UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

(FSME-13-078, August, Other, IAEA Guide DS457)

August 14, 2013

ALL AGREEMENT AND NON-AGREEMENT STATES
STATE LIAISON OFFICERS

OPPORTUNITY TO REVIEW AND COMMENT ON INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA) DRAFT SAFETY GUIDE DS457, "PREPAREDNESS AND RESPONSE FOR A NUCLEAR OR RADIOLOGICAL EMERGENCY" (FSME-13-078)

Purpose: To provide States with the opportunity to review and comment on the Draft Safety Guide DS457, "Preparedness and Response for a Nuclear or Radiological Emergency"[1,2,3] by October 4, 2013.

Background: The objective of Draft Safety Guide DS457 is to establish requirements for an adequate level of preparedness for, and response to, a nuclear or radiological emergency with the aim of mitigating its consequences. The draft safety guide is a revision of the current Safety Requirements publication entitled *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series no. GS-R-2).

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1 This information request has been approved by OMB 3150-0029, expiration 11/30/2013. The estimated burden per response to comply with this voluntary collection is approximately 8 hours. Send comments regarding the burden estimate to the Records and Information Services Branch (T-5F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects.resource(ãnrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0200), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

2 This information request has been approved by OMB 3150-0200, expiration 09/30/2015. The estimated burden per response to comply with this voluntary collection is approximately 8 hours. Send comments regarding the burden estimate to the Records and Information Services Branch (T-5F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects.resource(ãnrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0200), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

3 This information request has been approved by OMB 3150-0163, expiration 03/31/2016. The estimated burden per response to comply with this voluntary collection is approximately 8 hours. Send comments regarding the burden estimate to the Records and Information Services Branch (T-5F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects.resource(ãnrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0200), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

Discussion: NRC has been provided the Draft Safety Guide DS457, "Preparedness and Response for a Nuclear or Radiological Emergency" for Member State review and comment. Enclosed are the following documents: (1) communication from the IAEA concerning this document and its review, including an “Explanatory Note” regarding this document; (2) Draft Safety Guide, DS457, "Preparedness and Response for a Nuclear or Radiological Emergency" and (3) a blank template for comment preparation.

Please provide comments to one of the individuals listed in the Point of Contact below using the IAEA comment template provided in Enclosure 3. If you have any questions regarding this correspondence, please contact me or the individual named below.

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/RA/

Brian J. McDermott, Director
Division of Materials Safety and State Agreements
Office of Federal and State Materials
and Environmental Management Programs

Enclosures:
1. Explanatory Note from IAEA
2. DS457
3. IAEA Comment Template

IAEA

Atoms for Peace

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In reply please refer to: J5.03.1
Dial directly to extension: (+431) 2600-22028

The Secretariat of the International Atomic Energy Agency (IAEA) presents its compliments to the Ministries of Foreign Affairs of its Member States and has the honour to request that they draw the attention of the appropriate governmental authorities to the following draft safety standard:

Preparedness and Response for a Nuclear or Radiological Emergency
(DS457)

Member States and their experts are hereby provided with an opportunity to review and evaluate this draft safety standard, which is available online at:

http://www-ns.iaea.org/standards/documents/draft-ms-posted.asp

A hard copy of the draft text will be sent out upon request.

Any proposed changes to this draft text resulting from the review by Member States will be taken into account in the finalization of the safety standard.

Member States are kindly requested to provide comments on the draft text following the guidance given in the attached Explanatory Note.

The Secretariat of the International Atomic Energy Agency avails itself of this opportunity to assure the Ministries of Foreign Affairs of its Member States of its highest consideration.

2013-07-18

Enclosures: Explanatory Note

Form for Comments

Statement by the Commission on Safety Standards

Explanatory Note

Preparedness and Response for a Nuclear or Radiological Emergency (DS457)

The draft text for review, entitled ***Preparedness and Response for a Nuclear or Radiological Emergency***, was prepared as a draft Safety Requirements publication to be issued in the IAEA Safety Standards Series and has already been reviewed through consultants' meetings, as well as by the Radiation Safety Standards Committee (RASSC), the Nuclear Safety Standards Committee (NUSSC), the Transport Safety Standards Committee (TRANSSC), the Waste Safety Standards Committee (WASSC) and the Nuclear Security Guidance Committee (NSGC).

The objective of this draft text, as accepted by the Commission on Safety Standards (CSS), is to establish requirements for an adequate level of preparedness for, and response to, a nuclear or radiological emergency with the aim of mitigating its consequences. The draft text is a revision of the current Safety Requirements publication entitled *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GS-R-2, Vienna, 2002) that takes into account: (i) the experience gained during response to emergencies that have occurred since 2002, including, but not limited to, the Fukushima Daiichi nuclear accident, as well as the lessons identified from exercises conducted in the same time period; (ii) the feedback obtained from Member States applying requirements established in GS-R-2 since its publication; (iii) the latest developments as well as recommendations of the International Commission on Radiological Protection (ICRP); and (iv) the experience of relevant international organizations.

Comments are requested in relation to:

- Relevance and usefulness — Are the stated objectives appropriate, and are they met by the draft text?
- Scope and completeness — Is the stated scope appropriate, and is it adequately covered by the draft text?
- Quality and clarity — Do the requirements/guidance in the draft text represent the current consensus among specialists in the field, and are they expressed clearly and coherently?

Comments of an editorial nature will be considered; however, it should be noted that the draft text will be comprehensively edited by the IAEA Secretariat.

Any comments should be made in English, should refer to the relevant paragraph number in the draft text being reviewed, and should propose alternative text where appropriate. Please use the attached Form for Comments to record all comments.

The responsible IAEA officer is Ms Elena Buglova of the Incident and Emergency Centre, Department of Nuclear Safety and Security, who may be contacted for further information in connection with this subject by telephone at: +43 1 2600 22738 or via email at: E.Buglova@iaea.org.

Any comments should be sent through the established official channels to the responsible IAEA officer by **20 November 2013**.

Form for Comments

***Preparedness and Response for a Nuclear or Radiological Emergency* (DS457)**

COMMENTS BY REVIEWER Reviewer: Page.... of.... Country/Organization: Date:				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

Statement by the Commission on Safety Standards

Publications in the IAEA Safety Standards Series are prepared and reviewed in accordance with a uniform process. To this end, the Commission on Safety Standards (CSS) and four committees with harmonized terms of reference — the Nuclear Safety Standards Committee (NUSSC), the Radiation Safety Standards Committee (RASSC), the Waste Safety Standards Committee (WASSC) and the Transport Safety Standards Committee (TRANSSC) — were established in 1996. The CSS has a special overview role with regard to the IAEA's safety standards and provides advice to the Director General on the IAEA's overall programme with regard to regulatory aspects of safety.

The uniform preparation and review process involves organizing expert group meetings; arranging at different stages of preparation for the internal review of draft texts; submitting the texts to the relevant Committee(s) for review; submitting draft texts to the IAEA's Member States for comment; and submitting the approved final draft of the safety standard[1] for endorsement by the CSS before publication.

The CSS stresses the importance of Member States' comments to the preparation and review process for safety standards. Publications in the IAEA Safety Standards Series not only should be of the requisite quality but also should represent the consensus view of the Member States and should address the issues of importance to the Member States. While the CSS, the Committees and the Secretariat strive to provide safety standards that satisfy these criteria, the review of draft standards by experts in the Member States is an essential stage in obtaining the broadest possible technical consensus and the highest possible quality and relevance.

Member States are also encouraged to provide the IAEA with feedback on their use of the safety standards. The status of safety standards extant and in preparation can be seen on the IAEA's website, where there are also links to electronic files for existing publications, including those in other official languages.[2] The responsible IAEA officer is Mr Dominique Delattre, Head of the Safety Standards and Application Unit of the Department of Nuclear Safety and Security. He may be contacted for further information in connection with this subject by telephone at: + 43 1 2600 22696 or via email at: D.Delattre@iaea.org.

[1] Safety Guides are published under the authority of the Director General. Safety Fundamentals and Safety Requirements publications require the approval of the Board of Governors, after endorsement by the CSS.

[2] See http://www-ns.iaea.org/committees/files/CSS/205/status.pdf.

Date: 03 July 2013

Preparedness and Response for a Nuclear or Radiological Emergency

Jointly sponsored by
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[logo] [logo] [logo] [logo] [logo] [logo] [logo]
[[To be updated accordingly.]]

General Safety Requirements Part 7
No. GSR Part 7

Draft DS457

Status: Draft as approved for submission to Member States for comments **Action:** Soliciting comments by Member States Comments due by 20 November 2013	

IAEA
International Atomic Energy Agency

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 at 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 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 and protection 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 **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** consists of reports designed to encourage and assist research on, and development and practical application of, nuclear energy for peaceful uses. The information is presented in guides, reports on the status of technology and advances, and best practices for peaceful uses of nuclear energy. The series complements the IAEA's safety standards, and provides detailed guidance, experience, good practices and 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

IAEA SAFETY STANDARDS SERIES No. GSR Part 7

PREPAREDNESS AND RESPONSE FOR A NUCLEAR OR RADIOLOGICAL EMERGENCY

GENERAL SAFETY REQUIREMENTS

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

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[[To be updated accordingly.]]

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 2015

Draft DS457

Rev 5.0

03/07/2013

PREFACE BY THE JOINT SPONSORING ORGANIZATIONS

It is recognized among organizations responsible for emergency management (including those responsible for the management of conventional emergencies) that good preparedness in advance of an emergency can substantially improve the emergency response. Moreover, one of the most important features of the preparations is that they are integrated among the different bodies involved, ensuring 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') adopted in 1986 place specific obligations on the Parties and on the IAEA. The practical implementation of the various articles of these conventions as well as the fulfilment of some obligations of the IAEA (under the Convention on Nuclear Safety, Legal Series No. 16, 1994, Article 16, and the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, INFCIRC/546, 1997, Article 25) warrant appropriate requirements for emergency management.

In March 2002, the IAEA's Board of Governors approved a Safety Requirements publication, Preparedness and Response for a Nuclear or Radiological Emergency (IAEA Safety Standards Series No. GS-R-2), jointly sponsored by seven international organizations (FAO, IAEA, ILO, OECD/NEA, PAHO, OCHA and WHO), which established the requirements for efficient preparedness and response for a nuclear or radiological emergency in any State. Since its publication in 2002, Member States were using these Safety Requirements publication in establishing or enhancing their emergency preparedness and response arrangements and capabilities. The IAEA General Conference, in resolution GC(56)/RES/9, emphasized "the importance for all Member States of implementing emergency preparedness and response programmes, including strengthening mechanisms to facilitate timely international information exchange during a nuclear emergency, and requests the IAEA, 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 IAEA's Safety Standards".

To ensure the coordinated and consistent emergency preparedness and response arrangements at the international level, the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE), as an interagency co-ordination mechanism, co-ordinates emergency preparedness and response arrangements of the relevant international intergovernmental organizations (international organizations). The IACRNE also works towards coordinated and consistent international standards on emergency preparedness and response and their practical implementation in States and relevant international organizations.

The IAEA, relevant international organizations and Member States reviewed the IAEA Safety Requirements publication No. GS-R-2 based on lessons identified in exercises and in response to emergencies that occurred since its publication in 2002 (including the accident at the TEPCO's Fukushima Daiichi Nuclear Power Plant in 2011). The revised IAEA Safety Requirements publication No. GS-R-2 is hereby published as General Safety Requirements Part 7 in the IAEA Safety Standards Series.

[[A paragraph on Sponsoring Organizations to be inserted accordingly]]

These Safety Requirements are binding on the IAEA Secretariat in relation to its own operations and on States in relation to operations assisted by the IAEA.

These Safety Requirements are also to be applied by Sponsoring Organizations in accordance with their respective mandates and the Joint Radiation Emergency Management Plan of the International Organizations (EPR - Joint Plan). Other international organizations irrespective of whether they are members of the IACRNE are encouraged to consider these Safety Requirements in their own emergency management arrangements.

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

CONTENTS

1. INTRODUCTION

BACKGROUND

1.1. This publication in the IAEA Safety Standards Series applies the Fundamental Safety Objective and Safety Principles of Fundamental Safety Principles the IAEA Safety Fundamentals [1].

1.2. This publication addresses the fundamental safety principle, Principle 9, concerned with ensuring that arrangements are made for preparedness and response for a nuclear or radiological emergency [1]. This publication also provides for consistency with the Nuclear Security Fundamentals, Essential Element 11, concerned with ensuring planning for, preparedness for, and response to a nuclear security event [2]. It therefore addresses the emergency arrangements to be in place irrespective of the initiator of the emergency, whether due to a natural event, human error, 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, jointly sponsored by seven international organizations (FAO, IAEA, ILO, OECD/NEA, PAHO, OCHA and WHO)[1]. The present Safety Requirements publication is a revised and updated version of Safety Requirements Series No. GS-R-2 to take account of developments and experience gained since 2002 with due consideration, but not limited to, the experience gained in the response to the accident at the TEPCO's Fukushima Daiichi Nuclear Power Plant. The publications [3] and [4] elaborate on the requirements established in this publication and provide guidance on their implementation.

1.4. This publication is the Safety Requirements publication in the IAEA Safety Standards Series addressing the requirements for preparedness and response for a nuclear or radiological emergency including the transition from an emergency exposure situation to an existing exposure situation. All other Safety Requirements publications in the IAEA Safety Standards Series reference 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 local, regional and national level) and international organizations. The functions of many of these organizations would be the same for a nuclear or radiological emergency as for 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 must be well

[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).

coordinated and emergency arrangements must be appropriately integrated with those for a conventional emergency and those for a nuclear security event.

1.6. Both safety measures and security measures have in common the aim of protecting human life and health and the environment. Safety 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[2] [1].

1.7. This publication also provides guidance for (1) preparedness and response for a nuclear and radiological emergency for the relevant international organizations and (2) the inter-agency coordination within 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 their safe operation and an independent regulatory body with responsibilities for establishing rules for safe operation and for enforcing them. In this context, the IAEA has issued a General Safety Requirements publication on the governmental, legal and regulatory framework for safety [5]. 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. In this context, IAEA Nuclear Security Series [6-8] provide recommendations.

OBJECTIVE

1.9. The present publication establishes the requirements for an adequate level of preparedness and response for a nuclear or radiological emergency. Their implementation is intended to mitigate the consequences of a nuclear or radiological emergency.

1.10. The fulfilment of these requirements will also contribute to the harmonization of arrangements for preparedness and response for a nuclear or radiological emergency worldwide as such an emergency may be a transnational.

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

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[2] An example is the operating organization's contingency plan that includes measures to respond to thefts and acts of sabotage at a nuclear facility. The contingency plan for the nuclear facility needs to be compatible with the emergency arrangements developed by the operating organization for the same facility [6].

SCOPE

1.12. The requirements apply to all those facilities and activities with the potential for causing radiation exposure, environmental contamination or public concern warranting protective actions and other response actions in a nuclear or radiological emergency, and that are:

(a) Used in a State that chooses to adopt the requirements or that requests any of the Sponsoring Organizations to provide for the application of the requirements;

(b) Used by States with the assistance of Sponsoring Organizations in compliance with applicable national and international legal instruments;

(c) Used by the IAEA or which involve the use of materials, services, equipment, facilities and non-published information made available by the IAEA or at its request or under its control or supervision; or

(d) Used under any bilateral or multilateral arrangement whereby the parties request the IAEA to provide for the application of the requirements.

1.13. The requirements also apply to the off-site jurisdictions that may need to take protective actions and other response actions in a State that adopts the requirements.

1.14. The requirements apply to actions in preparedness and response for emergencies involving ionizing radiation only. The requirements do not apply to preparedness or response for emergencies involving hazards associated with non-ionizing radiation such as microwave, ultraviolet or infrared radiation.

1.15. The requirements apply for preparedness and response for a nuclear or radiological emergency irrespective of the initiator of the emergency, whether due to a natural event, human error, mechanical or other failure or a nuclear security event. They do not cover preparedness for, or response measures that are specific to, nuclear security events, for which separate recommendations are provided in Refs [6-8]. Such response measures include activities related to instruments alarms, information alerts, management of a crime scene, nuclear forensics and related actions that would be taken in relation to a nuclear security event. However, the requirements 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 public, workers, emergency workers and patients.

STRUCTURE

1.16. This publication comprises five main sections. Section 2 provides for the interpretation and application of these safety requirements. Section 3 establishes the goals of emergency preparedness and response, together with the principles for taking protective actions and other response actions that are applicable for meeting these goals. Section 4 establishes the general requirements that must be met

before effective emergency arrangements can be started and defines the emergency preparedness categories for which the requirements have been established using a graded approach. Section 5 provides the requirements for performing the functions critical for an effective emergency response. The requirements for emergency response apply to the performance of critical functions or tasks in a nuclear or radiological emergency. The requirements for emergency preparedness apply to preparations to be made in order to ensure that there is a capability to meet the requirements for response. Section 6 establishes requirements for the infrastructure necessary to develop and maintain adequate preparedness arrangements. Guidance values for restricting exposure of emergency workers and helpers in an emergency are provided in Appendix I. The internationally agreed generic criteria for which protective actions and other response actions are expected to be undertaken in a nuclear or radiological emergency are provided in Appendix II.

2. INTERPRETATION, RESOLUTION OF CONFLICTS AND ENTRY INTO FORCE

DEFINITIONS

2.1. Terms used in this publication have the meanings given under Definitions.

INTERPRETATION

2.2. Except as specifically authorized by the statutory governing body of a relevant 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 will be binding on the Sponsoring Organization.

RESOLUTION OF CONFLICTS

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

2.7. These standards shall come into force one year after the date of their adoption or acknowledgement, as appropriate, by the relevant Sponsoring Organization.

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

GOALS OF EMERGENCY RESPONSE

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

(a) To regain control of the situation;

(b) To prevent or mitigate on-site and off-site consequences;

(c) To avoid or 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 prevent, to the extent practicable, the occurrence of non-radiological consequences;

(g) To keep the public informed;

(h) To protect, to the extent practicable, property and the environment; and

(i) To prepare, to the extent practicable, for the resumption of normal social and economic activity.

