

## Notes to the issue of water cooling at the power plant expansion

In terms of the planned Paks expansion the issue of water cooling is a highly complex one, the solution of which would thus also require a complex preparation. The first in line of the relating difficulties is the compliance with wildlife-protection legislation without operational limits. Furthermore strengthening of wildlife protection legislation during the lifespan of the expansion cannot be ignored. From another perspective, the unique qualities of the Danube River and the operational experience of earlier facilities of a similar kind can be determining factors.

When developing a cooling system that does not, even for temporary periods, limit the availability of the planned power plants, two possible directions seem available:

- One is possibly constructing a closed cooling water system, which is independent of the environment and its wildlife, as well as of the requirements of wildlife protection. The development of a closed water cooling system (e.g. cooling lake) is common in nuclear power plants both East and West.
- The other possibility is to improve the critical conditions of operation in an open system that connects to the natural river flow. Among these the issue of water abstraction alluvium and water level, the extreme values of water temperature and the guarantee of transfusion can all be mentioned. The solution to these issues is connected to other conditions of economic activity, such as shipping. It is important to note that issuing a ban for 60 years of guaranteeing shipping routes does not seem to be a well-chosen decision.

According to the provided information only the possibility of an open system of fresh water cooling was assessed, with a construction similar to previous ones. This, however, is unfortunate from several perspectives:

- It would be wise to learn from past mistakes, instead of making them again. The cooling water canal functioning as an inundation trap in side-branches without flow did not work either in Százhalombatta or Paks. The constant need for dredging and taking the risks of silting are not necessarily well-reasoned. There are other solutions even within our country borders.
- Mistakes made during planning of the current cool water canal have not been solved for more than quarter of a century and it will be impossible to solve them while guaranteeing the constant operation of the existing power plant. The difficulties of water supply during low-water periods cause problems both during winter and summer. Revising the issue of cooling water would be advisable.
- The transfusion of warm water is not guaranteed by the current method or the solutions described in the provided information. Besides the given recycling process the warm water plume is sustained on the right bank up to the country border; there is no fast transfusion. Revising the issue of warm water transfusion would be advisable.
- Keeping the temperature limits of rechanneling warm water in low-water periods can cause problems in the summer time. What would happen in case of a nearly double heat load is unknown. The tightening of wildlife protection regulation is likely in the long run; in addition, the possibility of rising peak values of river temperature cannot be ignored.

The cooling of the new blocks should be adjusted to the conditions of the given environment and the watercourse of the Danube in such a way that it would not impede the production of electricity during the planned lifespan of the facilities and that it would not forcefully paralyze the economic development of the area.

In the long run, the strict tightening of the rules and requirements of the protection of natural surface waters and their wildlife has to be taken into consideration; it is necessary to prevent that stricter laws cause a hindrance in the use of cooling water and the operation of the entire facility during the year (unlike what happened at the power plants along the river Rhone in the summer of 2014).