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An Introduction to the IAEA Safety Standards

Safety Standards and Nuclear Security Guidance Development Section
Office of Safety and Security Coordination
Department of Nuclear Safety and Security

Webinar

Tuesday 15 December

14:00-15:30 (CET)

Programme



Topic	Presenter
Opening Remarks	Dominique Delattre, Section Head SSDS, IAEA
Overview of the IAEA Safety Standards	Katherine Asfaw, SSDS, IAEA
Accessing and Navigating the IAEA Safety Standards (<i>Demo</i>)	Tatiana Karseka-Yanev, SSDS, IAEA
Q&A Session	All participants Moderator: Maria Nikolaki SSDS, IAEA



Objectives

The objectives of the webinar are:

- To enhance the understanding on the IAEA safety standards (purpose, scope, target audience, structure, status), as well as how Member States can apply the standards
- To provide information on how the standards are developed, established and revised
- To increase awareness of the available resources for accessing the safety standards and the newly developed e-learning materials



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Overview of the IAEA Safety Standards

Ms Katherine Asfaw
Senior Standards Specialist
SSDS, IAEA

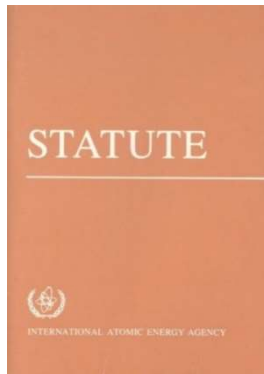


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The IAEA safety standards: origin, purpose, structure and scope

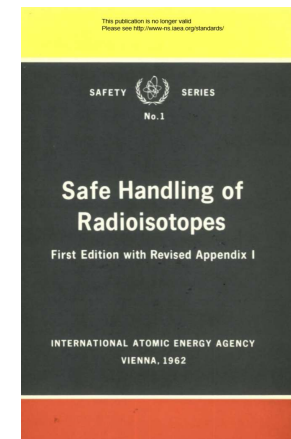
Origin



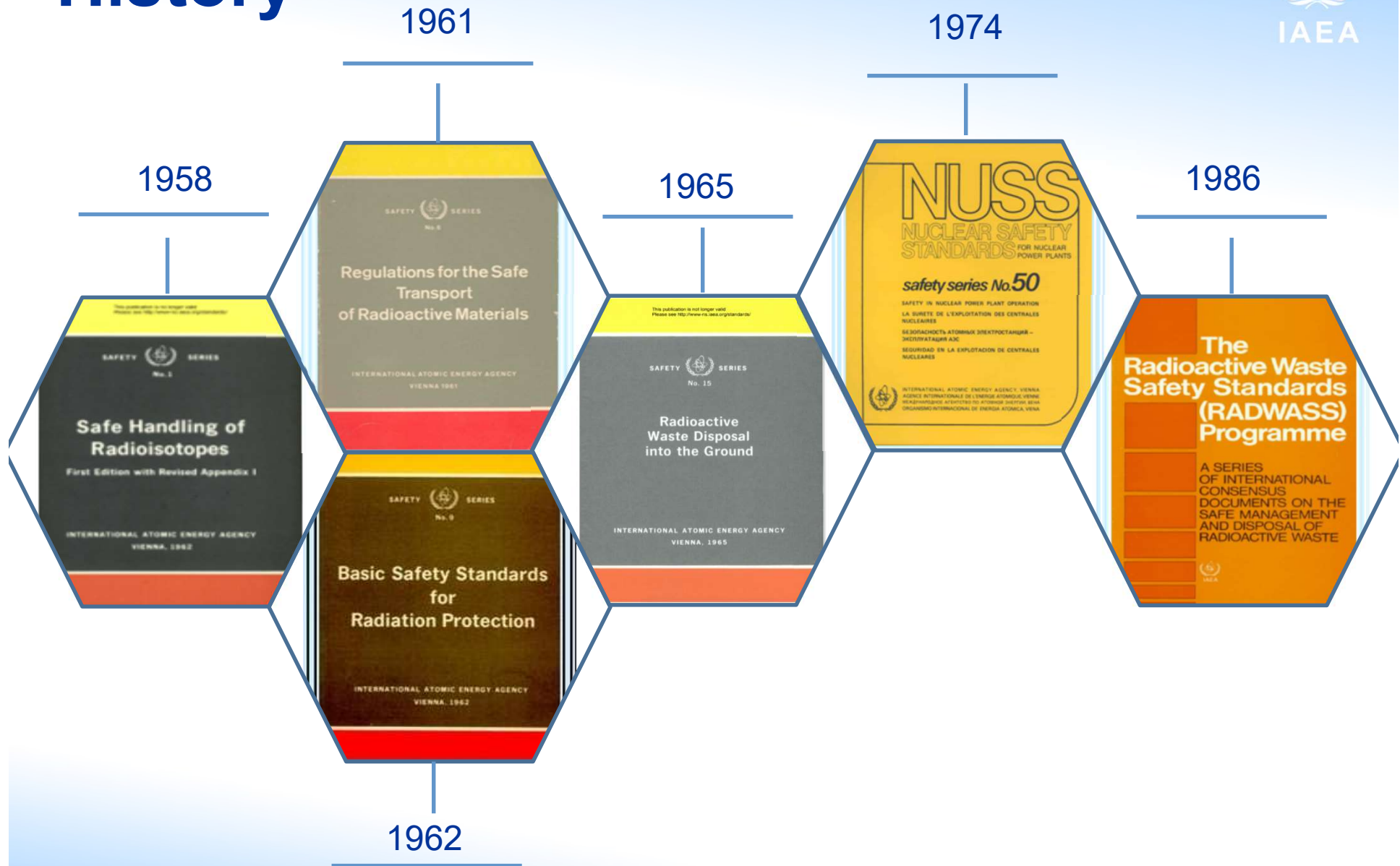
Under Article III.A.6, the IAEA is authorized:

“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 IAEA published its first safety standard, Safety Series No. 1, Safe Handling of Radioisotopes, in 1958, just one year after the Agency was established



History



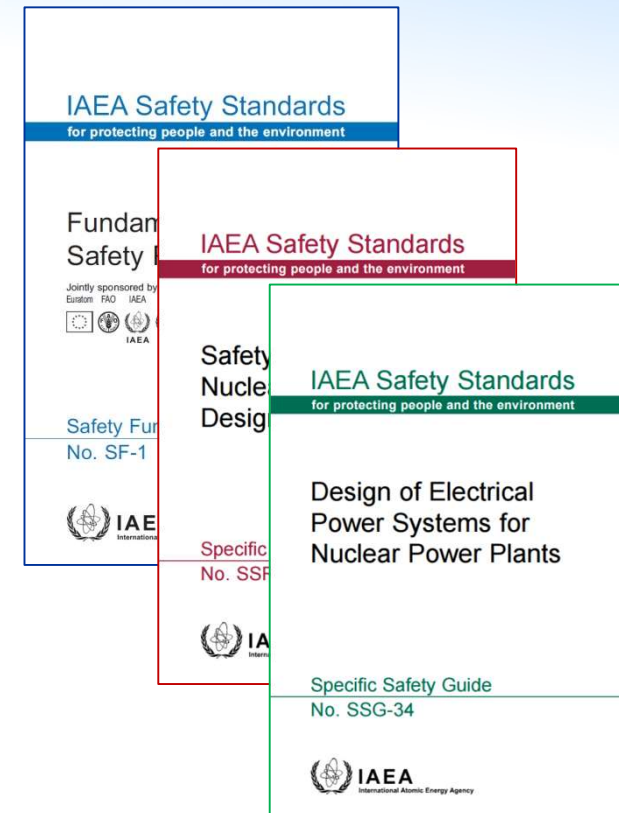
History



Purpose



- An integrated, comprehensive and consistent set of up-to-date, user friendly and fit-for-purpose safety standards of high quality
- They provide for a high level of protection for people and the environment from harmful effects of ionizing radiation
- They present international consensus on a level of safety



Scope



IAEA safety standards are primarily addressed to national regulatory authorities and cover all regulatory and operational aspects of nuclear and radiation safety.

