAEA is authorized to establish or adopt standards of safety for protection of health and minimization of danger to life and property, and to provide for the application of these standards.

The publications by means of which the IAEA establishes standards are issued in the **IAEA Safety Standards Series**. This series covers nuclear safety, radiation safety, transport safety and waste safety. The publication categories in the series are **Safety Fundamentals**, **Safety Requirements** and **Safety Guides**.

Information on the IAEA's safety standards programme is available on the IAEA Internet site

<http://www-ns.iaea.org/standards/>

The site provides the texts in English of published and draft safety standards. The texts of safety standards issued in Arabic, Chinese, French, Russian and Spanish, the IAEA Safety Glossary and a status report for safety standards under development are also available. For further information, please contact the IAEA at: Vienna International Centre, PO Box 100, 1400 Vienna, Austria.

All users of IAEA safety standards are invited to inform the IAEA of experience in their use (e.g. as a basis for national regulations, for safety reviews and for training courses) for the purpose of ensuring that they continue to meet users' needs. Information may be provided via the IAEA Internet site or by post, as above, or by email to Official.Mail@iaea.org.

RELATED PUBLICATIONS

The IAEA provides for the application of the standards and, under the terms of Articles III and VIII.C of its Statute, makes available and fosters the exchange of information relating to peaceful nuclear activities and serves as an intermediary among its Member States for this purpose.

Reports on safety in nuclear activities are issued as **Safety Reports**, which provide practical examples and detailed methods that can be used in support of the safety standards.

Other safety related IAEA publications are issued as **Emergency Preparedness and Response** publications, **Radiological Assessment Reports**, the International Nuclear Safety Group's **INSAG Reports**, **Technical Reports** and **TECDOCs**. The IAEA also issues reports on radiological accidents, training manuals and practical manuals, and other special safety related publications.

Security related publications are issued in the **IAEA Nuclear Security Series**.

The **IAEA Nuclear Energy Series** comprises informational publications to encourage and assist research on, and the development and practical application of, nuclear energy for peaceful purposes. It includes reports and guides on the status of and advances in technology, and on experience, good practices and practical examples in the areas of nuclear power, the nuclear fuel cycle, radioactive waste management and decommissioning.

PREPAREDNESS AND RESPONSE
FOR A NUCLEAR OR
RADIOLOGICAL EMERGENCY



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PREPAREDNESS AND RESPONSE FOR A NUCLEAR OR RADIOLOGICAL EMERGENCY

GENERAL SAFETY REQUIREMENTS

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HUMANITARIAN AFFAIRS,
WORLD HEALTH ORGANIZATION,
WORLD METEOROLOGICAL ORGANIZATION

This publication includes a CD-ROM containing the IAEA Safety Glossary: 2007 Edition (2007) and the Fundamental Safety Principles (2006), each in Arabic, Chinese, English, French, Russian and Spanish versions.

The CD-ROM is also available for purchase separately.

See: <http://www-pub.iaea.org/MTCD/publications/publications.asp>

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 2015

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FOREWORD

by Yukiya Amano
Director General

The IAEA's Statute authorizes the Agency to “establish or adopt... standards of safety for protection of health and minimization of danger to life and property” — standards that the IAEA must use in its own operations, and which States can apply by means of their regulatory provisions for nuclear and radiation safety. The IAEA does this in consultation with the competent organs of the United Nations and with the specialized agencies concerned. A comprehensive set of high quality standards under regular review is a key element of a stable and sustainable global safety regime, as is the IAEA's assistance in their application.

The IAEA commenced its safety standards programme in 1958. The emphasis placed on quality, fitness for purpose and continuous improvement has led to the widespread use of the IAEA standards throughout the world. The Safety Standards Series now includes unified Fundamental Safety Principles, which represent an international consensus on what must constitute a high level of protection and safety. With the strong support of the Commission on Safety Standards, the IAEA is working to promote the global acceptance and use of its standards.

Standards are only effective if they are properly applied in practice. The IAEA's safety services encompass design, siting and engineering safety, operational safety, radiation safety, safe transport of radioactive material and safe management of radioactive waste, as well as governmental organization, regulatory matters and safety culture in organizations. These safety services assist Member States in the application of the standards and enable valuable experience and insights to be shared.

Regulating safety is a national responsibility, and many States have decided to adopt the IAEA's standards for use in their national regulations. For parties to the various international safety conventions, IAEA standards provide a consistent, reliable means of ensuring the effective fulfilment of obligations under the conventions. The standards are also applied by regulatory bodies and operators around the world to enhance safety in nuclear power generation and in nuclear applications in medicine, industry, agriculture and research.

Safety is not an end in itself but a prerequisite for the purpose of the protection of people in all States and of the environment — now and in the future. The risks associated with ionizing radiation must be assessed and controlled without unduly limiting the contribution of nuclear energy to equitable and sustainable development. Governments, regulatory bodies and operators everywhere must ensure that nuclear material and radiation sources are used beneficially, safely and ethically. The IAEA safety standards are designed to facilitate this, and I encourage all Member States to make use of them.

PREFACE

BACKGROUND

Organizations responsible for the management of emergencies (including conventional emergencies) recognize that good preparedness in advance of any emergency can substantially improve the emergency response. One of the most important elements of emergency preparedness is the coordination of arrangements among the different bodies involved to ensure clear lines of responsibility and authority.

The Convention on Early Notification of a Nuclear Accident ('Early Notification Convention') and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency ('Assistance Convention'), both adopted in 1986¹, place specific obligations in relation to a nuclear or radiological emergency on the States Parties to the Conventions and on the IAEA.

The practical implementation of the various articles of these Conventions, as well as the fulfilment of certain obligations under Article 16 of the Convention on Nuclear Safety² and Article 25 of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management³, warrants the establishment of appropriate arrangements for emergency preparedness and response.

The Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) has been established as an inter-agency coordination mechanism to ensure that arrangements for emergency preparedness and response at the international level are consistent. IACRNE, which comprises relevant international intergovernmental organizations (hereafter, international organizations), maintains the Joint Radiation Emergency Management Plan of the International Organizations. IACRNE also contributes to the development of consistent international standards on emergency preparedness and response and to their practical application.

¹ INTERNATIONAL ATOMIC ENERGY AGENCY, Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Legal Series No. 14, IAEA, Vienna (1987).

² INTERNATIONAL ATOMIC ENERGY AGENCY, Convention on Nuclear Safety, Legal Series No. 16, IAEA, Vienna (1994).

³ INTERNATIONAL ATOMIC ENERGY AGENCY, Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, IAEA International Law Series No. 1, IAEA, Vienna (2006).

