DOPAS

DOPAS
Training Workshop 2015

A General Overview Of DOPAS Project

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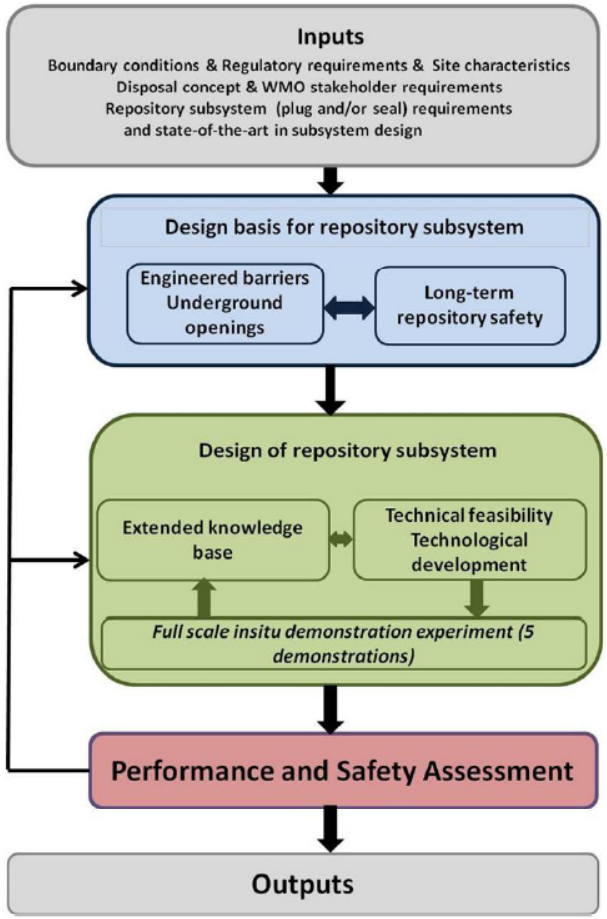
on behalf of consortium
14 September 2015

The research leading to these results has received funding from the European Union's European Atomic Energy Community's (Euratom) Seventh Framework Programme FP7/2007-2013, under Grant Agreement No. 323273 for the DOPAS project.

5.2.1

DOPAS (2012-2016) in general
Full-scale demonstration of plugs and seals

- **DOPAS is about full-scale demonstrations of plugs in underground and above ground with 4 year duration**
  - **for the feasibility of construction and for the performance assessment of the plugs selected for the demonstrations**
- **14 partners, 8 countries, 5 experiments**
- **18.5 million euro budget with Euratom FP7 support**

