

NEA Activities to Enhance the Nuclear Regulatory Framework

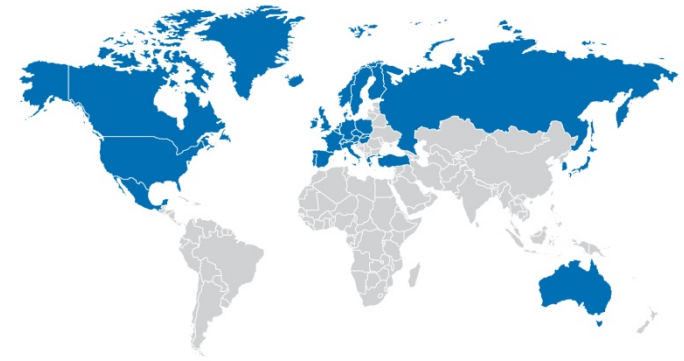
Mr. Luis E. Echávarri
Director-General
OECD Nuclear Energy Agency

OECD/NEA International Conference on Global Nuclear Safety Enhancement
8 April 2014, Tokyo, Japan

Presentation Outline

- Introduction to the NEA
- NEA activities to enhance safety
- NEA report on activities after the Fukushima Daiichi nuclear power plant accident
- Summary

OECD/NEA Membership



- Australia
- Austria
- Belgium
- Canada
- Chile
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Israel
- Italy
- Japan
- Korea
- Luxembourg
- Mexico
- Netherlands
- New Zealand
- Norway
- Poland
- Portugal
- Russia
- Slovak Republic
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey
- United Kingdom
- United States

OECD and NEA member
OECD member, not NEA
NEA member, not OECD

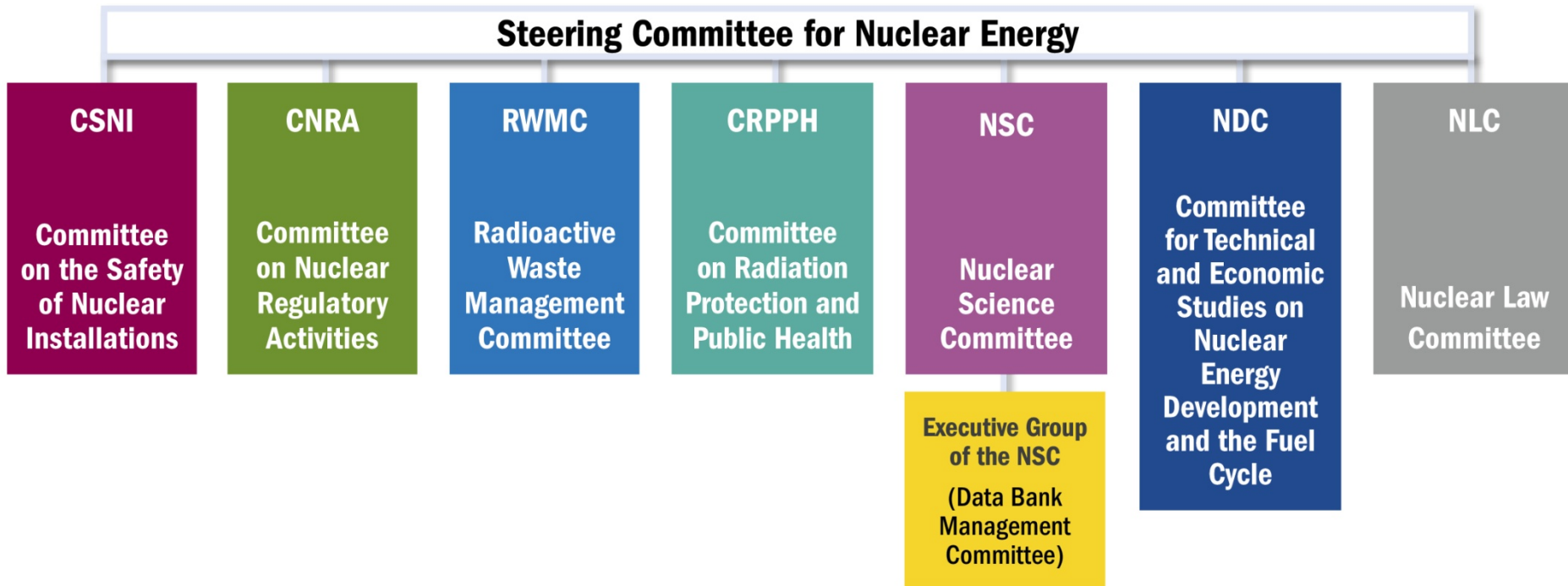


The NEA Mission



- To assist its member countries in maintaining and further developing, through **international co-operation, the scientific, technological and legal bases** required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes.
- To provide authoritative assessments and to forge **common understandings** on key issues, as **input to government decisions on nuclear energy policy**, and to broader OECD policy analyses in areas such as energy and sustainable development.

