

Verner T., student of IFNTUOG
Hrytsulyak H.M., Doctor of Agricultural Sciences,
Head of the Department of Technology of
of Environmental Protection and Labor Safety,
Ivano-Frankivsk National Technical University of Oil and Gas,
Lopushniak V.I., Doctor of Agricultural Sciences,
Professor of the Department of Technology
of Environmental Protection
of Environmental Protection and Labor Safety,
Ivano-Frankivsk National Technical University of Oil and Gas

TREATMENT OF SAWMILL WASTEWATER AND UTILIZATION OF WATER TREATMENT SLUDGE

In the current conditions of the Ukrainian energy sector, considerable attention is paid to the environmental aspects of thermal power plants. They remain important energy infrastructure facilities, but they create a significant anthropogenic burden on the environment. One of the most pressing environmental challenges is the problem of wastewater treatment resulting from thermal power plant technological operations, as well as the effective disposal of water treatment sludge [1,3, 6].

Thermal power plant wastewater has a variety of origins: heat exchange water, wastewater from the ash and slag removal system, chemical water treatment water, wash water, rainwater, and domestic water. Depending on the source, they can contain suspended solids, heavy metals (mercury, copper, nickel, vanadium), organic matter, oil products, reagents, and have an elevated temperature. Such wastewater adversely affects the quality of surface and groundwater, causes thermal pollution, and can lead to the death of aquatic life [3, 5].

Treatment of thermal power plant wastewater is based on the use of a set of methods that ensure the removal of various groups of pollutants. The most common methods are mechanical methods (settling, filtration), physical and chemical methods (coagulation, flotation, sorption, reverse osmosis), and biological methods used to treat domestic and some process wastewater. The effectiveness of treatment depends on the correct selection of methods in accordance with the composition of the wastewater and the requirements of the regulatory framework [2, 3].

A particular problem is water treatment sludge, which accumulates at thermal power plant in large volumes. This waste is a complex mixture of inorganic substances (metal oxides, salts, reagent residues) and may contain toxic impurities and heavy metals. Safe storage of sludge requires large areas and poses risks to soil, groundwater, and air (due to dust and fire) [1, 4, 6].

However, sludge also has the potential to become a secondary raw material. Promising areas of utilization include use in construction (cement, concrete, paving slabs), road construction, agriculture (ameliorant), and the extraction of valuable

components, including metals. An important aspect is the cost-effectiveness of such solutions: sludge utilization reduces disposal costs and allows for additional production.

To minimize the environmental impact of thermal power plants, it is advisable to implement recycling water supply systems, reuse treated wastewater, modernize treatment facilities, and improve the regulatory framework for industrial waste management. An integrated approach to wastewater treatment and sludge disposal will help achieve environmental safety and sustainable development of the energy sector.

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Yaremak Iryna, PhD, Associate Professor
Department of Electrical Engineering

Ivano-Frankivsk National Technical University of Oil and Gas,

Yaremak Roman, Master's Student

Ivano-Frankivsk National Technical University of Oil and Gas,

ENVIRONMENTAL ASPECTS OF SOLAR ENERGY IN THE CONTEXT OF UKRAINE'S SUSTAINABLE ENERGY RECOVERY

Amid Russia's military aggression against Ukraine, issues of energy independence, ecological security, and energy sector modernization have become critically important. Solar energy, as a leading area of "green" transformation, has significant ecological potential that aligns with sustainable development goals and the post-war energy model.