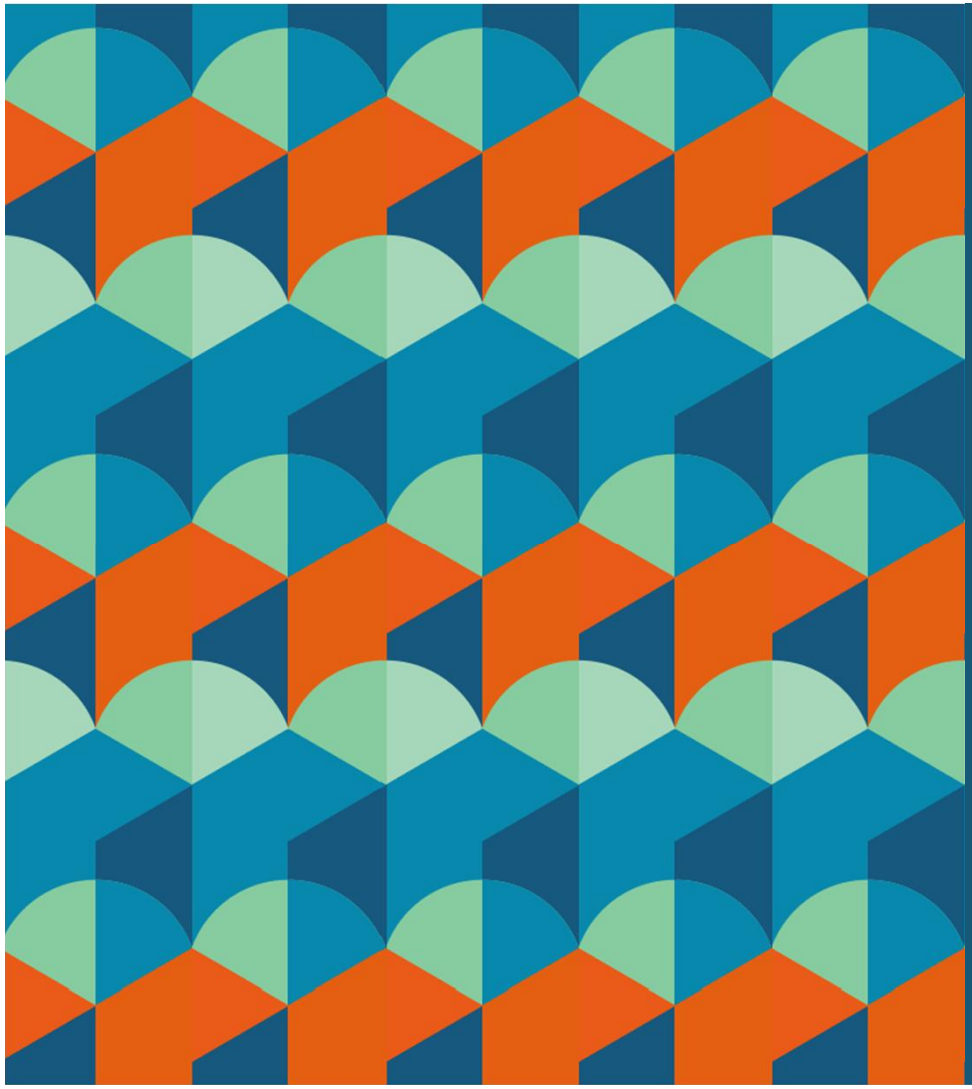


Lessons Learned from FiR 1 TRIGA Decommissioning

M. Airila, I. Auterinen, P. Kotiluoto, A. Räty and O. Vilkamo

SYP 2019

Helsinki, 30-31 October 2019


30.6.2015

Status of decommissioning

2012 VTT's decision to shut down FiR 1

2013–15 EIA for decommissioning

2015 End of operations

2016 Dismantling planning

