

Experience from Olkiluoto 3 EPR

Nuclear Safety in Europe

First Regulatory Conference
Brussels 28.-29. June 2011

Petteri Tiippana

Director

Nuclear Reactor Regulation

Radiation and Nuclear Safety Authority, STUK

Outline

- General about Olkiluoto 3 project
- Experience from Olkiluoto 3
 - Regulatory framework in the country of construction
 - Design completion and management
 - Experience and know how
 - New and advanced manufacturing technology
 - Role of Quality Management
 - Licensee's responsibility
 - Safety culture
 - Regulatory oversight and inspections
- Conclusions

OL3 Project - General

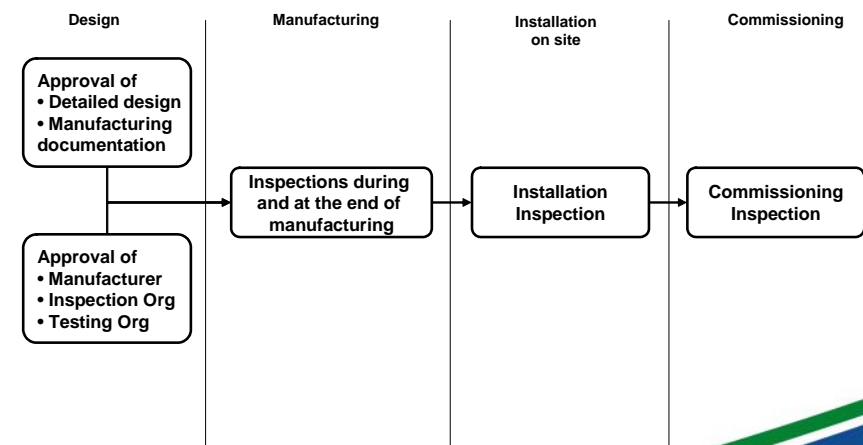
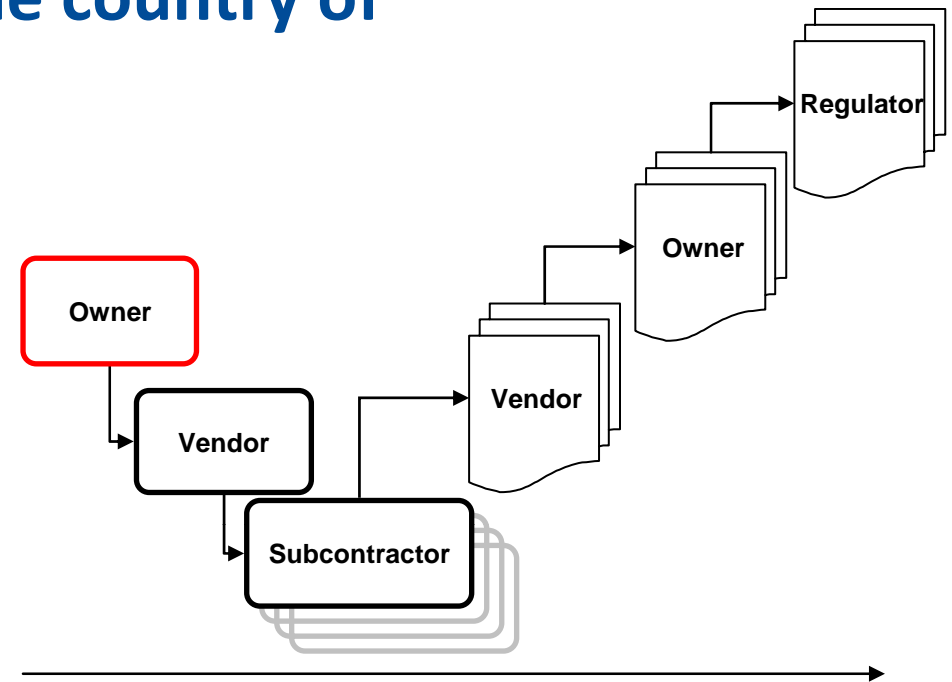


Photos: TVO

- OL3 is the first EPR being constructed
- OL3 is a turn key project
 - Owner and operator (Licensee) is TVO
 - Constructed by Consortium of Areva and Siemens
- Project is progressing but is about 4 years behind its' original schedule
- Operating license application is expected in 2011 and start of operation in 2013

