SÚRAO | SPRÁVA ÚLOŽIŠŤ RADIOAKTIVNÍCH ODPADŮ

Radioactive Waste Management and the Czech Republic position in the adoption of EU Waste Directive

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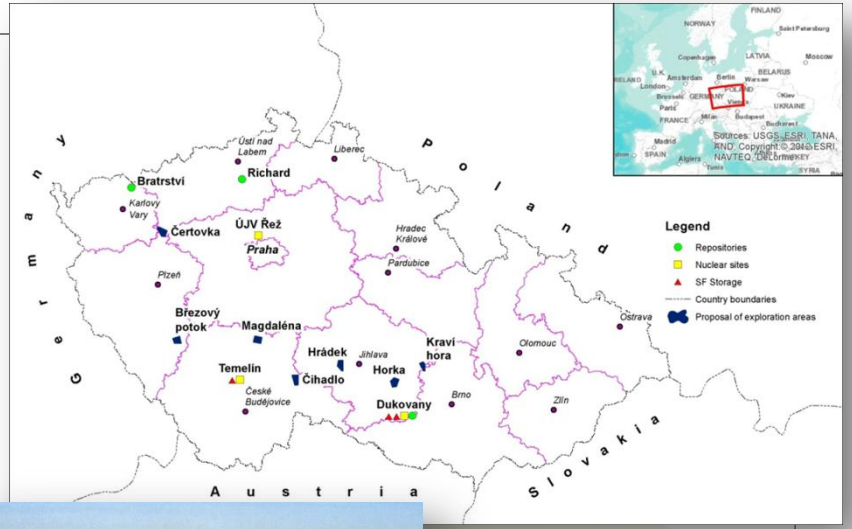
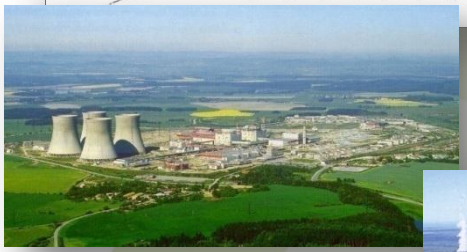
Správa úložišť radioaktivních odpadů

Supporting small EU Member States in responding to and reporting on the EU Waste Directive
4th and 5th December 2013 – Luxembourg

Basic facts

- The Czech Republic has 6 nuclear reactors in 2 NPPs (Dukovany and Temelin)
- 2 (or 3) New nuclear reactors should be built until 2025
- The basic disposal concept is direct disposal of spent fuel assemblies in granite host rock
- **The operation of deep geological repository should start in 2065, but 2 sites for DGR should be selected according to Government Decision by 2018**
- Sites should be selected on the bases of safety case results which should indicate that repository at selected site will be safe.





Geological Disposal of Spent Nuclear Fuel in the Czech Republic

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Main Organisation Involved

Legislation principles:

- **The state guarantees the safe disposal** of all radioactive waste.
- **All producers** of radioactive waste **shall bear all costs** associated with its management from the time of origin to its disposal.
- **Správa úložišť radioaktivních odpadů (SÚRAO)** = ~~Radioactive Waste Repository Authority (RAWRA)~~ - set up on 1st June 1997 as a state organization to provide **all activities associated with radioactive waste disposal**
- **SÚJB (State Office of Nuclear Safety)** – independent regulator
- **Ministry of Finance** – operate **Nuclear Account**
- **„Working Group o Dialogue“ – platform for dialogue of DGR siting process**

Radioactive Waste Management Concept

Approved by the Government in 2002

LLW /ILW waste

Disposal at existing repositories

- Bratrství – institutional wastes - only natural nuclide content
- Richard – institutional wastes – artificial nuclide content – industry, research, medicine, …
- Dukovany – wastes produced by NPP operation

HLW / Spent Nuclear Fuel (SNF)

Decided future **disposal in a Deep Geological Repository (DGR)**

- 2015 – Two suitable sites – **main and alternative**
- 2025 – Approval of the safety of the final site
- 2030 – Construction of Underground Research Laboratory
- 2065 – Commissioning of the DGR

