

PROBLEMS OF SPENT FUEL RECYCLING AND RADIOACTIVE WASTE UTILIZATION

A. Bekareva, E. Shashkina

National Research Tomsk Polytechnic University,

Russia, Tomsk, Lenin Avenue, 30, 634050

E-mail: asb53@tpu.ru

Nuclear power industry is one of the most perspective branches of energetics in the future. But it has its disadvantages like other branches. The problem of spent nuclear fuel and radioactive waste management is the most difficult problem that has not been resolved effectively for over ten years.

Spent nuclear fuel is fuel that has been irradiated in a nuclear reactor and cannot sustain reaction effectively. The accumulation of spent nuclear fuel in the absence of effective, environmentally safe and economically efficient recycling technology means a serious economical and ecological threat not only to developed countries, but to the whole world in the future. About three hundred forty five (2014) thousand tons of spent nuclear fuel have been accumulated in the world by today. This amount tends to increase as fast as the number of atomic power station grows. The main goal of nuclear power industry today is to develop a complete closed nuclear fuel cycle, which allows reducing available spent fuel and refusing to store it in the future. Moreover, we need to provide environmentally friendly and safe radiochemical recycling, as now it is one of the most hazardous and unhealthy industries.

Radioactive waste is the waste containing radioactive material. It is considered as useless material, because required isotopes cannot be extracted and returned to the nuclear fuel cycle. Disposal of radioactive waste in geological formations is considered as accepted way to utilize it now. But it must be acutely hazardous for future generations owing to long half-live lasting thousands of years. There are some alternative ideas to manage utilization, for example, to send up waste into space or dispose it in abyssal depths. They are not popular due to political and economic problems, but worthwhile considering. The issue of radioactive waste management is still open and does not have any solution until now.

Developing complete closed nuclear fuel cycle allows recycling accumulated spent fuel and radioactive waste stored now, and avoiding these problems in the future. This way is generally accepted and is currently studied, but it has a lot of economic, political, moral and other challenging issues. That is why the problem hasn't had any solution for over ten years.

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