GOAL OF EMERGENCY PREPAREDNESS

3.2. The goal of emergency preparedness is to ensure an adequate is capability in place at the operating organization and local, regional, national levels and, where appropriate, international levels for effectively meeting the practical goals for emergency response (see para. 3.1) in the event of a nuclear or radiological emergency for the following infrastructure elements: authority and responsibilities; organization and staff; coordination; plans and procedures; tools, equipment and facilities; training, drills and exercises; and overall management system including a quality management programme.

4. GENERAL REQUIREMENTS

Requirement 1: Emergency management system

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

4.1. The government shall ensure that an emergency management system[1] is established and maintained on the territories and within the jurisdiction of the State for the purposes of emergency response to protect human life, health and the environment in the event of a nuclear or radiological emergency.

4.2. The emergency management system shall be commensurate with the results of the hazard assessment (see paras 4.15–4.23) 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 also paras 5.4 and 5.5).

4.4. The government shall ensure the coordination and consistency of its emergency arrangements with international emergency arrangements[2].

4.5. Relevant international organizations shall coordinate their arrangements in preparedness for a nuclear or radiological emergency and their emergency response actions.

Requirement 2: Roles and responsibilities

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

GENERAL

4.6. The government shall make adequate preparations to anticipate, prepare for and respond at local, regional and national levels to nuclear or radiological emergencies and also, as appropriate, at the international level. This shall include adopting legislation and establishing regulations to effectively govern the preparedness and response for a nuclear or radiological emergency at any level (see paras 1.11 and 4.11).

[1] The term ‘management system’ reflects and includes the concept of ‘quality control’ and its evolution through ‘quality assurance’ and ‘quality management system’ (the system for managing quality).

[2] Arrangements set under the Assistance Convention and the Early Notification Convention [9] are examples of these international emergency arrangements.

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 organizations[3].

4.8. The government shall ensure that operating organizations, the regulatory body and response organizations have the necessary resources, considering their expected roles and responsibilities, to deal with radiological and non-radiological consequences of a nuclear or radiological emergency, whether the emergency occurs within or beyond national borders.

COORDINATING MECHANISM

4.9. The government shall establish a national coordinating mechanism, consistent with its emergency management system:

(a) to ensure that roles and responsibilities are clearly allocated and are well understood by operating organizations, response organizations and the regulatory body (see para. 4.7);

(b) to coordinate:

i. the hazard assessment within the State (see paras 4.15–4.23); and

ii. the periodic reviews of the assessed hazards (see para. 4.19);

(c) to coordinate and ensure consistency among the emergency arrangements of the various response organizations and the regulatory body under the all-hazards approach, including those arrangements for response to relevant nuclear security events, and, as appropriate, to coordinate and ensure consistency with those arrangements of other States and of international organizations;

(d) to coordinate and ensure consistency among the emergency arrangements, contingency plans and security plans of operating organizations required by the regulatory body and by other competent authorities with responsibilities for regulating nuclear security, as relevant (see para. 4.13(b));

(e) to ensure that appropriate emergency arrangements are in place, both on-site and off-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 control[4];

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

[4] Examples of sources not under regulatory control are orphan sources and sources under governmental control but not under regulatory control, such as sources in military applications. This also encompasses radioactive material that is out of regulatory control as defined in Ref. [8].

(f) to ensure that arrangements are in place for enforcing compliance with the national requirements for emergency preparedness and response established by legislation, regulations and guides (see paras 4.6 and 4.11);

(g) to coordinate the analysis of an emergency and an emergency response (see para. 5.139);

(h) to ensure that appropriate training and exercise programmes are in place and implemented and that training and exercises are systematically evaluated;

(i) to coordinate:

i. provision of public information in a nuclear or radiological emergency (see para. 5.95); and

ii. the identification of inappropriate actions taken by the public or any other actors in a nuclear or radiological emergency and actions taken promptly to address inappropriate actions (see paras 5.120 and 5.124).

REGULATORY BODY

4.10. The arrangements for preparedness to respond to a nuclear or radiological emergency for facilities and activities under the responsibility of the operating organization shall be dealt with through the regulatory process.

4.11. 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 [5]. These principles, requirements and associated criteria shall include those for preparedness and response for a nuclear or radiological emergency.

4.12. 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 action and shall carry out inspections to verify a compliance with the required arrangements. For a facility in category I, II or III and for an activity in category IV (see para. 4.17), appropriate emergency arrangements shall be established from the time that the source is brought to the site, and complete emergency arrangements shall be ensured before the commencement of operation of the facility or commencement of the activity.

4.13. The regulatory body shall ensure and shall be provided by the operating organization with sufficient assurance, for all facilities and activities under regulatory control, that the emergency arrangements:

(a) are integrated with those of other response organizations as appropriate before the authorization is granted;

(b) are integrated with contingency plans in the context of Ref. [6] and with security plans in the context of Ref. [7];

(c) provide a reasonable assurance of an effective response, in compliance with these requirements, in the event of a nuclear or radiological emergency;

(d) are tested in an exercise before the commencement of operation of a facility or commencement of an activity and thereafter, at suitable intervals.

4.14. The regulatory body shall ensure that the operating organization is given sufficient authority to promptly take protective actions and other response actions on the site in response to a nuclear or radiological emergency.

Requirement 3: Assessment of hazards

The government shall ensure that a hazard assessment is performed to provide a basis for a graded approach to preparedness and response for a nuclear or radiological emergency.

4.15. Identified hazards and potential consequences of an emergency shall provide a basis for establishing arrangements for preparedness and response for a nuclear or radiological emergency. These arrangements shall be commensurate with these hazards and consequences.

4.16. Based on the identified hazards and potential consequences of a nuclear or radiological emergency, protection strategies shall be developed, justified and optimized, following steps elaborated in Ref. [3], for taking effective protective actions and other response actions to avoid or to minimize severe deterministic effects and to reduce the risk of stochastic effects, in accordance with the generic criteria in Appendix II.

4.17. For the purposes of these requirements, assessed hazards are grouped according to the emergency preparedness categories shown in Table I. The five emergency preparedness categories (hereinafter referred to as ‘categories’) in Table I establish the basis for graded approach to be applied in application of these safety requirements and for developing generically justified and optimized arrangements for preparedness and response for a nuclear or radiological emergency.

TABLE I. EMERGENCY PREPAREDNESS CATEGORIES FOR THE PURPOSES OF THESE REQUIREMENTS

Category	Description
I	Facilities, such as nuclear power plants, for which on-site events[a, b] (including those beyond design basis) are postulated that could give rise to severe deterministic effects[c] off the site that warrant precautionary urgent protective actions, urgent or early protective actions and other response actions in accordance with international standards[d], or for which such events have occurred in similar facilities.
II	Facilities, such as some types of research reactors and nuclear reactors used to power vessels, for which on-site events[a, b] are postulated that could give rise to doses to people off the site that warrant urgent or early protective actions and other response actions in accordance with international standards[d], or for which such events have occurred in similar facilities. Category II (as opposed to category I) does not include facilities for which on-site events (including those beyond design basis) are postulated that could give rise to severe deterministic effects off the site, or for which such events have occurred in similar facilities.
III	Facilities, such as industrial irradiation facilities or some medical facilities, for which on-site events[b] are postulated that could warrant protective action and other response actions in accordance with international standards[d] on the site, or for which such events have occurred in similar facilities. Category III (as opposed to category II) does not include facilities for which events are postulated that could warrant urgent and early protective actions off the site, or for which such events have occurred in similar facilities.
IV	Activities and acts that could give rise to a nuclear or radiological emergency that could warrant protective actions and other response actions in accordance with international standards[d] in an unforeseen location. These activities and acts include: (a) transport of nuclear or radioactive material and other authorized activities involving mobile dangerous sources such as industrial radiography sources, nuclear powered satellites or radioisotope thermoelectric generators or fixed sealed sources; and (b) theft of a dangerous source and use of a radiological dispersal device or radiological exposure device. This category also includes: (a) detection of elevated radiation levels of unknown origin or commodities with contamination; (b) identification of medical symptoms due to radiation overexposure; and (c) transnational emergency as a result of a nuclear or radiological emergency abroad that is not a category V. Category IV represents a level of hazard that applies for all States and jurisdictions.
V	Areas within emergency planning zones and distances[e] for a facility in category I or II not located in the State where the facility is located (i.e. across the border).

a. Involving an atmospheric or aquatic release of radioactive material, or external exposure (such as due to a loss of shielding or a criticality event), that originates from a location on the site.

b. Such events include nuclear security events.

c. Doses in excess of those for which protective actions and other response actions are expected to be undertaken under any circumstances in accordance with the generic criteria in Appendix II. See 'deterministic effect' in the Definitions list of this publication.

d. See the generic criteria in Appendix II.

e. See para. 5.53.

4.18. The government shall ensure that for all facilities and activities, a comprehensive hazard assessment is performed. The hazard assessment shall consider:

(a) events that could occur at the facility or activity, including those not considered in the design basis;

(b) events involving a combination of a nuclear or radiological emergency and a conventional emergency such as an emergency following an earthquake, a volcanic eruption, a tropical cyclone, a tsunami, an aircraft crash or any civil disturbances that affects wide areas and/or impairs capabilities to provide support in the emergency response;

(c) events affecting several facilities and activities simultaneously and their interactions;

(d) events at nuclear facilities or events affecting activities in other States;

(e) results from threat assessments [6-8].

4.19. The government shall ensure that a review is periodically performed in order to ensure that all facilities and activities that could experience events that would necessitate protective actions and other response actions are identified. This review shall be undertaken to take into account any changes to the hazards within the State and beyond its borders including any change in assessments of threats, the experience and lessons learned from research, operation and emergency exercises, and technological developments (see paras 6.30, 6.34 and 6.36). The results of this review shall be used to revise the emergency arrangements.

4.20. Operating organizations shall appropriately revise the emergency arrangements (a) prior to any change in the facility or activity that may impact the existing hazard assessment (e.g. movement of irradiated reactor fuel to a new location, projected flooding or storms) and (b) when new information challenging the existing arrangements become available.

4.21. In the hazard assessment, facilities and activities, on-site areas, off-site areas and locations shall be identified for which a nuclear or radiological emergency could warrant:

(a) Precautionary urgent protective actions (taken on the basis of conditions at the facility or on the site before environmental monitoring is conducted (see Ref. [3]) to avoid or to minimize severe deterministic effects by keeping doses below levels approaching the generic criteria at which urgent protective actions and other response actions are to be undertaken under any circumstances in accordance with Appendix II;

(b) Urgent protective actions and other response actions to avoid or to minimize severe deterministic effects and to reduce the risk of stochastic effects in accordance with Appendix II;

(c) Early protective actions and other response actions, in accordance with Appendix II;

(d) Other response actions such as longer term medical actions in accordance Appendix II; or

(e) Protection for the emergency workers in accordance with paras 5.65–5.79 and Appendix I.

4.22. The hazard assessment shall also identify facilities and locations at which there is a significant likelihood of encountering a dangerous source that is not under control (e.g. scrap metal processing facilities, national border crossing points, seaports, airports and abandoned military or other facilities where dangerous sources may have been used in the past etc.).

4.23. For all facilities and activities, non-radiation related hazards to people on and off the site that are associated with the facility or activity (such as the release of toxic chemicals, e.g. uranium hexafluoride (UF_6), fires, explosions, etc.) that may impair the effectiveness of the actions taken in response to the nuclear or radiological emergency at the facility or activity shall be identified in the hazard assessment.

5. FUNCTIONAL REQUIREMENTS

GENERAL

5.1. The requirements for response established in this Section apply for the response to a nuclear or radiological emergency. The requirements for response must be met to achieve the practical goals of emergency response (see para. 3.1). In order to ensure that there is the necessary capability to meet the requirements for response, the requirements for preparedness apply as part of the planning and preparation process for emergency response.

Requirement 4: Managing emergency response operations

The government shall ensure that arrangements are in place for the emergency response operations to be appropriately managed.

Response

5.2. For facilities in categories I, II and III, the on-site emergency response shall be promptly executed and managed without impairing the performance of the continuing operational safety and security functions both within the facility and at other facilities at the same site.

5.3. For facilities in categories I, II and III, the off-site emergency response shall be promptly executed and effectively managed and coordinated with the on-site emergency response.

5.4. The emergency response shall be coordinated between all response organizations, including those specialized in responding in a conventional emergency and in an emergency initiated by a nuclear security event.

5.5. The emergency response shall be managed immediately and continuously under a clearly specified command and control system and shall be directed by clearly designated emergency response commander.

5.6. Information necessary for making decisions on the allocation of resources shall be appraised throughout the nuclear or radiological emergency.

5.7. For facilities in categories I or II and areas within category V, response organizations (including those of other States) within the emergency planning zones and distances (see para. 5.53) shall coordinate their emergency responses and shall provide mutual support.

Preparedness

5.8. For facilities in categories I, II and III, arrangements shall be made for the transition from normal operations to emergency operations to be clearly defined and to be effectively made without jeopardizing safety and nuclear security. The responsibilities of all persons who would be on the site in an emergency shall be designated as part of the arrangements for the transition. It shall be ensured

that the transition to the emergency response and the performance of initial response actions do not impair the ability of the operating personnel (such as the control room staff) to ensure safe and secure operation while taking mitigatory actions.

5.9. For facilities in categories I, II and III, arrangements shall be made for coordinating the emergency responses of all the off-site response organizations with the on-site response.

5.10. For a site where several facilities in category I are collocated, adequate arrangements (in terms of number of qualified personnel and amount of equipment and supplies, for example) shall be made to manage all the facilities if each of them is under emergency conditions simultaneously. This shall include arrangements to manage the deployment and the protection and safety of personnel responding on and off the site (see paras 5.65–5.79).

5.11. For facilities and activities in categories I, II, III and IV, arrangements shall be made to ensure, as far as practicable, that the facility or activity has nuclear security system [6, 7] that would be functional in a nuclear or radiological emergency.

5.12. Arrangements for response to a nuclear or radiological emergency shall be coordinated and integrated with arrangements at the national, regional and local level for response to conventional emergencies and to emergencies initiated by nuclear security events. Arrangements shall be made for coordinated response to a radiological emergency with other States, as appropriate.

5.13. Arrangements shall be made for the establishment and implementation of a clearly specified command and control system for emergency response as part of the emergency management system (see paras 4.1–4.3) and for identifying a single clearly designated emergency response commander (see para. 6.4) to direct the emergency response under the all hazards approach. When different emergency response commanders are designated to direct the on-site and off-site response, these arrangements shall provide sufficient assurance for their effective coordination. An emergency response commander shall be available immediately and continuously following a notification of an emergency and shall not be assigned any other responsibilities that would interfere with the prompt execution of the specified functions (see para. 6.5).

5.14. Arrangements shall be made for obtaining and assessing the information necessary in order to allocate resources for all response organizations.

5.15. For facilities in category I or II and areas within category V, arrangements shall be made for coordinating the response to a nuclear emergency between response organizations (including those of other States) within the emergency planning zones and distances (see para. 5.53).

Requirement 5: Identifying, notifying and activating

The government shall ensure that a system is put in place for the prompt identification and notification of emergency conditions and for the activation of an emergency response.

Response

5.16. For facilities and activities in categories I, II, III and IV, when circumstances necessitate an emergency response, operating personnel shall promptly determine the appropriate emergency class (see para. 5.25) or the level of emergency response and shall initiate the appropriate on-site actions. Upon classification of the nuclear or radiological emergency, the operating personnel shall promptly notify and provide sufficient information to, as appropriate, the off-site notification point.

5.17. When circumstances necessitate an emergency response, those staff at locations where there is a significant likelihood of encountering a dangerous source that is not under control (see para. 4.22) and first responders in an emergency at an unforeseen location shall promptly initiate the appropriate actions on the site and shall notify and provide sufficient information, as appropriate, to the off-site notification point.

5.18. Upon notification of a nuclear or radiological emergency warranting an off-site response, the off-site notification point shall promptly initiate a preplanned and coordinated response that is appropriate to the emergency class or the level of emergency response.

5.19. In the event of a transnational emergency, the notifying State shall promptly notify[5], either directly or through the IAEA, those States that may be affected. The notifying State shall also notify[6] the IAEA of a transnational emergency. The notifying State shall provide information on the nature of the emergency and on any potential transnational consequences and shall respond to requests from other States and from the IAEA for information with the intent of minimizing any consequences.

5.20. Appropriate emergency response actions shall be initiated promptly upon the receipt of a notification from another State or of information from the IAEA on a notification relating to an actual or potential transnational emergency that could affect the State or its nationals.

Preparedness

5.21. Notification point(s)[7] shall be established to receive notification of an actual or potential nuclear or radiological emergency. The notification point(s) shall be continuously available to receive any notification or request for support and to respond promptly or to initiate a preplanned and coordinated off-site response appropriate to the emergency class or the level of emergency response. The notification point(s) shall have immediate and continuous communication with the response

[5] Such a notification is in accordance with the State's obligations under the general principles and rules of international law, and for the case of a significant transboundary release, it is in accordance with the Early Notification Convention [9].

[6] Such a notification is in accordance with the State's obligations under the general principles and rules of international law, and for the case of a significant transboundary release, it is in accordance with the Early Notification Convention [9].

[7] This can be the notification point used to receive notification of and to initiate the off-site emergency response to an emergency of any type (conventional, nuclear or radiological).

organizations that are providing support. Such communication shall use suitable and diverse means of communication.

5.22. For facilities in categories I and II and for areas in category V, the off-site notification point shall have immediate and continuous communication with the off-site decision maker who has the authority and responsibility, as appropriate, without consultation, immediately to initiate precautionary urgent protective actions and urgent protective actions and other response actions off-site. In a nuclear or radiological emergency, the off-site decision maker shall not be given any other responsibilities that would interfere with prompt execution of the specified function (see para. 6.5).

