



*60 Years*

**IAEA**

*Atoms for Peace and Development*

# Lecture 1

# Overview of International Safety Standards

# Establishment of the International Atomic Energy Agency

*Speech “Atoms for Peace” USA’s President, Dwight Eisenhower, In the UN assembly in 1953.*

The IAEA was  
established  
in 1957





**The IAEA has been established as the UN family system organization for atoms for peace and development**

- 178 Member States
- 2338 professional and support staff
- €333 million annual regular budget

# IAEA Three pillars

→ Nuclear Science and Technology

→ Nuclear Safety

→ Safeguards and Verification



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**October 2016**

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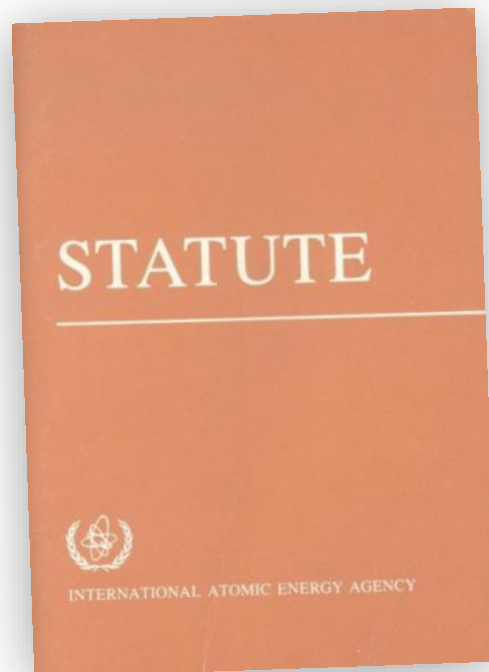


Joint Convention  
Assistant

**L. Tanchuk**  
Team Assistant



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



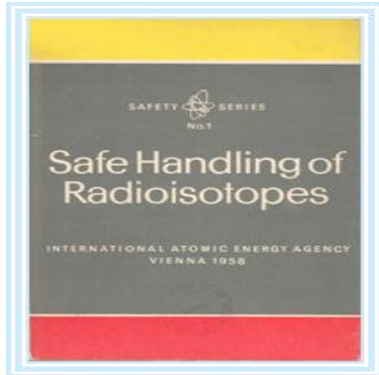
*“To establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property...*

*and to provide for the application of these standards ...”*

# History

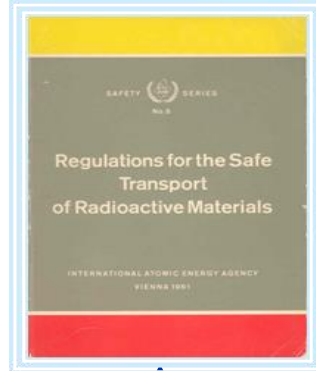
**In 1958, the IAEA published its first Safety Standard, Safety Series No. 1.  
Over the years, about 200 publications were issued in the Safety Series.**

**Safe Handling  
of Radioisotopes**



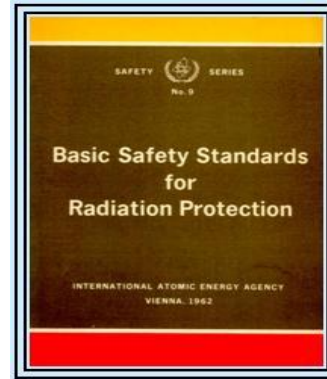
1958

**Safe Transport  
of Radioactive  
Material**



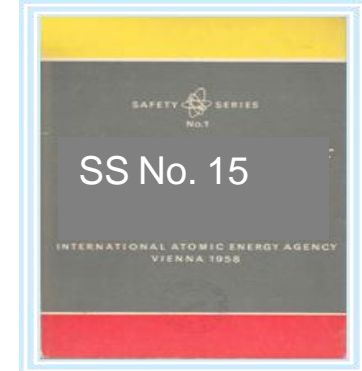
1961

**BSS for  
Radiation Protection**



1962

**Radioactive Waste  
Disposal into the  
Ground**



1965

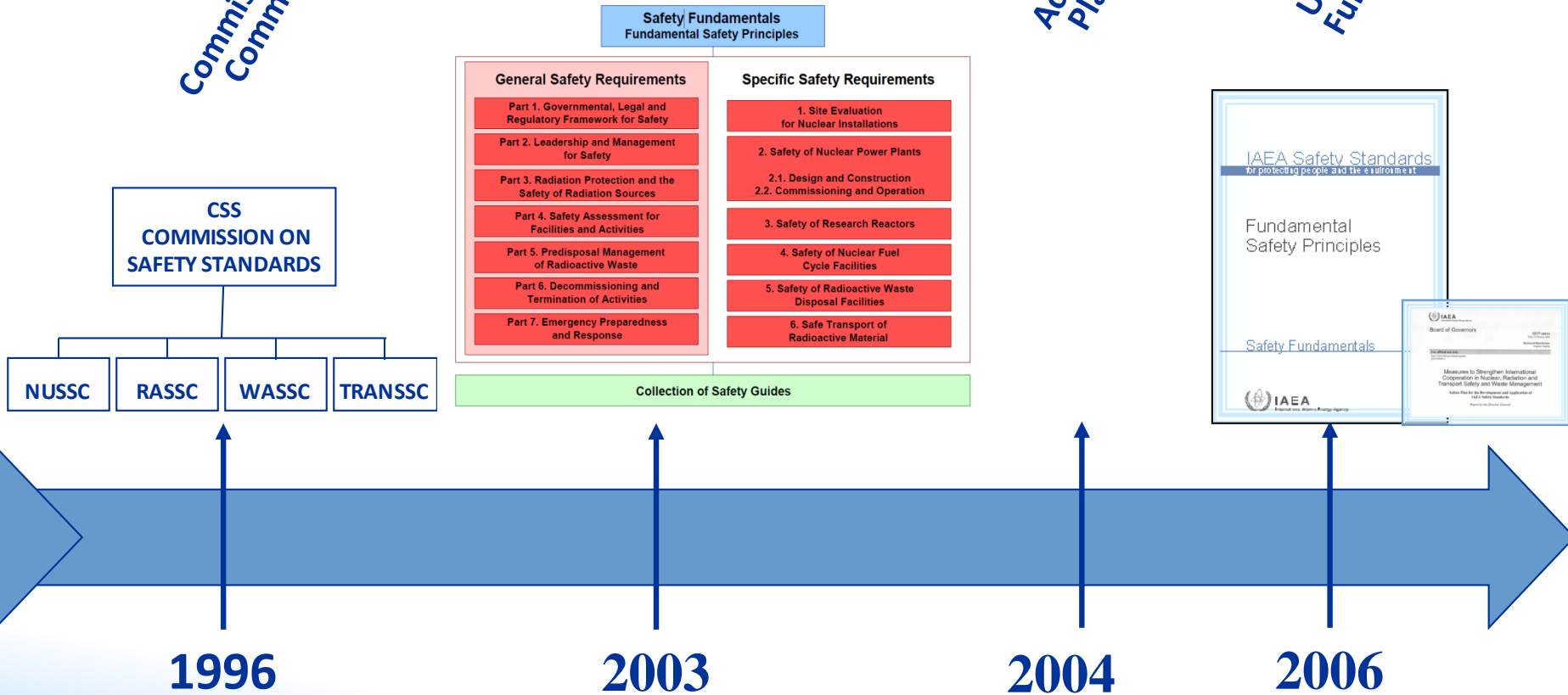
# History (cont'd)

Commission and Committees

Overall Structure

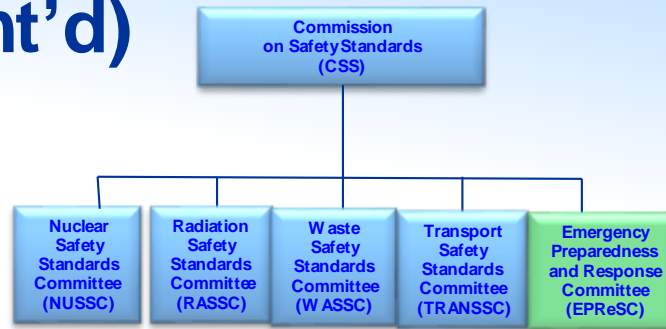
Action Plan

Unified Safety Fundamentals



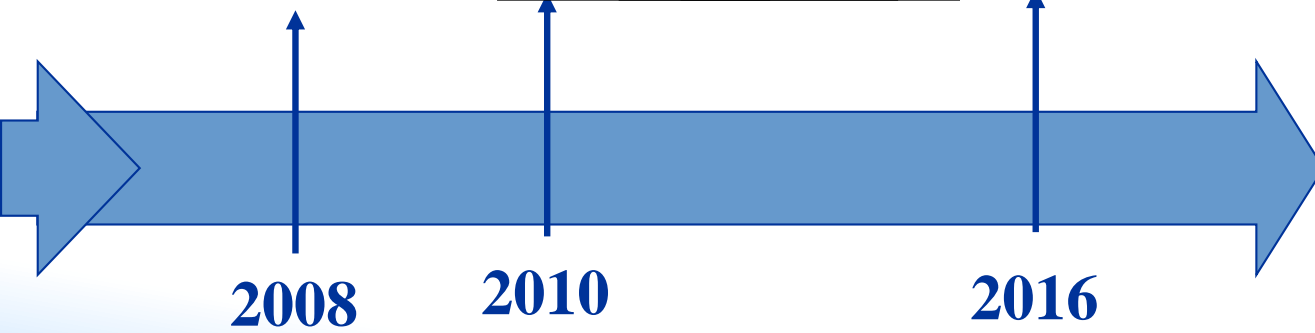


# History (cont'd)



Long Term Structure  
New Format

IAEA Safety Standards	IAEA Safety Standards	IAEA Safety Standards	IAEA Safety Standards	IAEA Safety Standards	IAEA Safety Standards	IAEA Safety Standards
for protecting people and the environment	for protecting people and the environment	for protecting people and the environment	for protecting people and the environment	for protecting people and the environment	for protecting people and the environment	for protecting people and the environment
General Safety Requirements No. GSR Part 2	Leadership and Management for Safety	Preparation for a Nuclear Emergency	Preparedness and Response	Design and Construction	Prediction and Management of Radioactive Discharges	Safety of Nuclear Fuel Cycle
General Safety Requirements No. GSR Part 2	General Safety Requirements No. GSR Part 1	General Safety Requirements No. GSR Part 3	General Safety Requirements No. GSR Part 4	General Safety Requirements No. GSR Part 5	General Safety Requirements No. GSR Part 6	General Safety Requirements No. GSR Part 7



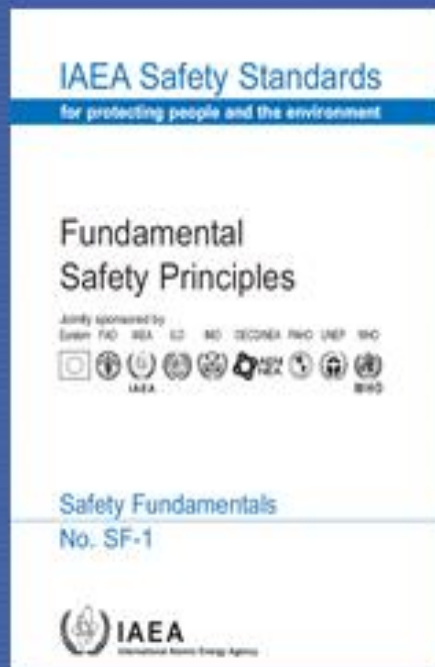
# 2016: All GSR Completed!



