Lessons learned from the preparatory process for licensing of the new nuclear units in Hungary

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New NPP project

Operating units
4 x VVER-440

Planned units
2 x VVER-1200
Hungary’s new NPP project so far

• The idea of NPP extension has been on the agenda since the 80’s (2*1000 MW additional capacity was planned for the site);

• 2008: energy policy conception: based on supply security and climate-protection objectives, the decision preparation work for new units started;

• 30th March, 2009: decision-in-principle of the Hungarian Parliament;

• January 2014: Intergovernmental agreement on the peaceful use of nuclear energy by Russia and Hungary:
  - Two VVER-1200 type reactors at the Paks site;
  - Russian loan for the 80% of construction costs;

• 7th December, 2014: Implementation agreements signed:
  - EPC contract;
  - Operation and maintenance support contract;
  - Agreement detailing fuel supply and the handling of spent fuel.
REGULATORY SYSTEM IN HUNGARY
Regulatory Framework in Hungary (licensing before construction)

Principal decision of the Parliament

Principal/Preliminary licensing stage

- Principal license for water usage*
- Site License**
- Environmental License***
- Principal license for the electric grid connection****

Main licensing stage

- License for water usage*
- Construction License**
- Electric Energy Generation License****

* Responsibility of the South-Transdanubian Water Management Directorate
** Responsibility of the Hungarian Atomic Energy Authority
*** Responsibility of the Government Office for Baranya County
**** Responsibility of the Hungarian Energy and Public Utility Regulatory Authority
Main licensing areas of HAEA

### Safety
- **Site Evaluation**
  - Licensing of Site Investigation and Evaluation
  - Licensing of the Site
- **Construction licence**
  - Licensing on level of SSCs
- **Commissioning licence**
- **Operational licence**

### Security
- **Determination of Design Bases Threats**
- **Licensing of the Physical Protection Plan**

### Safeguards
- **Preliminary supplying data**
- **Preliminary supplying data**
- **Safeguards registration** (7m prior the fuel)
SOME LESSONS LEARNED
The Nuclear Safety Regulation in Hungary

- Act No. CXVI/1996 about Nuclear Energy
- Gov. Decree No. 118/2011
- Nuclear Safety Code
- Safety Guidelines
- Local Regulations

Other regulations:
- Legally binding
- Non legally binding
Structure of the Nuclear Safety Code (NSC)

- **Volume 1.** Nuclear safety authority procedures of nuclear facilities
- **Volume 2.** Management systems of nuclear facilities
- **Volume 3.** Design requirements for operating NPPs
- **Volume 3A.** Design requirements for new NPPs
- **Volume 4.** Operation of NPPs
- **Volume 5.** Design and Operation of Research and Training Reactors
- **Volume 6.** Design and Operation of Spend Fuel Storage Facilities
- **Volume 7.** Siting of Nuclear Facilities
- **Volume 8.** Decommissioning of Nuclear Facilities
- **Volume 9.** Construction of New Nuclear Facilities
- **Volume 10.** Terminology
## Differentiation of requirements: Examples

<table>
<thead>
<tr>
<th>Screening values for natural hazards to be considered in the design basis [1/year]</th>
<th>Cumulative Core Damage Frequency (CDF) [1/year]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing NPP (Gen II)</strong></td>
<td>$10^{-4}$</td>
</tr>
<tr>
<td><strong>New NPP (Gen III+)</strong></td>
<td>$10^{-5}$</td>
</tr>
</tbody>
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### Safe Shutdown Earthquake values for the Paks site (PGA)

| Existing NPP (Gen II) | 0.25 g |
| New NPP (Gen III+) | 0.34 g |
Specific requirements for design and construction (Examples)

Design adaptation:
It has to be ensured that codes and standards from different countries and/or organisations form a consistent requirement system, minimising overlaps and unregulated areas.

Requirement management:
HAEA has to deal with more than 10000 paragraphs of legally binding requirements. To help easier handling of such a large amount of information specialized software tools are necessary.

Supply chain management:
Past and current NPP construction project have show why this is important. Robust requirements for the licensees’ "intelligent customer” capabilities should be implemented and enforced early on in the project, even during the design phase.
Estimated Licensing Milestones

- **2014.11.14.**
  - Site Investigation and Evaluation License

- **2017.03.30**
  - Site License

- Construction License

  **CLA*: 2018 Q3

  * = Submission of the Construction License Application

- Operational License

- Commissioning License

- ???

- ???
Public involvement
Other areas of interest

- EPC contract vs. licensees ultimate responsibility;
- Effect of construction on the safe operation of nearby nuclear facilities;
- Use of lessons learned from other project;
- Challenges for the regulatory body;
- Cooperation with other licensing authorities;
- International cooperation with regulatory bodies;
Thank you for your attention!

Questions?