2017 License application for decommissioning

Public hearing à 31.3.2018

STUK's safety assessment à 31.3.2019

2021–24 Dismantling begins, subject to SNF solution

Path forward
Alternatives

SNF interim storage option

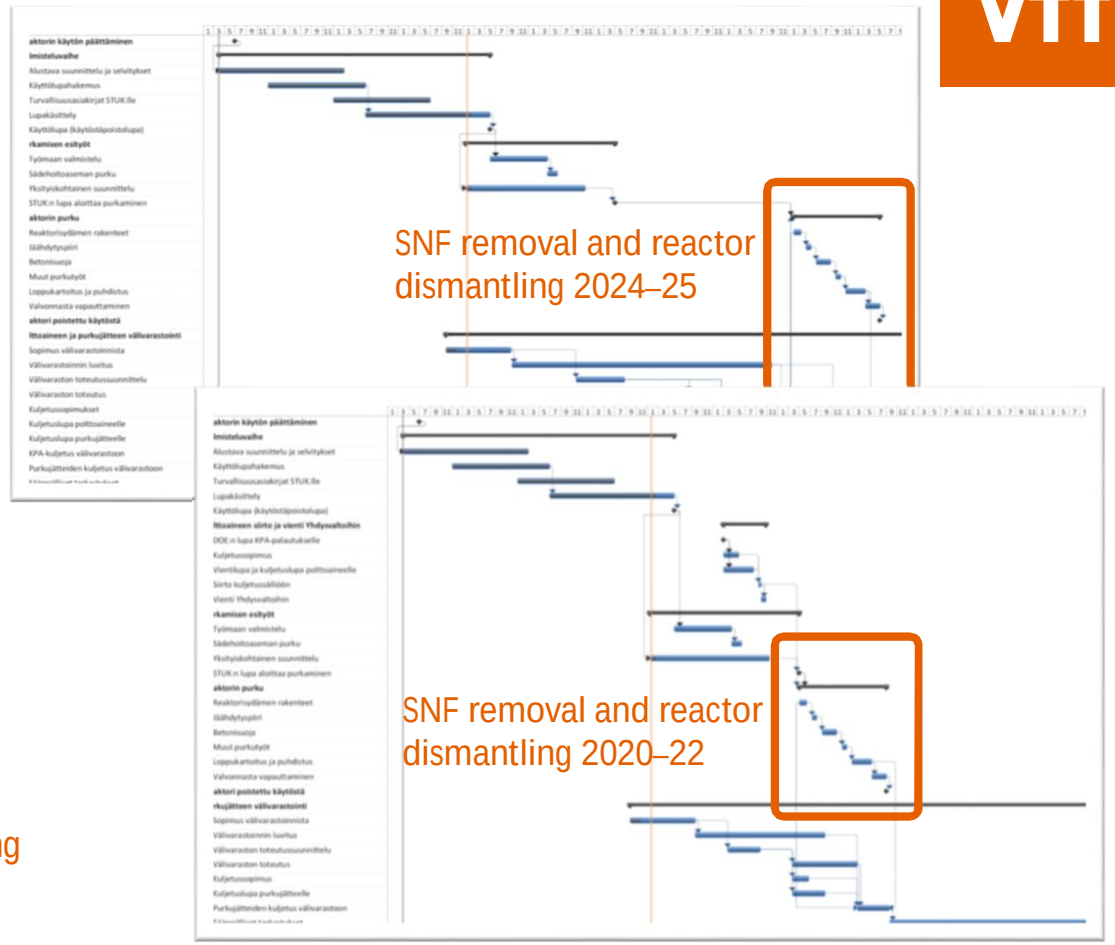
- Contract with domestic NPP operator
- Licensing + investments à + 2–3 years
- Final destination: USA or Finland

