



Lithuanian concept for disposal of RBMK-1500 SNF canisters and possibilities to apply LUCOEX technology

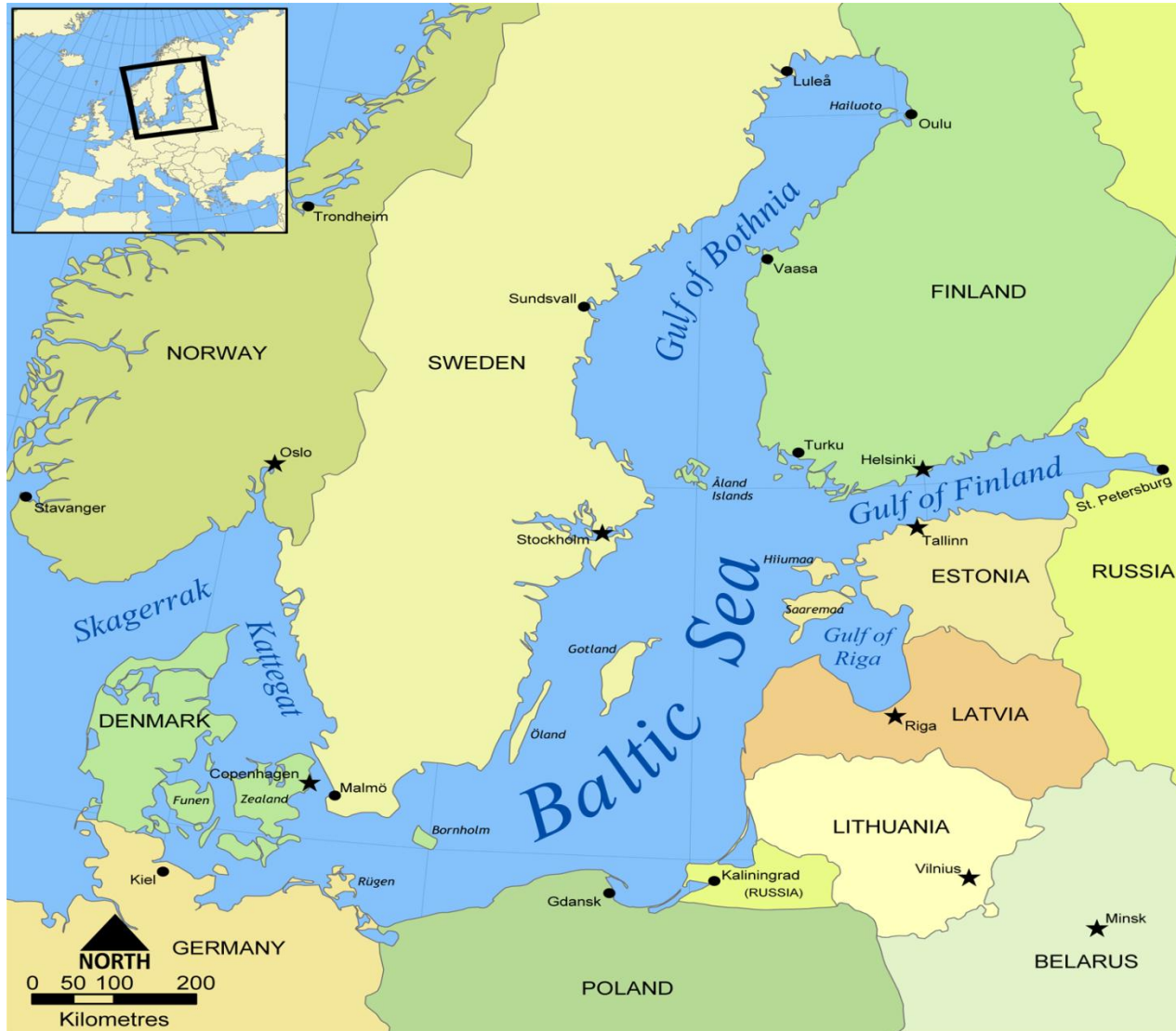
Lithuanian Energy Institute
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Theme Workshop: Installation, closure and initial state
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The LUCOEX project has received funding from the European Atomic Energy Community's 7th Framework Programme (FP7/2007-2011) under the grant agreement No. 269905



