

Can we identify specific types of regulatory approaches – e.g. level of regulator’s involvement – to procurement, documentation, supply chain, manufacturing and construction oversight?

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Multinational Cooperation in the Licensing of Nuclear Power Plants

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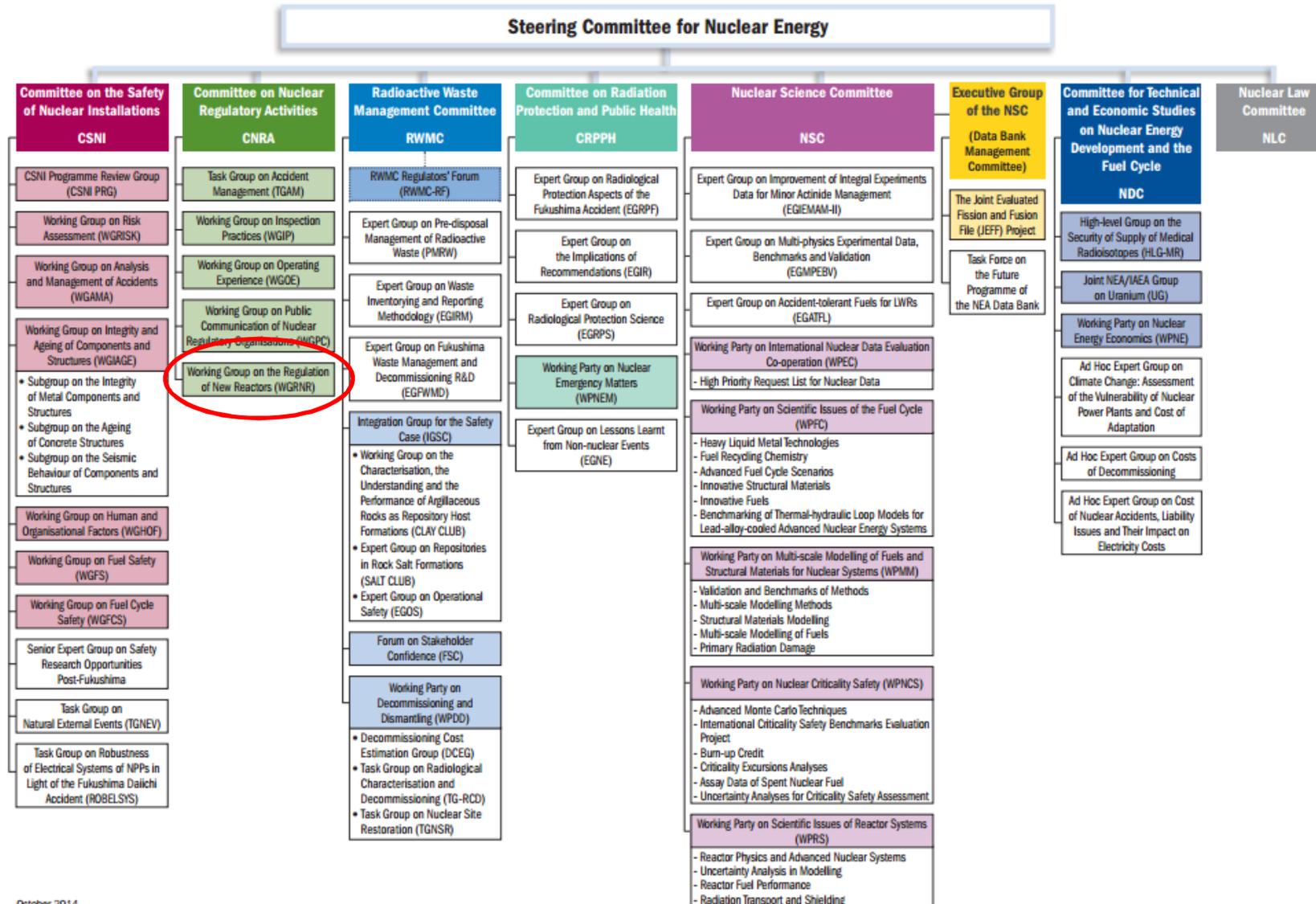
Outline

Presenting the OECD/NEA/CNRA/**Working Group on the Regulation of New Reactors** work and its recent results...



