IAEA 60 Years
Atoms for Peace and Development

Challenges in Strengthening Nuclear Safety Globally

Senior Regulator's Meeting
Vienna, September 29, 2016

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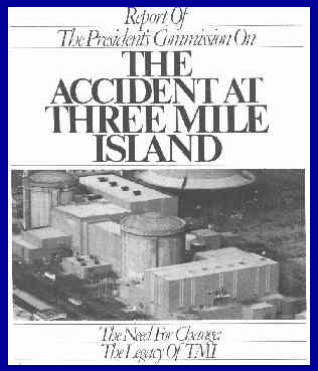
Department of Nuclear Safety and Security

Nuclear Safety Lessons

Lessons are learned not by being aware that there is a lesson to be learned, but by experiencing at first hand the significance of that lesson.

28 March 1979
Three Mile Island
Unit 2



26 April 1986
Chernobyl Accident
Unit 4

11 March 2011
Fukushima Daiichi A
Units 1 – 4

Nuclear Safety Lessons Learned: Chernobyl

"…Radioactivity does not respect national boundaries…… Rules ….should be worked out internationally …."

Hans Blix,
former IAEA Director General

Global Nuclear Safety Framework

Strengthening nuclear safety

- Legal incentive instruments
  - ✓ Convention on Nuclear Safety
  - ✓ Code of conducts
- Safety Standards
- Peer reviews
- Expert missions
- Multilateral and bilateral cooperation

Reinforcing national commitment to nuclear safety

- Safety is the national responsibility
- Safety is an essential condition for a sustainable and successful nuclear power programme
- Safety is an integral component in all infrastructure issues
- Safety has to be continuously improved

Nuclear Safety Lessons: Fukushima

"There can be no grounds for complacency about nuclear safety in any country…Safety must always come first."

Yukiya Amano,
IAEA Director General

Report on the Fukushima Daiichi Accident: Theme-focused main lessons and observations

- Ensure strong regulatory infrastructure
- Ensure protection against external events
- Enhance mitigation of beyond-design basis events and accidents
- Strengthen arrangements for accident management and emergency preparedness
- Mitigate radiological consequences from accidents

Action Plan on Nuclear Safety to strengthen safety and enhance regulatory effectiveness

Nuclear Safety Challenges: Issues and Trends

Enhance regulatory effectiveness

- Appropriate level of regulatory control over all facilities and activities
- Adequate demonstration of safety and compliance with legal and regulatory requirements
- Openness and transparency

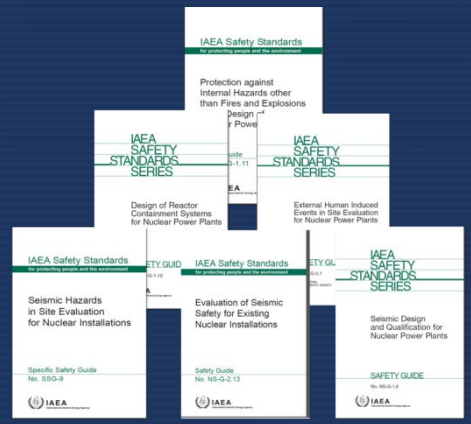
Strengthen safety of nuclear installations

- Minimizing risk of nuclear accidents and eliminating their consequences to the extent practicable
- Focusing on leadership and management for safety, including safety culture

Respond to globalization of nuclear safety

- Strengthening Global Nuclear Safety Framework

Effective Regulatory Framework



Appropriate framework for safety

- National policy and strategy
- Responsibility and competence for safety
- Provisions of technical services
- International obligations and arrangements

Strong Regulatory Body

- Independence
- Sufficient legal authority
- Stability and consistency of regulatory control
- Adequate resources and competency
- Strong safety culture
- Open and transparent communication and consultation
- Stakeholders involvement

Engagement in the Global Nuclear Safety Framework

- Legal instruments and peer-reviews
- Sharing of regulatory and operating experience

Strengthening Nuclear Safety

11 March 2011
Fukushima Daiichi Accident
Units 1 - 4

Review specific aspects of safety infrastructure

- Site evaluation (protection against external events)
- Design safety (prevention and mitigation of beyond-design-basis events and accidents)
- Accident management (arrangements to minimize radiological release)
- Emergency preparedness (protection of the public)

Review operator's management framework

- Primary responsibility for safety
- Functions and competencies
- Leadership and management for safety, including safety culture
- Knowledge and skills
- Training needs
- Feedback from operating experience
- Technical support capabilities

Globalization of Nuclear Safety

Global Nuclear Safety Framework

- Sustainable, broadly acceptable policies for nuclear safety and radioactive waste management
- Harmonized regulations and industry standards
  - Minimum international safety requirements
  - Standardized reactor designs
- Stakeholders involvement