- There was only one nuclear power plant in Lithuania - the Ignalina NPP with two similar units of RBMK-1500 reactors
- INPP reactors started operation in December 1983 and August 1987, respectively and provided ~70-80 % of the electricity produced in Lithuania
- After a final shutdown of INPP reactors, the accumulated amount of RBMK-1500 SNF is ~22 thousands of fuel assemblies (~2.500 tons of uranium)

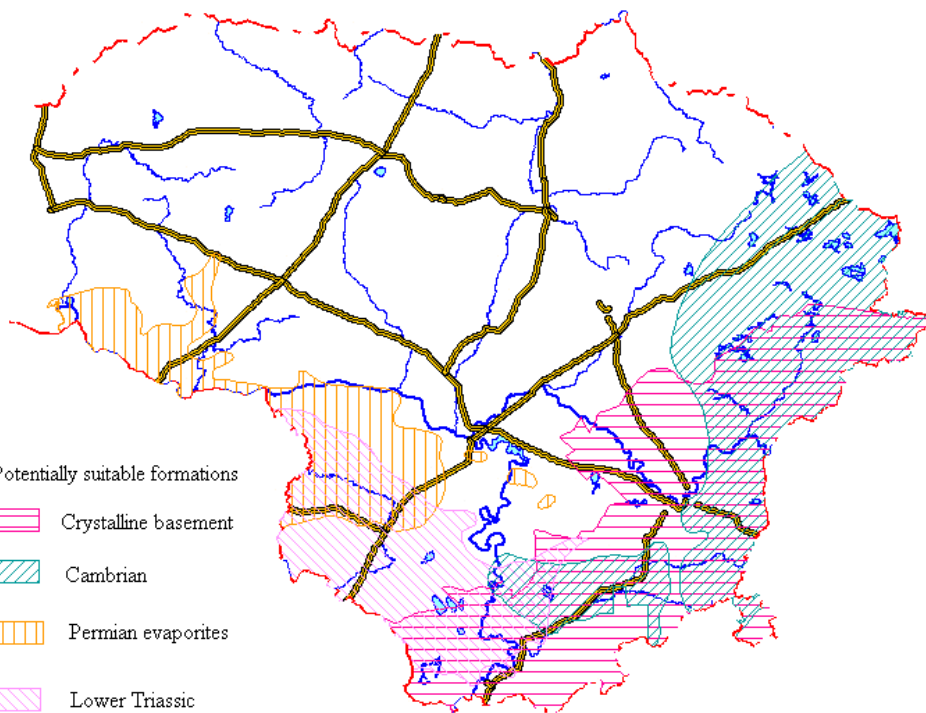


- Part of SNF is stored in the dry storage facility since 1999. Storage facility has been extended for several times and currently is filled up to its final capacity:
 - 20 CASTOR® RBMK-1500 casks (for 102 half-assemblies)
 - 100 CONSTOR® RBMK-1500 casks (for 102 half-assemblies)

- New SNF dry storage facility is under construction. SNF at this facility will be stored in the new CONSTOR® RBMK-1500/M2 casks (for 182 half-assemblies)



- During 2002-2005 investigations on the possibilities to dispose of SNF in Lithuania were performed with support of Swedish experts
 - Lithuanian Geological Survey was working on selection of prospective formations for SNF disposal in Lithuania:



- The crystalline rocks in the south-east Lithuania
- The Lower Cambrian Baltic Group clay formation
- The Lower Triassic clay formation