5.23. At facilities and locations where there is a significant likelihood of encountering a dangerous source that is not under control (see para. 4.22), arrangements shall be made to ensure that the on-site managers of operations and other staff, as well as the local officials responsible for the response, are aware of the indicators of a potential radiological emergency and aware of the appropriate notifications and protective actions and other response actions warranted immediately in the event of an emergency.

5.24. Arrangements shall be made to ensure that first responders in an emergency at an unforeseen location are aware of the observable indicators of a potential radiological emergency, appropriate notification, and protective actions and other response actions warranted immediately in the event of an emergency.

5.25. The operating organization of a facility or activity in category I, II, III or IV shall make arrangements for promptly classifying nuclear and radiological emergencies warranting protective actions and other response actions in order to protect workers, emergency workers, patients and the public in accordance with Appendices I and II. The emergency classes may differ from those specified below provided that emergencies of all these types are addressed:

(a) *General emergencies* at facilities in category I or II for an emergency that warrants taking urgent protective actions and other response actions on the site and off the site. Upon declaration of this emergency class, appropriate actions shall promptly be taken, according to the available information relating to the emergency, to mitigate the consequences of the emergency on the site and to protect people on the site and off the site.

(b) *Site area emergencies* at facilities in category I or II for an emergency that warrants taking protective actions and other response actions on the site and in the vicinity of the site based on off-site monitoring and other assessments. Upon declaration of this emergency class, actions shall promptly be taken: (i) to mitigate the consequences of the emergency on the site and to protect people on the site, (ii) to prepare to take protective actions and other response actions off the site if this becomes necessary, (iii) to use reliable technical/radiological assessments and/or projections provided that their limitations are recognized and that they can be used promptly (see para. 6.23) and (iv) to conduct monitoring and sampling off the site.

(c) *Facility emergencies* at facilities in category I, II or III for an emergency that warrants taking protective actions and other response actions at the facility. Upon declaration of this emergency class, actions shall promptly be taken to mitigate the consequences of the emergency and to protect people at the facility. Emergencies in this class can never give rise to an off-site hazard.

(d) *Alerts at facilities* in category I, II or III for an emergency that warrants taking actions to assess and to mitigate the consequences of the emergency at the facility. Upon declaration of this emergency class, actions shall promptly be taken to assess and to mitigate the consequences of the emergency and to increase the readiness of the on-site and off-site response organizations, as appropriate.

(e) *Other nuclear or radiological emergencies* for emergencies involving activities in category IV that warrant taking protective actions and other response actions. Upon declaration of this emergency class and the level of emergency response, actions shall promptly be taken to mitigate the consequences of the emergency on the site, to protect those in the vicinity (e.g. the public, workers, emergency workers) and to determine where and for whom other protective actions and other response actions are warranted.

5.26. The emergency classification system for facilities and activities in categories I, II, III and IV shall take into account all postulated emergencies including those of very low probability. The operational criteria for classification shall include emergency action levels (EALs) related to abnormal conditions for the facility or activity concerned and associated, either actual or projected, progression and other observables and indicators of the conditions at the facility and/or on the site or off the site (see para. 5.48). The classification system shall be established with the aim of allowing for the prompt initiation of an effective response in recognition of the uncertainty of projections to be used and other reliable information showing when the response actions may need to be taken to be effective. It shall be ensured that the process of rating the event on the joint IAEA and OECD/NEA International Nuclear and Radiological Event Scale (INES) [10] does not delay the emergency classification or other response actions[8].

5.27. For each facility or activity in category I, II, III or IV, arrangements shall be made: (1) to promptly recognize and classify a nuclear or radiological emergency, (2) upon classification, to promptly declare the emergency class and to initiate an appropriate on-site response, and (3) to notify the appropriate off-site notification point (see para. 5.21) and to provide sufficient information for an effective off-site response. These arrangements shall include appropriate and diverse means for alerting people on the site and for notifying off-site notification point (see paras 5.57, 5.56, 6.24 and 6.34).

[8] The emergency response classification system is not to be confused with INES. INES is used by States for the purpose of communicating to the public the severity of an event only. INES cannot be used as the basis for emergency response actions.

5.28. Declaration of a particular class of emergency at a facility or activity in category I, II, III or IV shall promptly initiate the appropriate level of coordinated and preplanned emergency response consistent with the results of the hazard assessment (see para. 4.22) in order to meet the goals of emergency response, as appropriate, on and off the site. The responsibilities and initial response actions of all response organizations shall be specified for each class of emergency.

5.29. For facilities in category I or II and for areas within category V, the hazard assessment shall demonstrate, for the range of postulated emergencies, that identification, notification, activation and other initial response actions can be performed in time to meet the practical goals (see para. 3.1) of emergency response.

5.30. Arrangements shall be made such that the absence of detailed plans for a nuclear or radiological emergency which have not been formulated in advance shall not delay the emergency response.

5.31. The State shall make known to the IAEA and to other States, directly or through the IAEA, its single warning point responsible for receiving emergency notifications and information from other States and information from the IAEA. This warning point shall be continuously available to receive any notification, request for assistance or request for verification and to initiate promptly a response or verification. The State shall promptly inform the IAEA and, directly or through the IAEA, other States of any changes that may occur in respect of the warning point.

5.32. The State shall make arrangements for promptly notifying and for providing relevant information to, directly or through the IAEA, those States that may be affected by a transnational emergency. The State shall have arrangements in place for promptly responding to requests from other States or from the IAEA for available information in respect of a transnational emergency, in particular with regard to minimizing any transnational consequences. These arrangements shall include making known to the IAEA and to other States, directly or through the IAEA, its designated organization(s) for doing so.

5.33. Arrangements shall be made to promptly and directly notify any State within the emergency planning zones and distances (see para. 5.53) in which urgent and early protective actions and other response actions could be required to be taken.

Requirement 6: Taking mitigatory actions

The government shall ensure that arrangements are in place for taking mitigatory actions in a nuclear or radiological emergency.

Response

5.34. The operating organization of a facility or activity in category I, II, III or IV shall promptly decide on, and take actions[9] on-site necessary to mitigate the consequences of a nuclear or radiological emergency involving a facility or an activity under its responsibility.

5.35. First responders in an emergency at an unforeseen location and those staff at locations where there is a significant likelihood of encountering a dangerous source that is not under control (see para. 4.22) shall take all practicable and appropriate actions to mitigate the consequences of a nuclear or radiological emergency.

5.36. Off-site emergency services shall be made available, and shall be capable, to support the on-site response at facilities and activities in category I, II, III or IV.

Preparedness

5.37. Arrangements shall be made to provide expertise and services in radiation protection promptly to local officials, first responders in an emergency at an unforeseen location and specialized services (e.g. law enforcement agencies) responding to emergencies involving activities in category IV and to those staff at locations where there is a significant likelihood of encountering a dangerous source that is not under control (see para. 4.22). This shall include arrangements for on-call advice or other appropriate mechanisms and arrangements to dispatch on-site an emergency team capable of assessing the radiation hazards, mitigating the radiological consequences and managing the exposure of emergency workers. In addition, arrangements shall be made to determine whether and when additional assistance is necessary and how to obtain such assistance (see paras 5.126 and 5.128).

5.38. The operating personnel of an activity in category IV, first responders in an emergency at an unforeseen location and those staff at locations where there is a significant likelihood of encountering a dangerous source that is not under control (see para. 4.22) shall be given basic instruction in the means of mitigating the potential consequences of emergencies (also see para. 5.58).

5.39. The operating organization of an activity in category IV shall make arrangements to respond promptly to emergencies in relation to the authorized activity in order to mitigate the consequences.

5.40. Arrangements shall be made to initiate a prompt search in the event that a dangerous source could possibly be in the public domain as a result of its loss or unauthorized removal (also see para. 5.63).

5.41. For facilities in category I, II or III, arrangements shall be made for mitigatory action by the operating personnel to prevent an escalation of the emergency, to return the facility to a safe and stable state, to ensure as far as practicable the continued functionality of the nuclear security system (see Ref. [6-8]), to reduce the potential for releases of radioactive material or exposures and to mitigate the

[9] Such actions may include actions such as discharge of radioactive material to the environment, provided that the appropriate off-site organizations are notified in advance.

consequences of any actual releases or exposures. These arrangements shall take into account full range of possible conditions affecting the emergency response (such as potential impact of postulated natural, human induced or other events affecting regional infrastructure and several facilities simultaneously) as well as the following aspects: the operational actions necessary; the operational information needs; the workload and habitability conditions of the operating personnel (such as in the control room); the response actions necessary in the facility; the conditions in the facility and, where appropriate, the conditions in the vicinity of the facility, in which response actions are necessary, including possible hazardous conditions affecting emergency workers (e.g. high temperatures, toxic gases, high external dose rates etc.); and the response and availability of the personnel, instrumentation and structures, systems and components of the facility under emergency conditions. Arrangements shall include emergency operating procedures and guidance for the operating personnel on mitigatory actions for severe conditions (for a nuclear power plant as part of the accident management programme [11]), for the full range of postulated emergencies, including accidents that are beyond the design basis and/or the design extension conditions and associated conditions.

5.42. For facilities in category I, II or III, arrangements shall be made, in particular by the operating organization, to provide technical assistance to the operating personnel. On-site teams for mitigating the consequences of an emergency (e.g. damage control, firefighting) shall be available and shall be prepared to perform actions in the facility. Any equipment necessary in response and recovery shall be placed so as to be readily available and accessible in the anticipated emergency conditions or environmental conditions when needed. The operating personnel directing mitigatory actions shall be provided with information and technical assistance that allows them to take effective actions to mitigate the consequences of the emergency. Arrangements shall be made to obtain support promptly from the emergency services (e.g. police, medical and firefighting services) off the site. Off-site emergency services shall be afforded prompt access to the facility and shall be informed of on-site conditions and provided with instructions and with means of protecting themselves as emergency workers (see paras 5.65–5.79 and Appendix I).

Requirement 7: Taking urgent protective actions and other response actions

The government shall ensure that arrangements are in place to assess emergency conditions and to take urgent protective actions and other response actions in a nuclear or radiological emergency with account taken of international standards.

Response

5.43. The magnitude of hazards and the possible development of hazardous conditions shall be appraised initially and throughout a nuclear or radiological emergency. This shall include observing the abnormal conditions at the facility or in the activity, use of reliable and timely technical/radiological assessments and/or projections (see para. 6.23) and conducting radiation

monitoring, environmental monitoring and assessment, in order promptly to identify, characterize or anticipate, as appropriate, new hazards or the extent of hazards and to refine the protection strategy.

5.44. All appropriate actions shall be taken to save lives and to prevent severe deterministic effects.

5.45. Urgent protective actions and other response actions shall be taken effectively in accordance with national generic criteria (see para. 5.50) and with due consideration of the conditions specific to the emergency.

5.46. Urgent protective actions and other response actions shall be modified as appropriate to take into account any new information relating to the emergency that becomes available. A protective action and other response action shall not be implemented if it is not justified or shall be discontinued when it is no longer justified.

5.47. Information about emergency conditions, assessments and protective actions and other response actions that have been recommended and have been taken shall be promptly made available, as appropriate, to all relevant response organizations throughout the emergency.

Preparedness

5.48. The operating organization of a facility in category I, II or III shall make arrangements to assess and anticipate promptly: abnormal conditions at the facility; exposures and releases of radioactive material and other hazardous material; radiological conditions on and off the site; and any actual or potential exposures of the public. These assessments shall be used: for deciding on mitigatory actions to be taken by the operating personnel; as a basis for emergency classification (see para. 5.25); for deciding on urgent protective actions and other response actions to be taken on the site including those for protection of workers; and for recommendations for urgent protective actions and other response actions to be taken off the site. These arrangements shall include provision for access to instruments displaying or measuring those parameters that can readily be measured or observed in a nuclear or radiological emergency. In these arrangements, the expected response of instrumentation and structures, systems and components at the facility under emergency conditions shall be taken into account. Any use of technical/radiological assessments and/or projections shall be made with recognition of their limitations and provided that they can be used promptly (see para. 6.23).

5.49. The operating organization for activities in category IV shall make arrangements to assess promptly the extent and/or the significance of any abnormal conditions on the site, any exposures or any contamination. These assessments shall be used for initiating the mitigatory actions, as a basis for protective actions and other response actions to be taken on the site; to identify members of the public who could potentially be exposed; and to communicate the extent of the hazard and the recommended protective actions and other response actions to the appropriate off-site response organizations.

5.50. National generic criteria for taking urgent protective actions and other response actions shall be established in accordance with the generic criteria in Appendix II and shall be justified and

optimized with account taken of local and national conditions and conditions specific to the range of postulated emergencies. Based on the national generic criteria, predetermined operational intervention levels (OILs) shall be developed for triggering urgent protective actions and other response actions. Arrangements shall be made for revision of these operational intervention levels, as appropriate, in a nuclear or radiological emergency, with account taken of the prevailing conditions as they evolve.

5.51. Arrangements shall be made for adjusting urgent protective actions and other response actions as the emergency evolves, when appropriate, with involvement of interested parties.

5.52. First responders in an emergency at an unforeseen location shall be informed that, in the event of an immediate danger to life (such as a fire), they should not delay any action to save human life or prevent serious injury on the grounds of the possible presence of radioactive material. First responders in an emergency at an unforeseen location shall be informed of the precautions to take in giving first aid or in transporting an individual with possible contamination.

5.53. For facilities in category I or II, arrangements shall be made for effectively making and implementing decisions on urgent protective actions and other response actions to be taken off the site in order to meet the goals of emergency response based on a graded approach. This capability shall make use of existing public infrastructure (e.g. buildings and transport networks) to avoid or minimize severe deterministic effects and to reduce the risk of stochastic effects, for the full range of possible emergencies (including those not considered in the design basis) at those facilities. These arrangements, depending on the capability to use existing public infrastructure (e.g. buildings, transport networks etc.), shall include the following:

(a) The specification of off-site emergency planning zones and distances for which arrangements shall be made for taking protective actions and other response actions. These emergency planning zones and distances shall be contiguous across national borders, where appropriate, and shall include:

(i) A precautionary action zone (PAZ), for facilities in category I, for which arrangements shall be made at the preparedness stage with the goal of taking precautionary urgent protective actions and other response actions, before any significant release[10] of radioactive material occurs, on the basis of conditions at the facility (i.e. conditions leading to the declaration of a general emergency; see para. 5.25), in order to avoid or to minimize severe deterministic effects.

(ii) An urgent protective action planning zone (UPZ), for facilities in category I or II, for which arrangements shall be made at the preparedness stage with the goal of initiating precautionary urgent protective actions if possible before a release on the basis of conditions at the facility (i.e. conditions leading to the declaration of a general emergency; see para. 5.25) and urgent

[10] A release that warrants taking protective actions or other response actions off the site.

protective actions and other response actions on the basis of reliable and timely predictions of the radiological situation off the site (see para. 6.23) if available or on monitoring off the site, in order to take response actions that are effective in reducing the risk of stochastic effects[11] off the site. Any such actions shall be taken in such a way as not to delay the implementation of precautionary urgent protective actions and other response actions within the precautionary action zone.

(iii) An extended planning distance (EPD) from the facility, for facilities in category I or II, for which arrangements shall be made at the preparedness stage to conduct monitoring and on the basis of predetermined operational intervention levels (see paras 5.50 and 5.103), identify areas within a period that would be effective in reducing the risk of stochastic effects by taking: (1) urgent protective actions and other response actions (e.g. evacuation) within a day following a release or (2) early protective actions and other response actions (e.g. relocation) within a week to a month following a release.

(iv) An ingestion and commodities planning distance (ICPD) from the facility, for facilities in category I or II, for which arrangements shall be made at the preparedness stage, following the declaration of a general emergency, to take effective response actions in accordance with the generic criteria in Appendix II, to protect the public from food, milk, water and commodities that may be contaminated by the release. These arrangements shall be made taking account of the uncertainty and limitations of the information available when protective actions and other response actions need to be taken to be effective.

(b) Criteria, based on emergency classification and on conditions at the facility and off the site (see paras 5.25, 5.26 and 5.48) and on use of reliable technical/radiological assessments and/or projections provided their limitations are recognized and that they can be used promptly (see para. 6.23), for the formulation of recommendations for urgent protective actions and other response actions off the site, which are to be provided to off-site officials responsible for taking protective actions within the emergency planning zones and distances. In addition, arrangements shall be made to provide for any necessary revision of these recommendations, prior to their implementation, to take account of prevailing conditions in an actual emergency and of any exposures or results of environmental monitoring following a release of radioactive material (see para. 5.55).

(c) A single position on the site at all times with the authority and responsibility promptly to recommend protective actions and other response actions to the off-site notification points upon the declaration of a nuclear or radiological emergency (see para. 5.27).

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[11] This does not mean that severe deterministic effects could not be observed within UPZ. However, severe deterministic effects are most likely to occur within PAZ.

(d) Arrangements for the prompt notification of the off-site notification points to include all the jurisdictions (including those beyond national borders) within the emergency planning zones and distances.

5.54. Within the emergency planning zones and distances, arrangements shall be made for taking appropriate and effective protective actions and other response actions, as necessary, promptly upon the notification of a nuclear or radiological emergency. These arrangements shall include arrangements for: designation and training of off-site decision makers to promptly initiate protective action and other response actions upon the notification of an emergency (see para. 5.22); taking appropriate actions for the protection of emergency workers; alerting permanent, transient and special population groups or those responsible for them and special facilities. The arrangements shall be coordinated with all jurisdictions (including those beyond national borders) within any emergency planning zone or distance. These arrangements shall also include arrangements to ensure that services are continuously provided in order to ensure public safety (e.g. services for the care of critically ill patients) throughout the emergency, including during the implementation of protective actions and other response actions.

