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NEGATIVE INFLUENCES ON THE LIVING ENVIRONMENT FROM THE MINERAL RAW MATERIALS EXPLOITATION

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Abstract

The mining activities are indicating large number of negative effects on the living environment. The nature of these negative effects depends from the mineral raw material that is exploited, and her further processing. The coal, salt, poly-metals (colored and noble) mines, and nuclear raw materials are the main polluters. The exploitation of building stone, architectonic stone, send and grit stone although wider developed and numerous, is less significant from the chemical point of pollution.
Like the surface diggings, the underground diggings are under the sea surface, and very often big sewage capacities are needed to enable progress in the mining process.
The influence that mining activities have on the living environment is appearing almost in every phase of the mining cycle, from the preparation of the locality, trough digging, separation and processing the ore.
Mining water are usually high mineralized, and are having low pH value (to 3), high contents of heavy metals like plumbum, zinc, cuprum, manganese, cadmium, cobalt, nickel, aluminum and sulfates. When water that leaks on the surface or underground, and in the same time expose the ore that contains sulfides, comes in contact with the air, sulfide acid is creating in the water, what is familiar as the natural process of creating mineral water (acetic water). The mining water polluted with heavy metals is endangering water resources, ground, people, building infrastructure that are near polluted environment. In this paper it will be shown, how the mining activity influence the water, air, environment and the appearance of noise.

Key words: Mining activity, living environment, pollution, water, air, ground, heavy metals, noise.

Introduction

The influence that the ore activities have on the environment, is showing in almost all of the phases of the ore cycle, from the preparation of the locality, trough the digging, separation and ore processing, to evacuation of the water that is taken, with aim supplying the mine with water, separation and drainage of the water from the hydro accumulation.
The pollution of the living environment, that is consequence of the mining activities, includes pollution of the acid mining water, heavy metals, and chemical reagents from the process of the manufacturing, suspended materials and separated water from the hydro unavailing.
With the termination of the ore activities, the problem of the pollution does not stop; instead, it can last years after the mine closing. The problem with the abandoned mines happens after certain time from the closing of the mine and pumping the water from the mine. Underground water, which level with the pumping is relatively decreased, is starting to accomplish the original level. Then the water is overwhelming the mine and overflows trough horizontal mining spaces in the river valleys and in to the rivers. The mining industry has significant role in the assemblage of the human activities, which influence negatively of the natural eco-systems. It is a

fact that this kind of influence is more obvious in the phase of preparation and manufacturing of the mineral raw materials, than in the phase of their obtaining. The influence of the exploitation of the mineral materials by the rule is exceeding the limits of the space in which the mines are, provoking changes in their closer and distant surrounding. Bad influences are different according their intensity and space desolation, aerap of the influence and the duration.
The result of these harmful influences is usually degradation of the total eco system, trough pollution and degradation of the field, water and air.
The harmful influences of the mine exploitation of the environment, depending from the media on which they have influence, generally can be classified in the following way: Influence on the water, that can be expressed trough change of the regime of the underground and surface water, as well in the zone of mining activity, what results with drainage of some of the springs and wells that are used for water supplying with drinking water, decreasing the fertility of the soil and descending of the field with possibility of migration of some harmful components, and also pollution of the surrounding underground and surface water flows.

Influence on the water

Generally, the influence of the mining activities on the underground and surface water surfaces is shown trough following aspects: change of their natural regime, in fact, increasing or decreasing of the water flow, change of the direction of the circuit lanes etc., change of the quality of the water-physical and chemical pollution of the water flows.
In the phase of exploitation the earlier accomplished natural drainage system can be disordered, and it can reflect very much in the mining spaces and their surroundings.
In the process of excavation of the mineral raw material, trough surface or underground exploitation comes to creating big open spaces and exposition of some easily reactive minerals. Additionally freshly opened surfaces are very liable on erosion, what as the result on which comes to significant increasing of the concentration of the hard particles, like sediments in the mining water.
This and similar appearances have direct influence of the water quality in the recipient water flows and the living things in them, initiating processes like reduction of the oxygen in the water, decreasing its transparency and blocking the basic processes of exchange of matters in the water eco-system. Usually it results with total destruction of the water living world and promotion of new animal species unusual for the mentioned areas. Usually that results with total destruction of the water living world and promotion of new unusual for that area animal species.
As a result of the contacts with easy reactive minerals, like sulfides, it comes to increasing of the water acid, and with that intensifying the processes of mobilization of metal ions and increasing of the metal concentration in the water.
Considering the connectivity of water flows and large mobility of this contaminates, trough the recipient water flows, the pollutions are reaching larger spaces that significantly exceed the borders of mining areas.
Additionally, mineralogical and chemical content of the dug minerals is to exist the potentiality from appearance of acidity or other chemical contamination of the water, like unique transport medium that appears in the zone of the mining activities.