SNF direct return option

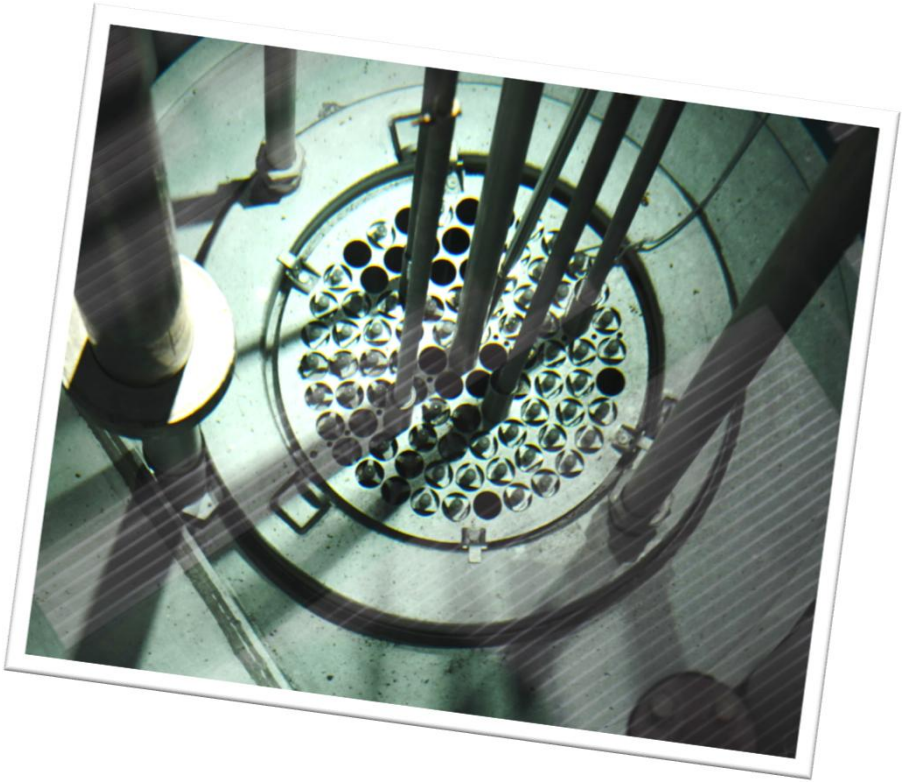
- Return to USA as soon as Idaho opens: 2020? 2021?
- Readiness to start dismantling in 2021

Selection of path?

- Preparation for transport to USA ongoing
- Preparations for interim storage: soon