# IAEA Safety Standards

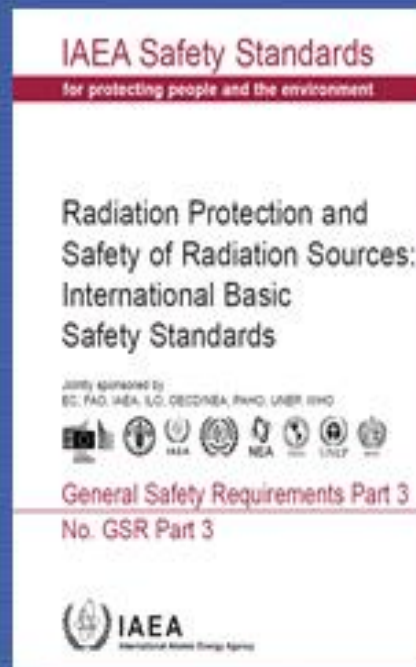
Principles

Safety Fundamentals



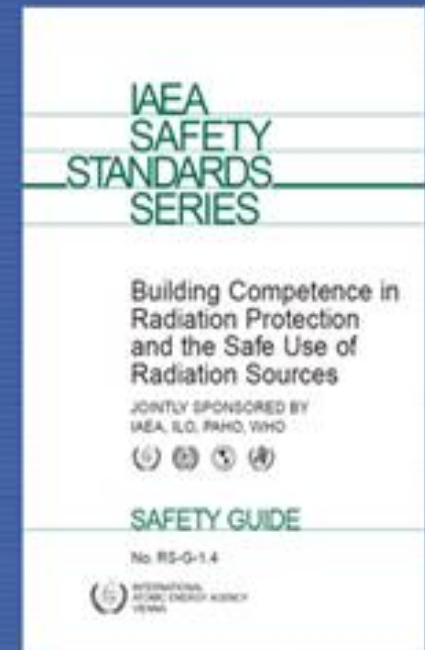
“Shall”

Safety Requirements



“Should”

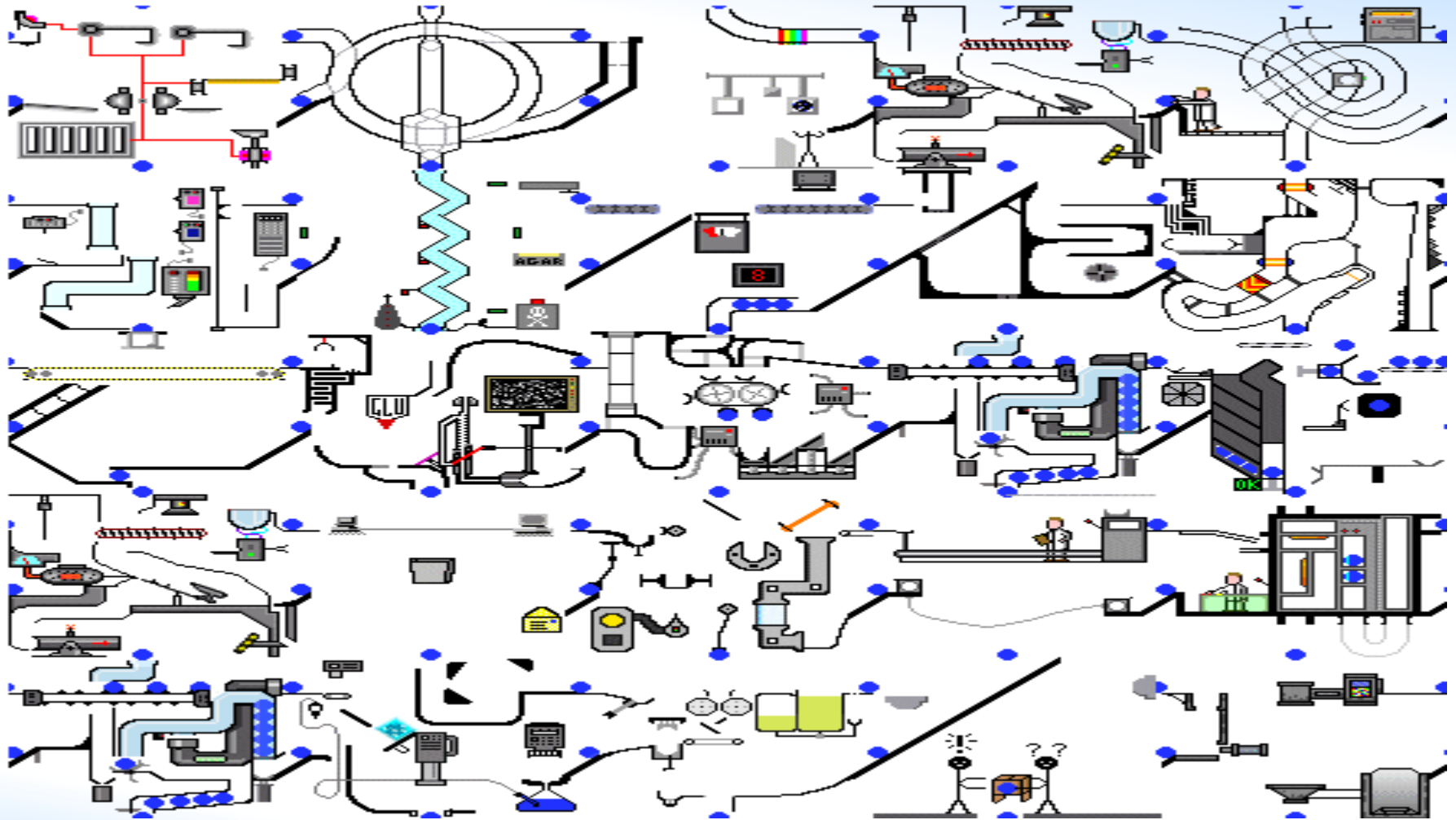
Safety Guides



# Development of Standards



# Development of Standards

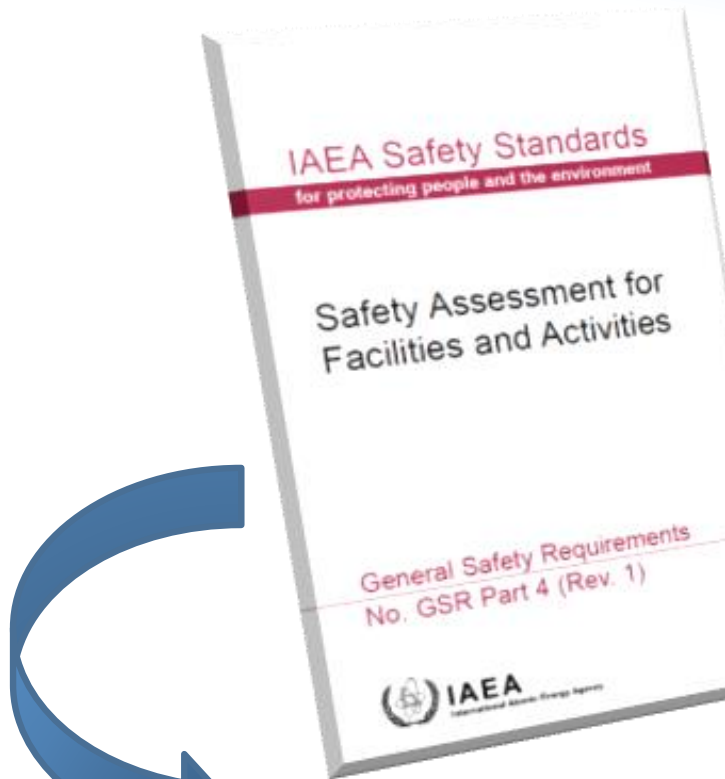


# Development of Standards - Process



# Consensus in the Development of Safety Standards

- IAEA standards reflect an international **consensus** on what constitutes a high level of safety
- Keeping silence when standard is developed/revised - means that Country does not have objections (consensus)



**Feedback Analysis Report**  
On  
**Revision to the Safety Requirements, "Decommissioning of Facilities Using Radioactive Material" (WS-R-5)**

**I. BACKGROUND:**

The current version of the Safety Requirements, "Decommissioning of Facilities Using Radioactive Material" (WS-R-5), was published in 2006. The Safety Requirements cover the protection of workers, the public and the environment; responsibilities of the major parties associated with decommissioning; developing a decommissioning strategy and the resulting decommissioning plan; decommissioning funding; managing of decommissioning; conduct or implementation of decommissioning activities; and determination of when decommissioning has been completed, including surveys to support the termination of decommissioning activities. WS-R-5 was the first Safety Requirements for decommissioning published as a "stand alone" document.

IAEA procedures prescribe a review cycle of 5 years for Safety Requirements. The Chairman of WASSC requested the Secretariat to begin an early review of the Safety Requirements related to decommissioning and termination of activities to determine whether they would need to be revised.

This feedback report has been prepared to assist in determining whether to revise WS-R-5. The affected sections of WS-R-5, the alternative approaches to revising WS-R-5 and the recommended next steps from the IAEA Secretariat are described herein.