They cover all facilities and activities that can give rise to radiation exposure (only peaceful facilities and activities are covered)



Safety standards are:

- Non binding on IAEA Member States but may be adopted by them
- Binding for the IAEA's own activities
- Binding on States in relation to operations assisted by the IAEA or States wishing to enter into project agreements with IAEA

The hierarchy



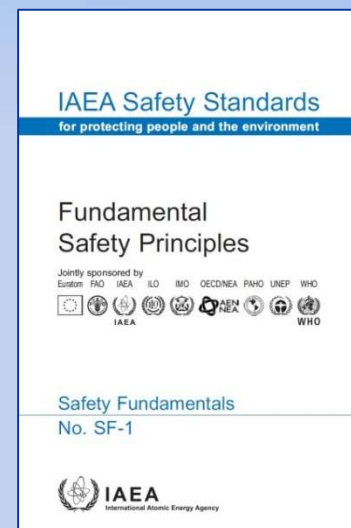
Fundamental safety objective and ten principles for protecting people and environment

Requirements that have to be met to ensure protection of people and environment

Recommendations on how to comply with the safety requirements

The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation

- Principle 1: Responsibility for safety
- Principle 2: Role of government
- Principle 3: Leadership and management for safety
- Principle 4: Justification of facilities and activities
- Principle 5: Optimization of protection
- Principle 6: Limitation of risks to individuals
- Principle 7: Protection of present and future generations
- Principle 8: Prevention of accidents
- Principle 9: Emergency preparedness and response
- Principle 10: Protective actions to reduce existing or unregulated radiation risk



General Safety Requirements

GSR Part 1: Governmental, Legal and Regulatory Framework for Safety

GSR Part 2: Leadership and Management for Safety

GSR Part 3: Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

GSR Part 4: Safety Assessment for Facilities and Activities

GSR Part 5: Predisposal Management of Radioactive Waste

GSR Part 6: Decommissioning of Facilities

GSR Part 7: Preparedness and Response for a Nuclear or Radiological Emergency

Specific Safety Requirements

SSR-1: Site Evaluation for Nuclear Installations

Safety of Nuclear Power Plants

SSR-2/1: Design
SSR-2/2: Commissioning and Operation

SSR-3: Safety of Research Reactors

SSR-4: Safety of Nuclear Fuel Cycle Facilities

SSR-5: Disposal of Radioactive Waste

SSR-6: Regulations for the Safe Transport of Radioactive Waste

GSR Part 1: Governmental, Legal and Regulatory Framework for Safety



Requirement 3: Establishment of a regulatory body

The government, through the legal system, shall establish and maintain a regulatory body, and shall confer on it the legal authority and provide it with the competence and the resources necessary to fulfil its statutory obligation for the regulatory control of facilities and activities.

Requirement 4: Independence of the regulatory body

The government shall ensure that the regulatory body is effectively independent in its safety related decision making and that it has functional separation from entities having responsibilities or interests that could unduly influence its decision making.

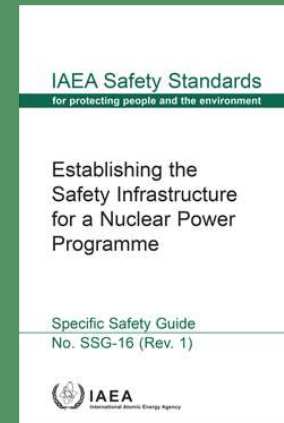
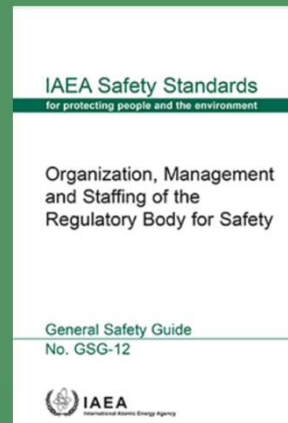
2.7. An independent regulatory body will not be entirely separate from other governmental bodies. The government has the ultimate responsibility for involving those with legitimate and recognized interests in its decision making. However, the government shall ensure that the regulatory body is able to make decisions under its statutory obligation for the regulatory control of facilities and activities, and that it is able to perform its functions without undue pressure or constraint.

Safety Guides provide recommendations and guidance on how to comply with the requirements

Safety Guides form a matrix structure:

General Safety Guides provide recommendations for a particular topic and can be applied to all types of facility or activity

Specific Safety Guides provide recommendations for a particular type of facility or activity



Financial aspects

2.11. Adequate and stable financing for all regulatory activities is fundamental to independence. The financing mechanism should be clearly defined in the legal framework. The budget for the regulatory body may include the fees levied for regulatory activities, but should not depend on fines or other penalties arising from enforcement actions, nor should it be decided by or be subject to the approval of those parts of the government that are responsible for the development, promotion and operation of nuclear technologies.

2.12. Although the overall budget of the regulatory body may be fixed by the government, the regulatory body should have the authority to distribute financial resources to its various regulatory activities for the greatest effectiveness and efficiency.

2.13. Specific provisions to fund the regulatory body should be established in the national legal framework or through the national fiscal process. How this is best accomplished will depend on a number of considerations, including the following:

- Precedents for the funding of other national regulatory organizations;
- The types and scale of regulated facilities and activities, and the associated workload based on the application of a graded approach to the execution of the functions of the regulatory body;
- How the regulatory body is structured, including its use of in-house and outsourced competences.

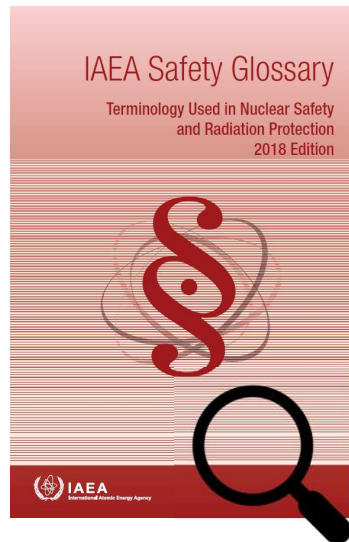
IAEA Safety Standards
for protecting people and the environment

