Leadership, management and culture for safety: IAEA Safety Standards, publications and review services

Nuclear Safety and Security Programme

IAEA | Nuclear Safety and Security

Nuclear safety is of paramount importance at nuclear installations and cultivating a safety culture in an organization depends on its leadership and management. Clear and identified roles, responsibilities and processes integrated across all levels help to foster a 'Safety First' culture. Safety at nuclear installations relies on individuals, technology, and the operating organization.

The importance of human and organizational factors is apparent from analyses of historical significant nuclear accidents in the nuclear industry including the severe accidents at the Three Mile Island and Chernobyl nuclear power plants (NPP). Years later, human and organizational factors remain a key focus with lessons learned from the March 2011 Fukushima Daiichi NPP accident. IAEA guidance and recommendations has been developed to assist its Member States in maintaining and improving high standards in the areas of leadership, management, and culture for safety.

While regulating safety is a national responsibility, international standards and harmonized approaches to safety promote good practices and consistency, and help to provide assurance that nuclear and radiation related technologies are safely used.

The IAEA Safety Standards provide a robust framework of fundamental principles, requirements, and guidance to ensure safety. These publications are essential to the international community because they reflect an international consensus and serve as a global reference for protecting people and the environment from the harmful effects of ionizing radiation.

The IAEA Safety Requirements GSR Part 2 *'Leadership and Management for Safety'* describes the concept of three balanced elements: leadership, management, and culture for safety. All three elements are interrelated and cannot be effective without the others. A well implemented management system will still fail to deliver acceptable results in safety performance without proper leadership and cultural values and behaviours exhibited by its nuclear professionals.

This brochure provides relevant details to learn more about updated information relevant to the scope of GSR Part 2 *'Leadership and Management for Safety',* an updated list of IAEA Safety Standards and publications in the areas of leadership, management and culture for safety and updated descriptions of the services offered by the Agency.

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The International Nuclear Safety Group (INSAG) has stated that a "commitment to safety and to the strengthening of safety culture at the top of an organization is the first and vital ingredient in achieving excellent safety performance." This establishes that nuclear safety is put clearly and unequivocally at the foundation of requirements from the most senior levels of the organization, and that there is absolute clarity about the organization's safety philosophy.

The Director General's report on the Fukushima Daiichi accident highlighted several core lessons from the analysis of the accident, including the following lessons related to nuclear safety:

"In order to promote and strengthen safety culture, individuals and organizations need to continuously challenge or re-examine the prevailing assumptions about nuclear safety and the implications of decisions and actions that could affect nuclear safety".

"A systemic approach to safety needs to consider the interactions between human, organizational and technical factors. This approach needs to be taken through the entire life cycle of nuclear installations".

To support Member States in the development and maintenance of a strong nuclear safety culture, the IAEA provides peer review missions, workshops and training programmes in addition to standards and publications related to safety culture and leadership and management for safety. These are discussed in detail in this brochure.

Independent Safety Culture Assessment (ISCA)

The IAEA developed the Independent Safety Culture Assessment (ISCA) peer review programme to provide a requesting organization with an assessment of its safety culture, including characteristics, shared values and the basic assumptions upon which the organization's practices are based. As a result of a successful ISCA peer review mission, an organization will be able to develop and strengthen its culture so that safety is appropriately prioritised by all its members.

The ISCA peer review team uses a range of methods to systematically collect a wide variety of organizational data including interviews, comprehensive surveys, focus group interaction, document reviews and observations.

Originally an optional module in the Operational Safety Review Team (OSART) mission service that could be requested as a short standalone mission, ISCA is being fully developed as an official standalone service. The ISCA guidelines (IAEA Services Series No. 32) are under revision to reflect this and are tentatively expected to be available in mid-2022. The short mission format will continue to be available and can be requested as an additional module performed with other IAEA peer review services including OSART, Integrated Safety Assessment of Research Reactors (INSARR), Safety Aspects of Long Term Operations (SALTO), and Integrated Regulatory Review Service (IRRS).

For a more in-depth review of the ISCA service please refer to IAEA Services Series No. 32: OSART Independent Safety Culture Assessment (ISCA) Guidelines.

Safety Culture Continuous Improvement Process (SCCIP)

SCCIP is offered as a training mission to assist an organization in performing a Safety Culture Self-Assessment (SCSA).

The SCCIP assists Member States in strengthening and maintaining their safety culture. The training enables staff from a receiving organization to conduct safety culture self-assessments, to develop effective improvement programmes and to create effective and sustainable organizational change.

To improve safety culture, a thorough understanding of the organization's overall culture is needed. A safety culture self-assessment helps the organization identify attitudes, underlying beliefs and assumptions that drive behaviours. These findings enable the organization to highlight strengths and weaknesses and lay the basis for creating an effective programme to improve safety culture.