5.55. Within emergency planning zones, arrangements shall be made for promptly assessing contamination, releases of radioactive material and doses for the purpose of deciding on or adjusting the protective actions and other response actions that have been taken. These shall include arrangements for: (a) use of reliable technical/radiological assessments and/or projections provided their limitations are recognized and that they can be used promptly (see 6.23) and (b) promptly conducting environmental monitoring and monitoring for contamination on people (e.g. evacuees) within the emergency planning zones and promptly assessing the results of the monitoring on the basis of predetermined operational intervention levels. Arrangements shall also be made to take these actions within emergency planning distances at an early stage.

5.56. The operating organization of a facility in category I, II or III shall make arrangements to ensure the safety of all persons on the site in a nuclear or radiological emergency. This shall include arrangements: to notify people on the site of an emergency; for all persons on the site to take appropriate actions immediately upon notification of an emergency; to account for those on the site; to locate and recover those unaccounted for; to take urgent protective actions; and to provide immediate first aid. This also includes ensuring the provision of: suitable assembly points for all persons on the site that are provided with continuous radiation monitoring; a sufficient number of safe escape routes; and suitable and robust alarm systems and means of communication so that all persons present in the facility and on the site could be warned and instructed, even under emergency conditions.

5.57. The operating organization of a facility in category I, II or III shall ensure that suitable and diverse means of communication that are necessary for taking protective actions and other response actions on the site and for communication with off-site officials responsible for the implementation of

protective actions and other response actions off the site or within any emergency planning zones or distances are available at all times under the full range of emergency conditions.

5.58. Operating personnel of activities in category IV, first responders in an emergency at an unforeseen location and those staff at locations where there is a significant likelihood of encountering a dangerous source that is not under control (see para. 4.22) shall be provided with guidance on taking urgent protective actions and other response actions in accordance with national generic criteria (see para. 5.50). This shall include the approximate radius of the inner cordoned off area in which urgent protective actions and other response actions would initially be taken and its adjustment on the basis of observed or assessed conditions on the site.

Requirement 8: Providing information and issuing instructions and warnings to the public

The government shall ensure that arrangements are in place to warn the public promptly of a nuclear or radiological emergency and to instruct them on actions that they must take.

Response

5.59. Upon declaration of a nuclear or radiological emergency, the public shall be promptly warned of the emergency and shall be instructed in the actions that they must take without undue delay that could jeopardize the effectiveness of protective actions and other response actions.

Preparedness

5.60. For facilities in category I or II and areas within category V, arrangements shall be made to provide information, before operation and throughout the lifetime of the facility, on the response to a nuclear or radiological emergency to permanent, transient and special population groups or those responsible for them and to special facilities within the emergency planning zones and distances (see para. 5.53). This shall include information on the potential for a nuclear or radiological emergency, on the nature of the hazard, on how people will be warned or notified and on the actions to be taken in the emergency. The information shall be provided in the languages mainly spoken in these emergency planning zones and distances. The effectiveness of these arrangements for public information shall be periodically assessed.

5.61. Arrangements shall be made for facilities in category I or II and in areas within category V to register those members of the public within the special population groups and, as appropriate, those responsible for them and promptly to provide a warning and instruction to the permanent, transient and special population groups or those responsible for them and to special facilities in the emergency planning zones and distances upon declaration of a general emergency (see para. 5.54). This shall include instructions in the languages mainly spoken in these emergency planning zones and distances (see para. 5.53) on the actions to be taken.

5.62. Arrangements shall be made for facilities and activities in category III and IV to provide information and instructions to the public to identify and locate people who may have been affected by the nuclear or radiological emergency and who may require urgent or longer term response actions such as decontamination, medical examination or medical screening (see para. 5.89).

5.63. Arrangements shall be made by response organizations supported by the operating organization, if any, for issuing a warning to the public in the event that a dangerous source could possibly be in the public domain as a consequence of its loss or unauthorized removal.

5.64. Arrangements shall be made by response organizations for information and advice to be promptly provided to national citizens and to those with interests abroad (e.g. to travellers and to exporters) in a nuclear or radiological emergency declared beyond national borders with due account taken of the response actions recommended either within the State where the emergency occurred or within the State affected by that emergency (see paras 5.97 and 6.14)..

Requirement 9: Protecting emergency workers and helpers in an emergency

The government shall ensure that arrangements are in place to protect emergency workers and to protect helpers in an emergency.

Response

5.65. Emergency workers and helpers in an emergency shall be appropriately protected.

5.66. Emergency workers not designated as such in advance of a nuclear or radiological emergency and helpers in an emergency shall be registered and integrated into the emergency response operations.

Preparedness

5.67. Arrangements shall be made to ensure that emergency workers are, to the extent practicable, designated in advance.

5.68. Arrangements shall be made to register and to integrate into the emergency response operations those emergency workers who were not designated as such in advance of a nuclear or radiological emergency and helpers in an emergency. This shall include designation of the response organization(s) responsible for ensuring their protection.

5.69. The operating organization and response organizations shall determine the anticipated hazardous conditions both on-site and off-site in which emergency workers might have to perform response functions in a nuclear or radiological emergency.

5.70. The operating organization and response organizations shall ensure that arrangements are in place for the protection of emergency workers and of helpers in an emergency for the range of

anticipated hazardous conditions in which they might have to perform response functions. These arrangements, as a minimum, shall include:

(a) training of those emergency workers designated as such in advance;

(b) providing instructions immediately before their use to those emergency workers not designated as such in advance and to helpers in an emergency on how to perform their specified duties under emergency conditions ('just in time' training);

(c) managing, controlling and recording the doses received;

(d) provision of appropriate specialized protective equipment and monitoring equipment;

(e) medical follow-up and psychological counselling, as appropriate;

(f) obtaining informed consent to perform specified duties, when appropriate.

5.71. The operating organization and response organizations shall ensure that all practical means are used to minimize doses to emergency workers and helpers in an emergency due to exposure to non-penetrating external radiation and due to intakes of radionuclides or to skin contamination.

5.72. In a nuclear or radiological emergency, the relevant requirements for occupational exposure in planned exposure situation established in Ref. [14] shall be applied for emergency workers, in accordance with a graded approach, except as required in para. 5.73.

5.73. The operating organization and response organizations shall ensure that no emergency worker is subject to an exposure in an emergency in excess of 50 mSv other than (1) for the purposes of saving life or preventing serious injury, (2) when undertaking actions to prevent severe deterministic effects and actions to prevent the development of catastrophic conditions that could significantly affect people and the environment, or (3) when undertaking actions to avert a large collective dose.

5.74. For the exceptional circumstances of para. 5.73, national guidance values shall be established for restricting the exposures of emergency workers and helpers in an emergency, in accordance with Appendix I.

5.75. The operating organization and response organizations shall ensure that emergency workers who undertake actions in which the doses received might 50 mSv do so voluntarily[12]; that they have been clearly and comprehensively informed in advance of the associated health risks as well as of available protective measures; and that they are, to the extent possible, trained in the actions that they may be required to take. Emergency workers not designated as such in advance shall not be the first choice for taking actions that might result in their exceeding the guidance values of dose for life saving actions given in Appendix I. Helpers in an emergency shall not be allowed to take actions that

[12] The voluntary basis for response actions by emergency workers is usually covered in the emergency arrangements.

might result in their exceeding the guidance values of dose for taking actions to avert a large collective dose given in Appendix I.

5.76. Arrangements shall be made to assess the individual doses received in the response to a nuclear or radiological emergency by the emergency workers and helpers in an emergency as soon as practicable and, as appropriate, to restrict further exposures in response to the emergency (see Appendix I).

5.77. Emergency workers who receive doses in the response to a nuclear or radiological emergency shall normally not be precluded from incurring further occupational exposure. However, qualified medical advice shall be obtained before any further occupational exposure if an emergency worker has received an effective dose exceeding 200 mSv or at the request of the emergency worker.

5.78. Information on the doses received in the response to a nuclear or radiological emergency and information concerning any consequent health risks shall be communicated to the emergency workers and to the helpers in an emergency.

5.79. Emergency workers and helpers in an emergency shall receive medical attention appropriate for the doses received in the response to a nuclear or radiological emergency (see Appendix II) or at their request.

Requirement 10: Managing the medical response

The government shall ensure that arrangements are in place for the provision of appropriate medical screening and triage, medical treatment and longer term medical actions for those who could be affected in a nuclear or radiological emergency.

Response

5.80. On the presentation of clinical symptoms of radiation exposure or other effects indicative of a possible nuclear or radiological emergency, the medical personnel or other responsible party who identifies the symptoms or the other effects shall notify the appropriate local or national officials and shall take response actions as appropriate.

5.81. Appropriate specialized treatment shall be given to any person who receives a dose that could potentially result in severe deterministic effects, consistent with national generic criteria (see para. 5.89).

5.82. Where appropriate, actions shall be taken to detect, in time to allow for effective treatment, radiation induced health effects among workers, emergency workers, patients and the public resulting from exposure in a nuclear or radiological emergency, consistent with national generic criteria (see para. 5.89).

Preparedness

5.83. Arrangements shall be made for medical personnel, both general practitioners and emergency staff, to be made aware of the clinical symptoms of radiation exposure and of the appropriate notification procedures and other response actions warranted if a nuclear or radiological emergency has occurred or is suspected.

5.84. Arrangements shall be made so that, in a nuclear or radiological emergency, individuals are provided promptly with appropriate medical attention regardless of their possible contamination. These arrangements shall include ensuring transport services are provided when needed and providing the advice to medical personnel that universal precautions against infection (e.g. masks, gloves, etc.) provide sufficient protection when treating patients with possible contamination.

5.85. Facilities in category I, II and III shall make arrangements to treat a limited number of individuals with contamination or overexposure, including arrangements for first aid, the estimation of doses, medical transport and the initial medical treatment of individuals with contamination or overexposure in predesignated medical facilities.

5.86. For areas within the emergency planning zones (see para. 5.53), arrangements shall be put in place for performing medical screening and triage and for assigning any individual exposed at levels exceeding the criteria in Table II.1 of Appendix II to a predesignated medical facility on the basis of predetermined operational criteria (see para. 5.89).

5.87. Arrangements shall be made at the national level to identify and to treat people who have undergone exposure or contamination. These arrangements shall include: guidelines for effective treatment; the designation of medical personnel trained in the early diagnosis and treatment of radiation injuries; and the selection of approved institutions to be used for extended medical treatment or longer term medical follow-up of individuals subjected to radiation exposure or contamination and for evaluating radiation exposure (external and internal). This shall also include arrangements for consultation on treatment following any exposure that could result in severe deterministic effects with medical practitioners experienced in dealing with such injuries[13].

5.88. Arrangements shall be made for the identification of individuals in those groups that are at risk of sustaining detectable increases in the incidence of cancers as a result of radiation exposure due to a nuclear or radiological emergency. Arrangements shall be made to take longer term actions to detect radiation induced health effects among such people in time to allow for their effective treatment.

5.89. National generic criteria shall be established for initiating appropriate medical actions in a nuclear or radiological emergency consistent with the generic criteria in Appendix II. On the basis of the generic criteria, predetermined operational intervention levels shall be developed for initiating

[13] Such arrangements for consultation on treatment include international assistance to be provided or coordinated by the IAEA and by WHO, for example, under the Assistance Convention [9].

appropriate medical actions. Arrangements shall be made for revision of these operational intervention levels, as appropriate, in a nuclear or radiological emergency, with account taken of the prevailing conditions as they evolve.

Requirement 11: Keeping the public informed

The government shall ensure that arrangements are put in place to keep the public informed throughout a nuclear or radiological emergency in order for people to be able to take appropriate protective actions and other response actions.

Response

5.90. The public shall be provided with useful, timely, truthful, consistent, clear and appropriate information throughout a nuclear or radiological emergency, in plain and understandable language.

5.91. Information provided by the response organizations, operating organization and others (e.g. international organizations) shall be coordinated and put into perspective, to the extent possible, in terms of associated health hazards (see Appendix II).

5.92. Practicable steps shall be taken throughout a nuclear or radiological emergency to address any misconceptions, rumours, and incorrect and misleading information that are circulated.

5.93. Response organizations and operating organizations shall respond in due time to any enquiries from the public and from news and information media.

Preparedness

5.94. Arrangements shall be made for providing useful, timely, truthful, consistent, clear and appropriate information to the public in a nuclear or radiological emergency, with account taken that the usual capabilities for communication might have been damaged as consequence of the emergency or its initiating event (e.g. by an earthquake, flooding, etc.) or overburdened by public use. These arrangements shall include arrangements for keeping the international community informed, as appropriate.

5.95. Arrangements shall be made to ensure that information communicated to the public in a nuclear or radiological emergency is coordinated and consistent (see para. 4.9(i)) with recognition of the evolutionary nature of the emergency.

5.96. Arrangements shall be made for putting information provided by any response organization, the operating organization or others (e.g. information on calculated doses or measured quantities) into perspective to the extent possible in terms of associated health hazards (see Appendix II), with account duly taken of pregnant women and children as the most vulnerable to radiation exposure.

5.97. Arrangements shall be put in place to explain to the public, in terms of associated health hazards (see Appendix II), any changes in the protective actions and other response actions being

recommended in the State and any differences from those being recommended in other States (see paras 6.13–6.15).

5.98. Arrangements shall be made to identify and address any misconceptions, rumours, and incorrect and misleading information that might be circulated and which might result in the public taking inappropriate actions[14].

5.99. Arrangements shall be made to respond to enquiries (including enquiries received through the IAEA) from the public and from news and information media, both national and international.

Requirement 12: Taking early protective actions and other response actions

The government shall ensure that arrangements are in place to take early protective actions and other response actions in a nuclear or radiological emergency, with account taken of international standards.

Response

5.100. Early protective actions and other response actions shall be taken effectively in a nuclear or radiological emergency, in accordance with national generic criteria (see para. 5.103) and with due consideration of the conditions specific to the emergency.

5.101. Contamination shall be appropriately managed.

5.102. An early protective action or other response action shall be discontinued when further assessment shows that continuation of the action is no longer justified.

Preparedness

5.103. National generic criteria for taking early protective actions and other response actions shall be established in accordance with the generic criteria in Appendix II and shall be justified and optimized with account taken of local and national conditions and conditions specific to the emergency. On the basis of these generic criteria, predetermined operational intervention levels shall be developed for triggering early protective actions and other response actions. Arrangements shall be made for revision of these operational intervention levels, as appropriate, in a nuclear or radiological emergency, with account taken of the prevailing conditions as they evolve.

5.104. Arrangements shall be made for adjusting early protective actions and other response actions as the emergency evolves, when appropriate, with involvement of interested parties.

5.105. Within the ingestion and commodities planning distance (see para. 5.53), arrangements shall be made for prompt protection in relation to, and for restriction of, non-essential local produce, forest

[14] Inappropriate actions in this context are actions that are not supported scientifically (e.g. stigmatizing of people or shunning of products from the area affected by a nuclear or radiological emergency).

products (e.g. mushrooms), milk from grazing animals, rainwater, animal feed and commodities that may have contamination following a radioactive release. These arrangements shall include: the use of (a) use of reliable technical/radiological assessments and/or projections provided their limitations are recognized and that they can be used promptly (see 6.23) and (b) predetermined operational intervention levels, the means for their revision, prompt monitoring for ground contamination, sampling and analysis of food, milk, drinking water and other commodities; the means to enforce the restrictions; and provisions to expand the monitoring and restriction beyond this distance if needed.

5.106. Within the extended planning distance (see para. 5.53), arrangements shall be made for effective relocation that may be required following a radioactive release. These shall include: use of (a) use of reliable technical/radiological assessments and/or projections provided their limitations are recognized and that they can be used promptly (see 6.23) and (b) predetermined operational intervention levels and the means for their revision; arrangements for the prompt monitoring of ground deposition; the means for accomplishing relocation; arrangements for assisting those persons who have been relocated; and provision to extend monitoring and relocation beyond the extended planning distance if necessary.

5.107. Within the emergency planning zones and inner cordoned off area, arrangements shall be made for monitoring the contamination levels of vehicles, personnel and goods moving into and out of contaminated areas in order to control the spread of contamination. These shall include: the use of predetermined operational intervention levels and the means for their revision; and arrangements for appropriate monitoring and decontamination, as applicable.

5.108. Arrangements shall be made for access control and restriction control for areas in which evacuations and relocations are carried out within emergency planning zones, the extended planning distance and the inner cordoned off area. Returns to these areas for short periods of time shall be permitted if justified (e.g. to feed animals left behind) and provided that those individuals entering the area are (1) subject to controls while in the area, (2) instructed on how to protect themselves and (3) briefed on the associated risks.

5.109. Arrangements shall be made to ensure that decontamination does more good than harm, with account also taken of the exposure of those persons performing the decontamination. These arrangements shall include testing of decontamination methods before their general use, and measurable criteria, in terms of dose reduction, for use in assessing the effectiveness of the decontamination.

5.110. Arrangements shall be made for taking early protective actions and other response actions as appropriate beyond areas in category V, including: (a) use of reliable technical/radiological assessments and/or projections provided their limitations are recognized and that they can be used promptly (see 6.23) and (b) promptly conducting environmental monitoring and monitoring for contamination of commodities, sampling and assessments, even if such monitoring and assessments

have the aim of reassuring the public or mitigating the non-radiological consequences of a nuclear or radiological emergency. These arrangements shall include use of predetermined operational intervention levels and the means for their revision.

5.111. Arrangements shall be made to assess exposures incurred by members of the public as a consequence of a nuclear or radiological emergency, and the results of the assessments shall be made publicly available. The assessments shall be based on the best available information, shall be put into perspective in terms of associated health hazards (see paras 5.91 and 5.96) and shall be promptly updated in the light of any information that would produce substantially more accurate results.

Requirement 13: Managing radioactive waste during a nuclear or radiological emergency

The government shall ensure the safe and effective management of radioactive waste during a nuclear or radiological emergency.

Response

5.112. Radioactive waste arising from a nuclear or radiological emergency, and associated protective actions and other response actions, shall be identified, characterized and categorized in due time.

5.113. Radioactive waste shall be managed with account taken of the characteristics of the waste in manner that does not compromise the protection strategy.

