Olkiluoto 3 Experience

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Outline

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

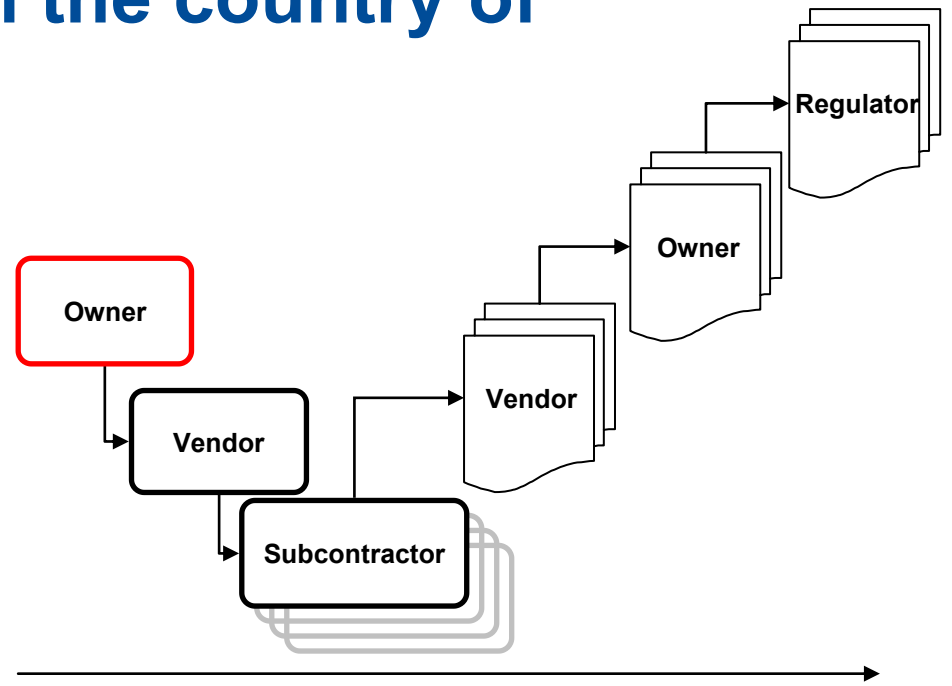
OL3 Project - General

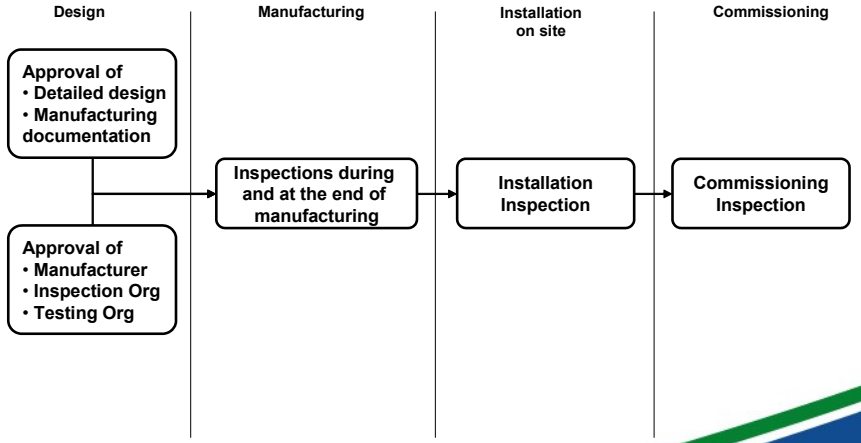
- OL3 is the first EPR being constructed
- OL3 is a turn key project
  - Owner and operator (Licensee) is TVO
  - Constructed by Consortium of Areva and Siemens
- Project is progressing but is more than three years behind original schedule

