# Posiva update January 2019

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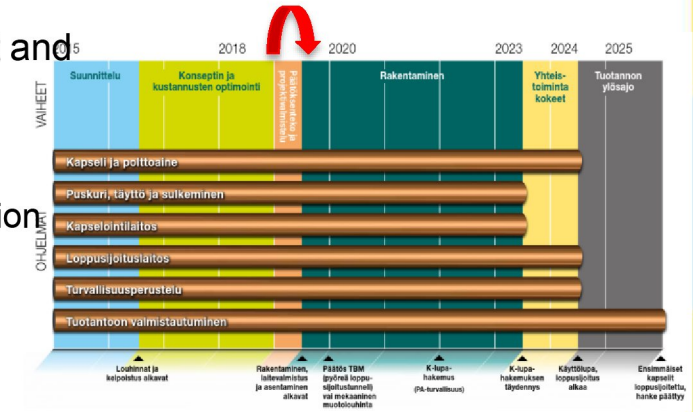
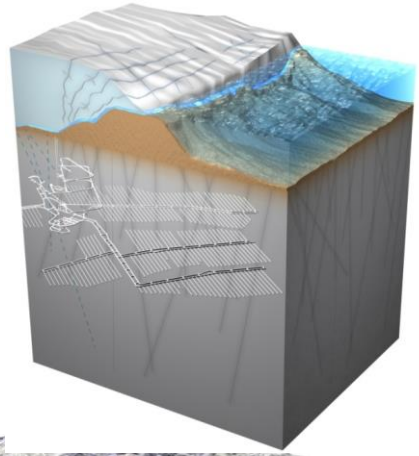
# Posiva's program

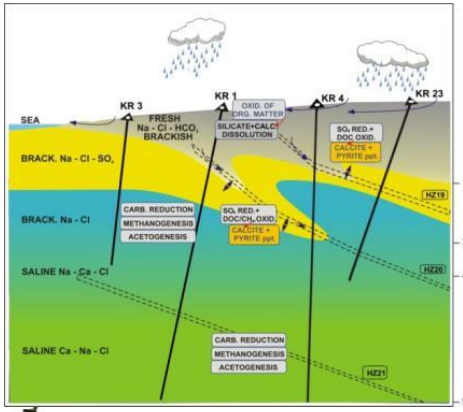
- Posiva reformulated its program into a phased approach, to assess the overall maturity of the program when proceeding from one phase to another
- Now, a decision is prepared to proceed from the "Concept and cost optimization phase" into the "Construction phase"
- The decision will involve several contracts to:
  - Construct the encapsulation plant
  - Manufacture and install the equipment of the encapsulation plant
  - Construct the technical and other rooms in final disposal facility
  - Manufacture and install the final disposal machinery
- Maturity of the concept and facility projects has been evaluated against the predefined criteria for the decision => a proposal to proceed has been made to Posiva's owners



# Finishing the concept and solving open issues

- Remaining research and development work is focused on closing the open issues recognized by Posiva and required by STUK
  - Issues deal mostly with verifying the assumptions and models used in the safety case for the construction license
  - The safety case work for the operating license is ongoing






# A phased strategy to develop and test disposal techniques

- Lab scale tests to study material performance
- Part-scale tests to upscale performance and rehearse installation
  - In various facilities
  - In ONKALO
- Full-scale installation tests per component
  - Above ground
  - In ONKALO® - POPLU
- Full-scale In-Situ System Test, FISST, in ONKALO®
  - All EBS components
- Commissioning
  - Without spent fuel (cold test)
  - With spent fuel (the 1st deposition tunnel - disposal of spent fuel in 30-40 canister)

