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Swedish Radiation Safety Authority

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# Opportunities and limits of enhanced co-operation from MDEP experience

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# MDEP Basics

## What is MDEP? And why…

A unique multinational initiative undertaken by national regulatory authorities of 14 countries to:

- Co-operate and share information on safety design reviews of specific designs in order to ensure a greater safety focus on the reviews in each country

  **🡐 New wave of new reactor designs in 2000s : EPR, AP1000… after a long period without new builds + new challenges on issues such as digital I&C**

- Share information about national and international regulatory requirements and practices in order to explore opportunities for possible harmonisation or convergence of such requirements when safety enhancements may be realised

  **🡐 Opportunity for better understanding. Prior to MDEP, reviewing new designs was not the priority for cooperation**

**MDEP expects that higher levels of safety will be achieved in the design and operation of new reactors *(STC position)***

# MDEP Basics

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## Who is involved in MDEP activities? Regulators

- Canada
- China
- Finland
- France
- Japan
- Republic of Korea
- Russian Federation
- South Africa
- U.K.
- U.S.A

**Since MDEP inception in 2006**

- India - Joined in 2012
- United Arab Emirates - Joined in 2012 as an associate member
- Sweden - Joined in 2013
- Turkey - Joined in 2013 as an associate member

- NEA: technical secretariat
- IAEA: takes part in generic activities
- National technical support organisations participate if requested by the national regulatory authority.

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# MDEP Structure

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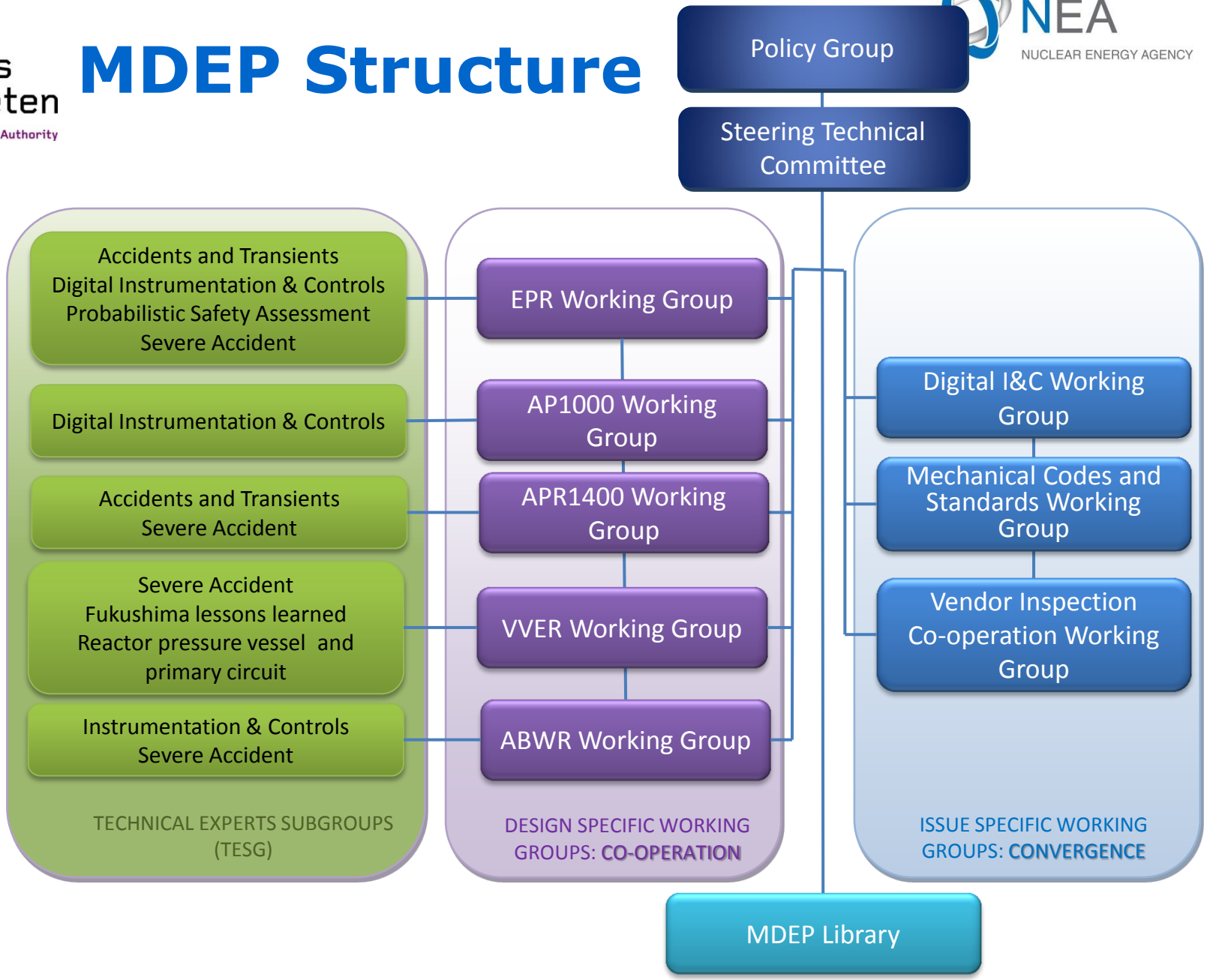