... to bring answers to “Can we identify specific types of regulatory approaches – e.g. level of regulator’s involvement – to procurement, documentation, supply chain, manufacturing and construction oversight?”

Committee Structure of the OECD Nuclear Energy Agency (NEA)



October 2014

WGRNR mandate

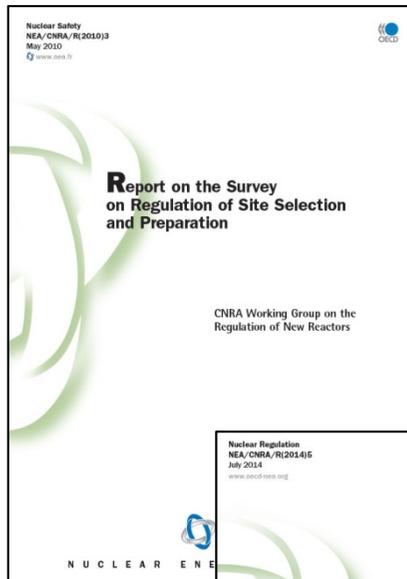
The Working Group on Regulation of New Reactors (WGRNR) shall be responsible for the programme of work in the CNRA dealing with regulatory activities in the primary program areas of siting, licensing and oversight for new commercial nuclear power reactors. The working group shall constitute an international forum for exchanging information and experience and with the agreement of CNRA and will plan its work to ensure improvements in nuclear safety through more effective and efficient regulation. In order to accomplish this prime objective the working group shall:

- Constitute a forum of experts for the licensing of new NPP
 - **And should facilitate a cooperative approach to identify key new regulatory issues and promote a common resolution.**
- Coordinate its work with the work performed by MDEP
- Closely coordinate its work with others CNRA and CSNI WGs

WGRNR Programme of work

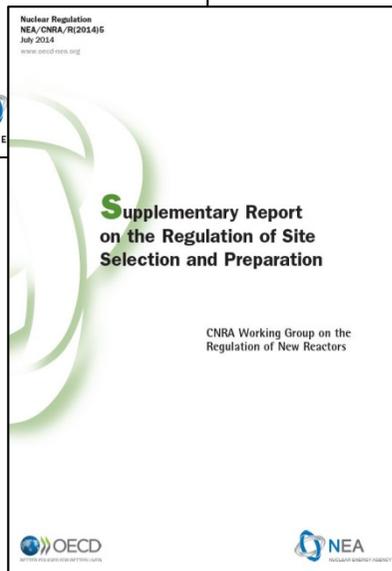
- **Regulation of Nuclear Sites Selection and Preparation**
- **Licensing Structure of Regulatory Staff and Regulatory Licensing Process**
- **Construction Experience Database**
- **Activity on the regulatory control during commissioning**
- **Other future topics under planning:**
 - Regulatory oversight of new licensee developing organisational capability
 - Interaction with WGOE on NCSFI issues

Site Selection and Preparation (1/2)



Report on the Survey on Regulation of Site Selection and Preparation, June 2010, NEA/CNRA/R(2010)3

<https://www.oecd-nea.org/nsd/docs/2010/cnra-r2010-3.pdf>



Supplementary Report on the Regulation of Site Selection and Preparation, July 2014, NEA/CNRA/R(2014)5

