

## Deep Geological Disposal in Slovenia



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### WM, Infrastructure – Legal status - 1

- Slovenia has small nuclear program:
  - 1 NPP, 676 MWe
  - 1 research reactor, 250 kW
- no plans for new NPP
- decision to phase out nuclear energy
- WM temporary solutions:
  - operators responsible for SF and waste management on the site
  - ARAO responsible for LILW from small producers



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### WM Infrastructure – Legal status - 2

#### No disposal facility except for mining and milling

- Public rejection of RWM
- no political support
- planned phase out of nuclear energy
- heritage of failed site selection for LILW between 1990-1993
- unresolved questions between Slovenia and Croatia
- small quantities to be disposed of

Priority – LILW final disposal

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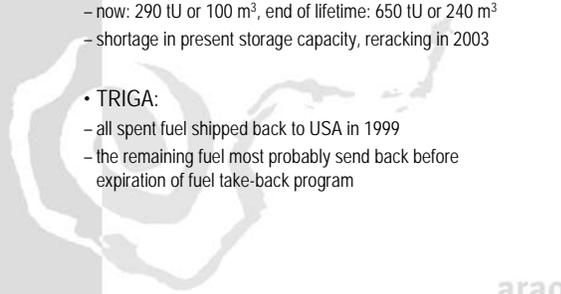
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### Technical status of SF / HLWM -1

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- NPP:
  - now: 290 tU or 100 m<sup>3</sup>, end of lifetime: 650 tU or 240 m<sup>3</sup>
  - shortage in present storage capacity, rerecking in 2003
- TRIGA:
  - all spent fuel shipped back to USA in 1999
  - the remaining fuel most probably send back before expiration of fuel take-back program



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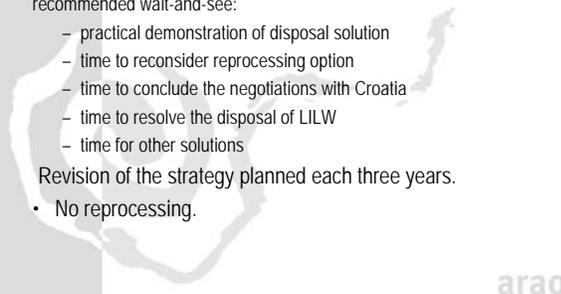
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### Technical status of SF / HLWM -2

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- Strategy of SFM adopted in 1996  
recommended wait-and-see:
  - practical demonstration of disposal solution
  - time to reconsider reprocessing option
  - time to conclude the negotiations with Croatia
  - time to resolve the disposal of LILW
  - time for other solutions
- Revision of the strategy planned each three years.
- No reprocessing.



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### Geological disposal development - 1

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- No final decision
- SF will be in the spent fuel pool until 2023,
  - no dry storage needed,
  - until 2020: decision about final solution for SF/HLW
  - in 2050: DGD construction or another solution
- New legislation – national programme of RWM and SFM required (2003)
- Agreement between Slovenia and Croatia (2003)
- EU Draft Directive on SNF&RWM (2003)



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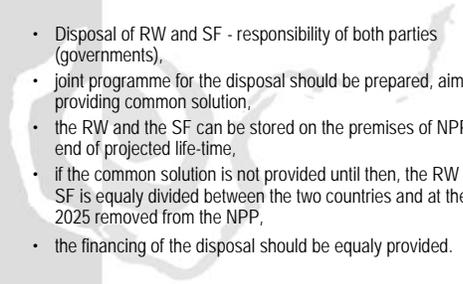
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### Technical status of SF / HLWM -3

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**What "the agreement" says about waste management?**

- Disposal of RW and SF - responsibility of both parties (governments),
- joint programme for the disposal should be prepared, aiming at providing common solution,
- the RW and the SF can be stored on the premises of NPP until the end of projected life-time,
- if the common solution is not provided until then, the RW and the SF is equally divided between the two countries and at the latest in 2025 removed from the NPP,
- the financing of the disposal should be equally provided.



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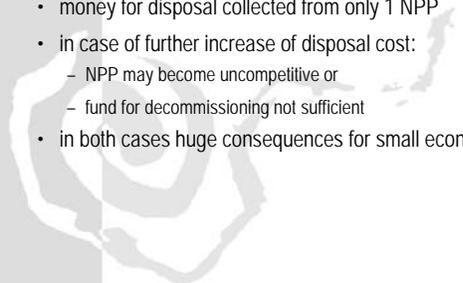
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### Geological disposal development - 2

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- Estimated costs of disposal not very accurate
- money for disposal collected from only 1 NPP
- in case of further increase of disposal cost:
  - NPP may become uncompetitive or
  - fund for decommissioning not sufficient
- in both cases huge consequences for small economy



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### Governmental Policy

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- **Strategies, plans and programmes under way**
  - Decommissioning Programme and Radioactive Waste and Spent Fuel Disposal Programme for the Krško NPP (to be adopted in 2004)
  - National Programme for Radioactive Waste and Spent Fuel Management (to be adopted in 2004)
    - conforming to the EU policy on SNF and RWM



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### National SNF&RWM Programme

- SNF and HLW management priority shifts
  - no permanent disposal needs until 2050
  - steps leading to conditional site authorisation have to be immediately implemented
  - multinational cooperation must be intensified to bridge the knowledge gap and open new perspectives
  - multinational repository is seen as a viable substitute to a national facility




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### National SNF&RWM Programme

- **National DGD repository issue** – a backbone cost estimate (2004, IAEA Assistance)
  - KBS – 3 disposal concept,
  - 500 m deep, crystalline rock,
  - operation of repository in 2050 (2030),
  - ~ 600 mio EUR
- **National DGD repository issue** – identification of suitable geological formations (2004)
  - diorite, gneiss




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### Conclusion - 1

- Deep Geological Disposal must be given due attention also in countries with small nuclear programmes
- Such countries are unlikely to build and operate their own DGD repositories, but the invested effort may help them to better cope with all possible options
- Multinational DGD repository is an option worth being considered, but with due caution




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## Conclusion - 2

- With postponing the decision:
  - lag behind in developing long-term / permanent solution,
  - limited financial resources,
  - scarce human resource,
  - small research potential.
- How can international cooperation help?
  - it can help small programs to sustain (develop) present level of knowledge and research activities,
  - in setting programs for final solution,
  - in optimizing costs,
  - transfer of technology for disposal and storage.

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