NEA Committees



Regulatory Activities (1/2)

The CNRA Task Group on Accident Management:

- **Goals:** identify measures that should be considered to enhance the regulations and regulatory guidance for operators' accident management activities.

Defence-in-depth:

- CNRA & CSNI Joint Workshop with industry participation – June 2013 (“Challenges and Enhancements to DiD in Light of the Fukushima Daiichi Accident”).
 - ✓ Concept of DiD is sound, even if improvements to be considered (balance between prevention and mitigation at all levels...);
 - ✓ Further consideration: implementation of the DiD concept to rare external (and internal) events, including in combination.

Regulatory Activities (2/2)

Crisis Communication (WGPC – Public Communication):

- **Goals:** expanding previous work (include international elements of crisis communication) and taking into account the experience gained in Fukushima.
- **CNRA workshop on Crisis Communication:** “Facing the Challenges” - Madrid - May 2012 (regulatory authorities, operators and stakeholders).
- **Report:** “Crisis Communication of Nuclear Regulatory Organisations: Towards Global Thinking” (December 2012).
- **Next steps:** workshop with stakeholders (Paris, 9 April 2014).

Safety Activities (1/2)

- **Technical Opinion Paper on Filtered Containment Venting:**
 - ✓ **Output:** a comprehensive summary of the current status of technology and venting strategies as well as developments required for possible improvements to filtration technologies.
- **Status Report on Hydrogen Generation, Transport and Management:**
 - ✓ **Output:** a comprehensive summary of hydrogen risk management technology and strategies.
- **Status Report on Spent Fuel Pools under Loss-of-Cooling Accident Conditions:**
 - ✓ **Output:** a summary of spent fuel pool accident phenomenology and mitigation measures, and a guide for further research activities.
- **Metallic Component Margins under High Seismic Loads (MECOS)**
 - **Output:** a report documenting best practices for the analysis of ageing of passive metallic components subjected to high seismic loads.

Safety Activities (2/2)

- **Human Performance and Intervention under Extreme Conditions:**
 - ✓ **Output:** a summary of human and organisational factors (HOF) challenges during extreme events, good HOF practices and knowledge gaps.
- **Workshop on Natural External Events Including Earthquakes:**
 - ✓ **Output:** a report on commendable practices and experience gathered on PSA methodologies for natural external events.
- **Workshop on the Robustness of Electrical Systems of NPPs in Light of the Fukushima Daiichi Accident:**
 - ✓ **Output:** a report describing the technical basis of the provisions already taken or planned in each country regarding the electrical sources, the distribution systems and the loads.
- **International benchmarking project on fast-running software tools for the estimation of fission product releases during accidents at nuclear power plants:**
 - ✓ **Output:** a state-of-the-art report for simple tools to estimate fission product releases, including areas for improvement.

Safety Research Activities ^(1/2)

- Resolve issues relevant for the nuclear community by means of research shared by many countries.
- Enhance technical exchange, co-operation and consensus-building internationally.
- Support the continued operation of unique test facilities which are of value to the OECD/NEA nuclear community.
- Help to retain OECD/NEA technical expertise and infrastructure in strategic fields of nuclear energy.
- Facilitate the above by means of cost-sharing arrangements where many countries contribute to programme funding.

Safety Research Activities (2/2)

- **Ongoing joint research projects** addressing issues from the accident to varying degrees, plus creation of an **expert group** on severe accidents, materials and other disciplines, to identify what **data** could be obtained **from the decommissioning** process at Fukushima Daiichi of use for **new safety research projects**.
- New project initiated following the proposal from Japan to improve severe accident codes and to determine the evolution of the accident at the three units: **BSAF - Benchmark Study of the Accident at the Fukushima Daiichi Nuclear Power Station**.
 - ✓ **Output:** Phase I will be a full-scope severe accident analysis for the first ~6 days of the accident scenario. Modelling results from Phase I will inform decommissioning processes and measurements, which in turn provide data for further phases of modelling and for improving severe accident codes and analysis.

Fukushima-related Research Activities

- **HYMERES: Hydrogen Mitigation Experiments for Reactor Safety**
✓ Hosted by Switzerland and France (PANDA/MISTRA).
- **BSAF: Benchmark Study of the Accident at the Fukushima Daiichi Nuclear Power Station**
✓ Eight countries participating. Hosted by Japan.
- **ATLAS: Beyond-design-basis accidents**
✓ Hosted by the Republic of Korea.
- **PKL-3: Accident management for PWRs**
✓ Hosted by Germany.

