IAEA
International Atomic Energy Agency

IAEA SAFETY STANDARDS

No. GSG-20

for protecting people and the environment

Leadership, Management and Culture for Safety

GENERAL SAFETY GUIDE

LEADERSHIP, MANAGEMENT AND CULTURE FOR SAFETY

The following States are Members of the International Atomic Energy Agency:

AFGHANISTAN
ALBANIA
ALGERIA
ANGOLA
ANTIGUA AND BARBUDA
ARGENTINA
ARMENIA
AUSTRALIA
AUSTRIA
AZERBAIJAN
BAHAMAS, THE
BAHRAIN
BANGLADESH
BARBADOS
BELARUS
BELGIUM
BELIZE
BENIN
BOLIVIA, PLURINATIONAL STATE OF
BOSNIA AND HERZEGOVINA
BOTSWANA
BRAZIL
BRUNEI DARUSSALAM
BULGARIA
BURKINA FASO
BURUNDI
CABO VERDE
CAMBODIA
CAMEROON
CANADA
CENTRAL AFRICAN REPUBLIC
CHAD
CHILE
CHINA
COLOMBIA
COMOROS
CONGO
COOK ISLANDS
COSTA RICA
CÔTE D'IVOIRE
CROATIA
CUBA
CYPRUS
CZECH REPUBLIC
DEMOCRATIC REPUBLIC OF THE CONGO
DENMARK
DJIBOUTI
DOMINICA
DOMINICAN REPUBLIC
ECUADOR
EGYPT
EL SALVADOR
ERITREA
ESTONIA
ESWATINI
ETHIOPIA
FIJI
FINLAND
FRANCE
GABON
GAMBIA, THE
GEORGIA
GERMANY
GHANA
GREECE
GRENADA
GUATEMALA
GUINEA
GUYANA
HAITI
HOLY SEE
HONDURAS
HUNGARY
ICELAND
INDIA
INDONESIA
IRAN, ISLAMIC REPUBLIC OF
IRAQ
IRELAND
ISRAEL
ITALY
JAMAICA
JAPAN
JORDAN
KAZAKHSTAN
KENYA
KOREA, REPUBLIC OF
KUWAIT
KYRGYZSTAN
LAO PEOPLE'S DEMOCRATIC REPUBLIC
LATVIA
LEBANON
LESOTHO
LIBERIA
LIBYA
LIECHTENSTEIN
LITHUANIA
LUXEMBOURG
MADAGASCAR
MALAWI
MALAYSIA
MALDIVES
MALI
MALTA
MARSHALL ISLANDS
MAURITANIA
MAURITIUS
MEXICO
MONACO
MONGOLIA
MONTENEGRO
MOROCCO
MOZAMBIQUE
MYANMAR
NAMIBIA
NEPAL
NETHERLANDS, KINGDOM OF THE
NEW ZEALAND
NICARAGUA
NIGER
NIGERIA
NORTH MACEDONIA
NORWAY
OMAN
PAKISTAN
PALAU
PANAMA
PAPUA NEW GUINEA
PARAGUAY
PERU
PHILIPPINES
POLAND
PORTUGAL
QATAR
REPUBLIC OF MOLDOVA
ROMANIA
RUSSIAN FEDERATION
RWANDA
SAINT KITTS AND NEVIS
SAINT LUCIA
SAINT VINCENT AND THE GRENADINES
SAMOA
SAN MARINO
SAUDI ARABIA
SENEGAL
SERBIA
SEYCHELLES
SIERRA LEONE
SINGAPORE
SLOVAKIA
SLOVENIA
SOMALIA
SOUTH AFRICA
SPAIN
SRI LANKA
SUDAN
SWEDEN
SWITZERLAND
SYRIAN ARAB REPUBLIC
TAJIKISTAN
THAILAND
TOGO
TONGA
TRINIDAD AND TOBAGO
TUNISIA
TÜRKİYE
TURKMENISTAN
UGANDA
UKRAINE
UNITED ARAB EMIRATES
UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
UNITED REPUBLIC OF TANZANIA
UNITED STATES OF AMERICA
URUGUAY
UZBEKISTAN
VANUATU
VENEZUELA, BOLIVARIAN REPUBLIC OF
VIET NAM
YEMEN
ZAMBIA
ZIMBABWE

The Agency's Statute was approved on 23 October 1956 by the Conference on the Statute of the IAEA held at United Nations Headquarters, New York; it entered into force on 29 July 1957. The Headquarters of the Agency are situated in Vienna. Its principal objective is "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

IAEA SAFETY STANDARDS SERIES No. GSG-20

LEADERSHIP, MANAGEMENT AND CULTURE FOR SAFETY

GENERAL SAFETY GUIDE

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 2026

COPYRIGHT NOTICE

Publishing Section
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 Vienna, Austria
tel.: +43 1 2600 22529 or 22530
email: sales.publications@iaea.org
www.iaea.org/publications

Printed by the IAEA in Austria
April 2026
STI/PUB/2132
https://doi.org/10.61092/iaea.onlw-qppn

IAEA Library Cataloguing in Publication Data

Names: International Atomic Energy Agency.
Title: Leadership, management and culture for safety / International Atomic Energy Agency.
Description: Vienna : International Atomic Energy Agency, 2026. | Series: Safety standards series, ISSN 1020-525X ; no. GSG-20 | Includes bibliographical references.
Identifiers: IAEAL 26-01815 | ISBN 978-92-0-129025-0 (paperback : alk. paper) | ISBN 978-92-0-129125-7 (pdf) | ISBN 978-92-0-129225-4 (epub)
Subjects: LCSH: Nuclear facilities — Safety measures. | Nuclear facilities — Management. | Nuclear facilities — Leadership.
Classification: UDC 621.039.58 | STI/PUB/2132

FOREWORD

by Rafael Mariano Grossi
Director General

The IAEA's Statute authorizes it to "establish…standards of safety for protection of health and minimization of danger to life and property". These are standards that the IAEA must apply to its own operations, and that States can apply through their national regulations.

The IAEA started its safety standards programme in 1958 and there have been many developments since. As Director General, I am committed to ensuring that the IAEA maintains and improves upon this integrated, comprehensive and consistent set of up to date, user friendly and fit for purpose safety standards of high quality. Their proper application in the use of nuclear science and technology should offer a high level of protection for people and the environment across the world and provide the confidence necessary to allow for the ongoing use of nuclear technology for the benefit of all.

Safety is a national responsibility underpinned by a number of international conventions. The IAEA safety standards form a basis for these legal instruments and serve as a global reference to help parties meet their obligations. While safety standards are not legally binding on Member States, they are widely applied. They have become an indispensable reference point and a common denominator for the vast majority of Member States that have adopted these standards for use in national regulations to enhance safety in nuclear power generation, research reactors and fuel cycle facilities as well as in nuclear applications in medicine, industry, agriculture and research.

The IAEA safety standards are based on the practical experience of its Member States and produced through international consensus. The involvement of the members of the Safety Standards Committees, the Nuclear Security Guidance Committee and the Commission on Safety Standards is particularly important, and I am grateful to all those who contribute their knowledge and expertise to this endeavour.

The IAEA also uses these safety standards when it assists Member States through its review missions and advisory services. This helps Member States in the application of the standards and enables valuable experience and insight to be shared. Feedback from these missions and services, and lessons identified from events and experience in the use and application of the safety standards, are taken into account during their periodic revision.

I believe the IAEA safety standards and their application make an invaluable contribution to ensuring a high level of safety in the use of nuclear technology. I encourage all Member States to promote and apply these standards, and to work with the IAEA to uphold their quality now and in the future.

THE IAEA SAFETY STANDARDS

BACKGROUND

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

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

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

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

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

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

THE IAEA SAFETY STANDARDS

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

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

Safety measures and security measures[1] have in common the aim of protecting human life and health and the environment. Safety measures and security measures must be designed and implemented in an integrated manner so that security measures do not compromise safety and safety measures do not compromise security.

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

Safety Fundamentals

Safety Fundamentals present the fundamental safety objective and principles of protection and safety, and provide the basis for the Safety Requirements. The principles are expressed as 'must' statements.

Safety Requirements

Safety Requirements are governed by the objective and principles of the Safety Fundamentals. They establish the requirements to be met to ensure the protection of people and the environment, both now and in the future. The format and style of the Safety Requirements facilitate their use for the establishment of a national regulatory framework. Requirements are presented as 'overarching' requirements[2] in bold, followed by a number of associated requirements; all are equally important and are expressed as 'shall' statements.

Safety Guides

Safety Guides provide recommendations on how to comply with the Safety Requirements, indicating an international consensus that it is necessary to take the

---

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

[2] The IAEA Regulations for the Safe Transport of Radioactive Material do not include overarching requirements.

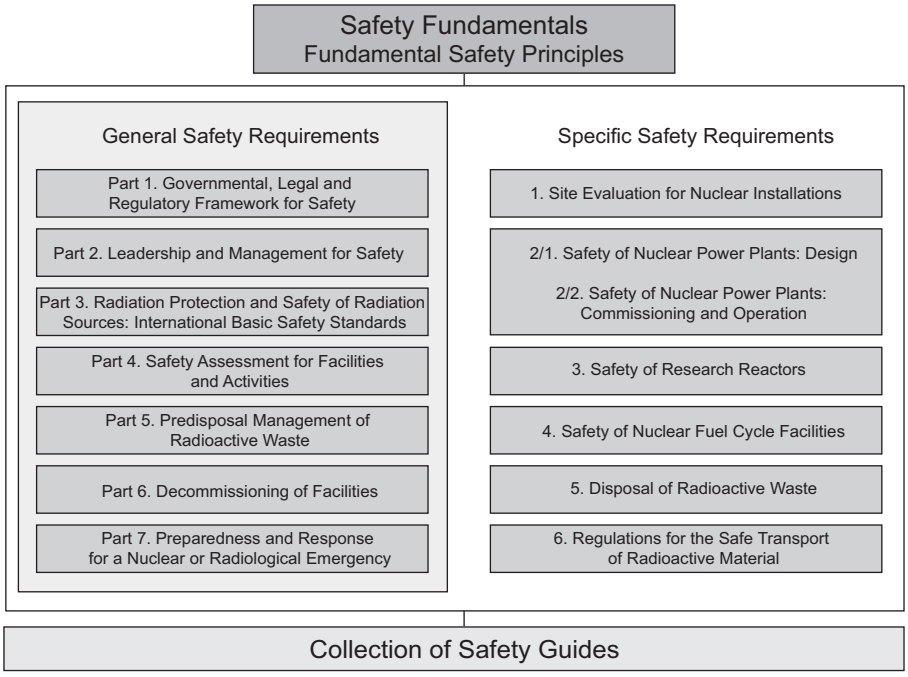

FIG. 1. The long term structure of the IAEA Safety Standards Series.

measures recommended (or alternative measures that achieve the same level of protection). Safety Guides present international good practices and, increasingly, best practices. The recommendations provided in Safety Guides are expressed as 'should' statements.