In March 2002, the IAEA's Board of Governors established safety requirements for preparedness and response for a nuclear or radiological emergency as an IAEA safety standard. The Safety Requirements publication, Preparedness and Response for a Nuclear or Radiological Emergency (IAEA Safety Standards Series No. GS-R-2), was issued in November 2002 with joint sponsorship by seven international organizations: the Food and Agriculture Organization of the United Nations (FAO), the IAEA, the International Labour Organization (ILO), the OECD Nuclear Energy Agency (OECD/NEA), the Pan American Health Organization (PAHO), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the World Health Organization (WHO).

Since its publication in 2002, States have been using the IAEA Safety Requirements publication No. GS-R-2 in establishing and enhancing their arrangements for emergency preparedness and response. The 55th General Conference of the IAEA in 2011, in resolution GC(55)/RES/9, emphasized "the importance for all Member States to implement emergency preparedness and response mechanisms and develop mitigation measures at a national level, consistent with the Agency's safety standards, for improving emergency preparedness and response, facilitating communication in an emergency and contributing to harmonization of national criteria for protective [actions] and other actions".

The 56th General Conference of the IAEA in 2012, in resolution GC(56)/RES/9, requested the IAEA Secretariat, Member States and relevant international organizations "to address compatibility issues in the development of national and international emergency response mechanisms and procedures consistent with the Agency's safety standards".

The 59th General Conference of the IAEA in 2015, in resolution GC(59)/RES/9, emphasized "the importance of the establishment, implementation, regular exercise and continuous improvement of national emergency preparedness and response measures, taking into account the IAEA safety standards", and encouraged Member States "to strengthen their national, bilateral, regional and international emergency preparedness and response mechanisms, as appropriate, to facilitate timely information exchange during a nuclear emergency, and [to] improve bilateral, regional and international cooperation to that effect".

REVISION PROCESS FOR THE SAFETY REQUIREMENTS

In 2011, the IAEA Secretariat, relevant international organizations and Member States began the review of IAEA Safety Requirements publication No. GS-R-2 on the basis of lessons identified in exercises and from the response

to emergencies since its publication in 2002 (including the response to the accident at the Fukushima Daiichi nuclear power plant in Japan in March 2011), and in due consideration of recommendations of the International Commission on Radiological Protection (ICRP).

The revision of IAEA Safety Requirements publication No. GS-R-2 commenced with a series of drafting meetings organized on the basis of thematic areas, as well as a series of review meetings of IACRNE. Representatives of IAEA Member States and of relevant international organizations, including representatives of the Sponsoring Organizations, then considered the draft text at a technical meeting held in November 2012.

On the basis of recommendations from these meetings, a revised draft text was prepared and was submitted for a first review by the IAEA Safety Standards Committees⁴ and Nuclear Security Guidance Committee in the first half of 2013. In July 2013, the draft text was submitted for comment to IAEA Member States and relevant international organizations. On the basis of comments received, a revised draft text was prepared and submitted for a second review by the Safety Standards Committees and the Nuclear Security Guidance Committee in the first half of 2014. The revised draft text was approved by the Safety Standards Committees and the Nuclear Security Guidance Committee in July 2014 and was endorsed by the Commission on Safety Standards in November 2014.

At its meeting on 3 March 2015, the Board of Governors of the IAEA established the draft Safety Requirements (in English) “as an Agency safety standard — in accordance with Article III.A.6 of the Statute⁵” and authorized the Director General “to promulgate these Safety Requirements and to issue them as a Safety Requirements publication in the IAEA Safety Standards Series”.

The international organizations that had expressed an interest in becoming sponsoring organizations of the revision of IAEA Safety Requirements publication No. GS-R-2 and that had actively participated in the revision process were invited to sponsor the new Safety Requirements publication. By July 2015, 13 international organizations had responded positively to the invitation, having followed their respective processes for approval or confirmation.

⁴ Nuclear Safety Standards Committee, Radiation Safety Standards Committee, Transport Safety Standards Committee and Waste Safety Standards Committee.

⁵ Statute of the International Atomic Energy Agency, IAEA, Vienna (1990).

The revision of IAEA Safety Requirements publication No. GS-R-2 is hereby issued in the IAEA Safety Standards Series as General Safety Requirements Part 7 under joint sponsorship by 13 international organizations: the FAO, the IAEA, the International Civil Aviation Organization (ICAO), the ILO, the International Maritime Organization (IMO), INTERPOL, the OECD/NEA, PAHO, the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), the United Nations Environment Programme (UNEP), OCHA, the WHO and the World Meteorological Organization (WMO).

The IAEA, on behalf of all the Sponsoring Organizations, wishes to express its great appreciation to all those who assisted in the preparation of this Safety Requirements publication and in the process of reaching a consensus.

APPLICATION OF THE SAFETY REQUIREMENTS

These safety requirements are binding on the IAEA Secretariat in relation to its own operations and on Member States in relation to operations assisted by the IAEA. They are recommended for use by Member States and by national authorities in relation to their own activities.

The Sponsoring Organizations are committed to continuously improving emergency preparedness and to coordinating their response to a nuclear or radiological emergency in line with these safety requirements, their respective mandates and, as appropriate, the Joint Radiation Emergency Management Plan of the International Organizations. These safety requirements are to be applied by the Sponsoring Organizations to their own operations in line with their respective mandates. States that are member states of the Sponsoring Organizations other than the IAEA may adopt these safety requirements, at their own discretion, or in accordance with their membership obligations, for application to their own activities.

All international organizations, irrespective of whether or not they are members of IACRNE, are encouraged to consider these safety requirements in establishing or enhancing their own emergency arrangements.

THE SPONSORING ORGANIZATIONS

The Food and Agriculture Organization of the United Nations (FAO)

In 1943, 44 governments committed to founding a permanent organization for food and agriculture at a meeting in Hot Springs, Virginia, USA. The formal foundation of the FAO of the United Nations took place at the first session of the

FAO Conference at Chateau Frontenac in Quebec, Canada, in 1945. The FAO works in partnership with the IAEA and other international organizations through the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture in preparing for and responding to nuclear or radiological emergencies in line with the Joint Radiation Emergency Management Plan of the International Organizations.

The FAO can provide assistance according to its Constitution⁶ and as a Party to the Early Notification and Assistance Conventions and in line with its strategic objective to increase the resilience of livelihoods to threats and crises. It collects, analyses, interprets and disseminates information relating to nutrition, food and agriculture (including fisheries, marine products, and forestry and primary forestry products). The FAO also promotes and, where appropriate, recommends national and international action with regard to the improvement of the processing, marketing and distribution of food and agricultural products and the adoption of international policies with regard to arrangements concerning agricultural commodities.

The International Atomic Energy Agency (IAEA)

The IAEA was established in 1957. Its statutory objective is to seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. One of the IAEA's statutory functions is "to establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety... (including such standards for labour conditions), and to provide for the application of these standards".

