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Main principles of NPP Licensing

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MAIN PRINCIPLES OF THE NPP LICENSING

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International Atomic Energy Agency

SPECIFICITY OF NUCLEAR POWER

NPP operation

Inventory of radioactive materials

Radiation hazards to workers, public and the environment

Proliferation Issues

Safeguards

Nuclear Safety & Security

Institutional aspects

Organizational aspects

Technical aspects

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DEFINITIONS

- **Licence** is a legal document issued by the regulatory body granting authorization to create a nuclear installation and/or to perform specified activities. Licence is the final result of evaluation of an application, gives the applicant the formal authorization to proceed within the limits set by the conditions included in the licence
- **Licensing process** is often used for nuclear installations; it includes all licensing and/or authorization processes for a nuclear installation and its activities.
- **Licensee** is the holder of a current and valid licence. The licensee is the person or the organization having overall responsibility for a nuclear installation and its activities and who is in possession of all necessary licences for the installation and its activities.

Licence = Authorization = Permit = Certificate

WHY A LICENSING PROCESS?

Fundamental Safety Objective:

- ✓ To protect people and the environment from harmful effects of ionizing radiation.
- ✓ Responsibility for safety rests with the NPP Operator, the organization responsible to adopt all reasonably practicable measures to prevent accidents and to mitigate their consequences.
- ✓ Government (Regulatory Body) is responsible to ensure that radiation risks are properly controlled by the NPP Operator.

NPP Operator demonstrates to the Regulatory Body that his responsibility has been, is, and will continue to be discharged.

RESPONSIBILITY FOR SAFETY

- Principle 1 of the IAEA Fundamental Safety Principles states that **“the prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risk” .**
- The licensee retains this responsibility throughout the lifetime of the licensed facilities, and this responsibility cannot be delegated.
- Should be no confusion between the role of the operator and the role of the regulator: **the operator is responsible for safety**, whereas the **regulator is responsible for approving and providing independent oversight of the operator’s activities that could impact safety**.

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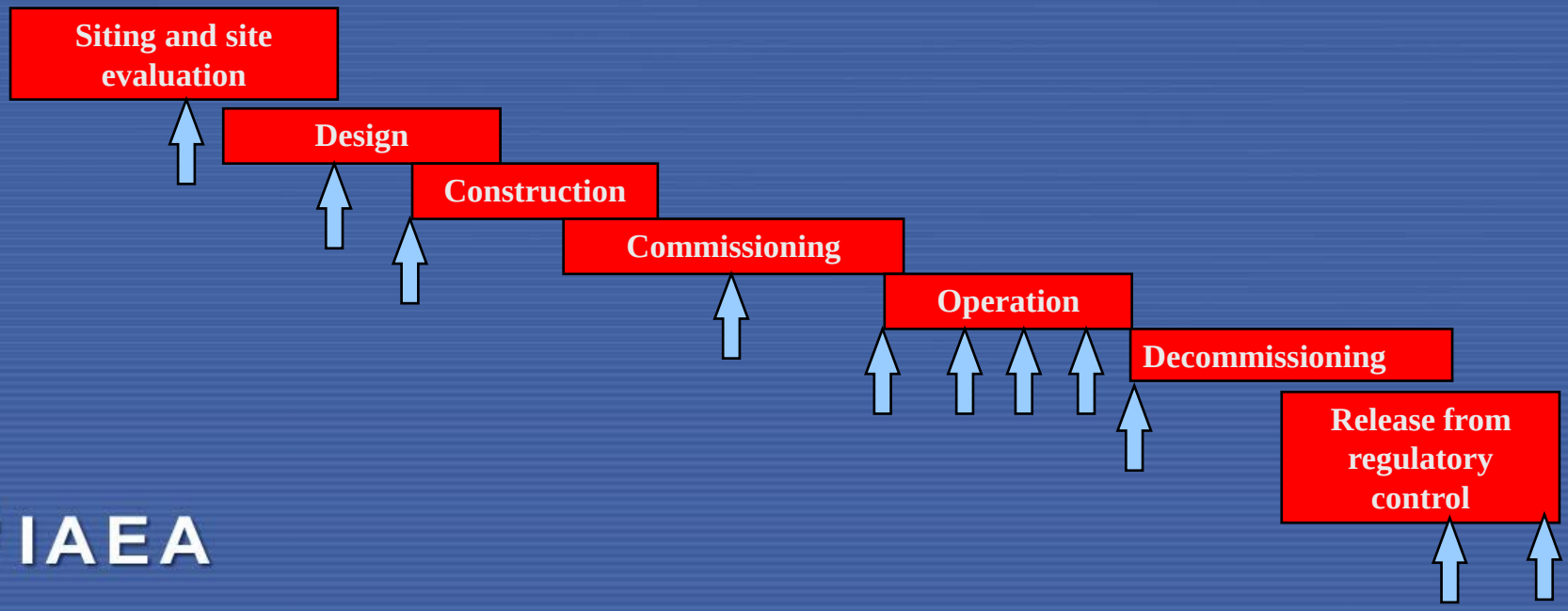
LICENSING BASIC PRINCIPLES