Organization, Management
and Staffing of the
Regulatory Body for Safety

General Safety Guide
No. GSG-12



The IAEA Safety Glossary

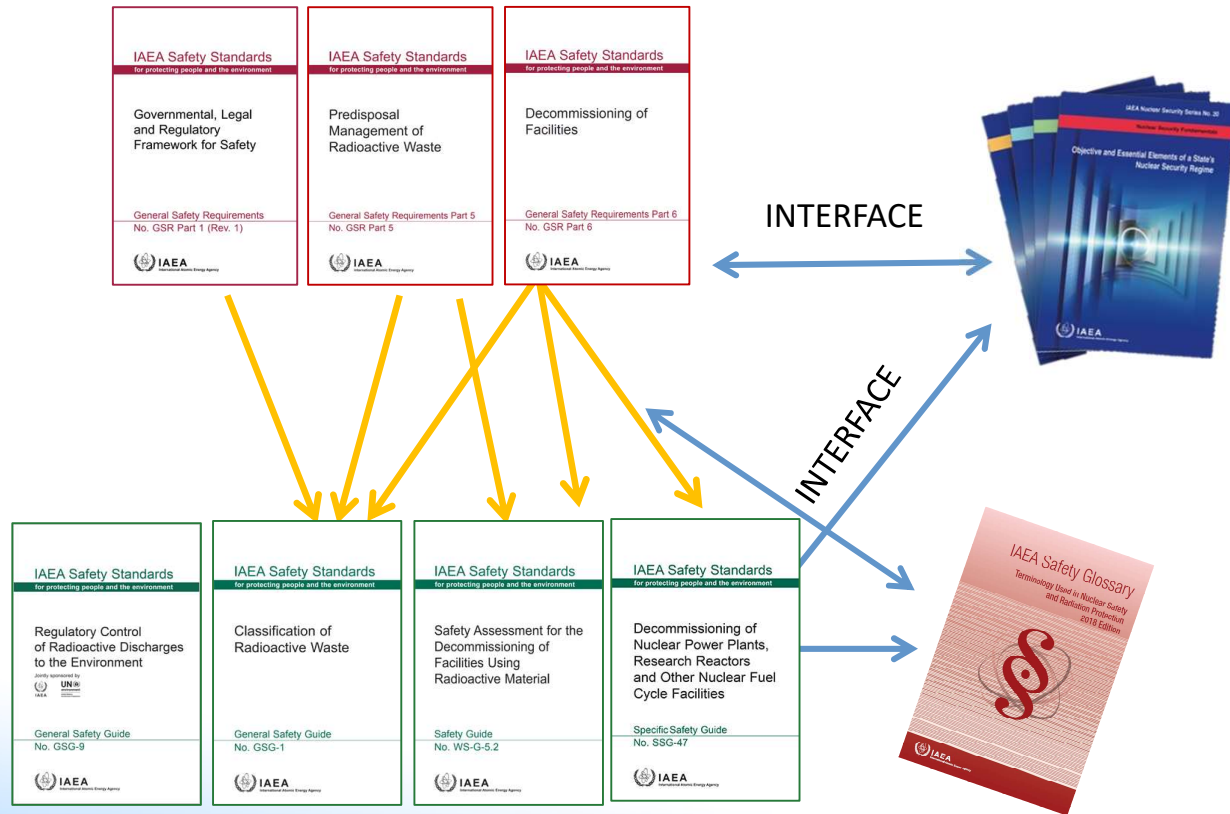


- To explain the meanings of technical terms that may be unfamiliar to the reader
- To explain any special meanings ascribed to common words or terms
- To explain the specific meanings of the same technical term in different contexts
- To recommend terms that should be used in IAEA publications and documents (and those that should not)
- To harmonize terminology and usage in the IAEA safety standards, and in their application

Relationships in the Safety Standards



The safety standards are a set of publications. They are consistent with one another and are interrelated.



Publications in the IAEA Nuclear Security Series provide recommendations and guidance on nuclear security and are consistent with the safety standards



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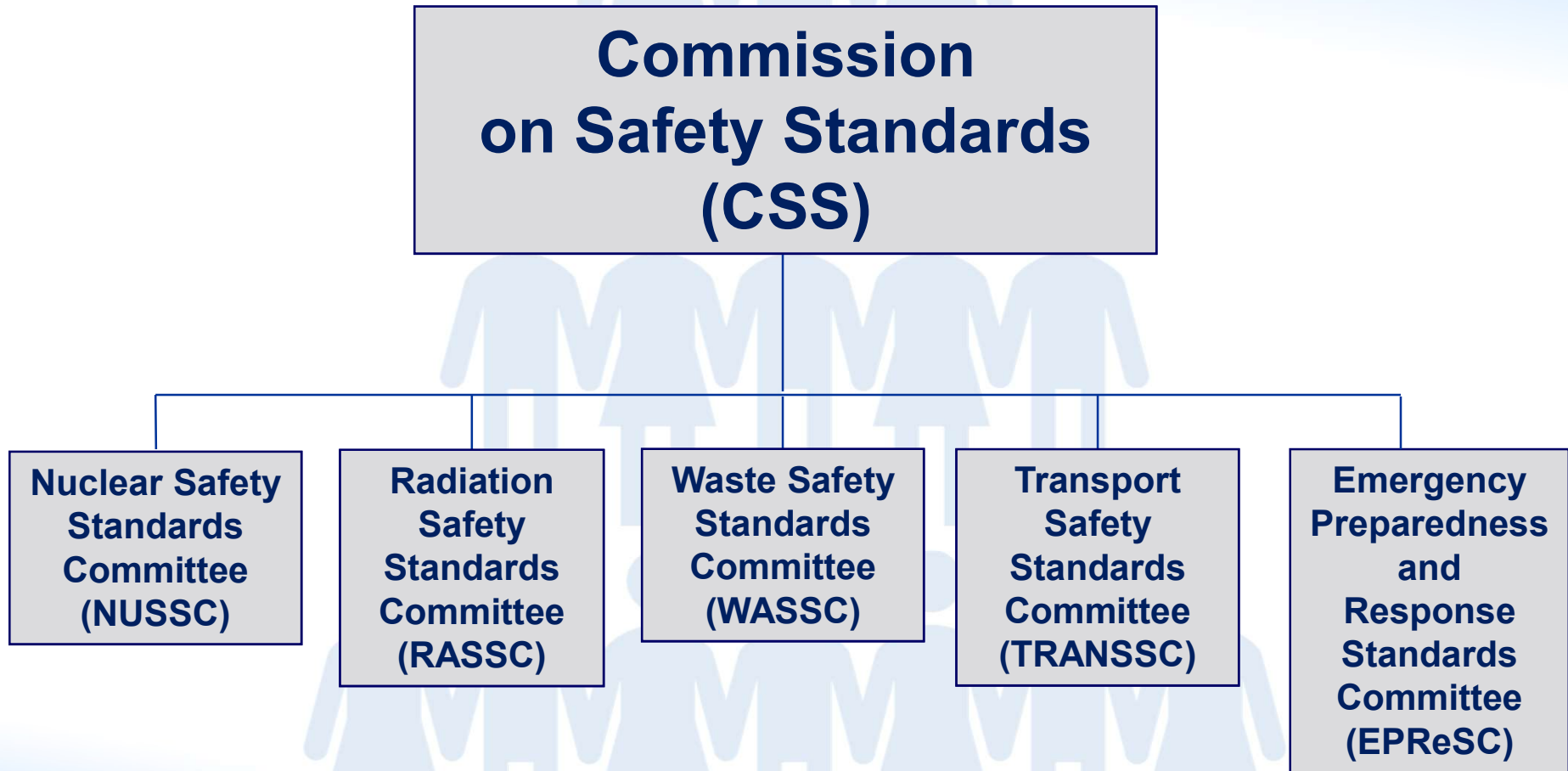
How the IAEA safety standards are developed, established and revised

Who is involved in the development of IAEA safety standards?