Deriving from this function, in the area of preparedness and response for a nuclear or radiological emergency, the IAEA develops safety standards and technical tools, supports its Member States in strengthening their emergency arrangements, provides for capacity building in its Member States, and performs, at the request of Member States, peer reviews on established emergency arrangements (such as Emergency Preparedness Review missions).

⁶ FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, Basic Texts of the Food and Agriculture Organization of the United Nations, Volumes I and II, 2013 Edition, FAO, Rome (2013).

The role of the IAEA in the response to a nuclear or radiological emergency derives, primarily, from the Early Notification Convention and the Assistance Convention. It includes notification and the exchange of official information, assessment of the potential consequences of an emergency and prognosis of its possible progression, the provision of assistance to Member States on request, and the provision of information to the public. The IAEA maintains its own emergency arrangements to fulfil its role in emergency response.

The IAEA also provides the secretariat of IACRNE, coordinates the inter-agency response in a nuclear or radiological emergency, and is the main coordinating body for the development and maintenance of the Joint Radiation Emergency Management Plan of the International Organizations.

The International Civil Aviation Organization (ICAO)

ICAO is an organization based on the Convention on International Civil Aviation⁷, signed in 1944. It became a specialized agency of the United Nations in 1947, with a mission to serve as the global forum of States for international civil aviation. ICAO is a cosponsoring organization of the Joint Radiation Emergency Management Plan of the International Organizations. The activities of ICAO⁸ include, for example, the reception and dissemination to aircraft in flight of information concerning releases of radioactive material into the atmosphere and provision of the regulatory framework for the safe transport of radioactive material as cargo on aircraft. ICAO also works with international partners to facilitate coordinated and consistent preparedness and response in the event of a nuclear or radiological emergency that may have an impact on international civil aviation.

The International Labour Organization (ILO)

The ILO was established in 1919 by the Treaty of Versailles to bring governments, employers and trades unions together for united action in the cause of social justice and better living conditions everywhere. It is a tripartite organization, with representatives of workers and employers taking part in its

⁷ Convention on International Civil Aviation, Chicago (1944).

⁸ Convention on International Civil Aviation, Chicago (1944), Annex 3 — Meteorological Service for International Air Navigation, Annex 11 — Air Traffic Services, and Annex 15 — Aeronautical Information Services. Additionally, provisions related to the transport of radioactive and nuclear material are contained in Annex 18 — The Safe Transport of Dangerous Goods by Air and the associated Technical Instructions for the Safe Transport of Dangerous Goods by Air.

work on equal status with representatives of governments. The ILO became the first specialized agency of the United Nations in 1946. One of the main features of the ILO, in addition to its tripartite structure, is its standard-setting activity. Some 60 international conventions and recommendations concern the protection of workers against occupational hazards.

Radiation protection is part of the ILO's action on the protection of workers against sickness, disease and injury arising out of employment, as mandated by the Constitution of the International Labour Organization⁹. In 1949, the ILO published a set of practical international standards on radiation protection which were revised and considerably extended in 1957 and were incorporated into the ILO Manual of Industrial Radiation Protection. In June 1960, the International Labour Conference adopted the Radiation Protection Convention, 1960 (No. 115), and its accompanying Recommendation (No. 114).

The Convention applies to all activities involving the exposure of workers to ionizing radiations in the course of their work and provides that each Member of the ILO which ratifies it shall give effect to its provisions by means of laws or regulations, codes of practice or other appropriate means. In 1986, the ILO Governing Body approved the publication of a Code of Practice for the radiation protection of workers (ionizing radiations) which gives practical guidance on the implementation of a radiation protection programme at the enterprise level.

The International Maritime Organization (IMO)

The IMO, established in 1948, works in partnership with the IAEA and other international organizations through its Marine Environment and Maritime Safety Divisions in preparing for, and responding to, nuclear or radiological emergencies in line with the Joint Radiation Emergency Management Plan of the International Organizations. The IMO has general responsibilities in relation to emergency preparedness, response and cooperation in accordance with the OPRC Convention¹⁰ and the OPRC-HNS Protocol¹¹.

The OPRC-HNS Protocol, in particular, by its implicit definition of hazardous and noxious substances, would also normally extend to incidents of marine pollution involving nuclear or radioactive material occurring at sea or in

⁹ INTERNATIONAL LABOUR OFFICE, Constitution of the International Labour Organization, Geneva (1919), as amended up to 1974.

¹⁰ International Convention on Oil Pollution Preparedness, Response and Co-operation (1990), as amended.

¹¹ Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (2000).

port. In addition, the IMO has developed safety codes, standards and guidelines for the transport of radioactive material as cargo and for nuclear powered ships for the prevention of such incidents, which, in certain cases, also cover elements of preparedness (see chapters VII and VIII of the SOLAS Convention)¹².

INTERPOL

INTERPOL, founded in 1914, is the world's largest international police organization. It facilitates cross-border police cooperation, and supports and assists all organizations, authorities and services whose mission it is to prevent or combat international crime. INTERPOL provides law enforcement officials in the field with support in an emergency and in operational activities, especially in its priority crime areas of fugitives, public safety and terrorism, drugs and organized crime, trafficking in human beings and financial and high technology crime.

When necessary, INTERPOL can deploy an Incident Response Team to support a country or countries in tasks as requested. The Command and Coordination Centre operates 24 hours a day and works in INTERPOL's four official languages, namely English, French, Spanish and Arabic, and serves as the first point of contact for any member country faced with a crisis. The Command and Coordination Centre can also assume a coordination role if an attack or disaster involves several member countries or if a member country's own ability to assume such a role has been compromised.

The OECD Nuclear Energy Agency (OECD/NEA)

The OECD/NEA was established in 1958. Its mission is to assist its member countries in maintaining and further developing, through international cooperation, the scientific, technological and legal bases required for a safe, environmentally benign and economical use of nuclear energy for peaceful purposes. Emergency preparedness and emergency management have long been main areas of focus for the OECD/NEA's Committee on Radiation Protection and Public Health. Following the Three Mile Island accident in 1979, and in particular following the Chernobyl accident in 1986, the OECD/NEA has worked to share national experience in emergency preparedness and emergency management, and to identify and address emerging issues. The OECD/NEA's International Nuclear Emergency Exercise series, INEX, has been an important mechanism for this work.

¹² International Convention for the Safety of Life at Sea (1974), as amended.

While the OECD/NEA member countries have assigned no statutory functions to the OECD/NEA for preparedness and response to a nuclear or radiological emergency, its work in this area has provided numerous useful resources to its members. The OECD/NEA is a founding and active member of IACRNE, and a cosponsoring organization of the Joint Radiation Emergency Management Plan of the International Organizations.

The Pan American Health Organization (PAHO)

PAHO, founded in 1902, is the specialized health agency of the Inter-American System, serves as the Regional Office for the Americas of the World Health Organization (WHO), and is a member of the United Nations system. According to the PAHO constitution¹³, its governing bodies set the organization's mandates. PAHO has technical expertise at its headquarters and at a number of country offices and scientific centres.