- Licensing process must be well-defined, clear, transparent and traceable.
- Two major players:
  1. **Regulatory Body:**
     - Defines the safety criteria, requirements, guidelines and documents to be provided by the applicant (NPP operating organization).
     - Establish a mechanism to solve safety issues with the applicant.
  2. **NPP Operating Organization:**
     - Prepare and submit the required documentation.
     - Be prepared to respond to the requests of the Regulatory Body.
- The public should be given an opportunity to provide their views during certain steps of the licensing process.

STEPS OF THE LICENSING PROCESS (1)

Depends on national legislation but often covers:

- siting and site evaluation (which may include the environmental impact assessment),
- design,
- construction,
- commissioning,
- operation,
- decommissioning, and
- release from regulatory control



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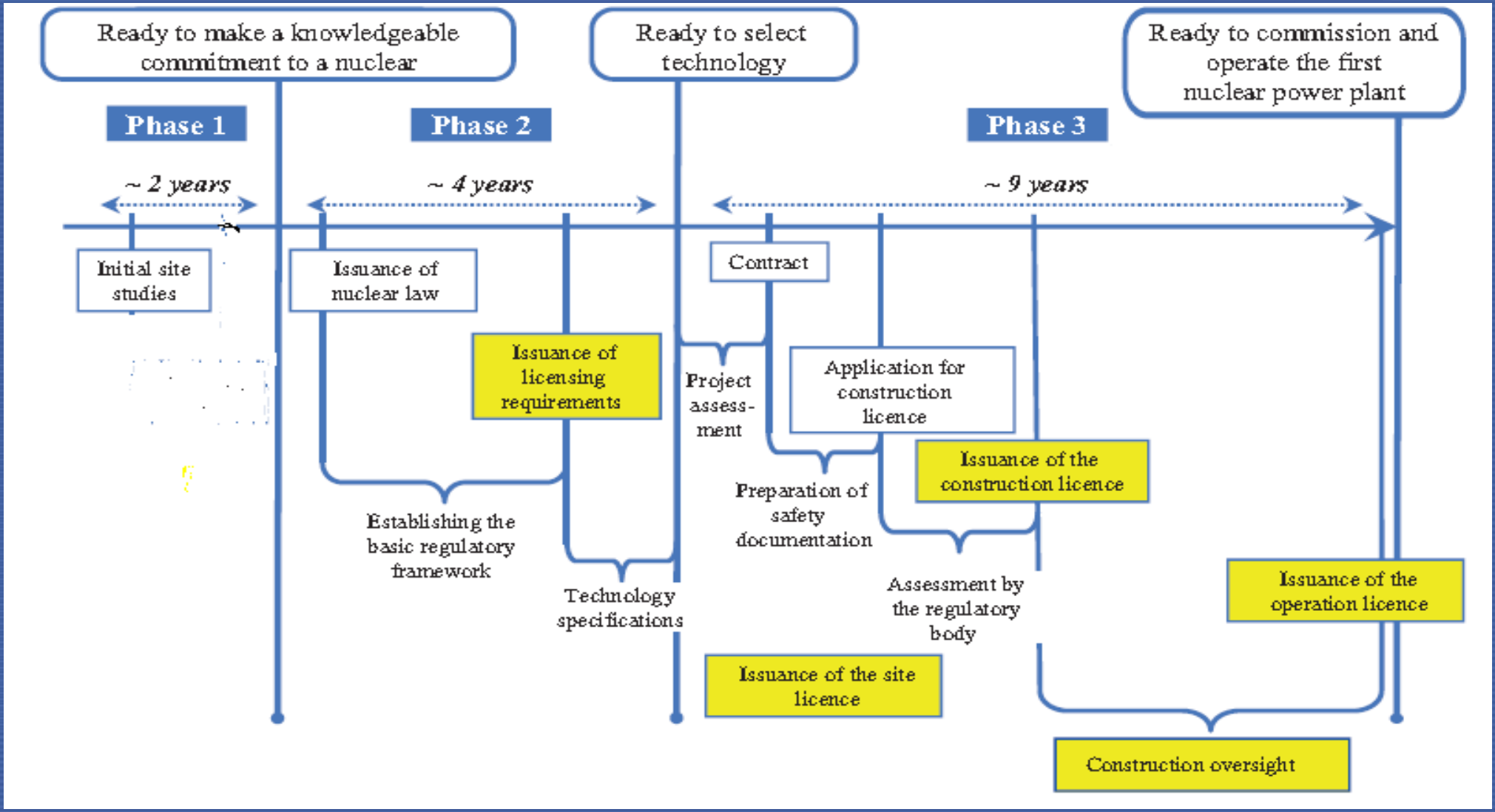
STEPS OF THE LICENSING PROCESS (2)



