Industrial Codes and Standards- case Finland

IAEA National Workshop on Industrial Involvement

25-27.2.20, Jakarta, Indonesia

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Outline

- Regulatory framework, nuclear safety
  - Technical
  - Management system
- Non-nuclear
- Supervision

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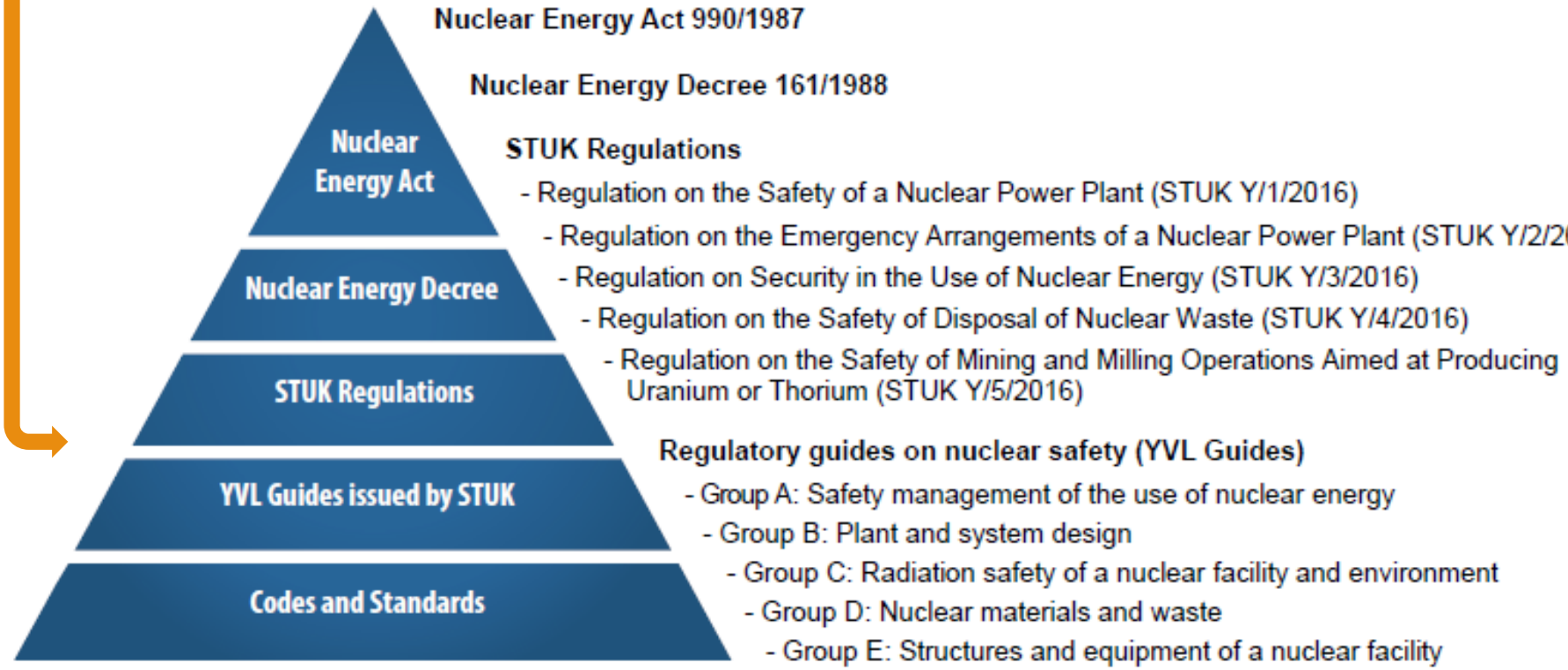
Regulatory Framework for Nuclear Industry in Finland

Taking into account the international requirements of IAEA, WENRA



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Technical Codes and Standards 1/2

- Finland has not strictly determined to follow *certain* nuclear industry standards (RCC-M, ASME, KTA, GOST..)
- Enables a variety of NPP technologies
  - PVR, Russia - Loviisa 1-2, Hanhikivi 1
  - BWR, Sweden - Olkiluoto 1-2
  - PVR (EPR), France, - Olkiluoto 3
- Standards that will be used in new builds are defined by the lisencee and NPP –vendor
  - During the design phase → licencing
  - Conformity with the Finnish safety requirements must be proved
  - Holder of the nuclear facility's construction license shall ensure during construction that the nuclear facility is constructed and implemented in conformity with the safety requirements and using *approved plans* and procedures