# Preparing for production

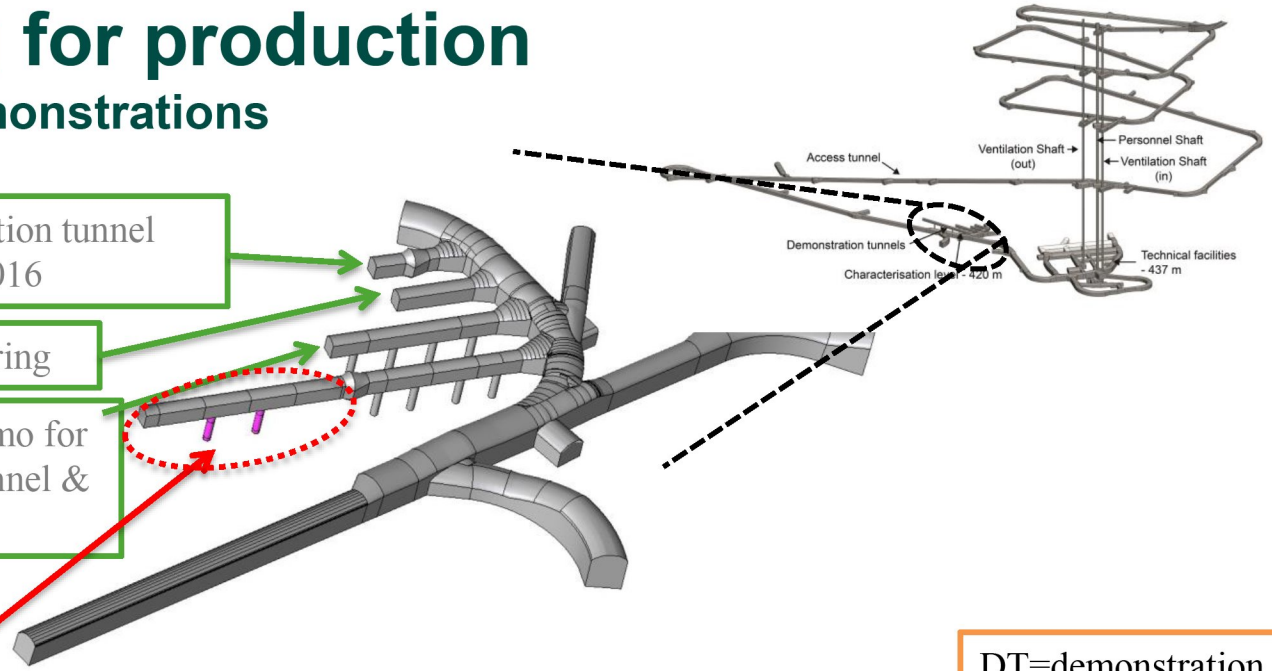
## ONKALO® demonstrations

DT4, POPLU=deposition tunnel end plug test, 2012-2016

DT3, POPLU monitoring

DT1, construction demo for CLA of deposition tunnel & 4 holes

DT2, construction demo, installation tests FISST 2016-2019




DT=demonstration tunnel
CLA=construction license application

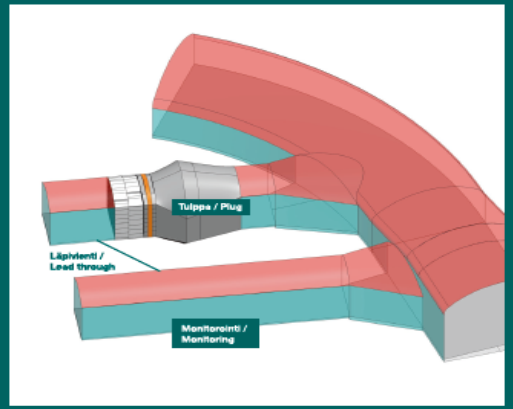
## DOPAS Full Scale Demonstration of Plugs and Seals

