WM2011
Session 3
International Deep Geological Repository Progress

Posiva Oy’s Developments in Finland
Marjatta Palmu, Senior Adviser

22.2.2011 Palmu Marjatta
Nuclear Waste Management of the Existing NPP’s in Finland

TEOLLISUUDEN VOIMA OYJ

- Olkiluoto power plant
- Operating waste repository commissioned in 1992
- Interim storage of spent nuclear fuel

In the future

FORTUM POWER AND HEAT OY

- Loviisa power plant
- Interim storage of spent nuclear fuel

POSIVA OY

- Operating waste repository commissioned in 1998 (1999)
- Final disposal of spent nuclear fuel planned start of operations in 2020

22.2.2011
Palmu Marjatta
The Division of Duties in Nuclear Waste Management

**LICENSES**
- Government
  - Ministry of Employment and the Economy (TEM)

**SUPERVISION**
- Radiation and Nuclear Safety Authority (STUK)

**MANAGEMENT OF FUNDING**
- The State Nuclear Waste Management Fund (VYR), Ministry of Employment and the Economy (TEM)

**TEOLLISUUDEN VOIMA OYJ (TVO)**

**FORTUM POWER & HEAT**

**POSIVA OY**
- Consultants, Contractors, Universities, Research Institutes
Isolation Principle
Site Selection Research Programme 1983-2000

Site identification 1983-1985

More than 100 candidate sites were identified

Preliminary site characterisation 1986-1992

Detailed site characterisation 1993-2000

=> Eurajoki site selected in 2000
Posiva Oy Established in 1995

- Ownership: Teollisuuden Voima Oyj 60 %, Fortum Power and Heat Oy 40 %
- ISO 9001 certified in 2008, ISO 14000 certified in 2010
- Mission: Final disposal of spent nuclear fuel of the owners and other tasks of expertise within nuclear waste management
- Gradual change from a R&D company to an implementing organisation
  - Organisation evolves according to changing demands
  - Long-term planning of the organisation on-going
- Steady increase of personnel: ~ 90 people
  - coupled with extensive use of contractors around 70 working at Olkiluoto
  - total employment effect over 300 persons
- Accrued budget in 2010: EUR 61 million
  - Estimate for 2011: EUR 71 million
Eurajoki municipality’s inhabitants views

”Nuclear waste can be safely disposed of into the Finnish bedrock”

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>100%</td>
<td>90%</td>
<td>80%</td>
<td>70%</td>
<td>60%</td>
<td>50%</td>
<td>40%</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>0%</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td>90%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>0%</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td>90%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
ONKALO’s Current Layout  (Construction started in 2004)  
Excavation at  PL 4650 (22.2.2011)

Main level: - 420
Excavation volume: 365,000 m³
ONKALO Construction Site in Summer 2010
After the Submission of the Construction License Application in 2012

- License expected so that construction of the repository (controlled area) can start in 2014
- Demonstrations on-going in ONKALO
- Preparing for production (operations)
  
- Construction of encapsulation plant and other permanent buildings after the license is granted
- Training of operating personnel
- Development and manufacturing of equipment
- Preparing to submit the operating license in 2018
Entire Disposal Facility (in ~ 2100)
Foreseen Closure ~ 2130
Costs of Final Disposal

- Total around 3,300 M€ (cost estimate 2009)
  - Investments 700 M€
  - Operation 2,400 M€ (until year 2120)
  - Decommissioning 200 M€

- The cost estimate for the final disposal of spent nuclear fuel assumes
  - that the existing nuclear power plant units will be in operation for 50-60 years and
  - that the new OL3 unit being built at Olkiluoto will operate for 60 years.
  - Some 5,500 tonnes of uranium will have accumulated by then.

- Funds for nuclear waste management are collected in advance in the price of nuclear electricity to the State Nuclear Waste Management Fund (VYR).
40 Years Long Road to Safe Disposal

Start of feasibility studies of geologic disposal

1978

Site investigations

1983

KPA - Spent fuel storages

VLJ-repositories

Posiva was established 1995

Site selection

2001

Decision in Principle by Government and ratification by Parliament

2012

Application for construction license

2018

Application for operations license

2020

Start of disposal

Test operation and commissioning

Construction of disposal facility

Construction of ONKALO and confirming investigations at Olkiluoto

Government’s decision on objectives and timetable