LICENSING APPLICATION

- ✓ Demonstrates the safety of the facility or proposed activity
- ✓ Information is accurate and sufficient to enable verification of compliance with regulatory requirements
- ✓ Technical solutions, in particular any novel ones, have been proven or qualified by experience or testing or both, and are capable of achieving the required level of safety

LICENSING SUPPORT DOCUMENTS

PSAR

- Issued before authorization to begin construction
- Include information on:
  - ✓ site evaluation
  - ✓ design basis and description of the NPP design
  - ✓ nuclear and radiation safety
  - ✓ deterministic analyses (accident analyses)
  - ✓ complementary Probabilistic Safety Assessment (PSA)

FSAR

- Include the same information as PSAR plus elements on the NPP construction, commissioning and operation stages and preliminary plan for the NPP decommissioning.

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OTHER LICENSING SUBMITTALS

- ✓ NPP Site Evaluation Report
- ✓ Environmental Impact Assessment Report
- ✓ Strategic plan for the licensing process, including the set of applicable requirements, guides, codes and standards to comply with
- ✓ Technical design documents (design description, design manuals, TS, etc.)
- ✓ Plan for fire protection
- ✓ Security (physical protection) plan
- ✓ Safeguards (accounting for and control of nuclear material) plan
- ✓ Program for training and qualification of staff.
- ✓ Commissioning program and schedule
- ✓ NPP Operating procedures, including OLCs
- ✓ Ageing management program
- ✓ Emergency preparedness and response plan and procedures
- ✓ Accident management procedures

REGULATORY REVIEW AND ASSESSMENT

- ✓ Determine whether the Operator's submissions demonstrate that the facility complies throughout its lifetime with the safety objectives, principles and criteria.

- ✓ Determine whether the Operator has adequate organization, management, procedures and resources to discharge its obligations and liabilities.

REGULATORY INSPECTIONS

- ✓ Provide a high level of assurance that all activities performed by the operator during all NPP licensing and lifetime stages are executed safely and meet the safety objectives and licence conditions.
- ✓ Check independently the operator capabilities and state of facility (NPP).
- ✓ Inspections should be made by the Regulatory Body during construction, commissioning and operation of the NPP.

