Deep Geological Disposal of Spent Fuel in Sweden

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Early decisions on:

- Direct disposal
- Independent interim storage
- R&D for spent fuel disposal
- Responsibilities
- Financing system

(Early is late 70’s/early 80’s)
Present situation Back-end

- **Interim storage, Clab**, in operation since 1985. Application to extend capacity until 2035.


- Sea based **transport system** in operation since 1982.

- **Licence application** for spent fuel repository and encapsulation plant. Disposal expected around 2030.
Nuclear Sweden

- 10 (12) operating reactor units at 3 sites
- ~ 45% of electricity
- Operation since 1972/1985
Sweden and reprocessing

- Early plans. Reprocess all fuel. Build Swedish reprocessing plant

- Contracts for reprocessing abroad (UK and France)

- Change of policy around 1980 for technical, economic, strategic and political reasons

- Contracts sold and fuel swapped to avoid dual disposal system

- Small quantity reprocessed in UK. No return of waste. Plutonium to be kept in UK
The KBS-3 method for disposal of spent nuclear fuel

- **Primary safety function:**
  - Secondary safety function:
- **Total containment**
- **Retardation**

- Fuel pellet of uranium dioxide
- Spent nuclear fuel
- Copper canister with cast-iron insert
- Cladding tube
- BWR fuel assemblies
- Bedrock
- Bentonite clay
- Final repository for spent nuclear fuel
Research, development and siting

- Technology implementation, licensing and building of encapsulation plant and repository
- Site investigations, Technology development
- Feasibility studies and development of scientific basis
- Methodology development
- SFR in operation
- Clab in operation
- m/s Sigyn in operation

- Canister Laboratory
- Åspö Hard Rock Laboratory
- Bentonite Laboratory
- Site selection Forsmark
- m/s Sigrid in operation

RD&D programme reviewed and approved every three years
Siting of the repository for spent nuclear fuel

**Knowledge accumulation**

- Study sites 1977-1985
- General siting studies 1990s

**Siting process**

- Feasibility studies 1992-2001
- Site investigations 2002-2007
- Licensing
- Construction

- Decision on site 2009

- Study sites:
  - Hultsfred
  - Malå
  - Nyköping
  - Oskarshamn
  - Storuman
  - Tierp
  - Älvskarleby
  - Östhammar

- General siting studies:
  - Oskarshamn (Laxemar)
  - Östhammar (Forsmark)

- Study sites:
  - Malå
  - Nyköping
  - Oskarshamn
  - Storuman
  - Tierp
  - Älvskarleby
  - Östhammar
Public consultation and involvement - key to success

- Broad national information
- Focused dialogue with potential local communities
- Strong local involvement of SKB and municipalities
- Ear-marked funding for municipality involvement
From then to now

Protests against drilling at a study sites

Announcement of site selection Forsmark
June 3rd, 2009
Talking with local people – being present
Visits to facilities
Opinion 2015

Steady progress in both municipalities. High confidence in SKB. SKB's future plans and activities will have a positive impact in the municipalities.
Factors for success

- Clear responsibilities for implementation and financing
- Scientific/engineering approach
- Trustworthy regulator
- Strong public involvement
- Close cooperation with local municipalities
Remaining challenges

• Licensing and accepting a First of a Kind facility
• Going from theory to practice – Industrialization
• Keeping public confidence
Thank you for your attention