**2. ISSUE AND BASIS FOR CHANGES:**

In 2005, the Secretariat began revising three related decommissioning safety guides, (i.e., Decommissioning of Nuclear Power Reactors and Research Reactors (WS-G-2.1); Decommissioning of Medical, Industrial and Research Facilities (WS-G-2.2); and Decommissioning of Fuel Cycle Facilities (WS-G-2.4)) for various reasons

**Feedback is one of the main inputs for the revision of the safety standards.**



## IAEA Safety Standards are:

- Not legally binding but may be adopted by Member States

- Binding on IAEA in its own or assisted by the IAEA operations;
- Member States receiving IAEA assistance are obliged to apply IAEA Safety Standards



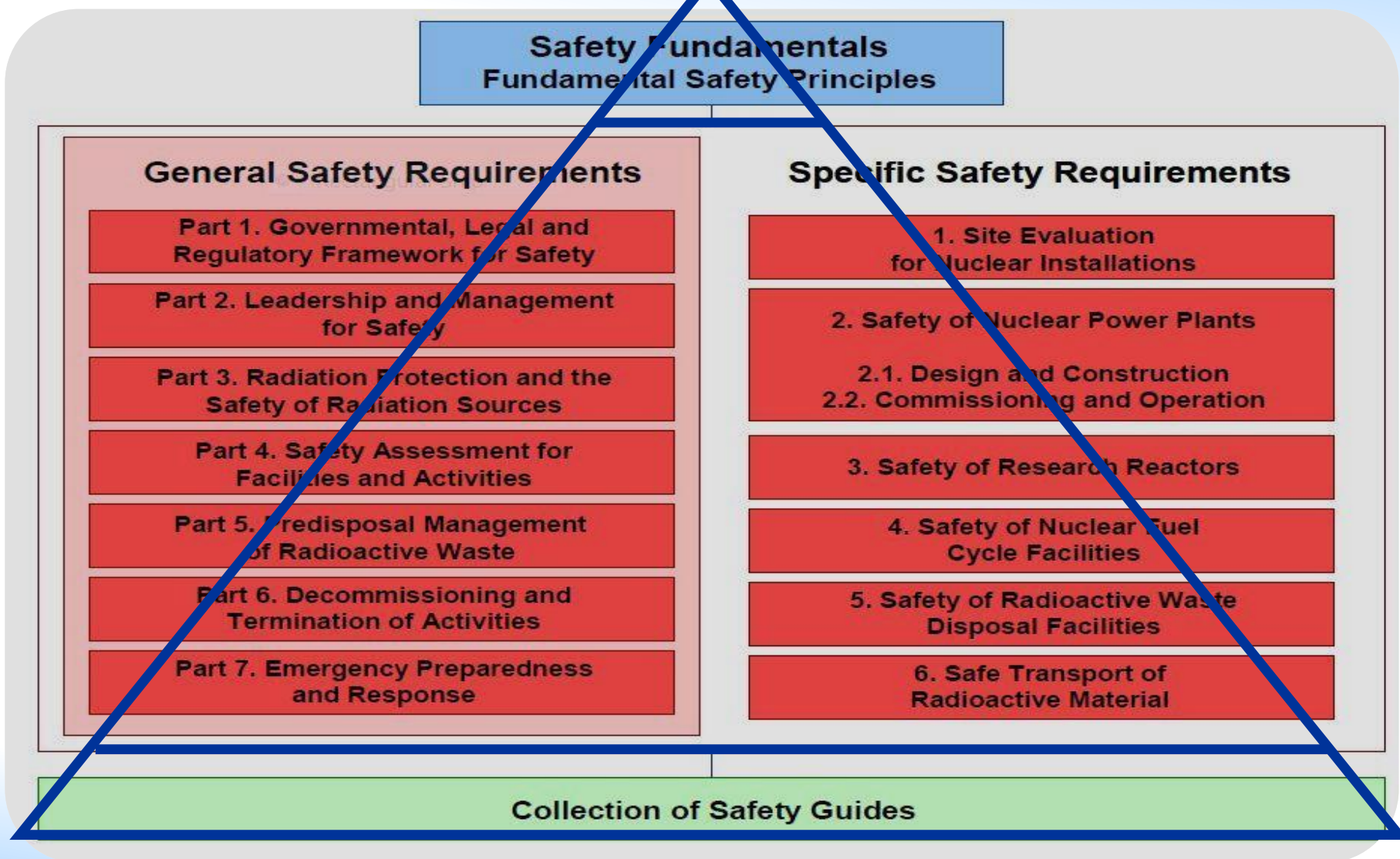
# Safety Standards Mandate

- Board of Governors and GC have specifically requested that TC projects involving radiation sources should only be submitted for approval if the country has achieved a certain minimum level of radiation safety.
- Board of Governors and GC have also requested that no procurement of sources should be cleared if the country has not achieved a certain minimum level of radiation safety accordingly with the IAEA safety standards.



# Development of Standards

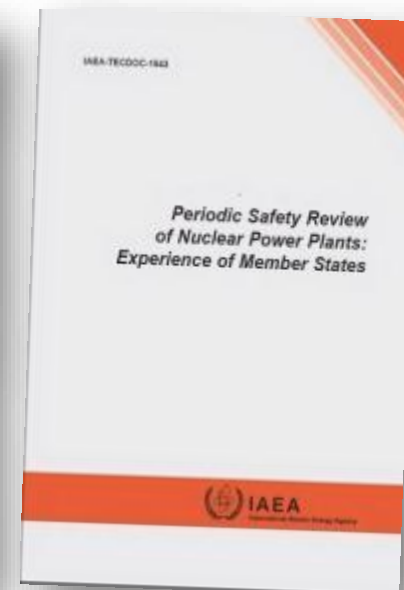
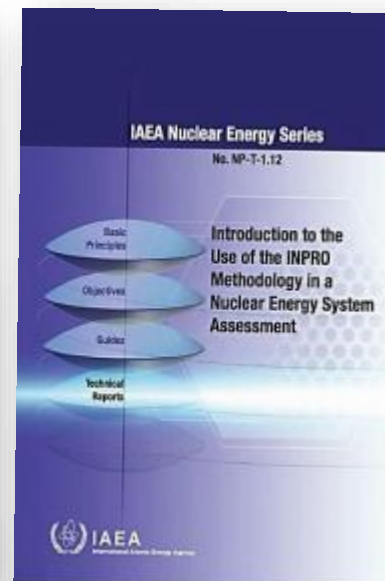
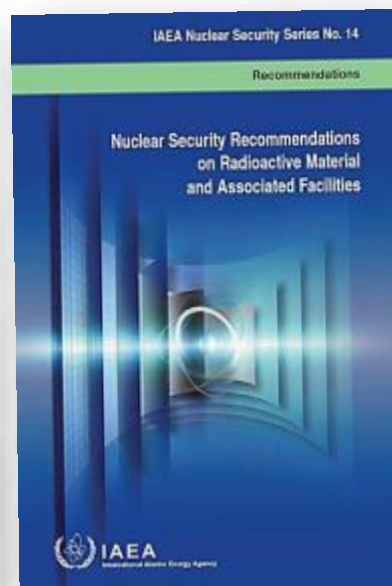
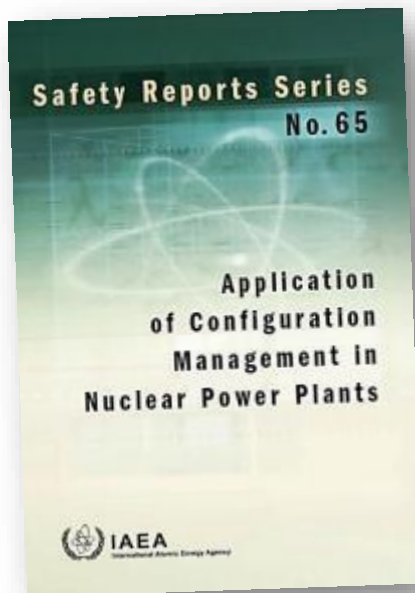
**Basic Strategies:** Clear, logical and integrated structure



# Basic Strategies

## Clear Scope

Beyond Safety Standards Series publications, the IAEA publishes *Safety Reports*, books in the *Nuclear Security Series* and in the *Nuclear Energy Series* and *TECDOCs*; each series has its scope.



# Basic Strategies

## Involvement of Stakeholders



## Harmonized Terminology

### I. DEFINITIONS

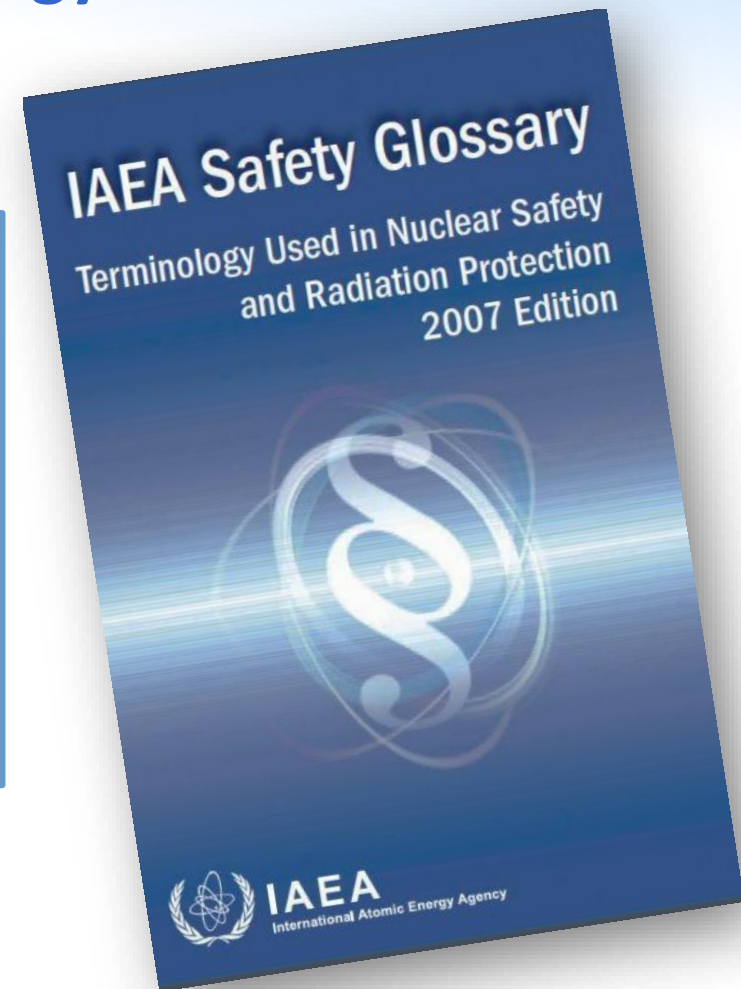
#### 1. For the purposes of this Code:

“authorization” means a permission granted in a document by a regulatory body to a natural or legal person who has submitted an application to manage a radioactive source. The authorization can take the form of a registration, a licence or alternative effective legal control measures which achieve the objectives of the Code.

“disposal” means the emplacement of radioactive sources in an appropriate facility without the intention of retrieval.

“disused source” means a radioactive source which is no longer used, and is not intended to be used, for the practice for which an authorization has been granted.

If the term is not defined in the CoC,  
the IAEA Safety Glossary should be used



## Interface between Safety and Security

1. Nuclear security and safety are equally important;
2. Safety document preparation profiles (DPPs) and nuclear security DPPs reviewed to identify/define interfaces, if any;
3. Draft safety publications and draft nuclear security publications having an identified interface to be developed in consultation;
4. After implementation of points 2 and 3, draft safety publications and draft nuclear security publications to be reviewed and approved to ensure coordination has been effective and in accordance with the Safety Fundamentals and Nuclear Security Fundamentals.