Among other functions, PAHO provides technical cooperation support in alerts and response to epidemics, in disaster preparedness, in health systems and services, in environmental health, in health legislation, in access to medicines and technologies, and in regulatory capacity. Several resolutions have been approved in relation to emergencies, including the formulation of regional plans of action for various types of disaster, and in relation to radiation safety standards that address nuclear and radiological emergencies. PAHO is a Party to the International Health Regulations¹⁴, the legally binding instrument that establishes the global health security framework, covering biological, chemical and radiation related hazards.

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)

The Comprehensive Nuclear-Test-Ban Treaty¹⁵ (CTBT) bans nuclear explosions by all States Parties to the Treaty at any place under their jurisdiction or control, in the atmosphere, underwater and underground. In preparation for the entry into force of the Treaty, the CTBTO was tasked in 1996 with establishing the International Monitoring System (IMS) for monitoring for signs of a nuclear

¹³ PAN AMERICAN HEALTH ORGANIZATION, Constitution of the Pan American Health Organization, PAHO, Buenos Aires (1947) as amended up to 1999.

¹⁴ WORLD HEALTH ORGANIZATION, International Health Regulations, WHO, Geneva (2005).

¹⁵ Comprehensive Nuclear-Test-Ban Treaty, United Nations, New York (1996).

weapon test explosion or any other nuclear explosion. The IMS includes a number of globally distributed radionuclide stations that continuously, and in near real time, report spectral measurements with high sensitivity for a large set of fission and activation products.

The response task for the CTBTO in a nuclear or radiological emergency is to provide monitoring data on radionuclides and noble gases in real time, including confirmation of non-detection. Advice on predictions in relation to atmospheric transport and dispersion may also be provided, as appropriate. Following an emergency, the CTBTO provides all relevant results on air concentrations of radionuclides from the global monitoring network and contributes relevant expertise.

The United Nations Environment Programme (UNEP)

UNEP¹⁶ was established in 1972 with headquarters in Nairobi, Kenya, and with six regional offices and various country offices. UNEP, as the leading global environmental authority, sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment. UNEP's disasters and conflicts subprogramme seeks to minimize environmental threats to human well-being from the environmental causes and consequences of conflicts and disasters. In addition, the UNEP/OCHA Joint Environment Unit based in Geneva, Switzerland, mobilizes and coordinates the international emergency response to acute environmental risks caused by conflicts, natural disasters and industrial accidents.

Further, the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which was established by the General Assembly¹⁷ in response to widespread concerns about the effects of radiation on human health and the environment, evaluates radiation doses, effects and risks worldwide. The UNSCEAR secretariat is based in Vienna and operates under the auspices of UNEP.

¹⁶ Institutional and Financial Arrangements for International Environmental Cooperation, United Nations General Assembly Resolution A/RES/27/2997, UN, New York (1972).

¹⁷ United Nations General Assembly Resolution 913 (X), UN, New York (1955).

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

OCHA, established in 1991 as an entity within the United Nations Secretariat, is responsible for bringing together humanitarian actors to ensure a coherent response to emergencies. The mandate of OCHA encompasses the coordination of humanitarian response, policy development and humanitarian advocacy. OCHA's activities include, for example, support in the planning of inter-agency response, mobilization and monitoring of humanitarian funding, reporting, analysis and information sharing, and deployment of rapid response teams for emergency relief.

OCHA also promotes preparedness to lessen the impact of disasters on vulnerable communities, especially in disaster prone countries. OCHA works with national governments, regional bodies and other agencies to develop, to test and to implement measures that help save lives in an emergency. OCHA also provides tools for contingency planning, hazard mapping and early warning reports, for example. With its international partners, OCHA works to ensure that the international community is ready to respond to humanitarian emergencies without delay and with the right assistance.

The World Health Organization (WHO)

The WHO, established in 1948, is the United Nations' specialized agency for health, and is the directing and coordinating authority on international health in the United Nations system. With 194 Member States, the WHO carries out its mandates through its headquarters in Geneva, six world regional offices and 150 country offices — and through close collaboration with national and international partners worldwide. Under its Constitution¹⁸, the resolutions of its governing body, and as a Party to both the Early Notification Convention and the Assistance Convention, the WHO provides technical support to its member states in relation to public health and medical response to nuclear and radiological emergencies.

Under the International Health Regulations, which are legally binding upon States, the WHO also conducts global public health surveillance, receives and assesses notifications and reports from States as required under the International Health Regulations, supports member states, and coordinates the public health response to a broad range of health events and risks, including biological,

¹⁸ Constitution of the World Health Organization adopted by the International Health Conference, New York (1946), as amended up to 2005.

chemical and radiation related hazards. It also supports countries in developing the necessary core public health capacities for these hazards.

The World Meteorological Organization (WMO)

The WMO is the authoritative organization in the United Nations system on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources. The International Meteorological Organization, founded in 1873, was the predecessor of the WMO, which was formally created when the WMO Convention¹⁹ came into force in 1950. The WMO became a specialized agency of the United Nations in 1951 with a mandate covering the areas of meteorology (weather and climate), operational hydrology and related geophysical sciences.

The WMO has an operational infrastructure comprising a number of World Meteorological Centres, Global Processing Centres for Long Range Forecasts, Regional Climate Centres and Regional Specialized Meteorological Centres. Some of these Regional Specialized Meteorological Centres support the IAEA through the provision of atmospheric transport modelling outputs.

The WMO promotes cooperation among its members in the creation and maintenance of meteorological, climatological, hydrological and geophysical observation networks, the exchange of data, and the processing and standardization of data, and in order to provide assistance, where necessary, with technology transfer, training and research. It also fosters collaboration between the national meteorological and hydrological services of its members.

The WMO fosters the application of meteorology in public weather services in order to better serve weather sensitive sectors — for example, agriculture, aviation, shipping, the environment and water resource management — and to mitigate the impacts of natural disasters. In addition, the WMO facilitates the free and unrestricted exchange of weather and climate related data and information products and services in real time or near real time on matters relating to public safety and security, economic welfare and environmental protection.

¹⁹ Convention of the World Meteorological Organization adopted by the Washington Conference, Washington, DC (1947), as amended up to 2007.

THE IAEA SAFETY STANDARDS

BACKGROUND

Radioactivity is a natural phenomenon and natural sources of radiation are features of the environment. Radiation and radioactive substances have many beneficial applications, ranging from power generation to uses in medicine, industry and agriculture. The radiation risks to workers and the public and to the environment that may arise from these applications have to be assessed and, if necessary, controlled.

Activities such as the medical uses of radiation, the operation of nuclear installations, the production, transport and use of radioactive material, and the management of radioactive waste must therefore be subject to standards of safety.