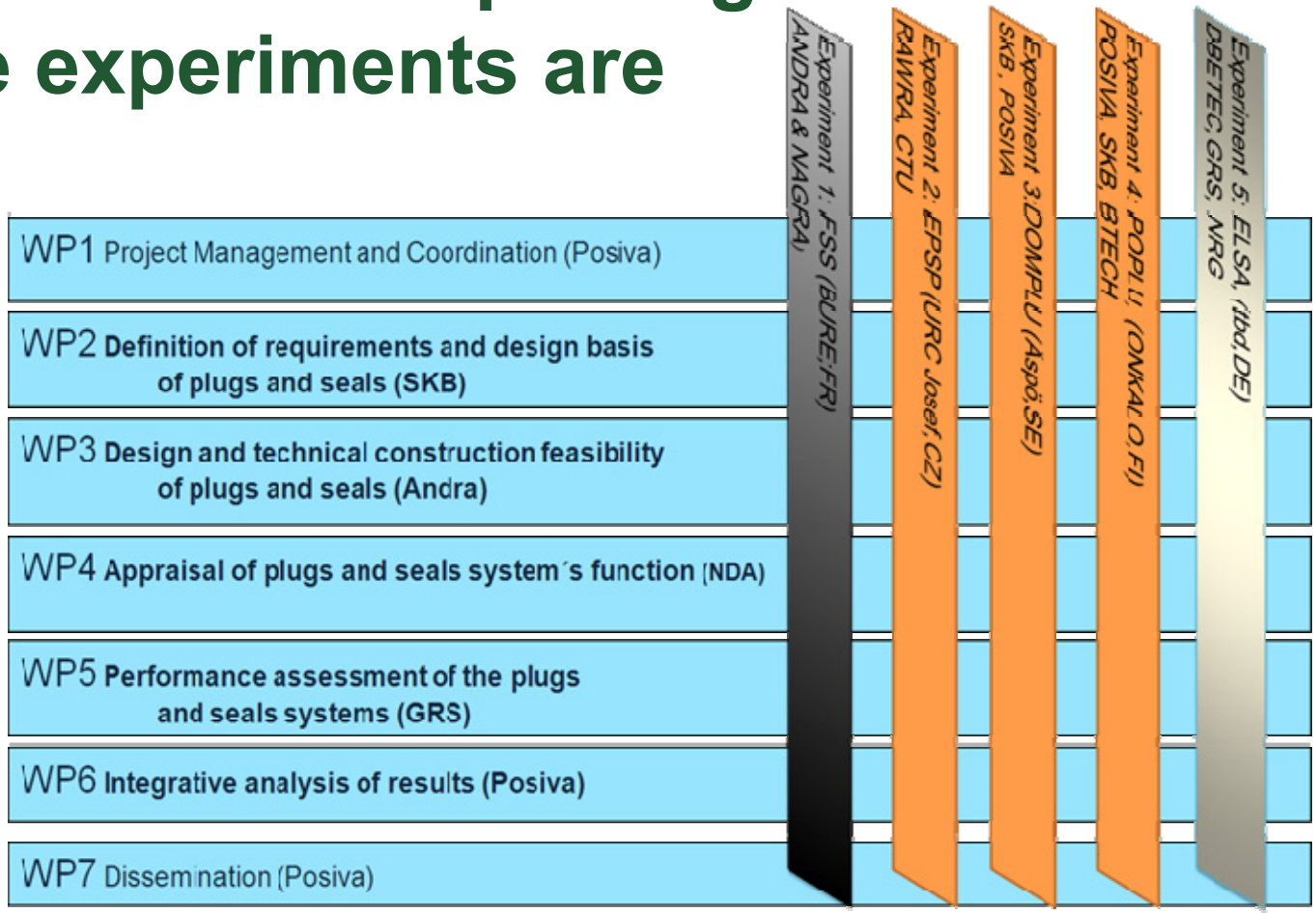


One context for DOPAS – meet our coordinator http://www.posiva.fi/en/media/time_travel_to_final_disposal#.Vel2m53yVmM

Seven DOPAS work packages and five experiments are

implemented partly or fully in underground or above ground conditions.

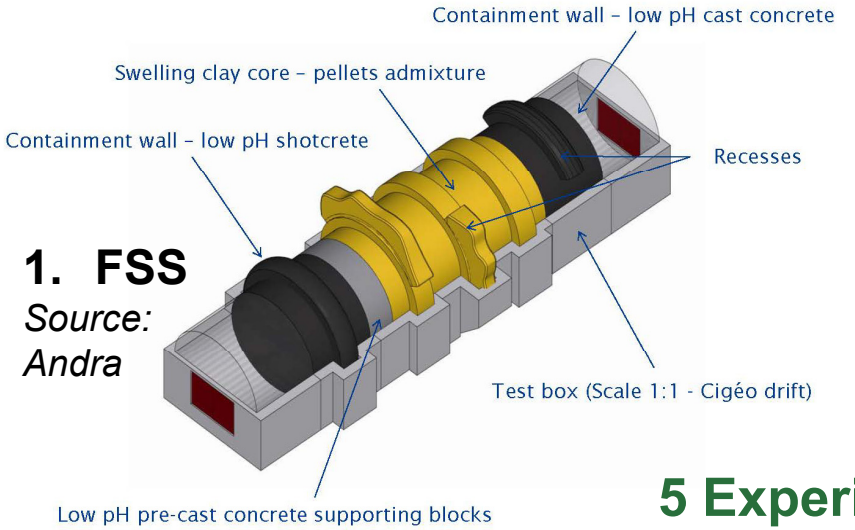
Results can be used for planning of L/ILW and Spent Nuclear Fuel repositories.



This training workshop is a part of the WP7 Dissemination.