5.114. Mixing of radioactive waste of different categories shall be avoided to the extent practicable.

Preparedness

5.115. The national policy and strategy for radioactive waste management [12] shall cover radioactive waste generated in a nuclear or radiological emergency.

5.116. The protection strategy (see para. 4.17) shall take into account radioactive waste that might arise from protective actions and other response actions that are to be taken.

5.117. Arrangements shall be made for the safe and effective management of radioactive waste. These arrangements shall include:

(a) a plan to characterize waste, including in situ measurements and analysis of samples;

(b) criteria for categorization of waste;

(c) avoiding the mixing of waste of different categories;

(d) minimizing the amount of material declared as radioactive waste;

(e) a method of determining appropriate predisposal management options (including processing, storage and transport), with account taken of the interdependences between all steps as well as impacts on the anticipated end points (clearance, authorized discharge, reuse, recycling, disposal) [12, 13];

(f) a method of identifying appropriate storage options and sites;

(g) consideration of non-radiological aspects of waste (e.g. toxicity, biological properties).

5.118. Consideration shall be given to the management of human remains and animal remains, contaminated as a result of a nuclear or radiological emergency, with due account taken of religious and cultural practices.

Requirement 14: Mitigating non-radiological consequences of a nuclear or radiological emergency and response

The government shall ensure that arrangements are in place for mitigating non-radiological consequences of a nuclear or radiological emergency and the response.

Response

5.119. All practicable steps shall be taken to mitigate non-radiological consequences of the emergency and the response and to ensure that the response actions do more good than harm.

5.120. Inappropriate actions taken by the members of the public and by others (e.g. commercial, industrial, infrastructural or other non-governmental bodies) shall be promptly identified and appropriately addressed.

5.121. Non-radiological consequences of the emergency and the response shall be considered when deciding on the protective actions and other response actions to be taken.

Preparedness

5.122. Arrangements shall be made for mitigating the non-radiological consequences of an emergency and response and for responding to public concern in a nuclear or radiological emergency (i.e. both actual and perceived). These arrangements shall include providing the public with: information on any associated health hazards and clear instructions on the actions to be taken (see paras 5.59–5.64 and 5.90–5.99); medical and psychological counselling; and appropriate social support.

5.123. Arrangements shall be made to mitigate impacts of a nuclear or radiological emergency and associated protective actions and other response actions taken on international trade, with account taken of the generic criteria in Appendix II. These arrangements shall provide for reassurance of the public and interested parties (such as importing States) on health hazards in relation to tradable commodities and on any revision of national standards.

5.124. Arrangements shall be put in place for ensuring that inappropriate actions[15] taken by members of the public and others (e.g. unjustified voluntary terminations of pregnancy, stigmatization of people from affected areas, cancellation of commercial flights, closing of airports etc.) are promptly identified and appropriately addressed. This shall include the designation of organization(s) with the responsibility for monitoring, identifying and addressing inappropriate actions taken by the public (including unnecessarily burdening the health care system) and others (e.g. commercial, industrial, infrastructural or other non-governmental bodies) (see para. 4.9(i)).

Requirement 15: Requesting, providing and receiving international assistance

The government shall ensure that adequate arrangements are in place to benefit from, and to contribute to, international assistance in preparedness and response for a nuclear or radiological emergency.

Response

5.125. Governments and international organizations shall respond in a timely manner, in accordance with established mechanisms and respective mandates, to any request made by a State for assistance in responding to a nuclear or radiological emergency.

5.126. When making a request to international organizations or to other governments for international assistance in response to a nuclear or radiological emergency, the request shall be made on the basis of international instruments (e.g. the Assistance Convention [9]), bilateral agreements or other international mechanisms.

Preparedness

5.127. Governments and international organizations shall respond to any request made by a State, in accordance with established mechanisms and respective mandates, for assistance in preparedness for a nuclear or radiological emergency.

5.128. Arrangements shall be put in place and maintained for requesting, providing and obtaining international assistance by other governments or international organizations in both preparedness for and in response to a nuclear or radiological emergency on the basis of international instruments (e.g. the Assistance Convention [9]), bilateral agreements or other mechanisms. These arrangements shall take due account of compatibility requirements for the capabilities to be rendered and obtained among different States so as to ensure the usefulness of these capabilities.

5.129. Arrangements shall be put in place and maintained for a timely response to requests for international assistance.

Requirement 16: Deciding on the transition from an emergency exposure situation to an existing

[15] Inappropriate actions in this context are actions that are not supported scientifically.

exposure situation

The government shall ensure that arrangements are put in place and are implemented, as appropriate, for the transition from an emergency exposure situation to an existing exposure situation, with account taken of the need for the resumption of accustomed social and economic activities.

Response

5.130. The transition from an emergency exposure situation to an existing exposure situation shall be based on an administrative decision, made public, by the authority responsible for the overall response.

5.131. Both radiological consequences and non-radiological consequences shall be considered in deciding on termination of the emergency phase, in justifying the introduction of protective actions and other response actions, and in optimizing the protection strategy, including selection of protective actions and other response actions to be taken.

5.132. The transition from an emergency exposure situation to an existing exposure situation shall be made in a coordinated and orderly manner, by making any necessary transfer of responsibilities between response organizations, with the involvement of relevant authorities and interested parties, and the rationale for the transition shall be explained to all parties involved.

5.133. Decisions to adjust protective actions and other response actions and other arrangements that affect the public and that are aimed at enabling the termination of emergency phase shall be made by a formal process that includes consultation with interested parties.

5.134. The basis for adjusting protective actions and other response actions and other arrangements that affect the public aimed at enabling the termination of emergency phase shall be explained and shall be put into perspective in terms of associated health hazards (see Appendix II). This shall include providing the public with information on the need for any on-going protective actions following the termination of the emergency phase and any necessary modifications to their personal behaviour. During this period of the emergency phase, public opinion and the response of news and information media shall be closely monitored in order to ensure that any concerns can be addressed promptly.

5.135. Following the termination of the emergency phase and the concurrent transition to an existing exposure situation, all workers undertaking relevant work (e.g. workers undertaking repairs to plant and buildings, recovery of sources, work for the management of radioactive waste, or remedial work for decontamination of the site and surrounding areas) shall be subject to the relevant requirements for occupational exposure in planned exposure situations [14].

Preparedness

5.136. The government shall ensure that, as part of its emergency preparedness, arrangements are in place for the transition from an emergency exposure situation to an existing exposure situation. These arrangements shall involve interested parties. The arrangements shall take into account that the administrative decision for the transition from an emergency exposure situation to an existing exposure situation might be taken at different times in different geographical areas. The planning process shall include: the roles and functions of organizations; methods of transferring information; methods for assessing radiological consequences and non-radiological consequences; ensuring consistent system of national generic criteria to be applied from the start of the emergency until the emergency phase is terminated (see Appendix II); review of the hazard assessment; establishment of national guidelines for termination of an emergency phase by returning to a planned exposure situation or by transition to an existing exposure situation, as appropriate, e.g. by adjusting protective actions and other response actions; and arrangements for on-going public communications, monitoring public opinion and the response of the news and information media.

5.137. After a decision has been made on the termination of the emergency phase by either returning to a planned exposure situation or by transition to an existing exposure situation, individual monitoring, environmental monitoring and health surveillance shall be conducted subject to the requirements for planned exposure situation or existing exposure situation, as appropriate [14].

5.138. Arrangements shall be made to communicate with the public the basis for the termination of the emergency phase and for any adjustment of protective actions and other response actions, including any necessary modifications to their personal behaviour, aimed at enabling the termination of the emergency phase and the concurrent transition to an existing exposure situation, as appropriate. Any information provided to the public shall be put into perspective in terms of associated health hazards (see Appendix II).

Requirement 17: Analysing the emergency and the emergency response

The government shall ensure that the nuclear or radiological emergency and the emergency response are analysed in order to identify actions to be taken to prevent the occurrence of other emergencies and to improve emergency arrangements.

Response

5.139. An analysis shall be performed after a nuclear or radiological emergency in order to identify actions to be taken to prevent the occurrence of other emergencies, either similar or not, and further actions to be taken to improve emergency arrangements. This review shall consider:

(a) Reconstruction of the scenario for the emergency;

(b) Root causes of the emergency;

(c) Regulatory controls;

(d) The possible involvement of other sources or devices (including those in other States);

(e) General implications for safety;

(f) General implications for nuclear security, as appropriate;

(g) Necessary improvements to emergency arrangements.

5.140. Data and information important for such an analysis shall be protected and preserved, to the extent practicable, during the emergency response.

Preparedness

5.141. Arrangements shall be made to undertake a timely and comprehensive analysis of the nuclear or radiological emergency and the emergency response with involvement of relevant interested parties. These arrangements shall consider the need for contribution to relevant internationally coordinated analysis.

5.142. Arrangements shall be made to protect and preserve data and information important for an analysis after a nuclear or radiological emergency.

5.143. Arrangements shall be made to enable comprehensive interviews on the causes of the nuclear or radiological emergency to be conducted with those involved.

5.144. Arrangements shall be made to acquire the expertise needed to perform an analysis of the nuclear or radiological emergency (e.g. from the IAEA or from the manufacturer of equipment).

5.145. Arrangements shall be made to take actions promptly on the basis of an analysis to prevent the occurrence of other emergencies, including notification of other operating organizations as relevant or of other States through the IAEA.

6. REQUIREMENTS FOR INFRASTRUCTURE

GENERAL

6.1. This section establishes the requirements for infrastructural elements essential to providing the capability for fulfilling the requirements established in Section 5.

Requirement 18: Authorities

The government shall ensure that authorities for preparedness and response for a nuclear or radiological emergency are clearly established.

6.2. The authority for developing, maintaining and regulating arrangements, both on-site and off-site, for preparedness and response for a nuclear or radiological emergency shall be established by means of acts, legal codes or statutes.

6.3. All of the functions specified in Section 5 shall be assigned to the appropriate operating organizations and to local, regional and national organizations, whose involvement in the performance of these functions, or in support of their performance, shall be documented[16]. The documentation shall specify their roles, functions, authorities and responsibilities in an emergency response and shall assent to the authorities, roles and responsibilities of other response organizations. Potential or actual conflicting and overlapping roles and responsibilities shall be identified and resolved as part of the preparedness process through the national coordinating mechanism (see para. 4.9). The authorities and responsibilities for making decisions concerning protective actions and other response actions on and off the site and for communication with the public shall be clearly assigned for each phase of the response.

6.4. The authority and responsibility for directing the emergency response shall be assigned to the appropriate emergency response commander in each phase of the response. When different emergency response commanders are given authority and responsibility for directing the on-site and off-site response, their effective coordination shall be ensured.

6.5. The emergency arrangements shall include the clear allocation of responsibilities, authorities and arrangements for coordination and communication in all phases of the response. These arrangements shall include: ensuring that for each response organization a single position in the response hierarchy has the authority and responsibility to direct its response actions; clearly assigning the responsibility for the coordination of the entire response and for the resolution of conflicts between response organizations; assigning to an on-site position the authority and responsibility for notifying the appropriate organization(s) of an emergency and taking immediate on-site actions; and assigning to an on-site position the responsibility for directing the entire on-site response (see paras 5.8, 5.9,

[16] Typically this is documented as part of the appropriate national, regional and local emergency response plans.

5.12 and 5.13). These arrangements shall be such as to ensure that those persons with authority and responsibility to perform critical functions in an emergency response are not assigned any other responsibilities in an emergency that would interfere with the prompt execution of the specified functions.

6.6. The arrangements for the delegation and/or transfer of authority shall be clearly specified in the relevant emergency plans, together with arrangements for notifying all appropriate parties of the transfer.

Requirement 19: Organization and staffing

The government shall ensure that the overall organization of the emergency preparedness and response is clearly specified and staffed with sufficient personnel who are adequately qualified and fit for their intended duty.

6.7. The organizational relationships and interfaces between all the major response organizations shall be established.

6.8. The positions responsible within each operating organization and response organization for the performance of the response functions specified in Section 5 shall be assigned in the emergency plans and procedures.

6.9. Personnel who are adequately qualified and fit for the intended duty shall be assigned to appropriate positions in all operating organizations and response organizations in order to perform the functions necessary to meet the requirements established in Section 5.

6.10. Appropriate number of adequately qualified personnel shall be available at all times (including during 24 hour operations) in order that appropriate positions can be promptly staffed as necessary following the declaration and notification of a nuclear or radiological emergency. Appropriate number of adequately qualified personnel shall be available in the long term to staff the various positions necessary to take the mitigatory actions, protective actions, and other response actions.

6.11. For a site with multiple facilities in category I or II are collocated, an appropriate number of adequately qualified personnel shall be available to manage all the facilities if each of them is under emergency conditions simultaneously (see para. 5.10).

Requirement 20: Coordination of emergency preparedness and response

The government shall ensure that arrangements are in place for coordinating an emergency response between the operating organization and local, regional, and national authorities, and, where appropriate, at the international level.

6.12. Arrangements for the coordination of emergency response and protocols for operational interfaces among operating organizations and authorities at the local, regional and national levels, to

include those responsible for the response to conventional emergencies and to emergencies initiated by nuclear security events, shall be developed, as applicable (see para. 6.4). The arrangements shall be clearly documented and this documentation shall be made available to all relevant parties. Arrangements shall be put in place to ensure effective working relationships among these organizations.

6.13. When several different organizations or other States are expected to have or to develop tools, procedures or criteria for use in responding to the same emergency, coordination arrangements shall be put in place to harmonize the results of assessments of contamination, doses and radiation induced health effects and of any other appropriate assessments made in a nuclear or radiological emergency in order not to give rise to inconsistency and confusion.

6.14. Arrangements shall be made in the event of a transnational emergency to coordinate with other States any protective actions and other response actions that are being recommended to their citizens or embassies in order either to ensure that they are consistent with those being recommended in these States or to provide an opportunity for those States to explain to the public the basis for the differences (see para. 5.97).

6.15. Arrangements shall be made to ensure that States with areas in category V are provided with appropriate information for developing their own preparedness to respond to a transboundary emergency and that arrangements shall be made for appropriate transboundary coordination. These arrangements shall include: agreements and protocols to provide information necessary to develop a coordinated means for notification, classification schemes, generic criteria and operational criteria for taking and adjusting protective actions and other response actions; arrangements for public information; and arrangements for the exchange of information between decision making authorities. The language and physical units to be used as well as the system for putting health hazards into perspective shall be determined and agreed in advance.

Requirement 21: Plans and procedures

The government shall ensure that plans and procedures necessary for effective emergency response are established.

6.16. Plans for emergency response shall be based on a hazard assessment as described in Section 4. A single national emergency response plan shall be developed that integrates all relevant plans for emergency responses in a coordinated manner and consistently with the all hazards approach.

6.17. Plans, procedures and other arrangements, to include coordinating bodies, letters of agreement or legal instruments, shall be made for coordinating a national emergency response. These arrangements for a coordinated national emergency response shall specify the organization responsible for the development and maintenance of the arrangements; shall describe the responsibilities of operating organizations and other response organizations; and shall describe the coordination effected

between these arrangements and the arrangements for response to a conventional emergency and to emergencies initiated by nuclear security events. Consideration shall also be given to parts of these plans, procedures and other arrangements that are confidential. The arrangements shall include provisions that can be used to formulate in detail a response to situations such as: a serious exposure or contamination resulting from contact with a source by a member of the public or resulting from the use of sources in medical applications in patients; the notification of a potential significant transboundary release of radioactive material; dangerous source in the public domain; the notification of the potential re-entry of a satellite; and other unanticipated situations warranting protective actions and other response actions.

6.18. Each response organization shall prepare a general plan or plans for coordinating and performing their assigned functions as specified in Section 5. Emergency plans shall be prepared which specify how responsibilities for managing emergency response operations will be discharged on the site, off the site and across national borders, as appropriate, in separate but coordinated and consistent plans. The plans for emergency response shall be coordinated with any other plans (such as emergency plans for areas in category V, plans for response to nuclear security events including management of crime scenes [8], security plans and contingency plans [6-8], plans for firefighting) that may be implemented in a nuclear or radiological emergency in order to ensure that the simultaneous implementation of the plans would not seriously reduce their effectiveness or cause conflicts.

6.19. The appropriate responsible authorities shall ensure that:

(a) a 'concept of operations'[17] for emergency response is developed at the beginning of the preparedness stage;

(b) emergency plans are prepared and, as appropriate, approved for any facility or activity that could give rise to a need for taking protective actions and other response actions;

(c) response organizations are involved in the preparation of emergency plans, as appropriate;

(d) the content, features and extent of emergency plans take into account the results of any hazard assessment and any lessons learned from operating experience and from emergencies that have occurred, including non-radiological emergencies (see paras 4.15–4.23);

(e) emergency plans are periodically reviewed and updated (see paras 6.34 and 6.36).

6.20. The operating organization of a facility or for an activity in category I, II, III or IV shall prepare an emergency plan. This emergency plan shall be coordinated with those of all other bodies having

[17] A concept of operations is a brief description of the ideal response to a postulated nuclear or radiological emergency, used to ensure that all those involved in the development of a capability for emergency response share a common understanding.

responsibilities in a nuclear or radiological emergency, including public authorities, and shall be submitted to the regulatory body.

6.21. Emergency plans shall cover the following as appropriate:

(a) A description of the organization used to perform the functions specified in Section 5;

(b) The conditions under which the plan is applicable;

(c) The chain of command and communication;

(d) The inventory of equipment and other resources needed for implementation;

(e) The actions to be taken by persons and organizations involved in the implementation of the plan for each emergency class or any conditions;

(f) Preparedness arrangements.

6.22. The operating organization and response organizations shall develop the necessary procedures, analytical tools and computer programs in order to be able to perform the functions specified to meet the requirements for emergency response established in Section 5.