Regulating safety is a national responsibility. However, radiation risks may transcend national borders, and international cooperation serves to promote and enhance safety globally by exchanging experience and by improving capabilities to control hazards, to prevent accidents, to respond to emergencies and to mitigate any harmful consequences.

States have an obligation of diligence and duty of care, and are expected to fulfil their national and international undertakings and obligations.

International safety standards provide support for States in meeting their obligations under general principles of international law, such as those relating to environmental protection. International safety standards also promote and assure confidence in safety and facilitate international commerce and trade.

A global nuclear safety regime is in place and is being continuously improved. IAEA safety standards, which support the implementation of binding international instruments and national safety infrastructures, are a cornerstone of this global regime. The IAEA safety standards constitute a useful tool for contracting parties to assess their performance under these international conventions.

THE IAEA SAFETY STANDARDS

The status of the IAEA safety standards derives from the IAEA's Statute, which authorizes the IAEA to establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property, and to provide for their application.

With a view to ensuring the protection of people and the environment from harmful effects of ionizing radiation, the IAEA safety standards establish fundamental safety principles, requirements and measures to control the radiation exposure of people and the release of radioactive material to the environment, to restrict the likelihood of events that might lead to a loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or any other source of radiation, and to mitigate the consequences of such events if they were to occur. The standards apply to facilities and activities that give rise to radiation risks, including nuclear installations, the use of radiation and radioactive sources, the transport of radioactive material and the management of radioactive waste.

Safety measures and security measures¹ have in common the aim of protecting human life and health and the environment. Safety measures and security measures must be designed and implemented in an integrated manner so that security measures do not compromise safety and safety measures do not compromise security.

The IAEA safety standards reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from harmful effects of ionizing radiation. They are issued in the IAEA Safety Standards Series, which has three categories (see Fig. 1).

Safety Fundamentals

Safety Fundamentals present the fundamental safety objective and principles of protection and safety, and provide the basis for the safety requirements.

Safety Requirements

An integrated and consistent set of Safety Requirements establishes the requirements that must be met to ensure the protection of people and the environment, both now and in the future. The requirements are governed by the objective and principles of the Safety Fundamentals. If the requirements are not met, measures must be taken to reach or restore the required level of safety. The format and style of the requirements facilitate their use for the establishment, in a harmonized manner, of a national regulatory framework. Requirements, including numbered ‘overarching’ requirements, are expressed as ‘shall’ statements. Many requirements are not addressed to a specific party, the implication being that the appropriate parties are responsible for fulfilling them.

¹ See also publications issued in the IAEA Nuclear Security Series.

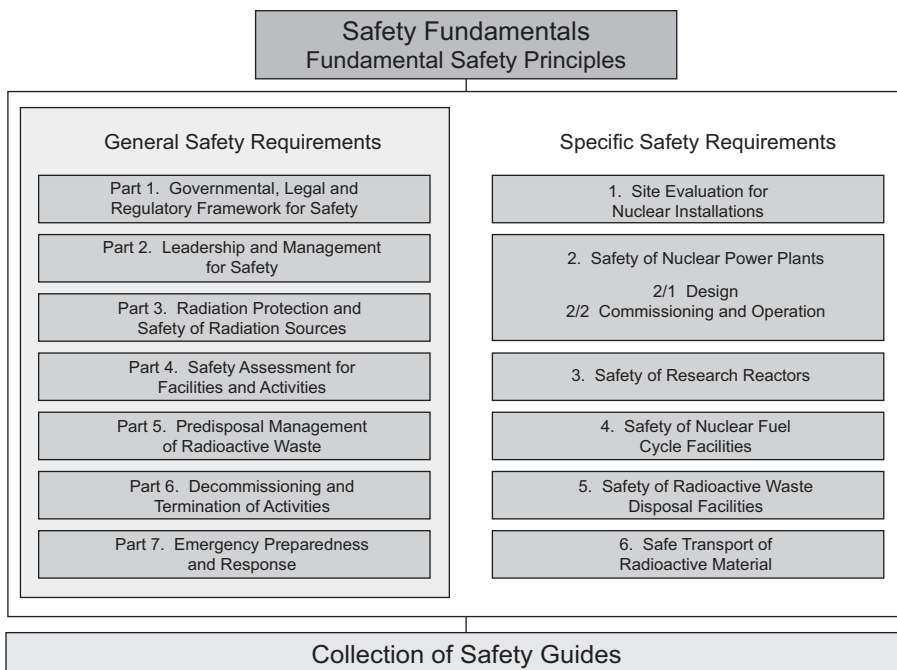


FIG. 1. The long term structure of the IAEA Safety Standards Series.

Safety Guides

Safety Guides provide recommendations and guidance on how to comply with the safety requirements, indicating an international consensus that it is necessary to take the measures recommended (or equivalent alternative measures). The Safety Guides present international good practices, and increasingly they reflect best practices, to help users striving to achieve high levels of safety. The recommendations provided in Safety Guides are expressed as ‘should’ statements.

APPLICATION OF THE IAEA SAFETY STANDARDS

The principal users of safety standards in IAEA Member States are regulatory bodies and other relevant national authorities. The IAEA safety standards are also used by co-sponsoring organizations and by many organizations that design, construct and operate nuclear facilities, as well as organizations involved in the use of radiation and radioactive sources.

The IAEA safety standards are applicable, as relevant, throughout the entire lifetime of all facilities and activities — existing and new — utilized for peaceful purposes and to protective actions to reduce existing radiation risks. They can be used by States as a reference for their national regulations in respect of facilities and activities.

The IAEA's Statute makes the safety standards binding on the IAEA in relation to its own operations and also on States in relation to IAEA assisted operations.

The IAEA safety standards also form the basis for the IAEA's safety review services, and they are used by the IAEA in support of competence building, including the development of educational curricula and training courses.

International conventions contain requirements similar to those in the IAEA safety standards and make them binding on contracting parties. The IAEA safety standards, supplemented by international conventions, industry standards and detailed national requirements, establish a consistent basis for protecting people and the environment. There will also be some special aspects of safety that need to be assessed at the national level. For example, many of the IAEA safety standards, in particular those addressing aspects of safety in planning or design, are intended to apply primarily to new facilities and activities. The requirements established in the IAEA safety standards might not be fully met at some existing facilities that were built to earlier standards. The way in which IAEA safety standards are to be applied to such facilities is a decision for individual States.

The scientific considerations underlying the IAEA safety standards provide an objective basis for decisions concerning safety; however, decision makers must also make informed judgements and must determine how best to balance the benefits of an action or an activity against the associated radiation risks and any other detrimental impacts to which it gives rise.