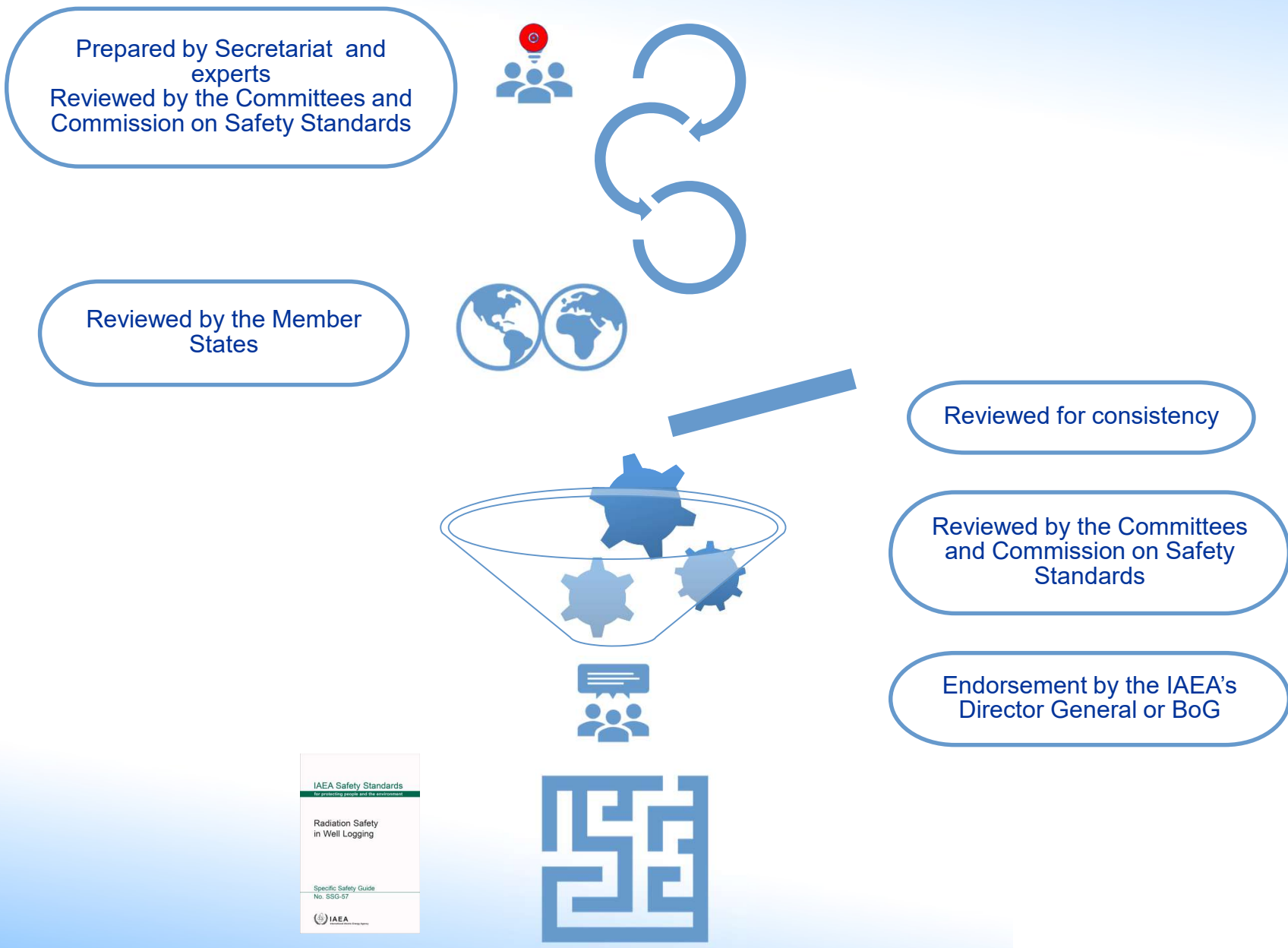


- The IAEA Secretariat
- Member States
- The Commission on Safety Standards
- The Safety Standards Committees and the Nuclear Security Guidance Committee
- The IAEA's Board of Governors
- The United Nations, its specialized agencies (such as the FAO, ICAO, ILO, IMO, WHO) and other intergovernmental organizations
- International experts
- Users

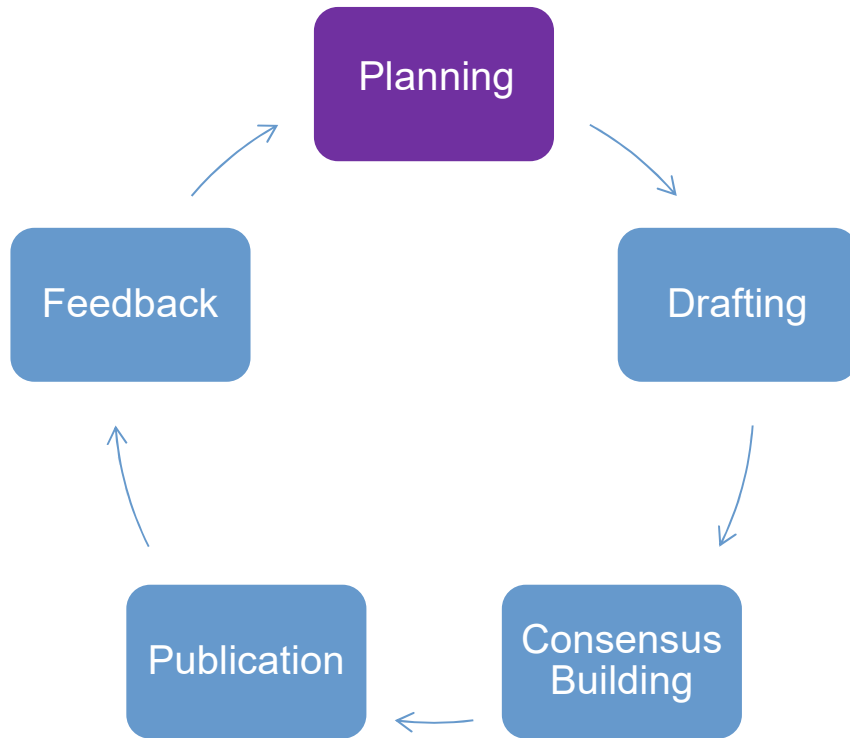
Commission & Committees



Strategies and Processes for the Establishment of IAEA Safety Standards



The process



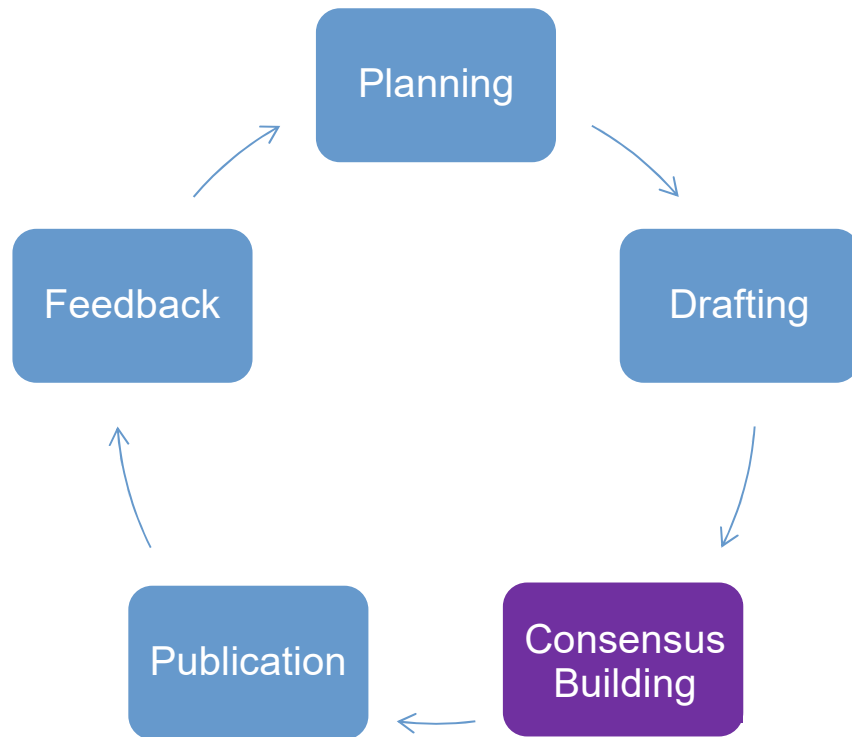
- ✓ The need for a new or revised standard is identified
- ✓ A Document Preparation Profile (DPP) is prepared
- ✓ The relevant Committees review the DPP
- ✓ The CSS reviews the DPP and confirms its place in the Safety Standards Series

