ные сооружения крупных городов в качестве основной ступени очистки реализуют этот метод очистки сточных вод.

В нашей стране проблемой очистки сточных вод занимались многие ученые. За последние годы сделан большой шаг вперед в технологии очистки сточных вод, ужесточились требования, предъявляемые к очистным сооружениям предприятий.

В последние годы особое внимание уделяется биологической очистке сточных вод, технологиям очистки сточных вод с использованием микроорганизмов. Однако такие технологии на сегодняшний день разработаны в недостаточной мере. Поэтому решение данной проблемы является актуальным в современных условиях.

Библиографический список

1. Сироткин, А.С. Технологические и экологические основы биосорбционных процессов очистки сточных вод: Автореф. дисс… д-ра техн. наук / А.С. Сироткин. Казань,2003. – 40 с.

2. Морозов, Д.Ю. Исследование адсорбционной очистки сточных вод, содержащих ионы тяжёлых металлов / Д.Ю. Морозов, М.В. Шулаев, И.А. Храмова, Л.И. Хабибуллина // Химическая промышленность. – Т.83, №3. – 2007. – С.141–144.

3. Брындина Л.В. Биосорбционая очистка сточных вод / Л.В. Брындина, А.Н. Пономарев, К.К. Полянский // Молочная промышленность. – 2013. – № 2. – С.22–23.

УДК 504.06

THE ENVIRONMENTAL PROBLEM OF SOIL POLLUTION BY OIL PRODUCTS IN BELARUS

Piotuh E.
Scientific supervisor Rodzkin O.I.
Belarusian National Technical University

The problem of oil pollution of soils of the Republic of Belarus is considered

Oil pollution it is really significant environmental problem for every country. The industrial development and transport intensification require increasing of oil production as a source of energy and raw materials. Oil production and reprocessing is one of the most dangerous field of industry for natural ecosystems including air pol-

lution. One more environmental problem is spills of oil and leaking into the surface and underground waters and soils.

Relevance of the topic due to the fact that the Republic of Belarus for environmental activities is essential, due to the fact that the potential environmental hazard has any production process, especially oil industry. In the Republic of Belarus are companies producing, processing and transportation of oil and oil products, actively develop the petrochemical, energy and other industries widely used personal and public transport.

Once in the ground, oil may interact with aquifers and enter into the drinking water. Also, the soil structure itself deteriorates, increases its acidity, accumulate in the soil pathogens (especially root rot pathogens), degradation of soil microflora and depression, disturbed soil microbiocenosis and biocoenosis as a whole. The total economic damage as a result of these processes is estimated at hundreds of billions of rubles annually. Meanwhile, natural soil fertility restoration with oil pollution occurs much more slowly than with other technological impurities

The main sources of hydrocarbon contamination are: vehicles, businesses refining and petrochemical industry; gaseous emissions and wastewater industry; hazardous waste industrial and municipal landfills (settling ponds, swimming pools); petroleum hydrocarbon spills caused by accidents at oil (Gomel region) and oil pipelines, oil storage tanks, and oil refineries, etc. [1].

Monitoring of oil pollution in the environment is one of the most challenging tasks. Providing a reliable economic control is impossible without the development and application of modern measurements. In quantitative assessment of the level of oil contamination the most widely used methods of infrared spectrophotometry, ultraviolet luminescence, gas and gas-liquid chromatography [2].

Monitoring of soil settlements and industrial zones are carried out on the territory of 44 areas. Monitoring of soil contamination of roadside strips of highways of Belarus held on 23 soil profiles (92 points up) in the zones of influence of roads of national importance with varying intensity vehicular traffic and the duration of the road operation for at least 20 years. Background soil monitoring is conducted on a network that includes 90 points of observation [3].

According to the results of the 2017 soil monitoring, values in excess of maximum permissible concentration of oil products in the soil, marked for the five surveyed in 2018 in seven cities (Fig. 1). The largest areas of contamination are typical for Minsk, Krichev, Soli-

gorsk and Mozyr (42.0 %, 27.6 %, 20.0 % and 16.1 % of the analyzed samples of the city, respectively) Average values of oil content in soils are at 0.4-1.4 MAC. The maximum values are registered in Krychau, Minsk, and Mosyr Baranovichy at 5.2 MPC, MPC 4.9, 2.4 and 1.5 MPC MPC respectively [4].