APPLICATION OF THE IAEA SAFETY STANDARDS

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

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

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

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

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

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

DEVELOPMENT PROCESS FOR THE IAEA SAFETY STANDARDS

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

All IAEA Member States may nominate experts for the Safety Standards Committees and may provide comments on draft standards. The membership of the Commission on Safety Standards is appointed by the Director General and includes senior governmental officials having responsibility for establishing national standards.

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

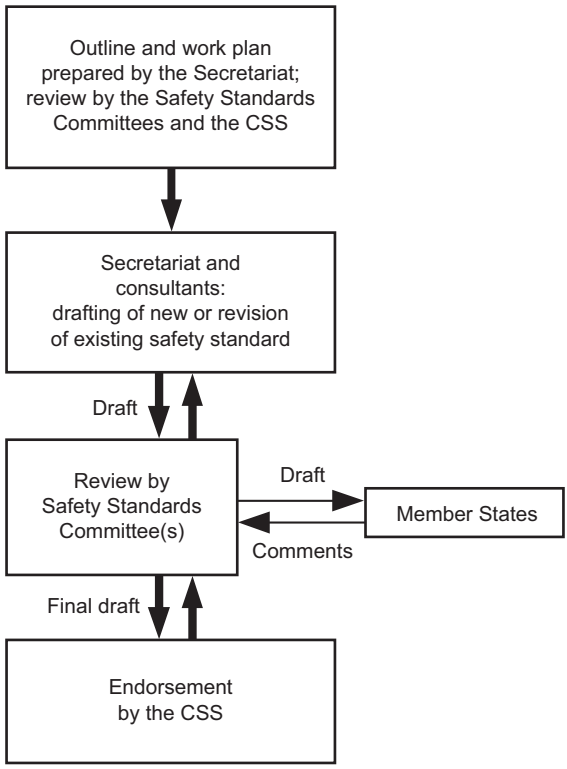

FIG. 2. The process for developing a new safety standard or revising an existing standard.

INTERACTION WITH OTHER INTERNATIONAL ORGANIZATIONS

The findings of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the recommendations of international expert bodies, notably the International Commission on Radiological Protection (ICRP), are taken into account in developing the IAEA safety standards. Some safety standards are developed in cooperation with other bodies in the United Nations system or other specialized agencies, including the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme, the International Labour Organization, the OECD Nuclear Energy Agency, the Pan American Health Organization and the World Health Organization.

INTERPRETATION OF THE TEXT

Safety related terms are to be understood as they appear in the IAEA Nuclear Safety and Security Glossary (see https://www.iaea.org/resources/publications/iaea-nuclear-safety-and-security-glossary). Otherwise, words are used with the spellings and meanings assigned to them in the latest edition of The Concise Oxford Dictionary. For Safety Guides, the English version of the text is the authoritative version.

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

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

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

CONTENTS

1. INTRODUCTION

BACKGROUND

1.1. Principle 3 of IAEA Safety Standards Series No. SF-1, Fundamental Safety Principles [1], states that "**Effective leadership and management for safety must be established and sustained in organizations concerned with, and facilities and activities that give rise to, radiation risks.**"

1.2. IAEA Safety Standards Series No. GSR Part 2, Leadership and Management for Safety [2], establishes requirements for leadership, management and culture for safety based on the interrelated concepts of all three elements. GSR Part 2 [2] also advocates a systemic approach in which the interactions between humans, technology and organizations are duly considered. Effective implementation of GSR Part 2 [2] is an important step in achieving the fundamental safety objective: "**to protect people and the environment from harmful effects of ionizing radiation**" [1].

1.3. This Safety Guide considers that leadership, management and culture for safety are interrelated concepts that support one another to achieve effective implementation of each of the three concepts.

1.4. This Safety Guide supersedes IAEA Safety Standards Series No. GS-G-3.1, Application of the Management System for Facilities and Activities[1].

1.5. Terms used in this Safety Guide are to be understood as they appear in the 2022 (Interim) edition of the IAEA Nuclear Safety and Security Glossary [3], unless otherwise specified.

OBJECTIVE

1.6. The objective of this Safety Guide is to provide recommendations on how to meet the requirements established in GSR Part 2 [2].

---

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-G-3.1, IAEA, Vienna (2006).

1.7. This Safety Guide aims to assist operating organizations, regulatory bodies and other governmental organizations in the application of the requirements established in GSR Part 2 [2]. It will also be of interest to other organizations involved in ensuring safety, such as technical support organizations, technical service providers and organizations within the supply chain.

SCOPE

1.8. The scope of this Safety Guide is the same as that of GSR Part 2 [2]; specifically, it applies to "facilities and activities that give rise to radiation risks" (para. 1.11 of GSR Part 2 [2]) and "in relation to the functions and activities of the regulatory body, as far as is appropriate" (para. 1.12 of GSR Part 2 [2]). Furthermore, the scope applies "throughout the lifetime of facilities and the duration of activities, for all operational states and for accident conditions, and in a nuclear or radiological emergency" (para. 1.13 of GSR Part 2 [2]).

1.9. All the recommendations provided in this Safety Guide are generally applicable; nevertheless, judgement and the use of a graded approach are needed for the application of specific recommendations to different facilities and activities.

1.10. Requirements on the management system of the regulatory body are established in IAEA Safety Standards Series No. GSR Part 1 (Rev. 1), Governmental, Legal and Regulatory Framework for Safety [4].

1.11. Further requirements on the management system of organizations and on safety culture are established in IAEA Safety Standards Series No. GSR Part 3, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards [5].

1.12. Requirements on the management system for the transport of radioactive waste are established in IAEA Safety Standards Series No. SSR-6 (Rev. 2), Regulations for the Safe Transport of Radioactive Material [6], and specific recommendations are provided in IAEA Safety Standards Series No. TS-G-1.4, The Management System for the Safe Transport of Radioactive Material [7].

1.13. Recommendations on developing and implementing management systems for safety during all steps of radioactive waste management are provided in IAEA Safety Standards Series No. GSG-16, Leadership, Management and Culture for Safety in Radioactive Waste Management [8].

1.14. Recommendations on the management system for nuclear installations are provided in IAEA Safety Standards Series No. GS-G-3.5, The Management System for Nuclear Installations [9].

1.15. An organization may also use applicable international or national standards to assist in the development of the management system, such as the one described in Ref. [10].

STRUCTURE

1.16. The structure of this Safety Guide reflects that of the requirements established in GSR Part 2 [2], as follows: Section 2 provides recommendations on how to meet Requirement 1 on responsibility for safety. Section 3 provides recommendations on how to meet Requirement 2 on leadership for safety. Section 4 provides recommendations on how to meet Requirements 3–5 on responsibility for the integrated management system. Section 5 provides recommendations on how to meet Requirements 6–8 on the management system. Section 6 provides recommendations on how to meet Requirement 9 on the management of resources. Section 7 provides recommendations on how to meet Requirements 10 and 11 on the management of processes and activities. Section 8 provides recommendations on how to meet Requirement 12 on culture for safety. Section 9 provides recommendations on how to meet Requirements 13 and 14 on measurement, assessment and improvement. The Annex presents a safety culture framework containing the traits and attributes that are present in organizations with a strong safety culture.

2. RESPONSIBILITY FOR SAFETY

2.1. Requirement 1 of GSR Part 2 [2] states that "**The registrant or licensee — starting with the senior management — shall ensure that the fundamental safety objective of protecting people and the environment from harmful effects of ionizing radiation is achieved.**" Senior management should ensure commitment to the achievement of the fundamental safety objective, applying a graded approach, primarily through formal and documented commitment. This should be communicated within the organization and to interested parties.

2.2. Senior management should ensure that they are aware of the regulatory requirements applicable to the facilities and activities under their control. Additionally, senior management should consider the need to apply relevant international codes and standards for safety and understand the related benefit.

2.3. The arrangements for achieving the fundamental safety objective should take into account any interfaces between safety, security and safeguards, with the basic objective being that safety, security and safeguards do not compromise one another. Similarly, when radiation risk is one of several different risks to be managed at the facility or during the activity, interfaces should be taken into account to protect people and the environment from all risks.

2.4. In order to achieve the fundamental safety objective, senior management should ensure that staff at all levels (including suppliers) are provided with specific training and coaching to understand the following:

(a) The radiation risks associated with specific facilities and/or activities, and their potential consequences;
(b) The processes for managing radiation risks relevant to their responsibilities;
(c) The interdependencies between different processes (in terms of radiation risks) and the need for effective risk management;
(d) The arrangements made for preparedness and response to nuclear or radiological emergencies.

2.5. Senior management should declare expectations regarding leadership, management and safety culture commensurate with the risks of the facility or activity and communicate these expectations throughout the organization.

2.6. Owners who have the legal right to possess and use the facility or the organization conducting the activity should take active oversight of safety performance, challenge senior management on safety matters and ensure that safety has the overriding priority in decision making.

3. LEADERSHIP FOR SAFETY

3.1. Requirement 2 of GSR Part 2 [2] states that "**Managers shall demonstrate leadership for safety and commitment to safety.**" Footnote 4 in GSR Part 2 [2] states:

> "'Leadership' is the use of an individual's capabilities and competences to give direction to individuals and groups and to influence their commitment to achieving the fundamental safety objective and to applying the fundamental safety principles, by means of shared goals, values and behaviour. 'Management' is a formal, authorized function for ensuring that an organization operates efficiently and that work is completed in accordance with requirements, plans and resources. Managers at all levels need to be leaders for safety."