As an intermediate committee structure:



# Safety Standards Pyramid



## Safety fundamentals - underlying principles aimed at politicians and regulatory authorities

- The structure of the safety standards reflects the ten Fundamental Safety Principles

## Safety Requirements - specify obligations and responsibilities (“shall”)

- requirements address what shall be done while the Guides will address how this may be achieved
- General Safety Requirements: Applicable to all facilities and activities
- Specific Safety Requirements: Applicable to specified facilities or activities

## Safety guides - recommendations on meeting requirements (“should”)

- Provide guidance on how to implement safety requirements
- General or Specific Safety Guides
- Expressed as ‘should statements’

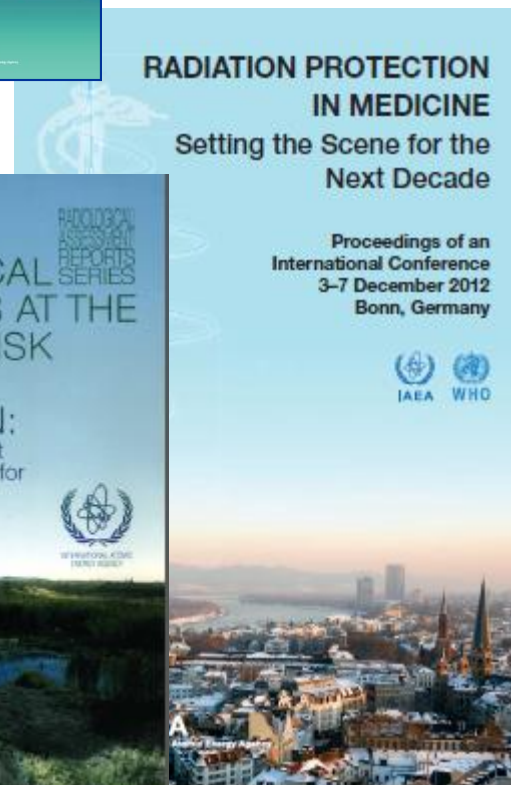
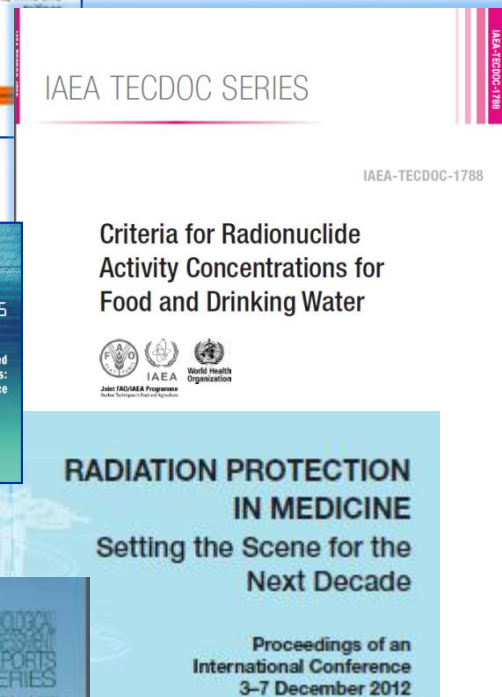
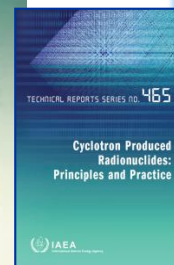
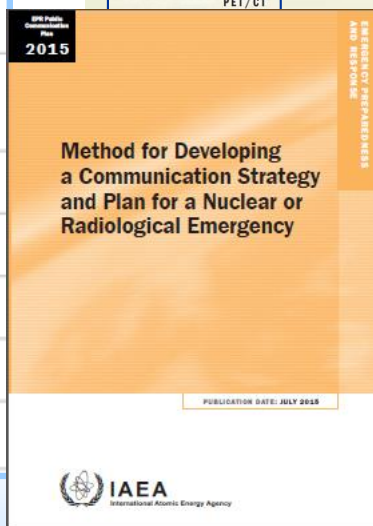
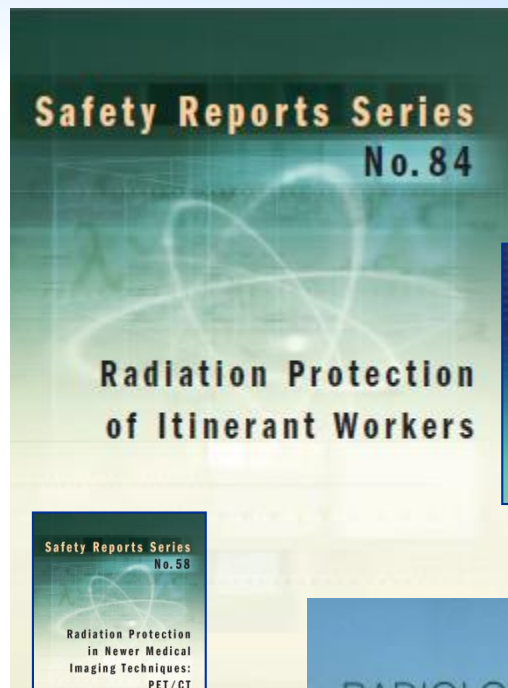


# Safety Standards Pyramid



# Safety standards – supported by IAEA Publications

- ▼ Safety & Security Publications
  - ▼ Safety Standards
    - 🏠 Standards home page
    - Draft Standards posted for official comment by MS
    - List of all valid Safety Standards
    - Recently published Standards
    - Revision of the BSS
    - Safety glossary
    - Safety Standards under development
    - Security Series
    - Series information
    - Other publications
    - Review committees
  - ▶ Conventions & Codes



# Safety Standards – Supported by Codes



- Non-legally binding
- Political support from 134 Member States
- Based on IAEA standards

**Provides recommendations to States on:**

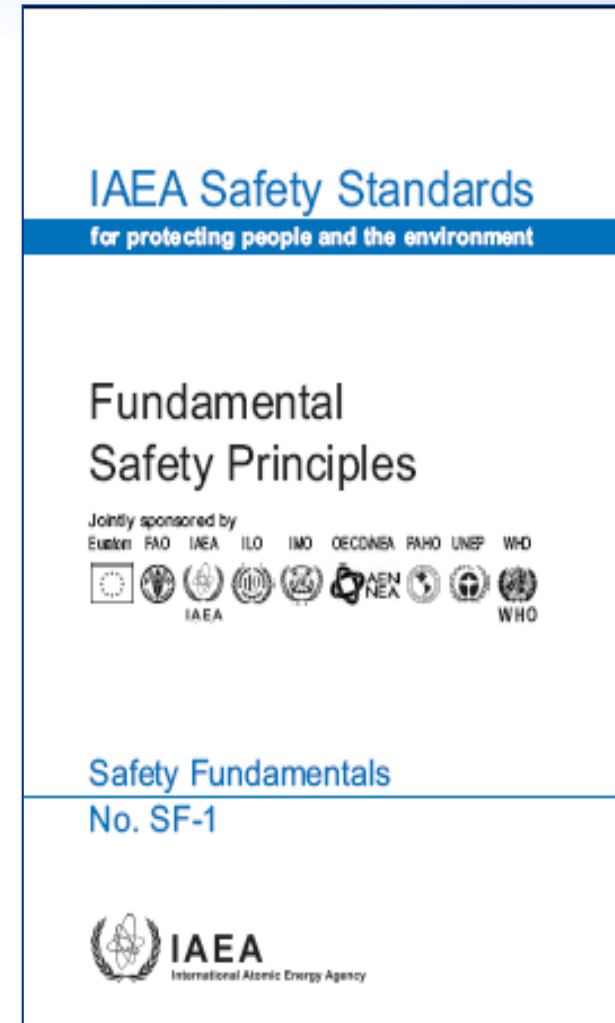
- ✓ Legislation
- ✓ Regulations
- ✓ Regulatory body
- ✓ Import/export controls

# Safety standards – SF-1: Fundamental Safety Principles

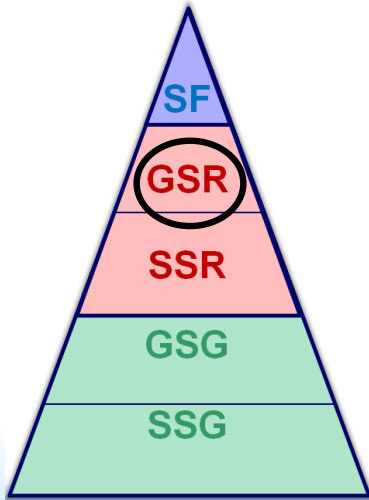
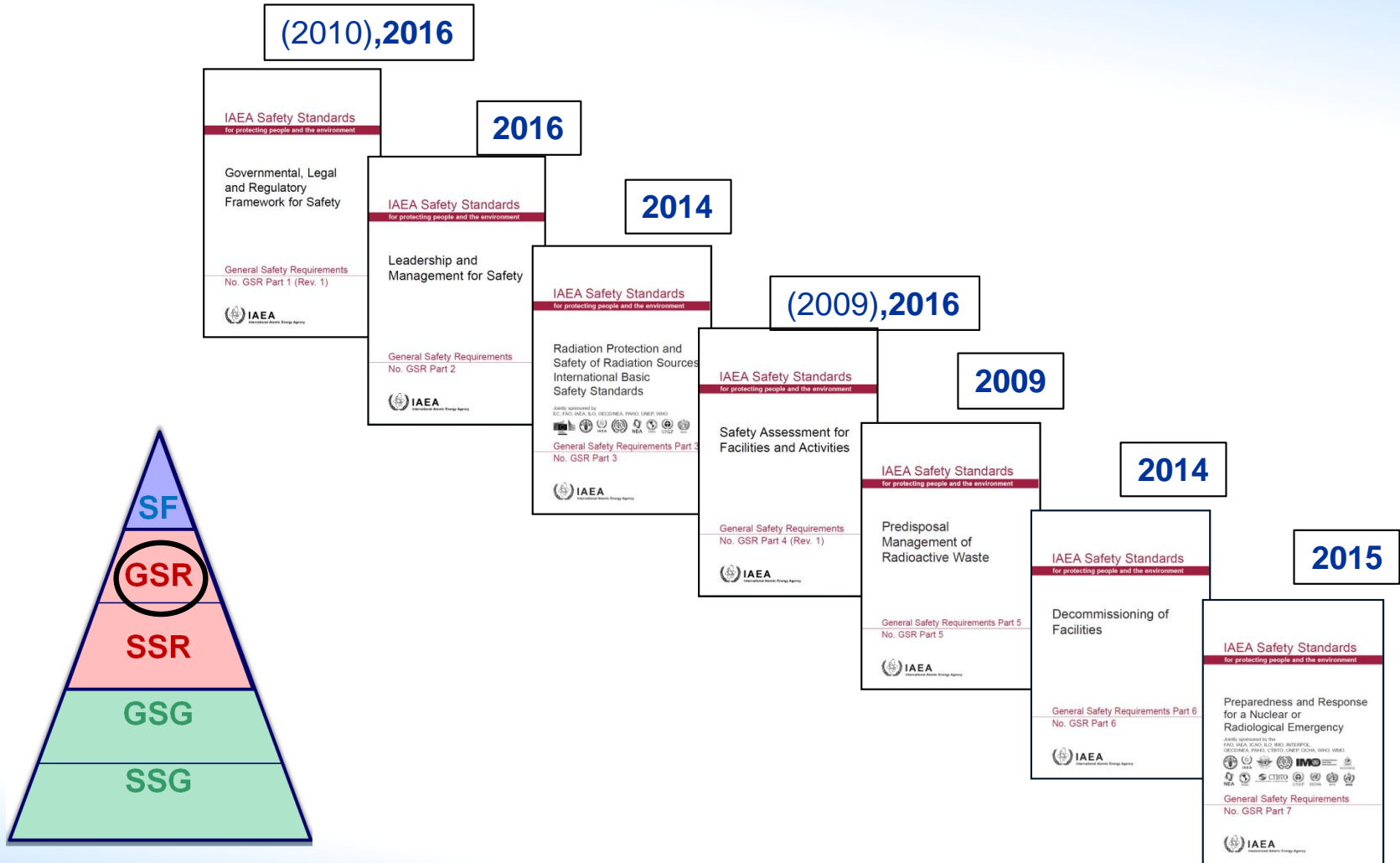
- Published in 2006
- Jointly sponsored by several international organizations
- 10 Fundamental Safety Principles for protection against exposure to ionizing radiation

