Current Status of Decommissioning in Lithuania

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Nuclear facilities in Lithuania

- Ignalina NPP (under decommissioning)
- Interim Spent Fuel Storage Facility (in operation)
- Solid Waste Management and Storage Facility (under commissioning)
- Landfill (under construction)
- NSR (design is completed)
- Maisiagala institutional waste storage facility (planning for decommissioning)
1. Bituminised waste facility;
2. Reactor units;
3. VLLW buffer storage;
4. NSR for LILW-SL;
5. Interim SNF Storage Facility,
6. Solid Waste Treatment and Storage Facility;
7. Landfill repository for VLLW.
Ignalina NPP

- Ignalina NPP is the only one nuclear power plant in Lithuania
  - with two units of RBMK-1500 reactors;
- Ignalina NPP was a vital component in Lithuania’s energy balance
  - was generating more than 70% of the total electricity production in Lithuania;
- Reactors were commissioned in 1983 and 1987 respectively;
- They original design lifetime was projected to 2010-2015;
- In 2002 Lithuanian government approved immediate dismantling strategy for Ignalina NPP;
- The first unit of Ignalina NPP was shutdown in 2004, the second – 2009
- No funds accumulated for decommissioning due to early closure of the Ignalina NPP.
Status of D&D activities at Ignalina NPP

Unit 1

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<th>Bldg. 119</th>
<th>Turbine Hall G1</th>
<th>Control, Electrics &amp; Deaerators D1</th>
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<td>ECCS Tanks</td>
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Unit 2

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<th>Control, Electrics &amp; Deaerators D2</th>
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- **Completed**
- **In progress**
- **Design stage**
- **Future**

*Convention on nuclear safety seventh Lithuanian national report, State Nuclear Power Safety Inspectorate*

- **Key dates:**
  - Both reactors defueled until 2019;
  - SNF removed from cooling pools until 2022;
  - Both reactors dismantled until 2034;
  - Site demolition until 2038.
SNF dry storage

- Part of SNF is stored in the dry storage facility since 2000. Storage facility has been extended for several times and currently is filled up to its final capacity:
  - 20 CASTOR® RBMK-1500 casks (for 102 half-assemblies)
  - 100 CONSTOR® RBMK-1500 casks (for 102 half-assemblies)
- Since existing storage facility is completely filled, implementation of the new interim storage facility was started in 2005;
- SNF at this facility will be stored in the new CONSTOR® RBMK-1500/M2 casks;
- In comparison with casks already in use, the new cask is more capacious and can store up to 182 half-assemblies;
- Certain amount of gas-leaking and canned mechanically damaged fuel bundles can be stored in these new casks
Interim Spent Fuel Storage Facility (ISFSF)

• In ISFSF SNF will be stored in CONSTOR®RBMK-1500/M2
  – 4.5 m height and 2.6 m diameter metal-heavy concrete casks, which weight with the fuel is 118 t;
  – The planned number of casks is 190 pcs;
  – Storage time is 50 years.
  – Two baskets inside the cask: 32M basket and stationary ring basket
  – Mechanically damaged SFA will be placed into over pack cartridges and then loaded into special baskets

• Stages of project implementation (for non-damaged SNF):
  – License was issued for construction in 2009;
  – Construction completed in 2014;
  – Cold trails period 2014-2016;
  – License was issued for operation in 2016;
  – Hot trails period 2016-2017;
  – Permission was issued for industrial operation in 2017;
  – As of November 10, 2017, 35 CONSTOR®RBMK-1500 / M2 containers loaded with SNF were placed to the ISFSF.
Solid Waste Management and Storage Facility (SWMSF)

- SWMSF comprise of:
  - Retrieval Facility to retrieve waste from the existing interim storages;
  - Processing Facility (SWTF) for sorting, size reduction, incineration and compaction of the waste;
  - Storage Facility (SWSF) for long and short lived waste packed into containers and stored until the repository facilities will be built.

- Stages of project implementation:
  - Cold trails finished in 2017;
  - Hot trails period 2017-2018;
  - Industrial operation license will be issued at the end of 2018.

Conceptual view of SWTSF. 1 - treatment facility, 2 - SL waste storage, 3 - LL waste storage. External walls of SWSF are shown transparent, inside stored waste containers can be seen. Possible extensions of SWSF are not shown.
Landfill disposal facility for VLLW

• **The Buffer Storage Facility:**
  – Designed for radiological measurement, transportation and temporary storage of VLLW;
  – Located at Ignalina NPP industrial site;
  – Capacity is 4,000 m³;
  – In operation since 2013.

• **Disposal Modules:**
  – Located in the Ignalina NPP sanitary protection zone;
  – Three disposal modules with capacity of 20,000 m³ each;
  – VLLW will be filled in campaigns;
  – The surveillance of closed repository will continue for 100 years (active for 30 and passive for 70 years);
  – Currently under construction;
  – Planned operation period 2018-2038.
**Waste packages:**
- 20 feet half height ISO cont.;
- compacted waste in bales;
- SIER in FIBC;
• General facts:
  – Located in the Ignalina NPP sanitary protection zone;
  – Multiple barriers concept;
  – 36 reinforced concrete vaults of total capacity of 100,000 m³;
  – The surveillance of closed repository will continue for no less than 300 years (active for 100 and passive for 200 years).

• Project is implemented in two stages:
  – Research of geological structures, characteristics, hydro-geological, geotechnical properties, development of TD, PSAR and Monitoring Program (completed);
  – Development of the Detailed Design and construction of the repository (tendering is in preparation).

• Stages of project implementation:
  – EIAR released for three candidate sites in 2007;
  – Construction license was issued at the end of 2017;
  – Planned operation period 2021-2038.
NSR for LILW-SL

Waste packages:

- Concrete containers with grouted:
  - pellets from supercompaction;
  - large-size metallic RAW.

- Concrete containers with grouted drums with cemented SIER.
Maišiagala RWSF site

Site is ~30 km from the capital, Vilnius;
The nearest (~7 km) town is Maišiagala;

Within a radius of 2.5 km there are no residents.
Maišiagala RWSF site

The reservoir for the liquid radioactive waste

The area „B“

The repository

The former decontamination building

The garage

Entrance

The administrative building

11th meeting of IDN, 5-7 December 2017, Vienna
Maišiagala RWS

- Typical RADON type RWS with size 5 x 15 x 3 m, volume ~ 200 m$^3$;
- RW collected from industrial, medical, military, and scientific research facilities in 1963–1989.
Inventory

- Main radionuclides: H-3, Cs-137;
- Small quantities of Sr-90, Pu-239, C-14, Co-60, Ra-226;

- Mainly solid RW;
- Small quantities of biological RW;
- Small quantities of liquid RW;
- DSS (~13 thousand);
- Total RW+DSS activity: ~77 TBq.

Tammiku RWS (Estonia)
Timetable

1963 - 1973: Operational period

1989: First Safety Assessment

2002: SAR and upgrading facility safety

2006: Approved RWM Strategy

2008: Preliminary DP

2011: Approved RWM Strategy

2015: Periodical SAR

2017: Decommissioning planning

2018: Radiological site characterisation

2019: Final DP

2020: Licensing (Decommissioning Project, SAR), licensing for transportation

2021: RW removal and transportation to the Ignalina NPP

2022: Dismantling contructions and removal of contaminated soil

2023: Unrestricted use of site

Final site radiological characterisation and release of site from regulatory control

NOW: EIAR

11th meeting of IDN, 5-7 December 2017, Vienna
Thank you for your attention!

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