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Global Nuclear Safety Framework

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GLOBAL NUCLEAR SAFETY FRAMEWORK

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Changing World and International Challenges

- Ensuring that plans for nuclear programme development sometimes do not move faster than the establishment of the necessary safety infrastructure and capacity
- Public concern regarding nuclear safety, spent fuel and radioactive waste
- Ageing management and regulatory oversight of nuclear installations is essential
- Maintaining highest possible conditions for safety, security and emergency response for all stages of facilities and activities
- Reinforcement of the global safety framework following the Fukushima Daiichi accident

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Global Nuclear Safety Framework

- Institutional, legal and technical framework to insure a high level of safety worldwide
- National key players: regulator, industry, technical organizations, stakeholders
- International key players: intergovernmental organizations, international industry, multinational networks, NGO

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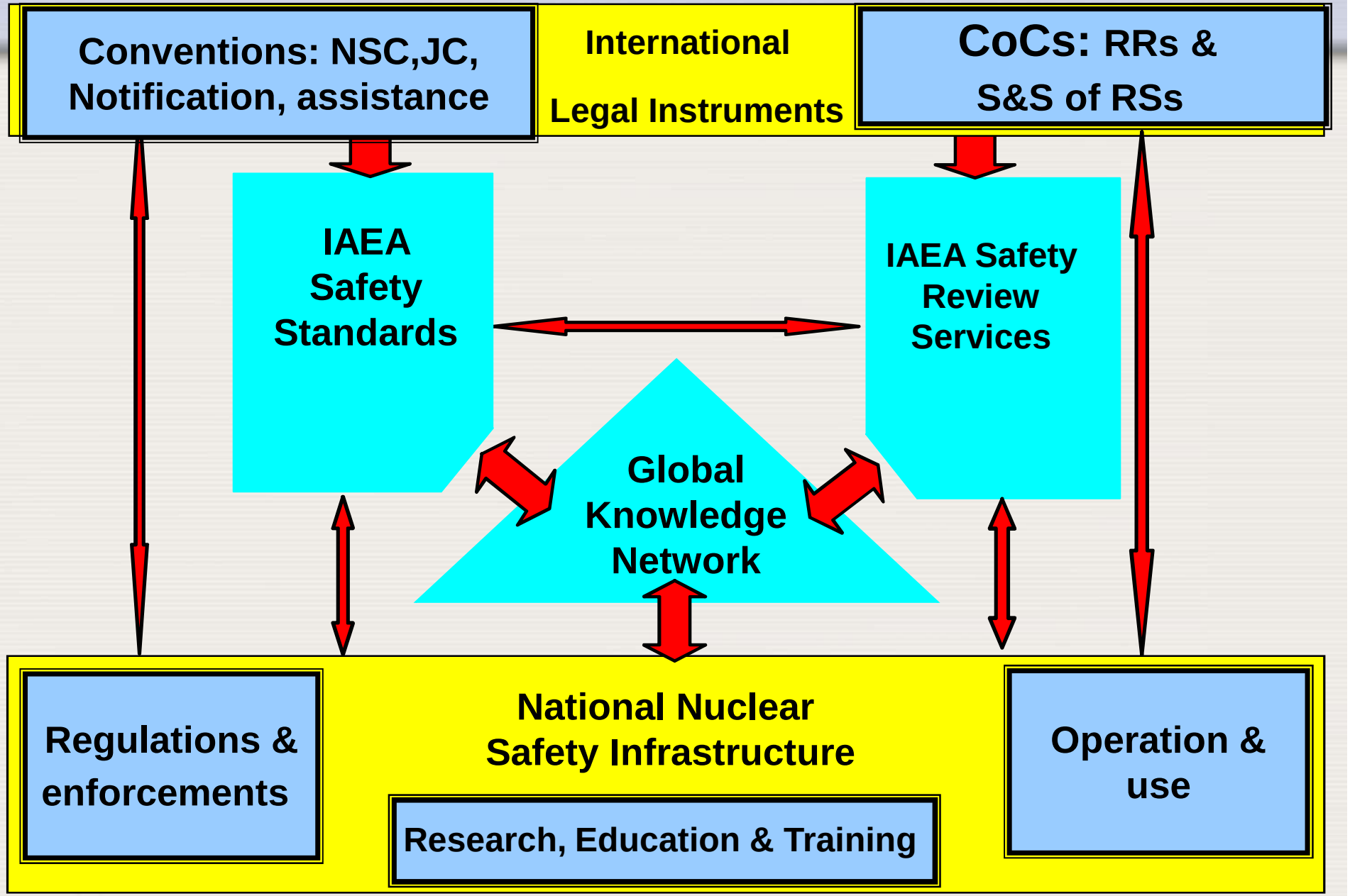
Global Nuclear Safety Framework



