

# RADIOLOGICAL ASSESSMENT OF THE POSSIBILITY OF USING WASTE MATERIALS FROM MAJOR POWER PLANTS AND THERMOELECTRIC POWER STATIONS IN VARIOUS INDUSTRIES IN POLAND

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## **Abstract**

The main source of energy generation in the world is production based on fossil fuels such as coal, natural gas, and mineral oil, [1]. Poland ranks eighth in the world in terms of the use of coal for electricity generation, with 68.9% of total production in 2019, [2]. The consumption of hard coal in Poland in 2020 amounted to 62.9 Mt (million tons), and over 60% of the material has been consumed as an energy resource in power plants, thermoelectric power stations, thermal power stations and power boilers of the commercial power industry, [3]. The production of electricity from solid fossils is connected with the generation of wastes, such as fly ash, smokestack dust, slag, ash-slag mixtures etc. Poland is one of the main producers of coal combustion by-products (CCB) in Europe with approx. 20 Mt of CCB per annum (of which ca. 80% is recycled) and with 400 Mt stored in landfills, [4]. The amount of the recycled energy-production wastes is still insufficient, therefore scientists and engineers constantly search for new opportunities to manage them for fully valued and safe products that can then be used in other industry branches. Proper management of CCB requires adequate knowledge of their properties, i.a. concentration activity of radioisotopes and thus radiological impact on human health.

Based upon the determined concentrations of natural radioactive isotopes, i.e. potassium 40K, radium 226Ra and thorium 232Th, in the combustion by-products, like slags and ashes, the most important parameters of radiological protection were calculated. The authors of this paper, by analyzing the determined indicators, endeavor to answer the question if the introduction into construction materials slags and ashes from Poland's largest power plants and thermoelectric power stations, or their use in agriculture, metallurgy and mining, does not pose a threat to human health and life.

**Keywords:** hard coal, slags, ashes, radioactivity, natural radioactive isotopes

## Literature:

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