The process



- ✓ IAEA staff and experts from regulatory bodies, industry and other interested parties in Member States draft the standard
- ✓ The Safety Standards Committees review the draft standard to ensure it meets the specifications of the DPP and that it is of sufficient quality to be sent to Member States for comment

The process



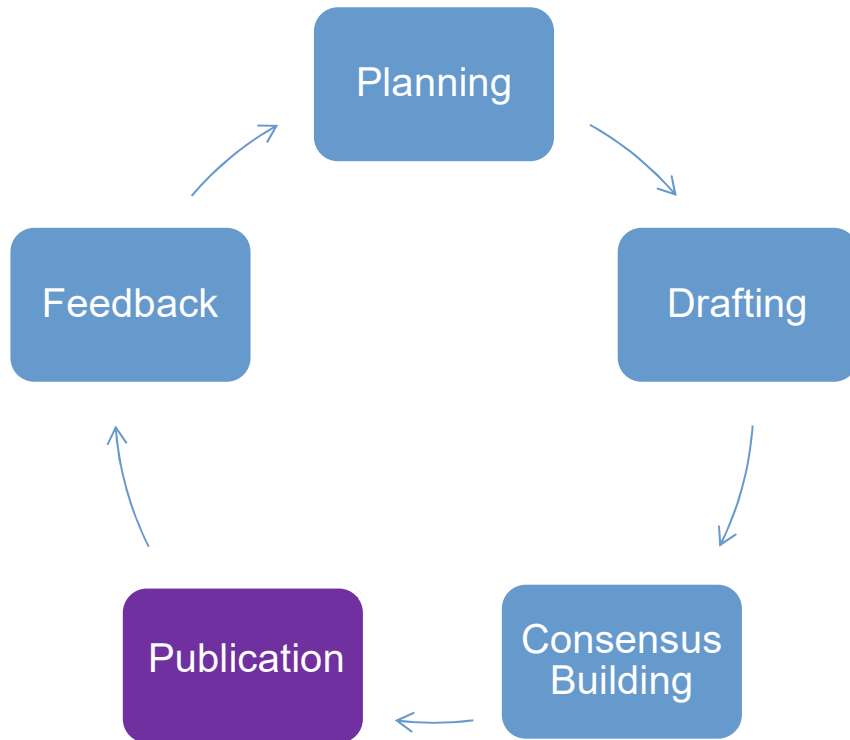
Member States Review

- ✓ Member States have 120 days to review the draft standard and provide comments

Standardization and refining

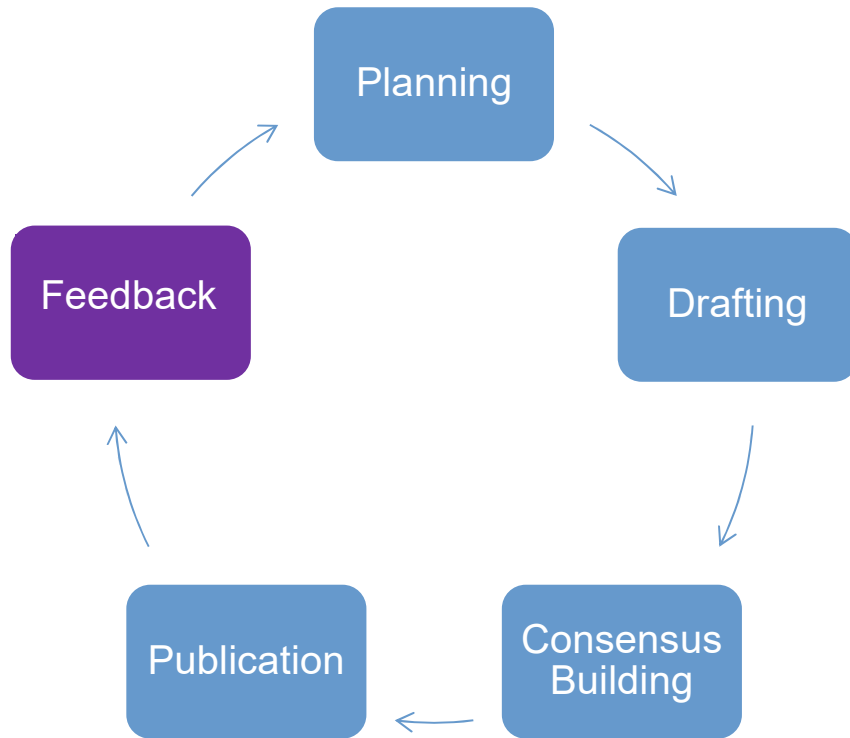
- ✓ The Secretariat carries out a comprehensive review of the text of the draft standard
- ✓ The Safety Standards Committees review the resolution of Member State comments and the revised draft
- ✓ The IAEA's professional editors edit the draft
- ✓ The final edited draft is presented to the CSS for their endorsement for publication

The process



- ✓ The IAEA Board of Governors approves Safety Requirements and Safety Fundamentals for publication
- ✓ The IAEA Director General approves Safety Guides for publication
- ✓ New standards are published online and in printed format
- ✓ New standards are included in the online user interface NSS-OUI

The process



- ✓ Feedback is used to identify areas where new standards need to be developed or where improvements are needed
- ✓ The IAEA Secretariat collects feedback from safety review missions, lessons learned from events, and experience in the use and application of the safety standards
- ✓ The NSS-OUI tool enables users to easily and quickly provide feedback

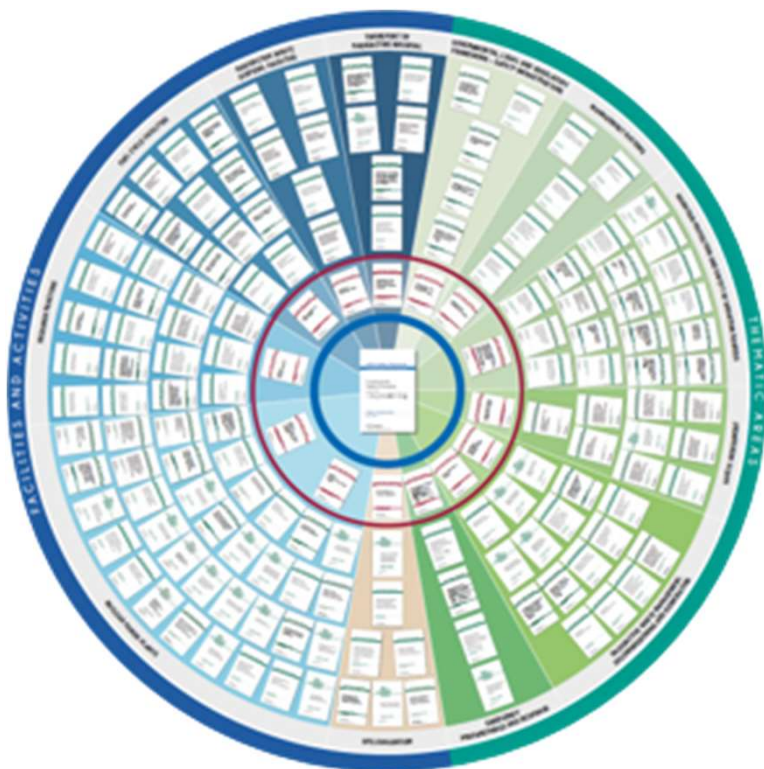


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Publications in the IAEA Safety Standards Series