DEVELOPMENT PROCESS FOR THE IAEA SAFETY STANDARDS

The preparation and review of the safety standards involves the IAEA Secretariat and five safety standards committees, for emergency preparedness and response (EPReSC) (as of 2016), nuclear safety (NUSSC), radiation safety (RASSC), the safety of radioactive waste (WASSC) and the safe transport of radioactive material (TRANSSC), and a Commission on Safety Standards (CSS) which oversees the IAEA safety standards programme (see Fig. 2).

All IAEA Member States may nominate experts for the safety standards committees and may provide comments on draft standards. The membership of

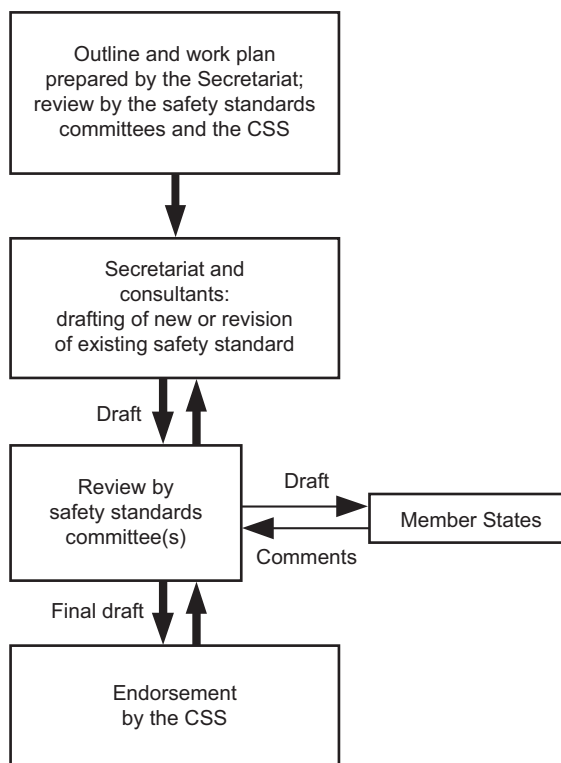


FIG. 2. The process for developing a new safety standard or revising an existing standard.

the Commission on Safety Standards is appointed by the Director General and includes senior governmental officials having responsibility for establishing national standards.

A management system has been established for the processes of planning, developing, reviewing, revising and establishing the IAEA safety standards. It articulates the mandate of the IAEA, the vision for the future application of the safety standards, policies and strategies, and corresponding functions and responsibilities.

INTERACTION WITH OTHER INTERNATIONAL ORGANIZATIONS

The findings of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the recommendations of international expert bodies, notably the International Commission on Radiological Protection

(ICRP), are taken into account in developing the IAEA safety standards. Some safety standards are developed in cooperation with other bodies in the United Nations system or other specialized agencies, including the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme, the International Labour Organization, the OECD Nuclear Energy Agency, the Pan American Health Organization and the World Health Organization.

INTERPRETATION OF THE TEXT

Safety related terms are to be understood as defined in the IAEA Safety Glossary (see <http://www-ns.iaea.org/standards/safety-glossary.htm>). Otherwise, words are used with the spellings and meanings assigned to them in the latest edition of The Concise Oxford Dictionary. For Safety Guides, the English version of the text is the authoritative version.

The background and context of each standard in the IAEA Safety Standards Series and its objective, scope and structure are explained in Section 1, Introduction, of each publication.

Material for which there is no appropriate place in the body text (e.g. material that is subsidiary to or separate from the body text, is included in support of statements in the body text, or describes methods of calculation, procedures or limits and conditions) may be presented in appendices or annexes.

An appendix, if included, is considered to form an integral part of the safety standard. Material in an appendix has the same status as the body text, and the IAEA assumes authorship of it. Annexes and footnotes to the main text, if included, are used to provide practical examples or additional information or explanation. Annexes and footnotes are not integral parts of the main text. Annex material published by the IAEA is not necessarily issued under its authorship; material under other authorship may be presented in annexes to the safety standards. Extraneous material presented in annexes is excerpted and adapted as necessary to be generally useful.

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1. INTRODUCTION

BACKGROUND

1.1. This IAEA Safety Requirements publication is governed by the fundamental safety objective and the fundamental safety principles established in the IAEA Safety Standards publication Fundamental Safety Principles (SF-1) [1]. In particular, this publication addresses Principle 9, which is concerned with the arrangements that must be made for preparedness and response for a nuclear or radiological emergency [1].

1.2. This publication also allows for consistency with Essential Element No. 11 of the IAEA Nuclear Security Fundamentals [2], which is concerned with the planning for, preparedness for and response to a nuclear security event. It therefore addresses the emergency arrangements that must be in place irrespective of the initiator of the emergency, which could be a natural event, a human error, a mechanical or other failure, or a nuclear security event.

1.3. In 2002, the IAEA published the Safety Requirements publication, Preparedness and Response for a Nuclear or Radiological Emergency (GS-R-2)¹, jointly sponsored by seven international organizations (the Food and Agriculture Organization of the United Nations (FAO), the IAEA, the International Labour Organization (ILO), the OECD Nuclear Energy Agency (OECD/NEA), the Pan American Health Organization (PAHO), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the World Health Organization (WHO)). This Safety Requirements publication is a revised edition of IAEA Safety Standards Series No. GS-R-2, updated to take into account developments and experience gained since 2002. In the revision process, due consideration has been given to — but was not limited to — experience gained from the response to the accident at the Fukushima Daiichi nuclear power plant and to recommendations of the International Commission on Radiological Protection (ICRP) [3]. The IAEA Safety Guides Criteria for Use in Preparedness

¹ FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-R-2, IAEA, Vienna (2002).

and Response for a Nuclear or Radiological Emergency (GSG-2) [4] and Arrangements for Preparedness for a Nuclear or Radiological Emergency (GS-G-2.1) [5] elaborate on the requirements established in GS-R-2 and provide recommendations and guidance on their implementation. In addition, Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material (TS-G-1.2 (ST-3)) [6] provides guidance on planning and preparing for emergency response to transport accidents involving radioactive material.

1.4. This Safety Requirements publication addresses the requirements for preparedness and response for a nuclear or radiological emergency (including requirements for the transition to an existing exposure situation). Other Safety Requirements publications refer to and are consistent with these requirements in relation to emergency preparedness and response.

1.5. The response to a nuclear or radiological emergency may involve many national organizations (e.g. the operating organization and response organizations at the local, regional and national levels) as well as international organizations. The functions of many of these organizations may be the same for the response to a nuclear or radiological emergency as for the response to a conventional emergency. However, the response to a nuclear or radiological emergency might also involve specialized agencies and technical experts. Therefore, in order to be effective, the response to a nuclear or radiological emergency has to be well coordinated, and emergency arrangements have to be appropriately integrated with arrangements for the response to a conventional emergency and with the response measures for a nuclear security event.