6.23. Procedures, analytical tools and computer models to be used in performing functions to meet the requirements for emergency response shall be tested under simulated emergency conditions and shall be validated as correct prior to use. Any arrangements that are made to use dose projection models early in the emergency response for supporting decision making on the protective actions and other response actions to be taken shall be made in recognition of the limitations of such models to include that the timing and magnitude of releases warranting taking precautionary urgent protective actions and urgent protective actions before, or shortly after, a release off the site may not be predictable and such a release could occur over several days resulting in very complex deposition patterns off the site. These limitations shall be made clear to, and understood by, those responsible for decision making. Tools used as a basis for precautionary urgent protective actions and urgent protective actions shall be integrated into decision-making systems in such a way that their use will not delay the implementation of these actions, especially for making decisions concerning those that need to be taken before or shortly after release to be most effective.

Requirement 22: Logistical support and facilities

The government shall ensure that sufficient logistical support and facilities are provided to enable response functions to be performed effectively in a nuclear or radiological emergency.

6.24. Adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation (such as procedures, checklists, telephone numbers, email addresses and manuals) shall be provided for performing the functions specified in Section 5. These items and facilities shall be selected or designed to be operational under the postulated conditions (such as radiological, working and environmental conditions) that may be encountered in the emergency response, and to be

compatible with other procedures and equipment for the response (such as the communication frequencies of other response organizations), as appropriate. These support items shall be located or provided in a manner that allows their effective use under postulated emergency conditions.

6.25. For facilities in category I, alternative supplies as contingency measures, such as the supply of water, compressed air and mobile electrical power, including any necessary equipment, that are necessary for mitigating severe emergency conditions shall be located and maintained in such a way that they can withstand and will be readily accessible in postulated emergency conditions.

6.26. Emergency response facilities or locations to support the emergency response shall be designated that are operational under the full range of postulated hazardous conditions with the following functions, as appropriate: receiving notifications and initiating the response; coordination and direction of on-site response actions; providing technical and operational support to those personnel performing tasks within a facility and those responding off-site; coordination and direction of off-site response actions with on-site response actions; coordination of national response actions; coordination of public information; coordination of radiological monitoring, sampling and assessment; managing those evacuated (including reception, registration, monitoring and decontamination as well as for meeting the personal needs of those staffing them such as housing, feeding, sanitation etc.); safe storage of necessary resources; and appropriate medical attention to and treatment of individuals who have undergone exposure or contamination.

6.27. For facilities in category I, emergency response facilities[18] separate from the control room and supplementary control room shall be provided so that: technical support can be given to the control room operating personnel in emergency conditions (technical support centre); operational control by the personnel performing tasks within or near the facility can be maintained (operational support centre); and the on-site emergency response is managed (emergency centre). These emergency response facilities shall operate as an integrated system in support of the control room, without interfering in each other's functions. For facilities in category I, the emergency response facilities or locations to be used in an emergency response shall provide reasonable assurance of being able to be operable and habitable under a range of hazardous conditions, including those not considered in the design basis.

Requirement 23: Training, drills and exercises

The government shall ensure that relevant response staff shall take part in regular training, drills and exercises to ensure that they are able to perform their assigned response functions in a nuclear or radiological emergency effectively.

[18] Such emergency response facilities may be collocated (i.e. these functions may be performed from a single emergency response facility or location) as long as it is ensured that they do not interfere with each other in performing their specified functions and that they are separated from the control rooms.

6.28. The operating organization and response organizations shall identify the knowledge, skills and abilities necessary to be able to perform the functions specified in Section 5. The operating organization and response organizations shall make arrangements for the selection of personnel and for training to ensure that the personnel have the requisite knowledge, skills, abilities, equipment, and procedures and other arrangements to perform their assigned response functions. The arrangements shall include ongoing refresher training on an appropriate schedule and arrangements for ensuring that personnel assigned to positions with responsibilities for emergency response undergo the specified training.

6.29. For facilities in category I, II or III all staff and all other persons on the site shall be instructed in the arrangements for them to be notified of an emergency and of their actions when notified of an emergency.

6.30. Exercise programmes shall be conducted to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for facilities in category I, II or III and the national level programmes for category IV or V are tested at suitable intervals. These programmes shall include the participation in some exercises of, as feasible, all of the organizations concerned. The exercises shall be systematically evaluated (see para. 4.9(h)) and some exercises shall be evaluated by the regulatory body. The programme shall be subject to review and updating in the light of experience gained (see paras 4.19 and 6.34).

6.31. The staff responsible for critical response functions[19] for a facility in category I or II and within the emergency planning zones and extended planning distance (to include areas in category V) shall participate in drills and training exercises at least once every year. For facilities in category III and activities in category IV the staff responsible for critical response functions shall participate in training exercises or drills on an appropriate schedule.

6.32. The officials off the site responsible for making decisions on protective actions and other response actions for the population within the emergency planning zones and extended planning distance (see para. 5.53) shall be trained in the protection strategy and shall regularly participate in exercises. The officials off the site responsible for public communications in a nuclear or radiological emergency shall also regularly participate in exercises.

6.33. The conduct of exercises shall be evaluated against established response objectives that demonstrate that identification, notification, activation and other response actions can be performed in time to achieve the practical goals of emergency response (see para. 3.1).

Requirement 24: Quality management programme

[19] Critical response functions are functions that must be performed promptly and correctly in order to classify, declare and notify an emergency effectively, to activate the emergency response, to manage the response, to take mitigatory actions, to protect emergency workers and to take urgent protective actions on and off the site in accordance with international safety standards.

The government shall ensure that a quality management programme is established to ensure a high degree of availability and reliability of all supplies, equipment, communication systems and facilities, plans, procedures and other arrangements necessary for effective emergency response.

6.34. The operating organization, as part of its management system, and response organizations, as part of its emergency management system, shall establish a quality management programme to ensure a high degree of availability and reliability of all supplies, equipment, communication systems and facilities, plans, procedures and other arrangements necessary to perform the functions specified in Section 5 in a nuclear or radiological emergency (see para. 6.24). This programme shall include arrangements for inventories, resupply, tests and calibrations, made to ensure that these items and facilities are continuously available and functional for use in a nuclear or radiological emergency. Arrangements shall be made to maintain, review and update emergency plans, procedures and other arrangements and to incorporate lessons learned from research, operating experience (such as the response to emergencies) and emergency exercises (see paras 4.19, 6.30 and 6.36). The quality management programme shall also include periodic and independent audits against the functions specified under Section 5 including participation in international audits such as those organized through the IAEA (e.g. Emergency Preparedness Review (EPREV) missions).

6.35. The operating organization and response organizations shall establish and maintain adequate records in relation to both the emergency arrangements and the response to a nuclear or radiological emergency, to include dose assessments, monitoring results and inventory of radioactive waste managed, in order to allow for their review and evaluation. These records shall also provide for the identification of those persons requiring long term health monitoring and follow-up, as necessary, as well as for the long term management of radioactive waste.

6.36. The operating organization and response organizations shall make arrangements to review and evaluate responses in real events and in exercises, to record the areas in which improvements are necessary and to ensure that the necessary improvements are made.

6.37. Relevant international organizations shall review and update their applicable standards, guidelines and relevant arrangements in emergency preparedness and response on the basis of research and lessons learned from the response to real emergencies and emergency exercises.

Appendix I

GUIDANCE VALUES FOR RESTRICTING EXPOSURE OF EMERGENCY WORKERS AND HELPERS IN AN EMERGENCY

I.1. This Appendix provides guidance values to be the basis for operational guidance for restricting exposure to emergency workers and helpers in an emergency.

I.2. In almost all emergencies, at most only the dose from external penetrating radiation can be measured or estimated continuously. In view of this and assuming that every effort has been made for protection against non-penetrating external radiation and from intake or skin contamination (see para. 4.71), Table I.1 provides guidance values for restricting exposure for emergency workers and helpers in an emergency in terms of personal dose equivalent $H_P(10)$ from external penetrating radiation.

I.3. As soon as possible, the total dose (i.e. effective dose or equivalent dose to an organ or tissue) via all exposure pathways (i.e. both external dose and committed dose from intake) needs to be estimated and further potential exposure restricted as appropriate (see para. 5.76). Table II.1 also provides guidance for the effective dose and equivalent dose to an organ or tissue via all exposure pathways (including committed dose from intake) for restricting further exposure in response to a nuclear or radiological emergency once the total dose has been estimated.

I.4. The guidance levels for external penetrating radiation ($H_p(10)$) do not consider the possible severe deterministic effects to a fetus which can occur at any dose greater than 100 mSv. Consequently female workers who are aware that they are pregnant or who might be pregnant shall be informed of this risk and would typically be excluded from taking actions in response to a nuclear or radiological emergency that might result in doses exceeding the guidance values in Table I.1 for actions to avert a large collective dose.

TABLE I.1. GUIDANCE VALUES FOR RESTRICTING EXPOSURE OF EMERGENCY WORKERS AND HELPERS IN AN EMERGENCY

Tasks	Guidance value[a]
Life saving actions	- $H_P(10)$[b] < 500 mSv or - E[c]<500 mSv, H_{fetus}[d]<100 mSv or - *Total dose less than the generic criteria in Table II.1 for which protective actions and other response actions are expected to be undertaken under any circumstances to avoid or to minimize severe deterministic effects.* This value may be exceeded under circumstances in which the expected benefits to others clearly outweigh the emergency worker's own health risks, and the emergency worker volunteers to take the action and understands and accepts this health risk.
Actions to prevent severe deterministic effects and actions to prevent the development of catastrophic conditions that could significantly affect people and the environment	- $H_P(10)$ < 500 mSv or - E<500 mSv, H_{fetus}<100 mSv
Actions to avert a large collective dose	- $H_P(10)$ < 100 mSv or - E<100 mSv, H_{fetus}<100 mSv

a. These values apply for: (a) the dose from exposure to external penetrating radiation. Doses from exposure to non-penetrating external radiation and from intake or skin contamination need to be prevented by all possible means. If this is not feasible, the effective dose and the equivalent dose to an organ or tissue that are received have to be limited to minimize the health risk to the individual in line with the risk associated with the guidance values given here; and (b) the total dose (effective dose or equivalent dose to an organ or tissue) via all exposure pathways (i.e. both external dose and committed dose from intake) which is to be estimated as soon as possible in order to enable restricting further potential exposure as appropriate.

b. $H_P(10)$ is the personal dose equivalent $H_P(d)$ where d = 10 mm. $H_p(10)$ also represents $H_p(3)$ (i.e. personal dose equivalent $H_P(d)$ where d = 3 mm), except in case of exposure to beta radiation with a maximum energy above about 0.7 MeV or to photon radiation with a mean energy below about 40 keV. In these cases, a restriction on $H_p(10)$ is not sufficient for protecting the lens of the eye. Therefore, in these cases, all practicable means needs to be taken for ensuring protection of the lens of the eye (see para. 5.71).

c. Effective dose.

d. Equivalent dose to the fetus.

Appendix II

GENERIC CRITERIA

II.1. This Appendix provides generic criteria:

(a) at which protective actions and other response actions are expected to be undertaken under any circumstances to avoid or to minimize severe deterministic effects;

(b) at which protective actions and other response actions are expected to be taken, if they can be taken safely, to reasonably reduce the risk of stochastic effects;

(c) at which restriction of trade is warranted in consideration of the non-radiological consequences of the emergency; and

(d) for use as a target dose for the transition to an existing exposure situation,

including examples of associated protective actions and other response actions expected to be taken.

II.2. These generic criteria are generically optimized for taking appropriate protective actions and other response actions in a nuclear or radiological emergency.

II.3. For each exposure scenario that could result in doses that exceed the generic criteria, operational criteria (e.g. operational intervention levels), shall be predetermined for these generic criteria to be used immediately and directly (without further assessment) to determine the appropriate protective actions and other response actions.

II.4. The operational criteria shall be established for the representative person with account duly taken of pregnant women and children as the most vulnerable to radiation exposure.

II.5. The basis for the protective actions and other response actions (e.g. operational criteria and calculated doses) shall be explained to the public and decision makers in terms of the associated health hazards, according to the following system:

(a) ‘Possibly dangerous to health’ when the generic criteria in Table II.1 are projected or received, since there is a possibility of severe deterministic effects (i.e. radiation induced health effects that are life threatening or can result in a permanent injury that reduces the quality of life);

(b) ‘Health concerns’ when the generic criteria in Table II.2 are projected or received, since the risk of radiation induced health effects warrants a medical screening;

(c) ‘Safe’ when the generic criteria both in Table II.1 and Table II.2 are not projected or received, since no protective actions and other response actions are justified from the radiological point of view to reduce the risk of stochastic effects or to minimize severe deterministic effects as there will be neither observable increase in incidence of cancer nor any severe deterministic effect.

GENERIC CRITERIA FOR ACUTE DOSES FOR WHICH PROTECTIVE ACTIONS AND OTHER RESPONSE ACTIONS ARE EXPECTED TO BE UNDERTAKEN UNDER ANY CIRCUMSTANCES TO AVOID OR TO MINIMIZE SEVERE DETERMINISTIC EFFECTS

II.6. Table II.1 provides generic criteria for use in developing a protection strategy and operational criteria for effective implementation of protective actions and other response actions to avoid or to minimize severe deterministic effects.

TABLE II.1. GENERIC CRITERIA FOR ACUTE DOSES FOR WHICH PROTECTIVE ACTIONS AND OTHER RESPONSE ACTIONS ARE EXPECTED TO BE UNDERTAKEN UNDER ANY CIRCUMSTANCES TO AVOID OR TO MINIMIZE SEVERE DETERMINISTIC EFFECTS [14]

External acute exposure (< 10 h)		If the dose is projected:
$AD_{Red\ marrow}$ [a]	1 Gy	– Take precautionary urgent protective actions immediately (even under difficult conditions) to keep doses below the generic criteria
AD_{Fetus}	0.1 [b] Gy	
AD_{Tissue} [c]	25 Gy at 0.5 cm	– Provide public information and warnings
AD_{Skin} [d]	10 Gy to 100 cm^2	– Carry out urgent decontamination
Internal exposure from acute intake (Δ = 30 d [e])		
$AD(\Delta)_{Red\ marrow}$	0.2 Gy for radionuclides with atomic number $Z \geq 90$ [f]	If the dose has been received: – Perform immediate medical examination, consultation and indicated medical treatment
	2 Gy for radionuclides with atomic number $Z \leq 89$ [f]	– Carry out contamination control
$AD(\Delta)_{Thyroid}$	2 Gy	– Carry out immediate decorporation [g] (if applicable)
$AD(\Delta)_{Lung}$ [h]	30 Gy	– Conduct registration for long term health monitoring
$AD(\Delta)_{Colon}$	20 Gy	
$AD(\Delta')_{Fetus}$ [i]	0.1 [b] Gy	– Provide comprehensive psychological counselling

[a] $AD_{Red\ marrow}$ represents the average RBE weighted absorbed dose to internal tissues or organs (e.g. red marrow, lung, small intestine, gonads, thyroid) and to the lens of the eye from exposure in a uniform field of strongly penetrating radiation.

[b] At 0.1 Gy there would only be a very small probability of severe deterministic effects to the fetus and only during certain periods post conception (e.g. between 8 and 15 weeks of gestation age) and only if the dose received is from high dose rates. During other periods post conception and for lower dose rates, the fetus is less sensitive. There is a high probability of severe deterministic effects at 1 Gy. Therefore, 1 Gy is used as the generic criteria for acute doses to the fetus: (i) in the hazard assessment (see para. 4.22) to identify facilities and activities, on-site areas, off-site areas and locations for which a nuclear or radiological emergency could warrant precautionary urgent protective actions to avoid or to minimize severe deterministic effects; (ii) for identifying exposure situations (see para. II.5) that are 'possibly dangerous to health'; and (iii) for making arrangements (see para. 5.53) for effective implementation of decisions on

urgent protective actions and other response actions to be taken off the site to avoid or minimize the occurrence of severe deterministic effects (e.g. establishing a precautionary action zone (PAZ)).

[c.] Dose delivered to 100 cm^2 at a depth of 0.5 cm under the body surface in tissue due to close contact with a radioactive source (e.g. source carried in the hand or pocket).

[d.] The dose is to the 100 cm^2 dermis (skin structures at a depth of 40 mg/cm^2 (or 0.4 mm) below the surface).

[e.] $AD(\Delta)$ is the RBE weighted absorbed dose delivered over the period of time Δ by the intake (I_{05}) that will result in a severe deterministic effect in 5% of exposed individuals. It is calculated as described in Ref. [16].

[f.] Different criteria are used to take account of the significant difference in the radionuclide specific intake threshold values for the radionuclides in these groups.

[g.] Decorporation is the action of the biological processes, facilitated by chemical or biological agents, by means of which incorporated radionuclides are removed from the human body. The generic criterion for decorporation is based on the projected dose without decorporation.

[h.] For the purposes of these generic criteria 'lung' means the alveolar-interstitial region of the respiratory tract.

[i.] For this particular case, Δ' means the period of in utero development.

GENERIC CRITERIA FOR PROTECTIVE ACTIONS AND OTHER RESPONSE ACTIONS TO REDUCE THE RISK OF STOCHASTIC EFFECTS IN AN EMERGENCY

II.7. Table II.2 provides generic criteria for use in developing a protection strategy and operational criteria for effective implementation of protective actions and other response actions to reduce the risk of stochastic effects in a nuclear or radiological emergency as elaborated in Ref. [3].

II.8. These actions shall be taken only for those affected for which they can be taken safely without endangering their lives (e.g. evacuation of patients requiring specialized medical treatment) or causing more detriment than they avert.

II.9. Arrangements shall be made to revise the predetermined operational criteria based on these generic criteria, as appropriate, to be adapted to the prevailing conditions.