International Instruments

- Legal instruments
  - Convention on Nuclear Safety
  - Code of conducts
- Peer reviews
- Expert missions

IAEA Role in Strengthening Nuclear Safety

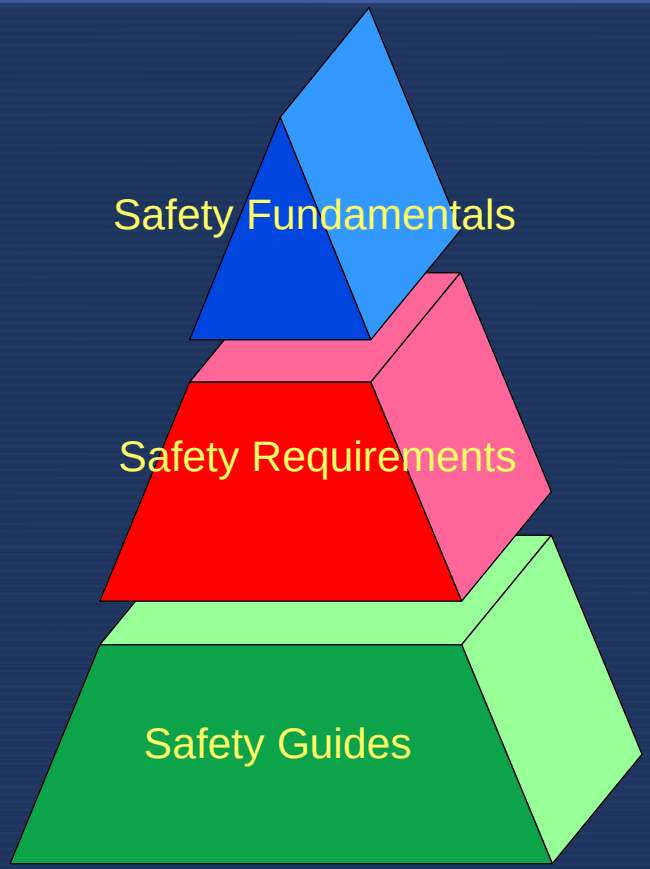
- **Safety Standards**
- **Peer Reviews**
- **Advisory Services**
- **Capacity Building**

- Nuclear Power Plants
- Research Reactors
- Fuel Cycle Facilities

Maintaining effective Global Nuclear Safety Framework

- Facilitating implementation of legal instruments
- Developing internationally recognized safety standards
- Providing safety services that meet Member States needs
- Providing quality support and assistance to Member States developing safety infrastructure
- Coordinating and collaborating effectively with other organizations
- Demonstrating the traits of a healthy safety culture

IAEA Safety Standards



Fundamental safety objective and principles for protecting people and environment

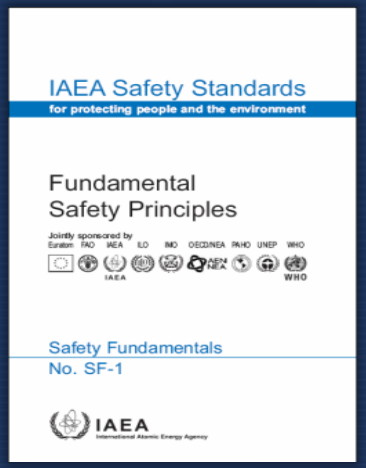
What shall be done

Requirements that must be met to ensure protection of people and environment –'shall'

How it should be done

Recommended ways of meeting the requirements – "should"

IAEA Fundamental Safety Principles



Ten safety principles form the basis on which safety requirements are developed and safety measures are implemented to achieve the primary safety objective

Primary safety objective: Protection of 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:** Limitations 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 risks must be justified and optimized

Safety Review Services (1/2)

Peer Review Services

Safety of nuclear installations

- Integrated Regulatory Review Service (IRRS)
- Site and External Events Design (SEED)
- Operational Safety Review Service (OSART)
- Integrated Safety Assessment of Research Reactors (INSARR)
- Safety Evaluation during Operation of Fuel Cycle Facilities (SEDO)
- Safety Aspects of Long Term Operation (SALTO)

Advisory Services

- Safety Assessment Advisory Programme (SAAP)
- Technical Safety Review Services (TSR)

Safety Review Services (2/2)

Review Basis

Conduct of Safety Review Services

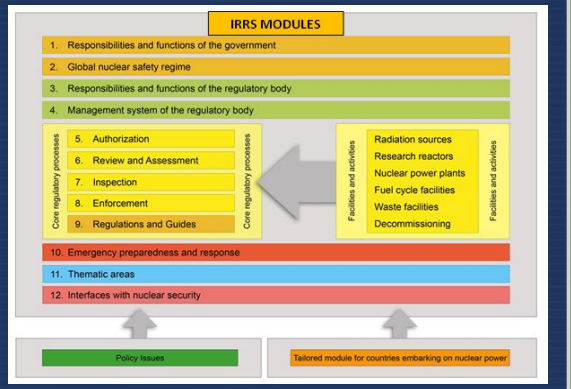
- IAEA safety standards form the basis
- Open and transparent
- Lead by IAEA staff and international experts

