

IAEA Safety Standards for NPPs Operation

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Division of Nuclear Installation Safety**



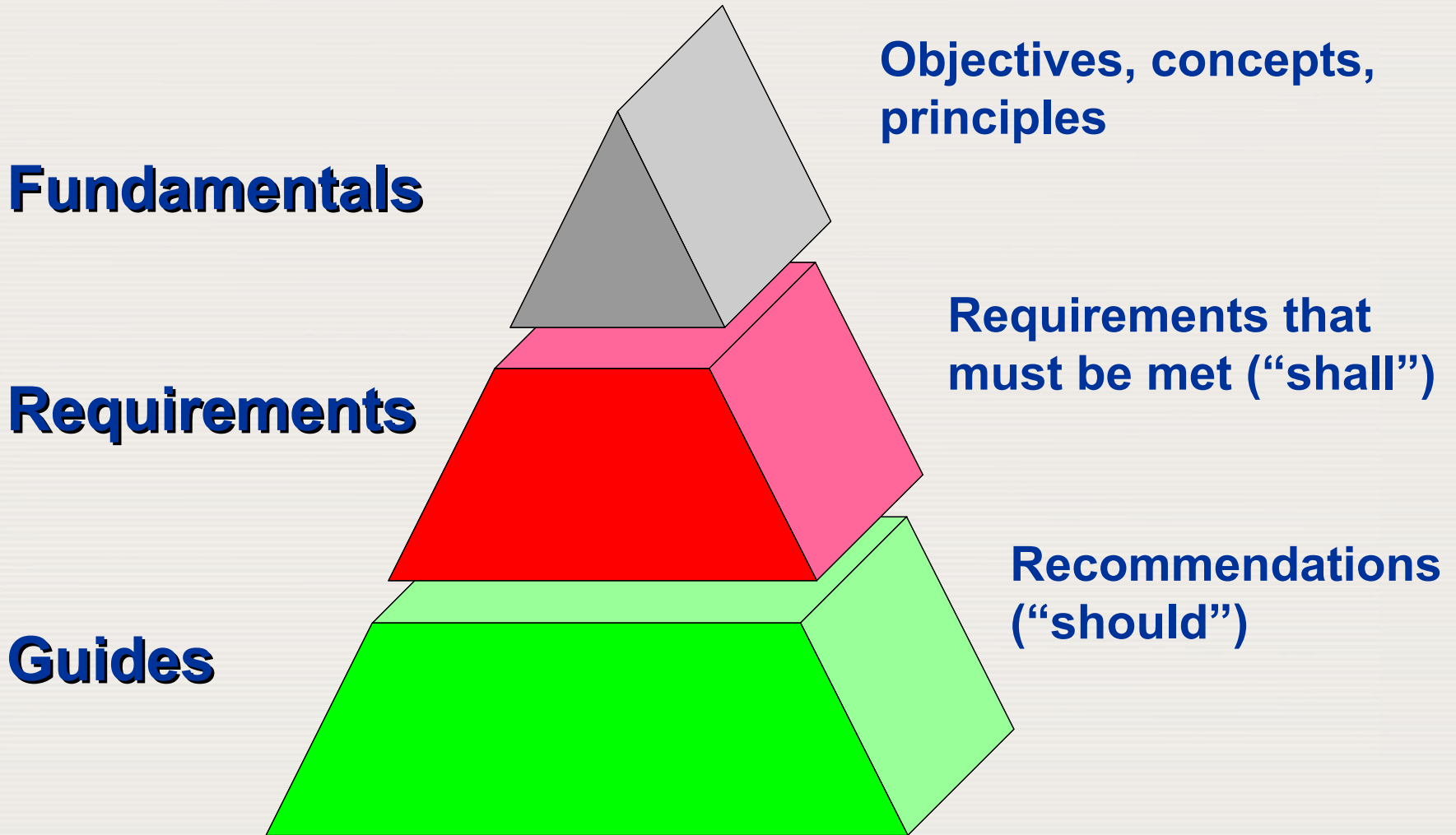
IAEA

International Atomic Energy Agency

Content

- IAEA Safety Standards: Categories
- Existing and future long-term structure of the IAEA Safety Standards
- Safety Requirements for Commissioning and Operation NPPs
- Safety Guides
- Concluding remarks

Safety Standards Series Hierarchy



Existing Structure of the IAEA Safety Standards

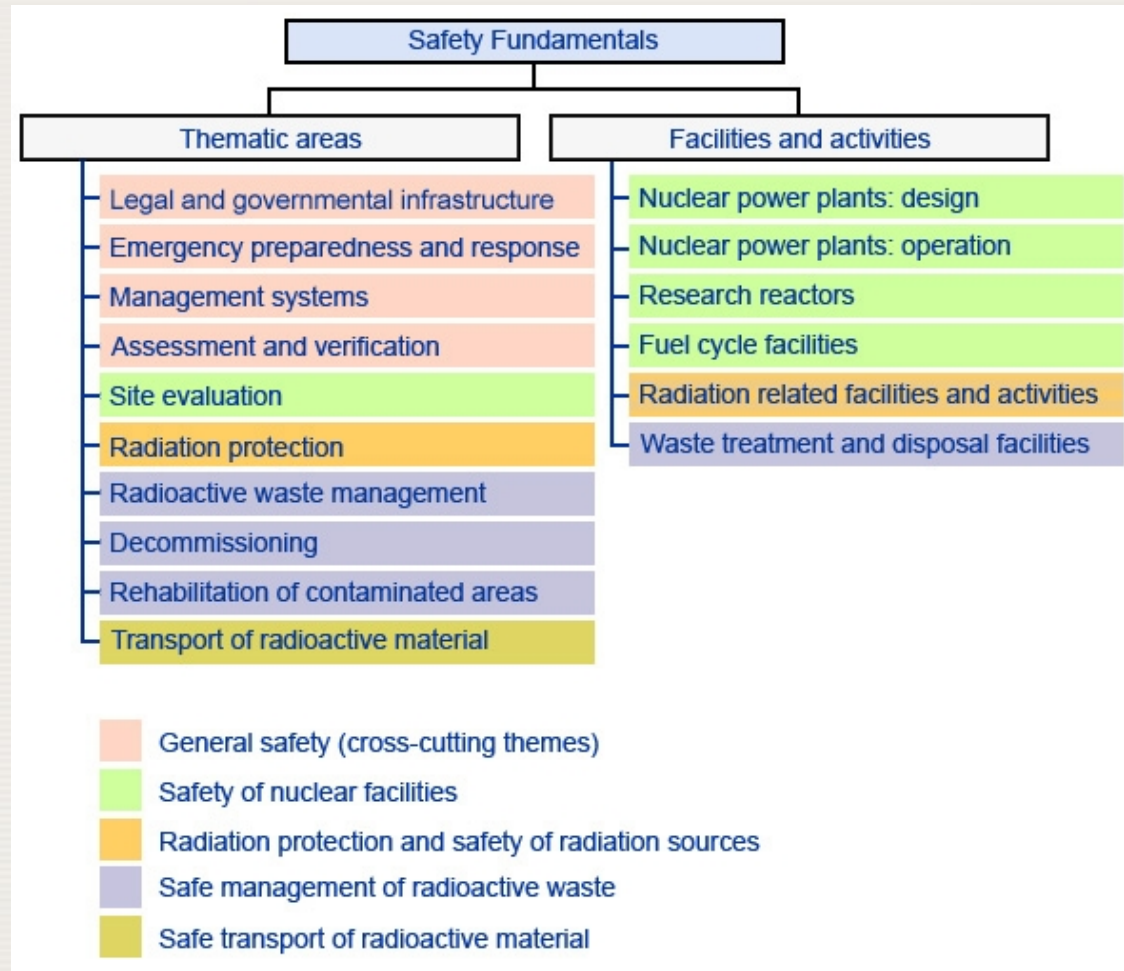
Two Categories:

Thematic:

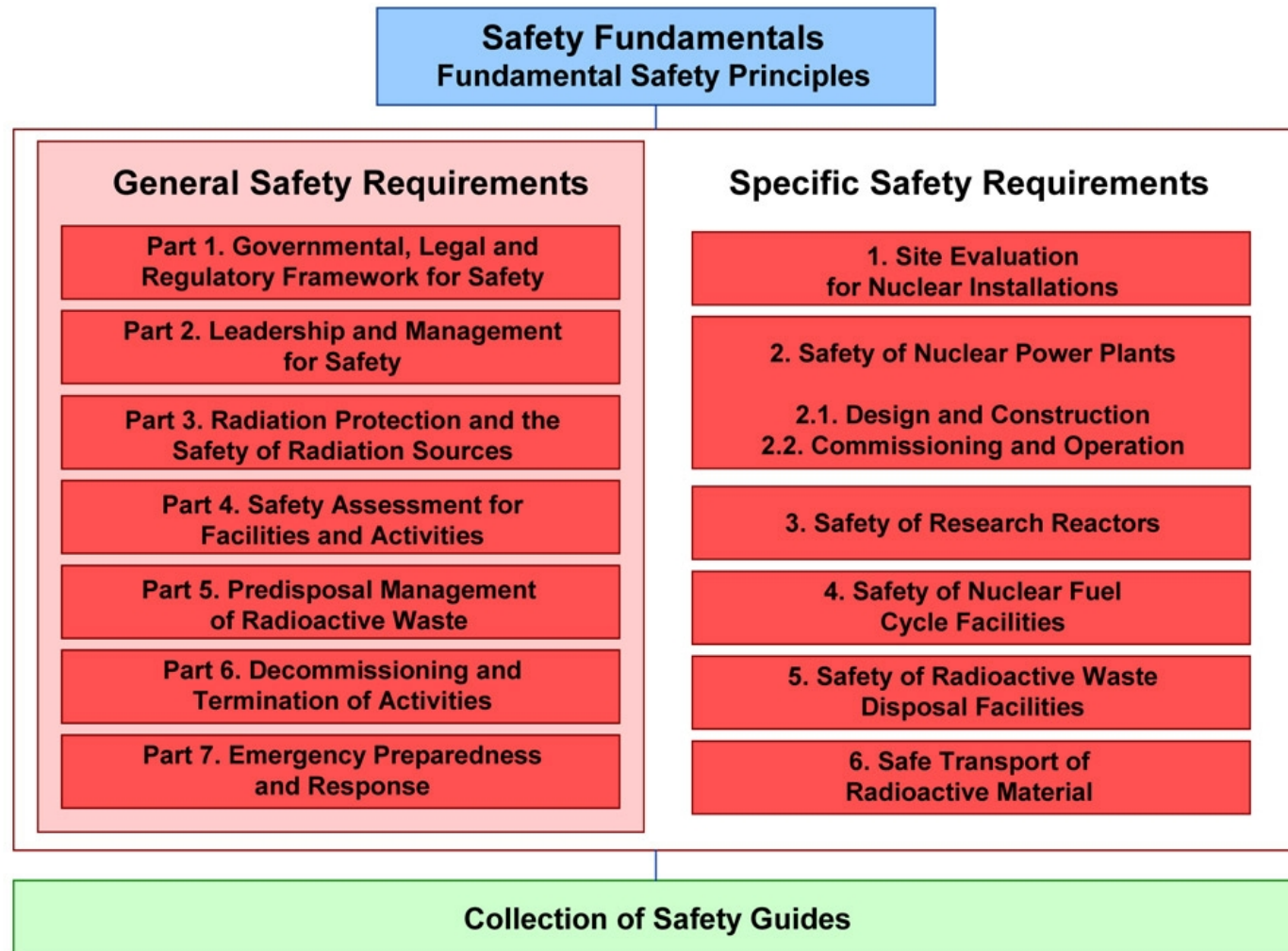
areas of cross-cutting nature.

Facility Specific:

NPPs, Research Reactors, Fuel Cycle Facilities, Radiation Facilities, Waste treatment and Disposal facilities



Future long-term structure of the Safety Standards



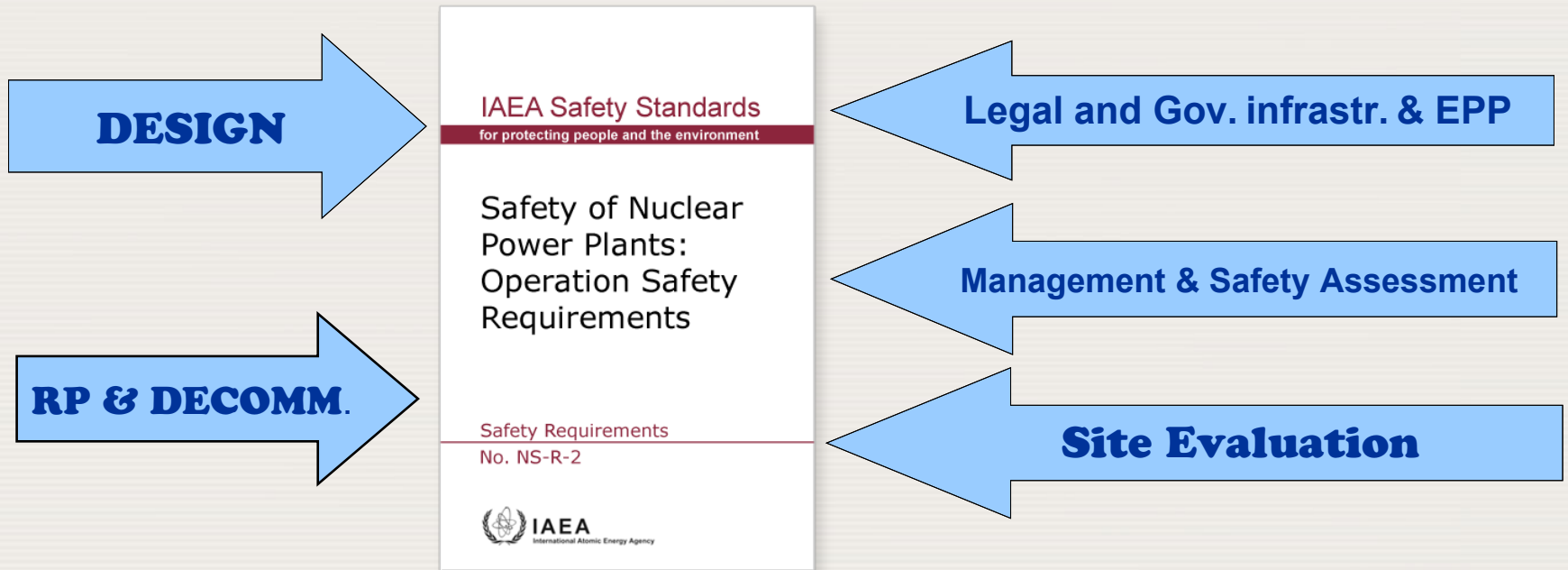
IAEA Safety Standards for NPPs: General

- The IAEA Safety Standards reflect international consensus on what constitutes a high level of safety, and form the basis for the IAEA safety review services and assistance.
- They are covering all the areas important to the safety of NPPs and provide support to effective application of the Nuclear Safety Convention.

IAEA Safety Standards for NPPs: General

- They are intended for use by all organizations involved in NPPs, including operating organizations, regulatory bodies, designers, and suppliers.
- The Safety Standards use regulatory language to allow for their incorporation into national safety regulations, and in developing national regulatory guides.