The organizational approach to safety should encompass commitment to the planning, implementation, assessment and continual improvement of programmes for leadership, management and culture for safety. Related policies, strategies, plans and actions should clarify and support this organizational approach and should collectively establish clear expectations for all individuals in the organization.

3.2. Paragraph 3.2(b) of GSR Part 2 [2] states:

> "Managers at all levels in the organization…shall ensure that their leadership includes…[d]evelopment of individual and institutional values and expectations for safety throughout the organization by means of their decisions, statements and actions".

Managers at all levels should demonstrate and act as role models in the promulgation of these values and expectations.

3.3. Paragraph 5.2(f) of GSR Part 2 [2] states:

> "Senior managers and all other managers shall advocate and support…using a systemic approach (i.e. an approach relating to the system as a whole in which the interactions between technical, human and organizational factors are duly considered)".

These interactions should be taken into account in the organization's decision making process. The systemic approach should be complemented by specific assessments as needed. This systemic approach should be applied, if relevant, by interdisciplinary teams that include members with diverse perspectives and expertise from different levels of management and staff, as well as from external organizations, if needed.

3.4. Paragraph 3.2(a) of GSR Part 2 [2] states:

> "Managers at all levels in the organization…shall ensure that their leadership includes…[s]etting goals for safety that are consistent with the organization's policy for safety, actively seeking information on safety performance within their area of responsibility and demonstrating commitment to improving safety performance".

Senior management should apply a long term view when formulating and aligning policies, goals, strategies, plans and objectives, and should actively promote a high level of safety performance as an essential part of the overall performance and as necessary to sustain a high level of the organization's overall performance.

3.5. Managers at all levels should seek the active involvement and support of individuals within the organization (and, where appropriate, within external organizations, such as suppliers) in the establishment and application of behavioural expectations. The communication methods used by managers to ensure staff awareness and commitment should support mutual and candid feedback on behavioural expectations.

3.6. Managers at all levels should be role models in terms of personal accountability by ensuring that their actions are consistent with their words, by ensuring that safety is clearly the overriding priority in all work, by holding themselves accountable for actions and decisions and by taking personal ownership of the results of their decisions and actions.

3.7. Managers at all levels should follow a risk based decision making process commensurate with the risks of the facility or activity. Decisions that have implications for safety should be documented and traceable.

3.8. Managers at all levels should implement actions to help ensure that all individuals make safety conscious choices and that actions are determined to be safe before proceeding.

3.9. Managers at all levels should be personally involved in relevant training and coaching when their involvement is necessary to ensure the understanding of and to reinforce personal accountability for safety by all members of the organization.

3.10. Managers at all levels should themselves undertake training to learn and stay up to date with evolving best practices and requirements, and through that participation set an example to staff.

3.11. Managers at all levels should engage in frequent formal and informal communication with staff to remain aware of any staff concerns in relation to safety. Managers should also regularly be present in the workplace to consistently observe, coach and mentor staff to encourage a focus on safety. Managers should use various communication tools and monitor their effectiveness in terms of engaging individuals in enhancing safety performance.

3.12. Managers at all levels should ensure that their staff are empowered to raise safety concerns in a safe environment (i.e. without fear of retaliation, sometimes referred to as a 'no blame culture'). Additionally, managers should:

(a) Ensure that staff are aware of the means available for raising safety concerns and actively encourage staff to raise safety concerns.
(b) Ensure that any concerns raised are addressed in a timely manner and provide feedback on progress in resolving the issue.
(c) Respond with urgency to any concern that indicates a serious safety issue.
(d) Encourage questions and ideas from individuals during formal and/or informal team meetings as well as during tasks in the workplace to assist in creating and maintaining a questioning attitude to safety and in identifying and resolving safety issues, thus enhancing safety performance.
(e) Provide recognition, as appropriate, of individuals who have raised safety concerns to reinforce and encourage such behaviour. Safety conscious behaviours should be recognized and taken into account within individual and collective performance evaluations.
(f) Promote collective learning by maintaining a focus on the effective use of lessons learned, benchmarking and operating experience.

3.13. Managers at all levels should communicate the basis for safety related decisions to help staff to understand why specific decisions were made and how these decisions affect their work.

4. MANAGEMENT FOR SAFETY: RESPONSIBILITY FOR THE INTEGRATED MANAGEMENT SYSTEM

4.1. Requirement 3 of GSR Part 2 [2] states that "**Senior management shall be responsible for establishing, applying, sustaining and continuously improving a management system to ensure safety.**" Senior management should ensure that the management system under their responsibility is used as a single framework for overall management of the organization. Senior management should foster the long term commitment and engagement of managers at all levels and of all individuals to the management system, through a process of participation and consultation.

4.2. Paragraph 4.1 of GSR Part 2 [2] states that "Senior management shall retain accountability for the management system even where individuals are assigned responsibility for coordinating the development, application and maintenance of the management system". If senior management assign staff members to coordinate parts of the management system, clearly defined authorities and responsibilities should be established to achieve the following:

(a) Coordination of the development, implementation and improvement of the management system;
(b) Assessment and reporting of the effectiveness of the management system;
(c) Integration of the various processes in the management system to meet safety objectives.

4.3. Senior management should take actions to implement the following:

(a) Establish a work environment that supports the effective implementation of the management system and its continuous improvement.
(b) Cultivate a work environment in which all applicable elements of the management system are implemented in daily work.
(c) Ensure that managers at all levels and individuals assigned to coordinate work on the management system are given the authority to raise issues relating to the management system with senior management.

4.4. If any part of the management system is developed or updated by an external organization, senior management should ensure that the part is consistent with the organization's overall management system. The responsibilities and authority for that part remain with senior management.

4.5. Senior management should ensure that suppliers' management systems are appropriate to the scope of their activities, that they comply with the relevant regulatory requirements and that they are consistent with the organization's overall management system where appropriate.

4.6. Paragraph 4.2 of GSR Part 2 [2] states that "Senior management shall be responsible for establishing safety policy." Senior management should ensure that the safety policy (or set of policies containing the safety policy) is documented and disseminated across the organization. The safety policy should have the following features:

(a) It should stipulate the responsibilities for safety.
(b) It should clearly state that the demands of the organization's overall performance and project schedules do not override safety.
(c) It should include a commitment to comply with all regulatory and statutory requirements.
(d) It should promote the enhancement of safety performance.
(e) It should include a commitment to develop, implement, maintain and improve the management system in order to support the achievement of safety objectives.
(f) It should stipulate the role of leadership for safety at all organizational levels.
(g) It should promote a strong safety culture.
(h) It should include a commitment to provide adequate financial, material and human resources to effectively meet the safety requirements.
(i) It should include a commitment to the highest safety performance by all individuals.

4.7. In the application of a graded approach, the safety policy may be customized to reflect the complexity of the facility or activity and the associated radiation risks.

4.8. Senior management should ensure the participation and consultation of managers at all levels, and of staff as appropriate, in the development of the safety policy, to enhance individual accountability.

4.9. Requirement 4 of GSR Part 2 [2] states that "**Senior management shall establish goals, strategies, plans and objectives for the organization that are consistent with the organization's safety policy.**" These goals, strategies, plans and objectives should be such as to ensure that regulatory requirements are met.

4.10. The organization's goals, strategies, plans and objectives should be developed, implemented and aligned in such a manner that their collective impact

on safety is understood and managed, and that safety is not compromised by other priorities. A process for their evaluation should be part of the management system.

4.11. Senior management should ensure that the organization's goals, strategies and plans are formulated to enable the various levels of the organization to define and monitor specific safety objectives.

4.12. Senior management should ensure that staff understand the relevant goals, strategies, plans and objectives set by senior management and their impact on safety, and feel personally engaged in and accountable for achieving them.

4.13. Paragraph 4.5 of GSR Part 2 [2] states that "Senior management shall ensure that goals, strategies and plans are periodically reviewed against the safety objectives, and that actions are taken where necessary to address any deviations." The frequency and methodology for such reviews should be clearly defined and communicated to all staff within the organization. Any resulting actions should be documented and implemented as part of a corrective action or improvement programme (see Section 9 of this Safety Guide).

4.14. In accordance with the application of a graded approach, the goals, strategies, plans and objectives, as well as the programmes for their review and improvement, should be documented to a level of detail that reflects the complexity of the facility or activity and the associated radiation risks.

4.15. Requirement 5 of GSR Part 2 [2] states that "**Senior management shall ensure that appropriate interaction with interested parties takes place.**" Paragraph 4.6 of GSR Part 2 [2] states that "Senior management shall identify interested parties for their organization and shall define an appropriate strategy for interaction with them." This strategy should be consistent with other strategies within the organization and relevant legal requirements.

4.16. Senior management should undertake the following:

(a) Decide on the topics that are to be communicated to interested parties on a regular basis, occasionally and in the case of an emergency. Regular topics should include the organization's safety performance, its overall performance and the environmental impact, as appropriate.
(b) Understand the potential impact on the organization from the interaction with interested parties and ensure that the necessary resources for dealing with this impact are provided.

4.17. Paragraph 4.7 of GSR Part 2 [2] states:

> "Senior management shall ensure that the processes and plans resulting from the strategy for interaction with interested parties include:
>
> (a) Appropriate means of communicating routinely and effectively with and informing interested parties with regard to radiation risks associated with the operation of facilities and the conduct of activities;
> (b) Appropriate means of timely and effective communication with interested parties in circumstances that have changed or that were unanticipated;
> (c) Appropriate means of dissemination to interested parties of necessary information relevant to safety;
> (d) Appropriate means of considering in decision making processes the concerns and expectations of interested parties in relation to safety."

In communication with interested parties, clear and unambiguous language should be used. Communication with interested parties should be performed based on honesty, openness, trust and fairness.

4.18. Senior management should monitor whether interactions with interested parties are adequately implemented. The results of this monitoring should be used as an input for the continual improvement of interaction with interested parties.

4.19. Senior management should ensure that the staff designated to interact with interested parties have the appropriate competence and are appropriately informed about the risks generated by the facility or activity and about the decisions and activities of the organization, including any incident or accident.