Benefits of Safety Review Services

- Improvement in regulation of nuclear installations and in their operational safety
  - ✓ Sharing knowledge and good practices
  - ✓ Disseminating lessons learned from the Fukushima-Daiichi accident
  - ✓ Providing opportunities for improvements
- Impact on governments, regulators and operators

Integrated Regulatory Review Service (1/3)

Main Facts



Key objectives

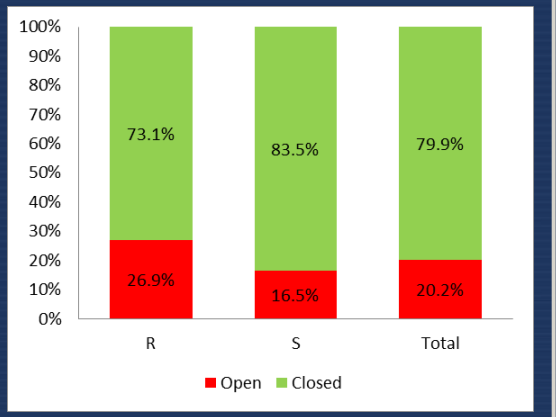
- Strengthen and enhance the effectiveness of national regulatory infrastructure for nuclear, radiation, radioactive waste and transport safety and the security of radioactive sources
- Assess the status of national regulatory infrastructure against IAEA safety standards.
- Enhance nuclear and radiation safety and regulatory effectiveness

Main scope

- All regulated nuclear facilities and activities

Integrated Regulatory Review Service (2/3)

Key Findings



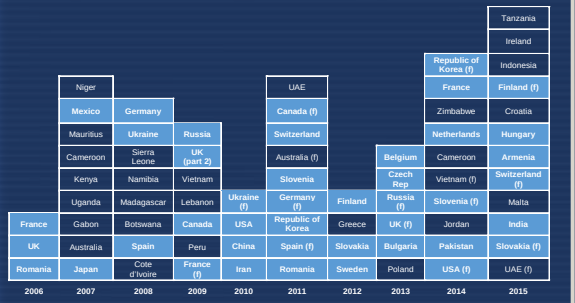
Missions in Member Sates with Nuclear Installations

	Member States	Missions
Initial Missions	36	39
Follow-up Missions	17	17
Total Missions		56

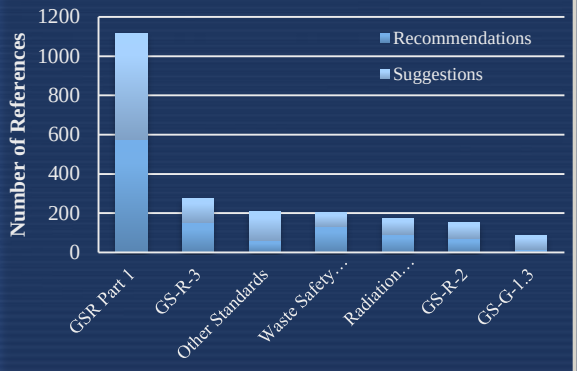
- 30 Member State with operating NPPs
  - 27 hosted an initial mission
    - 1 has not requested an initial mission (Brazil)
    - 1 is preparing to request an initial mission (Argentina)
    - 1 will have the initial mission in December 2016 (South Africa)
  - 16 hosted a follow-up mission
    - 2 have not requested a follow-up mission in the recommended 4 year period (Mexico, Iran)
- Mission Reports' confidentiality
  - All derestricted
- High level of implementation of findings
  - Difficulties in addressing those directed to the Government

Integrated Regulatory Review Service (3/3)

General Observations



IRRS Missions from 2006 to 2015



Safety achievements

- Regulatory Body's independence
- Clarification of Regulatory Body authority, role and responsibilities
- Regulations and regulatory guidance
- Regulatory Body management system, including better procedures and training

Opportunities for further improvements

- National policies and strategies for safety
- Development of regulations and guides
- Procedures and guidance for authorization, review and assessment

Summary

Safety Challenges

- Effective and transparent regulatory framework
  - Independence
  - Sufficient authority and competency
- Nuclear accident knows no borders
  - Participation in Global Nuclear Safety Framework
- Risk of nuclear accident is very low but real
  - Improve protection against external events
  - Enhance accident mitigation and emergency preparedness measures

Public acceptance

- Effective communication and dissemination of information
- Public understanding of all aspects of nuclear energy


thank you
MAKING NUCLEAR POWER
SAFER
The IAEA Action Plan