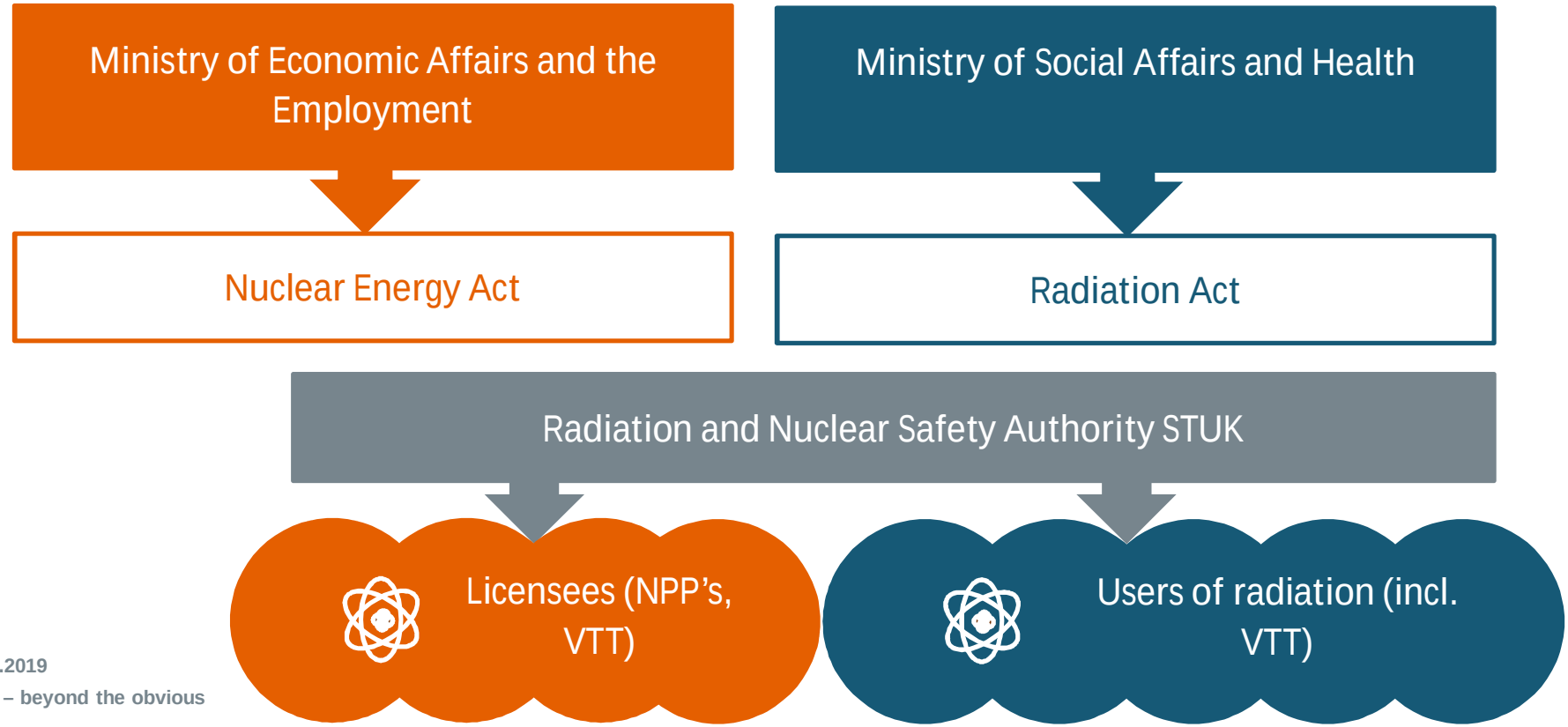
103 spent fuel elements

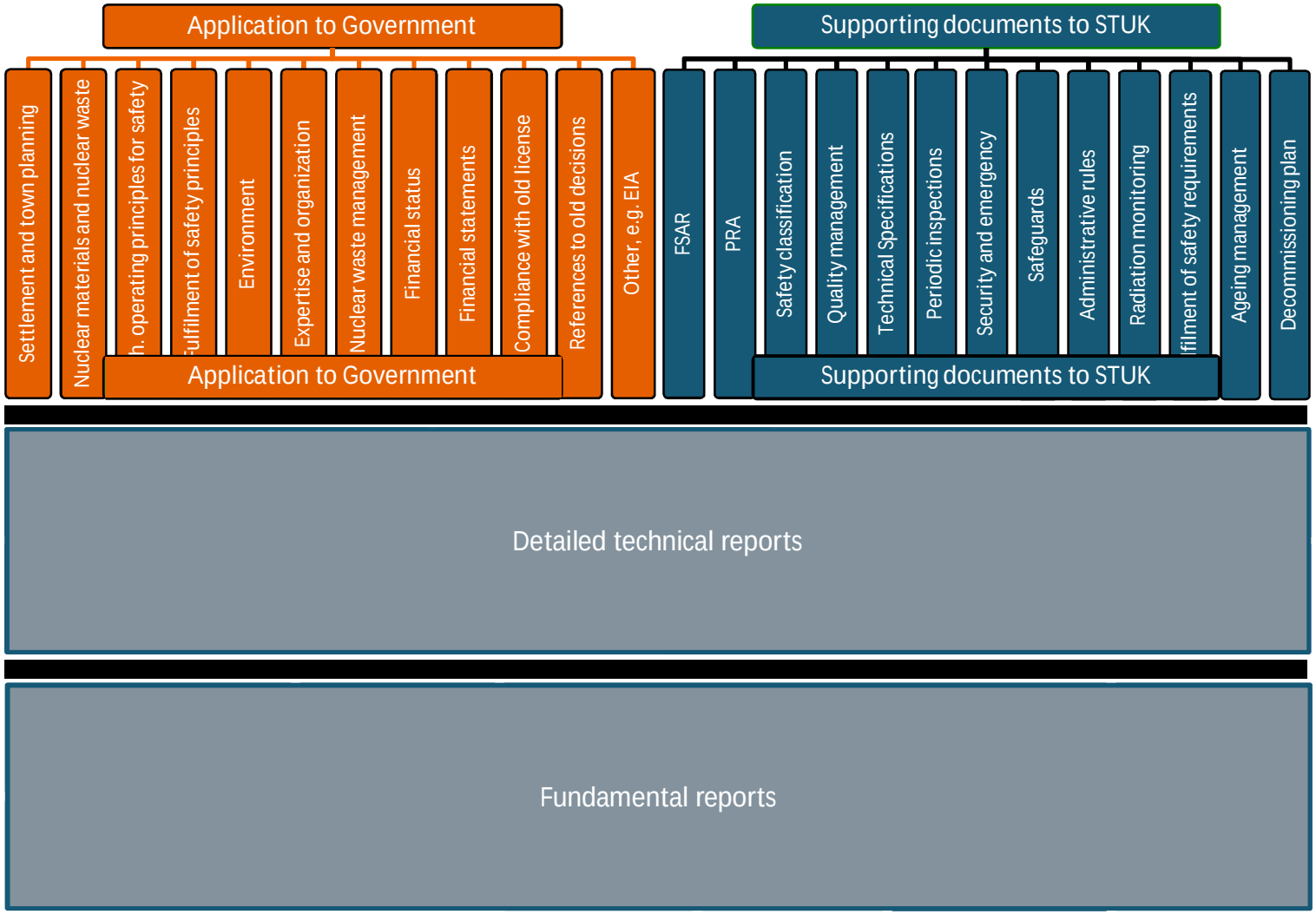


Licensing for decommissioning

Division of duties between ministries

According to the Finnish Radiation Act




Application to Government
Settlement and town planning
Nuclear materials and nuclear waste
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Environment
Expertise and organization
Nuclear waste management
Financial status
Financial statements
Compliance with old license
References to old decisions
Other, e.g. EIA
Application to Government
Supporting documents to STUK
FSAR
PRA
Safety classification
Quality management
Technical Specifications
Periodic inspections
Security and emergency
Safeguards
Administrative rules
Radiation monitoring
ilment of safety requirements
Ageing management
Decommissioning plan
Supporting documents to STUK
Detailed technical reports
Fundamental reports

Lessons learned during licensing and initial planning

Evolution of detail in planning