- ✓ Responsibility for safety
- ✓ Role of government
- ✓ Leadership and management for safety
- ✓ Justification of facilities and activities
- ✓ Optimization of protection
- ✓ Limitation of risks to individuals
- ✓ Protection of present and future generations
- ✓ Prevention of accidents
- ✓ Emergency preparedness and response
- ✓ Protective action to reduce existing or unregulated radiation risks

Principle 2: “An effective legal and governmental framework for safety, including an independent regulatory body, must be established and sustained.”



# General Safety Requirements



# Structure of the Long Term Set of Safety Requirements

## General Safety Requirements

Part 1 Governmental, Legal and Regulatory Framework

Part 2 Leadership and Management for Safety

Part 3 Radiation Protection and Safety of Radiation Sources

Part 4 Safety Assessment for Facilities and Activities

Part 5 Predisposal Management of Radioactive Waste

Part 6 Decommissioning and Termination of Activities

Part 7 Emergency Preparedness and Response

## Specific Safety Requirements

1. Site Evaluation for Nuclear Installations

2. Safety of Nuclear Power Plants

2.1 Design and Construction  
2.2 Commissioning and Operation

3. Safety of Research Reactors

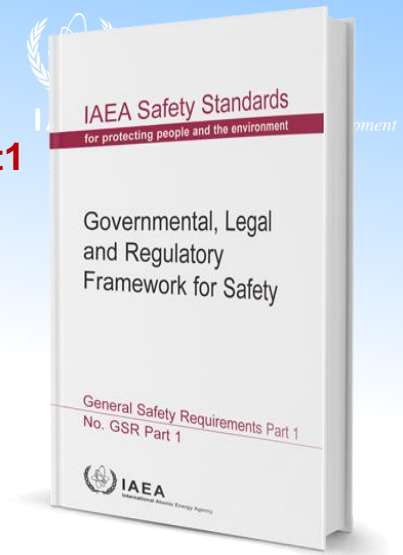
4. Safety of Nuclear Fuel Cycle Facilities

5. Safety of Radioactive Waste Disposal Facilities

6. Safe Transport of Radioactive Material

# National Regulatory Infrastructure (TSA 1)

GSR part1



Focuses on establishing an independent and functional regulatory infrastructure in a Member State (MS) so that it meets IAEA Safety Standards.

It includes 14 Elements:

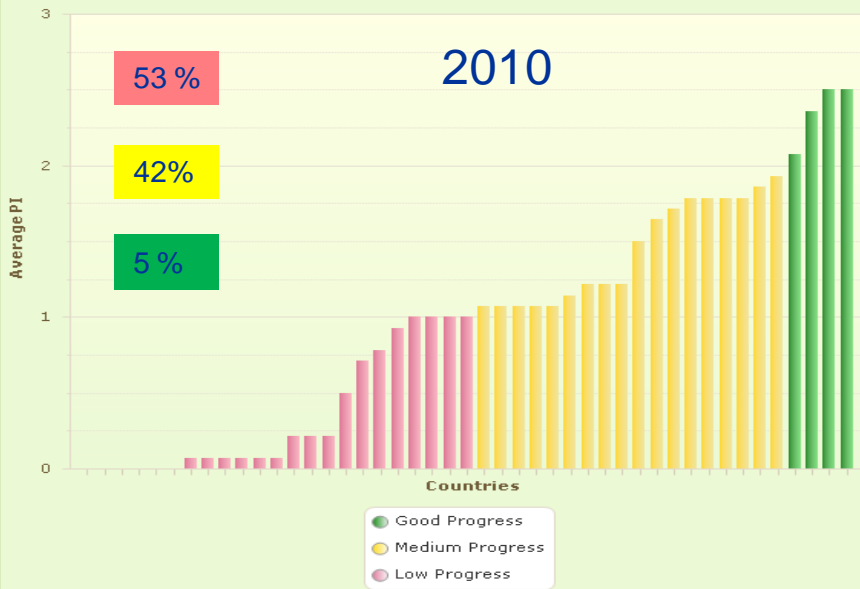
## Legislative and Statutory Framework

1. Legislation
2. Regulations and Guidance
3. Regulatory Body Establishment and independence
4. Regulatory Body Staffing and Training
5. Regulatory Body Funding
6. Coordination and Cooperation and the National Level
7. International Cooperation

## Activities of the Regulatory Body

8. Notification and National Register of Radiation Sources
9. Authorization
10. Safety and Security of Radiation Sources
11. Inspection
12. Enforcement
13. Information management
14. Quality Management

Status per country for TSA1 - Africa (As of 2010-08-11)



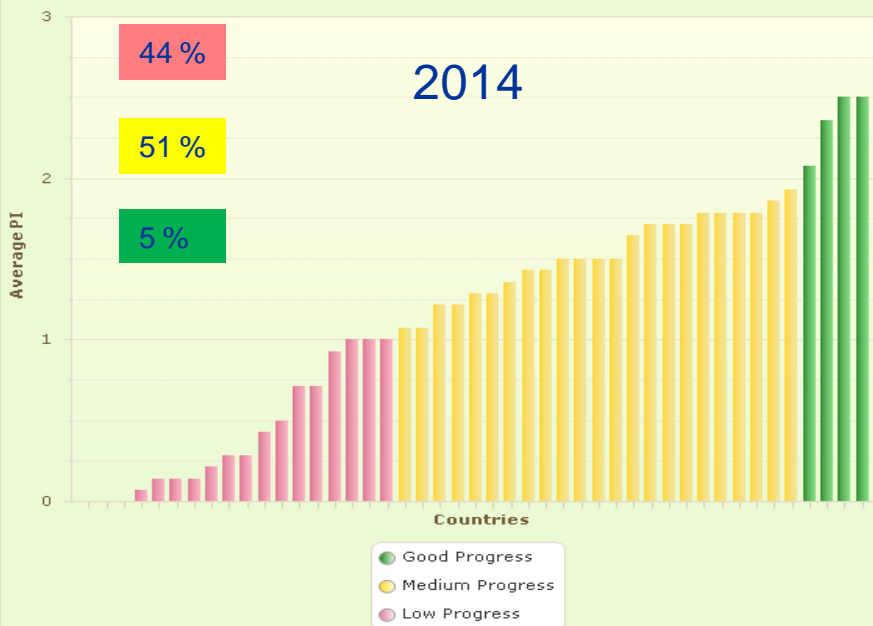
# Progress on Meeting the IAEA Safety Standards in TSA 1 “Regulatory Infrastructure for Safety” **2010-2018**

Good progress

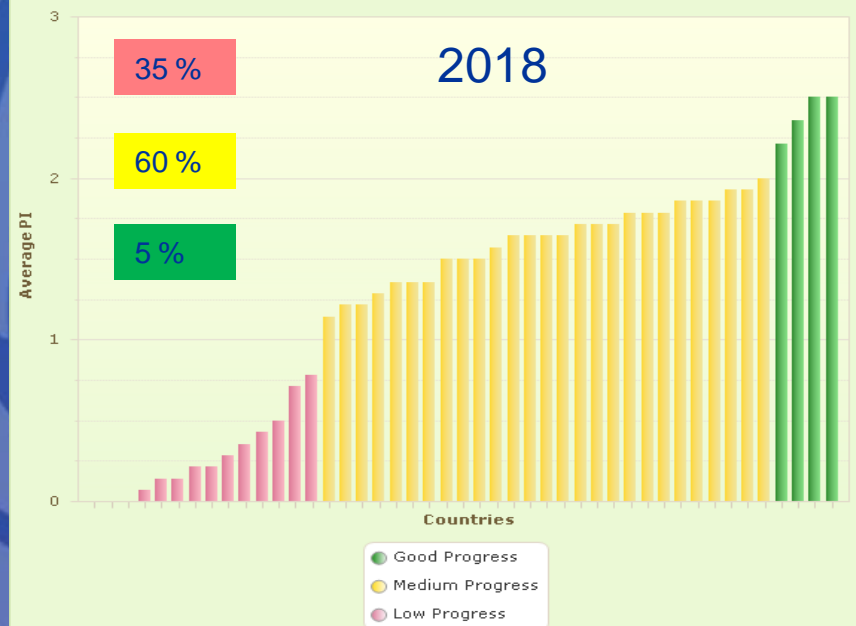
Medium progress

Low progress

Status per country for TSA1 - Africa (As of 2014-05-15)