1.6. Safety measures and security measures have in common the aim of protecting human life and health and protecting the environment. Paragraph 1.10 of Ref. [1] states that “Safety measures and security measures must be designed and implemented in an integrated manner so that security measures do not compromise safety and safety measures do not compromise security.” This emphasizes the importance of effective coordination between safety measures and security measures in relation to the response to a nuclear or radiological emergency.

1.7. This publication also provides guidance for (1) preparedness and response for a nuclear or radiological emergency by the relevant international organizations and (2) the inter-agency coordination performed through the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE).

1.8. It is assumed that States applying these requirements have in place an infrastructure for the purpose of regulating the safety of facilities and activities that could pose radiation risks. This includes laws and regulations governing the safe operation of facilities and the safe conduct of activities, and an independent regulatory body with responsibilities for establishing and enforcing rules for safe operation and safe conduct. In this context, the IAEA has issued General Safety Requirements publications on the Governmental, Legal and Regulatory Framework for Safety (GSR Part 1) [7] and on Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (GSR Part 3) [8].

1.9. In addition, it is assumed that States applying these requirements have in place an infrastructure for the purpose of regulating the nuclear security of nuclear material and other radioactive material, associated facilities and associated activities, as well as nuclear security measures for nuclear material and other radioactive material out of regulatory control. This also includes an independent regulatory body as well as other competent authorities with responsibilities for regulating nuclear security. In this context, IAEA Nuclear Security Series publications [9–11] provide recommendations.

OBJECTIVE

1.10. The present publication establishes the requirements for an adequate level of preparedness and response for a nuclear or radiological emergency. The application of these requirements is also intended to mitigate the consequences of a nuclear or radiological emergency if such an emergency arises despite all efforts made to prevent it.

1.11. The fulfilment of these requirements will contribute to the harmonization worldwide of arrangements for preparedness and response for a nuclear or radiological emergency.

1.12. These requirements are intended to be applied by the government at the national level by means of adopting legislation and establishing regulations, and by making other arrangements, including assigning responsibilities (e.g. to the operating organization or the operating personnel of a facility or an activity, local or national officials, response organizations or the regulatory body) and verifying their effective fulfilment.

1.13. The requirements are also intended for use by response organizations, operating organizations and the regulatory body in respect of preparedness and response for a nuclear or radiological emergency, as well as by authorities with responsibilities for emergency preparedness and response at the local and regional level and, as appropriate, by relevant international organizations at the international level.

SCOPE

1.14. The requirements apply for preparedness and response for a nuclear or radiological emergency in relation to all those facilities and activities, as well as sources, with the potential for causing radiation exposure, environmental contamination or concern on the part of the public warranting protective actions and other response actions.

1.15. The requirements also apply to preparedness and response for a nuclear or radiological emergency in relation to off-site jurisdictions that may need to take protective actions and other response actions.

1.16. The requirements apply for preparedness and response for a nuclear or radiological emergency irrespective of the initiator of the emergency, whether the emergency follows a natural event, a human error, a mechanical or other failure, or a nuclear security event². The requirements do not cover preparedness for, or response measures that are specific to, nuclear security events, for which recommendations are provided in Refs [9–11]. Such response measures include activities for the identification, collection, packaging and transport of evidence contaminated with radionuclides, nuclear forensics and related actions in the context of investigation into the circumstances surrounding a nuclear security event. The requirements established here do provide for a coordinated and integrated approach to preparedness and response for a nuclear or radiological emergency arising from a nuclear security event that necessitates protective actions and other response actions to be taken for protection of members of the public, workers and emergency workers, helpers in an emergency and patients.

² A ‘nuclear security event’ is an event that has potential or actual implications for nuclear security that must be addressed. Such events include criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities or associated activities. A nuclear security event, for example, sabotage of a nuclear facility or detonation of a radiological dispersal device, may give rise to a nuclear or radiological emergency.

STRUCTURE

1.17. This publication comprises six sections. Section 2 provides for the interpretation and entry into force of the requirements. Section 3 establishes the goals of emergency preparedness and response. Section 4 establishes the general requirements that are to be met before effective emergency arrangements can be made, defines by using a graded approach the emergency preparedness categories for which the requirements have been established and elaborates on the development of a protection strategy on the basis of the hazards assessed. Section 5 establishes the requirements to be met for performing the functions critical for an effective emergency response. Section 6 establishes requirements for the infrastructure necessary to develop and maintain adequate arrangements for preparedness. Guidance values for restricting exposure of emergency workers in a nuclear or radiological emergency are provided in Appendix I. Generic criteria for use in emergency preparedness and response are provided in Appendix II. Annex I presents the applicability of paragraphs in the text for each emergency preparedness category.

2. INTERPRETATION, RESOLUTION OF CONFLICTS AND ENTRY INTO FORCE

DEFINITIONS

2.1. Terms used in this publication have the meanings given under ‘Definitions’ on page 79. If not otherwise defined under Definitions, terms are used as defined in the IAEA Safety Glossary, 2007 Edition [12].

INTERPRETATION

2.2. Except as specifically authorized by the statutory governing body of a Sponsoring Organization, no interpretation of this standard by any officer or employee of the Sponsoring Organization other than a written interpretation by the Director General of the Sponsoring Organization shall be binding on the Sponsoring Organization.

RESOLUTION OF CONFLICTS

2.3. The requirements of this standard are established in addition to and not in place of other applicable requirements, such as those of relevant binding conventions and national laws and regulations.

2.4. In cases of conflict between the requirements of this standard and other applicable requirements, the government or the regulatory body, as appropriate, shall determine which requirements are to be enforced.

2.5. Nothing in this standard shall be construed as restricting any actions that may otherwise be necessary for protection and safety or as relieving the parties referred to in this standard from complying with applicable laws and regulations.

ENTRY INTO FORCE

2.6. The Secretariat envisages that, for the IAEA's own operations and for those operations assisted by the IAEA, arrangements will be made to meet these requirements within a period of no more than one year from the date of publication of this standard.

2.7. This standard shall come into force within a period of no more than one year from the date of publication of this standard for all the Sponsoring Organizations in accordance with their respective mandates.

2.8. If a State decides to adopt this standard, this standard shall come into force at the time indicated in the formal adoption by that State, and preferably within a period of no more than one year from the date of its publication.

3. GOALS OF EMERGENCY PREPAREDNESS AND RESPONSE

GOAL OF EMERGENCY PREPAREDNESS

3.1. The goal of emergency preparedness is to ensure that an adequate capability is in place within the operating organization and at local, regional and national levels and, where appropriate, at the international level, for an effective

response in a nuclear or radiological emergency. This capability relates to an integrated set of infrastructural elements that include, but are not limited to: authority and responsibilities; organization and staffing; coordination; plans and procedures; tools, equipment and facilities; training, drills and exercises; and a management system.

