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The system of differentiated water supply of settlements on the basis of desalination complex

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The aim of the work is to develop an environmentally safe system of differentiated water supply of settlements on the basis of desalination complex to solve the problem of water deficiency and reduce the environmental burden on the environment. The proposed water supply system involves obtaining drinking and technical water for various purposes based on desalination technology and recycled water (recycling) using membrane and distillation methods. The work proposes the development of a new technological scheme of the pre-treatment unit, taking into account the data on the composition of pollutants, salinity and productivity of the water treatment system. At the same time, the problem of softening the sea water before its desalination, as well as removing such toxic ions as boron and strontium, is of great importance. After the pre-treatment unit, the salt water enters the desalination unit. To reduce the energy intensity of the desalination process, a hybrid desalination scheme has been developed in the work. To obtain technical water, it is proposed to use the multi-effect desalination system with thermal vapor compression (MED-TVC) desalination process. In this case the salt content of desalinated water output is minimal (<0.025 kg/m^3), which enables the use of this water for various industrial purposes. For obtaining quality drinking water and water for irrigation in agriculture another portion of water from the pretreatment unit enters a low pressure reverse osmosis unit, which makes it possible to obtain at the output mineralized water with the total mineralization 0.5-1.0 kg/m^3. In addition, the use of waste water recycling technology, allows to reduce the required productivity of the desalination plant, and the processing of precipitation and concentrates of brines provides the ecological safety of the water supply system.

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