INTERNATIONAL INSTRUMENTS

Existing Conventions

- Convention on Nuclear Safety
- Convention on Spent Fuel and Radioactive Waste Management ("Joint Convention")
- Convention on Early Notification
- Convention on Emergency Assistance

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INTERNATIONAL INSTRUMENTS

Codes of Conduct

- Code of conduct on the Safety of Research Rectors
- Code of Conduct for the Safety and Security of Radioactive Sources

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Convention on Nuclear Safety

- The Convention on Nuclear Safety was adopted in Vienna on 17 June 1994
- The Convention was drawn up during a series of expert level meetings from 1992 to 1994 and was the result of considerable work by Governments, national nuclear safety authorities and the Agency's Secretariat
- The Convention entered into force on 24 October 1996
- The Convention is a legally binding instrument

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Convention on Nuclear Safety

There are 72 Contracting Parties (CP) to the Convention and 11 Signatory States that have not yet ratified the Convention.

- All but one countries with operating nuclear power plants are now parties to the Convention!
- So far there have been 5 Review Meetings (1999, 2002, 2005, 2008 and 2011)
- The 6th Review Meeting will take place 24 March - 3 April 2014 but their will be an extraordinary meeting from 27 to 31 August 2012

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Convention on Nuclear Safety

The objectives of this Convention are:

- to achieve and maintain a high level of nuclear safety worldwide through the enhancement of national measures and international cooperation including, where appropriate, safety related technical co-operation;
- to establish and maintain effective defences in nuclear installations against potential radiological hazards in order to protect individuals, society and the environment from harmful effects of ionizing radiation from such installations;
- to prevent accidents with radiological consequences and to mitigate such consequences should they occur

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Convention on Nuclear Safety

For the purpose of this Convention the following definitions apply:

- "nuclear installation" means for each Contracting Party any land-based civil nuclear power plant under its jurisdiction including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of the nuclear power plant.

  Such a plant ceases to be a nuclear installation when all nuclear fuel elements have been removed permanently from the reactor core and have been stored safely in accordance with approved procedures, and a decommissioning programme has been agreed to by the regulatory body

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Convention on Nuclear Safety

- Any sovereign State may become a Contracting Party; membership of the IAEA is not mandatory.

- In addition, regional organizations of integration or other nature may become a Contracting Party, provided that any such organization is constituted by sovereign states and has competence in respect of the negotiation, conclusion and application of international agreements in matters covered by this Convention. Such an organization shall not hold any vote additional to those of its Member States.

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Convention on Nuclear Safety

- Its aim is to legally commit participating States operating land-based nuclear power plants to main-tain a high level of safety by setting international benchmarks to which States would subscribe

- The Convention is an incentive instrument.

- It is not designed to ensure fulfilment of obligations by Parties through control and sanction but is based on their common interest to achieve higher levels of safety which will be developed and promoted through regular meetings of the Parties

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Convention on Nuclear Safety - Preamble

- "…responsibility for safety rests with the State having jurisdiction over a nuclear installation.."
- "…this convention entails a commitment to the application of fundamental safety principles for nuclear installations rather than detailed safety standards and that there are internationally formulated safety guidelines which are updated from time to time and so can provide guidance on contemporary means of achieving a high level of safety.."