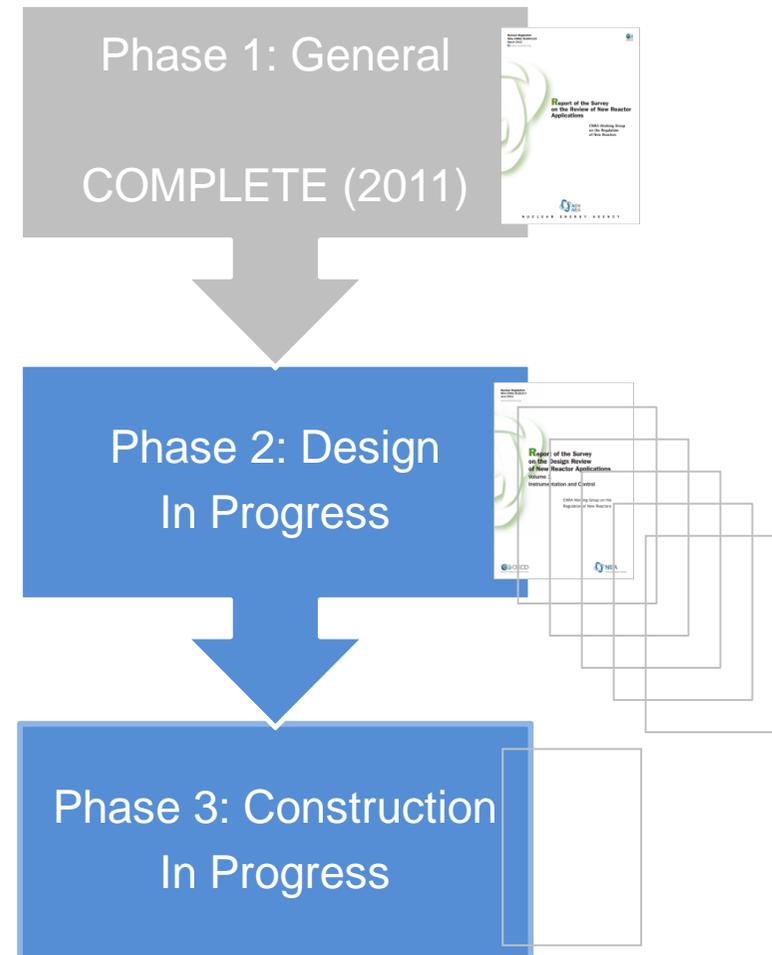
<http://www.oecd-nea.org/nsd/docs/2014/cnra-r2014-5.pdf>

Site Selection and Preparation (2/2)

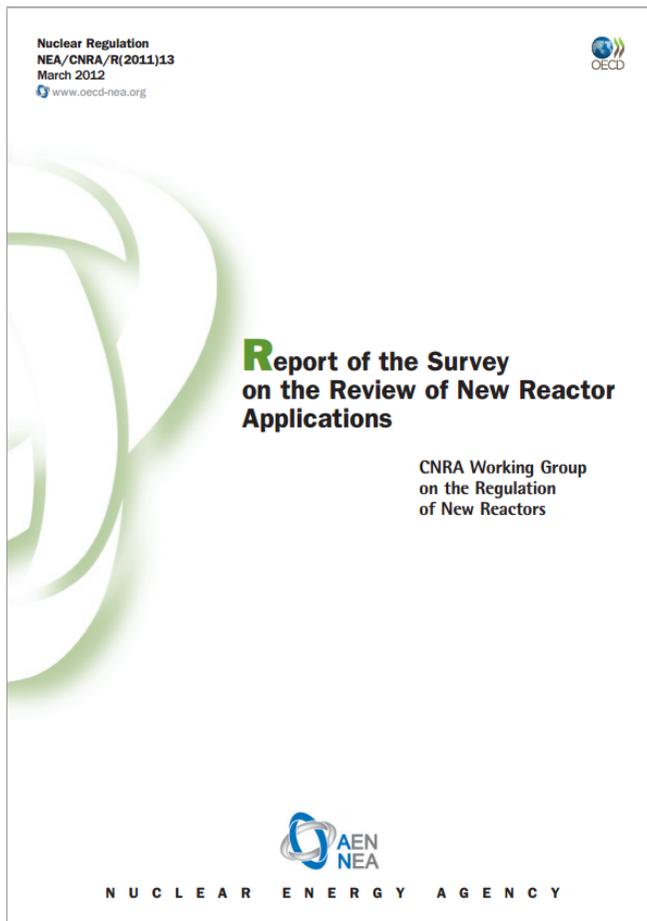
- Some member countries are **developing or revisiting siting requirements** for new reactors.
- The overall conclusion of the supplementary survey is that the **overarching requirements for site evaluation, selection and preparation phases are already generally adequate**.
 - any changes required as a result of the Fukushima Daiichi nuclear power plant accident are focused on clarifying requirements or providing guidance as to how requirements should be met.
- Design basis natural hazards and human-induced hazards, combinations of hazards and design extension conditions are typically being addressed as well as margin assessments and potential cliff-edge effects.