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# Policy Group and STC latest developments/activities

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- 2015 Milestone to assess the future of MDEP
  - PG will discuss mid and long term MDEP strategies
  - Initiated a data collection as a tool to inform future of MDEP
  - Potential new topics (concrete containment codes, specific regulatory challenges with passive systems, cooperation in new reactors operation stage)
  - Potential completion or transfer of activities of issue-specific WGs
- Membership expansion (new members in 2012, 2013, early consideration for potential new ones)
- Commissioning activities
- To set up a common line of activities among DSWGs
- Discussions with stakeholders
  - Regular meetings of STC with the industry, WNA/CORDEL
  - MDEP Conferences

# Design-Specific Working Groups

- Develop Common Positions
  (EPR Digital I&C design, EPR Fukushima lessons learned, AP1000 squib valves)
- Share issues identified, questions to applicant, and draft safety evaluations
- Identify differences among various country designs + potential for harmonisation
- Identify additional questions for applicants based on MDEP interactions
- Discuss technical topics within TESGs
- Discuss commissioning activities
  (initial test programmes)

# Design-Specific Working Groups

## Common positions related to Fukushima

Consideration of impact of the accident on new designs
Requested by the STC

- **EPR common position**

  Core common position
  + 5 appendices

  Published:
  - Long Term Loss of Electrical Power
  - Management of primary circuit cooling and sub-criticality
  - Pressure management of containment during severe accidents

  To be published mid-2015:
  - Reliability and qualification of severe accident management instrumentation
  - Long-term cooling of the fuel pools

- **AP1000WG – APR1400WG**

  Moving forward following EPRWG template

- **VVERWG** - Formed a TESG

- **ABWRWG**

  Focus on improvements in safety, hazards, etc. Slightly different set than EPRWG

# Design-Specific Working Groups

## EPRWG Common positions related to Fukushima

Core common position

- Relevance of safety objectives for Gen III reactors *(lower probability of core melt, limitation of releases, management of severe accident situations…)*
- Accidents with core melt: *the EPR design benefits from reinforced measures to prevent accident situations such as high pressure core melt, global hydrogen detonations and in-vessel and ex-vessel steam explosions, which would lead to large or early releases. However, cliff-edge effect for AC/DC power ➔ need for reinforcement of provisions for power supply*

Long-Term Loss of Electrical Power (LTLEP) (appendix 1)

- Physical separation, barriers, and design margin ➔ *EPR design appropriately accounts for external and internal events to make the likelihood of an LTLEP extremely low*
- Permanently installed equipment and mobile means to provide multiple layers of defence ➔ *approach acceptable*

# AP1000WG – Technical issues

## Common position on the design and use of explosive -actuated (squib) valves in nuclear power plants (December 2010)

Absence of regulatory experience with valves of this type

- Expectations for design, qualification, procurement and in-service activities (such as examination, inspection, testing and maintenance)

## Design modification following regulatory review

Passive Residual Heat Removal (PRHR) System ➔ condensate recirculation losses

- December 2011: UK ONR GDA questions original condensate return assumption
- Issue assessed by regulators following MDEP discussions
- AP1000 design changes ➔ modifications to gutters returning condensates to IRWST

# Issue-Specific Working Groups

- CSWG
  - Completed comparison of pressure boundary for Class 1 pressure vessels, piping, pumps, and valves in coordination with standards development organisations (SDO)
  - Publication of a set of 4 CSWG technical reports to support codes and standards harmonisation
  - Obtained commitments from SDO to work together to minimise further divergence of code requirements
  - ↳ CORDEL published a harmonisation proposal for certification of NDE personnel ➔ first step
- DICWG
  - Develops common positions (10 published, 2 more from initial programme plan)
  - ↳ Used as basis for
    - harmonised regulatory response to applicants and vendors
    - Harmonisation of standards (IEC, IEEE)

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# Issue-Specific Working Groups

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## ➢ VICWG

- ➢ Performed more than 50 witnessed, joint or multinational inspections
- ➢ Developed inspection protocol for conducting inspections
- ➢ Compares quality assurance requirements used in the oversight of vendors

↳ First multinational inspection (US NRC, UK ONR, FR ASN) in Valinox Nucléaire, France, in 2014

↳ Lessons to be learned to assess benefits for regulators as well as vendors

- ➢ Develops a list of good practices for vendor oversight
- ➢ Experience considered in the regulation for vendor inspection in Japan, Korea and the UK

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# This important work should lead to

## CONVERGENCE

Common positions

Deeper understanding of national practices

However there will be GAPs

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# Key issues in licensing

- Environmental Assessment and licensing processes are clear
- Requirements and guidance for the application are clear
- Applicant provides a high quality application

  And
- The design work is to large extend completed