GOALS OF EMERGENCY RESPONSE

3.2. In a nuclear or radiological emergency, the goals of emergency response are:

- (a) To regain control of the situation and to mitigate consequences;
- (b) To save lives;
- (c) To avoid or to minimize severe deterministic effects;
- (d) To render first aid, to provide critical medical treatment and to manage the treatment of radiation injuries;
- (e) To reduce the risk of stochastic effects;
- (f) To keep the public informed and to maintain public trust;
- (g) To mitigate, to the extent practicable, non-radiological consequences;
- (h) To protect, to the extent practicable, property and the environment;
- (i) To prepare, to the extent practicable, for the resumption of normal social and economic activity.

4. GENERAL REQUIREMENTS

Requirement 1: The emergency management system

The government shall ensure that an integrated and coordinated emergency management system for preparedness and response for a nuclear or radiological emergency is established and maintained.

4.1. The government shall ensure that an emergency management system is established and maintained on the territories of and within the jurisdiction of the State for the purposes of emergency response to protect human life, health, property and the environment in the event of a nuclear or radiological emergency.

4.2. The emergency management system shall be designed to be commensurate with the results of the hazard assessment (see paras 4.18–4.26) and shall enable an effective emergency response to reasonably foreseeable events (including very low probability events).

4.3. The emergency management system shall be integrated, to the extent practicable, into an all-hazards emergency management system (see paras 5.6 and 5.7).

4.4. The government shall ensure the coordination of and consistency of national emergency arrangements with the relevant international emergency arrangements³.

Requirement 2: Roles and responsibilities in emergency preparedness and response

The government shall make provisions to ensure that roles and responsibilities for preparedness and response for a nuclear or radiological emergency are clearly specified and clearly assigned.

General

4.5. The government shall make adequate preparations to anticipate, prepare for, respond to and recover from a nuclear or radiological emergency at the operating organization, local, regional and national levels, and also, as appropriate, at the international level. These preparations shall include adopting legislation and establishing regulations for effectively governing the preparedness and response for a nuclear or radiological emergency at all levels (see para. 1.12).

4.6. The government shall ensure that arrangements are in place for effectively governing the provision of prompt and adequate compensation of victims for damage due to a nuclear or radiological emergency.

³ Arrangements set under the Assistance Convention and under the Early Notification Convention [13] are examples of international emergency arrangements that are relevant for States Parties to these Conventions.

4.7. The government shall ensure that all roles and responsibilities for preparedness and response for a nuclear or radiological emergency are clearly allocated in advance among operating organizations, the regulatory body and response organizations⁴.

4.8. The government shall ensure that response organizations, operating organizations and the regulatory body have the necessary human, financial and other resources, in view of their expected roles and responsibilities and the assessed hazards, to prepare for and to deal with both radiological and non-radiological consequences of a nuclear or radiological emergency, whether the emergency occurs within or beyond national borders.

4.9. The government shall ensure that operating organizations, response organizations and the regulatory body establish, maintain and demonstrate leadership in relation to preparedness and response for a nuclear or radiological emergency [14].

Coordinating mechanism

4.10. The government shall establish a national coordinating mechanism⁵ to be functional at the preparedness stage, consistent with its emergency management system, with the following functions:

- (a) To ensure that roles and responsibilities are clearly specified and are understood by operating organizations, response organizations and the regulatory body (see para. 4.7);
- (b) To coordinate the hazard assessment within the State (see paras 4.18–4.26) and periodic reviews of the assessed hazards (see para. 4.25);
- (c) To coordinate and ensure consistency between the emergency arrangements of the various response organizations, operating organizations and the regulatory body at local, regional and national levels under the all-hazards approach, including those arrangements for response to relevant nuclear security events, and, as appropriate, those arrangements of other States and of international organizations;

⁴ This also includes the allocation of roles and responsibilities, as appropriate, among members of the government.

⁵ The mechanism for ensuring coordination may differ for different tasks. It may involve an existing body or a newly established body (e.g. a committee consisting of representatives from different organizations and bodies) that has been given the authority to ensure the necessary coordination.

- (d) To ensure consistency among requirements for emergency arrangements, contingency plans and security plans of operating organizations specified by the regulatory body and by other competent authorities with responsibilities for regulating nuclear security, as relevant, and to ensure that these arrangements and plans are integrated (see para. 4.14(b));
- (e) To ensure that appropriate emergency arrangements are in place, both on the site and off the site, as appropriate, in relation to facilities and activities under regulatory control, both within the State and, as relevant, beyond its borders, and also for sources that are not under regulatory control⁶;
- (f) To coordinate arrangements made for enforcing compliance with the national requirements for emergency preparedness and response as established by legislation and regulations (see paras 1.12, 4.5 and 4.12);
- (g) To coordinate a subsequent analysis of an emergency, including analysis of the emergency response (see Requirement 19);
- (h) To ensure that appropriate and coordinated programmes of training and exercises are in place and implemented, and that training and exercises are systematically evaluated;
- (i) To coordinate effective communication with the public in preparedness for a nuclear or radiological emergency.

Regulatory body

4.11. The government shall ensure that arrangements for preparedness and response to a nuclear or radiological emergency for facilities and activities under the responsibility of the operating organization are dealt with through the regulatory process.

4.12. The regulatory body is required to establish or adopt regulations and guides to specify the principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based [7]. These regulations and guides shall include principles, requirements and associated criteria for emergency preparedness and response for the operating organization (see also paras 1.12 and 4.5).

⁶ Examples of sources not under regulatory control are sources that have been abandoned, lost or stolen and sources under governmental control but not under regulatory control. Examples also include radioactive material that is out of regulatory control as discussed in Ref. [11].

4.13. The regulatory body shall require that arrangements for preparedness and response for a nuclear or radiological emergency be in place for the on-site area for any regulated facility or activity that could necessitate emergency response actions. Appropriate emergency arrangements shall be established by the time the source is brought to the site, and complete emergency arrangements shall be in place before the commencement of operation of the facility or commencement of the activity. The regulatory body shall verify compliance with the requirements for such arrangements.

4.14. Before commencement of operation of the facility or commencement of the activity, the regulatory body shall ensure, for all facilities and activities under regulatory control that could necessitate emergency response actions, that the on-site emergency arrangements:

- (a) Are integrated with those of other response organizations, as appropriate;
- (b) Are integrated with contingency plans in the context of Ref. [9] and with security plans in the context of Ref. [10];
- (c) Provide, to the extent practicable, assurance of an effective response to a nuclear or radiological emergency.

4.15. The regulatory body shall ensure that the operating organization is given sufficient authority to promptly take necessary protective actions on the site in response to a nuclear or radiological emergency that could result in off-site consequences.

Operating organization

4.16. The operating organization shall establish and maintain arrangements for on-site preparedness and response for a nuclear or radiological emergency for facilities or activities under its responsibility, in accordance with the applicable requirements (see paras 1.12, 4.5 and 4.12).