2007: Consultation on potential decommissioning strategies (Platom)

Various opt

Review of V

Suggestions

Experiences

2013: Preliminary dismantling plan (Platom)

Available di

Experiences

foreign rese

One of the

2016: Detailed dismantling planning (BNG)

All specific

Documenta

dismantling

Technical re

VTT prepar

plan and SA

2017 à Refine the detailed dismantling plan (Fortum)

Include all practical considerations:

- Site logistics
- Waste acceptance criteria
- Integrate dismantling, waste management, radiation protection and security operations

Dismantling planning 2016–17

Example: cutting of the biological concrete shield

Competitive tender for planning

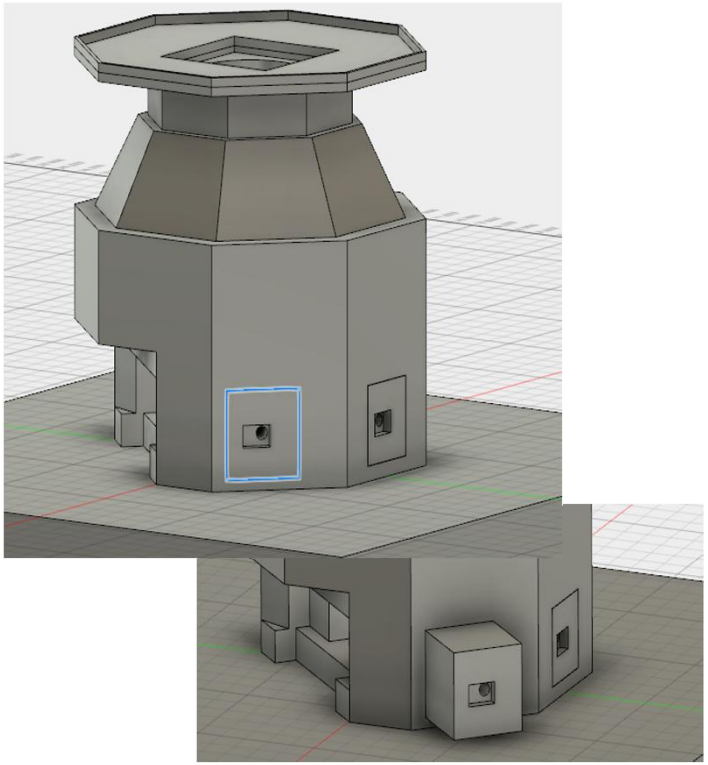
- Relatively high interest, good tenders
- Selected contractor: Babcock Noell GmbH & Fortum

Work completed by BNG and reviewed by VTT

- Practically in schedule (+ 1 month)
- One small additional work order
- Domestic regulation, packaging plan and safety classification scheme by Fortum