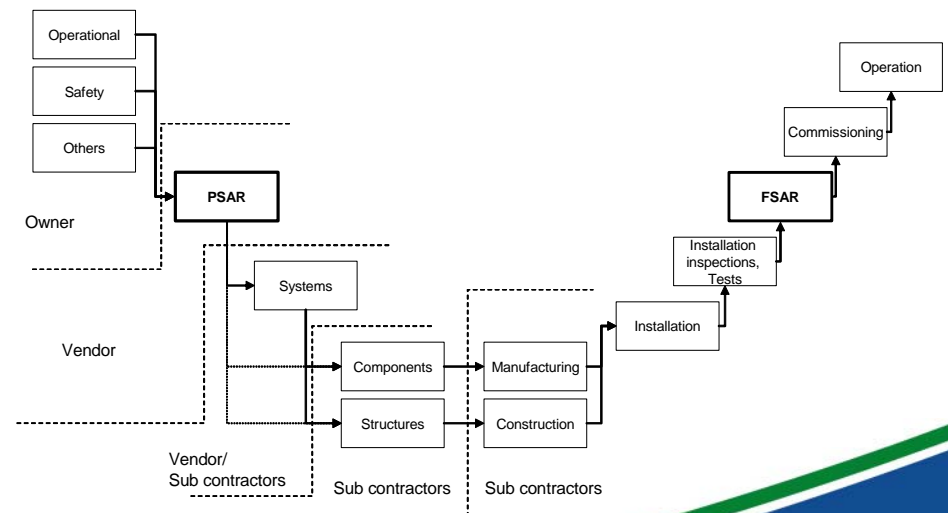
Regulatory framework in the country of construction

- Vendor and licensee are familiar with regulatory framework in the country of construction
 - Licensing, regulatory system and requirements are understood by vendor and licensee
 - Safety criteria are clear and known even before bidding process starts
 - Use of different technical standards in the project are clarified early
 - Regulatory approvals needed during the project (hold points) are known and understood by the licensee and vendor



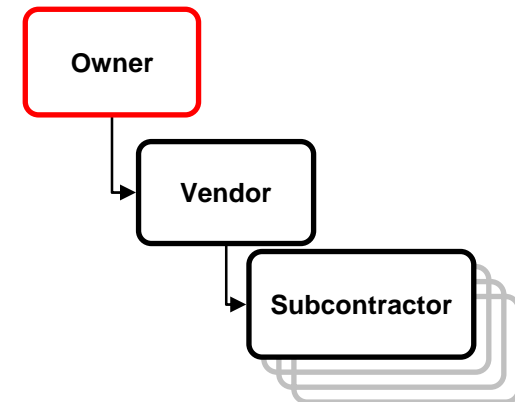
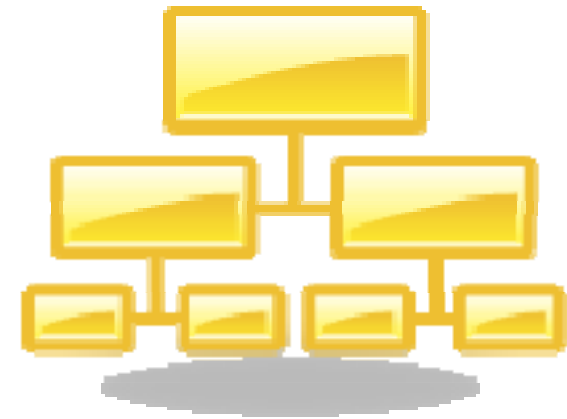
Completion and management of the plant's design

- Completion of the design prior construction
 - New design features,
 - Resources needed for the design
- Management of the design
 - Explicit design and implementation requirements
 - Design configuration and change management
 - Transparent path of requirements from plant level to the design of systems, structures and components
 - Interfaces between technical disciplines, between different organisations, between design and procurement



