IAEA SAFETY STANDARDS

FOR DESIGN AND SAFETY ASSESSMENT

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IAEA Statute (Article III.A.6)

- "To establish or adopt… [in consultation with…] standards of safety for the protection of health and minimization of danger to life and property"

- "…and to provide for the application of these standards"

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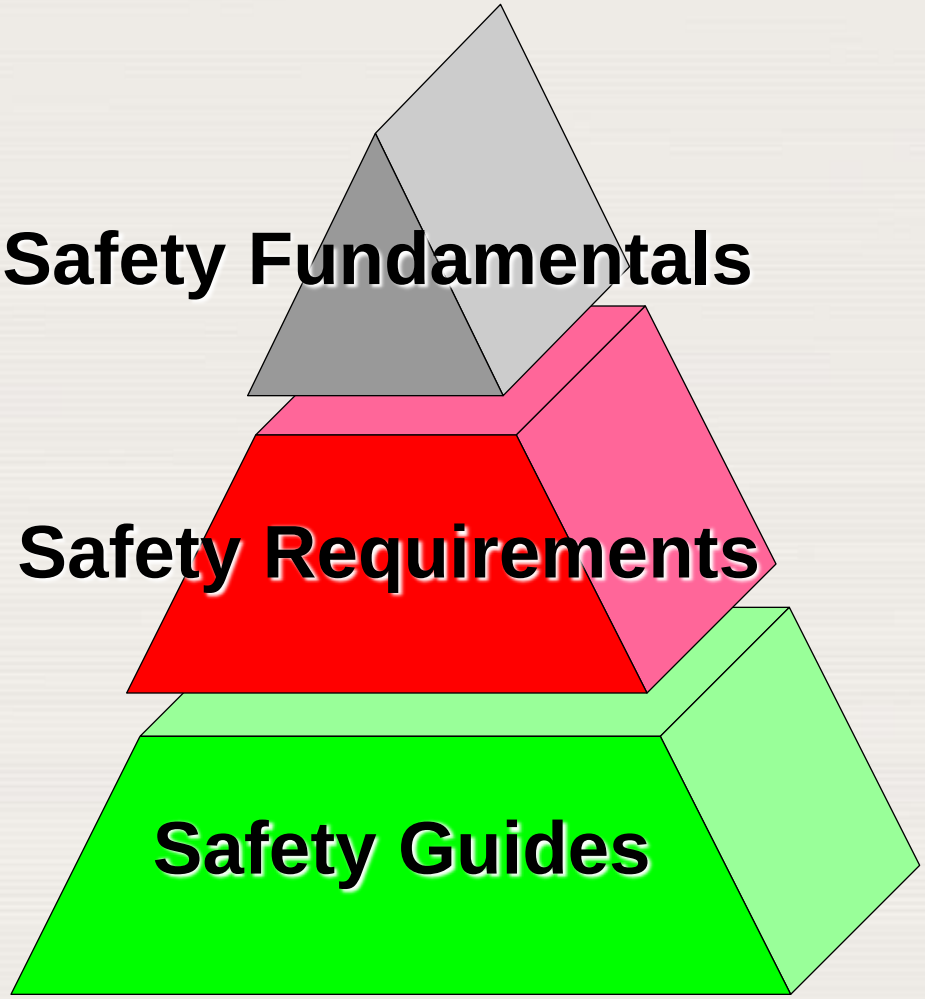
Safety Standards Hierarchy



