



DOCTORAL RESEARCH TOPIC:

Investigation of radionuclides migration from radioactive waste disposal facility taking into account interactions of engineered barriers with the environment

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

During operation of nuclear power plants and in the course of their decommissioning large amount of radioactive waste is generated. In addition, radioactive waste is generated using radioactive substances in industry, medicine and for research purposes. In order to avoid negative impact to human and environment, radioactive waste should be managed in appropriate way that ensures waste isolation and prevents the release of radionuclides into environment or minimizes it to acceptable limits. For this purpose radioactive waste is conditioned, loaded into special containers and disposed of in radioactive waste repositories. Low and intermediate short-lived radioactive waste is usually disposed of in near surface facilities while spent nuclear fuel and long-lived waste are disposed of in deep geological repositories. The safety of radioactive waste disposal facilities is ensured applying multibarrier system concept, the main components of which are waste matrix, waste containers and engineered as well as natural barriers. Cementitious materials are often used in different engineered barriers and as immobilizing matrix of radioactive waste. They play a crucial role in long-term contaminant containment. However, concrete in nature is exposed to percolated water and this causes its gradual degradation. One of the most relevant long-term detrimental processes is concrete decalcification. Calcium leaching changes concrete properties (e.g. porosity, permeability). These changes have impact on radionuclide release from the waste and further migration to the environment. Therefore, it is very important to investigate concrete barriers degradation and potential evolution of conditions for radionuclides migration from the repository. Such investigations are of great importance in Lithuanian case as well. During operation and as result of decommissioning of Ignalina nuclear power plant large amount of radioactive waste will be generated. This waste has to be managed in a way that keeps people and the environment safe over long periods of time.

SCIENTIFIC SUPERVISOR:

Dr. Dalia Grigaliūnienė
Nuclear Engineering Laboratory

Lithuanian Energy Institute
Breslaujos 3, 44403 Kaunas
Lithuania

Dalia.Grigaliuniene@lei.lt

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