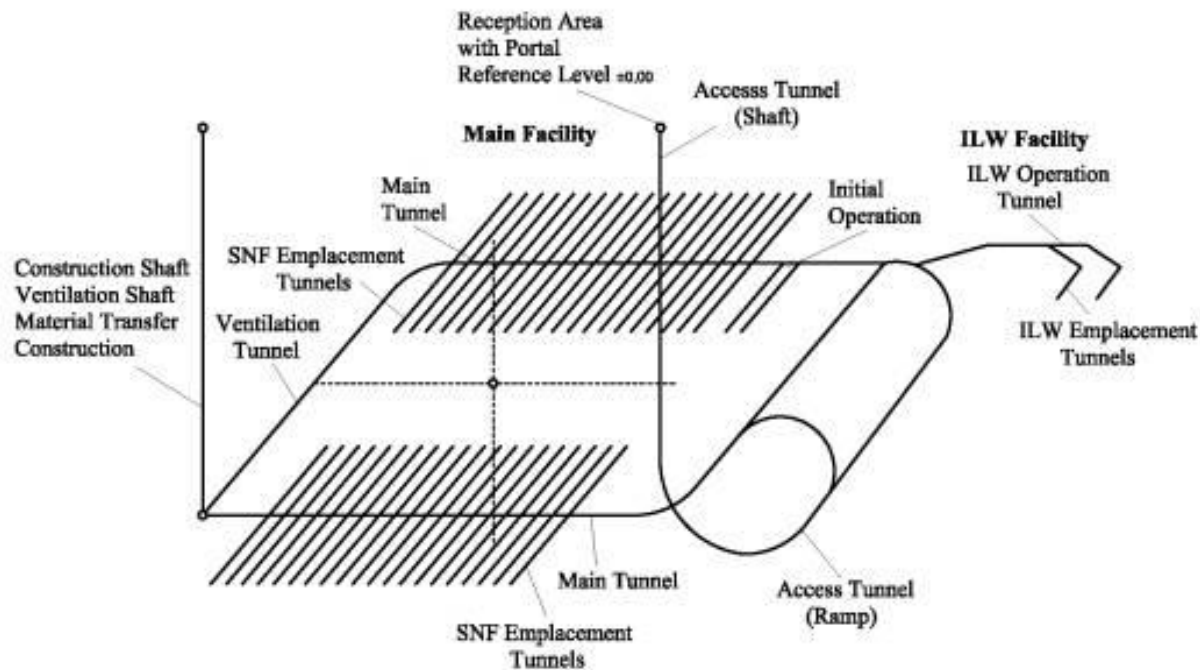


Geological disposal



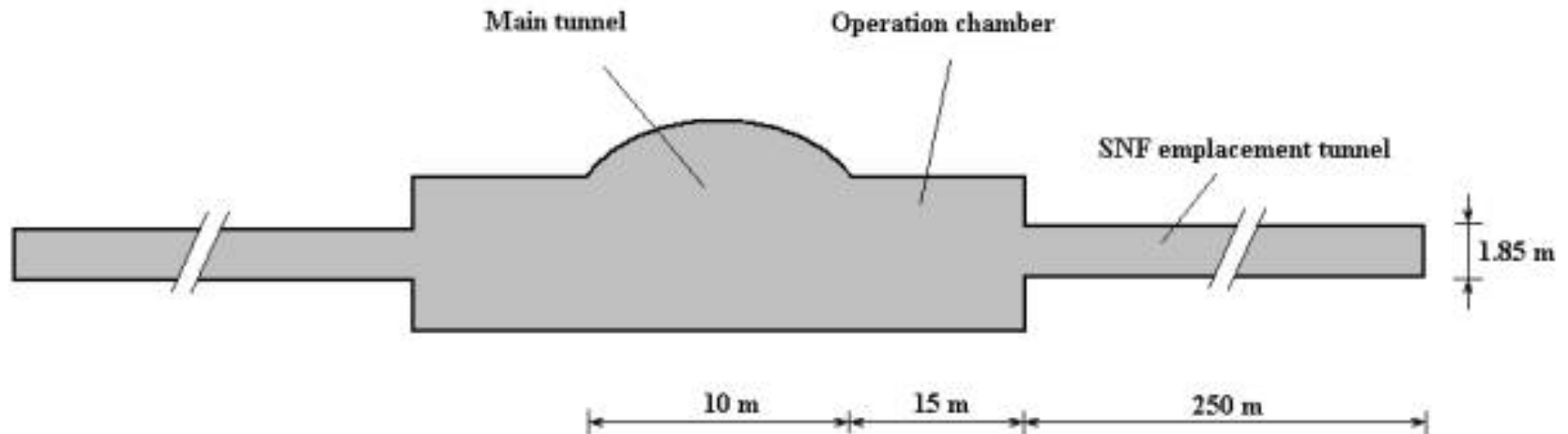
- During 2002-2005 investigations on the possibilities to dispose of SNF in Lithuania were performed with support of Swedish experts
 - Lithuanian Energy Institute was working on development of the disposal concept, cost estimation and preliminary safety assessment (for crystalline rock)
 - The proposed repository concept in crystalline rock is based on KBS-3 concept developed by SKB for disposal of the SNF in Sweden
 - There are two alternatives:
 - Vertical emplacement (KBS-3V)
 - Horizontal emplacement (KBS-3H)