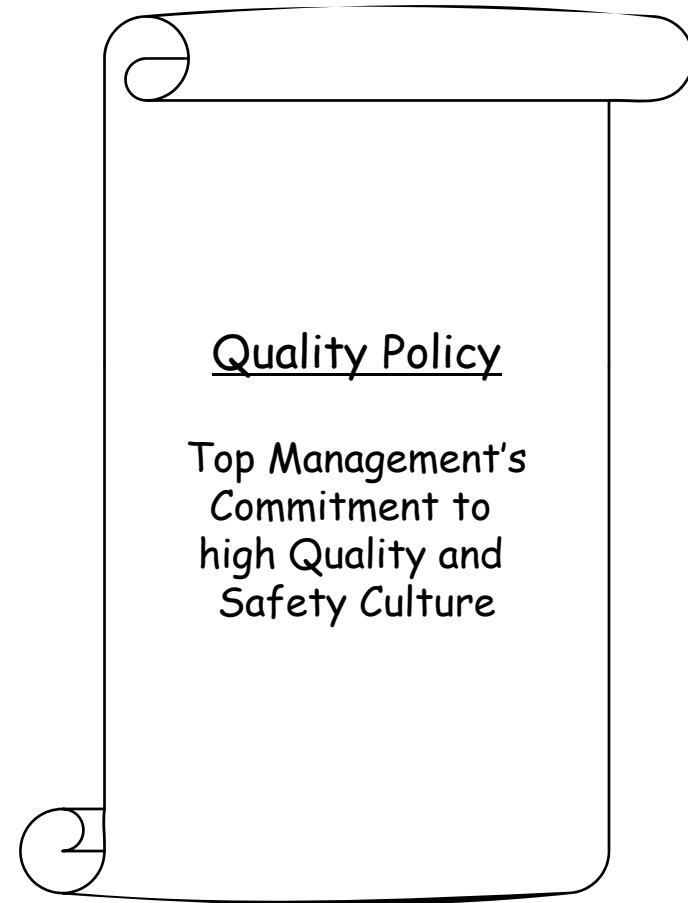
Experience and know how of the licensee and vendor, management of subcontractors

- Key persons (project management, QA, QC, Safety) experience in nuclear power construction and operation
- Adequate human resources (staffing studies covering the whole project)
- Subcontracted work need to be carefully managed
 - How subcontracting is managed (selected, trained, qualified and controlled)
 - Length of supply chains
 - Explicit contracts



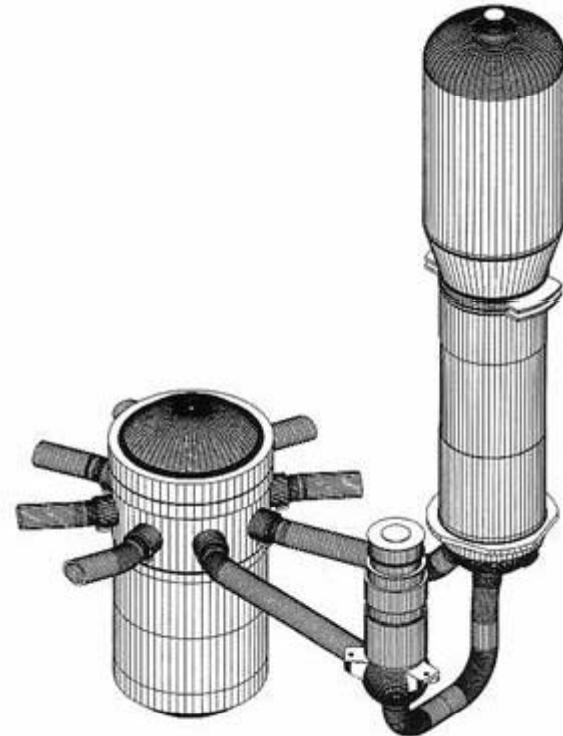
Role of Quality Management

- Common understanding on QA requirements throughout the project
 - Regulator, licensee, vendor and its subcontractors – for example definition and classification of a non conformance
- Nuclear specific requirements vs. conventional
 - Unambiguous link between safety significance and quality requirements
- Management is committed to QA
 - Trained, interested, uses QA as a management tool



