UDK 628.171.034.2

PHYSICAL CHEMICAL ANALYSIS OF THE WASTEWATER COMPOSITION OF SHEROBAD CEMENT PLANT

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Annotation: Microelements, heavy metals and light in the wastewater of Sherabad Cement Plant were determined by spectrophotometric, inversion voltammetric methods. It was found that the total hardness of the water is slightly high, and the amounts of sulfates, chlorides, water loads, nitrates and dry residue are high.

Key words : *Surface waters, spectrophotometric method, sulfates, chlorides, water environment, total hardness.*

Enter. A number of chemical elements, potassium, iron, fluorine and other elements, as well as water and air, are involved in the natural cycle of substances in nature.

We all know that water is called life. Indeed, life without water is unimaginable. Water is one of the wealth factors of our beautiful nature, biosphere, which is necessary for human, animal, plant world, in short, the whole being. It is a part of any living organism, actively participates in the living process of the organism, important biochemical processes, it improves heat exchange, dissolves various substances, breaks salts and other substances into ions, creates a vital environment in the organism.

In Central Asia, more than 80 percent of water is used for growing agricultural products. A complex situation related to clean water can lead to food shortages in the region. Clean drinking water is at the top of the list of problems that plague the population of most districts and villages, especially those living in the most remote areas. Today, the issue of delivering clean drinking water to remote mountainous regions of Surkhan is one of the urgent problems.

The problem. Analysis. Research. In their work, the authors believe that the use of meters for the consumption of hot and cold water encourages the consumer to control water consumption and reduces costs by 30-40% compared to paying bills according to established norms.

In this research work, it was mentioned that the amount of iron in water is one of its main sources for plants and people, and monitoring the content of iron in surface and tap water is considered an urgent task from year to year. The research objects were water samples taken from the river and Enisei near Krasnoyarsk, as well as iron ions in tap water taken from taps of three different districts of Krasnoyarsk were determined by spectrophotometric method.

In these research works, the main stages of production are described and the main directions of ecological modernization of cement production are listed. According to the authors, reducing the amount of cement dust, creating a closed water supply system

that reduces the amount of pollutants, and preventing the release of dust and other pollutants into the atmosphere.

In these works, it was mentioned that the purpose of conducting qualitative and quantitative assessment monitoring of the harmful content of wastewater is not only to create measures for their treatment, but also to study the negative anthropogenic impact on the hydrosphere and ecosystem. Over the next 150 years, surface and underground water pollution has significantly worsened, and it is one of the urgent tasks to control wastewater with new ideas and directions, to ensure that its composition meets the requirements of standard norms.

In recent decades, the consistent development of ecological research is related to the urgent needs of mankind to use the Earth's biological resources, and due to the development of cities, the growth of industry and agriculture, in some cases, water resources have become deplorable. At the same time, environmental assessment of the current and future state of reservoirs and watercourses, which are subjected to more and more intensive exploitation and pollution, and preservation of the natural state of water remains one of the urgent problems.

At present, it should be noted that the level of ecological culture of a person is low, and this does not allow to understand in advance what he is doing. But he is living in the time of ecological crisis and he understands that the main task of every person is to preserve nature in its own way. Everyone should follow the basic principle of constructive ecology - be ready to do anything to improve the environment. Thus, environmental monitoring and biotesting are one of the widely used methods for assessing the quality of natural waters.

According to the scientist, reservoirs are only places where water accumulates, and they can be flowing or non-flowing. There are temporary reservoirs (ponds) and permanent ones that have been used for many years. Ecosystems of water bodies are central, and flowing waters are called streams, which form managed ecosystems.

According to the authors, many professional ecologists are needed to regularly monitor the ecological status of many water bodies, but even the highly developed countries of the West are not able to do this. The contribution of educational activities to the study of the ecological condition of water bodies in collecting information about the ecological condition of regional water bodies, water protection zones helped to improve the ecological condition [1].

A number of chemical elements, potassium, iron, fluorine and other elements, as well as water and air, are involved in the natural cycle of substances in nature.

The article presents the results of experiments and laboratory studies on determining the sorption concentration of heavy metals: zinc (II) , cadmium (II) , lead (II) and chromium (III) KFG-1 and TFG-1 ions. exchangers from aqueous media. Optimum conditions for concentration and subsequent determination of heavy metals at the level of one -tenth of MPC are proposed by spectrophotometry . Comparative description of sorption properties of TFG-1 and KFG-1 ion exchangers with respect to cadmium (II) , zinc (II) , zinc (II) and chromium (III) ions in the pH range 1-12 . done; done [2].

