

**WORLD PRACTICE OF SPENT NUCLEAR FUEL  
MANAGEMENT**

**Tarasevich D.D., Bulin M.N.**, students

Supervisor – Zelianukha A.V., senior lecturer of the Department  
Engineering Ecology, Getsman E.M., senior lecturer of the Department  
Electric Power Systems and Networks  
Belarusian national technical university  
Minsk, Republic of Belarus

Modern technologies for reprocessing of spent nuclear fuel (SNF) are based on water and non-water methods.

Water-based processing methods include extraction and precipitation technologies. Extraction technology is based on the selective extraction of organic compounds of uranium and plutonium from solutions of SNF. In turn, with the help of precipitation technologies, difficult-to-dissolve uranium and plutonium compounds are created, which are then separated from the initial solution.

Non-water methods of SNF processing differ significantly from water methods. These include pyrochemical and pyrometallurgical processes.

The gas-fluoride technology is a vivid example of a pyrochemical process: the technology is based on the different fugacity and sorption capacity of uranium, plutonium, and fission products. The pyrometallurgical processes are based on electro-refining, which is based on the difference in the transfer of uranium, plutonium and fission products in salt melts.

PUREX technology is the most common water-extraction technology for the processing of spent fuel. The spent fuel is delivered to the processing plant in the form of fuel rods, which are further disassembled and cut. After the preliminary oxidation of SNF, the fuel elements are dissolved in acid and further prepared for extraction. The extraction process involves a number of steps using various chemical compounds, resulting in the deposition of insoluble uranium and plutonium compounds. These elements are used to create fuel for nuclear power plants, which leads to the creation of a closed fuel cycle.