NS-R-2: Safety of Nuclear Power Plants: Operation - Requirements



Relation of Requirements for Operation with other Requirements

IAEA Safety Standards for Nuclear Power Plants : Operation – April 2010

NS-R-2– Requirements on the “Safety of Nuclear Power Plants: Operation”

**Fire Safety
in the Operation
of NPPs
NS-G-2.1**

**Operational Limits and Conditions
and
Operating Procedures for NPPs
NS-G-2.2**

**Modifications
to NPPs
NS-G-2.3**

**The Operating
Organization
for NPPs
NS-G-2.4**

**Core Management
and Fuel Handling for NPPs
NS-G-2.5**

**Maintenance, Surveillance
and In-service Inspection
in NPPs
NS-G-2.6**

**Radiation Protection and
Radioactive Waste Management
in the Operation of NPPs
NS-G-2.7**

**Recruitment, Qualification
and Training
of Personnel for NPPs
NS-G-2.8**

**Commissioning
for NPPs
NS-G-2.9**

**Periodic Safety
Review of NPPs
NS-G-2.10**

IAEA Safety Standards for Nuclear Power Plants : Operation – April 2010

NS-R-2– Requirements on the “Safety of Nuclear Power Plants: Operation”

**A System for the Feedback of Experience
from Events in Nuclear Installations
NS-G-2.11**

**Ageing
Management
for NPPs
NS-G-2.12**

**Evaluation of Seismic
Safety for Existing
Nuclear Installations
NS-G-2.13**

**Conduct of Operations
at NPPs
NS-G-2.14**

**Severe Accident
Management Programmes
for NPPs
NS-G-2.15**

**Chemistry Programme
for Water Cooled NPPs_
DS388**

**Development and Application of Level 1
Probabilistic Safety Assessment
for Nuclear Reactors
DS394**

Safety of NPPs Requirements: Commissioning and Operation

- **Requirement 1**: Responsibilities of the operating organization
- **Requirement 2**: Management system
- **Requirement 3**: Structure and functions of the operating organization
- **Requirement 4**: Staffing of the operating organization
- **Requirement 5**: Safety policy
- **Requirement 6**: Operational limits and conditions

Safety of NPPs Requirements: Commissioning and Operation

- **Requirement 7**: Qualification and training of personnel
- **Requirement 8**: Performance of safety related activities
- **Requirement 9**: Monitoring and review of safety performance
- **Requirement 10**: Control of plant configuration
- **Requirement 11**: Management of modifications
- **Requirement 12**: Periodic safety review

Safety of NPPs Requirements: Commissioning and Operation

- **Requirement 13**: Equipment qualification
- **Requirement 14**: Ageing management
- **Requirement 15**: Records and reports
- **Requirement 16**: Programme for long term operation
- **Requirement 17**: Consideration of objectives of nuclear security in safety programmes
- **Requirement 18**: Emergency preparedness

Safety of NPPs Requirements: Commissioning and Operation

- **Requirement 19**: Accident management programme
- **Requirement 20**: Radiation protection
- **Requirement 21**: Management of radioactive waste
- **Requirement 22**: Fire safety
- **Requirement 23**: Non-radiation-related safety
- **Requirement 24**: Feedback of operational experience

Safety of NPPs Requirements: Commissioning and Operation

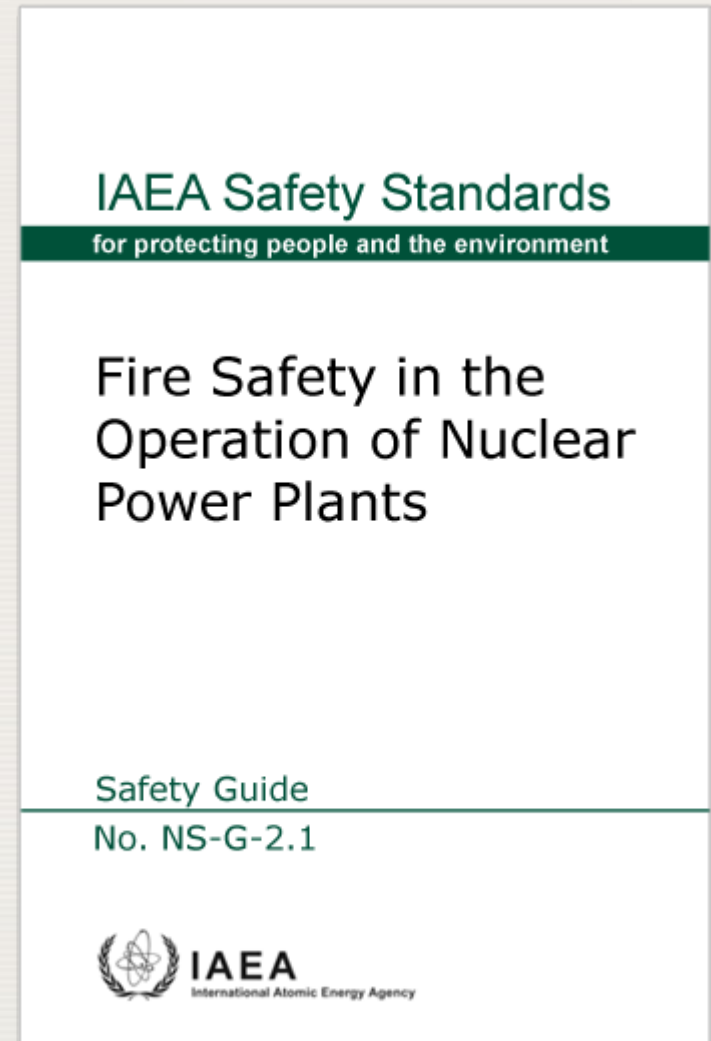
- **Requirement 25**: Commissioning programme
- **Requirement 26**: Operating procedures
- **Requirement 27**: Operation control rooms and control equipment
- **Requirement 28**: Material conditions and housekeeping
- **Requirement 29**: Chemistry programme
- **Requirement 30**: Core management and fuel handling

Safety of NPPs Requirements: Commissioning and Operation

- **Requirement 31**: Maintenance, testing, surveillance and inspection programmes
- **Requirement 32**: Outage management
- **Requirement 33**: Preparation for decommissioning

NS-G-2.1: Fire Safety in the Operation of Nuclear Power Plants (2000)

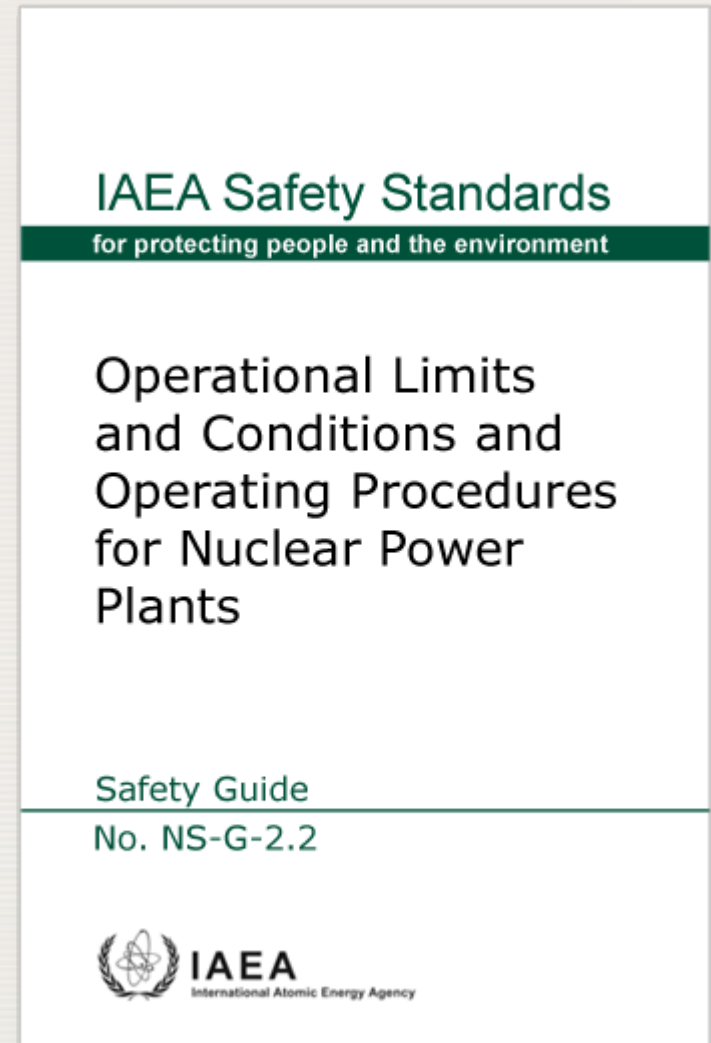
- The principle of defence in depth;
- Fire protection organization;
- Fire prevention and protection;
- Control of combustible materials and ignition sources;
- Updating of the fire hazard analysis
- Periodic inspection, maintenance and testing
- Training of plant personnel
- Manual fire fighting capability



NS-G-2.2: Operational Limits and Conditions and Operating Procedures for Nuclear Power Plants (2000)