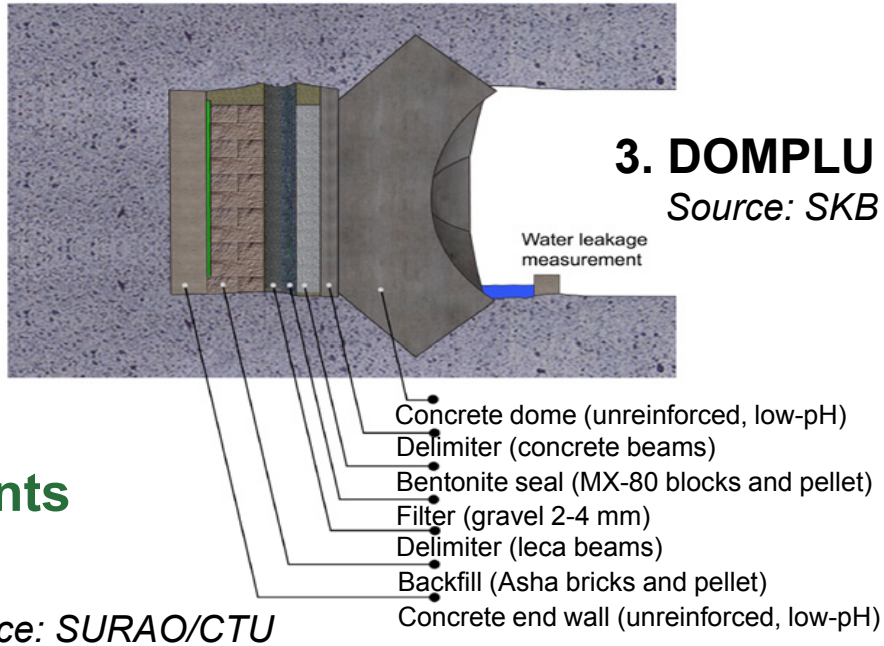
1. FSS

Source: Andra



3. DOMPLU

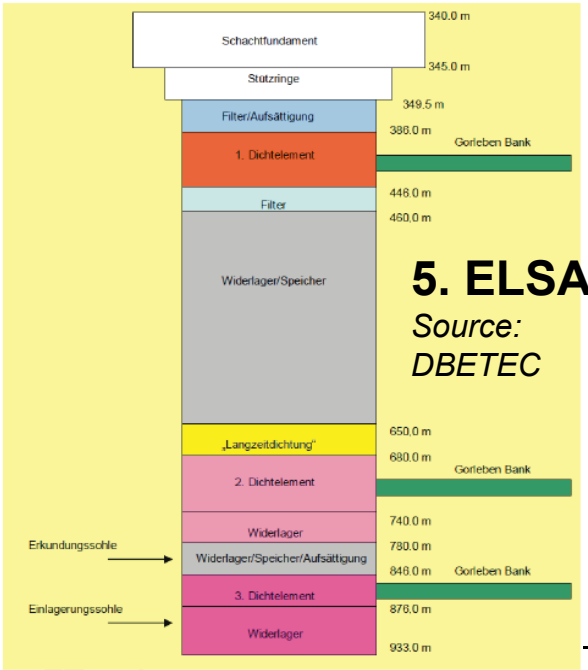
Source: SKB



5 Experiments

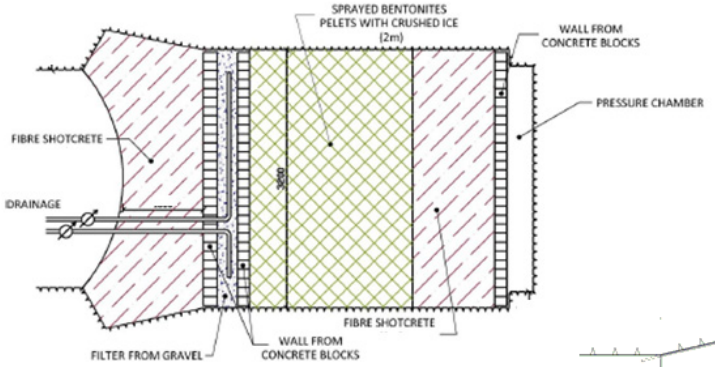
5. ELSA

Source: DBETEC



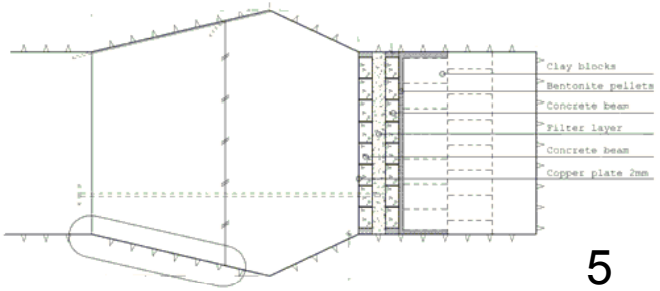
2. EPSP

Source: SURAO/CTU



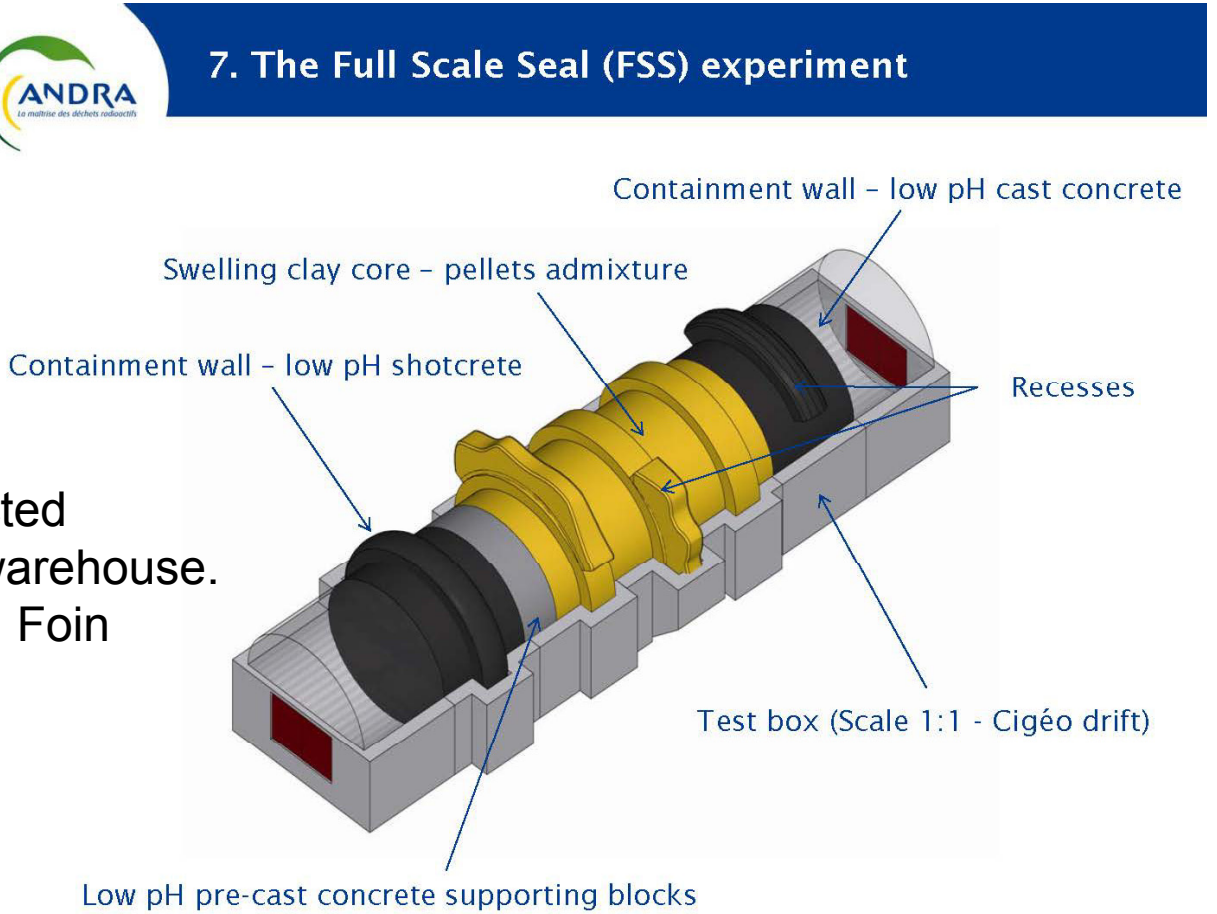
4. POPLU

Source: Posiva



Figures not in scale

