



Fig. 1. The scheme of automatic lighting control system

The designed and implemented control system allows for correct control and management of the "light day" for a closed environment in the form of an aquarium, which has a positive effect on the life of aquatic plants and organisms.

BIBLIOGRAPHY

1. Müller, E. Applied Aquaristics / E. Mueller. – 2007. – P. 73–78.
2. Jeremy, B. Learning Arduino. Tools and techniques of technical magic / J. Bloom. – 2016. – P. 124–146.
3. Schuka, A. Electronics / A. Shchuka. – 2008. – P 167–173.

ANALYSIS OF THE ENVIRONMENTAL ACTIVITIES AT MINSK HEATING NETWORKS OF CHPP-2

D. Totmjanina, C. Mukina

*Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
diana.batseco@gmail.com*

In this paper, the analysis of environmental activities at the enterprise and documentation of suos. The analysis revealed a number of environmental aspects that have an impact on the environment, including atmospheric air, water consumption and sanitation.

Keywords: the main environmental aspects, emissions of pollutants into the air, water supply, measures for the protection of atmospheric air, industrial environmental control.

Minsk CHP-2 is a part of Minsk heating networks. The purpose and direction of activity of CHPP-2 – ensuring reliable, trouble-free and economical operation of all equipment, production, conversion, distribution and release of electric energy and heat to consumers in strict accordance with the requirements of NPA and tnpa. It is a source of heat and power supply of the Central part of Minsk and heat supply to consumers of the neighborhood Serebryanka, as well as streets Chkalov, Mayakovsky, airfield, Mogilev and others.

The main activity of the branch "Minsk heat networks" is the production of electricity and heat. All activities of the enterprise are regulated by regulatory legal acts and technical normative legal acts of the Republic of Belarus, technical normative legal acts and other requirements established by GPO "Belenergo", RUE "Minskenergo", as well as the requirements of stakeholders to ensure the prevention of negative impacts on the environment and the population of Minsk.

The main environmental aspects that the Minsk heat networks branch can directly control and manage are:

- emissions of pollutants into the air;
- discharges of pollutants in the waste water in the city Sewerage network and the Svisloch river;
- production waste;
- land/soil pollution;
- use of natural resources (natural gas, water, fuel oil, diesel fuel);
- use of fuel and energy resources;
- use of chemical products, materials;
- removal and pollution of flora;

- physical factors (noise, EMF, etc.);
- risk of fire / explosion, emergencies and incidents with harmful effects on the environment.

As a result of the analysis, it was found that emissions of pollutants into the air are carried out from 168 emission sources, 127 of which are organized, equipped with gas treatment plants – 3.

To manage emissions of pollutants into the air, the branch conducts an inventory of emissions, identifies stationary sources of emissions and on this basis developed and agreed standards for the formation of emissions of pollutants into the air for planning work to reduce the impact of technological processes on the air basin.

The water of the branch of "Minsk heating networks" is carried out according to the contract signed with UE "Minskvodokanal" contract, agreement intraeconomic relations with Minsk CHP-3, the contract with JSC "Cloth" on a vacation technical clarified water to Kazakhstan "Western" agreement with the Republican unitary enterprise "ZSKA" pumping industrial water to Kazakhstan, the contract with JSC "Russian movt" Gorodovoy flow of water to Kazakhstan "Western".

Proceedings on exploitation of Vileyka-Minsk water system and the production of "Minskvtormet", UE "Minskvodokanal" guarantee the supply of technical and gorodovoe water branch of "Minsk heating networks".

Reset rain, household and industrial wastewater is carried out under agreements with the UE "Minskvodokanal", UE "Horribleness", KUP "Remavtodor the Central district of Minsk", UE "Remavtodor of the Moscow district of Minsk", UE "Gerdarmerie", the unitary enterprise "Remavtodor of Kastychnitski district of Minsk" and etc.

Interaction between UE "Minskvodokanal" and MTS is regulated by the following acts:

- about limits of responsibility for operation, technical condition and maintenance of external networks and input of the economic and drinking water supply system;
- about borders of responsibility for operation, technical condition of external networks of the Sewerage;
- carrying supplies water service water.

On MTS organized conditions for separate collection and delivery for the use of certain types of waste (secondary material resources): paper, plastic, PET bottles, wood waste. Under contracts with specialized organizations MTS periodically delivers to the disposal and use of waste oil, worn tires, batteries, spent fluorescent lamps, etc.

The branch carries out production environmental control in accordance with the "Instructions for the implementation of production control in the field of environmental protection".

Environmental protection action plans are drawn up annually and submitted to the RUE "Minskenergo" to include them in the General action plan and ensure appropriate funding.

To reduce emissions of pollutants such as nitrogen dioxide, nitrogen oxide, sulfur dioxide, carbon monoxide, it is necessary to carry out such activities as the conclusion of the thermal scheme of boilers Art. 5,6,7 with an increase in the load on boilers and CCGT, which will be aimed at reducing the number of sources of emissions, redistribution of emissions from the remaining sources and reducing the surface concentration of harmful substances at the respiratory level.

To reduce nitrogen dioxide emissions, it is necessary to carry out such activities as the reconstruction (replacement) of steam boilers, which will be aimed at reducing the concentration of nitrogen oxides in the exhaust gases of steam boilers.

AUTOMATION OF WATER LEAKAGE CONTROL SYSTEM

A. Turchinovich, T. Smirnova

Belarusian State University, ISEI BSU,

Minsk, Republic of Belarus

arkasha750@gmail.com

The automated control system of water rate-of-flow and protection against its leakages allows to minimize risk of damage from accidents in the water supply system, breakages of a sanitary inventory and also to lower the material inputs, the bound to elimination of consequences of leakages. The system allows to control the water rate-of-flow at around the clock functioning.

Keywords: "smart" house, aquatic ball faucet, sensors of water, Raspberry Pi, pulse counter.

One of the principal directions of increase in effectiveness of systems of water supply is automation of processes of accounting of a water discharge and keeping track of leakages in the operational and reliable mode. Systems of varying complexity and functionality are presented at the market of the automated devices of protection against leakages of water. But installation and service of such systems expensive. Development of microelectron-