Proceedings of Online International Conference on Advances in Technology, Social Sciences and Humanities
Organized by Novateur Publications, Pune, Maharashtra, India
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN: 2581-4230, Website: journalnx.com, July 11th and 12th 2020.

WATER CLARIFICATION PROCESS AT THE TASHKENT TPP WATER TREATMENT PLANT

Alimova Lola Odiljonovna,

Isakhodjayev Khayrulla Sunnatullayevich,

Usmonov Nizomjon Orifovich
PhD Tashkent state technical University

Abstract: the paper Describes an automated control and monitoring system for the regeneration of the n-cationite filter system, as well as operational monitoring of the Tashtpp water treatment plant.

Keywords: cationic filter, alkalinity, transparency, solution, acid, hydrolysis

For many years, ensuring stable operation of the clarifiers with a suspended layer has been a significant problem at the VPU Tashtes. As you know, they are observed intermittent removal of sludge.

With the help of the automated monitoring system for technological processes at the Tashtpp water treatment plant (ASMTP VPU), since may 2019, a constant measurement of the specific electrical conductivity (UEP) of the coagulant solution has been carried out [1].

The graph (a) clearly shows that deviations of the coagulant solution UE from the average value turn by 25%, which leads to unstable operation of clarifiers, removal of sludge and reduction of filter cycles of mechanical filters. Using mechanical filtration, "rough" water treatment is carried out. Mechanical filters that exist at the VPU Tashtpp have a low mud capacity, which does not always provide the required quality of clarified water before subsequent desalination (Fe and Al less $100\ {}^{mkg}\!/_{dm^3}$, suspended substances less $2\ {}^{mg}\!/_{dm^3}$).

Fig. 1 (a) shows the values of the UEP of the coagulant solution, which was supplied to the clarifiers for two days, starting from 10. 05. 2019.

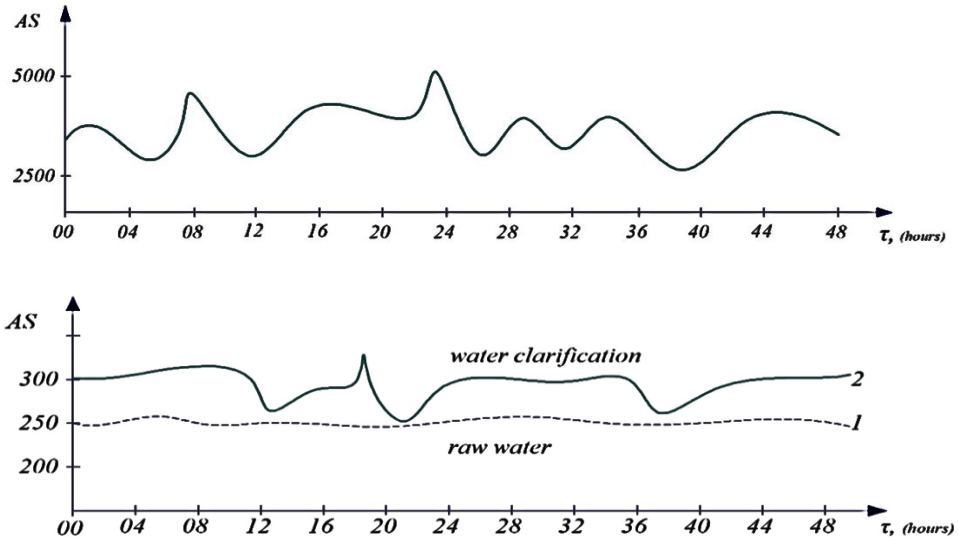

Fig. 1. Graphs comparing the specific electrical conductivity (UEP) of the coagulant solution supplied to the clarifiers (a) from the UEP of the Boz-su canal water and the treated water after the clarifiers (b).

Water at The tashtpp VPU is taken from the Boz-su scale, and the UEP values of raw water and clarified water are constantly monitored (see Fig. 1 (b)).

From Fig. (b) raw source water has a stable UE value for a long time. The UEP values of clarified water are characterized by high fluctuations over time. All these fluctuations show a change in the quality of clarified water, and this leads to instability of the entire desalting unit of the VPU.Pass poorly clarified water on mechanical filters can not, it can disable them, but also ion-washed filters. This will all lead to a significant expense of reagents for their recovery.

At the VPU TashPP, work is underway to create an automated control system for the technological process of water clarification. The scheme of this system is shown in Fig. 2[2, 3].

Looking at this diagram, you can understand that continuous information about the value of the UE from the conduct metric sensors $K1$, $K2$, $K3...$, enters the ASMTP VPU, is recorded and stored, and then enters the boiler of the coagulant and acid dispenser (DC and K). Information about the value pH is continuously received by DC and K. The value must

always be in the range $5{,}5 \div 7{,}5$. It is optimal for the occurrence of hydrolysis of the coagulant aluminum sulfate $(Al_2(SO_4)_3 \cdot H_2O)$.