Status per country for TSA1 - Africa







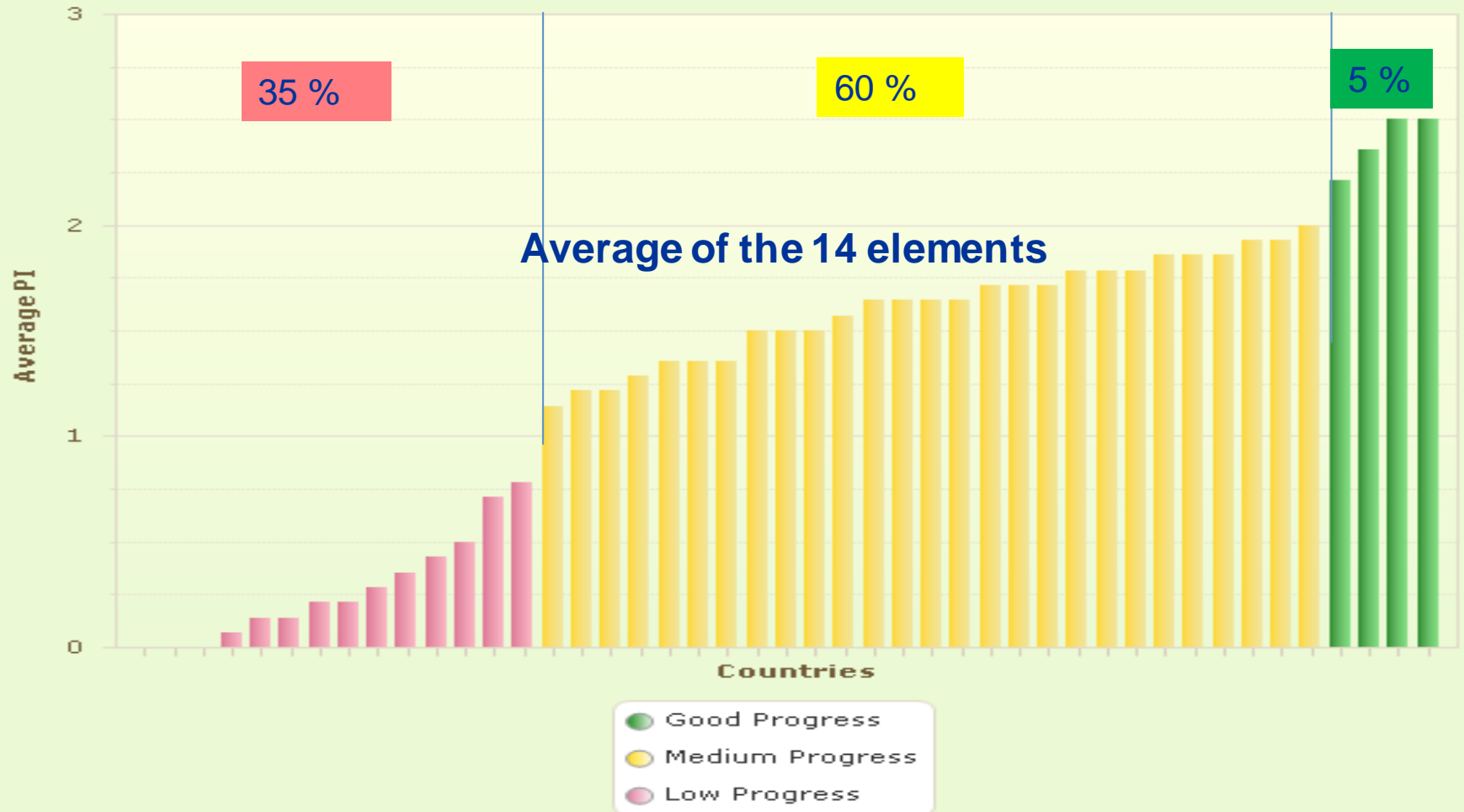
60 Years

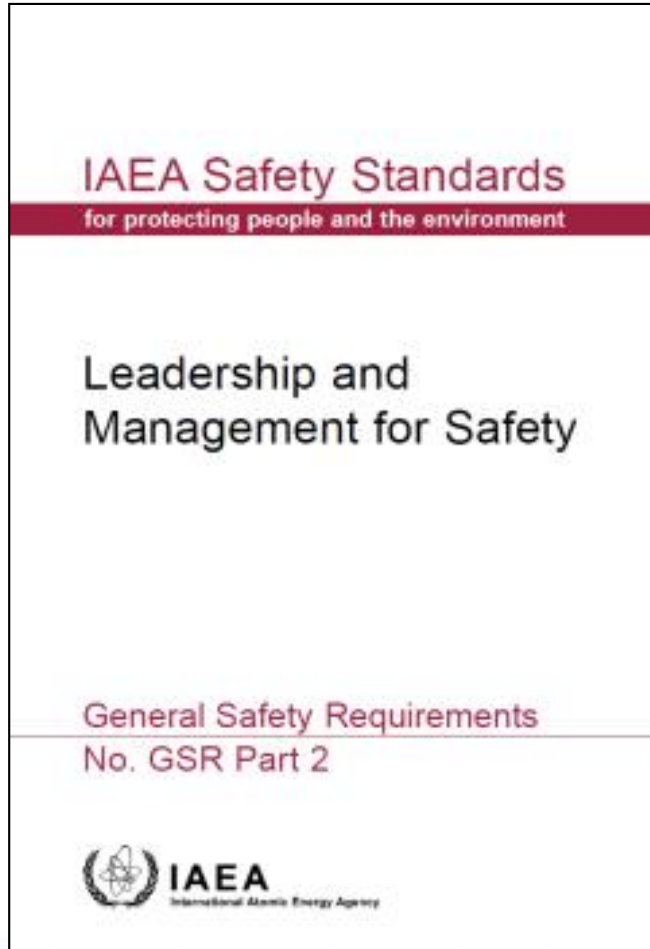
IAEA

Atoms for Peace and Development

# Progress on Meeting the IAEA Safety Standards in TSA 1- 2018

## Status per country for TSA1 - Africa





## 2. Leadership and MANAGEMENT SYSTEM

- General requirements (2.1–2.4)
- Safety culture (2.5)
- Grading the application of management system requirements (2.6–2.7)
- Documentation of the management system (2.8–2.10)

## 3. MANAGEMENT RESPONSIBILITY

- Management commitment (3.1–3.5)
- Satisfaction of interested parties (3.6)
- Organizational policies (3.7)
- Planning (3.8–3.11)
- Responsibility and authority for the management system (3.12–3.14)

## 4. RESOURCE MANAGEMENT

- Provision of resources (4.1–4.2)
- Human resources (4.3–4.4)
- Infrastructure and the working environment (4.5)

# GSR Part 3 (Basic Safety Standards)



## Three Exposure Situations

- Planned exposure situation
- Existing exposure situation
- Emergency exposure situation



## Three Categories of Exposure

- Occupational exposure
- Medical exposure
- Public exposure

# GSR Part 3 (Basic Safety Standards)

## 52 overarching requirements

- SECTION 2. GENERAL REQUIREMENTS FOR PROTECTION AND SAFETY
- SECTION 3. PLANNED EXPOSURE SITUATIONS
  - **GENERIC REQUIREMENTS**
  - **OCCUPATIONAL EXPOSURE**
  - **PUBLIC EXPOSURE**
  - **MEDICAL EXPOSURE**
- SECTION 4. EMERGENCY EXPOSURE SITUATIONS
- SECTION 5: EXISTING EXPOSURE SITUATIONS

## Schedules

- Schedule I:- Exemption and clearance
- Schedule II – Categories for sealed sources
- Schedule III – Dose Limits
- Schedule IV – dose considerations for emergency preparedness

# Part.4 Safety Assessment for facilities and Activities

## IAEA Safety Standards

for protecting people and the environment

### Safety Assessment for Facilities and Activities

General Safety Requirements Part 4

No. GSR Part 4



2010

2. BASIS FOR REQUIRING A SAFETY ASSESSMENT (2.1–2.7)
3. GRADED APPROACH TO SAFETY ASSESSMENT  
Requirement 1: Graded approach (3.1–3.7)
4. SAFETY ASSESSMENT  
Overall requirements (4.1–4.15)  
**Requirement 2:** Scope of the safety assessment (4)  
**Requirement 3:** Responsibility for the safety assessment (4.1–4.2)  
**Requirement 4:** Purpose of the safety assessment (4.3–4.15)  
Specific requirements (4.16–4.44)  
**Requirement 5:** Preparation for the safety assessment (4.18)  
**Requirement 6:** Assessment of the possible radiation risks (4.19)  
**Requirement 7:** Assessment of safety functions (4.20–4.21).  
**Requirement 8:** Assessment of site characteristics (4.22–4.23)  
**Requirement 9:** Assessment of the provisions for radiation protection (4.24–4.26)  
**Requirement 10:** Assessment of engineering aspects (4.27–4.37) .  
**Requirement 11:** Assessment of human factors (4.38–4.41)  
**Requirement 12:** Assessment of safety over the lifetime of a facility or activity (4.42–4.44)

# Part.4 Safety Assessment for facilities and Activities

## IAEA Safety Standards

for protecting people and the environment

### Safety Assessment for Facilities and Activities

General Safety Requirements Part 4  
No. GSR Part 4



2010

Defence in depth and safety margins (4.45–4.48)

**Requirement 13:** Assessment of defence in depth (4.45–4.48)

Safety analysis (4.49–4.61)

**Requirement 14:** Scope of the safety analysis (4.49–4.52).

**Requirement 15:** Deterministic and probabilistic approaches (4.53–4.56)

**Requirement 16:** Criteria for judging safety (4.57)

**Requirement 17:** Uncertainty and sensitivity analysis (4.58–4.59).

**Requirement 18:** Use of computer codes (4.60) .

**Requirement 19:** Use of operating experience data (4.61)

Documentation (4.62–4.65)

**Requirement 20:** Documentation of the safety assessment (4.62–4.65)

Independent verification (4.66–4.71) .

**Requirement 21:** Independent verification (4.66–4.71) .

## 5. MANAGEMENT, USE AND MAINTENANCE OF THE SAFETY ASSESSMENT.

**Requirement 22:** Management of the safety assessment (5

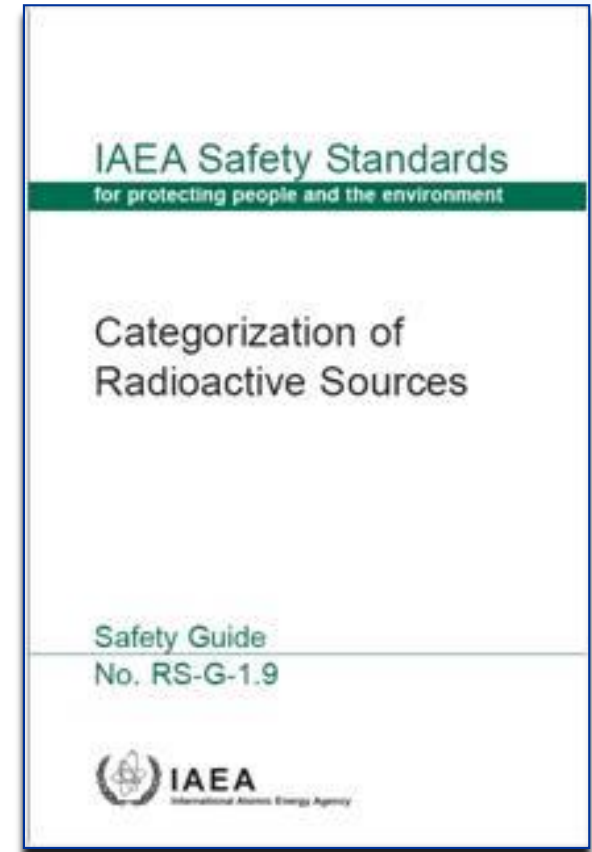
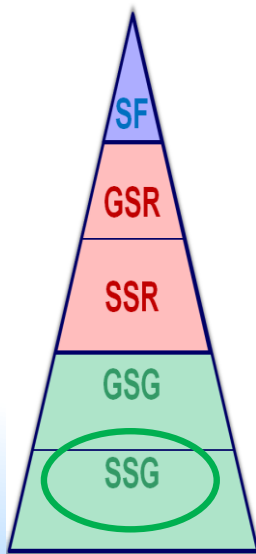
**Requirement 23:** Use of the safety assessment (5

