

### THE PROBLEMS OF THE SYBERIAN HYDRO POWER STATIONS EXPLOITATION

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The accident of the Sayano-Shushenskaya HPS showed us, that all the possible situations and the causes of possible damages should be considered while planning, building and exploitation of HPS.

The international commission of large dikes (ICLD) carried out a global selection of the information on the dikes destruction that displayed the growth of attention to the estimation of dikes safety. However, the attached data say that about 20% of dikes, built within the last three decades, do not have the estimation of their safety.

Unfortunately, in the ICLD report and scientific publications, a water pool is usually considered as a water storage reservoir, though according to the capital costs for its building and preparing to being filled and nature protective measures they make up to 20-50% of the sum hydrocomplex costs.

The peculiarity of building large HPS in Syberia is that water pools are created on forest-covered territories with a deposit of wood-bushes vegetation of app. 200 m<sup>3</sup> for a hectare.

Water pools that were created in forest-covered area became not only transport arteries with new morphological characteristics, but also the sources of active impact on nature.

The economic inexpediency of wood-cutting measures on areas with conifer wood deposits less than 50 m<sup>3</sup> for a hectare that was defined on the planning stage served as a cause of the refusal of these measures and planned bed flooding on Sayano-Shusheskoe, Krasnoyarskoye, and Kureiskoe water pools with sum volume of 2,85 millions m<sup>3</sup>. Beds of Ust-Ilimskoe and Bratskoe water pools with sum volume of 5,6 million m<sup>3</sup> were planned to be flooded for the same reason. In the bed of Boguchan water pool 2,2 million m<sup>3</sup> is planned to be flooded. Thus, the planned volume of wood flooding in HPS beds of Angar-Eniseyevskiy region (AER) was supposed to be 10,65 million m<sup>3</sup>. However, the real volume of flooded wood is significantly bigger. In the Krasnoyarskaya HPS water pool bed 0,47 million m<sup>3</sup> was flooded, in Kureyskaya HPS – 1,72 million m<sup>3</sup>, in Sayano-Shushenskaya HPS – 3,5 million m<sup>3</sup>, in Bratskaya HPS – 12,0 million m<sup>3</sup>, in Ust-Ilimskaya HPS –

5 million m<sup>3</sup>. Thus, 22,69 million m<sup>3</sup> were flooded in the AER water pools beds. Considering the flooding volume of in the Boguchanskaya HPS water pool bed planning of 2,0 million m<sup>3</sup> the sum volume of flooded wood is 24,69 million m<sup>3</sup>.

Floating and flooded wood has a relatively low impact on the water quality of the water pool (3-5% of the total pollution volume). However, its accumulation in bays, by coastlines, and in river mouth areas can provoke the creation of stagnant areas with a acute alteration of hydro-chemical composition. Small depths in the mentioned water pool areas, the increase in its temperature, and its pollution by biogenic and organic wood substances create favourable condition for the emerging of blue-green algae that leads to the worsening of gas content etc.

A complicated ecological situation in the majority of Russian region made the problems of management and rational usage of water and wood resources that provide for a normal human vital functions and stable functioning of natural environment the most important one.

The flooded wood is the one of extremely poor quality, it is not in demand, and its physical-mechanical qualities are lower than those of damp-growing wood. The collection and production of flooded wood are unprofitable and the technology of its processing is low-productive. But, considering that the floating wood can be a great threat to HPS, has a great impact on the water quality, and lower the recreation attraction of the water pool, measures aimed for the water area cleaning should be systematically carried out, as the process of paddling wood deposit replenishment is continuous.

The cleaning of water pools and rivers from the flooded and floating wood mass is a complicated technological process that requires a number of researches:

- natural inspection of floating wood and wood junk accumulation areas with the definition of fraction and qualitative content analysis of wood that has been carried along the shore and is floating within water pool;
- the preparation of wood deposits in river bays and on the coast;
- the implementation of qualitative-chemical water analysis in areas of floating wood concentration;
- the development of technologies and technological measures of wood gathering and removal;
- theoretical estimation of the concentrated wood warehousing impact on the environment;
- the definition of product composition, that can be obtained from floating wood, and possible ways of its realization.