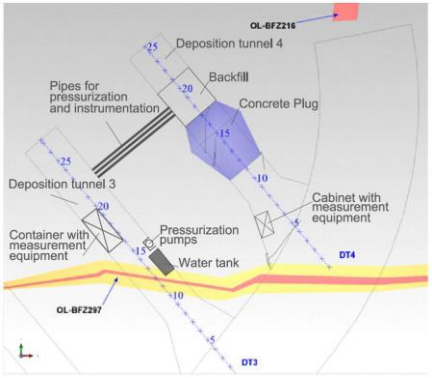
# POPLU loppusijoitustunnelin tulppakoe

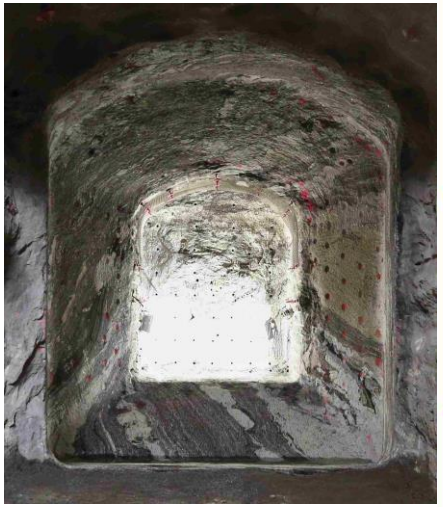
- POPLU loppusijoitustunnelin tulppakoe toteutetaan ONKALOn demotiloissa suunnitellussa loppusijoitussyvyydessä.
- Kiilan muotoisen tulpan pääkomponenttina toimii raudoitettu matalan pH:n omaava betoni. Betonitulpan taakse asennetaan modifioitu tunnelintäyttö tulpan tutkimustarvetta varten.
- Tulpan pituus on noin 6 metriä ja halkaisija noin 5,5 metriä.
- Asentamisen jälkeen tulppa paineistetaan ja sen toimintaa monitoroidaan noin 100 mitta-anturin avulla viereisestä tunnelista.

# POPLU deposition tunnel plug experiment

- POPLU deposition tunnel end plug experiment will be implemented in ONKALO demonstration area at the planned disposal depth.
- Steel reinforced low pH concrete is the main component in the wedge plug. A modified tunnel backfill will be located behind the plug for experimental purposes.
- Length of the plug is ~6 meters and the diameter is ~5.5 meter.
- The plug is pressurized and monitored using ~100 sensors from the neigh-bouring tunnel.



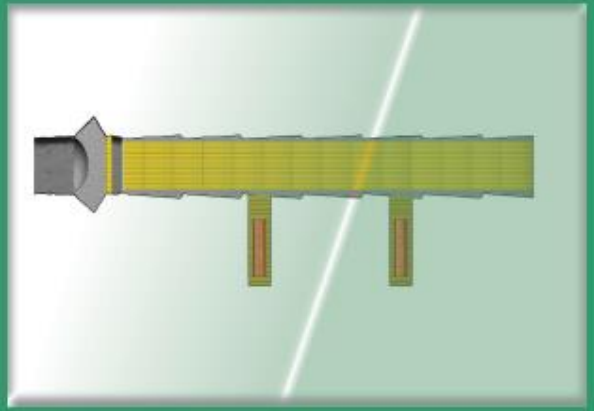



# FISST

## Full-scale In Situ System Test

ONKALO™ demonstration area at the disposal depth of 420 metres



### FISST Objectives and targets

- To prove that final disposal works in practice from supply chain to installation
- To prove that the pre-defined initial state can be achieved and the set requirements met
- To produce pioneering information about the early evolution of the disposal system
- To promote the global final disposal credibility and acceptability as FISST will prove that final disposal can be done, in real conditions, in a real final disposal facility

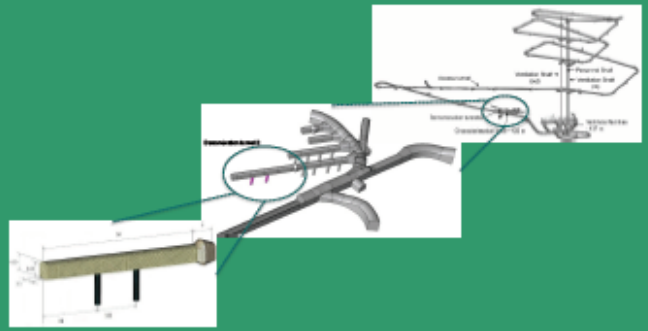
# FISST

## Full-scale In Situ System Test

Design, installation and comprehensive monitoring of EBS components in crystalline host rock:

- 2 copper canisters (with heating equivalent to the fuel decay heat)
- buffer in two deposition holes
- about 50m backfill
- deposition tunnel plug

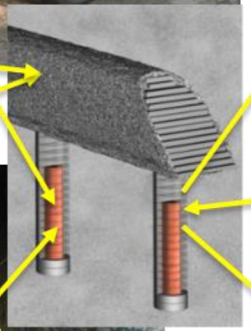
**FISST location in ONKALO™**



FISST will be implemented to show that this can be done in practice, in full scale and in a real repository environment

Installation starts in 2018 and external participation is allowed

# Full-scale In-Situ System Test FISST



# Safety case and site description

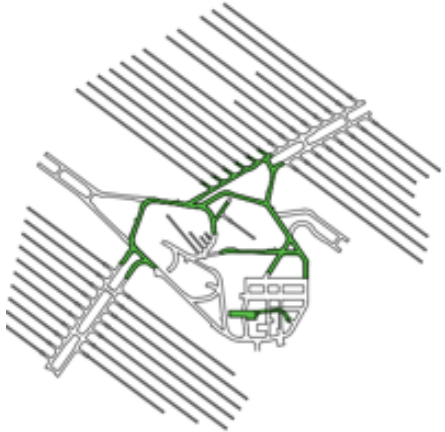
- The safety case work for the operating license is ongoing
- The safety case is compiled in a Content Management System
- OSD2019 (Olkiluoto Site Description) compiles geological, hydrogeological, hydrogeochemical, rock mechanical and surface environment characteristics in Olkiluoto, which have been studied and modelled nearly for four decades in Olkiluoto
- OSD2019 main product is an integrated Olkiluoto site model

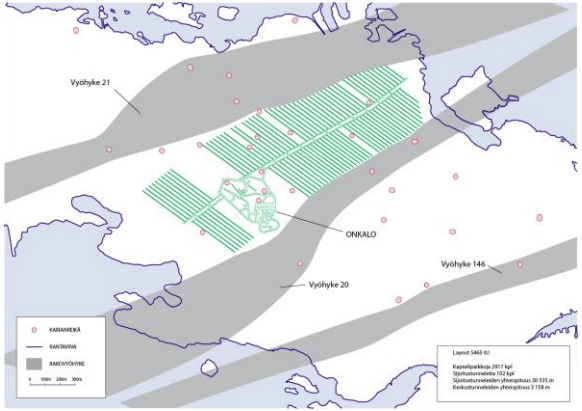
# Status of Encapsulation Plant Project

- Excavation and shot-creting of the foundation for the encapsulation plant finished
- Detailed design of encapsulation plant in preparation for procurement of construction
- Engineering and licensing of encapsulation plant systems in preparation for manufacturing
  - Main system suppliers selected

# Final disposal facility

- Canister shaft raise boring on-going
- Personnel shaft reinforcement and equipment for the lift in preparation
- Excavations of safety classified central tunnel in preparation





# Preparing for production

- Planning of the commission test ongoing
- Planning of the production for the first phase done
- Frame contracts with the main material and component suppliers done
- Personnel planning for the operation phase done

# Other activites

- Nuclear Waste Management programme YJH-2018 for 2019-2021 submitted to the Ministry in Sept. 2018
- Concept optimisation for industrialisation on-going
- Construction plans for the canister copper components accepted by STUK
  - Complementary studies related to some specific corrosion issues carried out
- Update of the cost estimate for financial provisions and for the facility’s lifetime by end of June 2019


# Thank you!
# Kiitos!

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