30th INTERNATIONAL GEOLOGICAL CONGRESS

BEIJING CHINA

4—14 August 1996

TWO TYPES OF PRODUCTION AND FUNCTIONING ARRANGEMENT OF QUARRY WATER RESERVOIRS FORMED AS A RESULT OF OPEN-CUT MINING OF NON-METALLIC MINERALS

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Hydroeconomic ecologically advantageous rehabilitation of worked out quarries must result in the formation of quarry water reservoirs that are essentially similar to natural limnic systems of the region (Khomitch S.A., 1987).

The investigations of the morphometry of basins, physical and chemical and bioproduction characteristics of quarry reservoirs made it possible to distinguish two main types of their production and functioning arrangement: macrophytic and phytoplanktonic ones. The type belonging of a reservoir depends on the level of the organic matter production by main producer, shows the prospects of the water body evolution and suggests the optimum way of its economic utilization. Water reservoirs of the macrophytic orientation show the property of autoregulation and are anthropogenic pollution resistant. The mechanism of their stability is based on the capacity of submerged marophytes to uptake nutrients, to accumulate nitrogen and phosphorus compounds in tissues, to create reserves of biogenic elements that are inaccessible to phytoplankton for the most part of the vegetative season (Pokrovskaya T.N. et. al., 1983). The evolution of macrophytic water reservoirs shows as well more various stages and states of the production and functioning unit (that are determined by the vegetative tissues saturation with nitrogen and phosphorus compounds). Water bodies of the productive-macrophytic orientation are most favourable for a long-term and multipurpose economic utilization (industrial and recreational water use, etc.). Phytoplanktonic aquatic systems are destined for special purpose, mainly fish-husbandry water utilization with a short economically favourable life.

Orientation of production and functioning structures in one of two ways of development is determined by the density, thermal and chemical-biological stratification of the water body due to morphometric parameters of quarries-basins. During the rehabilitation of worked out quarries it is possible to carry out a purposeful formation of some elements of the basin morphology (depending on the initial parameters of mined deposit and projected way of utilization): average and maximum depths; extension, slopes and depth of littoral zone; unevenness of shores, etc. In addition, allowing for natural limnic systems characteristics it is suggested to include the future quarry water reservoirs in the local hydrographic network and to arrange the catchment area, so as to eliminate the negative impact of anthropogenic factors.

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