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ASSESSMENT OF ENVIRONMENTAL RISKS IN EXPLORATION AND DEVELOPMENT OF OIL AND GAS FIELDS AND WAYS TO OVERCOME THEM

Hydrocarbon raw materials, combining oil, gas and condensate, are the most important and most progressive type of mineral and energy resources at the current stage of development of human society. Hydrocarbon deposits, which are the basis for the oil and gas industry, are industrially developed in Ukraine. Oil fields are concentrated in three geographic and geological regions: 1) the Carpathian depression, or the western region (Ivano-Frankivsk, Lviv, and Chernivtsi regions); 2) Dnipro-Donetsk basin, or the eastern region (Chernihiv, Sumy, Poltava, Kharkiv, Dnipropetrovsk regions); 3) Southern region (Odesa region).

According to the Law of Ukraine "On Oil and Gas", the oil and gas industry is a branch of the economy of Ukraine, which, together with other industries, provides search, exploration and development of oil and gas deposits, transportation, processing, storage and sale of oil, gas and their processing products.

At each stage of oil and gas production, there is a negative impact on the environment. At the same time, the main technologically dangerous production processes are related to the drilling of oil and gas wells, that is, to the production of oil and gas.

In the process of drilling oil and gas wells, the atmosphere is constantly polluted with hydrocarbons, mostly due to emissions from diesel engines of the drilling rig and vapors from chutes and tanks of washing fluids.

As for discharges of harmful substances into the water environment, it is known that the oil and gas industry uses water in large quantities. Water is necessary both for the main, most water-consuming technological processes, and for auxiliary and household needs. Technical water supply of drilling sites is mainly organized from nearby reservoirs or specially drilled wells for water [2].

The danger of natural water pollution is caused by the possibility of untreated sewage and pollutants entering water bodies. A characteristic problem in the construction of oil and gas wells is the generation of harmful waste, ensuring their reliable storage, disposal, burial or removal to disposal sites. Drilling wastewater, drilled rock, spent drilling mud are integral elements of the drilling process, it is known that drilling wastewater has the ability to filter through the waterproofing coating of mud barns, contaminating soils, surface and underground water.

Accidental releases and open gushing of oil, gas, and mineralized reservoir waters on land and within water areas are dangerous. Pollution of the water environment by petroleum products also occurs as a result of the violation of the integrity of the wellbore.

Soil pollution by oil and gas production occurs:

- when oil gushes from wells that are in the drilling stage;
- with the formation of a surface area of pollution by drilling waste;
- when oil gushes from wells in operation.

Contamination of the subsoil during field development can be caused by:

- insufficient control over the advancement of oil and gas bearing contours;
- insufficient control of reservoir pressure;
- insufficient control of hydrodynamic connections between layers.

Violation of the tightness of the column in the process of oil and gas extraction can lead to interlayer flow or open gushing of oil [3].

Pollution of the natural environment is also associated with the disposal of industrial waters. Sources of leaks of industrial water and oil products that have a negative impact on the environment are numerous injection wells, pumping stations, water treatment plants, water supply networks and other structures. During the exploitation of deposits, there is a danger of technological accidents at water pipes, injection wells and other objects. Simultaneously with water pollution by oil products, there is pollution by industrial brines and trace elements, the impact of which on the natural environment is no less dangerous than that of mineralized waters.

The degree of influence of oil and gas deposits on the environment is determined by man-made and natural factors. In order to protect the natural environment, it is necessary to carry out a set of environmental protection measures in the process of developing oil and gas deposits, in particular, to pay significant attention to subsurface protection. Subsoil protection measures consist in the selection of a field development system, in control and regulation, in the implementation of effective methods of increasing oil, gas, and condensate yield.

Therefore, for a comprehensive solution of environmental problems related to the extraction of minerals, it is necessary:

- the use of technologies that allow to reduce the costs of minerals during their extraction;
- carry out waste disposal (oil sludge, spent petroleum products, etc.) and apply repeated processing of materials (scrap metal);
- rational use of natural resources, including water, land and subsoil in accordance with established limits and permits;
- use modern energy- and resource-saving technologies.

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