

RESULTS OF GEO-RADIO-MONITORING FOR RADIOACTIVE WASTE STORAGE IN LARGE DIAMETER BOREHOLES IN CLAYEY GROUND

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The main purpose of the work carried out at the site of SUE MosSIA “Radon” is to develop the system of geo-radio-monitoring for new type of storage facility (large diameter borehole) integrated into existing monitoring system of the whole site, check its effectiveness and improve the system, obtain initial results on safety aspects for using large diameter boreholes for RAW storage.

Technology of large diameter boreholes (LDB) construction for low- and intermediate-level waste (LILW) isolation in moraine loams is being under development at SUE MosSIA “Radon” site since the end of the last century.

A project for construction of a demonstration unit for LILW storage in large diameter boreholes at the SUE MosSIA “Radon” site in Sergiev Posad region has been developed taking into account specific site conditions. The main aim of the project is to develop the technology of LDB repository construction, operational procedures such as loading and retrieval, to develop and improve monitoring system for the new repository type, to get practical data on safety of radioactive wastes storage in new repositories, hermiticity of construction, and behavior of waste, waste packages, construction materials and near-field.

In the case of LDB applications for LILW storage, the waste are removed from the scope of human activity into a stable geological medium. Waste are placed below the frost zone where damage of engineered barriers due to climatic factors is practically impossible.

Two boreholes with 1.5 m internal diameter and 38 m depth have been drilled in 1997, equipped with engineering barriers including bentonite-concrete stone, licensed as storage facilities in 2003 and are in use now for solid and solidified RAW storage.

Specific automated system of geo-radio-monitoring has been developed especially for the LDB-type repository, covering both the interior and the exterior of repository as well as the geological environment. This system is integrated into the monitoring system of the whole site that is under operation more than 45 years.

The geo-radio-monitoring system is presented in the paper, as well as initial results of monitoring and preliminary conclusions regarding safety aspects of using large diameter boreholes for RAW storage made on the basis of obtained monitoring results.