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Convention on Nuclear Safety - Scope

- The Convention applies to “the safety of nuclear installations”
- “nuclear installation” means any land based civil nuclear power plant…including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of a nuclear power plant; until,
- a plant is no longer a “nuclear installation” when all nuclear fuel elements have been removed permanently from the reactor core and have been stored safely in accordance with approved procedures, and a decommissioning programme has been agreed to by the regulatory body

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Convention on Nuclear Safety - Obligations of Contracting Parties

Implementing measures

- Each Contracting Party shall:
  - take legislative, regulatory and administrative measures and other steps necessary to implement its obligations..;
- Reporting
- Each Contracting Party shall:
  - submit for review a report on the measures it has taken to implement each of the obligations of..;

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Convention on Nuclear Safety - Obligations of Contracting Parties

Existing Nuclear Installations

- Each Contracting Party shall:
  - ensure that the safety of nuclear installations is reviewed as soon as possible..;
  - ensure that all reasonably practical improvements are made to upgrade the safety of the nuclear installation..;
  - shut down the nuclear installation as soon as practically possible, if such upgrading cannot be achieved..;

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Legislation and regulation

- Legislative and regulatory framework
  - Establisment of safety requirements and regulations
  - System of licensing for nuclear installations
  - Regulatory inspection and assessment
  - Enforcement of regulations and terms of licences
- Regulatory body with authority, competence and financial and human resources as well as with effective separation from promotion or utilization functions
- Operator's prime responsibility for safety

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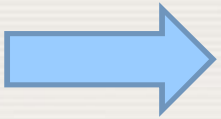
General safety consideration

- Priority to safety
- Financial and human resources
- Human factors
- Quality assurance
- Assessment and verification of safety
- Radiation protection
- Emergency preparedness



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Priority to safety

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

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Financial and human resources

Each Contracting Party shall take the appropriate steps to ensure that

- adequate financial resources are available to support the safety of each nuclear installation throughout its life
- sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety-related activities for each nuclear installation, throughout its life

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Human factors and Quality assurance

Each Contracting Party shall take the appropriate steps to ensure that

- the capabilities and limitations of human performance are taken into account throughout the life of a nuclear installation
- quality assurance programmes are established and implemented with a view to providing confidence that specified requirements for all activities important to nuclear safety are satisfied throughout the life of a nuclear installation

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Assessment and verification of safety

Each Contracting Party shall take the appropriate steps to ensure that

- comprehensive and systematic safety assessments are carried out before the construction and commissioning and throughout the facility life. Such assesments shall be well documented, updated in the light of operating experience and significant safety information and reviewed by the RB.
- verification by analysis, surveillance, testing and inspection is carried out to ensure accordance with design, safety requirements and operational limits and conditions.

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Safety of installation

- Siting: evaluating the effect of environment to NPP and the effect of NPP to environment
  - consulting other Contracting Parties in the vicinity of the facility and providing the necessary information to them for their own safety assesment of the safety impact on their own territory of the facility

- Design and construction: use of defence in depth and proven technology
  - design allows reliable, stable and easily manageable operation, including human factors and man-machine interface

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Safety of installation

Operation:

- Initial authorization and commissioning
- Operational limits and conditions
- Procedures for operations, etc.
- Emergency operating procedures
- Engineering and technical support
- Incident reporting
- Operating experience feedback
- Waste and spent fuel management at site

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Convention on Nuclear Safety

- The Convention is supported by three guidelines that are intended to be read in conjunction with the text of the Convention
  - *Guidelines regarding the Review Process under the Convention on Nuclear Safety INFCIRC/571 (*gives guidance on how the review process is best managed)
  - *Guidelines regarding National Reports under the Convention on Nuclear Safety INFCIRC/572 (*describes what should be contained in the national reports that have to be prepared by each CP for review by the other CP at the RMs)
  - *Rules of Procedure and Financial Rules INFCIRC/573 (*sets out the rules of procedure and financial rules for the review process under the CNS in general)

These documents can be modified, by consensus, by the CPs at their meetings.

