

Aleksandr Malenko
A.V. Yavorsky, research supervisor
V.V. Tikhonenko, language adviser
SHEI “National Mining University”, Dnipropetrovsk

Effect of Mine Waste upon the Environment

There are more than 1.5 thousand mine wastes within the territory of Donbass each of them containing average 1144 m³ of rock. Mine wastes can be found over the whole Donbass territory (the area of 800 ha). They not only change the landscape but also are serious environmental problem for Donbass. Mine waste rocks contain almost all the elements of Mendeleev’s table including radioactive ones. Mine waste itself is quite a complex aggregate with its rock and set of living organisms from bacteria to higher plants and animals inhabiting its slopes. Mine wastes in their turn create environmental problems for the surrounding biocenoses: weathering and corrosion of mine waste rock (being sometimes very toxic and radioactive) with spreading over the neighboring areas, spontaneous combustion under the influence of chemical reactions and bacteria activities with the emission of greenhouse gases, transpiration of radioactive gases, methane into the atmosphere etc.

Mine waste require large land areas that could be used more efficiently. Mined-out space can be filled with dead rock, secondary raw materials to reduce the amount of the mine wastes. Mining dumps can be used in definite spheres of production, for example, for road construction or production of building material.

Mine waste burning is also a major problem. It results in emission of various gases being dangerous for people. Burning can be followed by the appearance of new compounds and even new minerals. Thermal imagers are mounted to control such processes. Moreover, planting of greenery is also efficient to reduce mine wastes temperature.

In October, 2014, it became known that the company with coal reserves in Donetsk region launched dressing plant in Snezhnoe to process waste heaps. It is the second project at this enterprise connected with this type of activity so far. Here environmentally safe dressing technology is used. Four waste heaps of total 2.61 mln. m³ in volume have been processed since its launching. Rock of this mine wastes was used to fill expanded clay quarry being previously worked-out. As a result there are 5.22 ha of land for construction and additional territories instead of mine wastes. Rock mass of mine waste can contain up to 46% of coal, 15% of aluminum silicates, and 20% of silicon and iron oxides. According to “Ukrgeologiya” one ton of the rock can contain following rare earth elements: 55 g of germanium, 20 g of scandium, 100 g of gallium. It can be concluded that it is necessary to develop technologies of mine wastes reuse creating new high productive processing plants. Moreover, mine wastes processing will provide new employment opportunities.