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SITE SELECTION PROCEDURES AT THE INITIAL STAGES OF THE IMPLEMENTATION OF DGR PROGRAMME IN LITHUANIA – LESSONS LEARNED

During the assessment of potential geological Formations according to suitability for the deep geological repository (DGR) the positive and negative screenings of Lithuanian territory were performed. The criteria for the negative screenings have been covered protection zones of wellfields protection zones, European Natura 2000 areas, cities, areas of mineral deposits, formation thickness smaller than 50 m, depth of formation less than 200 m, paleo-incisions penetrating the pre-Quaternary succession, areas with an area larger or considerably smaller than 10 km². After eliminating the unfavorable regions according to the above-mentioned criteria, 110 potential areas have been identified covering all the geological formations selected as a potential formations for the DGR (Crystalline basement, Cambrian and Triassic clay, Permian evaporates) during the previous investigations carried out in years 2005-2020.

In regard to the positive screening procedures the territories potentially suitable for DGR construction shall be assessed under the following selection criteria: geological suitability, socio-economic and general safety criteria. The determination of the geological criteria was based on IAEA and EU regulatory documents and application of best practices from advanced DGR countries also strongly considering the peculiarities of the geological and tectonic structure, seismicity, geomechanical and hydrogeological characteristics of the host rocks and the subsurface processes occurring in the territory of Lithuania. The geological criteria established by Lithuanian geological survey were divided in two main groups: 1) a set of criteria ensuring the reliable stability of DGR; 2) a set of criteria for sufficient physical isolation of a DGR from biosphere. Taking into account the above mentioned criteria and availability of the geological data, the geological criteria have been defined for the selection and ranking procedures for all 110 previously identified sites comprising the potential geological formations. After the screening it was determined that from 110 previously identified areas, 31 areas should be eliminated based on geological criteria. At present, all remaining 79 areas are considered as potentially suitable for the further studies. Based on the analysis of the geological data the rather limited suitability of Permian evaporites in Lithuania (salt rocks and anhydrites) has been identified and, accordingly, these Permian formations were excluded from the set of the potential areas to be further investigated.

The social-economical analysis has provided a methodology, criteria and guidance for the rating of the potential sites of DGR from this perspective.

Permian evaporates has been also confirmed by results of the general safety analysis of the potential areas of DGR in Lithuania.

A combined analysis of all three (e.g. social-economical, geological and safety characteristics) studies will be carried out to substantiate a decision towards the further more detail geological investigations aimed in final determination of the most suitable DGR sitting locations (likely 3-5 potential sites).

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