TABLE II.2. GENERIC CRITERIA FOR PROTECTIVE ACTIONS AND OTHER RESPONSE ACTIONS IN AN EMERGENCY TO REDUCE THE RISK OF STOCHASTIC EFFECTS [14]

Generic criteria		**Examples of protective actions and other response actions**[a]
Projected dose that exceeds the following generic criteria: Take urgent protective actions and other response actions		
$H_{Thyroid}$	50 mSv[b] in the first 7 days	Iodine thyroid blocking[c]
E H_{Fetus}	100 mSv in the first 7 days 100 mSv in the first 7 days	Sheltering; evacuation; decontamination; restriction of consumption of food, milk and water; contamination control; public reassurance
Projected dose that exceeds the following generic criteria: Take early protective actions and other response actions		
E H_{Fetus}	100 mSv per annum 100 mSv for the full period of in utero development	Temporary relocation; decontamination; replacement of food, milk and water; public reassurance
Dose that has been received and that exceeds the following generic criteria: Take longer term medical actions to detect and to effectively treat radiation induced health effects		
E	100 mSv in a month	Screening based on equivalent doses to specific radiosensitive organs (as a basis for medical follow-up), counselling
H_{Fetus}	100 mSv for the full period of in utero development	Counselling to allow informed decisions to be made in individual circumstances

a. These examples are neither exhaustive nor are they grouped in a mutually exclusive way.

b. For the thyroid, iodine thyroid blocking is an urgent protective action that is prescribed: (a) if exposure due to radioactive iodine is involved, (b) before or shortly after a release of radioactive iodine, and (c) only within a short period before or after the intake of radioactive iodine.

c. The equivalent dose to the thyroid ($H_{Thyroid}$) only due to exposure to radioiodine.

GENERIC CRITERIA FOR FOOD, MILK AND DRINKING WATER AND OTHER COMMODITIES TO REDUCE THE RISK OF STOCHASTIC EFFECTS IN AN EMERGENCY

II.10. Table II.3 provides generic criteria for use in developing a protection strategy and operational criteria for effective implementation of protective actions and other response actions to reasonably reduce the risk of stochastic effects from ingestion of food, milk and drinking water and from used of other commodities in a nuclear or radiological emergency.

II.11. Generic criteria of 1/10 of the generic criteria for early protective actions and other response actions given in Table II.2 is established for food, milk and drinking water and other commodities restrictions to ensure that the dose from all exposure pathways, including ingestion, will not exceed the generic criteria for early protective actions and other response actions given in Table II.2.

II.12. If restriction of consumption of food, milk and drinking water will result in severe malnutrition or dehydration because replacements are not available, food, milk and drinking water with concentration levels projected to result in a dose above the generic criteria in Table II.3 may be consumed until replacements are available, or the affected people can be relocated, provided this will not result in doses above the generic criteria in Table II.1.

II.13. Arrangements shall be made to revise the predetermined operational criteria (e.g. operational intervention levels) for food, milk and drinking water and other commodities, as appropriate, to adapt to the conditions prevailing during the emergency to ensure that those people in the areas affected will not receive a dose from all exposure pathways greater than the generic criteria for early protective actions and other response actions given in Table II.2.

TABLE II.3. GENERIC CRITERIA FOR FOOD, MILK AND DRINKING WATER AND OTHER COMMODITIES TO REDUCE THE RISK OF STOCHASTIC EFFECTS IN AN EMERGENCY

Generic criteria		**Examples of protective actions and other response actions**
Projected dose from ingestion of food, milk and drinking water that exceeds the following generic criteria: Take protective actions and other response actions as justified[a].		
E	10 mSv per annum	Stop consumption and distribution of non-essential[a] food, milk and drinking water and restrict use and distribution of other commodities. Replace essential[b] food, milk and drinking water as soon as possible or relocate the people if replacements are not available. Estimate the dose of those who may have consumed food, milk and drinking water or used other commodities that may result in a dose exceeding the generic criteria to determine if medical counselling and follow-up is warranted in accordance with Table II.2.
H_{Fetus}	10 mSv for the full period of in utero development	

a. Justified actions yield sufficient benefits to outweigh the detriments associated with taking them. This shall include consideration of those detriments not associated with the radiation exposure to include the detrimental impact on health (e.g. possible reduced life expectancy due to resettlement), economy, society, and culture.

b. Restricting essential food, milk or drinking water could result in dehydration, severe malnutrition or other health consequences; therefore, essential food, milk and drinking water shall be restricted only if alternatives are available.

GENERIC CRITERIA FOR VEHICLES, EQUIPMENT AND OTHER ITEMS TO REDUCE THE RISK OF STOCHASTIC EFFECTS IN AN EMERGENCY

II.14. Table II.4 provides generic criteria for use in determining a protection strategy and operational criteria for effective implementation of protective actions and other response actions to reduce the risk of stochastic effects from the use of vehicles, equipment and other items from an area affected by a nuclear or radiological emergency.

II.15. Generic criteria of 1/10 of the generic criteria for early protective actions and other response actions given in Table II.2 is established for vehicles, equipment and other items from an affected area to ensure that the dose from all exposure pathways, including use of such vehicles, equipment and other items, will not exceed the generic criteria for early actions given in Table II.2 for a member of the public.

II.16. Restricting the use of vehicles, equipment and other items from an affected area could interfere with taking urgent protective actions and other response actions or with providing services essential for public health or well-being (e.g. transfer of patients requiring continuous specialized medical treatment, reaching a final destination only once the ship or aircraft has left the affected area). Such vehicles, equipment and other items whose use is projected to result in a dose above the generic criteria given in Table II.4 may be used until replacements are available, provided that: (a) their use will not result in doses that exceed the generic criteria given in Table II.1 for a member of the public or the guidance values for restricting exposure of emergency workers and helpers in an emergency given in Appendix I, and (b) actions are taken to control the dose to the user as an emergency worker, a helper in an emergency or a member of the public, as appropriate.

II.17. Arrangements shall be made to revise the predetermined operational criteria (e.g. operational intervention levels) for the use of vehicles, equipment and other items from an affected area, as appropriate, to adapt to the conditions prevailing during the emergency, to ensure that those people in the areas affected will not receive a dose from all exposure pathways greater than the generic criteria for early protective actions and other response actions given in Table II.2.

TABLE II.4. GENERIC CRITERIA FOR VEHICLES, EQUIPMENT AND OTHER ITEMS TO REDUCE THE RISK OF STOCHASTIC EFFECTS IN AN EMERGENCY

Generic criteria		**Examples of protective actions and other response actions**
Projected dose from the use of vehicles, equipment or other items from an affected area that exceed the following generic criteria: Take protective actions and other response actions as justified[a].		
E	10 mSv per annum	Stop non-essential[b] use. Use essential vehicles, equipment and other items from an affected area until replacements are available if: (a) use will not result in doses exceeding the generic criteria in Table II.2 for a member of the public or the guidance values in Appendix I for the emergency workers and helpers in an emergency, and (b) actions are taken to reduce the dose to the user as an emergency worker, helper in an emergency or a member of the public, as appropriate. Estimate the dose of those emergency workers, helpers in an emergency and members of the public who may have used a vehicle, equipment and other item from an affected area that may result in a dose exceeding the generic criteria for which medical counselling and follow-up is warranted in accordance with Table II.2.
H_{Fetus}	10 mSv for the full period of in utero development	

a. Justified actions yield sufficient benefits to outweigh the detriments associated with taking them. This shall include consideration of those detriments not associated with the radiation exposure to include the detrimental impact on health, economy, society, and culture.

b. Restricting use of essential vehicles, equipment and other items from an affected area could interfere with taking urgent protective actions and other response actions or with providing services essential for public health or well-being (e.g. transfer of patients requiring continuous specialized medical treatment, reaching a final destination only once the ship or aircraft has left the affected area).

GENERIC CRITERIA FOR RESPONSE ACTIONS FOR COMMODITIES AND FOOD TRADED INTERNATIONALLY

II.18. Table II.5 provides generic criteria for use in determining the strategy and operational criteria for effective implementation of response actions to reduce the non-radiological consequences of the emergency by providing a basis for the resumption of international trade.

II.19. Exceeding the generic criteria in Table II.5 does not mean that the commodities and food are unsafe in terms of the radiation induced health effects (see para. II.4). Commodities and food are to be considered unsafe in terms of the radiation induced health effects (see para. II.5) only if the generic criteria in Table II.1 or II.2 are projected to be exceeded.

II.20. The generic criteria for commodities and food traded internationally that could contain radioactive material as a result of a nuclear or radiological emergency are established at 1/100 of the generic criteria given in Table II.2 for early protective actions and other response actions to ensure that the dose to the public will be a small fraction for which actions are warranted to reduce the risk of stochastic effects, since these commodities and food may not be controlled following export.

II.21. Arrangements shall be made to revise the predetermined operational criteria based on these generic criteria, as appropriate, to adapt to the prevailing conditions.

II.22. For food traded internationally that could contain radionuclides as a result of a nuclear or radiological emergency, the operational criteria (guideline levels) as published by the Joint FAO/WHO Codex Alimentarius Commission [15] shall be used (see para. 5.23 of Ref [14]) ultimately.

II.23. If restricting trade in commodities and food could result in severe health effects or other detrimental effects in another State, than the commodities and food that are projected to result in a dose above the generic criteria may be traded if justified until replacements are available, provided that: (a) trade is approved with the receiving State; (b) trade will not result in doses that exceed the generic criteria in Table II.2 for the public; (c) actions are taken to control the dose during transport, and (d) actions are taken to control the use and reduce the dose to the member of the public.

TABLE II.5. GENERIC CRITERIA FOR RESPONSE ACTIONS FOR COMMODITIES AND FOOD TRADED INTERNATIONALLY

Generic criteria		**Examples of other response actions**
Projected dose from commodities and food that exceed the generic criteria: Take response actions to restrict international trade.		
E	1 mSv per annum	Restrict non-essential[a] international trade. Trade essential commodities and food until replacements are available if: (a) trade is approved with the receiving State; (b) trade will not result in doses that exceed the generic criteria given in Table II.2 for the public; (c) actions are taken to control the dose during transport; and (d) actions are taken to control the use and reduce the dose to the member of the public.
H_{Fetus}	1 mSv for the full period of in utero development	

[a.] Restricting the trade of essential commodities and food could result in severe health effects or other detrimental conditions in another State.

GENERIC CRITERIA AS A TARGET DOSE FOR THE TRANSITION TO AN EXISTING EXPOSURE SITUATION

II.24. Generic criteria shall be established for use as a target dose for the implementation of protective actions and other actions aimed at enabling the transition to an existing exposure situation with due consideration and verification of the fulfilment of conditions set in para. II.25. These criteria shall be established to 1/5[1] of the generic criteria for the early protective actions and other response actions given in Table II.2 and are provided below:

a) an effective dose of 20 mSv per annum; and

b) an equivalent dose to a fetus of 20 mSv for the full period of utero development.

II.25. The decision to terminate the emergency phase and the concurrent transition to an existing exposure situation shall be taken after: (a) justified[2] actions have been taken to reach the target dose[3] and it has been confirmed that further implementation of actions to reach the target dose will do more harm than good; (b) confirmation that the source of exposure is fully characterized for all members of the public living normally in the area; (c) the exposure situation is understood and remains stable; (d) any restrictions on normal living conditions are limited and provisions are in place to confirm compliance with such restrictions; and (e) ensuring that interested parties including members of the public are consulted and kept informed about the basis for the adjustment and transition placing the associated health hazards in perspective (see para. II.5).

II.26. Any further reduction of the dose to a member of the public below the target dose used for deciding on the transition to an existing exposure situation (see para. II.25) shall be carefully considered taking into account that actions to be taken to achieve such reduction may do more harm than good.

[1] This is of the order of the dose above which the government is required to ensure that an action plan is established comprising coordinated actions to reduce natural occurring source of exposure (e.g. Rn-222) [14]. This is also consistent with reference levels established in Ref. [14] for both emergency exposure situation and existing exposure situation.

[2] Justified actions yield sufficient benefits to outweigh the detriments associated with taking them. This shall include consideration of those detriments not associated with the radiation exposure to include the detrimental impact on health (e.g. possible reduced life expectancy due to resettlement), economy, society, and culture.

[3] This does not necessarily mean that the target dose is to be reached considering that no radiation induced health effects are to be observed for exposures below the generic criteria for early protective actions and other response actions given in Table II.2.

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Annex

REQUIREMENTS APPLICABLE BY CATEGORY

A-1. Table A-1 in this Annex lists the paragraphs applicable for each category.

TABLE A-1. PARAGRAPHS APPLICABLE FOR EACH CATEGORY

<table>
<tr><th>Category</th><th colspan="5">Paragraphs applicable for each category</th></tr>
<tr><td rowspan="2">I</td><td rowspan="2">1.1-1.16</td><td rowspan="2"></td><td rowspan="2"></td><td>5.53
6.11</td><td>5.10
6.26, 6.28</td></tr>
<tr><td rowspan="4">II</td><td rowspan="4">5.7, 5.15, 5.22, 5.29, 5.33, 5.54-5.55, 5.60-5.61, 5.86, 5.105-5.106
6.33</td><td rowspan="4">-</td></tr>
<tr><td>2.1-2.8
3.1-3.2
4.1-4.9, 4.11, 4.14-4.17, 4.19, 4.21</td><td>4.10, 4.12-4.13, 4.18, 4.20, 4.23
5.11, 5.16, 5.18, 5.25-5.28, 5.32, 5.34, 5.36, 5.143-5.145
6.21-6.22</td><td>5.2-5.3, 5.8-5.9, 5.41-5.42, 5.48, 5.56-5.57, 5.85
6.30</td></tr>
<tr><td>III</td><td>5.1, 5.4-5.6, 5.12-5.14, 5.21, 5.30-5.31, 5.43-5.47, 5.50-5.51, 5.59, 5.65-5.84, 5.87-5.104, 5.107-5.109, 5.111-5.142
6.1-6.10, 6.12-6.14, 6.16-6.20, 6.23-6.25, 6.27. 6.29, 6.31-6.32, 6.34-6.38</td><td>5.62</td></tr>
<tr><td>IV</td><td>4.22
5.17, 5.23-5.24, 5.35, 5.37-5.40, 5.49, 5.52, 5.58, 5.62-5.64, 5.110</td></tr>
<tr><td>V</td><td>6.15</td><td>5.19, 5.20</td><td>5.7, 5.15, 5.22, 5.29, 5.33, 5.54-5.55, 5.60-5.61, 5.86, 5.105-5.106
6.33</td><td></td></tr>
</table>

DEFINITIONS

The following definitions apply for the purposes of these Standards.
Further definitions are provided in the IAEA Safety Glossary: Terminology Used in Nuclear Safety and Radiation Protection (2007 Edition), IAEA, Vienna (2007):
http://www-ns.iaea.org/standards/safety-glossary.asp

The symbol 'ⓘ' denotes an information note; this note is not part of the definition.

*Those terms that are consistent with terms defined in the IAEA Safety Standard No. GSR Part 3 have been indicated with a *. New definitions have been indicated with a **.*

arrangements

See (emergency) arrangements.

authorization*

The granting by a regulatory body or other governmental body of written permission for a person or organization to conduct specified activities.

control*

The function or power or (usually as controls) means of directing, regulating or restraining.

ⓘ It should be noted that the usual meaning of the English word control in safety related contexts is somewhat 'stronger' (more active) than that of its usual translations and other similar words in some other languages. For example, 'control' typically implies not only checking or monitoring something but also ensuring that corrective or enforcement measures are taken if the results of the checking or monitoring indicate such a need. This is in contrast, for example, to the more limited usage of the equivalent word in French and Spanish.

regulatory control. Any form of control or regulation applied to facilities and activities by a regulatory body for reasons relating to nuclear safety and radiation protection or to nuclear security.

ⓘ In nuclear security series [8], the phrase 'out of regulatory control' is used to describe a situation in which nuclear material or other radioactive material is present without an appropriate authorization, either because controls have failed for some reason, or because they never existed.

dangerous source

See source.

deterministic effect*

A health effect of radiation for which generally a threshold level of dose exists above which the severity of the effect is greater for a higher dose.

ⓘ The level of the threshold dose is characteristic of the particular health effect but may also depend, to a limited extent, on the exposed individual. Examples of deterministic effects include erythema and acute radiation syndrome (radiation sickness).

ⓘ Such an effect is described as a severe deterministic effect if it is fatal or life threatening or results in a permanent injury that reduces quality of life.

ⓘ Deterministic effects are also referred to as 'harmful tissue reactions'.

early protective actions**

See protective actions.

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 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.

nuclear or radiological emergency. An emergency in which there is, or is perceived to be, a hazard due to:

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

emergency action level (EAL)*

A specific, predetermined, observable criterion used to detect, recognize and determine the emergency class.

(emergency) arrangements*

The integrated set of infrastructural elements necessary to provide the capability for performing a specified function or task required in response to a nuclear or radiological emergency. These elements may include authorities and responsibilities, organization, coordination, personnel, plans, procedures, facilities, equipment or training.

emergency class*

A set of conditions that warrant a similar immediate emergency response.

ⓘ This is the term used for communicating to the response organizations and to members of the public the level of response needed. The events that belong to a given emergency class are defined by criteria specific to the installation, source or practice, which, if exceeded, indicate

classification at the prescribed level. For each emergency class, the initial actions of the response organizations are predefined.

emergency classification

The process whereby an authorized official classifies an emergency in order to declare the applicable emergency class.

ⓘ Upon declaration of the emergency class, the response organizations initiate the predefined response actions for that emergency class.

emergency exposure situation*

An emergency exposure situation is a situation of exposure that arises as a result of an accident, a malicious act, or any other unexpected event, and requires prompt action in order to avoid or reduce adverse consequences.

ⓘ Emergency exposures can be reduced only by protective actions and other response actions.

emergency plan*

A description of the objectives, policy and concept of operations for the response to an emergency and of the structure, authorities and responsibilities for a systematic, coordinated and effective response. The emergency plan serves as the basis for the development of other plans, procedures and checklists.

ⓘ A ***concept of operations*** is a brief description of the ideal response to a postulated nuclear or radiological emergency, used to ensure that all those involved in the development of a capability for emergency response share a common understanding.

emergency planning distance**

See extended planning distance (EPD) and ingestion and commodities planning distance (ICPD).

emergency planning zone

See precautionary action zone (PAZ) and urgent protective action planning zone (UPZ).

emergency planning zones and distances**

See precautionary action zone (PAZ), urgent protective action planning zone (UPZ), extended planning distance (EPD) and ingestion and commodities planning distance (ICPD).