International References for a High Level of Nuclear Safety

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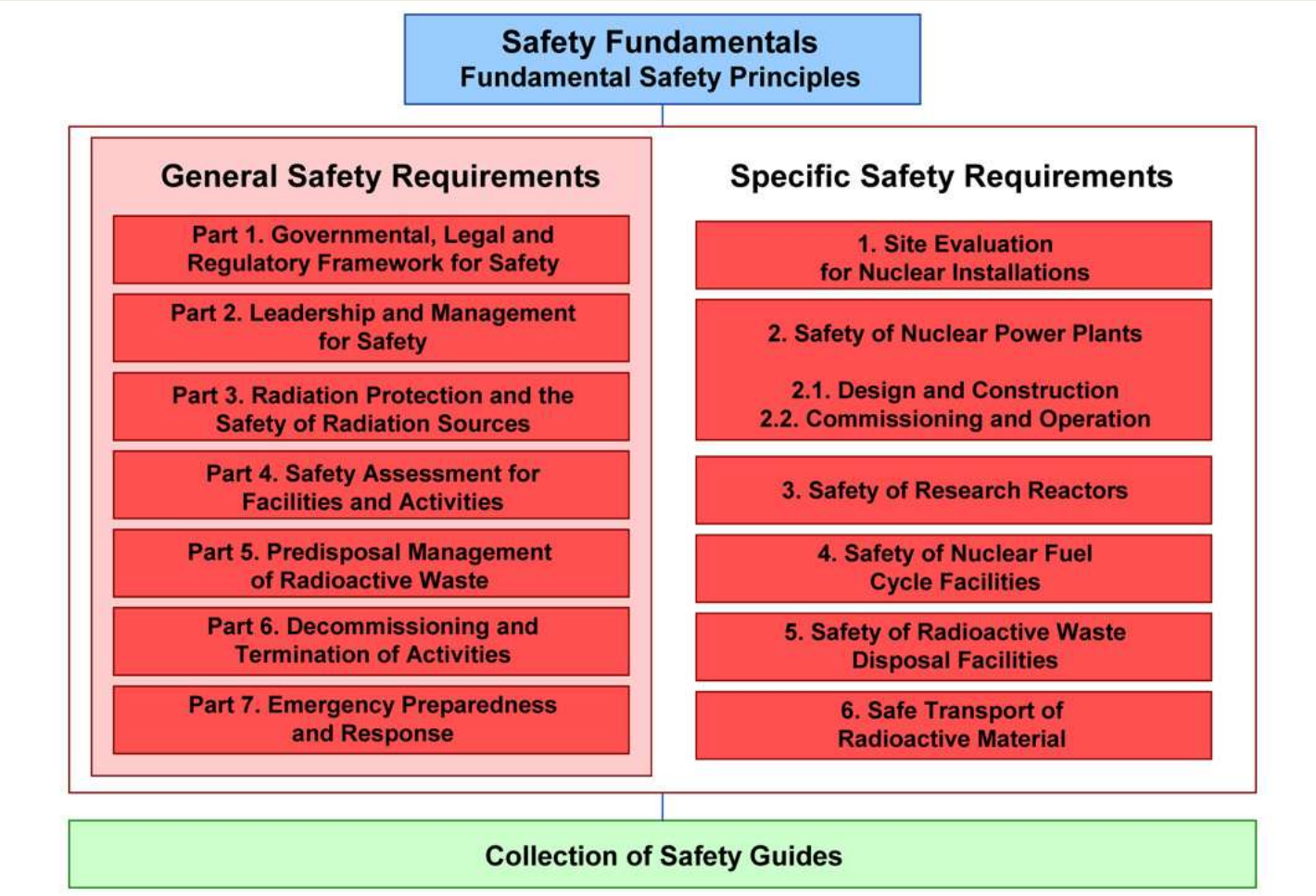
Structure of the IAEA Safety Standards



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Development of Safety Standards

- Development process involving:
  - International Commission
  - International Technical Committees
  - Consultation of IAEA Member States
  - Recognized experts

- Member States approve standards through the Board of Governors or the Director General of the IAEA

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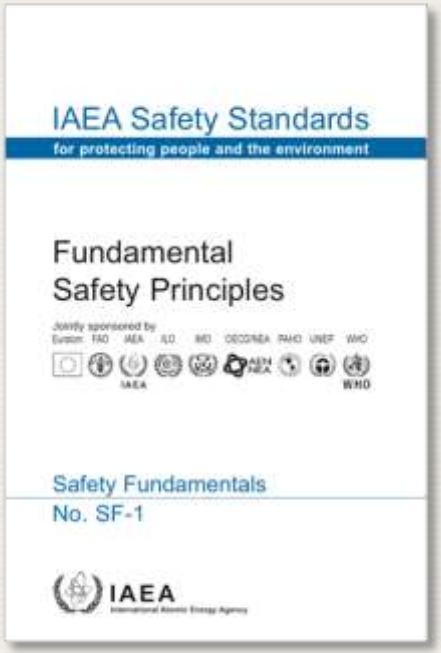
SF-1 Safety Fundamentals - Safety Principles

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



Principle 5: Optimisation of protection

Protection must be optimized to provide the highest level of safety that can reasonably be achieved.

