

NEA/MDEP
Conference on New
Reactor Design
Activities

Paris

10-11 September
2009

WNA CORDEL Group and its Roadmap to greater Standardization of Reactor Designs

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WNA CORDEL WG



WNA CORDEL Working Group

Cooperation in Reactor Design Evaluation and Licensing (CORDEL)

Founded in January 2007

Membership:

Includes all major vendors and many utilities interested in new build.

Chairman: Michael Micklinghoff (E.ON)

Vice Chairman: Francois Bouteille (AREVA NP)

Companies: AREVA NP, Atkins, Atomstroyexport, British Energy, EDF, ENDESA, ENEL, NNEGC Energoatom, E.ON, EXCEL Nuclear Services, GE-Hitachi, Hitachi-GE Nuclear, KHNP, Mitsubishi Heavy Industries, NOK, OPG, Rosenergoatom, RWE Power, TEPCo, TVO, Westinghouse, also FORATOM/ENISS, EUR, EPRI, ISO

CORDEL's agenda: International standardization of reactor designs

International standardization means that each vendor's design can be built by a vendor, and ordered by a utility, in every country without obligatory adaptation to specific national regulations

Standardization will

- help deliver large-scale worldwide new build of nuclear power plants
- bring benefits for safety

Standardization and safety

Fleets of standardized designs offer a broad basis for construction and operation experience feedback

Design improvements could be implemented across the fleet

Risk of a design shortcoming affecting the whole fleet (large scale shutdown) is small due to high probability of early detection of design flaws

Standardized advanced plants will bring additional safety layers for design, construction, operation and decommissioning

Standardization: Industry's role

- Industry's commitment to standardization - definition of utilities' requirements for new reactors (EUR, URD)
- Industry should work together towards common industrial nuclear Codes & Standards, i.e. mechanical codes, I&C.
- Vendors should share existing licence application documents with applicants and regulators
- Owners' Groups to be strengthened in order to facilitate the exchange of operation experience and of design improvements within the fleets and across the fleets
- Operators and vendors to jointly tackle the issue of a Design Authority to maintain design knowledge across the whole life cycle of a nuclear power plant

Existing regulatory/legal situation

Each reactor project needs a licence issued in a specific procedure after full assessment by the competent regulatory body

Licence is issued according to special national licensing procedures, which vary considerably

Licence is based on national safety requirements, which are similar in high-level goals, but vary considerably in details

► **This makes licensing of standardized designs across a range of countries extremely difficult**

Role of Regulators and Governments

- Standardization as such must be delivered by industry...
- ...but industry needs to be enabled to do so by starting new approaches within national and international regulatory frameworks
- Three main targets to tackle the situation presented in the previous slide:
 - **design approvals with international impact**
 - **harmonization of safety requirements**
 - **alignment in licensing procedures**