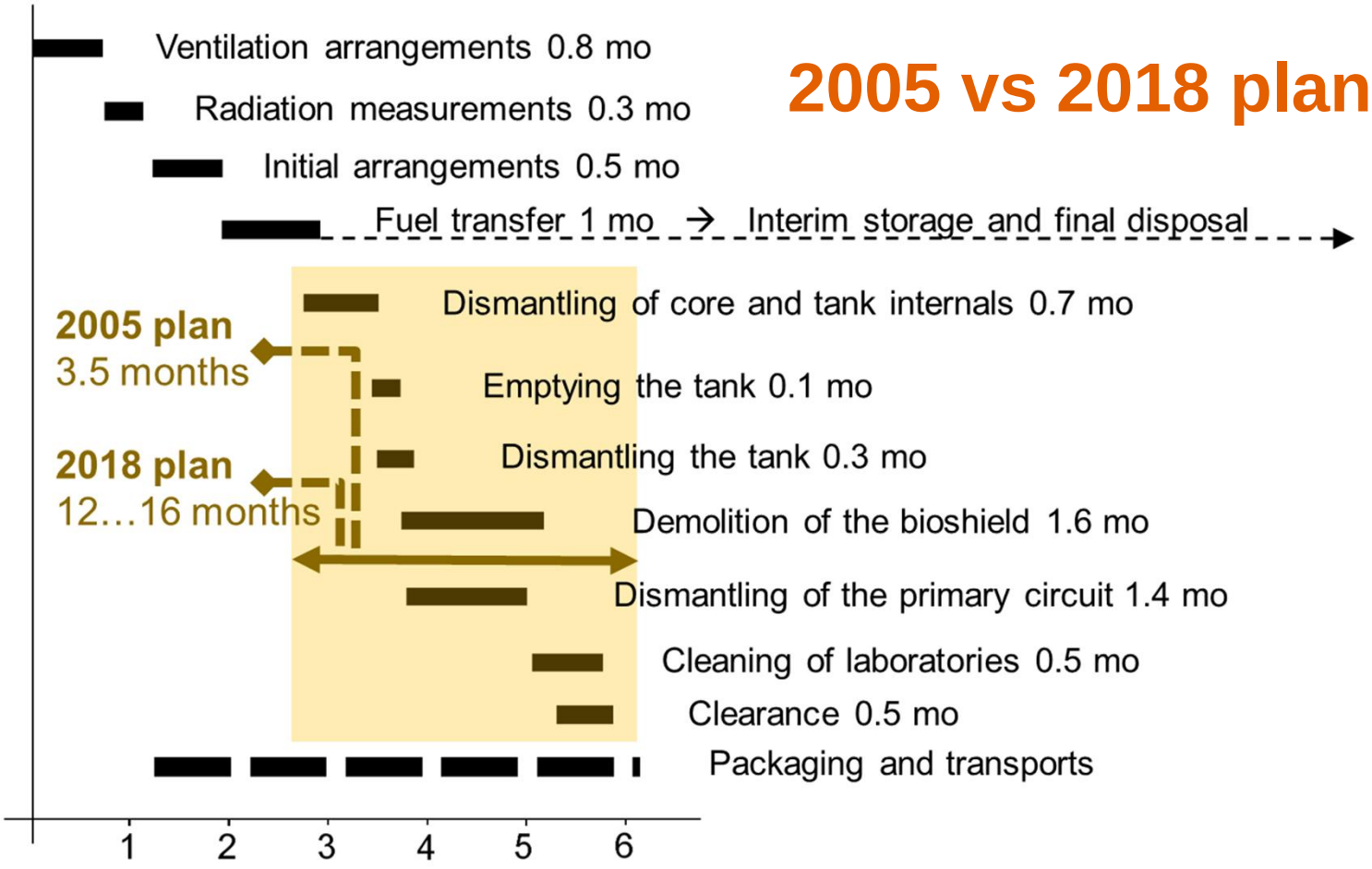
The plan forms the basis for…

- Technical part of the licensing documentation
- Also supports costing calculations