The SCCIP is suitable for any organizations and facilities that handle or utilise nuclear material, in countries that are developing nuclear programmes as well as those with established nuclear power programmes.

The length, format and focus of the SCCIP programme can be customized to meet the specific needs of the requesting organization. Both full focused missions and tailored missions focused on specific elements are available.

The IAEA additionally has several publications that assist Member States in performing Safety Culture Self Assessments.

Safety Culture Self-Assessments:

Safety Reports Series No. 83 – Performing Safety Culture Self-assessments

This publication provides practical guidance on how to conduct a safety culture self-assessment. The focus is on using such assessments as a learning opportunity for organizational growth and development rather than as a fault-finding or 'find and fix' exercise.

IAEA Services Series No. 40 – Guidelines for Safety Culture Self-Assessment for the Regulatory Body

The objective of this publication is to provide guidance for regulatory bodies on how to perform SCSAs. The information provided will be of practical value to regulatory bodies trying to improve their own safety culture and will enhance the effectiveness of their safety culture oversight efforts. The IAEA has developed a methodology for SCSA in regulatory bodies. The SCSA methodology set out in Safety Reports Series No. 83 has been applied and associated training material has been developed to support and strengthen national regulatory bodies in strengthening their safety culture.

IAEA TECDOC No. 1321 – Self-Assessment of Safety Culture in Nuclear Installations Highlights and Good Practices

This report summarizes the findings of two IAEA Technical Committee Meetings on Safety Culture Self-Assessment Highlights and Good Practices. The purpose of the meetings was to discuss the practical implications of evolutionary changes in the development of safety culture, and to share international experience, particularly on the methods used for the assessment of safety culture and good practices for its enhancement in an organization.

International School on Nuclear and Radiological Leadership for Safety

The training under this School equips the participants with knowledge, skills and tools to lead and foster a culture for safety within their organizations. The School's programme is based on the IAEA Safety Standards (GSR Part 2 in particular) and utilizes innovative methodology and experiential learning to achieve its overarching objective. It centres around the case studies based on adaptations of real situations within the nuclear and radiological working environments. This training is designed primarily for early- to mid-career professionals from regulatory bodies, operating organizations, and technical support organizations. This School is conducted at national and regional levels at the request of a Member State. It can be delivered in both the traditional face-to-face and a virtual format. Further information can be found at: goto.iaea.org/LeadershipSchool

Leadership, Management and Culture for Safety training course

The training course introduces leadership and management for safety and explains the balance and interrelations of leadership, management and culture for safety and in the context of operational safety. Participants will learn practical approaches to applying GSR Part 2. This workshop is designed primarily for middle managers of operating organizations, regulatory bodies, and technical support organizations. This training course is conducted at the IAEA premises and is open to interested participants from Member States. It can also be conducted at the request of a particular organization of a Member State. An updated version of this training course is being developed.

Systemic Approach to Safety Workshop

This workshop draws on IAEA Safety Standards, state-of-the-art research, and lessons from severe events to provide participants with hands-on learning about strengthening safety within complex systems. Participants will learn the tools and techniques they need to apply the Systemic Approach to Safety. This workshop is designed primarily for middle managers of operating organizations, regulatory bodies, and technical support organizations. This training course is conducted at the IAEA premises and is open to interested participants from Member States. It can also be conducted at the request of a particular organization of a Member State. Currently an updated version of this training course is being developed.

SCCIP training course

The training course introduces SCCIP methodology (please refer to the previous section in this brochure). Participants will learn how to conduct safety culture improvement activities in their own organizations. This training course is conducted at the IAEA premises and is open to interested participants from Member States. It can also be conducted at the request of a particular organization of a Member State. An updated version of this training course is under development.

Safety Culture Self-Assessment for Regulatory Body Workshop

This workshop introduces safety culture self-assessment methodology. Participants will learn how to conduct safety culture self-assessments in their own organization. This workshop is conducted at national and regional levels at the request of a regulatory body of Member States.

Customized Programmes and Workshops

Customized programmes can be designed to meet a very specific need or request by a Member State. This may be on a topic related to leadership, management, and culture for safety, or to address a unique or specific challenge. An initial consultation is scheduled to understand the situation or need, and then the best approach and relevant topics to meet the need is determined.

IAEA Publications Providing Guidance on Topics Relating to Leadership and Management for Safety:

General Safety Requirements (GSR) Part 2 – Leadership and Management for Safety

This high level publication sets forth the basics in relation to establishing, sustaining and continuously improving leadership and management for safety and an integrated management system. It supersedes IAEA Safety Standards Series No. GS-R-3 in 2016.

IAEA Safety Standards Series No. GS-G-3.1 – Application of the Management System for Facilities and Activities

This publication expands upon the concepts introduced in GSR Part 2 and provides guidance for following the requirements for management systems that integrate safety, health, security, quality assurance and environmental objectives.