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The Heart of the CNS is the Peer Review Process

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Convention on Nuclear Safety

- The Convention obliges Contracting Parties to submit reports on the implementation of their obligations for "peer review" at meetings of the Parties to be held at the IAEA.

- This mechanism is the main innovative and dynamic element of the Convention.
- Peer Review Process includes:
  - National Report
  - Questions and Answers
  - Organizational and Review Meeting
  - A commitment to a continuous learning and improving process, a key element of a strong safety culture

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Convention on Nuclear Safety

Being a Contracting Party to the CNS implies to enter into the following essential commitments:

- To prepare a National Report on the entire national nuclear safety regime. That was new and also of great importance to improving nuclear safety

  ⇒ The very first National Reports gave a comprehensive status quo on the “nuclear situation” in each country by addressing the issues of the articles of the CNS.

  ⇒ The subsequent Reports were built on the previous ones

  ⇒ A self-assessment of steps and measures already taken, in progress and future activities to enhance nuclear safety had to be included in the report

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Convention on Nuclear Safety

- Taking an active part in an open and transparent review of its National Report and the Reports of other CPs (i.e. questions and answers)

  $\Rightarrow$ Presentation and “defending” of the activities reported to the assembled CPs during the RM

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Convention on Nuclear Safety

- The challenge for the next decade is to reinforce the Convention, to avoid complacency but move the focus on safety to the next plateau

  $\Rightarrow$ Priorities being given to promoting effective Safety Management Systems and effective use of the IAEA Safety Standards

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Fukushima Related Activities

5th RM was the first major international nuclear safety meeting after the events at Fukushima.

Actions:

- **Prior to the 5th RM**
- **During the 5th RM**
- **After the 5th RM**

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Actions Prior to the 5th Review Meeting

The President of 5th RM requested the following **9 topics regarding Fukushima accident be addressed** in the RM, as far as possible, in the Country Group presentations:

- NPP design against external events;
- Offsite response to emergency situations (e.g. station blackout);
- Emergency management actions and preparedness following worst case accident scenarios;
- Safety consideration for operation of multi units at the same NPP site;
- Cooling of spent fuel storage in severe accident scenarios;
- Training of NPP operators for severe accident scenarios;
- Radiological monitoring following NPP accident involving radiological releases;
- Public protection emergency actions;
- Communications in emergency situations.

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Actions during the 5th Review Meeting

- The issue was discussed within **Country Group sessions;**
- **Open Ended Working Group (OEWG)** prepared a consensus statement of the CPs on the Fukushima Daiichi accident;
- **Side event,** opened to all Member States to discuss the accident, was held.

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Actions during the 5th Review Meeting (cont'd)

Country Groups

- **9 topics** and **several others** concerning **accident mitigation** were discussed to varying degrees in the CGs, based on available information. The **importance of provisions and procedures** to cope with **severe accidents** was confirmed (e.g. several CPs reported that they have hydrogen mitigation, additional backup emergency power supply systems and residual heat removal means installed in their plants or are in the process of doing so).
- Many CPs reported on their **plans and initial actions** based on the available information from Japan.
- Several CPs started immediately to **assess the implications for their facilities** with the information that is currently available. A range of early actions were reported to **re-examine the safety margins** for NPPs when subjected to **extreme external events** and any resultant **postulated severe accidents.**
- Many Contracting Parties reported **difficulties to provide the media and the public** with **prompt and reliable information**.

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Actions during the 5th Review Meeting (cont'd)

OEWG

- CPs should make a **statement for general public** in response to Fukushima Daiichi accident.
- **Statement** includes:
  - condolences to the Japanese people;
  - reaffirming of the objectives of the CNS;
  - commitment to draw and act on the lessons learned;
  - support for the IAEA's continuing role, specifically noting the Ministerial Conference in June 2011;
  - commitment to hold dedicated meeting in 2012 on the Fukushima accident.
- Statement included in **Summary Report** of 5th RM -- CNS public webpage.