Which is the influence of mining water and activities on the quality of living?

The mining water polluted with heavy metals is endangering water resources, the earth, people and buildings that are in the near surrounding of the jeoparded area. Most significant problems caused from this type of pollution and are directly connected to the quality of the life/health and security is:

- danger of the health connected with the presence of the toxic metals in the water,

- danger of the health which is result of the undone rehabilitation of the mining localities, and connected with inhaling and swallowing dirt carried by the wind from mining locality that is consisted of cadmium, plumbum, mercury, arsenic, antimony, silver, etc.,
- esthetical pollution of the water flows connected to the change of the color, and provoked from entering of hydroxide sols in the iron, cuprum, aluminum or arsenic, destroying the active life and enabling the use of this water flows for water supplying and recreation.
- endangering the health provoked from accidents with big proportions, like consequence of the leak of large amount of dirty mining water,
- danger provoked from the usage of these polluted water and soil for agricultural purposes,
- provoking faster corrosion of the equipment, building and concrete constructions.

How today the problem of the pollution with mining water and mining activities is seen in the environment?

The acid mining water is representing one of the most serious threats of the environment, but unfortunately they are treated like this very rarely. The practice in the South-Eastern Europe shows that special attention is dedicated to the water that is the product of the technological process of the separation from the mineral raw materials and polluted water from the mine remains. Some knowledge for the potential acidity and toxic of this water exists, but the practice and the literature shows that the neutralization of this water is used from the aspect of security of the workers in the mines, or the usage of the water for further usage. The effects of the flowing water of the eco-systems are not surveyed. It is an assumption that in Europe there are 10.000 active, closed or abandoned mines from which 5 to 10billion of m^3 of polluted mining water are leaking.

Dimensions and problems

Macedonia is reach with mineral raw materials and has large amount of significant locations. Most significant are the localities of plumbum, zinc, cuprum and nickel. The localities of non metal mineral raw materials are also outspreaded, but the raw material itself is characterized with large pureness. The complex political situation and the negative working have big influence on the mining process, which is put in very difficult situation. Bad managing and the lack of ecological awareness have put significant ecological problems. The active and abandoned mines are a potential danger for the environment and the health of the population, and also on the quality of life in those areas.
The dumping ground in Veles, where 850.000 tons of heavy metal waste lays, has caused pollution of the underground and surface water and the soil with heavy metals, sulfur acid and other polluters. The pollution from the leaking of the water from the hydro-slag in Probistip directly in Kiselicka river (picture 1), Zletovska river [6-7], Bregalnica and Vardar can be seen with bare eye. It is the same case with the water from Bucim[5] in Topolnickariver, Madenska river and Lakavica (picture 2), flowing water from Sasa in Kamnicka river [8-9](picture 3). Putting the dangerous waste in the yard of Topilnica in Veles, the contact of the acid mining water with the rocks that are consisted from sulfide minerals and heavy metals are entering into the underground and surface water and are provoking soil contamination.

Picture 1: Drainage of Kiselicka river under the new flotation hydro-slag Ozren

Picture 2: The look of Topolnickariver under hydro-slag and digging slag Bucim

Picture 3: Mining water from Saza mine are directly flowing into Kamenickariver.

