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THE MAIN FUNCTIONS OF WATER TREATMENT PLANTS AND WATER TREATMENT PROCESSES

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ABSTRACT
The article is devoted to the study of the operation and supervision of water treatment facilities and water treatment processes. Analysis of water in Central Asia, drinking water in Uzbekistan and scientific results in regulatory documents.

Keywords: process, hydroecology, standards, disinfection, water supply.

Introduction

In the conditions of increasing water scarcity in Central Asia, the lower reaches of the Amu Darya, due to its territorial location, turned out to be the most vulnerable areas in terms of water availability.

The existing significant shortage of water resources is further deepened by their qualitative depletion. This process is also complicated by salinization and contamination of surface and groundwater. This hydroecological fund in Uzbekistan formed a very difficult situation with the water supply of the population. According to estimates [1,2], about 1,9-2,1 km^3/year of water is used for household and drinking purposes in Uzbekistan. The coverage of the population with centralized water supply is 73.4% on average. Practice shows that the efficiency of water use reduced by its losses and leakage in transportation systems through pressure water pipelines. First of all, this is due to a violation of the continuity of the hydraulic mode of water supply in the pipes.

Despite the availability of sufficient capacity, the centralized water supply system of settlements and cities still has significant problems. In particular, the population deprived of the opportunity to receive uninterrupted drinking water in sufficient quantity that meets the "Drinking water" standard. The analysis of the operation of the water supply system in Karshi showed that the possible potential of the centralized water supply system allows providing each resident with drinking water per day about 167 liters (water leakage during its transportation is more than 32%) [1].

The analysis of scientific literature shows that many works of foreign and domestic researchers are devoted to the problems of the entire complex of drinking water supply systems. The scientific results obtained by them are reflected in scientific publications and in regulatory documents. However, a number of issues still remain insufficiently studied. These include a decrease in the reliability of the functioning of water treatment facilities, which are located with a close hydraulic connection with surface sources.

The study of the water quality of a natural source makes it possible to establish the nature of the necessary operations for its treatment. At the same time, the tasks of eliminating a certain shortage of natural water or a whole complex of disadvantages arise at the treatment facilities – artificially giving water new properties required by consumers.

All the various functions assigned to treatment facilities can be reduced to the following [3]:

1) Removal of suspended substances contained in the water from the water, which causes a decrease in its turbidity, this process is called water clarification;
2) Elimination of substances that cause the color of water - discoloration of water;
3) Destruction of bacteria contained in water, including pathogens – disinfection of water;
4) Removal of calcium and magnesium cations from water – softening of water; reduction of the total content in water – desalination of water;
5) Partial desalination of water to a residual salt concentration of no more than 1000 mg/l is called desalination of water;
6) Removal of gases dissolved in water (degassing), elimination of odors and tastes of natural water.

The degree of the required depth of clarification, discoloration, desalination of water depends on the nature of its use.

Part of the water treatment operations can be related to the processes of water purification itself: elimination of turbidity, chromaticity, removal of plankton, bacteria and excessive amounts of dissolved salts.

In household and drinking water using, river water, sewage treatment plants are assigned the tasks of clarification, discoloration, elimination of odors and tastes of water, and sometimes at the same time its softening.

The solution of the tasks assigned to the treatment facilities can be carried out by using various technological techniques. Thus, the clarification of water can be achieved by settling and filtering it, and settling can be simple mechanical, when the purified water passes through special pools (settling tanks) at a very low speed. The deposition time of suspended particles depends on their size. The smaller the particles, the longer it will take for them to settle. To precipitate colloidal particles, coagulation is used to accelerate the deposition process of the

suspension. To do this, chemical reagents (coagulants) are introduced into the water, contributing to the binding of particles causing turbidity into large flakes, which accelerates their precipitation in sedimentation tanks. In some cases, water for deep clarification after settling tanks is directed to filters, where it is further clarified by passing through layers of filter material.

Along with clarification, water during coagulation and filtration is largely freed from bacteria, which increases its sanitary qualities.

Disinfection (disinfection) of water is a special operation for the destruction of bacteria contained in water, in particular pathogens. For disinfection, chlorination, ozonation, as well as bactericidal irradiation of water are used.

To improve the quality of water, other operations are also used: softening, desalting and others. Water softening is the process of reducing its hardness due to the presence of calcium and magnesium salts.

In the practice of water treatment, the following methods of water softening have become widespread: a) reagent; b) cationic; c) Donnan dialysis, carried out on membrane devices; d) thermochemical. All these methods are described in detail in [5].

Desalination is the removal of salts dissolved in it from water, usually to a salinity of several milligrams or fractions of a milligram per 1 liter, depending on the requirements of consumers. Currently, the most common way to determine the degree of frequency of water is to estimate it by the specific electrical conductivity λ, om^{-1}.

In the process of water treatment, the removal of carbon dioxide, oxygen and hydrogen sulfide is required. All three gases are corrosive gases that cause or enhance the processes of metal corrosion.

A set of measures related to the removal of gases dissolved in water from water is called water degassing. Chemical and physical methods of water degassing are used [5].

Thus, sewage treatment plants are one of the main elements of the water supply system and are closely related to its other elements. The most widespread in the practice of water treatment in urban water pipes are schemes of sewage treatment plants with gravity movement of water.

References

1) Usmanov I.A., Makhmudov I.E. Assessment of the condition of aqueducts and the quality of drinking water in the centralized drinking water supply system of Karshi // Bulletin of the Association of Doctors of Uzbekistan. Tashkent, 2008. No. 3-pp.96-97.
2) Makhmudov I.E. On the creation of a reliable drinking water supply system in settlements of the Republic of Uzbekistan // journal "Energy va resource tezhash muammolari". Tashkent, 2007. No.3-4 -pp.126-127.
3) Abramov N.N. Water supply. Textbook for universities – M.Stroiizdat. 1982. -440 p.
4) Starinsky V.P., Mikhaylik L.G. Water intake and treatment facilities of municipal water pipes – Minsk "Higher school" 1989. -270 p.
5) Belan F.I. Water treatment. M. Energiya. 1979.
6) K I Baymanov, A L Toreev and R K Baimanov. About the longitudinal slopes of flat rivers IOP Conf. Series: Earth and Environmental Science 1045 (2022) 012009, doi:10.1088/1755-1315/1045/1/012009.