Current Status of the Safety Standards



131 safety standards published



Fundamentals and Requirements issued in all official languages



40% of standards are under revision



The expected total number of standards is 136


Recently published standards (2020)



IAEA Safety Standards
for protecting people and the environment


Establishing the Safety Infrastructure for a Nuclear Power Programme

Specific Safety Guide
No. SSG-16 (Rev. 1)




IAEA Safety Standards
for protecting people and the environment

Arrangements for Public Communication in Preparedness and Response for a Nuclear or Radiological Emergency

Jointly sponsored by



General Safety Guide
No. GSG-14



IAEA Safety Standards
for protecting people and the environment

Radiation Safety of X Ray Generators and Other Radiation Sources Used for Inspection Purposes and for Non-medical Human Imaging


Specific Safety Guide
No. SSG-55



IAEA Safety Standards
for protecting people and the environment

Design of the Reactor Coolant System and Associated Systems for Nuclear Power Plants


Specific Safety Guide
No. SSG-56



IAEA Safety Standards
for protecting people and the environment

Radiation Safety in Well Logging


Specific Safety Guide
No. SSG-57



IAEA Safety Standards
for protecting people and the environment

Radiation Safety of Accelerator Based Radioisotope Production Facilities


Specific Safety Guide
No. SSG-59



IAEA Safety Standards
for protecting people and the environment

Design of Auxiliary Systems and Supporting Systems for Nuclear Power Plants

Specific Safety Guide
No. SSG-62



Upcoming publications

- SSG-15 (Rev. 1) Storage of Spent Nuclear Fuel
- SSG-58 Radiation Safety in the Use of Nuclear Gauges
- SSG-60 Management of Residues Containing Naturally Occurring Radioactive Material from Uranium Production and Other Activities
- SSG-61 Format and Content of the Safety Analysis Report for Nuclear Power Plants
- SSG-63 Design of Fuel Handling and Storage Systems for Nuclear Power Plants



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Accessing and Navigating the IAEA Safety Standards

Ms Tatiana Karseka-Yanev

Safety Officer

SSDS, IAEA



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IAEA Safety Standards - Resources

Where to get more information



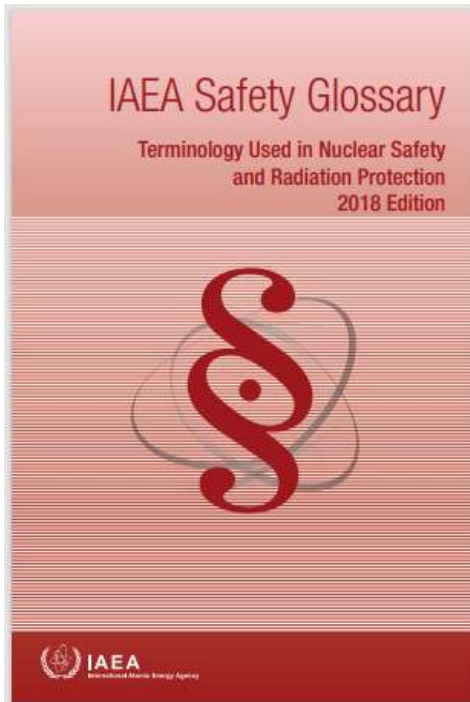
NSS-OUI

IAEA.org

The screenshot shows the top navigation bar of the NSS-OUI with the IAEA logo and 'NUCLEUS' text. Below it, the main header reads 'IAEA Nuclear Safety and Security Online User Interface'. A search bar is visible with the text 'Search'. On the left, there are links for 'Home', 'Browse', and 'Search'. The main content area includes a 'Search' section with links for 'Advanced Search' and 'Relationship Search'. A paragraph explains that documents are marked with metadata and that users should use the advanced search page for specific criteria. Another paragraph notes that full-text search is useful for very specific terms. A third paragraph suggests using the search box in the 'Browse Publications' tab for specific publications like GSR Part 1 or SSG-1. A fourth paragraph advises using quotes for exact matches. At the bottom, there is a link to a self-learning tool and a search input field with the placeholder text 'Search publications'.

The screenshot shows the IAEA.org website. The top navigation bar includes the IAEA logo, 'International Atomic Energy Agency', and a search bar. Below the navigation bar, there are links for 'TOPICS', 'SERVICES', 'RESOURCES', 'NEWS & EVENTS', and 'ABOUT US'. The main content area features a large banner for 'IAEA Safety Standards protecting people and the environment'. Below the banner, there is a section titled 'Safety standards' with a list of links: 'Scientific and technical publications', 'Draft standards posted for official comment by Member States', 'Recently published safety standards', 'Safety Glossary', 'Safety standards under development', and 'Search safety standards'. To the right of this list, there is a paragraph explaining that safety standards are the IAEA's key publications, providing fundamental principles and recommendations for nuclear safety. Below this paragraph, there is another paragraph stating that 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 be subject to standards of safety. A third paragraph states that the prime responsibility for nuclear safety must rest with the person or organization responsible for these activities, and that regulating safety is a national responsibility. A fourth paragraph explains that 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. A fifth paragraph notes that the IAEA is required by its Statute to promote international cooperation, and that its Statute authorizes it to establish or adopt safety standards for the protection of health and to minimize the danger to life and property. The Agency develops such standards on the basis of an open and transparent process. To the right of the main content, there is a search bar with the text 'Search Safety Standards (NSS-OUI)'. Below the search bar, there is a section titled 'Related resources' with a list of links: 'Strategies and processes', 'Status of Safety Standards', 'Superseded Safety Standards', 'Safety Standards poster', 'IAEA Safety Standards and Nuclear Security Guidance Online-User Interface (NSS-OUI)', 'E-learning Guidance for Consultants and invited Experts on the Drafting of the IAEA Safety Standards', and 'Review committees'. At the bottom, there is a section titled 'Languages' with the text 'All safety standards in one file:'.

IAEA Safety Glossary, 2018 Edition



<https://www.iaea.org/publications/11098/iaea-safety-glossary-2018-edition>



IAEA Safety Glossary

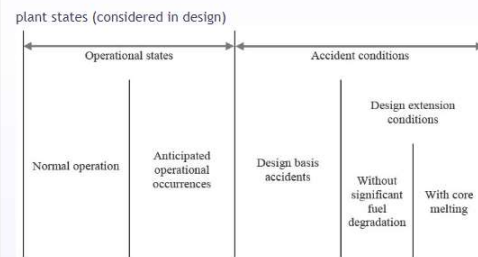
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plant states - Also: plant state
<https://kos.iaea.org/iaea-safety-glossary/594>