4.20. In the application of a graded approach, the strategy for interaction with interested parties should be proportional to the nature of the facility or activity and its associated radiation risks. This strategy should be documented at a level of detail that reflects the complexity of the facility or activity and the associated radiation risks. The training of staff involved in communication with interested parties should reflect the scope of interaction and be customized in accordance with a graded approach.

5. MANAGEMENT FOR SAFETY: INTEGRATION AND DOCUMENTATION OF THE MANAGEMENT SYSTEM

5.1. Requirement 6 of GSR Part 2 [2] states that "**The management system shall integrate its elements, including safety, health, environmental, security, quality, human-and-organizational-factor, societal and economic elements, so that safety is not compromised.**" The management system should be a single, integrated framework for the overall management of the organization, including the management of all relevant processes. An effective management system supports the achievement of a high level of safe and efficient performance and promotes the continuous improvement of safety culture.

5.2. Paragraph 4.8 of GSR Part 2 [2] states that "The management system shall be developed, applied and continuously improved. It shall be aligned with the safety goals of the organization." Senior management should oversee this alignment to ensure that the objectives of the organization are consistently achieved in a safe, efficient and effective manner.

5.3. If an external project management organization is used to manage large projects (e.g. the development of a new facility, the major refurbishment of an existing facility), the project management system should be consistent with the operating organization's management system.

5.4. When establishing the management system, the organization should undertake the following:

(a) Identify legal and regulatory requirements, applicable codes and standards, and the organization's management and technical practices that apply to its staff, facilities, products, processes and activities to ensure that all the relevant requirements are adequately met (see also para. 4.12 of GSR Part 2 [2]).
(b) Consider national and international recommendations and best practices for management systems.
(c) Establish priorities and time frames for the implementation of the elements of the management system.

5.5. The management system should apply to all relevant individuals, each of whom should be made aware of the importance of complying with the requirements of the management system.

5.6. In the management system, all of the goals, strategies, plans and objectives of an organization are required to be considered in a coherent manner (see para. 4.9 of GSR Part 2 [2]). As part of this, the organization should undertake the following:

(a) Identify interdependences between these goals, strategies, plans and objectives and their potential to impact one another.
(b) Assign priorities to the goals, strategies, plans and objectives, and implement arrangements to ensure that these priorities are respected in decision making.
(c) Ensure that safety is paramount in guiding decisions and actions.

5.7. Paragraph 4.10 of GSR Part 2 [2] states:

> "Arrangements shall be made in the management system for the resolution of conflicts arising in decision making processes. Potential impacts of security measures on safety and potential impacts of safety measures on security shall be identified and shall be resolved without compromising safety or security".

If conflicts between the elements of the management system are identified, they should be resolved using a structured, transparent, documented and well communicated decision making approach. Senior management should encourage the involvement of relevant individuals at all levels through active participation in decision making. The interface between safety, security and other elements of the management system should be considered at each level of interaction and decision making.

5.8. In applying a graded approach, for a less complex facility or activity with a low radiation risk, the management system may be simpler and less formal but should still integrate all the necessary elements. The extent of documentation may be limited to those tasks with a higher risk and to processes that are related to meeting regulatory requirements.

5.9. Paragraph 4.13 of GSR Part 2 [2] states:

> "Provision shall be made in the management system to identify any changes (including organizational changes and the cumulative effects of minor changes) that could have significant implications for safety and to ensure that they are appropriately analysed."

These provisions should ensure that all changes (i.e. technical modifications, documentation changes and organizational changes) are methodically identified,

documented, analysed and controlled. For each change, the impact on the objectives of the organization, including those relating to safety, health, the environment, security and quality, should be considered within the context of applying a graded approach.

5.10. The interactions between changes should be considered in order to eliminate or minimize any adverse consequences on safety.

5.11. Senior management should ensure that individuals with the authority to approve changes are appropriately qualified and clearly designated.

5.12. Senior management should ensure that staff are informed about changes and understand and comply with all relevant requirements.

5.13. Senior management should establish criteria for the evaluation of technical modifications and organizational changes based on a graded approach. If the evaluation of a significant change is conducted by an independent external organization, then the methodology, team structure and relevant competences (including training) should be specified and agreed by the organization whose management system is being evaluated.

5.14. Senior management should consider the safety aspects of organizational changes and ensure that there is no adverse impact on safety. This includes any transitional arrangements as well as the final changes, which should be designed to enhance safety.

5.15. Senior management should ensure that individuals are aware of how their responsibilities will change both during and after organizational changes. Consideration should be given to the need for temporary additional resources and for compensatory measures to manage any impacts of such changes during a transitional phase.

5.16. The monitoring of changes should provide early indications of any associated negative impacts on safety performance, thereby ensuring that there is sufficient time to take appropriate action before safety is compromised.

5.17. Senior management should ensure that all justified changes are communicated to interested parties in order that they know and understand the objectives of these changes.

5.18. The organization should ensure that the management system contains provisions for dealing with technical modifications or organizational changes that might affect any third party approvals, authorizations, accreditations or certifications. These provisions should include the processes for notification, reauthorization, reaccreditation or recertification, as appropriate.

5.19. Requirement 7 of GSR Part 2 [2] states that "**The management system shall be developed and applied using a graded approach.**" Paragraph 4.15 of GSR Part 2 [2] states (references omitted):

> "The criteria used to grade the development and application of the management system shall be documented in the management system. The following shall be taken into account:
>
> (a) The safety significance and complexity of the organization, operation of the facility or conduct of the activity;
> (b) The hazards and the magnitude of the potential impacts (risks) associated with the safety, health, environmental, security, quality and economic elements of each facility or activity;
> (c) The possible consequences for safety if a failure or an unanticipated event occurs or if an activity is inadequately planned or improperly carried out."

The application of a graded approach should be reflected in the resources devoted to the development and implementation of the management system in different facilities and activities. This may include the following:

(a) The extent and level of detail of the documentation;
(b) The type and level of planning, analysis, verification, monitoring and assessment associated with the management system;
(c) The number of staff engaged in the development and implementation of the management system and their level of qualification and training.

5.20. Requirement 8 of GSR Part 2 [2] states that "**The management system shall be documented. The documentation of the management system shall be controlled, usable, readable, clearly identified and readily available at the point of use**." Senior management should ensure that the documentation of the management system is appropriate to the organization and to its facilities and activities, and is flexible enough to accommodate changes.

5.21. For a less complex facility or activity with a low radiation risk, the scope of the documentation and its level of detail may be adjusted accordingly. Some of the management system processes and arrangements may be undertaken on a less formal basis, provided that the organization can demonstrate that these practices and arrangements are applied consistently and the achievement of the fundamental safety objective is ensured. Quality manuals, operating procedures, guidelines, working instructions or other documents may be considered as the equivalent of management system documentation.

5.22. Senior management should decide on the structure of documentation of the management system, which should be appropriate to the organization. This structure should support clarity and consistency of information. As an example, a three level structure of documentation might be applied, with level 1 providing an overview of the management system, level 2 providing a description of processes and procedures, and level 3 providing detailed instructions and guidance.

5.23. Senior management (or the appointed individual) should identify the need for specific documents for the management system and provide guidance to the relevant parts of the organization to ensure that the documents are prepared in a consistent manner. The guidance should cover the scope and content of the documents, when they are applied, how they are controlled, and which standards and codes apply to them.

5.24. Using a graded approach, senior management should decide on the level of control to be applied to different types of document that support the management system. For example, different levels of control might be applied to the following:

(a) Documents that define the management system, including responsibilities and authorities;
(b) Regulatory requirements, authorizations and licences;
(c) Drawings and process descriptions;
(d) Procedures and work instructions, including those for emergencies;
(e) Safety related analyses and assessment reports;
(f) Data file specifications and computer codes;
(g) Records;
(h) Contracts with suppliers.

5.25. Senior management should ensure that all individuals assigned to the preparation, review, revision and approval of documents of the management system are competent to perform the tasks and are given access to appropriate information.

5.26. Senior management should also ensure that the document control process for the management system includes provisions for the following:

(a) Preparation, review, approval and issue of documents;
(b) Distribution and availability of specific documents at the necessary locations;
(c) Revision of documents;
(d) Withdrawal of outdated documents.

5.27. The content of documents for the management system should be determined with the participation of the individuals who will use the documents and whose work will be affected by them. These individuals should also be consulted during subsequent revisions of the documents.

5.28. The document control process should include provisions for a periodic review of the documents that constitute the management system, taking into account the current status of the facility or activity. Documents should be updated as necessary; revised documents are required to be reviewed and approved in the same way as the initial documents (see para. 4.18 of GSR Part 2 [2]). All changes should be traceable.

5.29. Senior management (or the appointed process owner) should ensure that records are managed as follows:

(a) All records are registered upon receipt and categorized according to criteria established by the organization.
(b) The retention time for each record is clearly specified.
(c) The records are checked to ensure that they are readable and complete.
(d) The records are made available and are otherwise stored in a safe and secure environment to prevent damage and loss.
(e) Access to the records is controlled.
(f) The records are disposed of according to criteria established by the organization.

5.30. The transfer of information from one type of media to another should include procedures for verifying that the information has been transferred as specified.

6. MANAGEMENT FOR SAFETY: MANAGEMENT OF RESOURCES

6.1. Requirement 9 of GSR Part 2 [2] states that "**Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them.**" Footnote 10 in GSR Part 2 [2] states that "'Resources' includes individuals (the number of individuals and their competences), infrastructure, the working environment, knowledge and information, and suppliers, as well as material and financial resources."

6.2. Senior management should ensure that the management of resources includes the following:

(a) The effective, efficient and timely provision of resources throughout the duration of an activity or the lifetime of a facility, and during emergency response;
(b) A consideration of the organization's goals, strategies, plans and objectives in relation to safety;
(c) A consideration of the regulatory requirements and standards in relation to safety;
(d) An assessment of predictable challenges and future demands on the resources needed to accomplish planned activities.

6.3. Paragraph 4.23 of GSR Part 2 [2] states:

> "Senior management shall ensure that competence requirements for individuals at all levels are specified and shall ensure that training is conducted, or other actions are taken, to achieve and to sustain the required levels of competence."