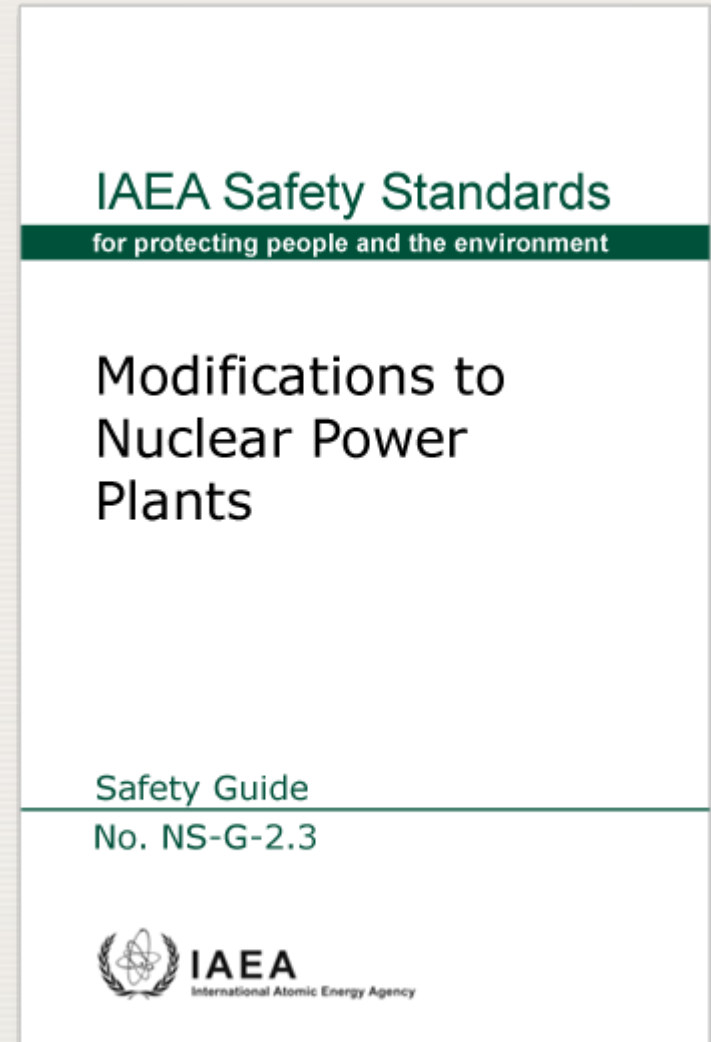
Guidance on formulating and presenting the OLCs and Operating Procedures for NPPs.

Development, content, and implementation of the OLCs and Operating Procedures for the operation of NPPs.



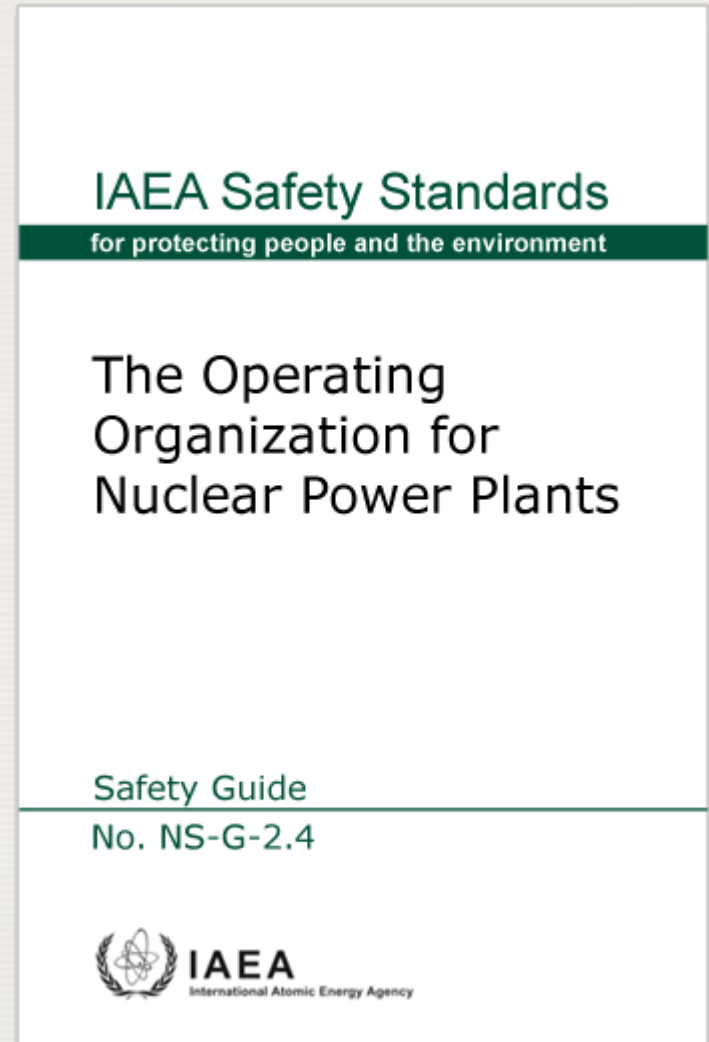
NS-G-2.3: Modifications to Nuclear Power Plants (2001)

This Safety Guide deals with the intended modification of structures, systems and components, operational limits and conditions, procedures and software, and the management systems and tools for the operation of a NPP.



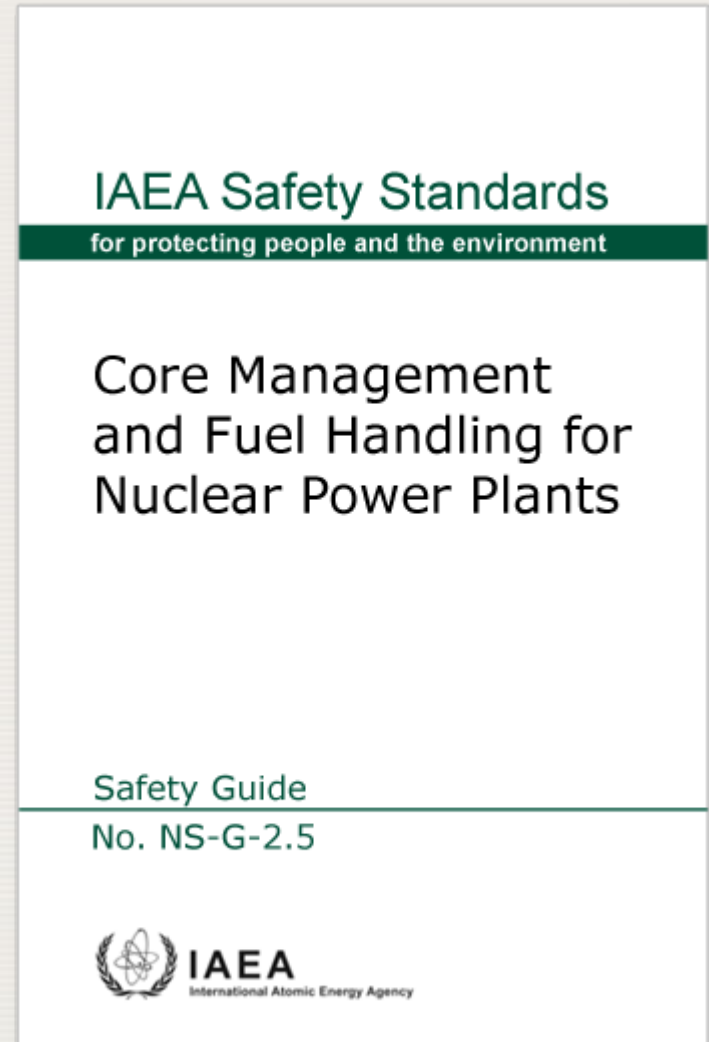
NS-G-2.4: Operating Organization for Nuclear Power Plants (2002)

Safety matters directly related to the operation of NPPs;
Internal interrelationships between operations and design, construction and commissioning;
Involvement of the operating organization in reviews of safety issues;
Relationship between the Operating organization, the regulatory body and the general public.



