

**NORM, TENORM materials' (coal slag, coal residue, red mud, manganese mud, uranium waste) radioactivity of natural origin in Hungary**

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Nowadays, the reusability inspections of by-products generated in large amounts during technological processes, and the recultivation of deposits are more and more frequent. Since these contain radioisotopes of natural origin in a state accumulated to a certain degree the radiological study is essential for their use and any recultivation.

*Uranium production wastes:* uranium had been mined in the Mecsek Mountains in Hungary between 1957 and 1997, and a chemical concentration unit had been in operation from 1962 to 1997. During mining the 18.5 Mt of coarse waste (Ra-226: 0,1 – 1,6 Bq/g) was placed on the surface. Proper shaped hills were formed from 100-300 g/t ores, and a part of the uranium was dissolved. This created the so-called heap leaching wastes (7,2 Mt, Ra-226: 1,5 – 2,0 Bq/g). 18.2 Mt of ore were processed in the concentration unit, from which a total of 19.5 Mt (Ra-226: 12,6 Bq/g) sludge was generated together with the used auxiliary materials.

*Red mud:* Three bauxite processing plants had been in operation in Hungary. In Mosonmagyaróvár 8.1 Mt, in Ajka 29.5 Mt, and in Almásfüzitő 20.4 Mt of red mud (Ra-226: 330 (105-700) Bq/kg, Th-232: 262 (92 – 545) Bq/kg) considerably exceeding the radionuclide concentration of soils was created, which was placed in the reservoirs nearby.

*Coal slag:* The radium-content of coals mined in the surroundings of Ajka and Tatabánya in Hungary is considerable, therefore, the Ra-226 concentration of the bottom-ash (slag), fly-ash created during the burning exceeds the soils' radium concentration (Ajka: 1962 (578-2893)Bq/kg, Tatabánya 1912 (843-2407)Bq/kg) by magnitudes. Unfortunately, these had also been used for building materials.

*Manganese mud:* In case of samples taken from the manganese clay deposits generated during manganese mining and ore enrichment no considerable radionuclide enrichment was found.

*The usability of NORM, TENORM materials placed in Hungary are still under study together with the reasonableness of their remediation in order to survey and decrease the population's radiation exposure.*

Acknowledgement. This work was supported by the Hungarian State and the European Union projects Grant No. TÁMOP-4.2.2.A-11/1/KONV-2012-0071