Managers at all levels should contribute to the analysis of training needs; the development, review and approval of training programmes; the delivery of selected parts of the training; and the evaluation of training effectiveness. Managers at all levels should ensure that appropriate periodic retraining or requalification is provided, to ensure that individuals remain capable of performing their assigned tasks.

6.4. Senior management should ensure that the organization develops and retains fundamental core competences. Core competences should be built up by means of engagement with relevant industry experts, professional

associations, research centres, and universities at the national and international levels, taking into account a graded approach.

6.5. Paragraph 4.22 of GSR Part 2 [2] states that "Senior management shall determine which competences and resources the organization has to retain or has to develop internally, and which competences and resources may be obtained externally, for ensuring safety." If external competences and resources are used, the organization should have sufficient knowledge to undertake the following:

(a) Identify the specific needs of the organization for external competences and resources;
(b) Specify the objective, scope, requirements and relevant qualifications and competences for activities conducted by external organizations or individuals;
(c) Monitor activities conducted by external organizations or individuals;
(d) Understand, evaluate and use the outcomes of activities conducted by external organizations or individuals.

6.6. Adequate contractual arrangements for activities conducted by external organizations or individuals should be established.

6.7. To support the achievement and development of collective and individual competences, managers at all levels should consider the need for the following:

(a) A knowledge of the facility and/or activity, and the associated radiation risks;
(b) A knowledge of the management system and related documentation, including the organizational structure, responsibilities and levels of authority, process description, work procedures and instructions;
(c) A knowledge of legal and regulatory requirements;
(d) A knowledge of nuclear safety and security measures, including their interfaces;
(e) An understanding of the organization's values and behavioural expectations, and the organization's safety culture framework.

6.8. Managers at all levels should ensure the timely specification and acquisition of the necessary competences (e.g. for specific tasks) and should make provisions for the timely delivery of training and qualification.

6.9. Paragraph 4.23 of GSR Part 2 [2] states that "An evaluation shall be conducted of the effectiveness of the training and of the actions taken." The

evaluation of training effectiveness should include individual performance, training organization performance and the appropriateness of the training process.

6.10. The organization should apply a graded approach to the different elements of the training programme (e.g. analysis of training needs; development, review and approval of the training programme; training documentation; evaluation of training effectiveness) ensuring that an appropriate level of detail is employed.

6.11. Senior management should analyse and plan for the organization's future competence needs. This should include consideration of the following:

(a) The future needs related to the organization's goals, strategies, plans and objectives;
(b) Any planned refurbishments of a facility (e.g. owing to equipment ageing or obsolescence), major change in the technologies or equipment supporting the activities, or organizational changes (e.g. owing to the departure of management or staff);
(c) Predicted future demographic and economic conditions;
(d) Foreseeable staff fluctuations and retirements;
(e) Future changes to regulatory requirements that could affect the organization.

6.12. Managers at all levels should contribute to the development of staff competences and should pay special attention to positions that are important to safety. Managers should take actions to develop, maintain and improve the staff knowledge, skills and abilities necessary for safety and for understanding the safety consequences of inadequate or incorrect work.

6.13. Managers at all levels should create a respectful working environment that has a positive influence on the motivation, satisfaction and performance of individuals.

6.14. Paragraph 4.27 of GSR Part 2 [2] states that "The knowledge and the information of the organization shall be managed as a resource." Senior management should treat knowledge and information as fundamental resources that are essential for achieving the goals, strategies, plans and objectives of the organization. To manage knowledge and information, senior management should undertake the following, as applicable:

(a) Identify the organization's information and knowledge needs, for example as they are necessary in establishing and meeting the organization's goals, strategies, plans and objectives.

(b) Identify and ensure access to internal and external sources of information and knowledge.
(c) Establish management system processes to ensure the preservation of organizational knowledge.

7. MANAGEMENT FOR SAFETY: MANAGEMENT OF PROCESSES AND ACTIVITIES

7.1. Requirement 10 of GSR Part 2 [2] states that "**Processes and activities shall be developed and shall be effectively managed to achieve the organization's goals without compromising safety.**" Senior management should ensure that these processes and activities are identified, developed, documented and managed in accordance with a graded approach. This should be based on the nature of the organization's activities, the associated radiation risks (including risks during emergencies) and the regulatory requirements that apply.

7.2. Managers at all levels should promote and support a common understanding of process management, which processes should be established and managed, and how these processes interrelate.

7.3. The processes of the organization should be identified by senior management on the basis of a comprehensive review of the activities being conducted in the organization and in consultation with the relevant organizational units and staff.

7.4. Processes should be developed using a structured approach, for example using the following categories:

(a) Core processes, the outputs of which are crucial to the mission of the organization;
(b) Management processes, which provide direction and governance for an organization;
(c) Supporting processes, which provide the resources and infrastructure necessary for the other processes.

7.5. The following steps should be used to develop the processes of an organization:

(a) Identify the processes necessary for the organization.

(b) Create a logical structure of the processes specifying the sequence of and the interactions between the processes (see also para. 7.9).
(c) Develop a process description, including inputs, outputs and records.
(d) Address regulatory requirements and relevant codes and standards.
(e) Identify the resources needed for each process.
(f) Identify the indicators to measure and assess the effective implementation of each process.
(g) Apply continuous learning from operating experience and benchmarking.

7.6. When establishing a process, the organization should consider factors such as the following:

(a) The risks associated with the process;
(b) The effects of the process on safety, health, environmental, security, quality, and societal and economic elements;
(c) The associated legal and regulatory requirements;
(d) The resources and competences needed within the organization to implement the process;
(e) The associated information and knowledge needs;
(f) The interrelation with other processes.

7.7. For each process, the following should be performed, as appropriate:

(a) Identification of who is responsible for managing the process;
(b) Selection of individuals, teams or organizational units that will contribute to defining and developing the process, review the draft process and validate the process and its documents;
(c) Specification of the criteria and methods for process validation;
(d) Specification of the distribution of the process documents and records.

7.8. Paragraph 4.32 of GSR Part 2 [2] states:

> "Each process or activity that could have implications for safety shall be carried out under controlled conditions, by means of following readily understood, approved and current procedures, instructions and drawings. These procedures, instructions and drawings shall be validated before their first use and shall be periodically reviewed to ensure their adequacy and effectiveness. Individuals carrying out such activities shall be involved in the validation and the periodic review of such procedures, instructions and drawings."

Each process that could have implications for safety should be subject to review, verification and validation by the responsible organizational unit, as well as by other affected organizational units and, if needed, by an independent organizational unit (within or outside the organization) before the process is implemented.

7.9. Paragraph 4.29 of GSR Part 2 [2] states:

> "The sequencing of a process and the interactions between processes shall be specified so that safety is not compromised. Effective interaction between interfacing processes shall be ensured. Particular consideration shall be given to interactions between processes within the organization, and to interactions between processes conducted by the organization and processes conducted by external service providers."

If the implementation of processes is outsourced to external organizations (e.g. processes relating to security, safety assessment or the calibration of equipment), the interaction of such processes with processes implemented within the organization should be managed as part of the organization's management system. Management of the interactions should include:

(a) Agreement on the outputs from the organization that will serve as inputs to the outsourced process, and the outputs from the outsourced process that will serve as inputs to the organization;
(b) Arrangements for the transfer of information between the organization and the provider of the outsourced process;
(c) Arrangements for monitoring and measurement of the outsourced process to be performed by the organization.

7.10. Requirement 11 of GSR Part 2 [2] states that "**The organization shall put in place arrangements with vendors, contractors and suppliers for specifying, monitoring and managing the supply to it of items, products and services that may influence safety.**" Paragraph 4.33 of GSR Part 2 [2] states:

> "The organization shall retain responsibility for safety when contracting out any processes and when receiving any item, product or service in the supply chain[11].
>
> "[11]The supply chain, described as 'suppliers', typically includes: designers, vendors, manufacturers and constructors, employers, contractors, subcontractors, and consigners and carriers who supply safety related items. The supply chain can also include other parts of the organization and parent organizations."

Managers at all levels should ensure that all relevant staff are aware that the prime responsibility for safety remains with the organization itself, even when suppliers are used for the supply of safety related items, products and services.

7.11. Senior management should ensure that the organization's objectives and processes for procurement and supply chain management are established and are based on a graded approach.

7.12. Managers at all levels should establish coordination and interaction with suppliers to promote and facilitate safety and safety culture, quality, and economic and other important aspects, with the aim of continual improvement of supply related processes. Clearly specified lines of communication should be established.

7.13. When the organization outsources processes associated with supply chain management to an external organization, senior management should ensure that the external organization complies with applicable management system requirements.

7.14. Paragraph 4.36 of GSR Part 2 [2] states that "The organization shall make arrangements for ensuring that suppliers of items, products and services important to safety adhere to safety requirements and meet the organization's expectations of safe conduct in their delivery."

7.15. Paragraph 4.34 of GSR Part 2 [2] states:

> "The organization shall have a clear understanding and knowledge of the product or service being supplied[12]. The organization shall itself retain the competence to specify the scope and standard of a required product or service, and subsequently to assess whether the product or service supplied meets the applicable safety requirements.
>
> "[12]The capability of the organization to have a clear understanding and knowledge of the product or service to be supplied is sometimes termed an 'informed customer' capability."

Senior management should ensure that relevant staff within the organization are capable of assessing the safety implications of items, products and services provided by suppliers. This should include:

(a) Understanding product or service specifications, including their relevance to safety;

(b) Specifying requirements for items, products and services, including the quality assurance requirements that apply;
(c) Monitoring and assessing items, products and services to ensure that they meet the needs of the organization;
(d) Demonstrating to the regulatory body that items, products and services meet safety requirements.

7.16. Paragraph 4.35 of GSR Part 2 [2] states that "The management system shall include arrangements for qualification, selection, evaluation, procurement, and oversight of the supply chain." The organization should develop processes for qualification, evaluation and selection of suppliers, for procurement and for oversight of supplier's performance. These processes should be communicated to potential suppliers and should include the following:

(a) A description of how the supply specifications are developed (e.g. design requirements, safety and quality requirements, economic and commercial aspects);
(b) A description of the qualification, evaluation and selection process of suppliers, including relevant criteria and how the results are administrated and communicated;
(c) A description of the contracting process;
(d) A description of the oversight of suppliers in the supply chain (e.g. audits, inspections, witnessing and hold points, document review and approval);
(e) A description of the receipt and acceptance criteria for items, products and services;
(f) A description of the management system requirements and requirements related to quality;
(g) A description of the reporting process for detected counterfeit, fraudulent or suspicious items;
(h) A description of the requirements related to information security.