A revised version of this document will include an updated safety culture framework.

IAEA Safety Standards Series No. GS-G-3.5 – The Management System for Nuclear Installations

This Safety Guide further expands upon the concepts introduced in GSR Part 2 with specific guidance for NPPs. It contains detailed recommendations in relation to nuclear installations, to complement the general recommendations provided in IAEA Safety Standards Series No. GS-G-3.1.

INSAG Series No. 4 – Safety Culture

This report by the IAEA's International Nuclear Safety Group INSAG describes the concept of 'Safety Culture' in connection with nuclear plant safety in relation to both organizations and individuals engaged in nuclear power activities.

INSAG Series No. 13 – Management of Operational Safety in Nuclear Power Plants

The report deals with the framework necessary for safety management in organizations in order to promote safety culture, by systematically addressing the general principles underlying the management of operational safety and by providing guidance on good practices.

INSAG Series No. 15 – Key Practical Issues in Strengthening Safety Culture

This report discusses key issues in safety culture and practical matters such as the assessment of personal contributions to the enhancement of safety culture.

INSAG Series No. 27 – Ensuring Robust National Nuclear Safety Systems – Institutional Strength in Depth

This publication is intended to provide a philosophy to guide the thinking about the institutional structures necessary to assure nuclear safety. It refers to the three important institutional subsystems – the industry, regulator and stakeholders – and describes the interfaces that should be nurtured among these as well as within each subsystem. Defence in depth is a comprehensive approach to providing a systematic means to analyse and assure layers of systems to prevent or mitigate accidents.

Safety Reports Series No. 11 – Developing Safety Culture In Nuclear Activities – Practical Suggestions to Assist Progress

This Safety Report supplements Safety Series No. 75-INSAG-4: Safety Culture (1991) in describing practices that have proved valuable in establishing and maintaining a sound safety culture.

Safety Reports Series No. 42 – Safety Culture in the Maintenance of Nuclear Power Plants

This Safety Report reviews how challenges to the maintenance of nuclear power plants can affect safety culture. It also highlights indications of a weakening safety culture. The challenges described are in areas such as maintenance management, human resources management, plant condition assessment and the business environment.

Safety Reports Series No. 74 – Safety Culture in Pre-operational Phases of Nuclear Power Plant Projects

This publication focuses on safety culture during pre-operational phases that span the interval from before a decision to launch a nuclear power programme to first fuel load. It provides safety culture insights and focuses on eight generic issues: safety culture understanding; multicultural aspects; leadership; competencies and resource competition; management systems; learning and feedback; cultural assessments; and communication.

IAEA TECDOC No. 1329 – Safety Culture in Nuclear Installations: Guidance for Use in the Enhancement of Safety Culture

This publication focuses on culture and in particular on safety culture and its three level model. It addresses the stages of development of safety culture and what practices can be used to develop safety culture, and what indicators will help monitor progress. The symptoms of a weakening safety culture are described, as well as the lessons learned from organizations that have experienced safety culture problems.

IAEA TECDOC No. 1707 – Regulatory Oversight of Safety Culture in Nuclear Installations

This publication addresses the basics of regulatory oversight of safety culture and describes the currently implemented approaches at several regulatory bodies around the world and provides practical guidance on the basis of this experience.

IAEA TECDOC No. 1846 – Regulatory Oversight of Human and Organizational Factors for Safety of Nuclear Installations

Written for use by regulatory bodies and their technical support organizations, and those individuals supporting human performance activities and programmes, this publication addresses the definition and implementation of an oversight programme that adequately takes into account human and organizational factors to oversee safety throughout the lifetime of nuclear installations. A key concept is that safety is the result of interaction between humans, technology and the organization.

IAEA TECDOC No. 1895 – Safety Culture Practices for the Regulatory Body

This publication is the outcome of an IAEA meeting that provided a forum for senior regulators to share their experience and disseminate knowledge on how safety performance can be improved through effective leadership and management for safety and safety culture. The publication provides practical information for regulatory bodies on promoting and assessing safety culture within their own organizations and providing regulatory oversight of licensees' safety culture activities.

IAEA Safety Standards Series No. SSR-2/2 (Rev. 1) – Safety of Nuclear Power Plants: Commissioning and Operation

Replacing NS-G-2, this high level document establishes basic requirements for the management system.

IAEA Safety Standards Series No. NS-G-2.4 – The Operating Organization for Nuclear Power Plants

This publication develops the requirements in SSR-2/2 as they pertain to the operating organization.

IAEA Safety Standards Series No. GSG-12 – Organization, Management and Staffing of the Regulatory Body for Safety

This publication provides recommendations on meeting the requirements of IAEA Safety Standards Series No. GSR Part 1 (Rev. 1), Governmental, Legal and Regulatory Framework for Safety, in respect of the organizational structure, management and staffing of the regulatory body.