- The main elements of the repository are (at 300-500 m depth):
 - an access shaft, transport tunnels
 - an array of SNF emplacement tunnels (deposition drifts)
 - emplacement tunnels for long-lived intermediate level waste (ILW)

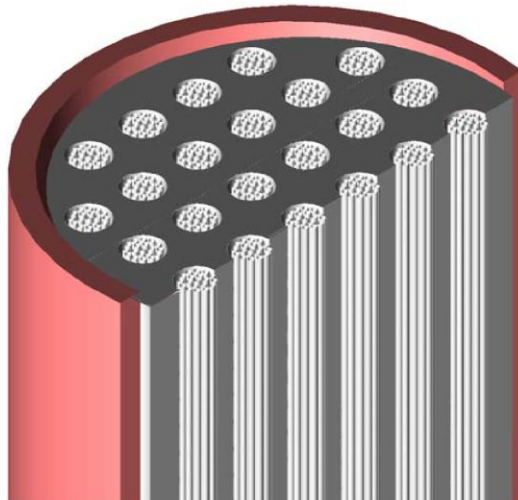
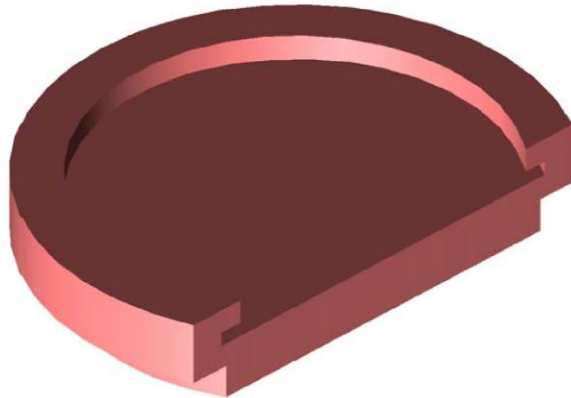


- The deposition area for SNF would cover $\sim 0.4 \text{ km}^2$

- The diameter of horizontal SNF emplacement tunnels is 1.85 m
- The length of horizontal SNF emplacement tunnels is 250 m
- The distance* between the emplacement tunnels is 40 m
- The distance* between the canisters is 1.2 m



*justified by thermal calculations



- Copper canister
 - height - 4070 mm
 - diameter of copper shell - 1050 mm
 - wall thickness - 50 mm
- Cast iron insert with 32 channels for RBMK-1500 SNF half-assemblies
 - minimum wall thickness of 50 mm
- For Lithuanian SNF disposal purposes ~1400 canisters would be required



Buffer/backfill



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- Buffer – compacted bentonite
 - thickness 0.35 m
 - Backfill – mixture of bentonite (15%) and crushed rocks (85 %)



Canister emplacement



Possibilities to apply LUCOEX technology for RBMK-1500 SNF???

| | KBS-3H | KBS-3V | RBMK-1500 SNF |
|-----------------|--------|--------|------------------|
| SNF canister | | | |
| Height | 4.83 | 4.8 | 4.07 |
| Outer diameter | 1.05 | 1.05 | 1.05 |
| Disposal tunnel | | | |
| Diameter | 1.85 | 1.85 | 1.85 |



THANK YOU FOR YOUR
ATTENTION !