Photos: TVO

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

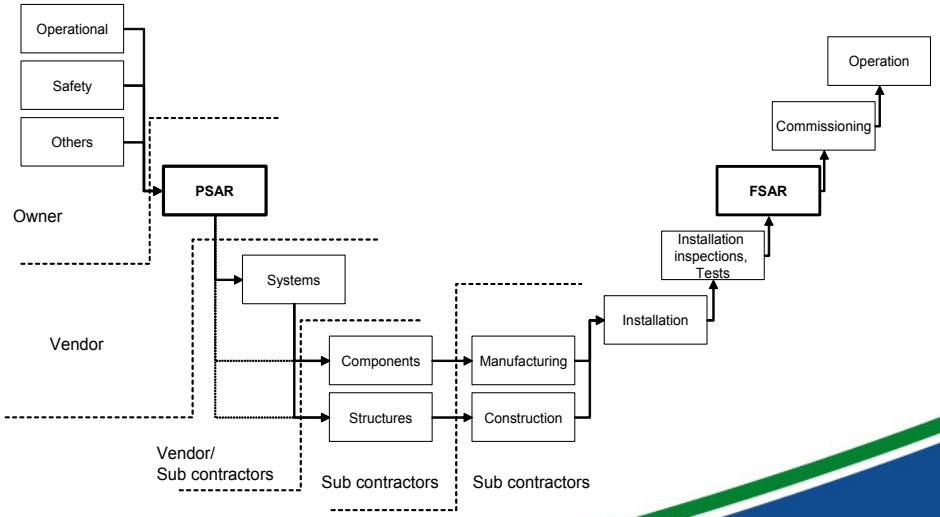




Completion and management of the plant's design

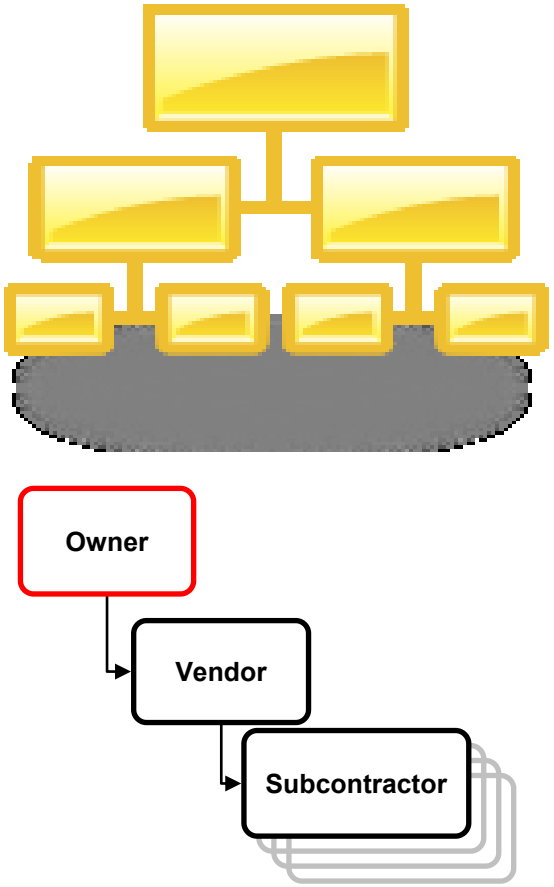
Design of the plant

- Completion of the design prior construction
  - New design features,
  - Resources needed for the design work
- 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



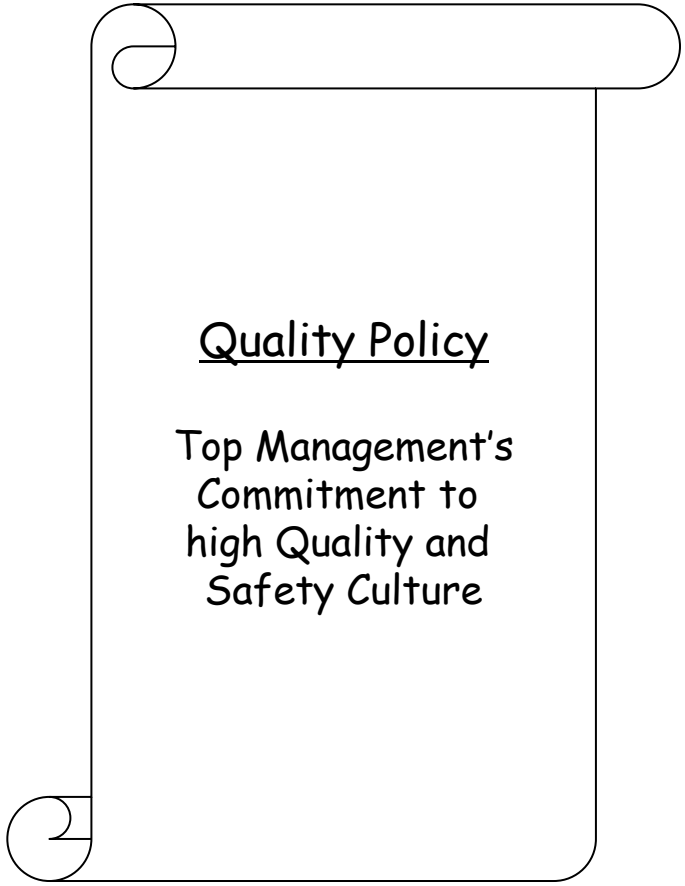
Experience and know how of the licensee and vendor, management of subcontractors

- 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
  - vendor in house capabilities vs. what needs to be subcontracted
  - how subcontracting is managed (selected, trained, qualified and controlled)
  - length of subcontractor chains?
  - are subcontractors ready for the project?