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Actions after the 5th Review Meeting

Extraordinary Meeting on Fukushima Daiichi Accident in August 2012

- Aim of the Meeting:
  - To **enhance safety** through reviewing and sharing lessons learned and actions taken by CPs in response to Fukushima Accident;
  - To **review the effectiveness** and, if necessary, the continued **suitability** of the provisions of the CNS.

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Actions after the 5th Review Meeting (cont'd)

2012 Extraordinary Meeting (ExOM)

- ExOM will be conducted as a **focused Review Meeting** limited to 5 days.
- All **Officers** of the 5th Review Meeting **will serve** in their current capacity for this Extraordinary Meeting, utilizing the **same Country Groups.**
- Not later than **three months prior to the Meeting,** all Contracting Parties will submit a short and concise **National Report** to the Secretariat via the CNS secured website for peer review by other CPs.

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Matters Arising during the RM

Regulatory Framework

- Concerns regarding the **human and financial resources** available to recruit and train staff
- Ongoing work for establishment of legislation that provides **de jure independence** of the regulatory body
- Challenges of providing regulatory **assessment of new designs and oversight of construction and commissioning** of NPPs
- **Harmonization** of CPs' **national safety standards with** the **IAEA** Safety Standards
- Assessment of **digital I&C** and the need to **exchange knowledge and experience** among regulators

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Matters Arising during the RM (cont'd)

Nuclear Power Plant Designs

- Some CPs have focused on ensuring that NPP **design information and the necessary technical expertise retained in the country** for both domestic and non-domestic suppliers of NPPs.

Peer Reviews

- Many CPs conducted or are requesting peer reviews under the IAEA **IRRS**. **EU** CPs have intention to **invite IRRS** missions in fulfilment of an obligation for periodic peer reviews under the **European Nuclear Safety Directive**
- Extensive use of **reviews by peers** from **independent organizations and experts.**

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Matters Arising during the RM (cont'd)

Transparency and Communication

PSR and Long Term Operation

Siting

- Issues related to **consulting CPs in the vicinity** of a **proposed NP** – on the provisions of necessary information upon their request.
- With many CPs planning new nuclear power plants, there is a **need to review the adequacy** of **site selection requirements according to IAEA safety standards**, as appropriate. In particular, CPs should better take into account **natural disasters**.

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Matters Arising during the RM (cont'd)

Countries Embarking on Nuclear Power Plant Programmes

- In particular, the importance of **strong early governmental support** was emphasized in connection with the establishment of the regulatory body.

Emergency Preparedness and Response

- Multilateral and bilateral **agreements and coordination of emergency preparedness measures** with neighbouring countries.
- Some CPs proposed to **harmonize** the approach for **decision making in emergency** situations, including with their neighbours.

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Matters Arising during the RM (cont'd)

Operating Experience

- Many CPs considered the use of **operational feedback** as a **key issue for** maintaining **nuclear safety**.
- Many CPs conducted or are requesting **peer reviews of operational safety** at their operating NPPs such as **OSART** as well as those conducted by other organizations.

Human and Organizational Factors

- General agreement on the nuclear safety **importance of continuing to promote an effective safety culture**, including human and organizational factors.

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6th Review Meeting of CPs to CNS

24 March – 3 April 2014

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Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

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The Joint Convention is….

- A legally binding agreement between Contracting Parties
- The first international binding legislation in the area of safety of spent fuel and radioactive waste management
- Based on the IAEA Safety Fundamentals for RWM (1995)
- An “Incentive” convention
- A “sister” convention of the Nuclear Safety Convention

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Objectives of the Joint Convention

- To achieve and maintain a high degree of safety worldwide in spent fuel and radioactive waste management,
- To ensure that there are effective defences against potential hazards so that individuals, society and the environment are protected now and in the future
- To prevent accidents and mitigate their consequences should they occur

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Contracting Parties commit …

- To prepare and submit a National Report for peer review by other Contracting Parties,
- To respond to the written questions submitted by other Contracting Parties;
- To attend the meetings of Contracting Parties;
- To participate actively in the review process in order to allow other Contracting Parties to discuss the Report and seek clarification.