Proceedings Series – International Atomic Energy Agency – Human and Organizational Aspects of Assuring Nuclear Safety – Exploring 30 Years of Safety Culture

These proceedings present the outcome of an international conference, at which the nuclear community had the opportunity to reflect on the pivotal role that human and organizational aspects play in assuring nuclear safety. Held 30 years after the Chernobyl accident, which led to the international adoption of the concept of safety culture, the conference provided distinguished experts and practitioners with a unique opportunity to share insights from the past and visions for a safer future.

Action Plan on Nuclear Safety Series - IAEA Report on Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant

Outcome of an International Experts Meeting held 21–24 May 2013, in Vienna, Austria to discuss the topic of human and organizational factors after the March Fukushima Daiichi nuclear power plant accident.

For further information

All books are freely available to download at: **www.iaea.org/publications**

For further information

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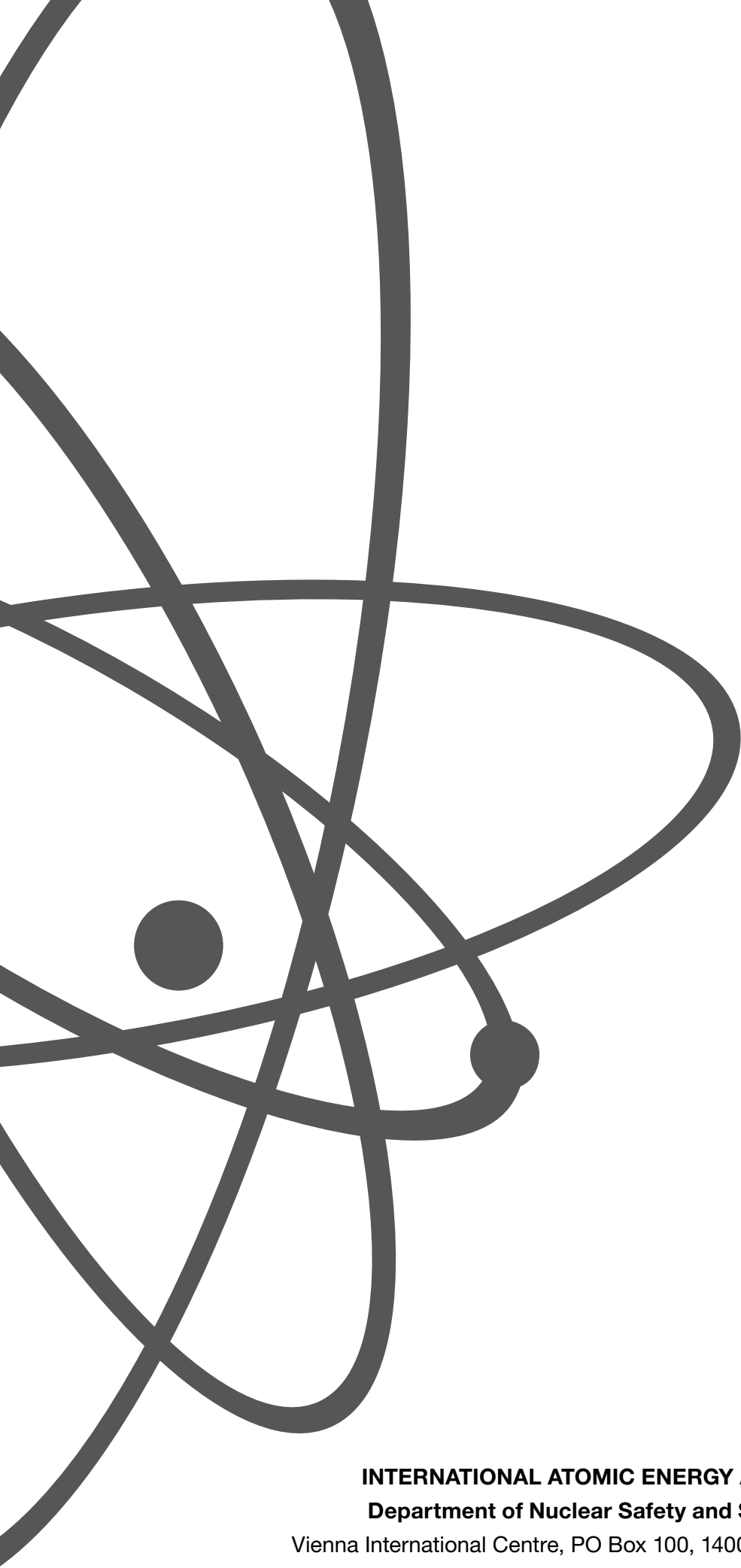
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