Potential regulatory hurdles on the way to standardization

Sovereignty of each country's regulator has to be respected

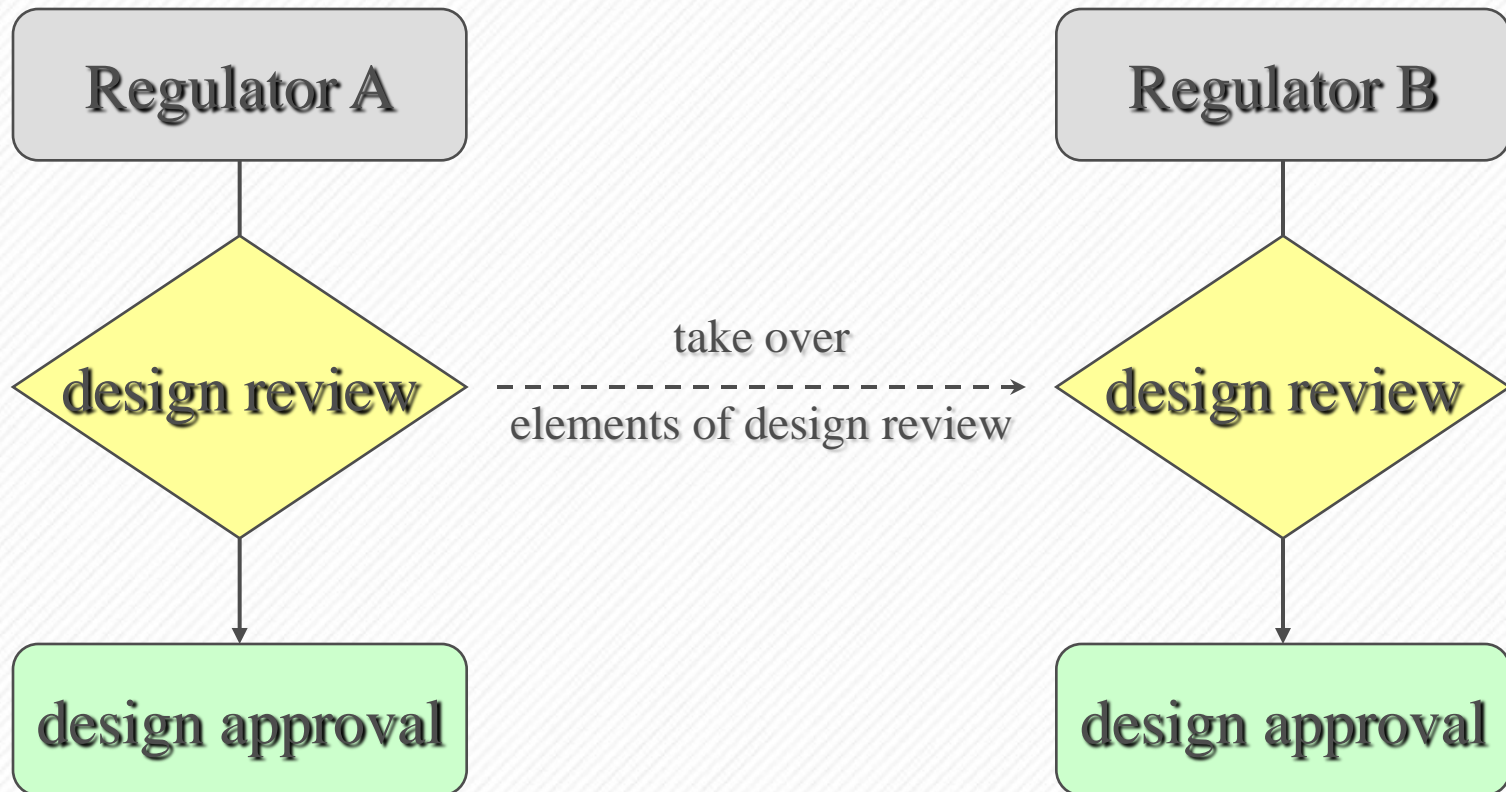
Regulators are bound by law to apply their national safety requirements and licensing procedures

Regulators need to build up knowledge of the design

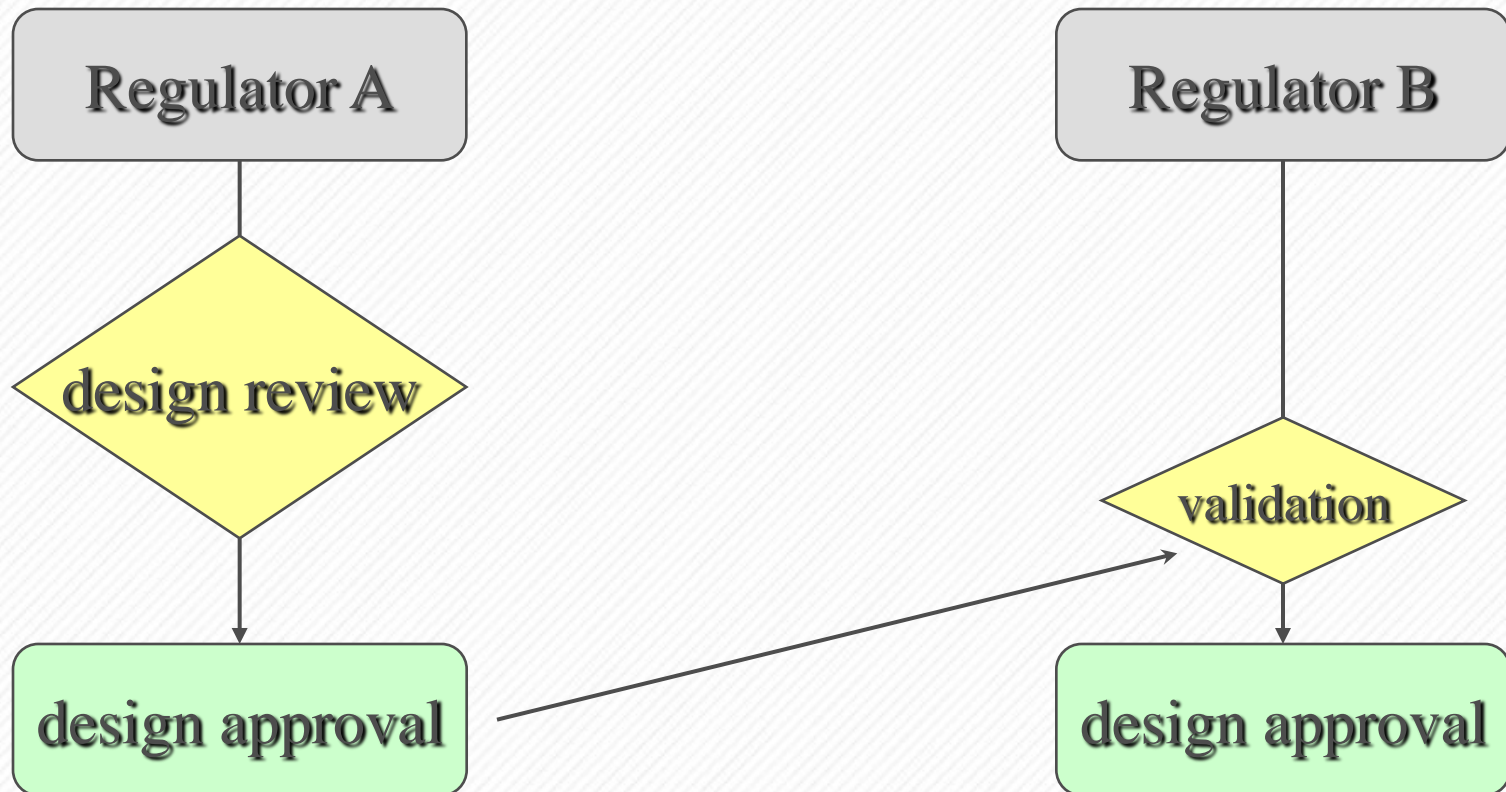
The CORDEL integrated approach: 3 steps towards standardization