**Requirement 24:** Maintenance of the safety assessment (5.1–5.10).

# Safety standards – Specific Safety Guides- SSG

## Categorization of Radioactive Sources Safety Standards Series: RS-G-1.9

- Basis for graded approach for radioactive sealed sources



# IAEA Safety Standards

for protecting people and the environment

- ## Processes for
- Notification
  - Authorization
  - Inspection
  - Enforcement

## Graded Approach



**FUNCTIONS AND PROCESSES OF THE  
REGULATORY BODY FOR SAFETY**



**GENERAL SAFETY GUIDE**

**GSG-13**





# IAEA Safety Standards

for protecting people and the environment

- Regulatory Body organization and Structured to cover all responsibilities.
- Integrated Management System



Organization, Management and Staffing of the  
Regulatory Body for Safety



GENERAL SAFETY GUIDE

GSG-12



## Communication and Consultation with Interested Parties by the Regulatory Body

General Safety Guide

No. GSG-6

This Safety Guide provides recommendations on meeting the safety requirements concerning communication and consultation with the public and other interested parties by the regulatory **body about the possible radiation risks associated with facilities and activities, and about processes and decisions of the regulatory **body****

## Establishing the Infrastructure for Radiation Safety

Specific Safety Guide

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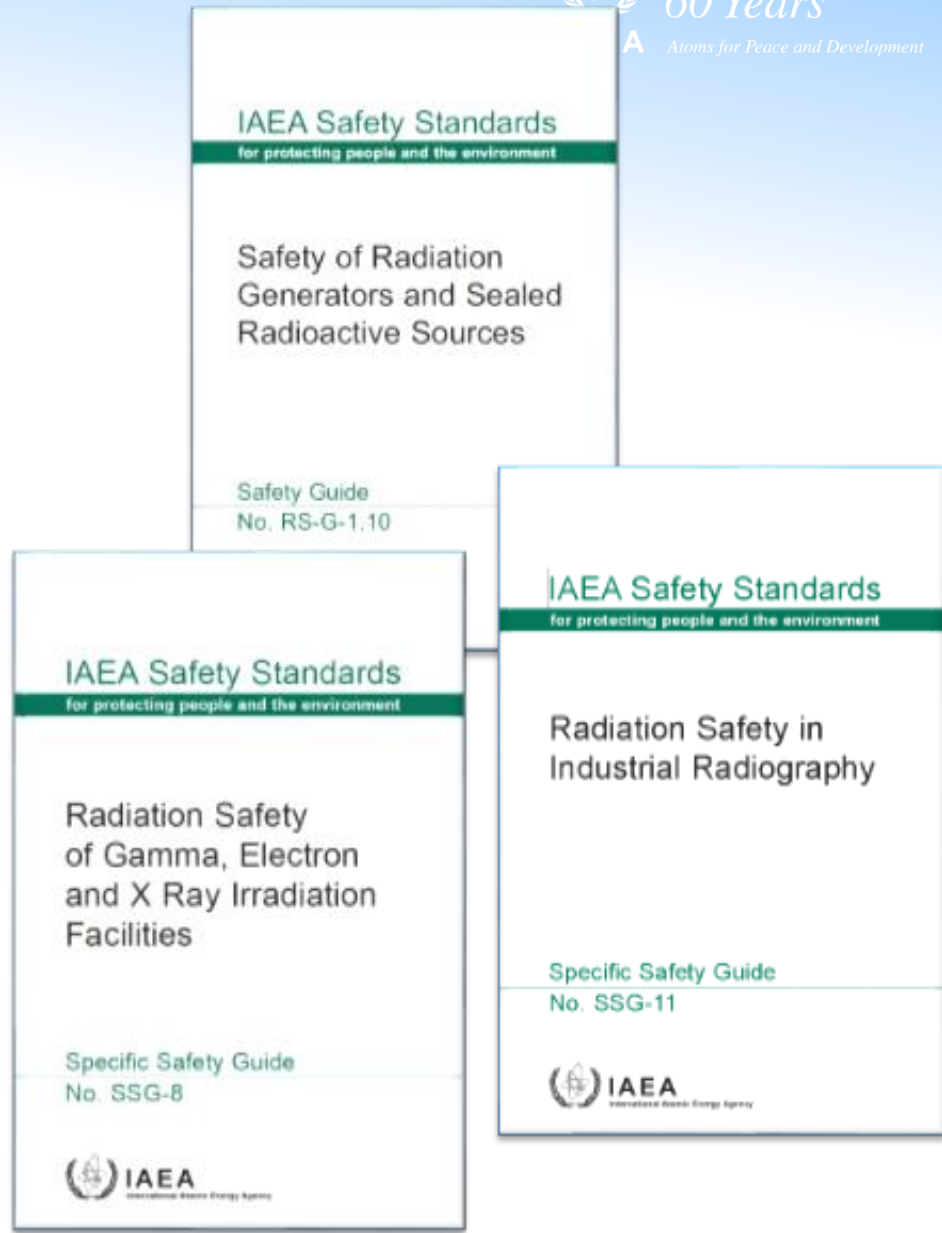
No. SSG-44

Provide guidance  
on the  
establishment of  
the national  
radiation safety  
infrastructure that  
meets the IAEA  
safety standards



# Specific Safety Guides

- **RS-G-1.10**, Safety of Radiation Generators and Sealed Radioactive Sources
- **SSG-8**: Radiation Safety of Gamma, Electron and X Ray Irradiation Facilities,
- **SSG-11**: Radiation Safety in Industrial Radiography



# Under publication or development

- DS419 Safety Guide: Radiation Safety in Well Logging
- DS420 Safety Guide: Radiation Safety for Nuclear Gauges
- DS471 - Radiation Safety of X ray Generators and Radiation Sources Used for Inspection Purposes and for Non-Medical Imaging
- DS470 - Radiation Safety of Radiation Sources Used in Research and Education

# Guide for Authorization and Inspection: *CYCLOTRON* Facilities

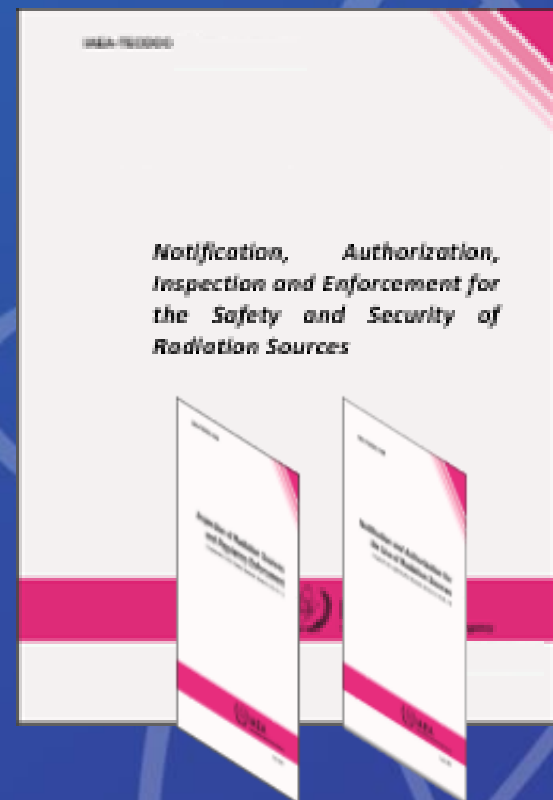


## Contents

INTRODUCTION .....	2
EVALUATING AN APPLICATION FOR AUTHORIZATION .....	2
GENERAL INFORMATION .....	2
INSTITUTIONAL INFORMATION .....	2
PERSONNEL .....	2
RADIATION GENERATOR AND RADIOACTIVE SOURCES .....	2
DESCRIPTION OF THE FACILITY .....	2
<b>SAFETY ASSESSMENT .....</b>	<b>2</b>
MANAGEMENT SYSTEM .....	2
OPERATION AND MAINTENANCE .....	2
OCCUPATIONAL EXPOSURE .....	2
RESPONSIBILITIES OF EMPLOYERS, REGISTRANTS AND LICENSEES, AND WORKERS, AND COOPERATION BETWEEN THEM .....	2
RADIATION PROTECTION PROGRAMME .....	2
RADIATION MONITORING, HEALTH SURVEILLANCE AND DOSE ASSESSMENT .....	2
INFORMATION, INSTRUCTION AND TRAINING .....	2
CONDITIONS OF SERVICE .....	2
SPECIAL ARRANGEMENTS .....	2
PUBLIC EXPOSURE .....	2
RADIATION MONITORING PROGRAMME .....	2
MANAGEMENT OF RADIOACTIVE WASTE AND DISCHARGES TO THE ENVIRONMENT .....	2
RECORDS .....	2
EMERGENCIES .....	2
DECOMMISSIONING OF THE FACILITY .....	2
CHECKLIST FOR INSPECTIONS .....	2
GENERAL INFORMATION .....	2
INSTITUTIONAL INFORMATION .....	2
PERSONNEL .....	2
RADIATION GENERATOR AND RADIOACTIVE SOURCES .....	2
DESCRIPTION OF THE FACILITY .....	2
MANAGEMENT SYSTEM .....	2