DOPAS Experiment 1: Full Scale Seal (FSS) in France



Bentonite core seal (dia. 9 m) constructed in a concrete box in a warehouse. See presentations of R. Foin and J. Wendling later.

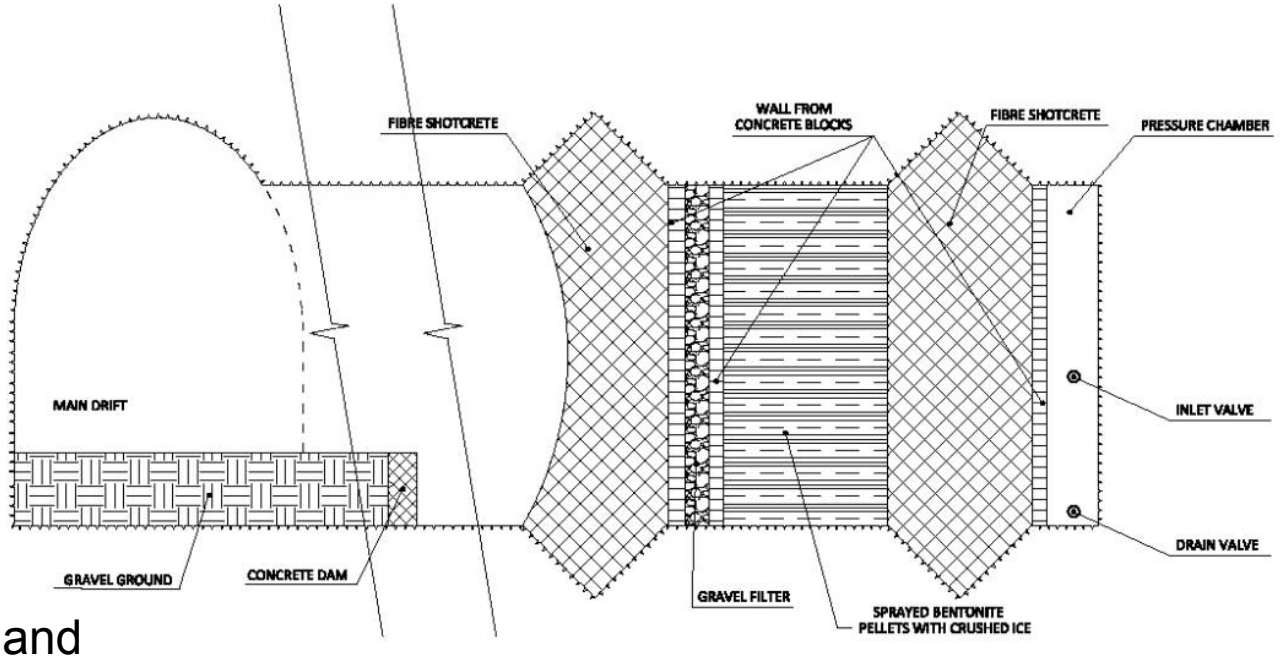
Figure: ANDRA

1. FSS STATUS (Andra & Nagra)

- FSS installing and emplacement actions done by September 2014, seal intended for clay.
- Clever dismantling finished by at end of August 2015.