Licensing process

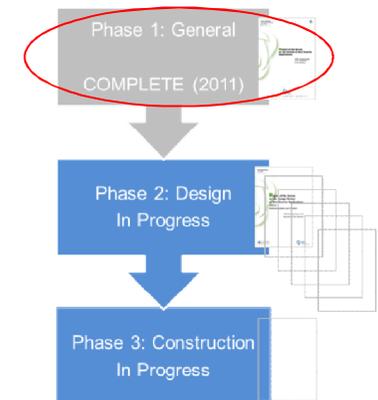
- A comprehensive report on each member's:
 - Regulatory Structure & Licensing Processes
 - Technical Reviews
 - Oversight during construction
- Purpose
 - Serve as a guide for developing regulatory bodies
 - Benchmarking for more developed regulators
 - Emphasis on Usefulness
- Based on a Survey (3 phases)



Licensing Process – General phase



- Importance of understanding other Member State Regulations
- Comprehensive report on the different regulatory structures, licensing processes and design reviews used by member states
- Understand the differences between types of regulatory approaches



<https://www.oecd-nea.org/nsd/docs/2011/cnra-r2011-13.pdf>

Can we identify specific types of regulatory approaches [...]?

- **General licensing process report NEA/CNRA/R(2011)13 discusses and identifies the different regulatory approaches and involvement as:**

PRE- CONSTRUCTION

- Most regulators: review of the basic design and site safety issues
- Some countries: more specific reviews (e.g.: USA's new licensing process requires the applicant to provide the complete design before getting the combined construction and operating licence.)

CONSTRUCTION

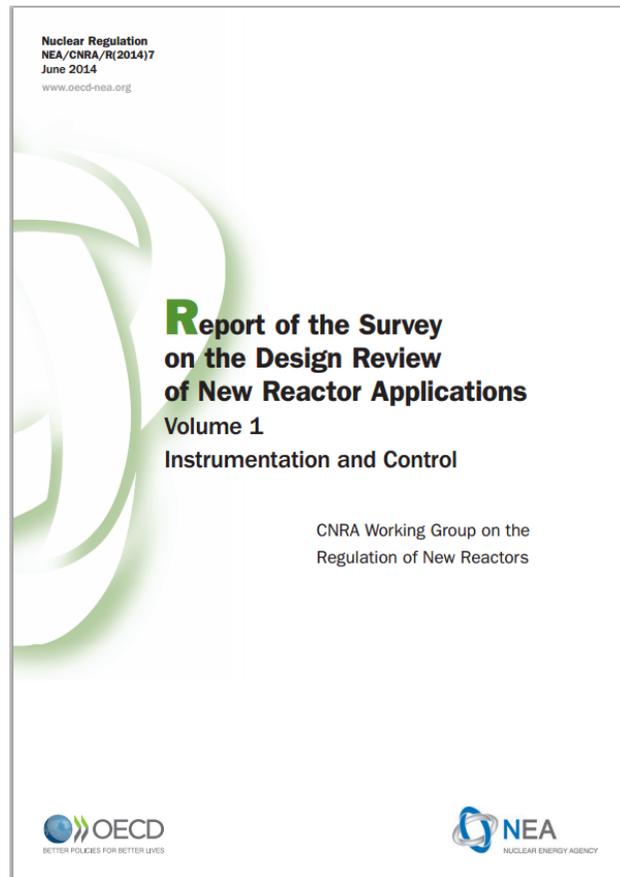
- All regulators: construction oversight
- Some regulators (e.g. Finland): also review and approve the detailed design
- Oversight during construction:
 - Many regulators call upon the support of experts such as TSOs.
 - In some countries (e.g. France or Japan), experts from the TSOs join the inspections during operation too.
 - In Switzerland and UK, for e.g., there are other authorities besides the regulator that have oversight roles during construction.

COMMISSIONING

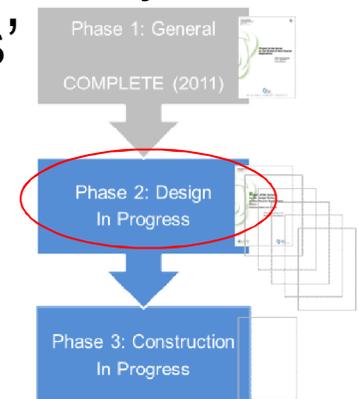
- For all: starts during construction, but continues well after construction ends.
- Comprises the issuing of the operating licence and the loading of fuel.
- In France: the regulator makes a decision for partial commissioning, informing the licensee that he can bring fuel on site.