New and advanced manufacturing technology

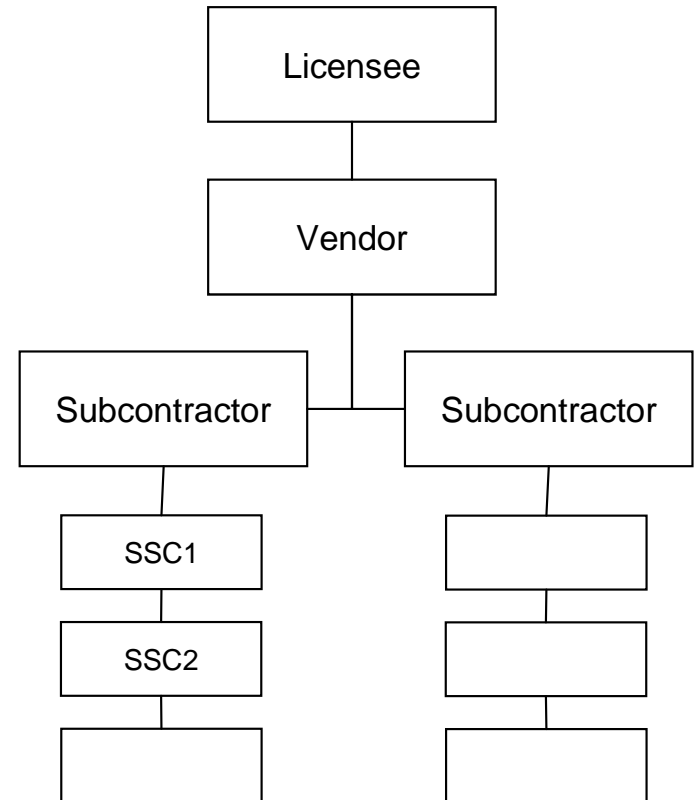
- Qualification of a new construction or manufacturing method may take time
- First pieces coming from manufacturing may not meet all specifications



Paineastia ja yksi neljästä kierto- ja höyrystämmeen

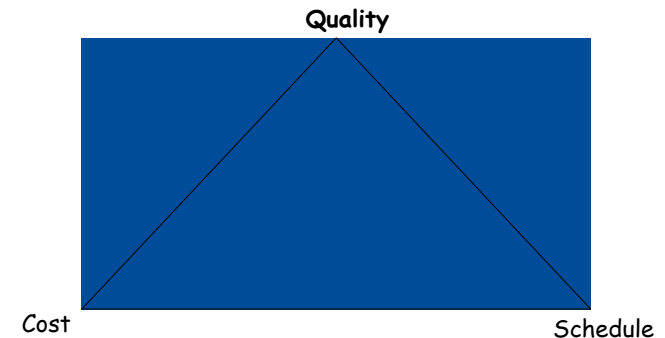
Licensee's responsibility

- Licensee is always responsible for safety
 - Has to control and oversee everything - Independently of the contract type
- Turn Key contract highlights the importance of clear and explicit contracts - requirements for design, manufacturing and construction, commissioning...
 - Requirements are clearly specified in contracts
 - Requirements are systematically, transparently and traceably managed
 - Strong and competent QA/QC to be able to verify compliance with the requirements



Safety culture in a construction project

- Familiarity with and understanding of safety culture aspects in a construction project
 - Safety and quality has higher priority than costs and schedule
 - Understanding of the safety significance of the work, to promote personal responsibility for own performance
 - Open reporting of safety and quality issues, feedback to workers - Foremen personnel management skills
- Multiculturalism of the projects and the construction site



Photos: TVO

Regulatory oversight and inspections

- Trust but verify...
 - Stringent regulatory approach and inspections are needed to verify that performance and equipment meet the specifications set by the designer and approved by the regulator
 - The QC inspectors may be under too much financial pressure from the manufacturer, vendor, and licensee, and may not be in a position to order stoppages and necessary corrections if work is not progressing as expected.
- ...but not to be a part of the project QC



Conclusions

- Starting new build has been demanding because much of the earlier experience and resources have been lost from the nuclear industry
 - Highlights the importance of good preparation for the project
- Construction of a nuclear power plant is a complex project and requires nuclear specific know how
 - Safety culture aspects has to be taken into account from day one
- Roles and responsibilities of participating organisations have to be clear and understood (Regulator, Licensee, Vendor, Subcontractors)
 - Licensee responsible for safety, Regulator is independent