

Section 01. Innovations in Engineering

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“Altait” Complex

According to data of International Committee on radiation protection average content of uranium in the man’s body is $9 \cdot 10^{-5}$ g. This content is various for different regions. It is supposed that uranium is required for normal animal and plant life. Toxic uranium effect is determined by its chemical properties and depends on its solubility. Uranium poisoning is possible at enterprises where extraction and processing of uranium raw material is carried out and at other objects where it is used in technological processes. Uranium negatively influences on all members of the body and it is a very dangerous poison. Symptoms of poisoning are kidney disease (albuminuria), affection of the liver and gastrointestinal tract. There are acute and chronic poisonings.

Currently uranium extraction is carried out in Ukraine at Ingulsk (Kirovograd) and Smolinsk (village Smolino, Maloviskovskiy region) mines which are the part of Eastern mining and concentration complex (head office is in Dnepropetrovsk region). This enterprise is the largest one among those which are engaged in extracting and processing uranium ore in Europe.

Sorting complex “Altait” put into operation on the dump of Smolinsk mine (Eastern mining and concentration complex). Group of specialists and scientists of Eastern mining and concentration complex are trying to solve a problem concerning the ecological safety of uranium production. Here are the results.

This complex is a unique one in the world. It was developed by Ukrainian scientists in collaboration with engineers of research - and - production complex “Automation and machine building of “Eastern mining and concentration complex “ within the framework of the program of passing to non-waste production of uranium ore. How does this complex work? You can see a great bedded rockfill not far from enterprise. Granite is crushed directly at enterprise. After that it is loaded on moving conveyer. Then radioactivity level is measured of each piece. Uranium is soft, silvery-white metal. It is heavier than iron and lead. Metal uranium and its compounds are mainly used as a nuclear fuel in nuclear reactors.

Principle of deep radiometric separation of radioactive ores is the basis of complex operation. Complex “Altait” enables to take completely radioactivity from rock dump and separate clean rock and to use it as a building material of the second class for road and industrial construction. While dump processing fine building fraction is separated. It can be used instead sand in the mines of the complex under hydraulic stowing of cavities. Therefore complex allows to reduce negative influence of rock dump on environment and to get additional products.