7.17. Managers at all levels should ensure that the processes and activities to monitor and assess supplier performance are implemented. Managers should also promote the sharing of experience between the organization and suppliers.

7.18. Organizations and individuals conducting procurement and related activities should ensure that the information provided to suppliers is coherent, easy to understand, and fully describes the product and service requirements and the organization's expectations of safe conduct.

7.19. The organization should apply a graded approach to the management of the supply chain. As such, the different elements of the procurement process (e.g. qualification, selection, evaluation, oversight of supplier's performance) and activities conducted during procurement should be implemented in a way and at a level of detail that are proportional to the safety significance of the item, product or service being supplied.

8. CULTURE FOR SAFETY

8.1. Requirement 12 of GSR Part 2 [2] states that **"Individuals in the organization, from senior managers downwards, shall foster a strong safety culture. The management system and leadership for safety shall be such as to foster and sustain a strong safety culture."**

8.2. Senior management should foster a strong safety culture by demonstrating a clear commitment to safety through their own management practices. They should ensure that their attitudes and behaviours are coherent, consistent and, most importantly, aligned with safety. All individuals in the organization should contribute to fostering and sustaining a strong safety culture. Safety culture expectations should be set out in the organization's safety culture framework (see the Annex), which defines the traits of a strong safety culture.

8.3. Paragraph 5.2(a) of GSR Part 2 [2] states:

> "Senior managers and all other managers shall advocate and support… [a] common understanding of safety and of safety culture, including: awareness of radiation risks and hazards relating to work and to the working environment...[and] an understanding of the significance of radiation risks and hazards for safety…".

Senior management should establish, apply and support direct and open communication with all individuals to promote and enhance a strong safety culture. Managers at all levels should use frequent communication (formal and informal) to convey the values related to safety to all individuals and to explain how these values should be incorporated into work practices.

8.4. The organizational policies, goals, strategies, plans and objectives described in the management system should foster safety culture by being designed so that

they help to ensure that individuals are motivated and able to act in accordance with the expectations set for them, and that an ownership of safety is evident at the organizational and individual levels.

8.5. Senior management should ensure that performance indicators and other measures of performance have no negative impact on the behaviours necessary to ensure safety.

8.6. Managers at all levels should promote safe working practices and conditions and discourage unsafe practices and behaviours. Various methods (e.g. training, team activities, rewards, staff promotion) should be used to create and support a working environment where safety conscious behaviour is recognized, encouraged and valued.

8.7. Managers at all levels should take personal accountability for ensuring that safety is the overriding priority. As well as being personally accountable for fostering a strong safety culture in areas under their control, managers should also understand the interfaces with other areas that have an impact on safety.

8.8. Managers at all levels should promote a strong safety culture in a visible and ongoing manner. Actions may include the following:

(a) Engaging in periodic communication with staff where safety culture is discussed;
(b) Maintaining a presence in the workplace, such as performing walkdowns of the facility and making observations of tasks where staff can be coached on the desired behaviours and attitudes and where staff can express any safety concern or idea for improvement;
(c) Communicating clear expectations regarding personal accountability, teamwork, questioning attitudes and safety focused decision making in meetings at all levels.

8.9. The organization should take measures to ensure that all staff understand what safety culture means, why it is important and how it applies to their daily work practices and their working environment. Staff should:

(a) Understand that safety and the organization’s overall performance mutually support each other;
(b) Understand that safety conscious behaviour is expected and needs to be formally and informally supported;
(c) Be accountable for safety;

(d) Be actively involved in improving safety;
(e) Promote safe behaviour in all situations;
(f) Coach others in safe behaviour;
(g) Support each other in achieving goals by communicating and coordinating activities within and across organizational boundaries;
(h) Understand the value of diverse thinking in optimizing protection and safety, and support such thinking;
(i) Understand the interface between safety culture and security culture.

8.10. Paragraph 5.2(c) of GSR Part 2 [2] states that "Senior managers and all other managers shall advocate and support…[a]n organizational culture that supports and encourages trust, collaboration, consultation and communication". Managers at all levels should set the expectation that trust and respect are key drivers of a strong safety culture and should therefore be considered as organizational values. Trust and respect in the workplace should be clearly demonstrated by the actions of managers. Differing opinions should be encouraged, discussed and thoughtfully considered.

8.11. Paragraph 5.2(d) of GSR Part 2 [2] states:

> "Senior managers and all other managers shall advocate and support…[t]he reporting of problems relating to technical, human and organizational factors and reporting of any deficiencies in structures, systems and components to avoid degradation of safety, including the timely acknowledgement of, and reporting back of, actions taken".

The management system should include tools and processes for reporting and resolving safety concerns. These should address not only major concerns but also minor concerns, precursors or adverse trends, as they might become major later. Individuals should be encouraged to report concerns in a timely manner. Managers at all levels should implement and clearly explain the measures that support the individual's right and responsibility to raise safety concerns in order to increase openness and decrease fear of raising concerns, thereby building a trusting and continually learning organization (see also para. 3.12).

8.12. Managers at all levels should ensure that safety concerns are resolved appropriately. The effectiveness of corrective actions should be assessed, and lessons should be shared and used to strengthen safety performance.

8.13. The organization should develop its capacity to learn not only from failures but also from positive achievements and successes (see also para. 6.8 of

GSR Part 2 [2]). The organization should employ a variety of approaches to stimulate learning and improve safety and the overall performance of the organization.

8.14. Paragraph 5.2(e) of GSR Part 2 [2] states that "Senior managers and all other managers shall advocate and support…[m]easures to encourage a questioning and learning attitude at all levels in the organization and to discourage complacency with regard to safety". The organization should seek and make use of operating experience from within the organization and from other organizations. External operating experience should be considered and, if relevant, adapted to the specifics of the facility or activity.

8.15. Managers at all levels should always be aware of the possibility of failures, unforeseen problems and unlikely events, even when past outcomes were successful. Managers should be aware that success can breed complacency, which should be avoided on both the individual and the organizational levels.

8.16. Managers at all levels should establish means for communicating concerns or issues relating to the interface of safety culture with security culture. Opportunities for mutual support should be identified. Cooperation and teamwork to ensure that the needs of both safety and security are met should be supported and encouraged.

8.17. In the application of a graded approach to a less complex facility or activity with a low radiation risk, expectations concerning safety culture may be communicated both formally and informally; safety conscious decisions and actions can be credited as fostering a strong safety culture.

9. MEASUREMENT, ASSESSMENT AND IMPROVEMENT

9.1. Requirement 13 of GSR Part 2 [2] states that "**The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety.**" Senior management should support the establishment of a continual learning approach in the measurement, assessment and improvement of the effectiveness of the management system.

9.2. The method of assessment of the effectiveness of the management system should take into account the purpose of the assessment, the organizational structure

and the management system itself, and be applied using a graded approach. The assessment should be designed with the following aims:

(a) To identify strengths, weaknesses, opportunities and threats (i.e. SWOT analysis);
(b) To analyse trends;
(c) To identify areas for improvement.

For a less complex facility or activity with a low radiation risk, the management system assessment and process assessment methodologies may be simpler and less formal.

9.3. Paragraph 6.4 of GSR Part 2 [2] states:

> "Independent assessments and self-assessments of the management system shall be regularly conducted to evaluate its effectiveness and to identify opportunities for its improvement. Lessons and any resulting significant changes shall be analysed for their implications for safety."

Senior management should ensure both self-assessments and independent assessments[2] of the management system.

---

[2] Independent assessments are defined as follows [3]:

"*Assessments* such as *audits* or surveillance carried out to determine the extent to which the *requirements* for the *management system* are fulfilled, to evaluate the effectiveness of the *management system* and to identify opportunities for improvement. They can be conducted by or on behalf of the organization itself for internal purposes, by interested parties such as customers and regulators (or by other persons on their behalf), or by external independent organizations",

with the following information notes:

—"This definition applies in *management systems* and related fields."
—"Persons conducting *independent assessments* do not participate directly in the work being assessed."
—"*Independent assessment activities* include internal and external *audit*, surveillance, peer evaluation and technical review, which are focused on *safety* aspects and areas where problems have been found."
—"An ***audit*** is used in the sense of a documented activity performed to determine by investigation, *examination* and evaluation of objective evidence the adequacy of, and adherence to, established *procedures*, instructions, specifications, codes, standards, administrative or operational programmes and other applicable documents, and the effectiveness of their implementation."

9.4. Staff assigned to manage processes should periodically conduct self-assessments of those processes and their effectiveness. These self-assessments should involve organizational units and individuals that significantly contribute to these processes.

9.5. Paragraph 6.6 of GSR Part 2 [2] states:

> "Senior management shall conduct a review of the management system at planned intervals to confirm its suitability and effectiveness, and its ability to enable the objectives of the organization to be accomplished, with account taken of new requirements and changes in the organization."

Senior management should use outcomes of these reviews to improve safety and the organization's overall performance. The results of the assessment of the effectiveness of processes (see para. 9.4) should be provided as an input to these periodic management system reviews. Resulting actions from the management system review should be tracked, monitored and reported at regular intervals to ascertain their progress and to observe whether they are effective.

9.6. Paragraph 6.3 of GSR Part 2 [2] states:

> "The causes of non-conformances of processes and the causes of safety related events that could give rise to radiation risks shall be evaluated and any consequences shall be managed and shall be mitigated. The corrective actions necessary for eliminating the causes of non-conformances, and for preventing the occurrence of, or mitigating the consequences of, similar safety related events, shall be determined, and corrective actions shall be taken in a timely manner."

Non-conforming items should be properly identified, recorded, segregated, controlled and reported. Their impact on safety should then be evaluated. Non-conformances should be monitored until they have been resolved and their causes eliminated. Feedback should be provided to the individuals who identified the non-conformances. The process to control non-conformances should include provisions to prevent the inadvertent use of products or services that are non-conforming.