NS-G-2.5: Core Management and Fuel Handling for Nuclear Power Plants (2002)

The safety objectives of core management;
The receipt of fresh fuel,
Storage and handling of fuel;
The loading and unloading of fuel and core components;
Loading a transport container with irradiated fuel and its preparation for transport off the site.



NS-G-2.6: Surveillance and In-service Inspection in Nuclear Power Plants (2002)

Organizational and procedural aspects of MS&I;
Preventive and remedial measures, including testing, surveillance and in service inspection;
Preventive and predictive maintenance, repairing defective plant items, selecting and training personnel, providing related facilities and equipment, procuring and stores spare parts.

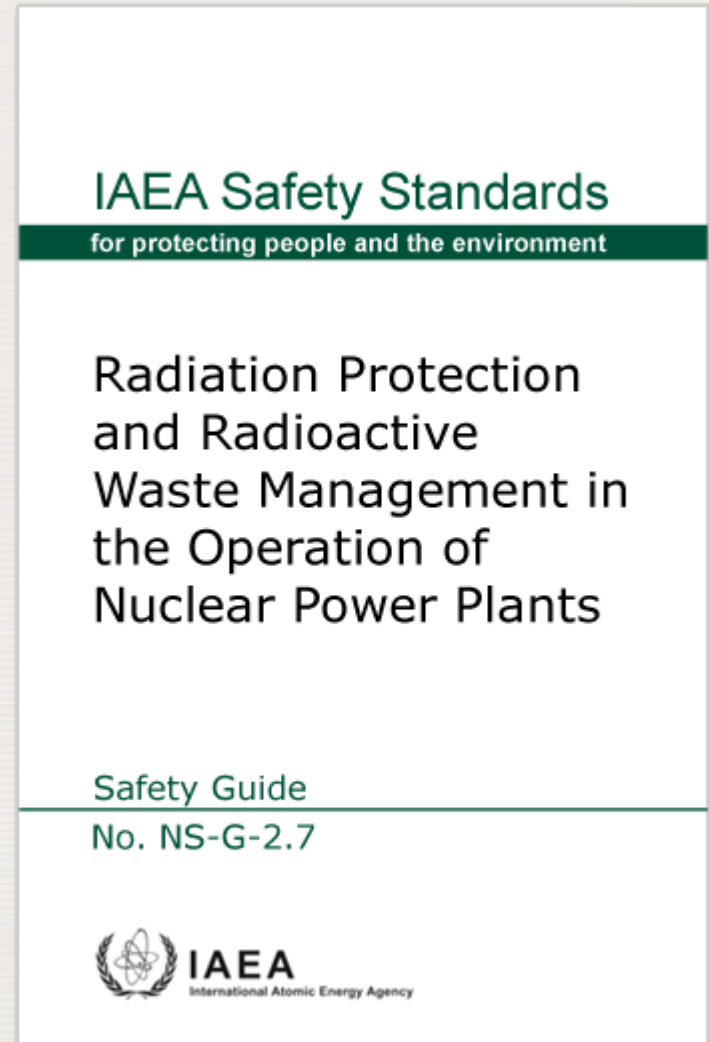


NS-G-2.7: Radiation Protection and Radioactive Waste Management in the Operation of Nuclear Power Plants (2002)

Development of radiation protection programmes at NPPs;

Classification, workplace monitoring and supervision;

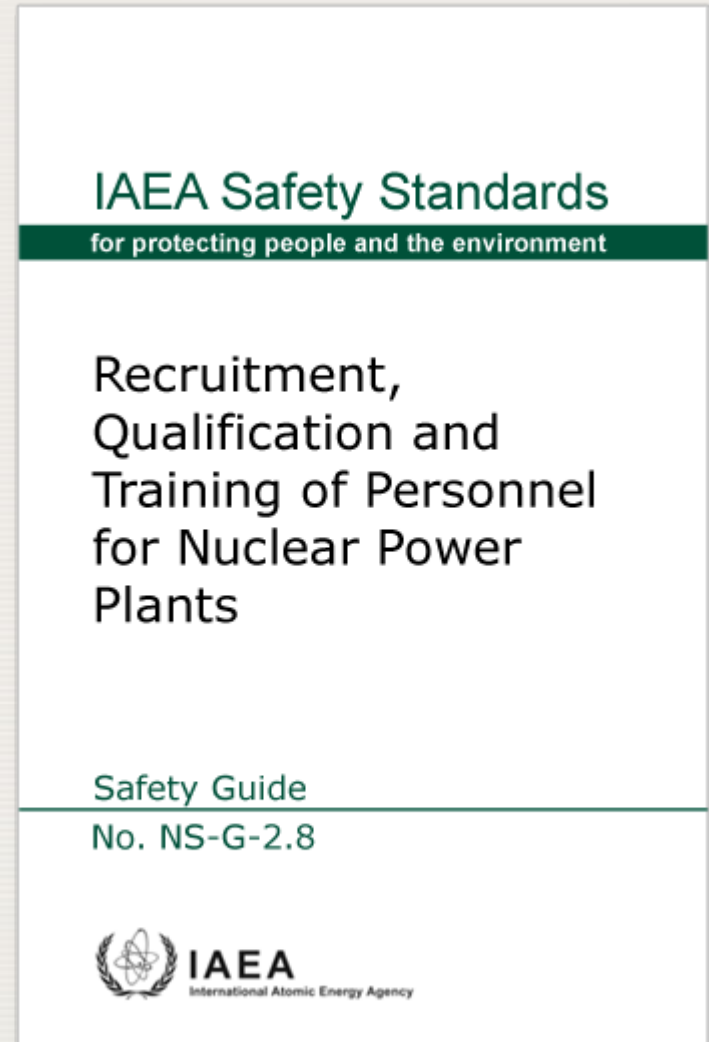
Application of the principle of optimization of protection (ALARA);
Safety related aspects of a programme for the management of radioactive waste at NPPs.



NS-G-2.8: Recruitment, Qualification and Training of Personnel for Nuclear Power Plants (2002)

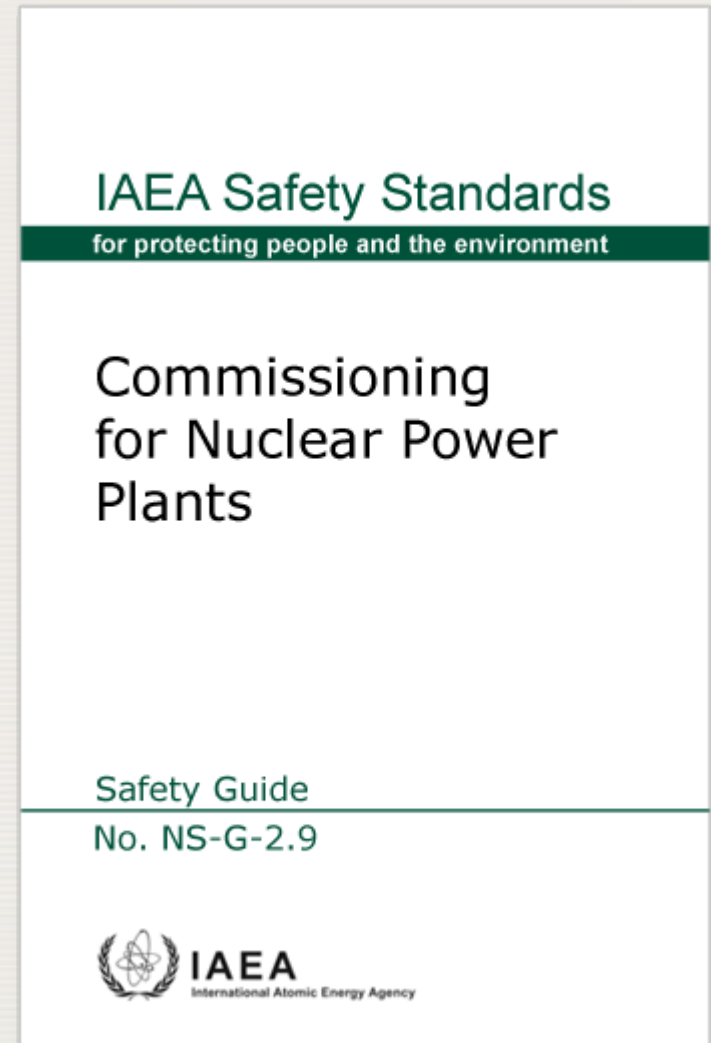
This Safety Guide deals specifically with those aspects of qualification and training that are important to the safe operation of NPPs;

It provides recommendations on the recruitment, selection, qualification, training and authorization of plant personnel.