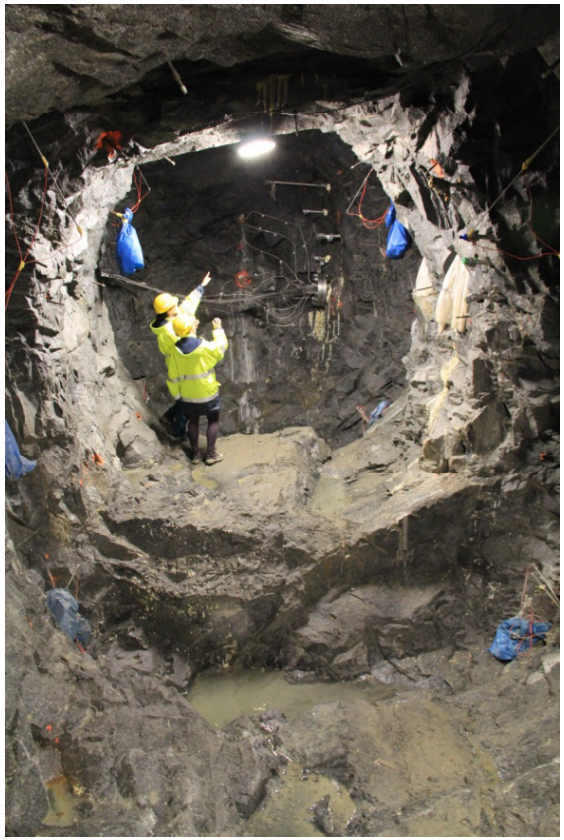
2. Experimental Pressure and Sealing Plug (EPSP) in Czech Republic

Feasibility testing of plug shotcreting method in Josef underground laboratory.
Site visit to EPSP and other presentations follow.



Source: SURAO, CTU

2. EPSP STATUS (SURAO, CTU & UJV)



- Plug location host rock improvement was done during 2014
- Construction of plug elements (e.g. shotcreting) started in Autumn 2014
- Bentonite saturation on-going in August-September 2015

Photos© SURAO &CTU

Crystalline host rock of Josef Underground Laboratory

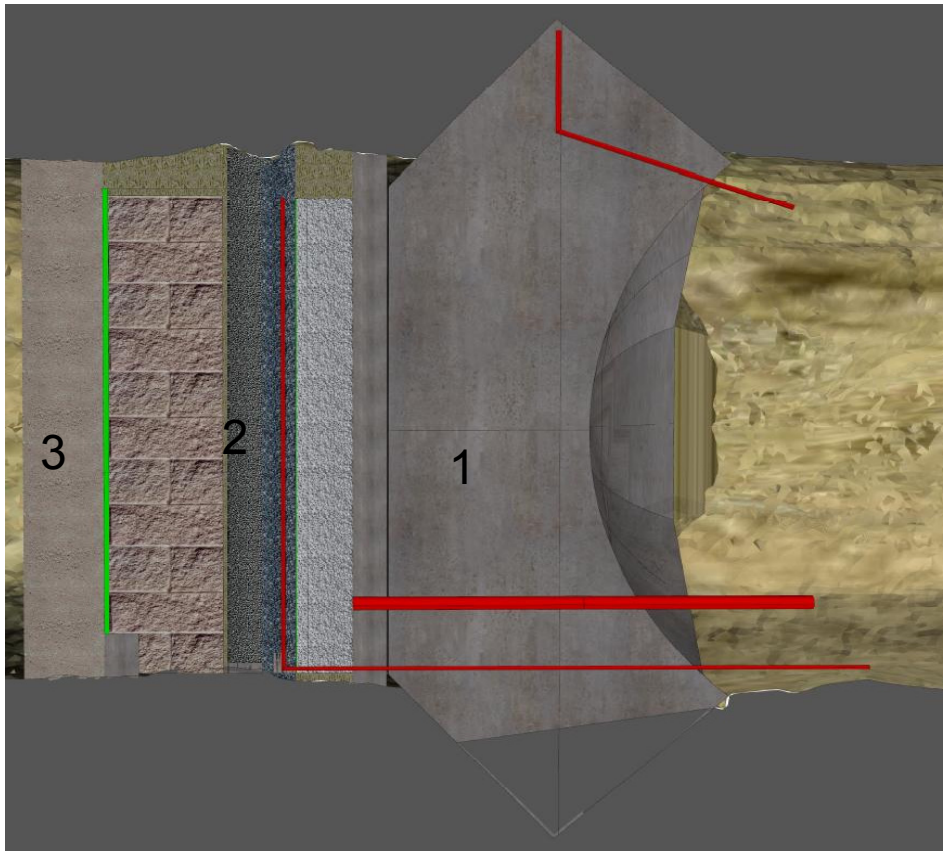
3. Dome Plug (DOMPLU) in Äspö HRL, Sweden

Current reference design for KBS-3V repositories in Sweden and Finland. DOMPLU construction was started prior DOPAS and the results are collected now.