Support for R&D of P&T

to observe the potential for an international DGR

LLW/ILW management

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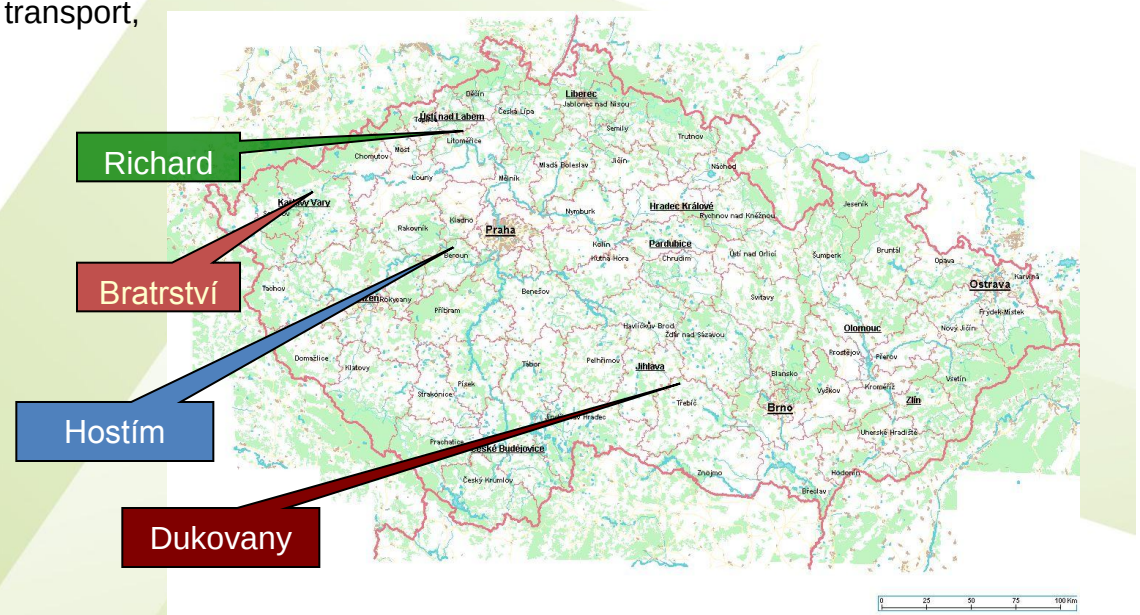
- From 2nd half of the 1950s - intensive research of nuclear energy and ionizing radiation use
- Amount - 41400 m^3 up to 2100
- Collection, sorting, treatment, conditioning, transport, storage
  - RW generators´ responsibilities
- RW disposal
  - SURAO´s responsibility
- 3 repositories in operation:
  - Richard - 1964
  - Bratrství - 1974
  - Dukovany - 1995
- Closed repository Hostim - monitoring
  - 1959 -1964
- Waste tracking system