The influence on the air

With the pollution of the air with floating fractions of mineral dirt (solid particles), different dangerous fluids (SOx, NOx, CO) together with organic components, methane and other dangerous materials including radionuclide. With changes of the microclimate and creating of zones with specific microclimate, different from the surrounding area etc.With the noise as a special factor of pollution of the living atmosphere, from psychological and physical aspect.

The influence on the soil

With the change of the micro relief and the orography of the field, as result of what the landscape and the esthetical values are changing, of the zone embraced with the mining activities. Destruction of the stability of the natural orographic structures, as well as on the objects build on the land, as a result of the influence of the seismic effects from the operation of detonating, influences on the soil, water and air that are the basic carriers of the entire living world, are directly leading to changes and damages of byogenocenological cover in total. Actually it comes to degradation of the living and vegetable world, created from the nature, and the one created from the man.

Violating the stability of the natural orographic structures, and the objects build in the land, as a result of the action of the seismic effects, from the operations of blasting, the influences on the earth, water and air that are the basic carriers of the whole living world, are leading directly to changes and damages on the biogenocenological cover in total. Actually, it comes to degradation of the living and floral world, the one created by the nature and one created by man.

We must add the sociological changes and influences here.

Like we have mentioned before, the influence of the mineral raw materials digging, by surface or underground exploitation, is shown generally trough taking the agricultural land, change of pedologocal and geological content and change of the micro-landscape and orography of the field.

Digging the ground with strong intensity, with aim to come to the useful mineral component results with dislocation of enormous land spaces. The dislocation itself results with significant temporary and permanent changes of the landscape characteristics in these zones. These mining activities (which results with the change of the natural micro-landscape) are regulating the

creation of new artificial landscape forms, which are usually very different from the natural shapes.

These newly created shapes because of their difference with the natural shapes have direct influence on the microclimate conditions. Also the new orography is conditioning the development of the new eco-system, which will be different from the surrounding eco-systems, and even total opposite of them.

From the same importance are the esthetical characteristics of the newly created forms, especially in the cases when with the mining activities there are whole regions taken, with special natural and landscape values (national parks, the surroundings of the urbane zones etc).

Globally, the changes of the landscape have multifunctional and multidimensional influence of the embraced spaces and their surroundings.

Sometimes, the ore rocks itself are consisting some concentrations of certain damage gasses or elements, like: methane, radon, and some radioactive elements.

Usually these concentrations are very small and the amounts that are emitted in the shape of mineral dust or gasses during mining operations are small, but anyway additionally increase the air pollution.

Long-term exposure on their activity presents form of risk for appearance of respiratory diseases of the people and animals that are exposed, problems in the maintenance of the equipment, destruction the comfort and the security of the personal etc.

Noise

Under noise we understand every unwanted or unpleasant sound. The sound with high intensity, independent of can it be registered by sensed organs of the people or animals, can influence harmful on their organisms.

It influenced first on the central nerve system. Than trough it, it influence to the other organs (including the heart and blood vessels, endocrine glades etc.).

The noise like factor of negative influence on the living and working atmosphere with different intensity is a leading appearance almost in every technological operation in the mining industry. Because of that, and the fact that larger number of the mining operations is located near urbane communities, lately greater attention is dedicated to this problem, where big amount of technologies and techniques are accepted for their reduction for acceptable level.

Conclusion

Mining water are usually highly mineralized, and have low pH value (to 3), high contents of iron, cuprum, zinc, aluminum and sulfates. The pollution of the living environment which is a consequence of the mining activities embracing the pollution with acid mining water, heavy metals, chemical reactants from the manufacturing process, suspended materials and separated water from the hydro dumps.

The influence of the mining activities on the underground and surface water, is shown trough change of their natural regime, in fact trough increasing or decreasing the flow of water, change of the direction of the goal paths etc., change of the water quality, physical and chemical pollution of the watercourses.

The influence of the digging out the mineral raw materials by surface or underground exploitation on the land is shown generally trough taking over the agricultural areas, change of the pedological and geological content, and change of the micro landscape and orography of the field. The noise like factor of negative influence on the living and working atmosphere with different intensity is a leading appearance almost in every technological operation in the mining industry.

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