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Rock Dumps - the Valuable Mineral and Raw Material Resources

In Ukraine the mining industry is of primary importance in providing the national economy with raw materials. As a result of its functioning rock dumps from underground mining have been accumulated on large areas, which have a negative impact on the atmosphere, soils, surface and ground waters, health of the population in mining regions, and cover a considerable area of agricultural land. The dump is a chaotic mixture of coal and rock fractions stored in a specially allotted area.

Rock dumps of coal industry on the territory of the country (under Ukrainian control) have been accumulated in the amount of more than 1 billion tons and an area of more than 1,400 hectares in Dnipro, Donetsk, Luhansk, Lviv and Volyn regions by 2016. In density of their location they can be divided into the following 8 areas: Pavlohrad, Dobropolskyi, Pokrovskyi, Uhledarskyi, Toretskyi, Lysychanskyi, Chervonohradskyi and Novovolynskyi. According to the mineralogical composition, rock dumps are a source of accumulation of valuable components and materials for use in the national economy.

The rock mass of the mine dumps contains an average of 10 to 40% of coal, up to 15% of alumina and up to 20% of silicon and iron oxides. According to the SE "Ukrheolohiia", a much higher content of rare earth elements is found in at least 20 g per ton of rock than in Clarke of the earth's crust such as germanium, scandium, gallium, yttrium, etc. The rational content of elements for industrial development of dumps should be not less than 10 g/t. The total average content of identified rare earth metals is not less than 250 g/t. According to their physical, mechanical and chemical properties the mine rocks can well serve as a material for the construction industry. Thus, the use of mine rocks as coarse and fine aggregate for concrete, ceramic wall materials, astringent substances, base course, etc. has been proved. However, the industrial utilization of rocks is not carried out, only scattered instances are registered. It should also be noted that the development of waste dumps should be carried out from the point of their complete elimination, with subsequent transformation, for example, into leisure facilities, as this practice is successfully introduced in the developed countries of the world.

Thus, the waste dumps of the mining industry accumulated on the earth's surface should be viewed not as tails, but from the perspective of a powerful source of mineral and raw materials for the national economy. Taking into account scientific and technological progress the development of waste dumps in the coming years is quite capable of competing with traditional methods of mining when considering initial capital costs which are substantially higher.