

3. Яценюк: Війна коштує Україні 80 мільйонів на день. URL: <https://www.pravda.com.ua/news/2014/09/17/7038057/>.
4. Vlad Mykhnenko. Causes and Consequences of the War in Eastern Ukraine: An Economic Geography Perspective. *Europe-Asia Studies*. 2020. 72:3. Pp. 528–560. DOI: 10.1080/09668136.2019.1684447.
5. Julia Bluszcz, Marica Valente. The Economic Costs of Hybrid Wars: The Case of Ukraine. *Defence and Peace Economics*. 2020. DOI: 10.1080/10242694.2020.1791616.
6. Економіка України у 2021-му: чому зростання неминуче. URL: <https://www.ukrinform.ua/rubric-economy/3187513-ekonomika-ukraini-u-2021mu-comu-zrostanna-neminuce.html>.
7. Чотири джерела фінансування: Резніков розповів, як будуть створювати “пояс успішності” на Донбасі. URL: <https://kanaldom.tv/uk/chetyre-istochnika-finansirovaniya-reznikov-rasskazal-kak-budut-sozdavat-poyas-uspeshnosti-na-donbasse>

UDC 32.019.51

Poberezhna L., Ph.D., Assoc.; Romaniv R.; Bondarchuk T.

Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine

MILITARY ACTION IN EASTERN UKRAINE - ENVIRONMENTAL CONSEQUENCES

Побережна Л. канд. техн.н., доц.; Романів Р.; Бондарчук Т.

БОЙОВІ ДІЇ НА СХОДІ УКРАЇНИ – ЕКОЛОГІЧНІ НАСЛІДКИ

One of the most dangerous environmental consequences of hostilities in the Donbass is environmental pollution in the event of an emergency disruption of large industrial enterprises. As a result of direct damage to production infrastructure and equipment, emergency shutdowns of enterprises due to damage and lack of raw materials, energy and electricity, the risks of negative impact on the natural environment of the region increase significantly. In some cases, this leads to accidental volleys of emissions and discharges of harmful substances, in others - to a longer impact on the environment by reducing the efficiency of treatment and use for the production of low-quality, often non-standard raw materials.

Among the many industrial enterprises damaged as a result of hostilities were the most environmentally hazardous industries: Yasynivsky, Avdiyivsky and Yenakiyevo coke plants, Yenakiyevo metallurgical plant, Lysychansk refinery, Donetsk state chemical plant, Slovyansk, Luhansk Severodonetsk "Nitrogen" and Gorlovka "Styrene". At all the listed enterprises cases of destruction of infrastructure, disturbance of electric and water supply, raw materials and materials are fixed. Some enterprises were destroyed after the signing of the Minsk agreements. For example, on May 23, artillery shelling at the Avdiivka Coke Plant caused a fire and a coke oven gas leak. All four high-voltage lines supplying the enterprise were broken by shells, resulting in a volley of coke oven gas with a high content of benzene, toluene, naphthalene, hydrogen sulfide, mercaptan, hydrocyanic acid and ammonia. On May 27, after the projectile hit the open switchgear of Luhansk TPP, one of the power units was stopped. Due to technical reasons and the impossibility of carrying out major repairs in the conditions of hostilities, unit № 9 was disconnected at the station on May 29. One example of such "indirect" effects of hostilities is the study of air quality. In addition to the mentioned negative effects of the conflict, it is worth paying attention to soil pollution. As a result of flooding of territories, increase of emissions of harmful substances, and also at large-scale spill and combustion of fuels and lubricants there is a soil pollution in rather considerable territories. Given that the area set aside for arable land, for example, in the Donetsk region,

reaches 64% of its territory, such an impact will lead to a significant decline in the quality of agricultural products and the withdrawal of agricultural land from circulation. increase in emissions of harmful substances, as well as large-scale spillage and combustion of fuels and lubricants is soil contamination in fairly large areas. Given that the area set aside for arable land, for example, in the Donetsk region, reaches 64% of its territory, this impact will lead to a significant decline in the quality of agricultural products and the withdrawal of agricultural land from circulation. increase in emissions of harmful substances, as well as large-scale spillage and combustion of fuels and lubricants is soil contamination in fairly large areas. Given that the area set aside for arable land, for example, in the Donetsk region, reaches 64% of its territory, this impact will lead to a significant decline in the quality of agricultural products and the withdrawal of agricultural land from circulation.

References

1. <https://nashkiev.ua/vlast/infografika/posiril-ou-prirodou-yak-viys-kovi-dii-vplivayut-na-ekologiyu-ou-zoni-ato.html>

UDC 32.019.51

Poberezhny L., Dr., Prof.; Stanetsky A., Ph.D.; Markhalevych V.

Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine

MAIN TECHNOGENIC AND ENVIRONMENTAL RISKS IN THE AREA OF THE JOINT FORCE OPERATION

Побережний Л., д. тех. н., проф.; Станецький к.техн.н., А.; Мархалевич В.

ОСНОВНІ ТЕХНОГЕННО-ЕКОЛОГІЧНІ РИЗИКИ У ЗОНІ ПРОВЕДЕННЯ ООС

The ecological situation in Eastern Ukraine even before the start of hostilities is possible describe as a crisis that has developed over a long period use of natural resources and negative impact directly for all objects of environment. Low level of ecological consciousness of society, lack of sufficient treatment of discharges and emissions, lack of civilized waste management, especially extremely hazardous, lack of integrated approach to solving environmental problems, led to a significant environmental degradation of Eastern Ukraine, excessive surface pollution and groundwater, air, land resources. The situation with intense air pollution was developing for decades in the process of formation and development of industry Eastern Ukraine. The biggest air pollutants air steel enterprises of the coal industry, ferrous metallurgy, chemical industry, thermal energy.

In particular, most methane released into the atmosphere in cities and areas where coal mines are located enterprises and reach about 70% of total emissions. The main pollutants of water bodies were the enterprises of the metallurgical industry, the coal industry and energy. In a number of cities, sewage treatment plants are morally and physically obsolete. Water resources of Donetsk and Luhansk areas are characterized by a high concentration of salts. The reason for this there is a discharge into water bodies of highly mineralized mine waters, with which year gets more than 1 million tons of various salts. Industrial waste also had a significant man-made impact on the environment. By 200 years of development of coal deposits of Donetsk and Luhansk regions about 1260 heaps were formed. Due to the lack of modern landfills and enterprises for disposal and processing of hazardous waste, storage of hazardous waste is carried out on the territory of enterprises, which is not always the case environmental requirements. Given that before the military aggression, there was a significant anthropogenic pressure on the environment in the eastern regions of Ukraine due to extraction of coal, ore and other minerals, metallurgical production, the formation of a significant amount of waste, the presence hazardous chemicals used in industry, the damage done to the environment today is multiplying, it is enormous and unlikely to be offset in the near future.