In this study, the highly efficient ion exchanger polyfunctional DMT+FK, DMK+FK, DMT+AF and DMK+AF ionites synthesized in static and dynamic

conditions from individual and mixed solutions of Cu (II), Ni (II), Zn (II), Ag The sorption capacity for (I) ions was determined. Based on the obtained results, the ionites synthesized were used for the treatment of industrial wastewater and for the separation of non-ferrous and heavy metal ions in hydrometallurgy.

Cement is obtained by grinding clinker and gypsum for a long time. Clinker is a raw material consisting of a mixture of limestone and earth with a certain composition, which ensures the predominance of calcium silicate, and is a product formed by uniform firing. Three technological processes are used in the production of cement: wet, dry and mixed method.

One of the most used methods is the wet method, which helps the clinker to form evenly. Therefore, this method is used in production due to the high quality level, although the costs are high. The Sherabad cement plant also uses the wet method, and the raw materials from the water ponds are homogenized and transferred to the next process. [3].

Water supply systems. Industrial enterprises use water for the following purposes:

- For the needs of production processes;
- For consumer needs;
- For the needs of the fire safety system;

Also, depending on the technology used by the industrial enterprise, their amount may be in different proportions. The main water source of Sherabad Cement Plant is underground water. The I-stage pumping station is also integrated with pumps that draw water from the depths of the wells. In addition, there is a problem of reliable operation of high-capacity (100-300 m^3/h) underground water extraction pumps typical of large enterprises. Increasing the reliability of water sources can be done by connecting existing water wells to networks. It is necessary to take into account the seasonal nature of existing water wells and their location. The deepest water supply wells are 203 meters [4]. In deep industrial artesian wells, iron, calcium, magnesium, fluorine and chlorides are almost always found to be significantly abnormal in the water. In the cooling system of the main production equipment, the temperature is moderate (+46ºC), and the water supply system of the small thermal power plant is different from the above system. In this case, the transition of water to the vapor state, condensation processes and when it arrives at the cooling device (Ventilation cooler) is in most cases high (+65ºC level) [5]. Water is brought to the main pumping station through the I and II stage pumping stations and passes through various stages of water preparation based on existing requirements and is collected in special water collection basins and delivered to consumers.

The water coming from the I-stage pumping station goes through the flotation and coagulation processes and the first special clarifier. At the next stage, the wastewater is subjected to additional mechanical and chemical treatment and collected in separate water collection reservoirs with a volume of 500 m^3 each. Purified and cooled water is stored in a fire water storage tank, excess water is used for landscaping and reducing dust particles released into the environment. One of the urgent tasks is to control the water consumption of the Sherabad cement plant, as well as the chemical composition of the water based on the automated central system. The composition of waste water of enterprises must comply with the requirements of the regulatory document

SanQvaM No. 0318-15, SanQvaM No. 0200-06 (Table №1, Table №2).

Table №1

Classification of water bodies according to the level of pollution

No	Component names	Unit of measure	Fixed concentration
1.	Mineralization: dry residual	mg/ dm^3	Not more than 1000 Chlorides - 350 Sulfates - 500
2.	Smell, taste	score	2-4
3.	KBE-biological need for oxygen	mgO_2 / dm^3	6.0-10.0
4.	KKE-chemical demand for oxygen	mgO_2 / dm^3	15.0-40.0
5.	Dissolved oxygen	mgO_2 / dm^3	4.0 is no less
6.	rN		6.5-8.5
7.	Suspensions	mg/dm^3	0.75

Table №2

Above ground water quality level according to chemical indicators

Name of pointers	Water quality indicator by classes			
	Unit of measure	1	2	3
Blurry	mg/l, not much	20	1500	10000
Color	degree, not much	30	50	100
The smell	score, not much	2	3	4
Hydrogen indicator	(pH)	6.5-8.5	6.5-8.5	6.5-8.5
Iron	mg/l, not much	0.3	1.0	3.0
Manganese	mg/l, not much	0.1	1.0	2.0
Fluoride	mg/l, not much	0.7	0.7	0.7
Oxidability	mgO_2 /l, not much	7.0	15.0	20.0

Technical water is mainly used for the purpose of cooling the crusher device that grinds raw materials, sprinkling water on the dust released during the process, speeding up the mixing processes of semi-finished products, cooling the lower parts of the rotating boiler room and mill base and other types of devices. Technical water consumption for the main production technology of the plant is an average of 144 m^3 per day. The heat generated during the cement production process from the 8 MW small thermal power plant is captured without being released into the atmosphere and used to generate steam in the existing two-stage boilers. The water preparation and cooling system of the heat station works autonomously.

It has a special water treatment complex, a 100 m^3/h water chiller and an open water reservoir with a volume of 4000 m^3, with an average water consumption of 475 m^3 per day for a small thermal power plant.