Main parts of this deposition tunnel plug:

1. Concrete Dome
2. Filter and seal layer
3. Backfill zone

Source: SKB



3. DOMPLU STATUS (SKB & Posiva)

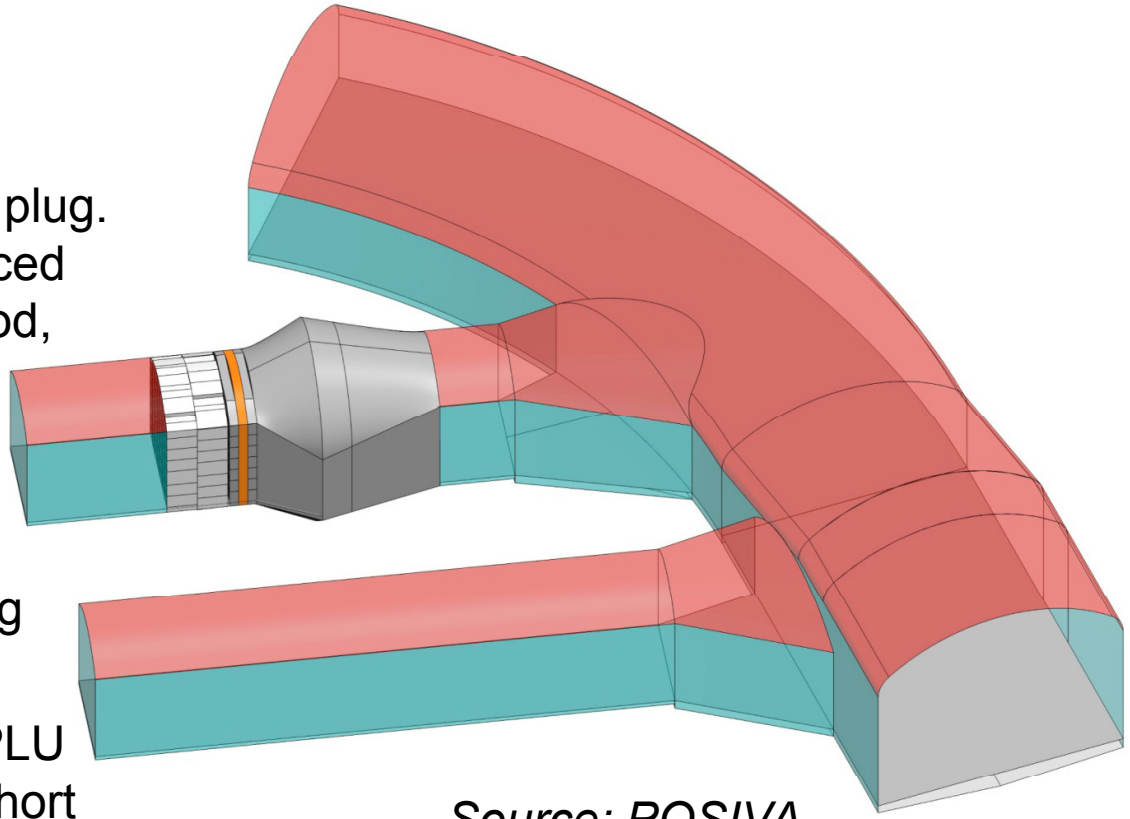
- Wire sawed plug slot produced in crystalline rock
- Dome plug was casted in March 2013, cooling system installed
- Data freeze for DOPAS reporting in September 2014
- Plug's performance is currently monitored

Photos: SKB

4. Posiva's deposition tunnel plug (wedge plug) (POPLU) in ONKALO, Finland

POPLU represents an alternative to the current reference design for the deposition tunnel plug. Plug location was produced with an alternative method, plug's oversight complies with nuclear facility requirements and the concrete cast is reinforced with no cooling system.

Both DOMPLU and POPLU are intended to have a short life time: only several hundreds of years.

