

Name of the project:

IRN AP19679359 « Development of a system of magnetic treatment of process water to reduce the formation of scale on the heating surface».

Relevance:

The main idea is to create a pilot sample of a complex system of magnetic treatment of industrial water to reduce scale on the heating surfaces of heat exchangers, boiler units, water heaters and other thermal power equipment. It is possible not only to prevent the formation of scale, but also to clean the already existing deposits of hardness salts. The use of a magnetic field obtained from electromagnets and permanent magnets will reduce the consumption of chemical reagents in water treatment systems, in this regard, the harmful effect on the environment is reduced, since magnetic fields do not have a harmful effect on water resources.

Aim:

The aim of the project is to develop a comprehensive system for the magnetic treatment of industrial water in order to reduce the formation of scale on the heating surface of thermal power equipment by using a combination of pulsed electromagnets and permanent magnets.

Results obtained for 2023:

1. Preparatory work, conclusion of contracts for the purchase of equipment and materials.
2. Formulation of the main hypotheses. Carrying out complex theoretical studies related to the assessment of the influence of magnetic fields created by electromagnets and permanent magnets on the hardness and pH-factor of process water used in thermal power plants.
3. Checking the conditions and choosing the simulation environment. Carrying out theoretical studies related to the influence of various magnetic fields on water.
4. Development of computer models of structural elements and the laboratory sample itself in order to study the process of the influence of magnetic fields on the water hardness index.
5. Carrying out technical calculation and designing of a laboratory sample of the industrial water magnetic treatment system.
6. Preparatory work related to the coordination and conclusion of contracts for the manufacture of a laboratory sample.
7. Conducting full-scale studies of a laboratory sample and, if necessary, adjusting its design parameters.

Project Manager: Mehtiyev Ali Javanshirovich, candidate of technical sciences, specialty "Mining machines". H-index Scopus - 9, Web of Science - 7. Scopus Author ID - 57219935782, Web of Science Researcher ID - R-2415-2017, ORCID 0000-0002-2633-3976.

Research team members:

1. Sarsikeyev Yermek Zhaslanovich - executive, PhD in the specialty "Power Engineering".
2. Gerassimenko Tatyana Sergeyevna - executive, candidate of technical sciences in the specialty "Electrical equipment and electrical technologies in agriculture".
3. Kasiphan Akgul - executive, PhD in the specialty "Soil Science and Agrochemistry".
4. Alkina Aliya Daulet Khanovna - executive, master of technical sciences in the specialty "Infocommunication systems and technologies".
5. Mekhtiev Ruslan Alievich - executive, master in the specialty "Heat power engineering".
6. Kirichenko Lalita Nikolaevna – executive, 2nd year doctoral student.

Information for potential users:

The project is aimed at solving the problem of scale formation on the heat exchange surfaces of both industrial and domestic water heaters.