Licensing Process – Phase 2: Design

□ Volume 1: Instrumentation and Control (I&C)



- Report covers the regulatory requirements and scope of Regulatory review and assessment as well as review techniques
- Report finds the consensus Standards used in I&C design
- Reporting the needed skill sets
- Reporting the level of regulatory effort in member countries' NPP projects and I&C renewals



<http://www.oecd-nea.org/nsd/docs/2014/cnra-r2014-7.pdf>

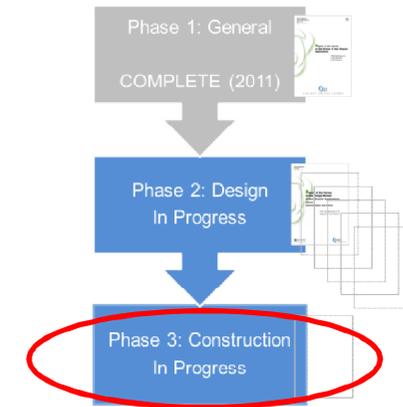
Licensing Process – Phase 2: Design

Discussion of results for I&C: Level of effort

Country	Total Estimated Level of Effort for I&C	Basis for Estimate
Canada	3 000 hours	Construction Licence Application review
Finland	2 505 working days (20 040 hours)	Olkiluoto 3 NPP review
France	5 man years, 6 man months, and 25 working days (11 160 hours)	Review of NPPs with digital I&C systems
India	-	Resources (hours) are not set up for each individual review area
Japan	-	Resources (hours) are not set up for each individual review area
Korea	1 610 working days (12 880 hours)	Review of digital I&C and control room modernization at Shin-Kori 3&4
Russia	32 – 48 man months (5 120 – 7 680 hours)	Current review experience and planned future activities
Slovakia	-	Level of Effort defined by regulation and dependent upon the activity to be approved
Slovenia	3 540 hours	Review of a licensing process for Instrumentation and Control (I&C) systems design approval
Sweden	675 working days (5 400 hours)	Review of digital I&C and control room modernization for Ringhals Unit 2
United States	27 180 hours	Standard Design Certification review

Phase 3. Overview of Construction Oversight Survey

- Objective: gather data from members and report on the approaches to construction oversight.
- Three General Oversight Categories:
 - Inspection
 - Assessment
 - Enforcement
- Participants: Canada, Finland, France, Hungary, Korea, The Netherlands, Russia, United Kingdom, United States.



Construction experience programme (ConEx database)

International system for collecting construction experience (ConEx) for commercial nuclear power reactors:

- regulators to share experience gathered during construction which can be incorporated into their own regulatory oversight and inspection programmes
 - help licensees to improve their own approaches and arrangements
 - learn from past construction experience by analysing, reporting and sharing construction events in order to avoid repeating them in the future
- ⇒ Second Construction Experience Synthesis Report 2011-2014 to be submitted for CNRA review.

Summarises events reported to the WGRNR ConEx database by NEA member countries' regulatory bodies between 2011 and 2014.

Can we identify specific types of regulatory approaches [...]?

- **Activity on regulatory control during commissioning**
 - WGRNR/MDEP joint workshop 2016 to discuss and report regulatory approaches and involvement on commissioning. Workshop planning is ongoing by defining potential “Top Ten” key issues for commissioning e.g:
 - ...
 - *Timely inspection for test procedures and sampling*
 - *Timely inspection for licensee’s organisational readiness*
 - *Regulatory hold points and witness points*
 - *What test can be omitted and why*
 - ...

Can we identify specific types of regulatory approaches [...]?

WGRNR's purpose is to find best practices for regulatory development. We have to also acknowledge the different Vendor, Licensee and Supply Chain approaches in different countries. According to recent construction experience (ConEx programme) we can highlight some common issues as examples:

- **Application of well-established industry standards and guidelines.** Deficiencies caused by failing to implement a rigorous design control process may be latent and therefore difficult to detect by normal inspection and surveillance processes. Thus, these defects may only become evident when they cause unexpected failures that result in significant problems during testing and operations.
- **Maintaining and enhancing a robust management system** for new reactor construction, The management system needs to integrate all relevant processes, including Engineering and Design Management; Requirements Management; Configuration Management including Change Management; Quality Management; Corrective Action Management Programme; and Management of Non-Conformances. All processes should be well defined through clear procedures which are applied consistently throughout the supply chain.
- **Promoting and sustaining a robust safety culture** throughout the licensee organisation and supply chain.