Radiological Protection Activities

- Criteria for international trade in food and goods.
- Policies on returning to evacuated areas, clean-up and waste management.
- Workshops on decontamination and stakeholder involvement.
- Emergency management communications and ICRP recommendations.
- Collecting information on management of occupational exposure in high radiation areas.

Liability and Compensation

- The Nuclear Law Committee (NLC) has received extensive presentations from Japanese experts on Japan's implementation of its liability and compensation regime after the Fukushima Daiichi nuclear power plant accident.
- NEA Legal Affairs in co-operation with the Japanese Mission to the OECD published a report in 2012 on *Japan's Compensation System for Nuclear Damage*, which included relevant legal texts and commentary from Japanese experts.
- Although Japan is not currently a member of one of the international conventions, Japan's legislation mirrors international norms, e.g. strict liability, exclusive liability (legal channeling) and compulsory financial security.
- The Japanese experience provides lessons and good practices, e.g. in claims handling and establishing guidance for compensation payments.

Multinational Design Evaluation Programme (MDEP) members

Regulatory authorities of:

Full members:



Canada



China



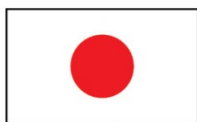
Finland



France



India



Japan



Republic of Korea



Russian Federation



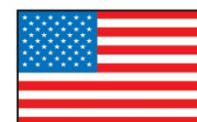
South Africa



Sweden



United Kingdom



United States

Associate members:



Turkey

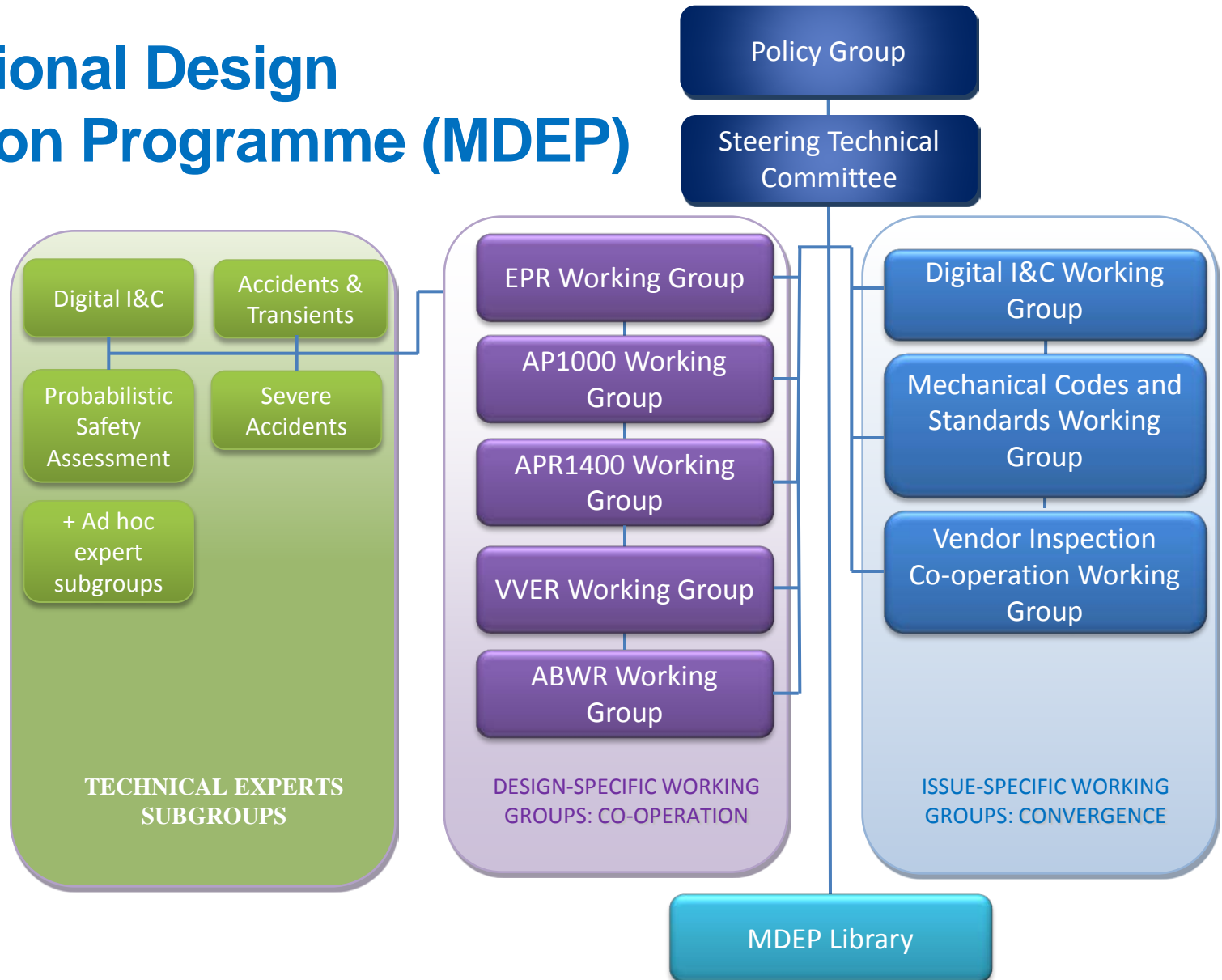


United Arab Emirates

- **NEA Technical Secretariat**

IAEA participation in generic activities.

Multinational Design Evaluation Programme (MDEP)

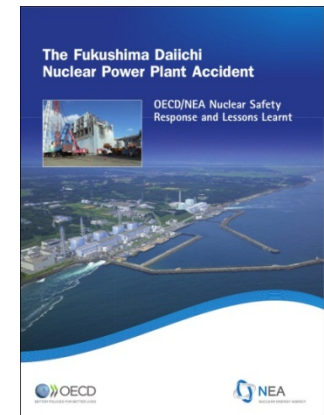


Key Messages about MDEP

- MDEP is a key programme for new build activities, pooling an effective and efficient expert network from different countries.
- MDEP is a mid- and long-term programme, but short-term concrete results are necessary.
- Significant progress is being made: joint inspections and common protocol, common positions, convergence of mechanical codes, sharing design review activities, commissioning programmes, digital I&C.
- Convergence of regulatory practices will in time lead to convergence of regulatory requirements.
- MDEP is ensuring information dissemination.

The Fukushima Daiichi Nuclear Power Plant Accident: OECD/NEA Nuclear Safety Response and Lessons Learnt

- Executive Summary
- Introduction
- Immediate response by NEA member countries
- NEA initial considerations and approach
- NEA actions in follow-up to the Fukushima Daiichi accident
- Direct support to Japan by the NEA
- Key messages
- Conclusions



Report Content - Members' Immediate Response

- All NEA member countries took early action.
 - ✓ No technical basis for requiring the currently operating plants to shut down (except in Japan).
- All countries with nuclear facilities carried out **targeted comprehensive safety reviews or “stress tests”** addressing:
 - ✓ Extreme external events (i.e. earthquakes and flooding hazards);
 - ✓ Loss of safety functions caused by long-term loss of electrical power and/or loss of cooling water supplies;
 - ✓ Accident management and defence-in-depth;
 - ✓ Emergency preparedness and radiological protection;
 - ✓ Post-accident recovery and clean-up;
 - ✓ Crisis communication;
 - ✓ Regulatory infrastructure;
 - ✓ Bilateral and regional collaboration.
- Safety reviews identified **safety enhancements**.

Key Messages from the Report

- Assurance of safety
- Shared responsibilities
- Human and organisational factors
- Defence-in-depth (DiD)
- Stakeholder engagement
- Crisis communication
- International aspects of emergency preparedness
- Trade and transportation issues
- Research and development
- International co-operation and NEA contribution

Conclusions from the Report

- After focused safety reviews, the current safety level is sufficient and **no immediate shutdown is required**, but need to increase robustness to face extreme situations **beyond existing safety margins**.
- **Operators** have the **prime responsibility for safety**. **Regulatory authorities** play a **fundamental role** in ensuring such compliance.
- **Since a severe accident can never be completely ruled out**, the necessary provisions for dealing with and managing an emergency situation (**onsite and offsite**) must be planned, tested and regularly reviewed.
- The accident identified **significant human, organisational and cultural challenges** (including to ensure independence, technical capability and transparency of the regulatory authority).

Summary

- The NEA continues to support its member countries in enhancing the technical basis for the **safe and economic use** of nuclear power.
- The safety committees have initiated activities after the Fukushima Daiichi accident to **further improve power plant safety and the regulatory framework**.
- The NEA committees continue to play a leading role in performing and further developing **safety research projects**.
- The NEA safety committees provide **a framework to assist member countries** in the resolution of safety challenges related to the accident, and to strengthen confidence in the solutions and their implementation.
- The NEA is interacting very closely with Japanese institutions to co-operate and benefit from the **broad research programme** related to the **Fukushima Daiichi decommissioning** plan.

Thank you for your attention

OECD Nuclear Energy Agency
www.oecd-neo.org