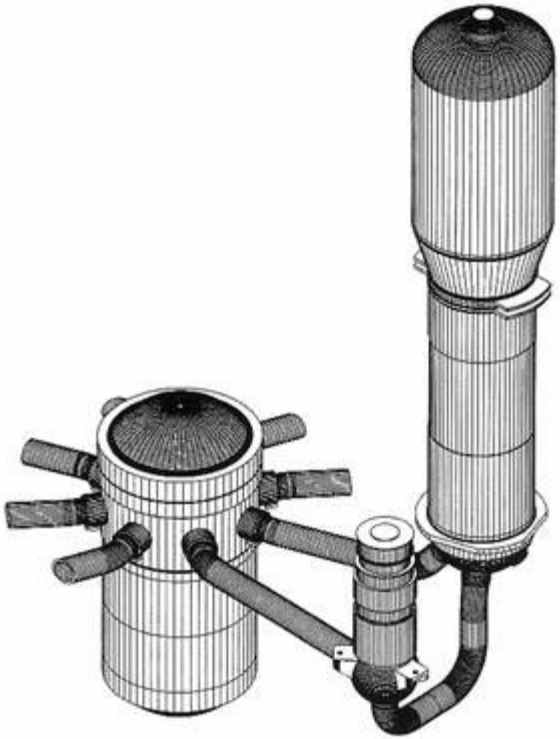
Role of quality management

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



New and advanced manufacturing technology

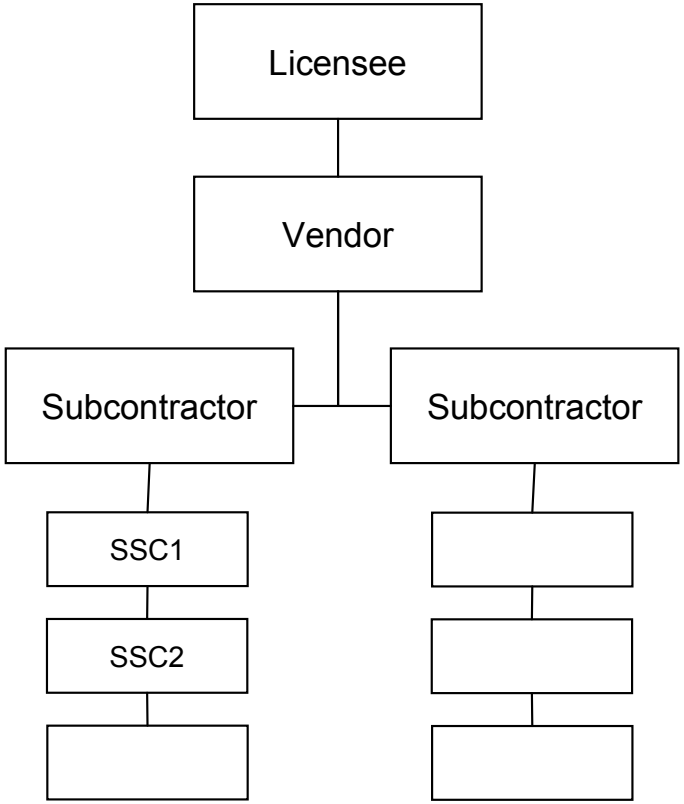
- Qualification of a new construction or manufacturing method may take time
- First pieces coming from manufacturing may not meet all specifications



Paineastia ja yksi neljästä kiertopiiristä höyrystimineen

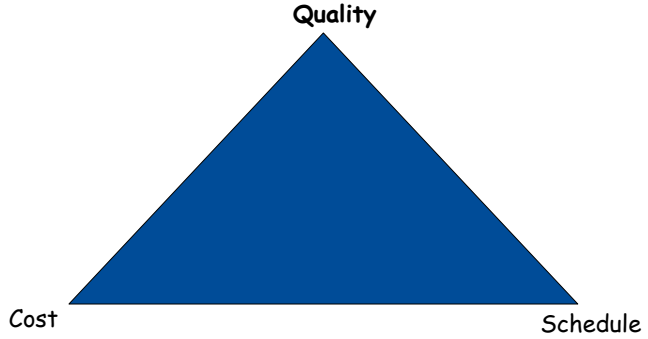
Licensee's responsibility in turn key contract

- Licensee is always responsible for everything
  - Has to control and oversee everything - Independently of the contract type
- Highlights the importance of clear and explicit requirements for design, manufacturing and construction, commissioning...
  - systematic, transparent and traceable requirement management together with
  - 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
    - Understanding and respect of the hazard - Observance of design criteria, inspection and quality requirements
  - Open reporting of safety and quality issues, feedback to workers
    - Foremen personnel management skills
- Multiculturalism of the projects and the construction site



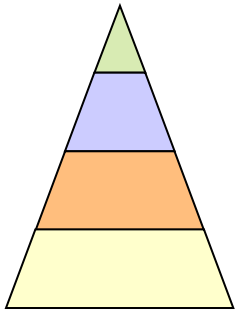
Photos: TVO

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.
- Regulator is not part of the QC of the project

Regulatory issues in new construction

- Safety requirements are up to date before project starts
- Independence of the regulator with strong powers and enforcement tools
- Adequate resources, tools etc. for the work
- Regulatory system and decisions are transparent and traceable
- Regulator is ready for media and public interest on the project
- International issues
  - Co-operation between regulators (bilateral, MDEP etc.) has been very useful
  - IAEA services (IRRS, INIR, Pre-OSART etc)



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 the beginning
- Roles and responsibilities of participating organisations have to be clear (Regulator, Licensee, Vendor, Subcontractors)
  - Clear need for regulatory inspections during construction and manufacturing