9.7. Senior management should ensure that responsibilities for the management of non-conformances are allocated within the management system. Senior management should also ensure that all staff are aware of their right and

responsibility to identify and report non-conformances and to propose corrective actions.

9.8. Senior management should ensure that appropriate training is provided to all staff on reporting non-conformances and proposing and approving corrective actions. This training should reinforce that staff are enabled and encouraged to freely raise concerns.

9.9. Non-conformances and events to be identified, reported and evaluated should include at least the following:

(a) Deviations from approved processes or documentation;
(b) Supply of products or services that do not meet requirements;
(c) Failures of individuals to implement work instructions;
(d) Inadequate documentation containing incorrect or incomplete information;
(e) Inadequate training of individuals to perform the safety related tasks they have responsibility for.

9.10. In the application of a graded approach, the different elements of the non-conformance management process (e.g. recording, reporting) may be implemented at varying levels of detail. The management of non-conformances should be performed by trained and experienced individuals on the basis of the safety significance of the non-conformance.

9.11. Non-conformances and their direct and root causes and contributing factors should be analysed for trends to identify recurring events, generic issues and weaknesses. Mitigation actions should be taken as appropriate.

9.12. Non-conformances should be regarded as opportunities for improvement, and they should be used for the improvement of the management system and its processes.

9.13. The results of corrective actions should be monitored at planned intervals to ascertain whether the corrective actions are effective. Where appropriate, corrective actions implemented to prevent recurrence should be reviewed for their effectiveness in eliminating the root cause. Individuals who are responsible for implementing a corrective action should be provided with the necessary authority and resources.

9.14. Requirement 14 of GSR Part 2 [2] states that "**Senior management shall regularly commission assessments of leadership for safety and of safety culture in its own organization.**" A thorough assessment of both leadership and safety culture should be performed periodically in order to monitor and evaluate trends and changes. The assessments of leadership for safety and of safety culture should be conducted together.

9.15. Self-assessments and independent assessments of leadership and safety culture (see paras 6.9 and 6.10 of GSR Part 2 [2]) should be aimed at improving safety performance. The assessments should provide comprehensive feedback on the status of values, beliefs, assumptions and daily work practices, and on how this status influences safety. Cultural factors having a negative impact on safety should be monitored and addressed. Cultural factors having a positive impact on safety should be clearly recognized, and measures should be taken by senior management to ensure that these factors are sustained.

9.16. A graded approach should be applied to the conduct of these assessments; for example, for a less complex facility or activity with a low radiation risk, the assessments of leadership for safety and of safety culture may be less formal.

9.17. Paragraph 6.9 of GSR Part 2 [2] states:

> "Senior management shall ensure that self-assessment of leadership for safety and of safety culture includes assessment at all organizational levels and for all functions in the organization. Senior management shall ensure that such self-assessment makes use of recognized experts in the assessment of leadership and of safety culture."

Senior management should ensure that self-assessments and independent assessments are managed by individuals and groups with sufficient expertise and experience in assessing leadership for safety and safety culture, including in the use of appropriate methods.

9.18. Multiple methods should be used in the assessment of leadership for safety and of safety culture. The assessment methods used, such as surveys or questionnaires, document review, interviews, observations and focus groups, should complement one another. The data collected should be representative of all functions and all levels of the organization.

9.19. Managers at all levels should ensure the following:

(a) They are actively involved and encourage all individuals to participate in the assessments of leadership for safety and of safety culture.
(b) The resources necessary for an effective assessment, including resources for planning, implementation and reporting, are provided.
(c) Sufficient resources to address issues discovered during the assessment are provided.

9.20. The results of self-assessments and independent assessments should be thoroughly reviewed and discussed by senior management. Senior management should clearly demonstrate that they take ownership of the findings and support cross-functional actions that impact all relevant organizational units and functions. Senior management should also consider processes outsourced to external organizations.

9.21. Paragraph 6.11 of GSR Part 2 [2] states that (reference omitted) "The results of self-assessments and independent assessments of leadership for safety and of safety culture shall be communicated at all levels in the organization." Senior management should ensure the effective communication of the results of assessments and the actions that will be taken to address the findings. The actions should be followed up and their effectiveness reviewed until the expected effect has been achieved.

REFERENCES

[1] EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006), https://doi.org/10.61092/iaea.hmxn-vw0a

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership and Management for Safety, IAEA Safety Standards Series No. GSR Part 2, IAEA, Vienna (2016), https://doi.org/10.61092/iaea.cq1k-j5z3

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Nuclear Safety and Security Glossary: Terminology Used in Nuclear Safety, Nuclear Security, Radiation Protection and Emergency Preparedness and Response, 2022 (Interim) Edition, IAEA, Vienna (2022), https://doi.org/10.61092/iaea.rrxi-t56z

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Governmental, Legal and Regulatory Framework for Safety, IAEA Safety Standards Series No. GSR Part 1 (Rev. 1), IAEA, Vienna (2016).

[5] EUROPEAN COMMISSION, 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 ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014), https://doi.org/10.61092/iaea.u2pu-60vm

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, 2025 Edition, IAEA Safety Standards Series No. SSR-6 (Rev. 2), IAEA, Vienna (2025), https://doi.org/10.61092/iaea.439y-2h8h

[7] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.4, IAEA, Vienna (2008).

[8] INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership, Management and Culture for Safety in Radioactive Waste Management, IAEA Safety Standards Series No. GSG-16, IAEA, Vienna (2022).

[9] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for Nuclear Installations, IAEA Safety Standards Series No. GS-G-3.5, IAEA, Vienna (2009).

[10] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Quality Management Systems — Requirements, ISO 9001:2015, ISO, Geneva (2015).

Annex

SAFETY CULTURE FRAMEWORK

A–1. Table A–1 presents a safety culture framework that attempts to enhance the alignment of different safety culture models used in some Member States.[1] This safety culture framework describes traits and attributes of a healthy safety culture. A graded approach can be used in the application of this framework, taking into account the type of facility or activity and the associated radiation risks.

[1] The information in this annex is based on work carried out in 2016–2020; see A Harmonized Safety Culture Model, available at https://www.iaea.org/sites/default/files/20/05/harmonization_05_05_2020-final_002.pdf