Supervision

State Ofice for Nuclear Safety



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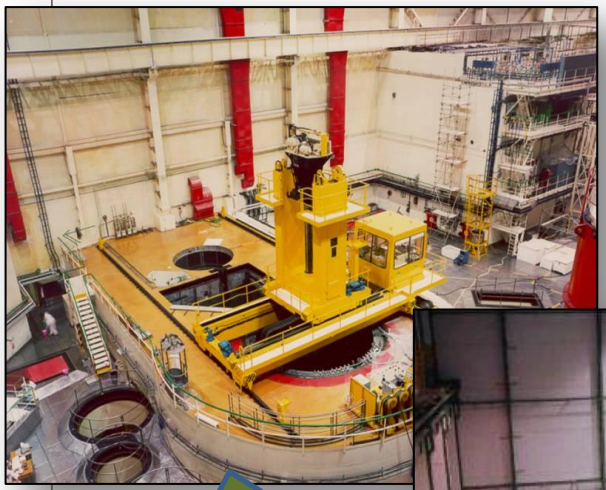
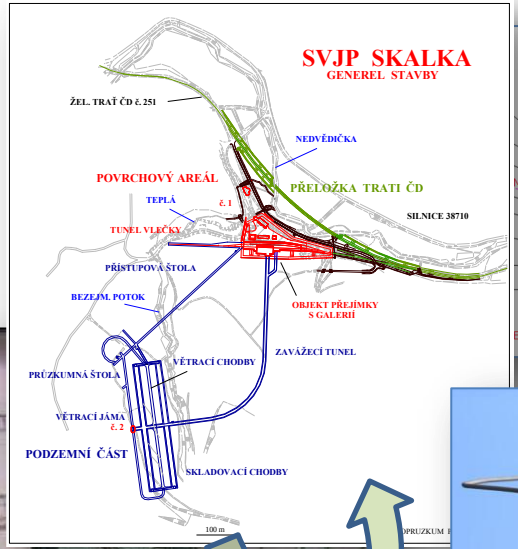
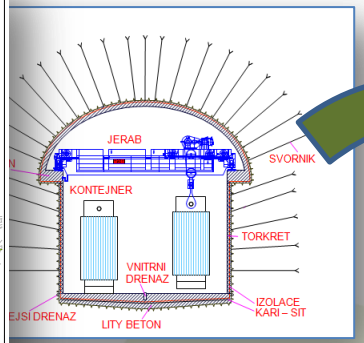
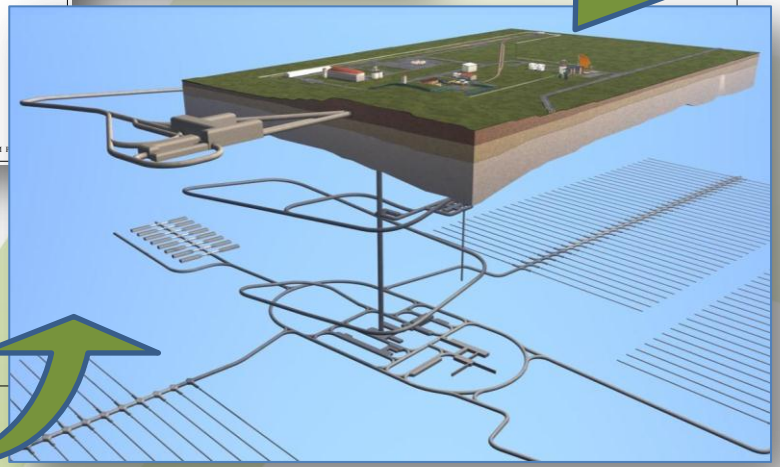
Spent Nuclear Fuel Management

NPP→ Storing at NPP sites →Central Interim storing (back up option) →DGR 2065









Geological Disposal of Spent Nuclear Fuel in the Czech Republic

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Inventory and Cost Estimation

Supposed waste amounts for DGR (by Reference Design 2011)

6 reactors in operation and 3 planned

- HLW/ILW - NPPs Dukovany and Temelin 3000 m3
- HLW/ILW- new NPPs 2000 m3
- SNF – NPP EDU 1 (4 reactors) 1940 t (est. 40 y)
- SNF – NPP ETE 1 (2 reactors) 1790 t (est. 40 y)
- SNF - new 3 units (ETE 2+EDU1) 5000 t (est. 60 y)

Cost estimation

By Reference designs:

- 1999 (only existing NPPs in operation) – 49 bill CZK / less 2 bill €
- 2011 (all supposed SNF and HLW/ILW) – 110 bill CZK / 4 bill €

