Chernobyl Nuclear Power Plant decommissioning strategy and driving factors for selection

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Deferred Dismantling Strategy (SAFSTOR) is accepted for ChNPP:

- Preservation and long-term (up to 50 years) safe enclosure of the most contaminated equipment (primary circuit and reactor) under supervision
- Step-by-step dismantling of equipment – from the most “clean” to “contaminated”
- End status is “Brown spot”.

![Diagram showing stages of ChNPP Decommissioning strategy]

- **2000**: Shutdown Stage
- **2015**: Final Shutdown and Preservation Stage
- **2028**: Safe Enclosure Stage
- **2045**: Dismantling Stage
- **2064**: End Status
Deferred dismantling strategy. Why?

• No decommissioning funds
• No required site infrastructure
• No detailed Decommissioning Plan and Project
• No storages for Long Live and High Level Wastes
• No future use of plant site
• Additional radiation from “Shelter” Object
• 3 Units to be decommissioned
Terms of safe enclosure

Factors defining the duration of safe enclosure stage

• Rate of activity decay;
• Economical practicability;
• Barrier resource;
• Availability of required infrastructure for RAW management generated during dismantling of reactor and PC;
• Sufficient financing of dismantling activities.
Economic practicability - factor for defining the duration of safe enclosure stage

Costs, mln. UAH

- Radiation component of dismantling works
- Operational costs for the maintenance of barriers
- Resultant Costs

Timeline:
- Shutdown Stage
- Final Shutdown and Preservation Stage
- Safe Enclosure Stage
- Dismantling Stage
Barrier resource - factor for defining the duration of safe enclosure stage

- Central Hall tent
- Building structures
- Metal structures
Decrease in the number of 5000 people after shutdown all units in 2000. Several enterprises have been established on basis of the Chornobyl NPP.

Decrease of 650 people after the separation of non-core functions.

Dynamics of contract personnel
Contracting approach
own staff versus contractors

On Chornobyl NPP strategy postulate that almost all work is done by own staff.
The personnel of contracting organizations are involved at the ChNPP site for the following work:

• If the ChNPP own personnel of the required expertise are not available.

• Special activities – design work, research work, seismic investigation of Shelter and etc.;

• One-time activities where expensive equipment is require for a short time

• Due to economic rationality, when the cost of contracting personnel is much lower than the cost of the own personnel.
**Cost estimations**

On the implementation of the ChNPP decommissioning strategy of not less than **4 billion US$ from 2007 to 2064**. Their distributing on the stages is:

<table>
<thead>
<tr>
<th>Этап</th>
<th>US$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final shutdown and preservation</td>
<td>0.91 billion</td>
<td>31,78%</td>
</tr>
<tr>
<td>Safe enclosure</td>
<td>1.52 billion</td>
<td>33,15%</td>
</tr>
<tr>
<td>Dismantling</td>
<td>1.52 billion</td>
<td>35,07%</td>
</tr>
</tbody>
</table>
Main cost drivers for decommissioning and their impact on strategy selection

The main factors having impact on the cost:

• The decommissioning of Chernobyl NPP was not prepared
  • the necessary decommissioning Infrastructure were absent;
  • untrained personnel.
• The ChNPP is located within the exclusion zone;
• The experience of decommissioning was absent;
• An essential factor is lack of funding for work schedule that causes the extension of decommissioning period and additional costs;
• Increase in cost of work because the activities are carried out under radiation exposure.
Development of ChNPP industrial site final status

- **«Green field»**
  - 1992
- **«Brown spot»**
  - 2002
- Industrially developed site
  - 2008

Industrialy developed site is the best solution for the final status of Chernobyl NPP site decommissioning
Thank you for your attention!