STATUS OF RADIOACTIVE WASTE MANAGEMENT IN FINLAND

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Nuclear waste management in Finland
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Olkiluoto

Owner: Teollisuuden Voima Oy
Type: BWR
Capacity: 2 x 860 MWe
Commercial operation: 1979 & 1982
Type: PWR 1x1600 MWe
Under construction

Loviisa

Owner: Fortum Oyj
Type: PWR
Capacity 2 x 488 MWe
Implementation of waste management

Teollisuuden Voima Oy
- Olkiluosto power plant
- Operating waste repository
- Interim storage of spent nuclear fuel

Fortum Power and Heat Oy
- Loviisa power plant
- Interim storage of spent nuclear fuel

In future

Posiva Oy
- Final disposal of spent nuclear fuel
- Operating waste repository
Repository for operating waste at Olkiluoto

Control building
Access tunnel
Shaft
Research tunnel
Construction tunnel
Low level waste silo
Medium level waste silo
Interim storage for spent fuel at Olkiluoto
Decommissioning of nuclear power plants

- Technical plans and cost estimates have been made for the decommissioning of the Finnish nuclear power plants.
- Dismantling can be started soon after the end of NPP operation (Loviisa) or after a controlled storage of a few decades (Olkiluoto).
- All radioactive structures and systems will be dismantled.
- The waste is disposed of in an extension of the repository for operating waste in the bedrock of the NPP site.
Disposal of decommissioning waste at Olkiluoto
Olkiluoto in summer 2006
Final disposal of spent fuel
Finnish concept for final disposal of spent fuel

- According to the Nuclear Energy Act, all nuclear waste generated in Finland must be handled, stored and permanently disposed of in Finland.
- The disposal of spent fuel from Olkiluoto and Loviisa NPPs is implemented by Posiva Oy.
- The repository will be located in crystalline bedrock at Olkiluoto and the disposal will be based on the KBS-3 concept.
- The site suitability shall be confirmed through underground characterisation of the intended host rock.
- For this purpose an underground rock characterisation facility, ONKALO, is now under construction.
- In parallel progress is being made in the development of the technology needed for the encapsulation and disposal of the spent fuel.
Posiva Oy

- Company established in 1995
  - Ownership: Teollisuuden Voima Oy 60 %, Fortum Power and Heat Oy 40 %
- Mission: Final disposal of spent nuclear fuel and other tasks of expertise within nuclear waste management
- Gradual change from R&D company to implementing organisation
  - Organisation adjusted according to changing demands
- Steadily developing staff
  - Own staff about 70 persons
  - Extensive use of contractors
- Turnover growing
  - Accrued in 2006: EUR 43 million
  - Estimated for 2007: EUR 47 million
40 years’ effort

- Start of feasibility studies for geologic disposal
  - 1978

- Site investigations
  - 1983

- Site selection
  - 2001

- Construction of ONKALO and confirming investigations at Olkiluoto
  - 2012

- Construction of disposal facility
  - 2018

- Application for construction license
  - 2020

- Application for operation license

- Decision-in-Principle by Government and Parliament

- Government’s decision on objectives and time schedule

- Test operation and commissioning
  - 2020
Site selection research programme 1983 - 2000

Site Identification
1983 - 1985

Preliminary Site Characterisation 1986 - 1992

Detailed Site Characterisation 1993 - 2000

More than 100 candidate sites were identified
Environmental Impact Assessment (EIA)

- Environmental Impact Assessment procedure was implemented in 1997-1999 at every site included in the site investigation programme.
- In the EIA procedure, the environmental, health and social impacts of the final disposal have been assessed.
- The environmental impacts have been assessed during the construction, operation and decommissioning of the facility.
- The EIA process enhanced public interest and involvement at local and national level.
The decision on the final disposal of spent fuel

**POSIVA**
Application for the Decision-in-Principle
May 1999

**GOVERNMENT**
Making the Decision-in-Principle
December 2000
January 2000

**PARLIAMENT**
Ratification of the Decision-in-Principle
May 2001
February 2001

**STUK - RADIATION AND NUCLEAR SAFETY AUTHORITY**
Evaluation of safety
January 2000

**EURAJOKI MUNICIPALITY**
Supporting statement by the municipal council
January 2000

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**EURAJOKI MUNICIPALITY**
Supporting statement by the municipal council
January 2000
Acceptance of Eurajoki municipality

- Result of the vote: 20 for, 7 against (January 2000):
- Background
  - Nuclear facilities have served well and created trust
  - People have accustomed to nuclear facilities and benefited from them
  - Final disposal offers employment opportunities
  - Employees of the power plants have acted as communicators
  - Communication measures of the implementer
  - Liaison group between Posiva and Eurajoki
  - Environmental Impact Assessment (EIA)
  - SWOT-analysis of the Municipality: ”Olkiluoto Vision”
  - Vuojoki agreement: renovation of Vuojoki Mansion
Ratification in the Parliament

- Vote in May 2001: 159 for, 3 against
- Decisive arguments
  - “Aiming at final disposal is a better solution than just resorting to interim storing.”
  - “Option for retrievability of waste canisters must be maintained.”
  - “The present generation has to accept responsibility for nuclear waste.”
Political acceptance

- Government’s early commitment to final disposal has been primary driver of the project *(1983 Government’s decision on long-term strategy for Nuclear Waste Management)*.
- The step-wise decision-making is probably the only way forward in a programme which spans over a century or more.
- 1994 Nuclear Energy Act prohibited export and import of nuclear waste and it helped to gain local acceptance.
- Final disposal is an issue of high expertise – communication requires also the engagement of waste management experts and scientists.
- Nuclear actors have spoken ”the same language” and thus built confidence on final disposal.
"Building blocks" of successful siting

- National need, supported by legislation, clear responsibilities
- Quality and transparency of scientific and technological programme
- Open and public siting process
- Local and national trust
- Local socio-economic benefits