

The Ecological Monitoring System of the Territory of the Mining and Chemical Enterprise at the Stage of Liquidation

Elvira Dzhumelia¹, Volodymyr Pohrebennyk²

1. Department of Ecological Safety and Nature Protection Activity, Lviv Polytechnic National University, UKRAINE, Lviv, 130, Hen. Chuprynka St., E-mail: elviradzhumelia@gmail.com

2. Department of Ecological Safety and Nature Protection Activity, Lviv Polytechnic National University, UKRAINE, Lviv, 130, Hen. Chuprynka St., E-mail: vpohreb@gmail.com

Abstract – On the example of Rozdil State Mining and Chemical Enterprise (SMCE) "Sirka" the main problems of the system of ecological monitoring of the territory of the mining and chemical enterprise at the stage of liquidation are highlighted. It was established that monitoring of the territory of the enterprise at the stage after the exploitation will increase its environmental safety and surrounding settlements.

Keywords – sulphur mine, reclamation, environmental monitoring, soil pollution, water pollution, mining and chemical enterprise.

Introduction

The activity of mining enterprises or complexes is temporary. When an enterprise ceases its work and goes into the stage of liquidation, it is necessary to protect and restore the environment, the territory must be restored back to its original state. Ensuring ecological safety during the liquidation of the mining and chemical enterprise is carried out on the basis of monitoring and includes: control over the release of gas in areas dangerous and threatening to penetrate methane to the surface, and measures to prevent its uncontrolled exit and accumulation under built-up areas and in underground structures (organized outlet through degassing pipelines, laid in trunks, through specially drilled wells from the surface in underground workings, etc.); control over the level of underground mine waters with the implementation of the need to reduce them to the set level of pumping, drainage, engineering training of the territory to drainage; control over deformations of the earth's surface with the implementation of technological measures for the protection of buildings and structures, the elimination of the consequences of failures. Environmental monitoring is also necessary for the dynamics of soil contamination and the quality of atmospheric air near dumps; radiometric control of waste heaps, sediment ponds, accumulation ponds, underground waters, buildings in hazardous areas [1].

Monitoring Problems

At present, the theoretical and methodological approaches to environmental monitoring of a mining enterprise in the liquidation stage, as well as its material and technical and financial support have not been solved. . This problem is only at the initial stage of the solution. The need for a scientific substantiation of the monitoring system in the area of former mining activity, where the mosaic of technogenesis is very complex, requires the use of various theoretical positions, concepts and methodological tools, and interdisciplinary studies of various sciences.

Rozdil State Mining and Chemical Enterprise "Sirka" left after its activities tailing pits, dumps of phosphogypsum, flooded quarries. Also, there are tars, that imported from Hungary in 2004, on the territory of the enterprise and a household waste landfill.

Soils are of great importance to the environment, including a protective role for ecosystems. In industrial areas, especially in areas of mining and chemical works, there is a negative anthropogenic impact on the natural environment and its individual components. The activity of the mining and chemical enterprise pollutes the environment with heavy metals,

harmful substances. Particularly widespread pollution of soils and the water environment (underground and surface waters) with the following pollutants: zinc, lead, strontium, chromium, manganese, etc. In addition, as a result of chemical activity, soil acidity may be altered.

The water environment is contaminated by components of the salt composition, ecological and sanitary indicators, indicators of toxic and radiation action. Heavy metals pollute the soil and water environment. It is necessary to create the monitoring system since the enterprise is in the liquidation, but still poses a threat to the environment. It is necessary to consider the organization of the monitoring system of mining objects depending on the types of influence on the sources of environmental impact, since each source may have several types of influence on the elements of the environment [2], [3].

The informational and analytical monitoring system of the Rozdil state mining and chemical enterprise "Sirka" is intended for analysis of the state of:

- soils;
- industrial waste;
- geophysical processes;
- water objects.

The current state of the environment of the enterprise and its impact on the adjacent territories will be determined using the system of environmental monitoring of soil of Rozdil SMCE "Sirka", that will allow to react in a timely manner to adverse changes in the composition of the soils of the territory, to predict and simulate the process of migration of heavy metals in soils, and to reduce the area of pollution. The system of ecological monitoring of the environment of mining and mining-chemical enterprises and complexes at the stage of liquidation should be the part of the system of state environmental monitoring [4].

Conclusion

The system of ecological monitoring of the environment of mining and mining and chemical enterprises and complexes at the stage of liquidation should become an effective information and analytical base for the regulation of the ecological situation in the areas of extraction of minerals. Creation of such a system is an important step to increase the ecological safety of the territory, because timely information about the ecological state provides a operative solution to the problem with minimal risks and consequences.

References

- [1] V.S. Biletskyi. *Concise Mining Encyclopaedia*. Donetsk, UA: Donbas, 2007, pp. 26-29.
- [2] M. Bryk, B. Kołodziej. "Reclamation problems for the area of a former borehole sulfur mine with particular reference to soil air properties," *Land Degrad. Dev.*, 20, pp. 509-521, 2009.
- [3] E. Dzhumelia, V. Pohrebennyk, O. Korostynska, A. Mason, M. Cygnar. "Technogenic Pollution of Soil due to Mining and Chemical Enterprises," in Proc. *16th International Multidisciplinary Scientific GeoConference SGEM, Albena, Bulgaria*, vol. 2, 30 June – 6 July, 2016, pp. 363-370.
- [4] V. Pohrebennyk, E. Dzhumelia. "The Methodology for Design of Informational and Analytical System for Environmental Monitoring of Mining and Chemical Enterprise in the Liquidation," *Environmental problems*, Volume 2, Number 4, pp. 215-220, 2017.