Reference Lis

Definition



Notes

- The entries that follow (terms and definitions) relate to consideration at the *design* stage (i.e. by means of hypothetical scenarios)
- Care needs to be taken to select, use and relate defined terms and other words in such a way that clear distinctions are drawn and may be inferred between, for example: events and situations (see the entry for *event*); accidents and other incidents; what is actual (i.e. what is), possible (i.e. what might be) or potential (i.e. what could become), and what is hypothetical (i.e. what is postulated or assumed); and what is observed or determined objectively, and what is decided or declared subjectively.
- 'Conditions', for example, is used in terms in the sense of rules set in *design* (as in *operational limits and conditions*) and also circumstances of *operation* (as in plant conditions); and in terms used in both *design* and *operation* (e.g. in *accident conditions, service conditions*).
- Drafters and reviewers thus need to bear in mind whether text concerns *design* or *operation*, or both. The potential, the postulated or the assumed in *design* needs to be distinguished from the observed or the determined in *operation*; and the decided on or declared (such as an *emergency*), in both *design* and *operation*, needs to be distinguished from the former (i.e. the

Broader

Narrower

anticipated operational occurrence
 controlled state
 design extension conditions
 normal operation
 operational states
 safe state
 accident conditions
 beyond design basis accident
 design basis accident

Related concepts

uncertainty
 facility states
 probabilistic safety assessment
 model

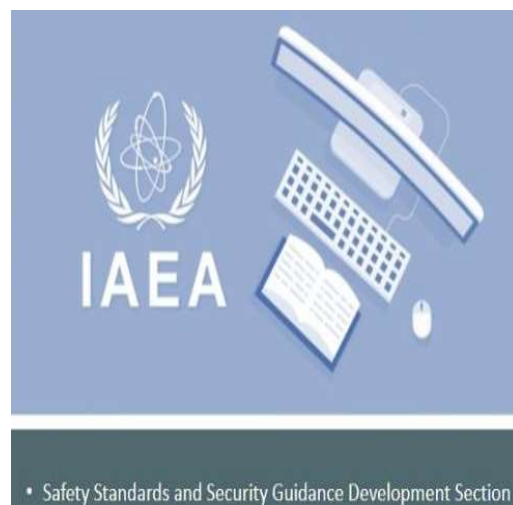
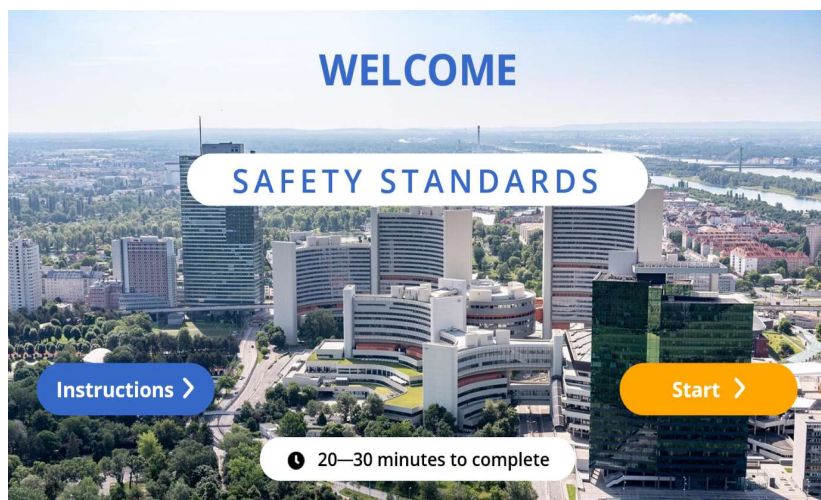
<https://kos.iaea.org/iaea-safety-glossary.html>

E-learning



IAEA Safety Standards Overview
<https://elearning.iaea.org/m2/enrol/index.php?id=691>

Guidance for External Contributors on Drafting IAEA Safety Standards
<https://elearning.iaea.org/m2/course/view.php?id=689>





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Nuclear Safety and Security Online User Interface (NSS-OUI)

Easy Access through Nuclear Safety and Security Online User Interface (NSS-OUI)



- Search through entire collections
- Relationships and links between requirements and corresponding recommendations
- Hyperlinks to definitions from the IAEA Glossary
- Updates on newly published Standards and other IAEA publications
- Free access at any time and any place (no sign in)



<https://nucleus-apps.iaea.org/nss-oui>



IAEA | Nuclear Safety and Security

Home Browse Search

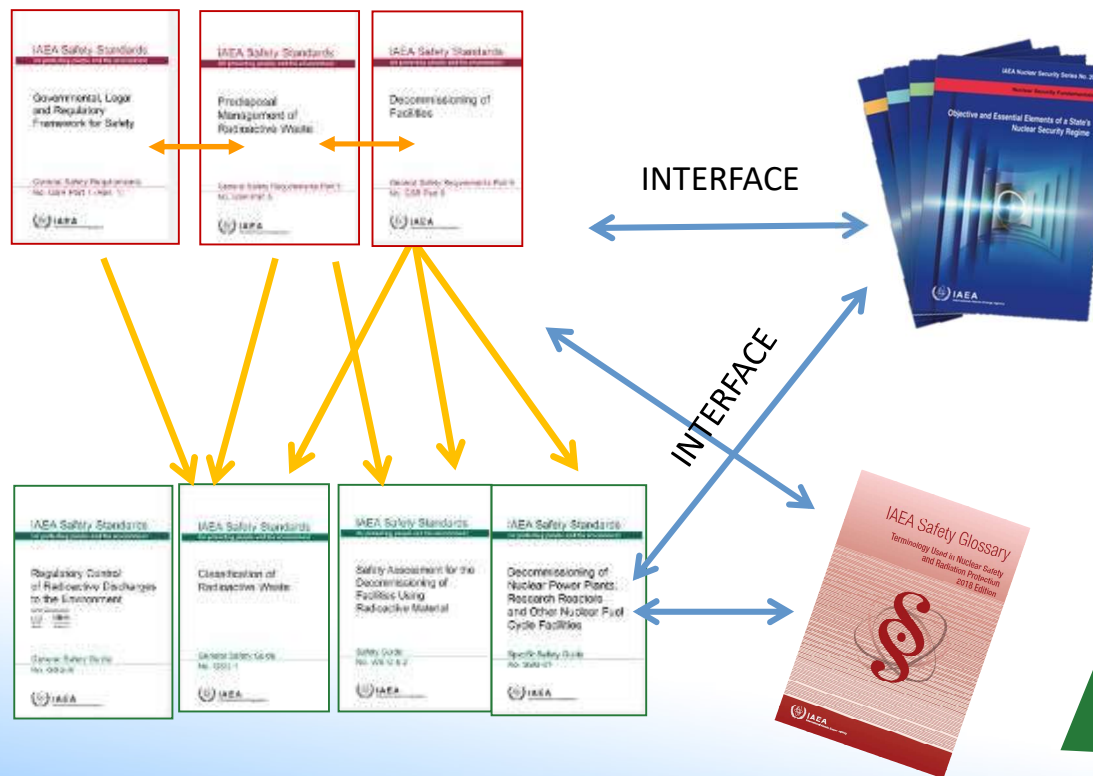
Content and relationship management through metadata and explicit relationship notes



The safety standards are a consistent and interrelated set of publications.