Principle 6: Limitation of risk to individual

Measures for controlling radiation risks must ensure that no individual bears an unacceptable risk of harm.

Principle 8: Prevention of accidents

All practical efforts must be made to prevent and mitigate nuclear or radiation accidents.

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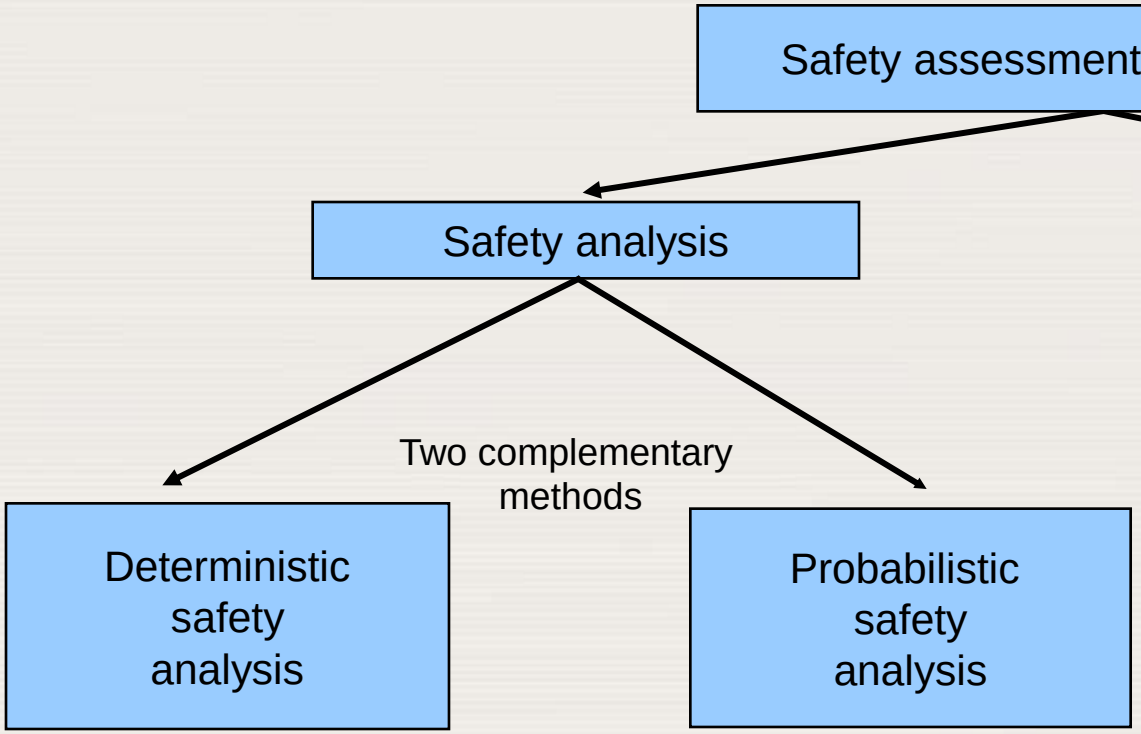
Safety Assessment - Background

- Safety assessments are to be undertaken as a means of evaluating compliance with these safety principles for **all nuclear facilities and activities** and to determine the measures that need to be taken to achieve safety.

- Safety assessment needs to be performed by the organization responsible for operating the facility or carrying out the activity, independently verified and submitted to the regulatory authority as part of the licensing process.