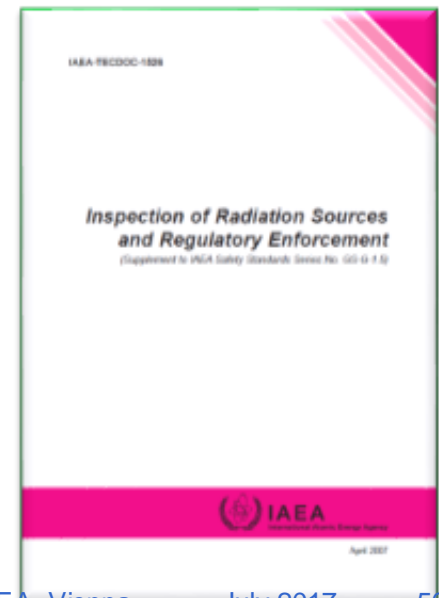
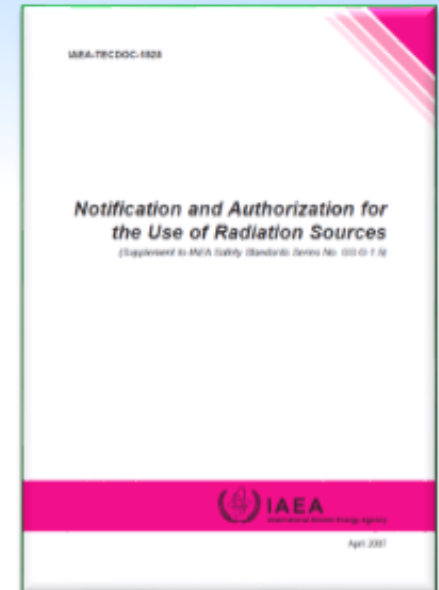
# NEW TECDOC on Notification, Authorization, Inspection and Enforcement for **the Safety and Security** of Radiation Sources (Draft version)

- First IAEA TECDOC addressing the implementation of safety and security requirements in a harmonized way
- Is intended to provide practical guidance on how to implement IAEA Safety Requirements and applicable IAEA Nuclear Security Series guidance
- NEW TECDOC does not replace IAEA TECDOC 1525 and TECDOC 1526 on notification and authorization, and on inspection and enforcement



# Technical Documents

- IAEA-TECDOC-1525 Notification et Authorisation pour l'utilisation des sources de rayonnements (under revision)
- IAEA-TECDOC-1526 Inspection des sources de rayonnements et mesures coercitives (under revision)





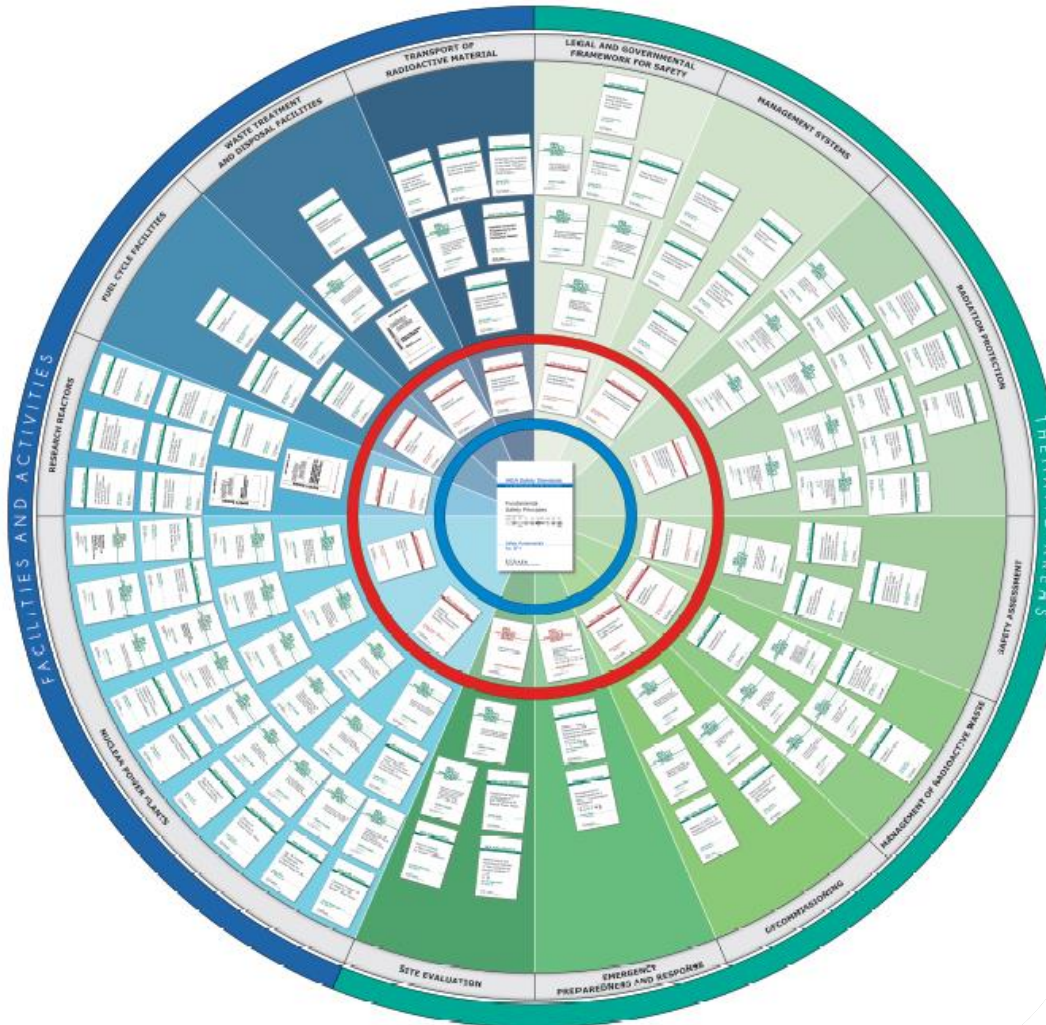
# IAEA Safety Standards

protecting people and the environment



60 Years

IAEA Atoms for Peace and Development





At last he had found the Regulatory Guidelines.

# Status of the Safety Standards 60 Years Atoms for Peace and Development

Updated “Status of Safety Standards” on the web site:

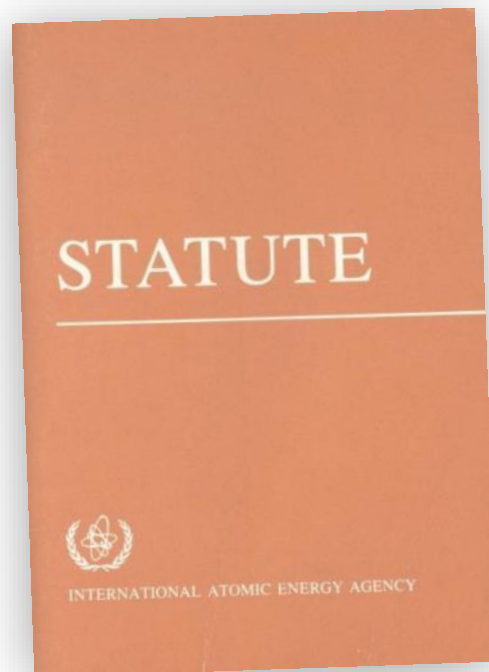
<http://www ns.iaea.org/committees/files/CSS/205/status.pdf>

- Includes hyperlinks to the published safety standards in official languages
- Includes general information and a link to the IAEA Safety Glossary

All the IAEA Standards can be downloaded from:

<http://ns-files.iaea.org/standards/iaea-safety-standards.doc>

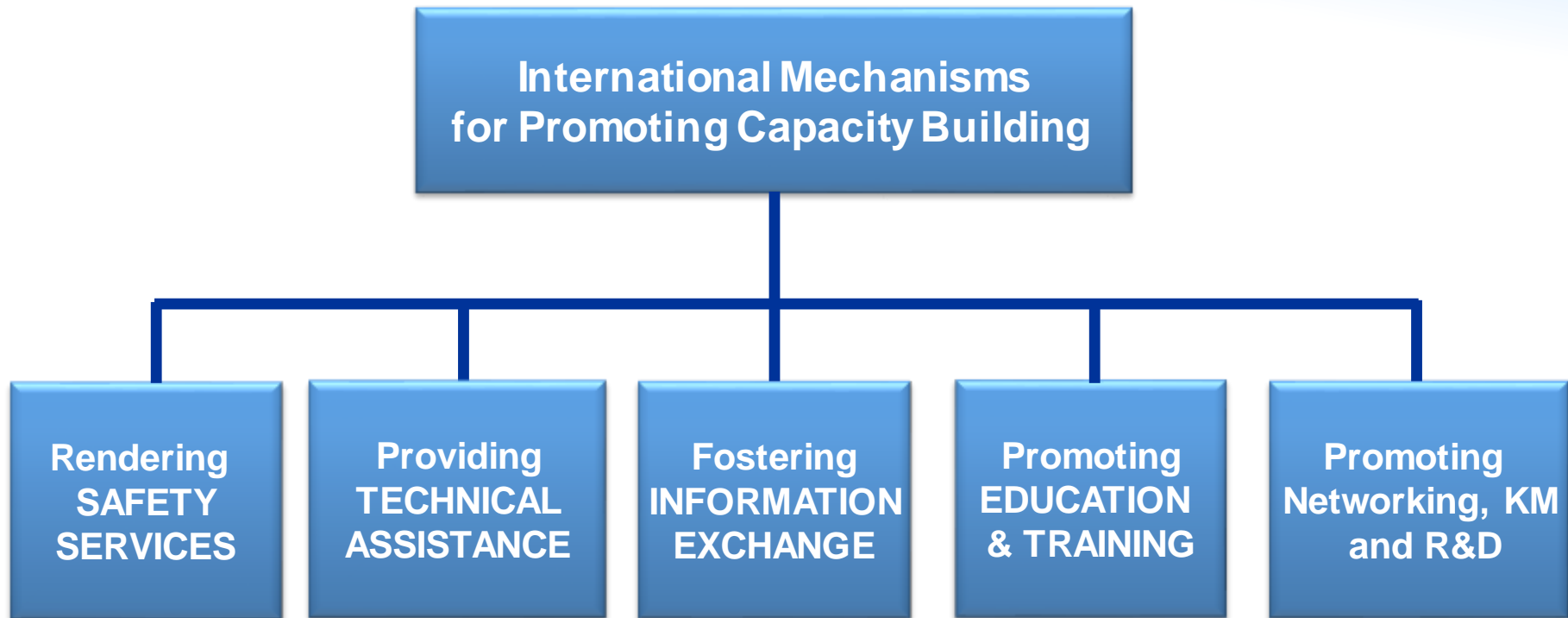
Under Article III.A.6 of its Statute, the IAEA is authorized:



*“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 the application of these standards ...”*

# Provisions for the application of standards



## Services and Tools for implementation of the Safety Standards

- IAEA has developed many services, tools, training courses to promote the Safety Standards and to assist their implementation by MS
- IAEA is implementing many projects (Technical cooperation, Extra-Budgetary Funds) to facilitate the application of Safety Standards
- Peer- Reviews, including IRRS, are key elements of the promotion and application of IAEA Safety Standards
- Relevant Safety Standards are the backbone of the IRRS

## Services and Tools for implementation of the Safety Standards

- Review and Advisory Services (IRRS & Advisory Mission)
- Self Assessment Methodology and Tool (SARIS)
- Regulatory Authority Information System (RAIS)
- Training Materials and courses on several topics for different target groups (Regulators, Lawyers, Customs, etc.)
  - For instance, the school of drafting regulations



**IAEA**

*60 Years*

*Atoms for Peace and Development*

*Thank you!*