Geological Disposal of Spent Nuclear Fuel in the Czech Republic

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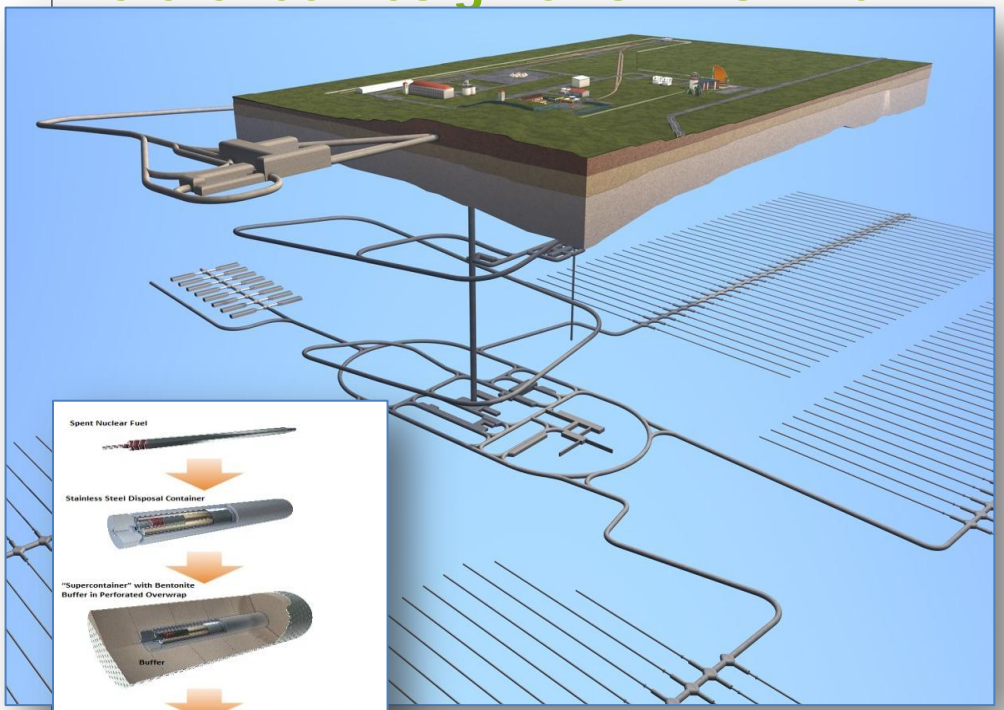
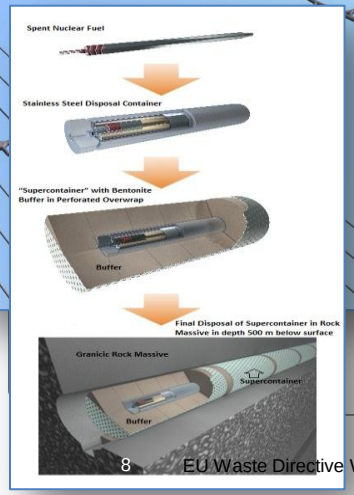
Reference Design of CZ DGR 2011





- The basic fuel back end concept consists of the **direct disposal of spent fuel** in **steel based canisters** in a **crystalline host rock**
- Operation period **2065 – 2140**
- **Progressive construction** along SNF emplacement
- **Surface facility** – SNF / HLW **reception**
- **Encapsulation facility – in the underground near the Surface facility**
- Disposal level – **Supercontainer facility**
- **Disposal of HLW in separate part**

Update of National RWM Concept – time schedule

- First Proposal – middle of 2013 – In July sent to MIT (Ministry of Industry and Trade)
- Until end of 2013 – decision on strategically E.I.A.(SEA) in the Government
- 2014 – SEA documentation and public debate – public hearings
- Beginning of 2015 – approving of new RAWM concept by the Government
- Sending to EC – March(??)/2015
- Changes in the updated concept – LLW / ILW repositories operation
  - **Bratrství** Repository – will be closed until 2020
  - **Richard** Repository – necessary to prepare new disposal chambers –until 2020
  - **Dukovany** Repository – necessary to update operation strategy after decision of new NPP construction
  - DGR development – small changes of time schedule:
    - 2018 – two candidate sites
    - 2025 – final site
    - 2030 – characterisation programme to confirm final site
    - 2065 – DGR commissioning