CORDEL proposes **3 subsequent steps to overcome these hurdles and to achieve full international standardization** of reactor designs

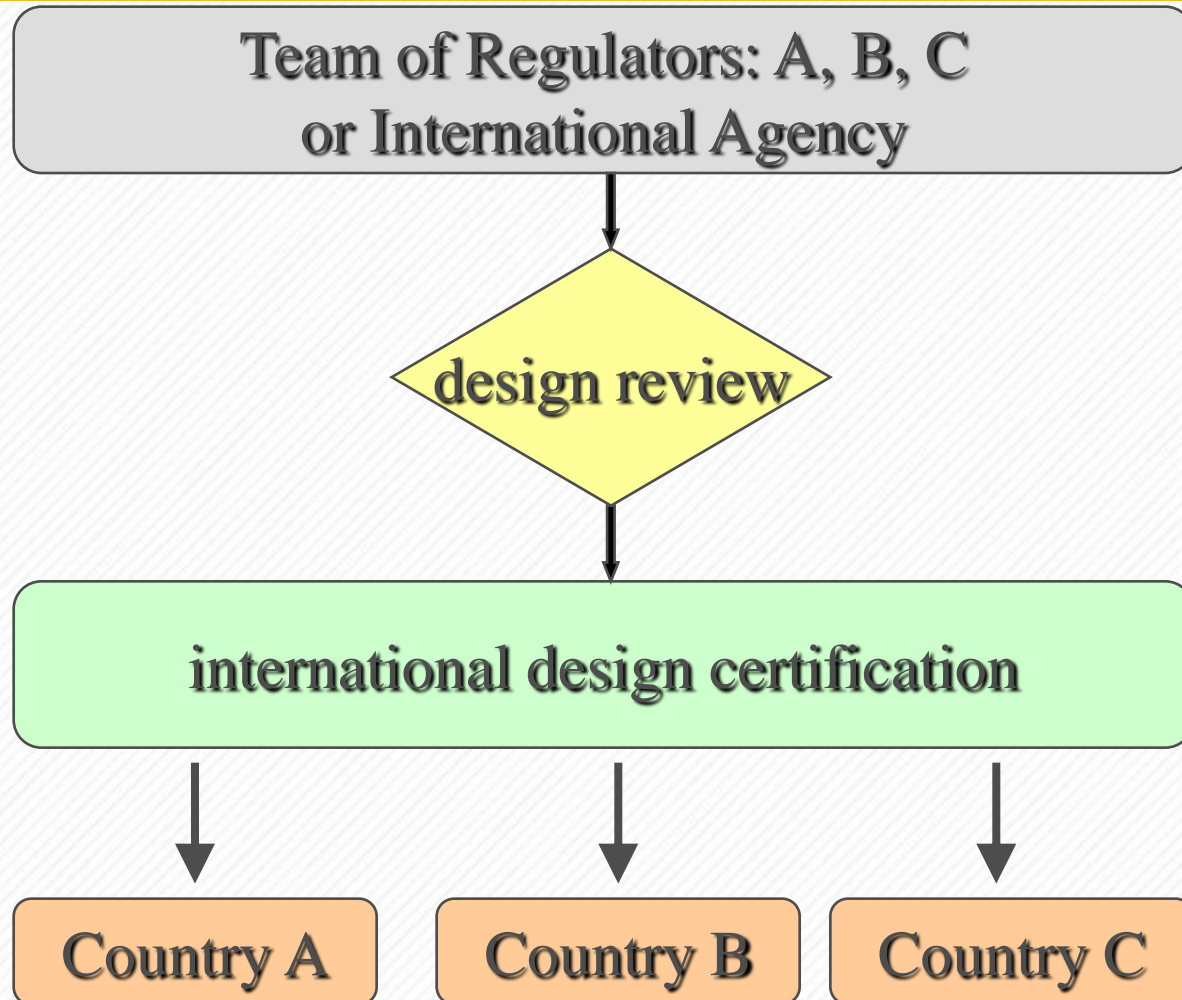
Step 1: Share design assessment



Step 2: Accept design approvals



Step 3: Issue international design certification



Step 1: Mutual acceptance of design reviews and assessments

- **For demonstration of safety, the regulators could make use of:**
 - Assessment work done by their peers, e.g. by reusing calculations or modelling of event sequences
 - Assessments done by industry (EUR, US URD)
- **This would reduce the strain on regulators' resources**
- **This would be done within existing legal framework and existing responsibilities of regulators**
- **MDEP development towards shared assessment work is highly appreciated**

Step 2: Mutual acceptance of design approvals (1)

Mutual acceptance of design approvals – a facilitated takeover of a foreign design approval

- not “automatic” but through a “**validation**” procedure. There are models for this, e. g. transport casks for radioactive waste.
- Focus for national regulator would be on “local” site-specific and operator-specific issues
- Adaptation of national legislation may in some countries be necessary to permit taking over foreign design approvals

Step 2: Mutual acceptance of design approvals (2)

Example: Italy's new Act on Energy Companies, Act no. 99 of 23 July 2009, Art. 25, 2 i):

[Government is empowered to issue] a provision that **licences** relating to technical requirements and specifications for reactor designs which have been licenced in the past 10 years by the competent authorities in member states of OECD-NEA, or in states linked to Italy by bilateral agreements ... in the nuclear sector, will be considered to be valid in Italy after approval by the Nuclear Safety Agency

Step 2: Mutual acceptance of design approvals (3)

- Licensing processes and documents should be aligned so that the design acceptance of one country would fit into the licensing sequence of another country
- Contents of supporting documents should be harmonized (e.g. US Design Control Document and UK Pre-construction Safety Report)
- Strong alignment of safety requirements is necessary. Two possible ways:
 - harmonization of national regulations to jointly agreed or international standards (see WENRA)
 - acceptance of foreign regulations on a case-to-case basis

Step 3: International Design Certification

- International Design Certification - issued by a team of all concerned regulators (MDEP?) or by an international organisation
- National regulator assesses applicability to local circumstances, and supervises construction, commissioning and operation