TABLE A–1. SAFETY CULTURE FRAMEWORK

Safety culture trait	Safety culture attributes
IR. Individual responsibility All individuals are personally accountable for safety. All individuals feel it is their duty to know the standards and expectations and rigorously fulfil those standards and expectations. There is personal ownership for safety. All individuals have a commitment to promoting safety both individually and collectively.	*IR.1 Adherence:* Individuals understand and accept the importance of standards, processes, procedures, expectations and work instructions. Individuals at all levels of the organization adhere to standards and expectations. *IR.2 Ownership:* Individuals demonstrate personal commitment to safety in their behaviours and work practices. They promote safe behaviours in all situations and coach others when necessary. *IR.3 Collaboration:* Individuals and work groups help each other achieve goals by communicating and coordinating their activities within and across organizational boundaries. Individuals understand and accept the value of diverse thinking in optimizing protection and safety.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
QA. Questioning attitude Individuals remain vigilant for assumptions, anomalies, conditions, behaviours or activities that might adversely impact safety, and appropriately voice those concerns. Individuals are watchful for and avoid complacency. They recognize that minor issues might be warning signs of something more significant. Individuals are aware of conditions and alert to potential vulnerabilities, and report them.	*QA.1 Recognition of unique risks:* Individuals understand the unique risks associated with facilities and activities. They understand that the technologies may be complex and might fail in unforeseen ways with significant consequences. *QA.2 Avoidance of complacency:* Individuals recognize and plan for the possibility of mistakes, unforeseen problems and unlikely events, even when past outcomes were successful. Individuals recognize that complacency often comes with success and continually strive to avoid complacency in themselves and others. *QA.3 Questioning in the case of uncertainty:* Individuals stop when uncertain and seek advice. The situation and risks are evaluated and managed before proceeding. *QA.4 Recognition and questioning of assumptions:* Individuals question assumptions and are prepared to offer different perspectives when they believe something is not correct.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
CO. Communication Communication supports a focus on safety. Leaders use formal and informal communication to frequently convey the importance of safety. The organization maintains a variety of communication channels, including direct interaction between managers and workers. Effective dialogue is encouraged. Effective communication in support of safety is broad and includes workplace communication, reasons for decisions and expectations.	*CO.1 Free flow of information:* Individuals communicate openly and candidly, both up and down, and across the organization. The flow of information up the organization is considered to be as important as the flow of information down the organization. *CO.2 Transparency:* Communication with regulatory bodies and other organizations (e.g. for audits and other independent oversight) and with the public is appropriate, professional and accurate. *CO.3 Reasons for decisions:* Leaders ensure that the reasons for technical and administrative decisions are communicated to the appropriate individuals in a timely manner. *CO.4 Expectations:* Leaders frequently communicate and reinforce the expectation that safety is prioritized over competing goals. *CO.5 Workplace communication:* Communication about safety is included in all work activities so that everyone has the information necessary to work safely and effectively.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
LR. Leader responsibility Leaders demonstrate a commitment to safety in their decisions and behaviours. Leaders are role models for safety. Senior management are the leading advocates of safety and demonstrate their commitment in both word and action. Leaders throughout the organization set an example for safety. Corporate policies emphasize the overriding importance of safety.	*LR.1 Strategic alignment:* Leaders establish and promote organizational priorities that place safety above competing goals. Leaders take a long term approach to the organization and align policies and actions. They emphasize that high levels of safety are necessary to sustain high levels of production. *LR.2 Leader behaviour:* Leaders throughout the organization set an example for safety. *LR.3 Employee engagement:* Leaders develop an aligned and engaged workforce that creates a positive environment in support of safety. Leaders seek the active involvement of individuals at all levels in identifying and resolving safety issues. Factors affecting work motivation and job satisfaction are considered when making decisions. *LR.4 Resources:* Leaders ensure that staff, equipment, procedures and other resources are available and adequate to support safety. Human resources policies, including those relating to recruitment, succession planning and promotions, place a high priority on behaviour and decisions aligned with safety. *LR.5 Field presence:* Leaders are frequently present in all areas of the organization, observing work and material conditions. They ask questions, communicate, coach, and reinforce standards and expectations. Leaders listen to and act upon the concerns of and feedback from the workforce. *LR.6 Rewards and sanctions:* Leaders ensure that rewards and sanctions encourage attitudes and behaviours that promote safety. Individuals are answerable not only for results but also how they achieve the results.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
	LR.7 Change management: Leaders use a systematic process for communicating and implementing change so that safety is not compromised. The rationale for the change is clearly communicated. The impact of the change on safety is assessed before, during and after the change. *LR.8 Authority, roles and responsibilities:* Leaders ensure that authority, roles and responsibilities are clearly defined and understood.
DM. Decision making Decision making is systematic, rigorous, thorough and prudent. Leaders support conservative decision making and the ability to recover quickly from unforeseen circumstances. Leaders follow the decision making process. Responsibility for decision making is clear.	*DM.1 Systematic approach:* Individuals use a consistent, systematic approach to evaluate relevant factors, including risk, when making decisions. Using a systematic approach, high quality information is collected from all relevant sources. *DM.2 Conservative approach:* Individuals make prudent choices over those that are simply allowable. Actions are determined to be safe before proceeding, rather than proceeding until proven unsafe. *DM.3 Clear responsibility:* Authority and responsibility for decisions are specific and well defined. *DM.4 Resilience:* Prudent decision making is always used, but in anticipation of unforeseen situations where no procedure or plan applies, organizations develop the ability to adapt.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
WE. Respectful work environment Trust and respect permeate the organization. A high level of trust is cultivated in the organization. Differing opinions are encouraged, discussed and thoughtfully considered. Employees are informed of steps taken in response to their concerns.	*WE.1 Respect is evident:* All individuals are treated with dignity, respect and openness, and their contributions are recognized. *WE.2 Opinions are valued:* Individuals are encouraged to ask questions, voice concerns and provide suggestions. Differing opinions are solicited and respected. *WE.3 Trust is cultivated:* Trust is fostered among individuals and work groups throughout the organization. Openness and honesty are fostered between individuals, between work groups and throughout the entire organization. *WE.4 Conflicts are resolved:* Fair and transparent methods are used to resolve conflicts. Conflicts are resolved in a timely manner. *WE.5 Facilities reflect respect:* Housekeeping and material conditions reflect respect for both people and equipment. Facilities are conducive to a productive work environment and housekeeping is maintained.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
CL. Continuous learning Learning is highly valued. The organizational capacity to learn is well developed. The organization employs a variety of approaches to stimulate learning and improve performance, including human, technical and organizational aspects. Individuals and teams are highly competent and seek opportunities for improvement.	*CL.1 Constant examination:* Safety is regularly monitored and assessed through a variety of techniques, including independent assessments and self-assessments of the organization's programmes and processes. Safety culture is regularly assessed and enhanced. *CL.2 Learning from experience:* The organization systematically and effectively collects, evaluates and implements relevant internal and external lessons in a timely manner. Lessons are also shared with relevant organizations. *CL.3 Training:* The organization provides effective training and ensures knowledge transfer to maintain a knowledgeable and competent workforce. *CL.4 Leadership development:* Competent leaders are developed through leadership training and succession management processes. *CL.5 Benchmarking:* The organization learns from the practices of other organizations, including those in other industries.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
PI. Problem identification and resolution Issues potentially impacting safety are systematically identified, fully evaluated and promptly resolved according to their significance. Identification and resolution of a broad spectrum of issues, including human performance and organizational issues, are used to strengthen safety and improve performance.	*PI.1 Identification:* A method for collecting issues is implemented. The issues collected are not only major issues but also minor issues, as these could become major issues. Individuals identify issues in a timely manner. Self-reporting is expected and valued by the organization. *PI.2 Evaluation:* Issues are thoroughly evaluated to determine underlying causes and whether the issue exists in other areas. Issues are evaluated in an appropriate time frame. *PI.3 Resolution:* Identified issues are corrected appropriately. The effectiveness of the corrective actions is assessed to ensure that issues are adequately addressed. Important lessons are shared. *PI.4 Identifying trends:* Issues are analysed to identify possible patterns and trends. A broad range of information is evaluated to obtain an overall view of causes and results.
RC. Raising concerns Staff feel free to raise safety concerns without fear of retaliation, intimidation, harassment or discrimination. The organization creates, maintains and evaluates policies and processes that allow staff to raise concerns freely.	*RC.1 Supportive policies are implemented:* The organization clearly states and effectively implements a policy that supports an individual's right and responsibility to raise safety concerns. The organization does not tolerate harassment, intimidation, retaliation or discrimination for raising concerns. *RC.2 Confidentiality is possible:* The organization implements at least one method for raising and resolving concerns that is confidential and independent of line management influence. Timely feedback is provided to the concerned individual.

TABLE A–1. SAFETY CULTURE FRAMEWORK (cont.)

Safety culture trait	Safety culture attributes
WP. Work planning The process of planning and controlling work activities is implemented so that safety is maintained. Work is managed in a deliberate process in which work is identified, selected, planned, scheduled, executed and reviewed. The entire organization is involved in and fully supports the process. All relevant parts of the organization work together to support the process of controlling work.	*WP.1 Work management:* There is a systematic approach to selecting, scheduling, coordinating and completing work activities, in which safety is emphasized. The identification and management of relevant factors, including safety, are taken into consideration in the work process. *WP.2 Safety margins:* Work is planned and conducted such that safety margins are preserved. Safety margins are understood and carefully maintained, and are changed only through a systematic and rigorous process. *WP.3 Documentation and procedures:* Documentation, including procedures, is complete, accurate, accessible, user-friendly, understandable and up to date. Changes are tracked.

CONTRIBUTORS TO DRAFTING AND REVIEW

Ali Bhatti, S.	Pakistan Nuclear Regulatory Authority, Pakistan
Bassing, G.	Consultant, Germany
Dahlgren, K.	Consultant, Sweden
Dieguez Porras, P.	International Atomic Energy Agency
Echizen, M.	Japan Nuclear Safety Institute, Japan
Figueroa-Toledo, G.	Nuclear Regulatory Commission, United States of America
Gilley, D.	International Atomic Energy Agency
Jakimaviciene, V.	State Nuclear Power Safety Inspectorate, Lithuania
Khripunov, I.	Consultant, United States of America
Kleindienst, C.	Kernkraftwerk Gösgen-Däniken AG, Switzerland
Koves, G.K.	Consultant, United States of America
Kubanova, I.	International Atomic Energy Agency
Lagrange, V.	Électricité de France, France
Lande, L.	International Atomic Energy Agency
Mäkelä, K.	International Atomic Energy Agency
Marfak, T.	Moroccan Nuclear and Radiation Safety and Security Agency, Morocco
Nikolaki, M.	International Atomic Energy Agency
Oedewald, P.	Radiation and Nuclear Safety Authority, Finland
Piciaccia, L.A.	Norwegian Radiation and Nuclear Safety Authority, Norway
Pike, C.	International Atomic Energy Agency
Pyy, P.	International Atomic Energy Agency

Rycraft, H.	International Atomic Energy Agency
Rzentkowski, G.	Consultant, Canada
Shaw, P.	International Atomic Energy Agency
Siearacki, D.	Nuclear Regulatory Commission, United States of America
Tarykin, V.	World Association of Nuclear Operators, Moscow Centre
Thompson, C.	Nuclear Regulatory Commission, United States of America
Wright, R.	International Atomic Energy Agency

IAEA SAFETY RELATED PUBLICATIONS

SAFETY STANDARDS

Under 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 through which the IAEA establishes standards are the **IAEA Safety Standards Series**. This series covers nuclear safety, radiation safety, transport safety, waste safety and emergency preparedness and response. The Safety Standards reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from harmful effects of ionizing radiation. The IAEA Safety Standards Series has the following hierarchy:

Safety Fundamentals present the fundamental safety objective and principles of protection and safety, and provide the basis for the Safety Requirements. The principles are expressed as 'must' statements.

Safety Requirements establish the requirements to be met to ensure the protection of people and the environment, both now and in the future. The format and style of the requirements facilitate their use in a national regulatory framework. Requirements are presented as numbered 'overarching' requirements in bold, followed by a number of associated requirements; all are equally important and are expressed as 'shall' statements.

Safety Guides provide recommendations on how to comply with the Safety Requirements. Safety Guides present international good practices and, increasingly, best practices. The recommendations provided in Safety Guides are expressed as 'should' statements.

INFORMATIONAL PUBLICATIONS

Under Articles III and VIII of its Statute, the IAEA makes available and fosters the exchange of information on the peaceful uses of atomic energy and serves as an intermediary among its Member States for this purpose. Safety related information is shared through various types of publication.

Safety Reports provide practical examples and detailed methods that can be used in support of the Safety Standards. Other safety related IAEA publications include **Emergency Preparedness and Response** publications, **IAEA Services Series** publications, **Proceedings Series** publications, **TECDOCs**, **Technical Reports**, **Training Course Series** publications and a range of non-serial publications.

The IAEA's safety related informational publications are not based on international consensus and therefore do not establish any requirements or provide any recommendations.

Feedback on IAEA publications may be given via the on-line form available at:
www.iaea.org/publications/feedback
The form may also be used to report safety issues or submit environmental queries concerning IAEA publications.

Alternatively, contact IAEA Publishing directly:

Publishing Section, Dissemination Unit
International Atomic Energy Agency
Vienna International Centre, PO Box 100, 1400 Vienna, Austria
Telephone: +43 1 2600 22529 or 22530
Email: sales.publications@iaea.org
www.iaea.org/publications

ORDERING LOCALLY

To purchase priced IAEA publications, please contact either your preferred local supplier or the IAEA's lead distributor:

Mare Nostrum Group
39 East Parade
Harrogate
North Yorkshire
HG1 5LQ
United Kingdom
Email: enquiries@mare-nostrum.co.uk
www.mngbookshop.co.uk

Trade Orders and Enquiries:
Telephone: +44 1243 843 291
Email: trade@wiley.com

Individual Orders and Enquiries:
Email: mng.csd@wiley.com

Priced and unpriced IAEA publications may also be ordered directly from the IAEA by contacting IAEA Publishing. The recipient is responsible for shipping costs and any customs and duties.

25-06139E-T