Deep Geological Disposal of Spent Nuclear Fuel in the Czech Republic

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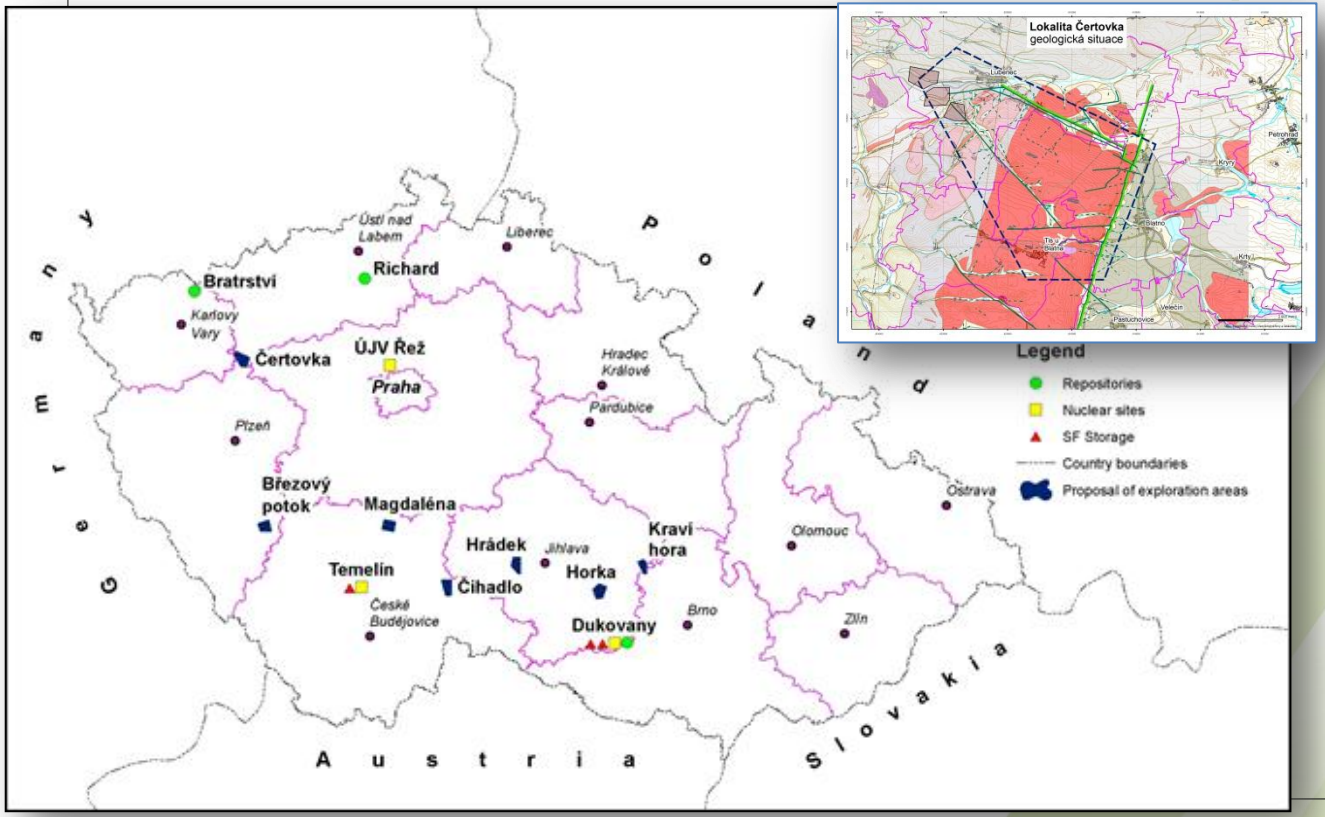
DGR – Site selection - in 2005 and 2011 – 7 preselected sites



2010 / 2012 - Voluntary approach how to involve local municipalities

- Problems
  - 7 sites
  - 40 municipalities
  - typical site 6 municipalities
  - Final municipality – referendum against

2013 - Changing site selection strategy

- Process divide to **3 stages**
- **(7+??)→(4)→(2)→(1)**
- To preselect new site near NPPs
- **Licence** procedure for Geo Survey **in progress**