Technical Codes and Standards 2/2

- YVL guides refer to, f.ex:

SFS – EN	Eurocodes
KTA	Pressure Equipment Directive
ASME	Pressure Equipment Act
RCC-M	Chemical Act
IEC	CE-markings
ASCE	National building codes
API	IAEA Safety Requirements
ANSI	WENRA
CEN	
NUREG	

http://www.stuk.fi/web/en/regulations/stuk-s-regulatory-guides/regulatory-guides-on-nuclear-safety-yvl-

EXAMPLE PUMPS

502.

The pump's structural design and dimensioning shall be based on standard ASME Boiler & Pressure Vessel Code (Section III, Division 1); as regards Safety Class 1 on Subsection NB-3400 [6] and as regards Safety Class 2 on Subsection NC-3400 [7]. **Other standards are acceptable provided that** it can be demonstrated that an equivalent certainty of pump integrity and performance can be achieved by design and dimensioning based on them.

503.

The structural design and dimensioning of Safety Class 3 pumps shall be based on a **design standard generally applied** by the pump-manufacturing industry.

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YVL Guides

A Safety management of a nuclear facility	B Plant and system design	C Radiation safety of a nuclear facility and environment	D Nuclear materials and waste	E Structures and equipment of a nuclear facility
A.1 Regulatory oversight of safety in the use of nuclear energy A.2 Site for a nuclear facility A.3 Management system for a nuclear facility A.4 Organisation and personnel of a nuclear facility A.5 Construction and commissioning of a nuclear facility A.6 Conduct of operations at a nuclear power plant A.7 Probabilistic risk assessment and risk management of a nuclear power plant A.8 Ageing management of a nuclear facility A.9 Regular reporting on the operation of a nuclear facility A.10 Operating experience feedback of a nuclear facility A.11 Security of a nuclear facility A.12 Information security management of a nuclear facility	B.1 Safety design of a nuclear power plant B.2 Classification of systems, structures and components of a nuclear facility B.3 Deterministic safety analyses for a nuclear power plant B.4 Nuclear fuel and reactor B.5 Reactor coolant circuit of a nuclear power plant B.6 Containment of a nuclear power plant B.7 Provisions for internal and external hazards at a nuclear facility B.8 Fire protection at a nuclear facility	C.1 Structural radiation safety at a nuclear facility C.2 Radiation protection and exposure monitoring of nuclear facility workers C.3 Limitation and monitoring of radioactive releases from a nuclear facility C.4 Assessment of radiation doses to the public in the vicinity of a nuclear facility C.5 Emergency arrangements of a nuclear power plant C.6 Radiation monitoring at a nuclear facility C.7 Radiological monitoring of the environment of a nuclear facility	D.1 Regulatory control of nuclear safeguards D.2 Transport of nuclear materials and nuclear waste D.3 Handling and storage of nuclear fuel D.4 Predisposal management of low and intermediate level nuclear waste and decommissioning of a nuclear facility D.5 Disposal of nuclear waste D.6 Production of uranium and thorium	E.1 Authorised inspection body and the licensee's in-house inspection organisation E.2 Procurement and operation of nuclear fuel E.3 Pressure vessels and piping of a nuclear facility E.4 Strength analyses of nuclear power plant pressure equipment E.5 In-service inspection of nuclear facility pressure equipment with non-destructive testing methods E.6 Buildings and structures of a nuclear facility E.7 Electrical and I&C equipment of a nuclear facility E.8 Valves of a nuclear facility E.9 Pumps of a nuclear facility E.10 Emergency power supplies of a nuclear facility E.11 Hoisting and transfer equipment of a nuclear facility E.12 Testing organisations for mechanical components and structures of a nuclear facility

Example Valves

Requirements phase by phase
in line with the life-cycle

Codes and standards –
As referenced *or equivalent* if
nuclear safety can be proved