INSPECTIONS DURING NPP CONSTRUCTION (1)

Objectives of the regulatory body inspections:

- ✓ Management system of the licensee and vendors/suppliers
- ✓ Implementation of the design features important to safety and security
- ✓ Documentation relating to demonstration of compliance of the selected design with applicable safety objectives and criteria
- ✓ Knowledge and training program of the local sub-contractors (capability of meeting the stringent quality standards of the nuclear industry)
- ✓ Acceptance of the deviations from the design during manufacturing and construction in accordance with the established methodologies.

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INSPECTIONS DURING NPP CONSTRUCTION (2)

- ✓ Regulatory Body work associated with the construction and manufacturing of the first NPP will involve many new activities for the regulator and it is likely that **external experts** will be needed both for training and for implementation.
- ✓ Experts from an **experienced regulator** (from NPP vendor country) may be included as advisors in the regulatory inspection teams and in the review of the inspection reports.
- ✓ This will assist with the efficiency and quality of regulatory oversight and in advancing the knowledge of the new entrant regulator staff.

INSPECTIONS DURING NPP COMMISSIONING (1)

- ✓ Commissioning work generally is completed over a relatively short time, typically a few months, being a period of intense activity.
- ✓ New entrant regulator should develop a detailed plan for review of commissioning work that ensures efficiency without any compromise in quality or safety.
- ✓ For certain commissioning work, the regulatory staff together with the regulator's technical support personnel should be physically present at the site. For instance, the regulator should witness the performance tests of safety systems.

INSPECTIONS DURING NPP COMMISSIONING (2)

Objectives of the regulatory body inspections:

- ✓ commissioning test program
- ✓ operational limits
- ✓ test acceptance criteria
- ✓ conditions and procedures
- ✓ status of the plant: as-built design
- ✓ nuclear materials storage
- ✓ management aspects: organizational structure, training, staff licensing
- ✓ operational programs (maintenance, surveillance, inspection, reporting, OPEX, etc.)
- ✓ operational aspects: OLCs during commissioning, operating instructions and procedures, EOP, emergency preparedness, physical protection
- ✓ completion and acceptance of the commissioning (safety related systems).

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INSPECTIONS DURING NPP OPERATION

- ✓ Regulatory oversight of the nuclear power plant during its operational phase is a very long term activity, covering the licensed operating period as well as its possible future extension.
- ✓ The major activities of regulation during operation are review of routine operation and safety related incidents, review of activities during outages, control of plant configuration and safety related changes in hardware and procedures, and assessment of the aging status of plat structures, systems and components.
- ✓ Periodic safety reviews are also conducted, typically every ten years, to verify that adequate safety margins are maintained and that the nuclear power plant meets the current applicable safety requirements.

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DIFFICULTIES IN LICENSING PROCESS (1)

New entrant regulators are facing difficulties in responding to the initial nuclear program needs in a timely manner, due to the **various reasons**:

- ✓ Very aggressive schedules for the nuclear power program, not taking into account the necessary early regulatory activities (building the regulatory framework, conducting the licensing process).
- ✓ Lack of an appropriate, well structured, and effective legal and regulatory framework
- ✓ Delayed establishment of the regulatory body and the recruitment of staff

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DIFFICULTIES IN LICENSING PROCESS (2)

(Cont.)

- ✓ Insufficient financial resources allocated to the regulatory body for external support
- ✓ Insufficient knowledge by the regulator to enable the adaptation of other countries' regulations or international safety standards
- ✓ Lack of a quality management system to ensure quality and consistency in the regulations and guides
- ✓ Insufficient experience in establishing a Human Resources Development plan and a training program to ensure the required competencies in the regulatory body in a timely fashion.

WESTERN EUROPE NUCLEAR REGULATORS ASSOCIATION-WENDRA

Recommendations:

- ✓ The licensee shall always have sufficient staff to understand the licensing basis of the plant, as well as to understand the actual design and operation of the NPP.
- ✓ The licensee shall maintain, sufficient staff to specify standards, manage and evaluate safety work carried out by his own staff or by contractors.
- ✓ Safety culture in the licensee organization.

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Thanks !