- International Design Certification is owned by the vendor and is valid for entire design life
- Vendor is responsible for maintaining design authority, operator is “intelligent customer” (it wouldn’t make sense to maintain 20 design authorities for one design.....)

Standardization: Role of WNA CORDEL

Industry is prepared to provide CORDEL with resources

- to promote standardization of designs
- to support regulators
- to encourage production of international codes and standards by international standards organizations and
- to make further steps towards strengthening best practice sharing and experience feedback mechanisms (via owners' groups)

Standardization: Role of MDEP

CORDEL proposes giving MDEP an enhanced role:

- MDEP's role should be strengthened in order to strive with new impetus towards joint design reviews and multinational design approvals
- MDEP should become international institution backed by inter-governmental agreements crafted under the auspices of IAEA or OECD-NEA
- MDEP needs its own workforce
- MDEP should work on comprehensive design reviews and, as a product of this work, make proposals for harmonization of safety standards to its member states

Standardization: Role of governments and IAEA

- A facilitated take over of Design Approvals by foreign regulators and an international harmonization of regulations may in the long run require
 - some changes in national legislation
 - creation of inter-governmental agreements
- This new framework would be beneficial for all - for established nuclear countries and for emerging nuclear countries or those with a small nuclear program
- IAEA is the most appropriate platform to coordinate inter-governmental initiatives

CONCLUSIONS (1)

WNA CORDEL Group proposes 3 subsequent steps to achieve full international **standardization** of reactor designs:

1. **Acceptance of design reviews** done by foreign regulators
2. **Acceptance of design approval** by a foreign regulator
3. Issuance of **internationally valid design certification**

In parallel and to enable this, national **licensing procedures** and **safety requirements** have to be harmonized.

CONCLUSIONS (2)

Stakeholders in the process - all have to be involved

- **Industry:**
 - operators and vendors: Owners' Groups, information exchange, systematic implementation of design improvements, maintaining of Design Authorities
- **Regulators:**
 - National regulators can already achieve great convergence within existing legal frameworks during Step 1
 - Fresh imperative for MDEP
- **Governments:**
 - Adjustments in national legislation may be required for Step 2
 - Creation of international legal framework
- **International organizations:**
 - IAEA and OECD-NEA to take more proactive part in harmonization