NS-G-2.9: Commissioning for Nuclear Power Plants (2003)

Commissioning programme, organization and management, test and review procedures and the interfaces between organizations involved in the commissioning activities;
The control of changes in the commissioning programme and with the documentation required and produced in commissioning.



NS-G-2.10: Periodic Safety Review of Nuclear Power Plants (2003)

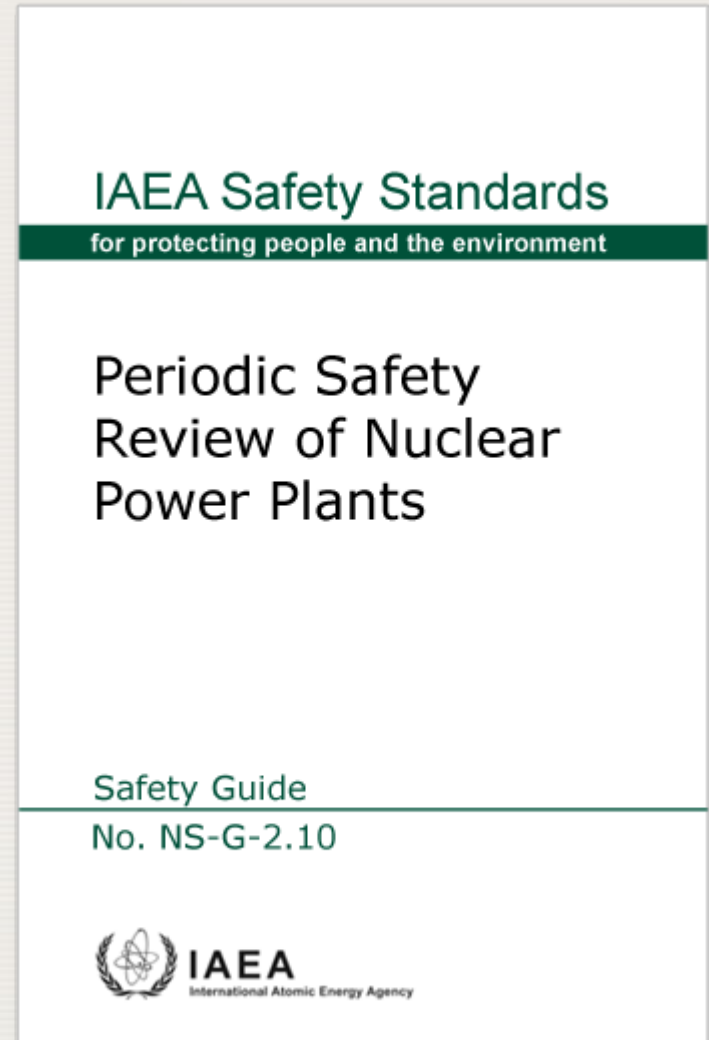
Review strategy;

Safety factors in a periodic safety review;

Roles and responsibilities;

Review procedure;

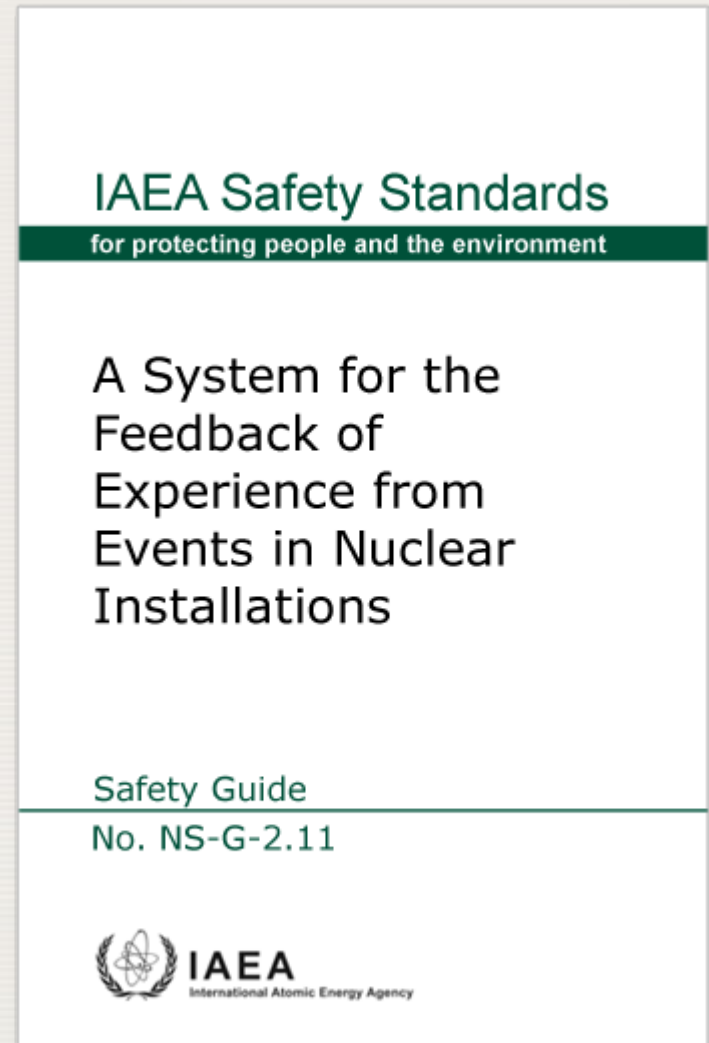
Basis for acceptability of continued plant operation.



NS-G-2.11: A System for the Feedback of Experience from Events in Nuclear Installations (2006)

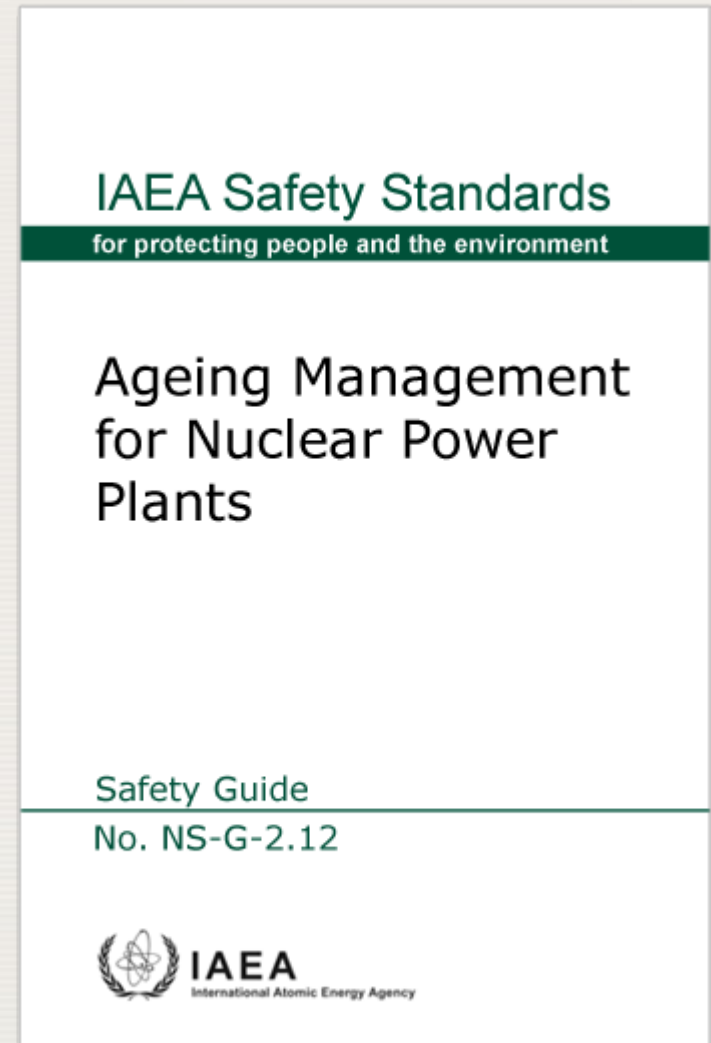
All the main components of Systems for the feedback of Operational experience for gathering relevant Information on events that have occurred;

Interaction between the different systems for using feedback on Operational experience.