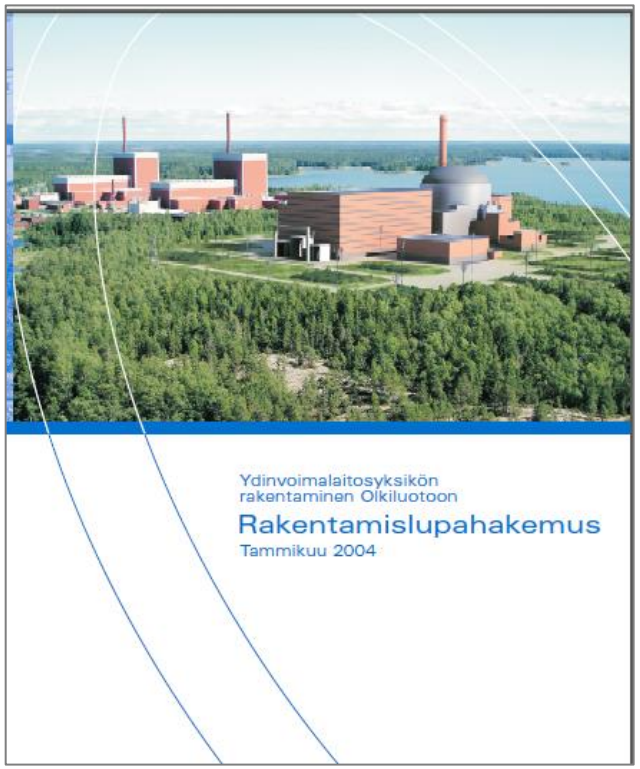
References

1. Nuclear Energy Act (990/1987).
2. Nuclear Energy Decree (161/1988).
3. Government Decree on the Safety of Nuclear Power Plants (717/2013).
4. Government Decree on the safety of disposal of nuclear waste (736/2008).
5. SFS-EN ISO 9001, Quality management systems. Requirements.
6. ASME Boiler & Pressure Vessel Code, Section III, Division 1, Subsection NB-3500 Valve Design.
7. ASME Boiler & Pressure Vessel Code, Section III, Division 1, Subsection NC-3500 Valve Design.
8. Decision of the European Parliament and of the Council No 768/2008/EC.
9. SFS-EN ISO/IEC 17065, Conformity assessment. Requirements for bodies certifying products, processes and services.
10. SFS-EN ISO/IEC 17020, Conformity assessment. Requirements for the operation of various types of bodies performing inspection.
11. SFS-EN ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories.
12. Pressure Equipment Directive 97/23/EY
13. SFS-EN 10204 Metallic products. Types of inspection documents.

VALVES OF A NUCLEAR FACILITY

Remarks

- Legal framework for nuclear safety regulation must be in place and understood before correct NPP tenders or any subtenders can be submitted
- Decisions regarding codes and standards selected for the project that will be lisenced, is done jointly with the NPP vendor
- Industries must integrate with the chosen codes and standards



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Management System Requirements

- Finnish legislation contains two basic requirements for management system (included in the regulatory guides):
  - The licensee shall commit its suppliers, sub-suppliers and other partners participating **in functions affecting nuclear safety**, to adhere to the **systematic management of safety and quality**
  - Systematic procedures shall be in place for identifying and correcting deviations significant in terms of safety
- The licensee has to oversee that the quality system of subcontractors and subcontractors activities are according to the set requirements
  - Systematic procedures also for selecting sub-suppliers
- The licensee has to ensure that the contractor's management system contains procedures for the handling of process and product related non-conformances and the procedures are followed

In Practise

- Everyone who is participating in functions **affecting nuclear safety** must prove to have an appropriate management system
- EPC Contractor is responsible for implementing the management system **throughout the NPP project supply chain**, the operator oversees that the implementation is being done
  - Lots of audits and controls (more in the SC presentation later)
- It is advisable to work according to known standards, like:
  - ISO 19443
  - ISO 9001
  - ISO 14001
  - IAEA GS-R-3
  - OHSAS 18001
  - ASME NQA-1
- Certification is always a big benefit, and usually required by the Lisencee and main Contractor(s), but the Finnish legislation does not require it

National Non-Nuclear Legal Framework

- NPP construction projects must follow national laws and regulations as any other civil construction site
- In Finland these are:
  - Environmental Act
  - Water Act
  - National building codes
  - Fire safety regulations
  - etc

Corresponding authorities and permits

- These refer to national codes and standards
- Knowledge of local regulations have been entrance points to many local companies participation

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Thank you!