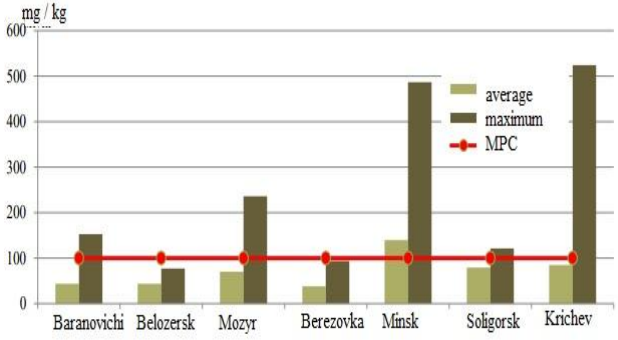

Fig. 1 – The petroleum content in the soils of the city in 2018

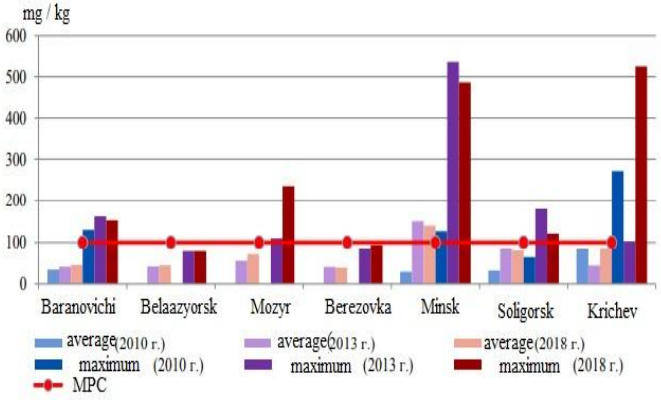

Fig. 2 – Content of petroleum products in the soil for years in cities

For all localities can also trace the dynamics of changes in the degree of oil contamination of urban soils (Fig. 2). In Minsk, exceeding the average values observed at the level of 1.4 –1.5 MAC in 2013 and 2018 The mean valuesin other cities were at the level of 0.3-0.8 MPC. Significant excess of the maximum values (from 1.3 to

5.4 MAC) typical for Minsk, Krichev, Mozyr, Baranavichy and Salihorsk in different years of observations [4].

The results of monitoring studies carried out on the territory of Belarus, revealed widespread and high levels of soil contamination and soil with oil products. Wherein the oil content have considerable variability: from background (less than 5 mg / kg) to hurricane (more than 100 000 mg / kg) values. The last characteristic of leaks (spills) of petroleum products.

The high content of oil (more than 5000 mg / kg) recorded in areas of impact of oil, gas stations, depots and warehouses lubricants, storage of solid household and industrial waste, the former bases, highways, the MTS et al.

Soil pollution with oil and petroleum products is one of the complex and multifaceted ecology and environmental issues. Oil and petroleum products are a common contaminant of soil on the territory of the Republic of Belarus due to the development in the country various industries, oil and neftetransportirovki, as well as extensive vehicle fleet.

Monitoring of soil contamination is carried out regularly and records that in recent years the situation has remained stable without any significant improvements. For the control of soil pollution with oil and oil products are used norms approved by the Ministry of Health of Belarus.

References

1. Geology and Mineral Resources of Quaternary sediments: materials VIII Collegiate geol. Readings, 3 – 4 April. 2014, Minsk, Belarus / the Editorial Board. AF Sanko (responsible. Ed.) [Et al.]. in 2 parts – Minsk: "Digital printing" 2014 – Part 2. 86. 2. Environmental monitoring of oil and gas / MA Saxony and others. // Physicochemical and biological methods. – Irkutsk Irkut. University Press, 2005. – 114 p.

3. Soil contamination in Belarus. [Electronic resource]. – Mode of access: http://rad.org.by/monitoring/soil

4. National Environmental Monitoring System of the Republic of Belarus: results of observations, 2018 / Edited by EP Bogodyazh – Minsk, Republican Center for Hydrometeorology, control of radioactive contamination and environmental monitoring. – 2019. – 450 s, yl.. 318.