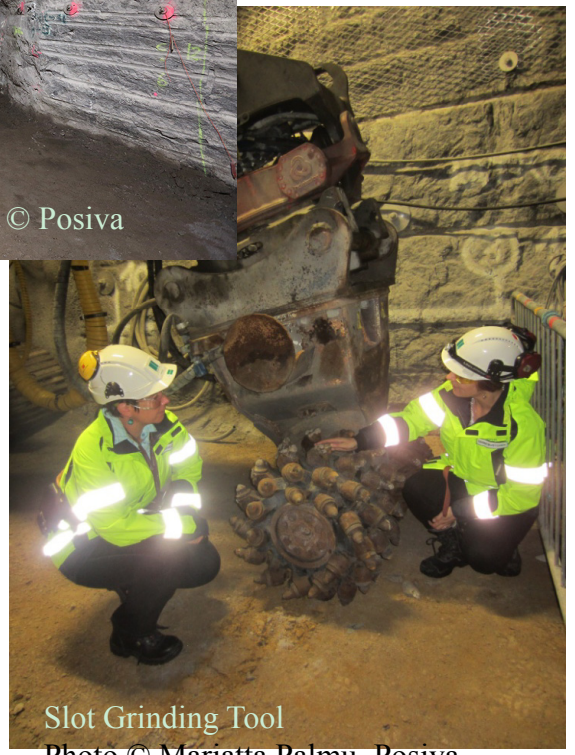


Source: POSIVA

4. POPLU status (Posiva, SKB, VTT & B+TECH)

- Plug location selection using repository criteria
- Slot excavation produced with boring, wedging and grinding method
- Plug installing and emplacement activities in 2015
- The first concrete casting is completed in July 2015, second casting on going this week