Table №3

Sherabad cement plant from the waters use case pointer

No	Water reservoirs	Water capacity, m^3	Objects to which water is diverted	Average water consumption, m^3/day
1.	Fire pit	500	Fire protection system	1.25
2.	A reservoir intended for household use	500	Landscaping areas, car wash	233.8
3.	A reservoir for technical water	500	needs of production workshops	144
4.	Small thermal power plant	500	Power plant water cooling system	475

We can represent the water supply basins of the Sherabad cement plant and their users according to Table №3.

№1, №2, №3, №4, №5 – Wells from wells to the main pumping station;

Pipes from wells to the main pumping station;

Water pipes in the cooling system

A water pipeline to a small thermal power station

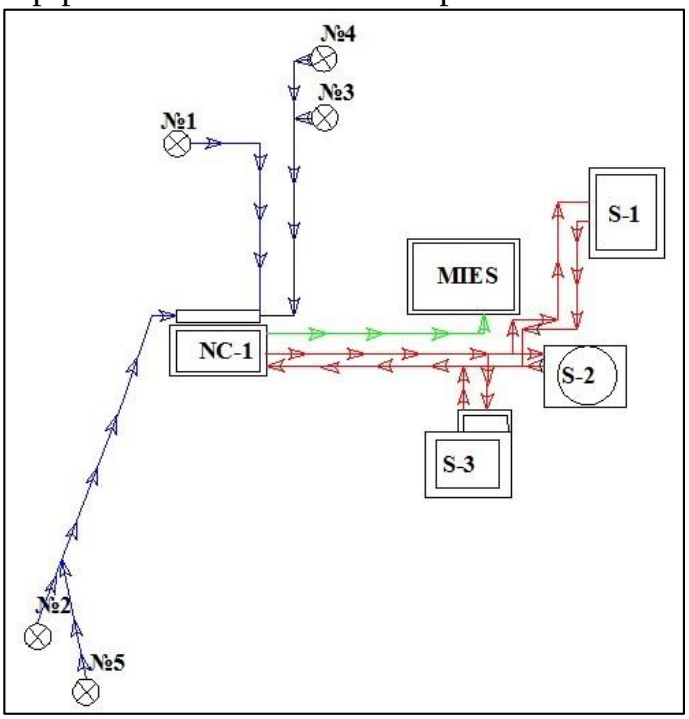

Figure 2. Water sources. Wells №1, №2, №3, №4, №5. NC-1 main water preparation, storage and transfer station. Grinding shop S-1. S-2 annealing workshop. S-3 raw material shop. MIES small thermal power plant.

The total hardness ranged from 8.8 mg-eq/l to 10 mg-eq/l when tested water samples were examined. The amount of sulfates ranged from 136.8 mg/l to 139.2 mg/l. The dry residue ranged from 480 mg/l to 673 mg/l. The amount of chlorides ranged from 2.0 mg/l to 3.6 mg/l. The pH of all tested wastewater samples was found to be 6 tang. Nitrates were found to range from 1.6 mg/l to 2.0 mg/l (Table №4).

Water samples were collected from the following sampling points:

№1. Water sample taken from a water well (Well No. 5) flowing from the area of Vandob village.

№2. Water sample taken from the main water well (Well No. 1).

№3. Water sample taken from the South Water Well (Well No. 4).

№4. A sample from a technical water storage pond.

№5. A sample from a fire pit.

Table №4

Composition of water samples taken from wells and reservoirs

No	Indicator - S	UzDSt 950: 2011	Tested water samples				
			#1 mg/l	#2 mg/l	#3 mg/l	#4 mg/l	#5 mg/l
1	General hardness	7(10) mg-eq/l	10	8.8	9.0	10	10
2	SO_4	400 (500)	136,8	139.2	139.2	136.8	139.2
3	Dry residue	1000 (1500)	673	480	485	669	665
4	Cu	1	-	-	-	-	-
5	Ms	3	-	-	-	-	-
6	Pb	0.0005	-	-	-	-	-
7	Mr	0.1	-	-	-	-	-
8	Cl	250 (350)	2.1	2.4	3.6	2	2.4
9	pH	6-9	6.0	6.0	6.0	6.0	6.0
10	NO_2	3	-	-	-	-	-
11	NO_3	45	1.6	1.9	2.0	1.6	1.7
12	Fe	0.3	-	-	-	-	-

Summary. Trace elements, heavy metals and its environment in Sherabad cement plant wastewater were studied by spectrophotometric and inversion voltammetric methods. It was found that the total hardness of the water is slightly high, the amounts of sulfates, chlorides, water medium, nitrates and dry residue are high. Based on the identified indicators, tasks were defined for further work.

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