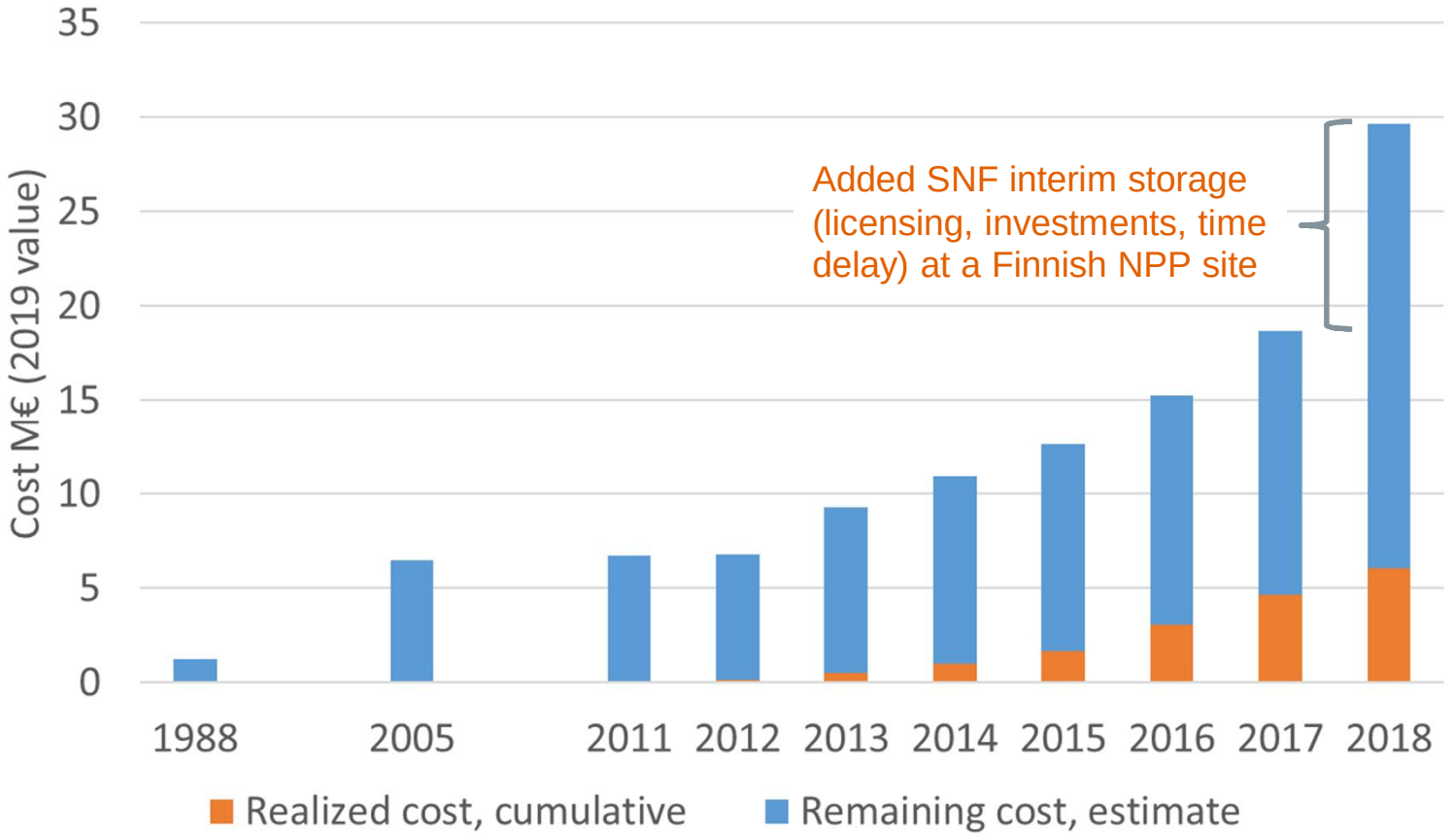


Babcock Noell GmbH

2005 vs 2018 plan



Cost estimate evolution 1988–2018



Summary of lessons learned

First nuclear facility to be decommissioned in Finland

Impact on national regulation and practices

- à Interpretations of specific requirements (safety goals and practice)
- à MEAE and STUK used FiR 1 experiences in development of legislation

Experience gained in the project organization

- à Active owner in dismantling planning projects
- à In-house experience in inventory modelling and measurements

Adapting the organization to decommissioning

- à Retained all operating personnel + key recruitments
- à Safety culture assessment 2018 – recommendations being implemented

Main challenge: uncertainty over waste solutions at shutdown

- à Licensing: long preparation and review times
- à Planning: slow convergence of plans (lack of fixed boundary conditions)

See also

VTT's info pages on the decommissioning project

http://www.vttresearch.com/services/low-carbon-energy/nuclear-energy/decommissioning-of-finlands-first-nuclear-reactor

Decommissioning license application (Website of the Ministry)

http://tem.fi/en/vtt-technical-research-centre-of-finland-ltd-s-licence-application-for-decommissioning

beyond
the obvious

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