Geological Disposal of Spent Nuclear Fuel in the Czech Republic

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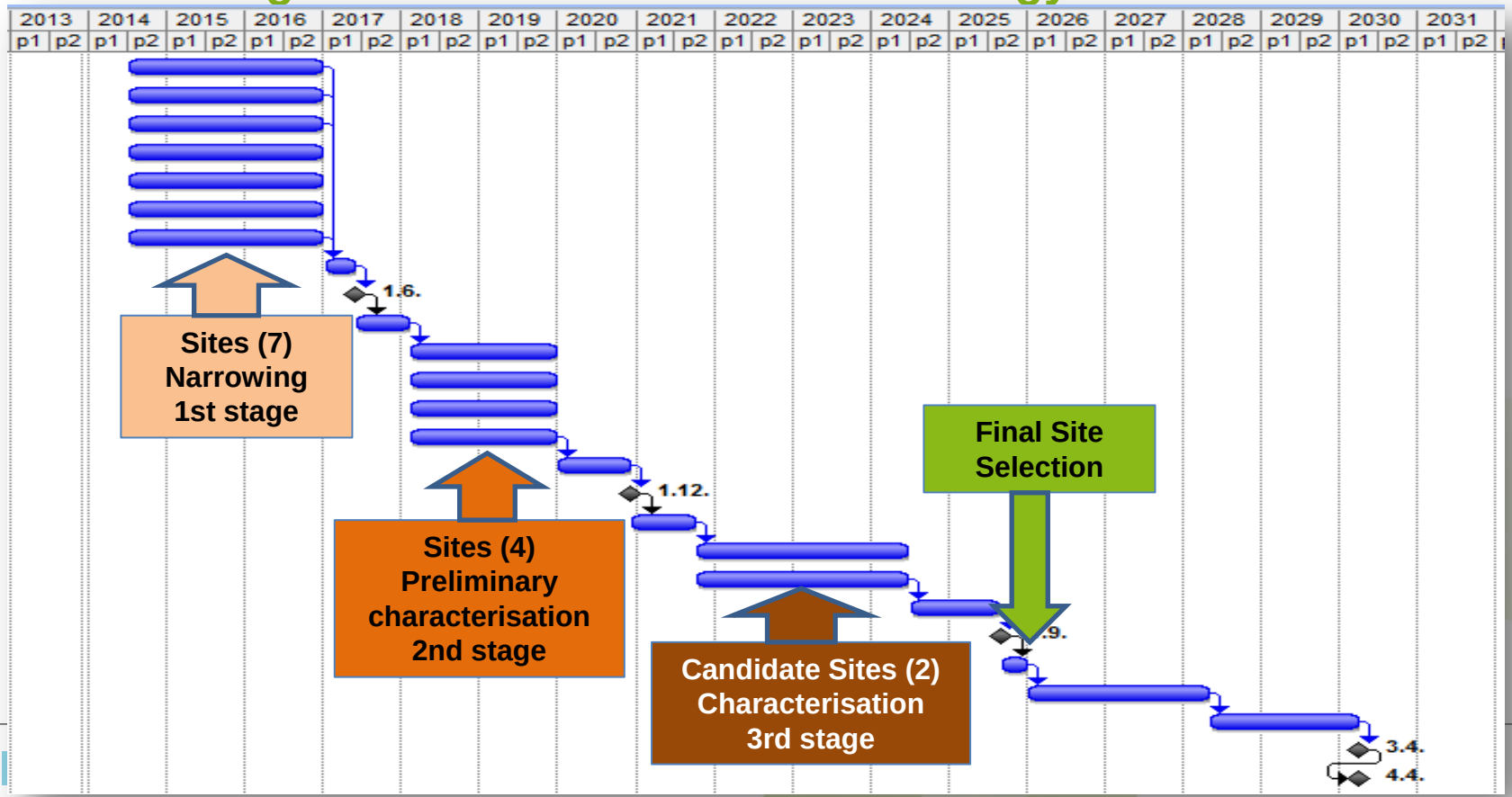
2013 – Changed CZ DGR Site selection strategy -Time Schedule



New Site Selection Programme for Final DGR Site 2013 - 2025

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- ✓ Near surface geological survey of preselected sites (7 + 1??) – project recently in the approval stage (2014 – 2016)
- ✓ Evaluation of primary data from sites and selection of 4 of the most suitable sites on the basis of preliminary safety evaluation and other socioeconomic, political and environmental criteria (2016)
- ✓ Geological survey of 4 sites with few deep boreholes (2016 – 2018)
- ✓ Evaluation of 4 sites and selection of 2 candidate sites for Government decision (2018/2019)
- ✓ Detail characterisation at 2 candidate sites (2020 – 2025)
- ✓ Evaluation of the candidate sites and selection of the final site (2025)

Thank you for your attention

Fig. 7. Example of how the surface facility for access to the geological repository might also look

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