NS-G-2.12: Ageing management for NPPs (2009)

The Safety Guide mainly focuses on managing the physical ageing of SSCs important to safety. It also provides recommendations on safety aspects of managing obsolescence and on the application of ageing management for long term operation.

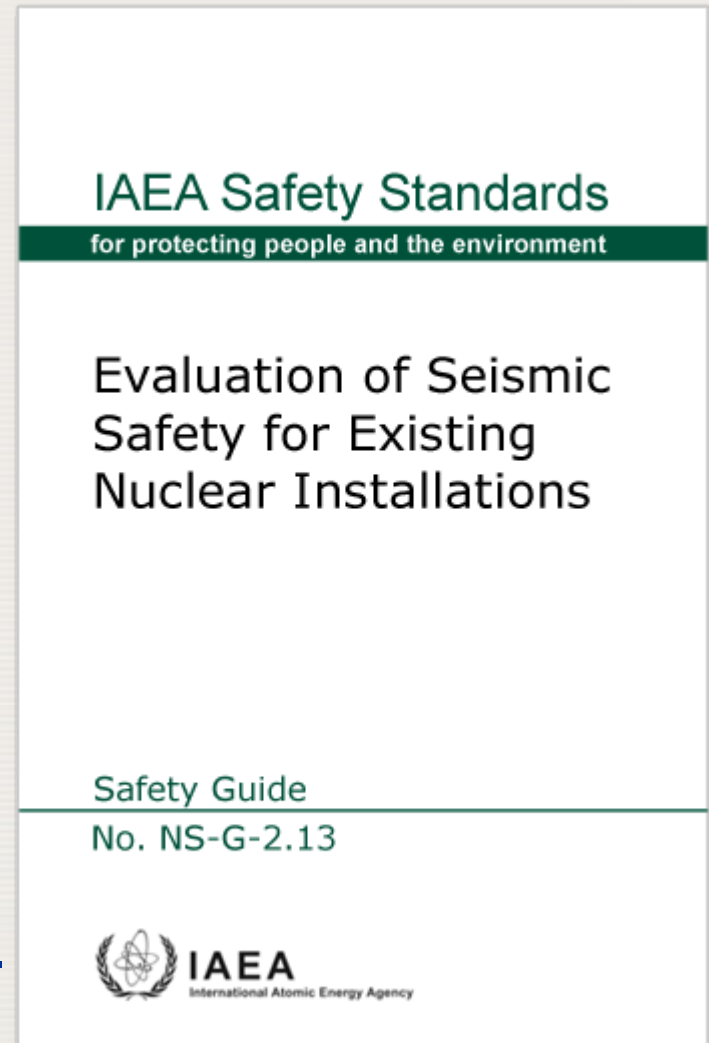


NS-G-2.13: Evaluation of Seismic Safety for Existing Nuclear Installations (2009)

Two methodologies are discussed in detail in this Safety Guide:

The **deterministic** approach generally represented by seismic margin assessment and the seismic **probabilistic** safety assessment.

Variations of these approaches or alternative approaches may be demonstrated to be acceptable also.



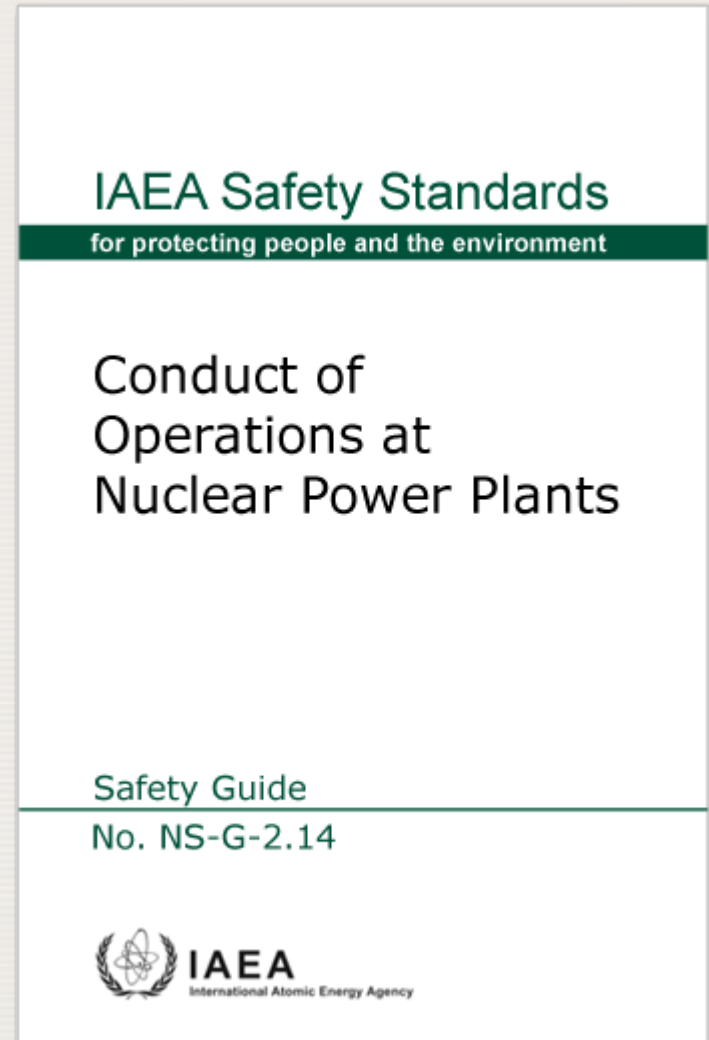
NS-G-2.14: Conduct of Operations at Nuclear Power Plants (2008)

Structuring the operations department of a NPP;

Setting high standards of performance and making safety related decisions in an effective manner;

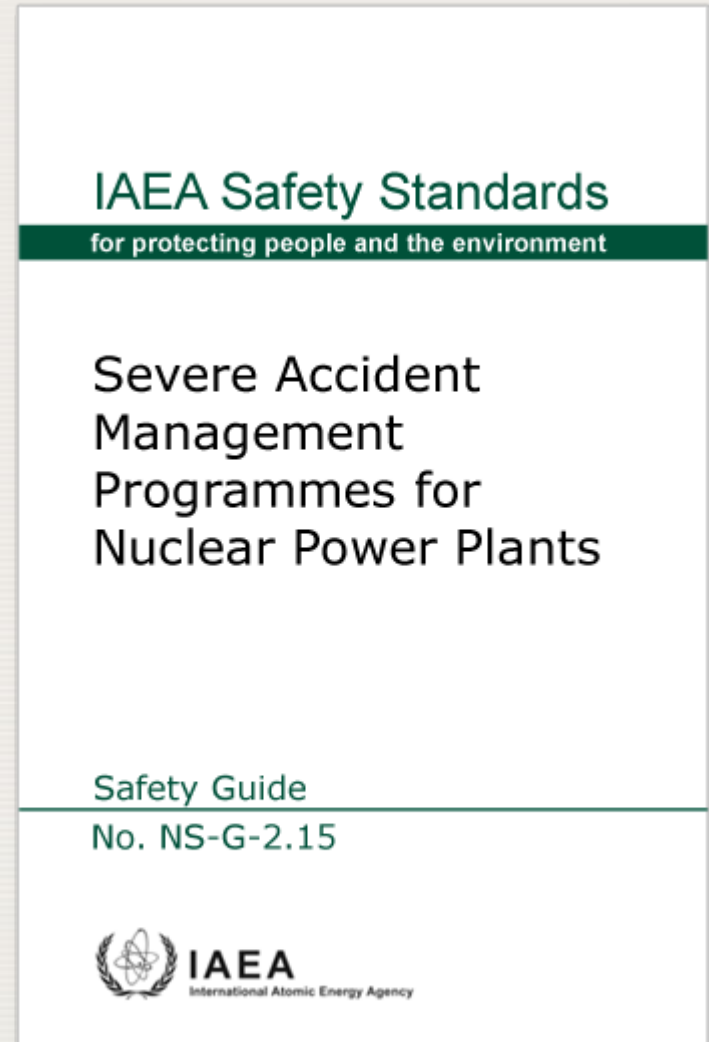
Conducting control room activities in a thorough and professional manner;

Maintaining a nuclear power plant within the established operational limits and conditions.