A 5-channel water transparency meter was developed and tested. Water from the channel, from 3 clarifiers and desalinated water enters a separate module. In the module, a collimated beam from the infrared led AL119A with a radiation power of up to $40\ mvt$ and $X = 935\ nm$ passes through the pressurized water and falls on the fd256 photodiode. The value of the measured transparency of the maximum water thickness is graded in units of D (cm). According to the VPU regulations, the "cross «is visible through the unit.

Looking at the transparency of raw water, DC and K with the help of UP2 opens the coagulant supply valve until the regulated value of the UE is reached after the ejector and keeps this value in a pre-fixed window with the help of UP2.

At high concentrations of the coagulant solution pH , the treated water falls into the interval $5{,}5 \div 7{,}5$, because the coagulant solution has an acidic reaction. At the same time, the concentration $D > 25\ sm$ of the coagulant solution is low and to maintain the necessary interval pH , sulfuric acid H_2SO_4 is transferred from the acid gauge to the coagulant gauge . Controlling the UP1 drive in an automated system this operation is performed by DC and K.

In the coagulant (DC) and acid (K) dispenser, when controlling the UP2 electric drive on the coagulant supply valve from the measuring tube to the ejector, a signal from the IVP is used (Fig.2).

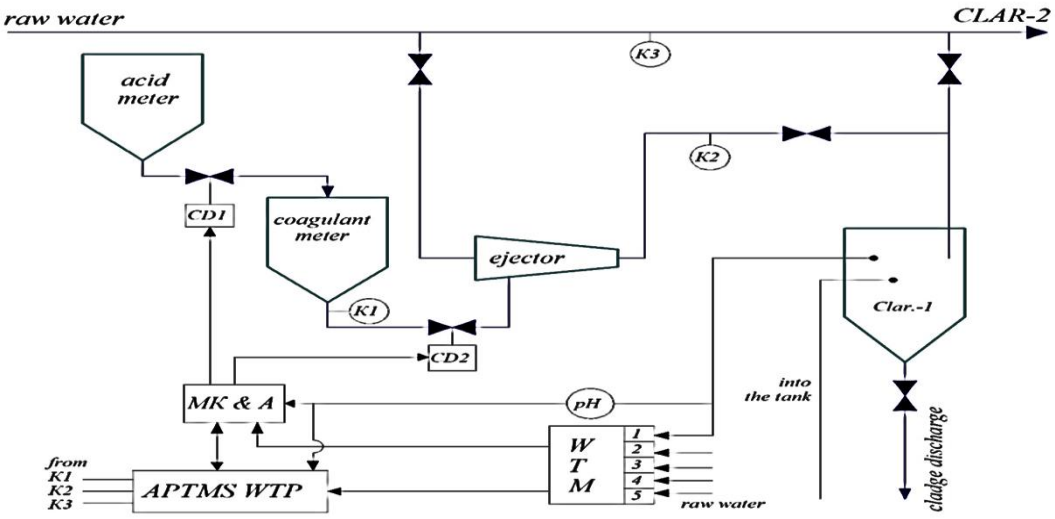

Fig. 2. Diagram of the automatic control system and control of the technological process of water clarification at the VPU Tashtpp.OSV-1, OSV-2-clarifiers, K1, K2, K3-conductometric sensors, UP1, UP2-electro-controlled drives, pH meter, DC and K – dispenser of coagulant and acid, IPV-5-channel water transparency meter, ASMTP VPU-automated system for monitoring technological processes VPU TashTPP.

As a result of all the above, it turns out that the automated control and control system for the technological process of water clarification at the VPU Tashtpp provides a dosed supply of coagulant on the clarifier by maintaining the optimal pH value of the treated water. All information about the K1, K2 sensors, K3...pH both the DC and K devices and the IVP are sent to ASMTP VPU and stored in the archive. The current state of the system can be observed in the "overview" and "charts" Windows of the PC monitor. By calling data and graphs from the PC archive, you can get information about the operation of the automatic system in any given period of time from the moment of its launch.

The best advantage of the automatic control system and control of the technological process of water clarification at the VPU is that it provides operational on-line information about the progress of the clarification process, provides technical regulations. This regulation, in turn, guarantees stable and trouble-free operation of the entire VPU Tashtpp

Literatures:

1.Usmonov N.O., Normuminov J.A., Axmatova S.R. Multichannel measuring the water transparency to automate water clarification process water treatment plant TashTPP. «European Conference on Innovations in Technical and Natural Sciences». Proceedings of the 13th International scientific conference. Vienna, – 2017 – 117-180 pp.

2. Usmonov N. O., Yusupaliev R. M. Experimental electrocoagulation unit for pre-treatment of natural water for steam generation at thermal power plants // Energy saving, Energetika energoaudit, - 2016. no. 10. - P. 8-12.

3. Islamov B. I., Litvinov S. N., Serikbayev M. T. automation and control of the water clarification process at the Tashtpp water treatment plant. International scientific and technical conference "Current state and prospects of energy development». Tashkent-2011, Pp. 29-31.