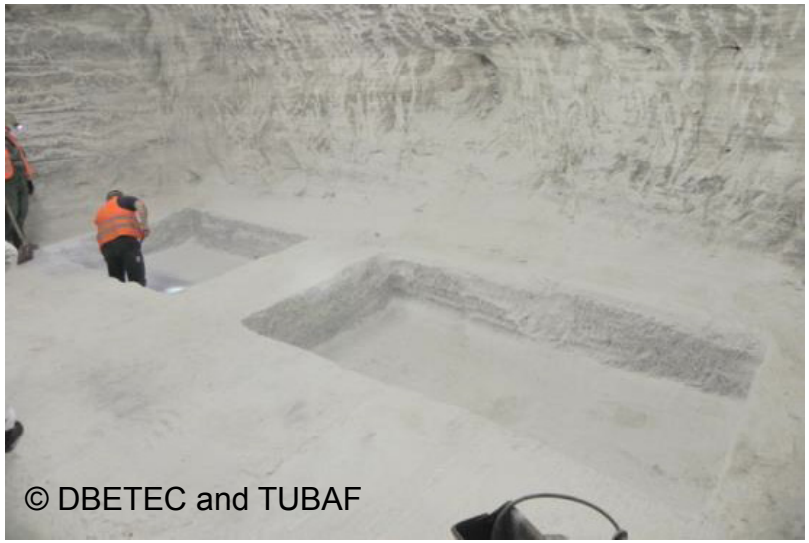
POPLU Slot location. Photo © Posiva

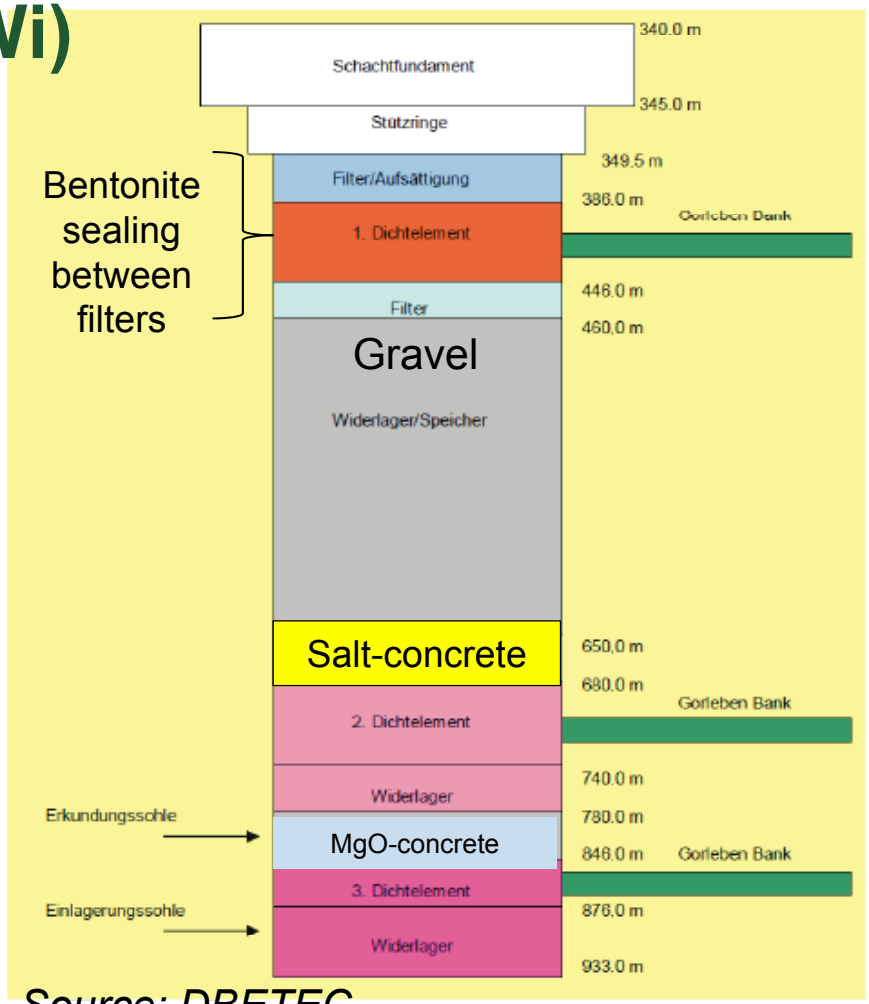


Slot Grinding Tool
Photo © Marjatta Palmu, Posiva

5. ELSA shaft seal experiment in Germany GRS+DBETEC and BMWi)

ELSA related background laboratory and modelling work for LAVA, LASA and THM ton on-going preparing for a future full-scale sealing demonstration. Gorleben shaft depth is over 900m. Foreseen seal lifetime couple of hundred thousands years.

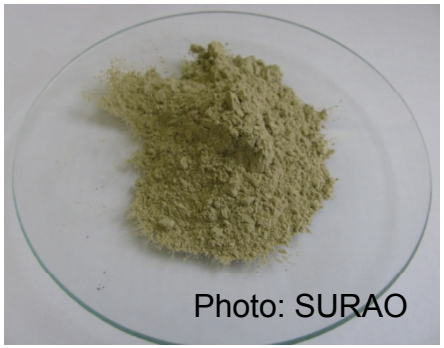




Source: DBETEC

Work carried out in different scales e.g. to define:

- are the densities high enough?
- what emplacement challenges exist ?
- what's the efficiency of methods?
- how to quality assurance and control ?

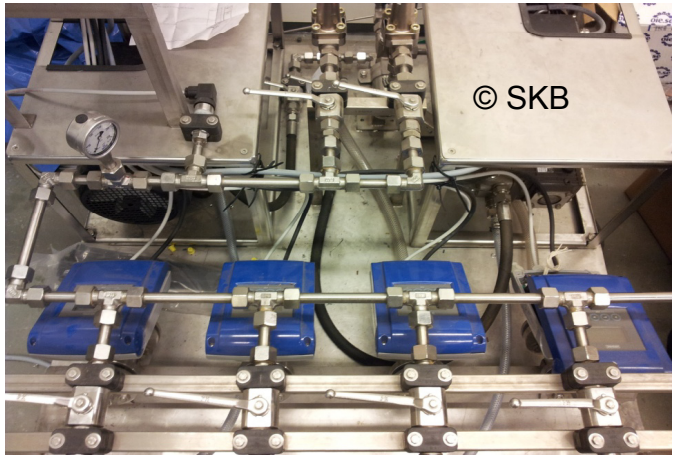


All other photos: ANDRA

The main outcomes of the DOPAS project will be the full scale demonstrators

- Establishing and using requirements for plugs and seals experiments in different European countries and producing a generic view taking into consideration the influences of national and general factors respectively.
  - The context and safety concept behind each experiment influences the intended lifetime of the plugs and seals during the repository lifetime from short to very long-term as presented later.
- Establishing design basis for different types of tested plugs and seals.
- Developing designs, working methods and materials for such plugs for deposition tunnels, drifts and for various shaft seals.
- Developing strategies for demonstration of design compliance with design basis.

Plug behaviour instrumentation example (monitoring performance)



Novel and added information and knowledge has been gained about

- How to locate suitable places for plugs.
- What densities can be achieved for bentonite components, dismantling large concrete/bentonite structures, and related logistics concerns.
- How to construct plugs under regulatory oversight, repository requirements and strict work safety rules:
  - e.g. approval and modification of materials, handling logistics, public procurement and all supporting activities like method tests, and addressing work safety constraints
- How to monitor the plug and seal behaviour
  - plans ready for POPLU (ONKALO) and EPSP (JOSEF)
  - on-going monitoring for DOMPLU (ÄSPÖ)
- And about how well the requirements are fulfilled by the implemented experiment designs.

DOPAS 2016 Seminar

- First announcement to be published
- Call for abstracts: Summer 2015
- **Deadline for abstracts: November 2015**

- Author notification: January 2016
- Final programme: February 2016
- Extended abstract submission: March 2016

- **DOPAS 2016 Seminar: 25-27 May 2016 in Turku, Finland**
- Proceedings published: August 2016

Visit:
http://www.posiva.fi/en/dopas/dopas_2016_seminar


Photo © J. Hansen, Posiva


Source: Posiva

Acknowledgements

- The research leading to these results has received funding from the European Union's European Atomic Energy Community's (Euratom) Seventh Framework Programme FP7/2007-2013 under Grant Agreement no 323273, the DOPAS Project
- More information can be found on the DOPAS website: www.posiva.fi/en/dopas
- DOPAS partners (see below) are thanked for their contributions to this presentation

DOPAS

Further reading for you. All public deliverables of the project are and will be available at:

www.posiva.fi/en/dopas

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