NS-G-2.15: Severe Accident Management Programmes for Nuclear Power plants (2009)

This Safety Guide includes recommendations for the development of an accident management programme to prevent and to mitigate the consequences of beyond design basis accidents, including severe accidents. Also focuses on the severe accident management programme.



DS388 - Chemistry Programme for Water Cooled Nuclear Power Plants

This Safety Guide refers to the main activities within the plant chemistry programme of the of water cooled reactors and to the chemistry control parameters having impact on their safe operation.

In addition, diagnostic parameters are defined, i.e. plant availability, extended component lifetime, chemical and radioactive releases to the environment, and personnel exposure data.

13 August 2008

IAEA SAFETY STANDARDS
for protecting people and the environment

Status: For Member States' comments
Comments due by 31 December 2008

**Chemistry Programme for Water Cooled
Nuclear Power Plants**

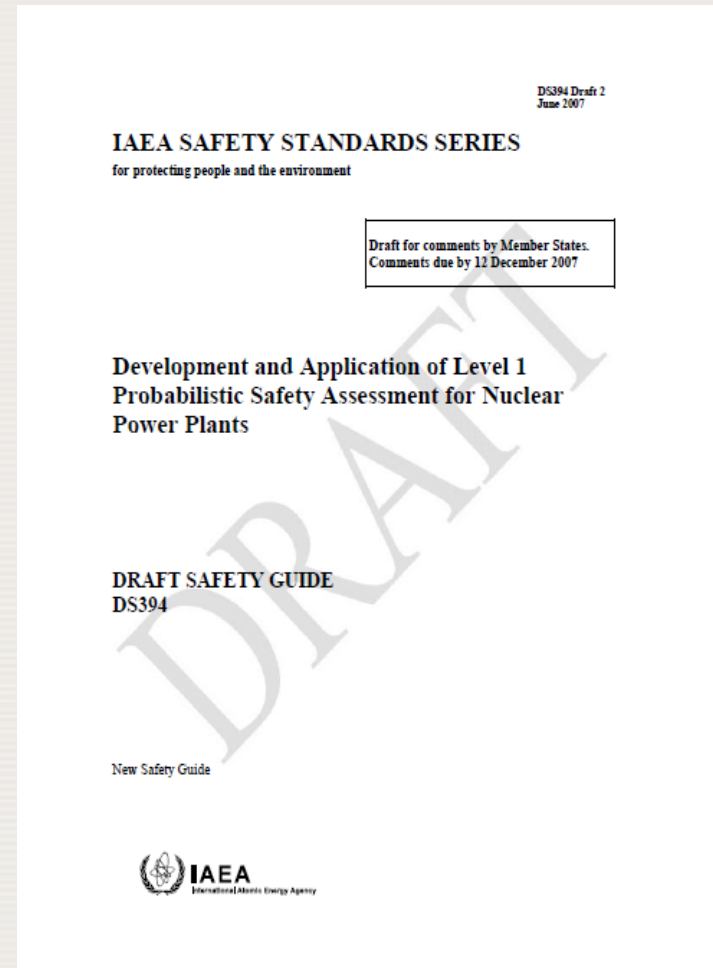
**DRAFT SAFETY GUIDE
DS388**

New Safety Guide

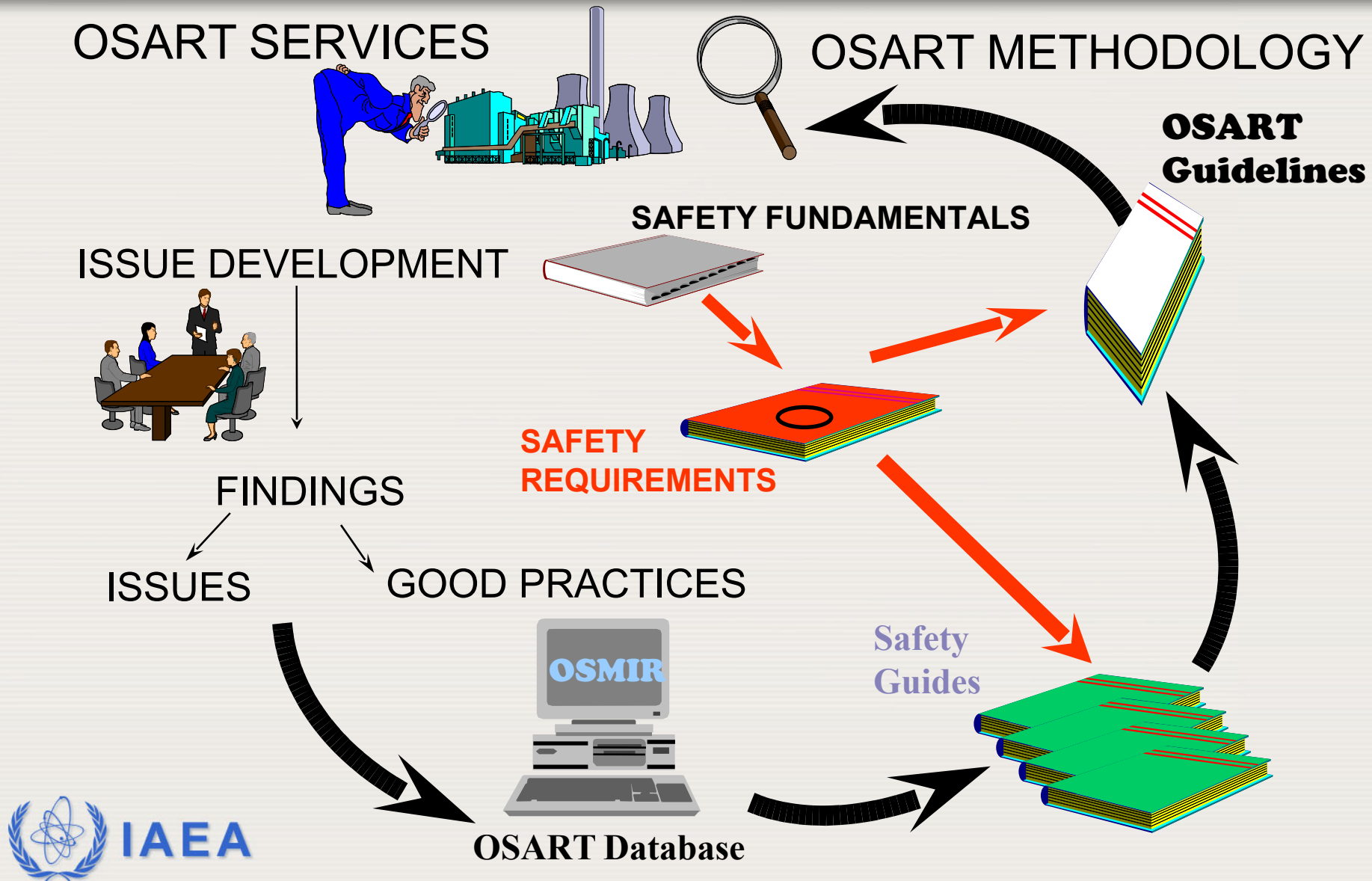
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DS394 - Development and Application of Level 1 Probabilistic Safety Assessment for Nuclear Reactors

This Safety Guide provides recommendations for performing or managing a level 1 PSA project for a NPP and using it to support the safe design and operation of NPPs. The recommendations aim to provide technical consistency of level 1 PSA studies to reliably support PSA applications and risk-informed decisions.



OSART – Nuclear Safety Standards interface



Concluding remarks

- Application of the IAEA Safety Standards will help Member States to achieve the highest level of safety for operation of NPPs.
- The IAEA programme on NPPs operational safety gives priority to the development and promotion of proper use of the IAEA Safety Standards, through:
 - **Assistance to Member States in application of the Safety Standards**
 - **Conduct of safety review missions and training activities based on the Safety Standards.**

Thank You

<http://www-ns.iaea.org/standards/default.htm>