Topical relationship – Hierarchical relationship – Semantic relationship



- Governmental, Legal and Regulatory Infrastructure for Safety (based on GSR Part 1)
 - National policy and strategy
 - GSR Part 1/ National policy and strategy/General
 - National policy and strategy for decommissioning
 - National policy and strategy for waste management
 - Governmental responsibility for the disposal of radioactive waste
 - International obligations and arrangements for international cooperation
 - Legal and regulatory framework
 - GSR Part 1/Legal and regulatory framework/General
 - Responsibilities of the regulatory bodies specific to occupational exposure
 - Responsibilities of the government and the regulatory body specific to public exposure
 - Responsibilities of the government specific to medical exposure
 - Responsibilities of the regulatory body specific to medical exposure
 - Responsibility of the regulatory body for the disposal of radioactive waste
 - Responsibility of the regulatory body for the management of radioactive waste
 - GSR Part 1/Emergency preparedness and response
 - GSR Part 1/Waste management
 - GSR Part 1/Decommissioning
 - GSR Part 1/Protective actions to reduce existing or unregulated radiation risks

Content and relationship management through metadata and explicit relationship notes

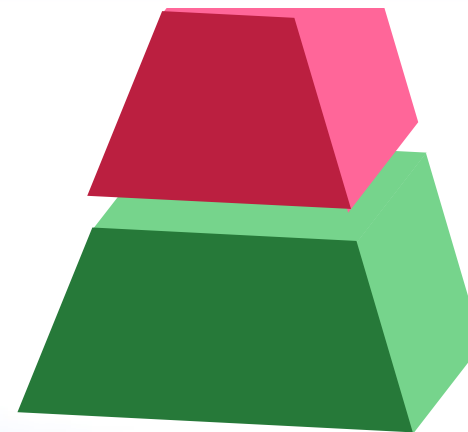
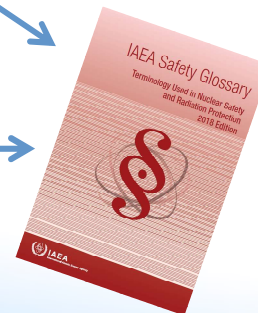
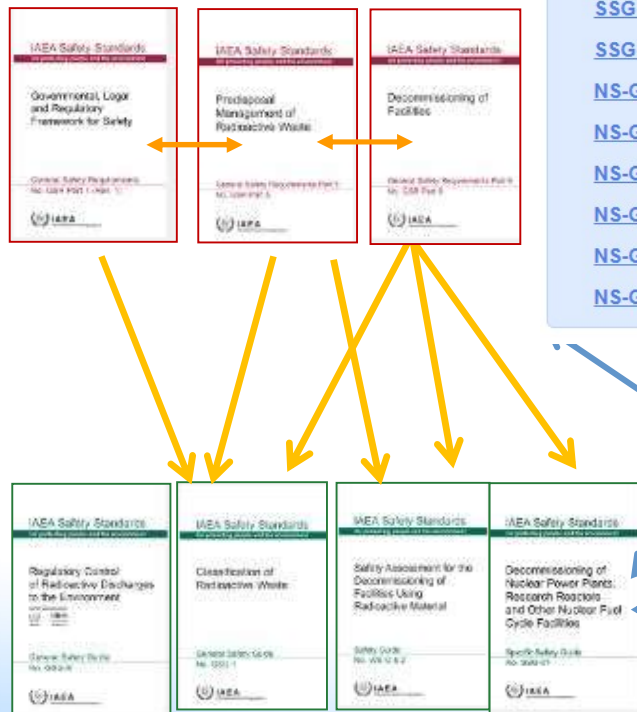
The safety standards are a consistent and interrelated set of publications.



Topical relationship – Hierarchical relationship – Semantic relationship

i See also:

- [NS-G-2.13](#) on Evaluation of Seismic Safety for Existing Nuclear Installations
- [SSG-9](#) on Seismic Hazards in Site Evaluation for Nuclear Installations
- [SSG-18](#) on Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations
- [SSG-21](#) on Volcanic Hazards in Site Evaluation for Nuclear Installations
- [NS-G-3.6](#) on Geotechnical Aspects of Site Evaluation and Foundations for Nuclear Power Plant
- [NS-G-1.5](#) on External Events Excluding Earthquakes in the Design of Nuclear Power Plants
- [NS-G-1.6](#) on Seismic Design and Qualification for Nuclear Power Plants
- [NS-G-1.7](#) on Protection Against Internal Fires and Explosions in the Design of Nuclear Power Plants
- [NS-G-1.11](#) on Protection against internal Hazards other than Fires and Explosions in the Design of Nuclear Power Plants
- [NS-G-3.1](#) on External Human Induced Events in Site Evaluation for Nuclear Power Plants





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NSS-OUI Demonstration

<https://nucleus-apps.iaea.org/nss-oui/>



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How to contact us

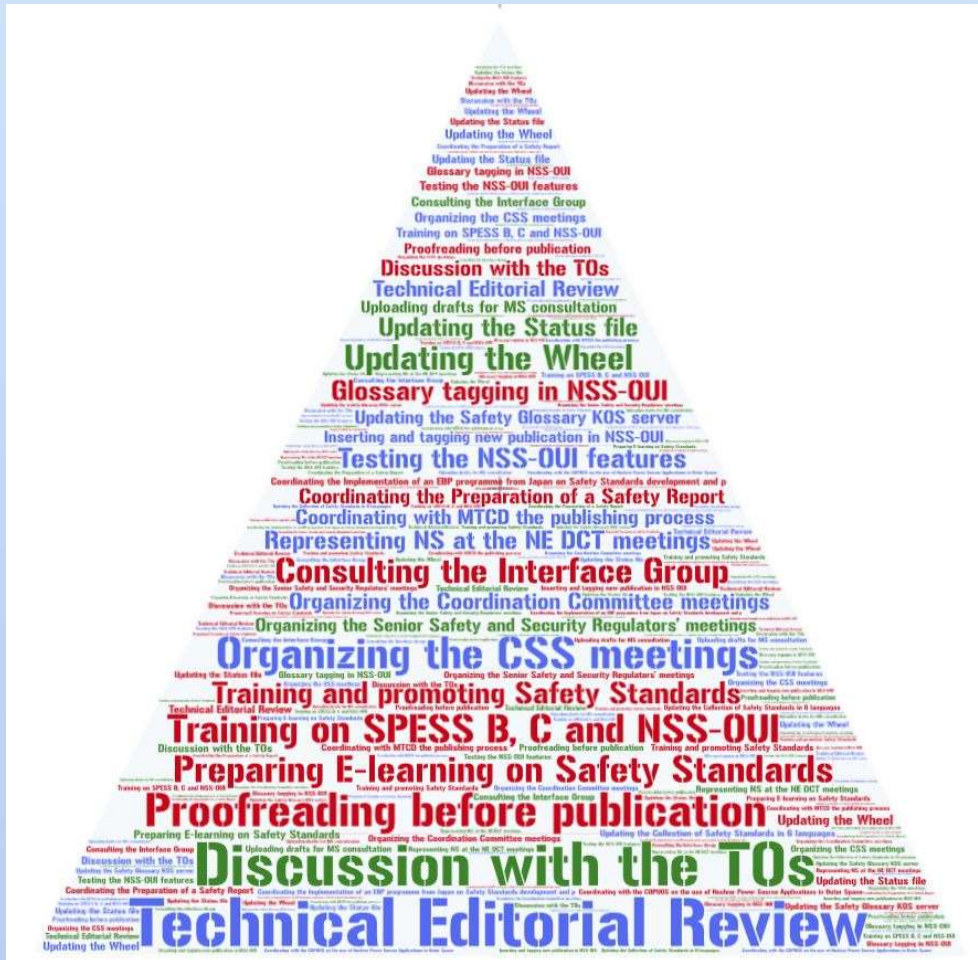
Safety.Standards@iaea.org



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SAFETY STANDARDS AND SECURITY GUIDANCE DEVELOPMENT SECTION



Dominique Delattre

Katherine Asfaw

Cristina Fischer

Tatiana Karseka-Yanev

Maria Nikolaki

Peter Shaw

Masaharu Yuzawa



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Questions?



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Thank you!