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Joint Convention

- Radioactive waste should be disposed of in the State in which it was generated whilst recognizing that safe and efficient management might be fostered through agreements among Contracting Parties
- Any state has the right to ban import of foreign spent fuel and radioactive waste
- Importance of informing the public on the issue
- Application of relevant safety standards
- Strengthening the international control system

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Joint Convention

- Scope
  - safety of spent fuel management excluding off-site transportation
  - safety of radioactive waste management excluding off-site transportation
  - discharges

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Joint Convention

General safety requirements

- Each Contracting Party shall take appropriate steps to ensure that individuals, society and the environment are adequately protected against radiological hazards
- Safety aspects are continuously taken into account

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Joint Convention

General safety provisions

- Each Contracting Party shall take legislative, regulatory and administrative measures and other steps necessary to implement its obligations
- Regulatory body should have adequate authority, competence and financial and human resources to fulfill its assigned responsibilities and have effective independence from other functions
- Prime responsibility rests with the holder of the licence or with Contracting Party if there is no license holder

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IAEA Ministerial Conference on Nuclear Safety
Vienna, 20-24 June 2011

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Ministerial Declaration

25 Points:

- Sympathy and solidarity with Japan
- IAEA Safety Standards
- Responsibility of Member States
- Central role of IAEA in promoting international cooperation
- Need for comprehensive assessment of Fukushima accident
- Importance of IAEA International Peer Reviews
- Need for comprehensive risk and safety assessment of all NPPs

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Ministerial Declaration cont.

Need to strengthen regulatory authorities

- **Importance of international instruments (Conventions)**
- **Importance of information sharing and dissemination**
- **Importance of Emergency Preparedness and Response**
- **Need for capacity building**
- **Need for safety infrastructure for embarking countries**
- **Need for global nuclear liability regime**
- **DG to prepare the report and Action plan for BoG and GC**

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Ministerial declaration cont.

Safety Standards specific statements:

- **Recognize the efforts of the international community to enhance knowledge in nuclear safety and radiation protection and strengthen international standards in nuclear safety, emergency preparedness and response and radiation protection of people and the environment and the need to draw the lessons from the accident at the Fukushima Daiichi Nuclear Power Station;**

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Safety Standards specific statements cont.:

- Underline that States with nuclear power programmes have a central role in ensuring the application of the highest standards of nuclear safety;
- Emphasize the importance of implementing enhanced national and international measures to ensure that the highest and most robust levels of nuclear safety are in place, based on IAEA safety standards, which should be continuously reviewed, strengthened and implemented as broadly and effectively as possible and commit to increase bilateral, regional and international cooperation to that effect;

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Safety Standards specific Statements cont.:

- Stress the need to receive from Japan and the IAEA a comprehensive and fully transparent assessment of the Fukushima Daiichi NPS accident in order for the international community to be able to draw and act upon the lessons learned, including a review of IAEA safety standards that are relevant to the accident, in particular those pertaining to multiple severe hazards;
- Underline the need for States planning to embark on a nuclear power programme to create an appropriate nuclear safety infrastructure based on IAEA safety standards and relevant guidance and assistance, using, among others, effective IAEA technical cooperation mechanisms for supporting the safe and secure use of nuclear technologies;

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DG Introductory Statement

- We need to strengthen IAEA Safety Standards and to ensure that they are universally applied.
- Safety Standards relevant to the accident, in particular those pertaining multiple severe hazards such as tsunamis and earthquakes should be reviewed.
- Other issues need to be addressed:
  - Prolonged power blackouts, availability of cooling water, cooling of spent fuel under severe accident conditions

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DG Introductory Statement cont.

- DG is asking CSS to review the relevant standards and to report within 12 months, with recommendations for strengthening them
- Implementation is the key. DG urges all MSs to make a firm commitment to apply IAEA Safety Standards in practice

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...Thank you for your attention

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