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 procedures*

A set of instructions describing in detail the actions to be taken by emergency workers in an emergency.

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.

emergency response commander**

The person responsible for directing the response of all the organizations responding to an emergency (including the response for radiological hazards, the response for conventional hazards and the response for law enforcement); referred to in some States as the incident commander.

emergency response facility or location**

Facility or location needed for supporting an emergency response, to which specific functions are assigned at the preparedness stage and which need to be usable under emergency conditions.

- ⓘ There are two different types of emergency response facilities or locations: those established in advance (e.g. technical support centre for nuclear power plants) and those established at the time of an emergency (e.g. triage area).
- ⓘ Depending on the emergency preparedness category and on the nature of an emergency, an emergency response facility may be an emergency response location.

emergency services

The local off-site response organizations that are generally available and that perform emergency response functions. These may include police, fire fighters and rescue brigades, ambulance services and control teams for hazardous materials.

emergency worker*

A person having specified duties as a worker in response to an emergency.

- ⓘ Emergency workers may include workers employed, both directly and indirectly, by registrants and licensees as well as personnel of responding organizations, such as police officers, firefighters, medical personnel, and drivers and crews of evacuation vehicles.
- ⓘ Emergency workers may or may not be designated as such in advance to an emergency. Emergency workers not designated as such in advance to an emergency, are not necessarily *workers* prior to the emergency.

existing exposure situation*

An existing exposure situation is a situation of exposure that already exists when a decision on the need for control needs to be taken.

- ⓘ Existing exposure situations include exposure to natural background radiation that is amenable to control; exposure due to residual radioactive material that arose from past practices that were never subject to regulatory control or exposure due to residual radioactive material arising from a nuclear or radiation emergency after an emergency exposure situation has been declared to be ended.

extended planning distance (EPD)**

Distance around a nuclear power plant within which arrangements are made to conduct monitoring in order to identify, within a period that would be effective in reducing the risk of stochastic effects, areas warranting (1) evacuation within a day following a release or (2) relocation within a week to a month following a release.

facilities and activities*

A general term encompassing nuclear facilities, uses of all sources of ionizing radiation, all radioactive waste management activities, transport of radioactive material and any other practice or circumstances in which people may be subject to exposure to radiation from naturally occurring or artificial sources.

- ⓘ Facilities includes: nuclear facilities; irradiation installations; some mining and raw material processing facilities such as uranium mines; radioactive waste management facilities; and any other places where radioactive material is produced, processed, used, handled, stored or disposed of — or where radiation generators are installed — on such a scale that consideration of protection and safety is required.
- ⓘ Activities includes: the production, use, import and export of radiation sources for industrial, research and medical purposes; the transport of radioactive material; the decommissioning of facilities; radioactive waste management activities such as the discharge of effluents; and some aspects of the remediation of sites affected by residues from past activities.
- ⓘ This term is intended to provide an alternative to the terminology of sources and practices (or intervention) to refer to general categories of situations. For example, a practice may involve many different facilities and/or activities, whereas the general definition (1) of source is too broad in some cases: a facility or activity might constitute a source, or might involve the use of many sources, depending upon the interpretation used.
- ⓘ The term facilities and activities is very general, and includes those for which little or no regulatory control may be necessary or achievable: the more specific terms authorized facility and authorized activity should be used to distinguish those facilities and activities for which any form of authorization has been given.
- ⓘ In the Fundamental Safety Principles (Safety Fundamentals), the term ‘facilities and activities — existing and new — utilized for peaceful purposes’ is abbreviated for convenience to facilities and activities as a general term encompassing any human activity that may cause people to be exposed to radiation risks arising from naturally occurring or artificial sources (see Ref. [1], para. 1.9).

first responders

The first members of an emergency service to respond at the scene of an emergency.

generic criteria**

Levels for the projected dose, the dose that has been received or the residual dose at which protective actions and other response actions are to be taken.

graded approach*

1) For a system of control, such as a regulatory system or a safety system, a process or method in which the stringency of the control measures and conditions to be applied is commensurate, to the extent practicable, with the likelihood and possible consequences of, and the level of risk associated with, a loss of control.
2) An application of safety requirements that is commensurate with the characteristics of the practice or source and with the magnitude and likelihood of the exposures.

ⓘ In the Nuclear Security Fundamentals [2], a 'graded approach' means the application of nuclear security measures proportionate to the potential consequences of criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities or associated activities, or other acts determined by the State to have an adverse impact on nuclear security.

hazard assessment*

Assessment of hazards associated with facilities, activities or sources within or beyond the borders of a State in order to identify:

(a) Those events and the associated areas for which protective actions may be required within the State;

(b) The actions that would be effective in mitigating the consequences of such events.

helpers in an emergency**

Members of the public who willingly and voluntarily help in response to a nuclear or radiological emergency.

ⓘ Helpers in an emergency are aware that they may be exposed to radiation and that their exposure could exceed the generic criteria at which protective actions and other response actions are to be taken to protect the public.

ingestion and commodities planning distance (ICPD)**

The distance around a nuclear power plant for the area within which arrangements are made, following the declaration of a General Emergency, to take effective response actions in reducing the risk for stochastic effects by protecting the public from food, milk, water and commodities that may be contaminated by the release.

inner cordoned off area**

An area established by the first responders around a potential radiation hazard within which protective actions and other response actions are recommended to be taken to protect the first responders and the public from possible external exposure and contamination.

interested party*

A person, company, etc., with a concern or interest in the activities and performance of an organization, business, system, etc.

ⓘ The term interested party is used in a broad sense to mean a person or group having an interest in the performance of an organization. Those who can influence events may effectively become interested parties — whether their 'interest' is regarded as 'genuine' or not — in the sense that their views need to be considered. Interested parties have typically included the following: customers, owners, operators, employees, suppliers, partners, trade unions; the regulated industry or professionals; scientific bodies; governmental agencies or regulatory bodies (national, regional and local) whose responsibilities may cover nuclear energy; the media; members of the public (individuals, community groups and interest groups); and other States, especially neighbouring States that have entered into agreements providing for an exchange of information concerning possible transboundary impacts, or States involved in the export or import of certain technologies or materials.

management system*

A set of interrelated or interacting elements (the system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner.

ⓘ The component parts of the management system include the organizational structure, resources and organizational processes. Management is defined (in ISO 9000) as coordinated activities to direct and control an organization.

ⓘ The management system integrates all elements of an organization into one coherent system to enable all of the organization's objectives to be achieved. These elements include the organizational structure, resources and processes. Personnel, equipment and organizational culture as well as the documented policies and processes are parts of the management system. The organization's processes have to address the totality of the requirements on the organization as established in, for example, IAEA safety standards and other international codes and standards.

non-radiological consequences**

Adverse psychological, social or economic consequences of a nuclear or radiological emergency or of the response to an emergency that have effects on human health and safety, quality of life, property or the environment.

notification

(1) A report submitted promptly to a national or international authority providing details of an emergency or a possible emergency; for example, as required by the Convention of Early Notification of a Nuclear Accident [9].

(2) A set of actions taken upon detection of emergency conditions with the purpose of alerting all organizations with responsibility for emergency response in the event of such conditions.

notification point

A designated organization with which arrangements have been made to receive notification (meaning (2)) and to initiate promptly predetermined actions to activate a part of the emergency response.

notifying State

The State that is responsible for notifying (see notification (1)) potentially affected States and the IAEA of an event of actual, potential or perceived radiological significance for other States. This includes:

(1) The State Party that has jurisdiction or control over the facility or activity (including space objects) in accordance with Article 1 of the Convention on Early Notification of a Nuclear Accident [9]; or

(2) The State that initially detects, or discovers evidence of, a transnational emergency, for example by: detecting significant increases in atmospheric radiation levels of unknown origin; detecting contamination in transboundary shipments; discovering a dangerous source that may have originated in another State; or diagnosing medical symptoms that may have resulted from exposure outside the State.

nuclear or radiological emergency

See emergency.

nuclear security*

The prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive material or their associated facilities.

nuclear security event**

An event that has potential or actual implications for nuclear security that must be addressed [2].

ⓘ Nuclear security event includes events that are criminal or intentional unauthorized act and unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities and associated activities. Examples of such events include a sabotage, a radiological dispersal device or radiological exposure device etc. and threat thereof.

off-site (area)

See site (area).

off-site decision maker**

A person off the site with the authority and the responsibility to take actions immediately, without consultation, to protect the public within the PAZ, UPZ, EPD, and ICPD**.**

on-site (area)

See site (area).

operational criteria**

Values of measurable quantities or observables to be used in the early phase of the response in a nuclear or radiological emergency in order to determine the need for appropriate protective actions and other response actions.

ⓘ These include operational intervention levels (OILs), emergency action levels (EALs), specific observables and other indicators of conditions on the site.

operational intervention level (OIL)*

A set level of a measurable quantity that corresponds to a generic criterion.

ⓘ OILs are typically expressed in terms of dose rates or of activity of radioactive material released, time integrated air concentrations, ground or surface concentrations, or activity concentrations of radionuclides in environmental, food or water samples. An OIL is a type of action level that is used immediately and directly (without further assessment) to determine the appropriate protective actions on the basis of an environmental measurement.

operating organization

Any organization or person applying for authorization or authorized and/or responsible for nuclear, radiation, radioactive waste or transport safety when undertaking activities or in relation to any nuclear facilities or sources of ionizing radiation. This includes, inter alia, private individuals, governmental bodies, consignors or carriers, licensees, hospitals, self-employed persons, etc.

ⓘ Operator includes either those who are directly in control of a facility or an activity during use of a source (such as radiographers or carriers) or, in the case of a source not under control (such as a lost or illicitly removed source or a re-entering satellite), those who were responsible for the source before control over it was lost.

operating personnel

Individual workers engaged in operation of an authorized facility or conduct of an authorized activity.

planned exposure situation*

A planned exposure situation is a situation of exposure that arises from the planned operation of a source or from a planned activity that results in an exposure from a source.

ⓘ Since provision for protection and safety can be made before embarking on the activity concerned, associated exposures and their probabilities of occurrence can be restricted from the outset. The primary means of controlling exposure in planned exposure situations is by good design of installations, equipment and operating procedures. In planned exposure situations, a certain level of exposure is expected to occur.

precautionary action zone (PAZ)

An area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to reduce the risk of severe deterministic effects off the site. Protective actions within this area are to be taken before or shortly after a release of radioactive material or exposure on the basis of the prevailing conditions at the facility.

preparedness stage**

The stage prior to a nuclear or radiological emergency at which arrangements for an effective emergency response are established.

projected dose*

The dose that would be expected to be received if planned protective actions were not taken.

protective action*

An action for the purposes of avoiding or reducing doses that might otherwise be received in an emergency exposure situation or an existing exposure situation.

early protective action*. A protective action in the event of a nuclear or radiological emergency that can be implemented within days to weeks and still be effective.

ⓘ The most common early protective actions are relocation and longer term restrictions on consuming contaminated food.

mitigatory action*. Immediate action by the operator or other party:

(a) To reduce the potential for conditions to develop that would result in exposure or a release of radioactive material requiring emergency actions on or off the site; or

(b) To mitigate source conditions that may result in *exposure* or a release of radioactive material requiring emergency actions on or off the site.

precautionary urgent protective action*. A protective action in the event of a nuclear or radiation emergency which must be taken before or shortly after a release of radioactive material, or before an exposure, on the basis of the prevailing conditions to prevent or to reduce the risk of severe deterministic effects.

***urgent protective action**.** A protective action 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.

ⓘ Urgent protective actions include iodine thyroid blocking, evacuation, short term sheltering, actions to reduce inadvertent ingestion, decontamination of individuals and prevention of ingestion of potentially contaminated food, milk or water.

radiological assessor**

A person who in the event of a nuclear or radiological emergency assists the operator or off-site response organizations by performing radiation surveys, performing dose assessments, controlling contamination, ensuring the radiation protection of emergency workers and formulating recommendations on protective actions and other response actions.

regulatory body*

An authority or a system of authorities designated by the government of a State as having legal authority for conducting the regulatory process, including issuing authorizations, and thereby regulating nuclear, radiation, radioactive waste and transport safety.

ⓘ The national competent authority for the regulation of radioactive material transport safety is included in this description.

representative person*

An individual receiving a dose that is representative of the doses to the more highly exposed individuals in the population.

ⓘ ICRP Publication 101 indicates that the dose to the representative person "is the equivalent of, and replaces, the mean dose in the 'critical group'", and provides guidance on assessing doses to the representative person. The concept of critical group remains valid.

residual dose*

The dose expected to be incurred in the future after protective actions have been terminated (or a decision has been taken not to implement protective actions).

ⓘ This applies in an existing exposure situation or an emergency exposure situation.

response action**

An action to be taken in response to a nuclear or radiological emergency.

ⓘ Response actions comprise protective actions and other response actions.

Other response action. An action to be taken in response to a nuclear or radiological emergency that is not a protective action.

ⓘ The most common other response actions are: medical examination, consultation and treatment; registration and long term health monitoring; providing comprehensive psychological counselling; public information and other actions to mitigate non-radiological consequences and for public reassurance.

response organization*

An organization designated or otherwise recognized by a State as being responsible for managing or implementing any aspect of an emergency response.

ⓘ This also includes those organizations necessary to support the management and/or implementation of an emergency response, such as meteorological services.

sabotage**

Any deliberate act directed against a nuclear facility or nuclear material in use, storage or transport which could directly or indirectly endanger the health and safety of personnel, the public or the environment by exposure to radiation or release of radioactive substances.

significant transboundary release

A release of radioactive material to the environment that may result in doses or levels of contamination beyond national borders from the release which exceed generic criteria for protective actions and other response actions, including food restrictions and restrictions on commerce.

site (area)**

A geographical area that contains an authorized facility, authorized activity or source within which the management of the authorized facility or authorized activity or first responders may directly initiate emergency actions.

ⓘ This is typically the area within the security perimeter fence or other designated property marker. It may also be the controlled area around a radiography source or an inner cordoned off area established by first responders around a suspected hazard.

On-site (area). (Area) within the site area.

Off-site (area). (Area) outside the site area.

source*

1. Anything that may cause *radiation exposure* - such as by emitting *ionizing radiation* or by releasing *radioactive material* - and can be treated as a single entity for *protection and safety* purposes.

ⓘ For example, a sterilization gamma irradiation unit is a source for the practice of radiation preservation of food and sterilization of other products; an X ray unit may be a source for the practice of radiodiagnosis; a nuclear power plant is part of the practice of generating electricity by nuclear fission, and may be regarded as a source (e.g. with respect to discharges to the

environment) or as a collection of sources (e.g. for occupational radiation protection purposes). A complex or multiple installation situated at one location or site may, as appropriate, be considered a single source for the purposes of application of international safety standards.

2. *Radioactive material* used as a *source* of *radiation.*

ⓘ Such as those sources used for medical applications or in industrial instruments. These are, of course, *sources* as defined in (1), but this usage is less general.

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

ⓘ The term *dangerous source* relates to dangerous quantities of radioactive material (D-values) recommended in Ref. [16].

radioactive source. A *source* containing radioactive *material* that is used as a source of radiation.

special facility

A facility for which predetermined facility specific actions need to be taken if urgent protective actions are ordered in its locality in the event of a nuclear or radiological emergency. Examples include chemical plants that cannot be evacuated until certain actions have been taken to prevent fire or explosions and telecommunications centres that must be staffed in order to maintain local telephone services.

special population groups

Members of the public for whom special arrangements are necessary in order for effective protective actions to be taken in the event of a nuclear or radiological emergency. Examples include disabled persons, hospital patients and prisoners.

stochastic effect*

A radiation induced health effect, the probability of occurrence of which is greater for a higher radiation dose and the severity of which (if it occurs) is independent of dose.

ⓘ Stochastic effects may be somatic effects or hereditary effects, and generally occur without a threshold level of dose. Examples include solid cancer and leukaemia.

transient population groups

Those members of the public who are residing for a short period of time (days to weeks) in a location (such as a camping ground) that can be identified in advance. This does not include members of the public who may be travelling through an area.

transnational emergency

A nuclear or radiological emergency of actual, potential or perceived radiological significance for more than one State.

ⓘ This may include:

(1) A significant transboundary release of radioactive material (however, a transnational emergency does not necessarily imply a significant transboundary release of radioactive material);

(2) A general emergency at a facility or other event that could result in a significant transboundary release (atmospheric or aquatic) of radioactive material;

(3) A discovery of the loss or illicit removal of a dangerous source that has been transported across or is suspected of having been transported across a national border;

(4) An emergency resulting in significant disruption to international trade or travel;

(5) An emergency warranting the taking of protective actions for foreign nationals or embassies in the State in which it occurs;

(6) An emergency resulting in or potentially resulting in severe deterministic effects and involving a fault and/or problem (such as in equipment or software) that could have serious implications for safety internationally;

(7) An emergency resulting in or potentially resulting in great concern among the population of more than one State owing to the actual or perceived radiological hazard.

urgent protective action

See protective action.

urgent protective action planning zone (UPZ)

An area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to avert doses off the site in accordance with international safety standards. Protective actions within this area are to be taken on the basis of environmental monitoring — or, as appropriate, prevailing conditions at the facility.

warning point**

A designated organization to act as a point of contact that is staffed or able to be alerted at all times for promptly responding to, or initiating a response to, an incoming notification (meaning (1)) warning message, request for assistance or request for verification of a message, as appropriate, from the IAEA.

worker*

Any person who works, whether full time, part time or temporarily, for an employer and who has recognized rights and duties in relation to occupational radiation protection.

ⓘ A self-employed person is regarded as having the duties of both an employer and a worker.

CONTRIBUTORS TO DRAFTING AND REVIEW

TITLE

COMMENTS BY REVIEWER Reviewer: Country/Organization:			Page.... of.... Date:	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification or rejection