- Safety assessment includes Safety Analysis and an Evaluation of the Engineering Factors Important to Safety

Safety Assessment and Safety Analysis



Predicts the response to postulated events with predetermined assumptions; checks fulfilment of acceptance criteria

Combines the likelihood of initiating events, potential scenarios and their consequences into estimation of CFD, source term or overall risk

Evaluation of engineering factors important to safety

- Proven engineering practices
- Defence in depth
- Radiation protection
- Safety classification
- Protection against internal and external hazards
- Combination of loads
- Selection of materials
- Single failure criterion
- Redundancy, diversity
- Equipment qualification
- Ageing
- Man-machine interface, …

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General safety approach

- THE GENERAL SAFETY APPROACH IS MAINLY BASED ON THE CONCEPT OF DEFENCE IN DEPTH
  - High quality, conservatism and safety margins
  - Plant deterministically designed against a broad set of postulated events according to established design criteria
  - Capability to deal with conditions that are not considered in the design basis
- THE DETERMINISTIC APPROACH IS COMPLEMENTED BY PROBABILISTIC EVALUATIONS

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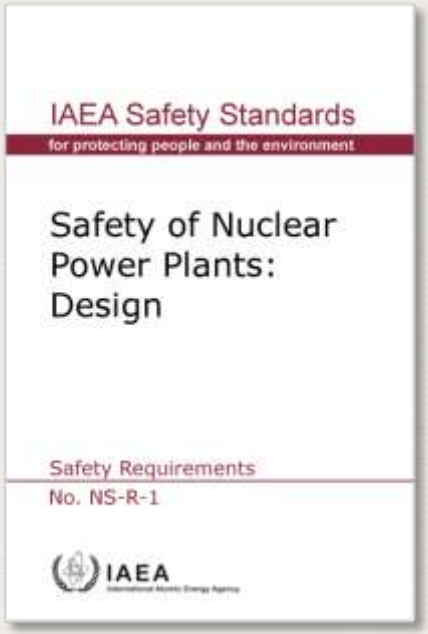
Design and Safety Assessment Requirements



To be implemented by the designer to fulfill the fundamental safety functions with the appropriate level of Defence in Depth

To be used by the reviewer of the design (e.g. Utility and Safety Authority) to assess the safety of the design

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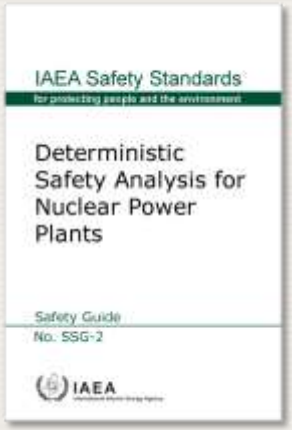
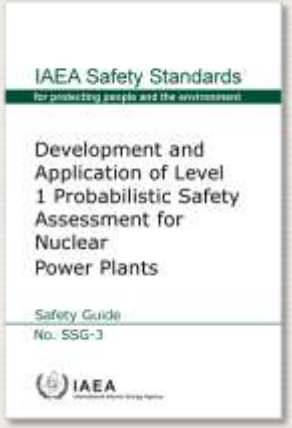
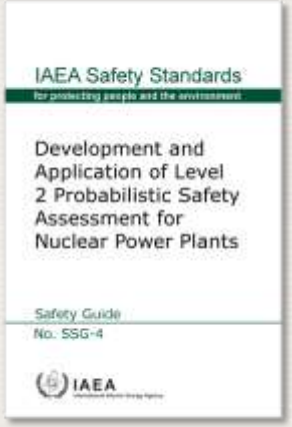
IAEA Safety Standards for Safety Assessment

Other Standards







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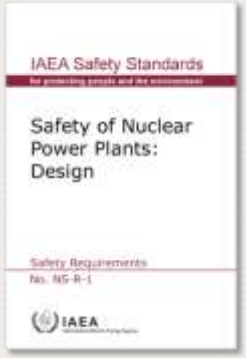
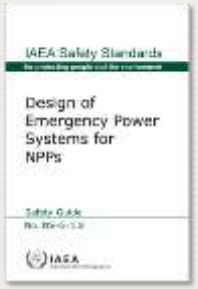
IAEA Safety Standards for Design of NPPs





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Status of Safety Standards

Safety Standards represent international consensus on best international practices to achieve a high level of safety

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Utilization by Member States

- Formally adopted into a Member State's legal framework (e.g. China, Netherlands etc.)
- Direct use of standards to establish regulation (e.g. Canada, Czech Republic, Germany, India, Korea, Russian Federation etc.)
- Used as reference for review of national standards and situations (by all States, also by Industry)
- Used by International Organizations (European Safety Directive, WENRA)

Thank you for your attention!

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