

## **POLYCYCLIC AROMATIC HYDROCARBONS (PAH) IN ASH FRACTIONS OF OIL SHALE COMBUSTION: FLUIDIZED BED *vers* PULVERIZED FIRING**

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*Power generation from fossil fuels is a substantial source of pollution, the extent of which depends on the type of fuel and technology of combustion being used. Currently, more than 90% of electricity produced in Estonia is generated by oil shale-fired power plants (PP), Eesti and Balti PP. The main technology of processing oil shale used in PP was pulverized firing (PF). At present a new technology, fluidized bed combustion (FBC) process, has been introduced. The current study focuses on comparison of solid wastes discharged by both processes, with a special emphasis on hazardous organic compounds, particularly the fraction of polycyclic aromatic hydrocarbons (PAH), present in ash. Ash samples were collected at each unit of electrical precipitators of PF and FBC boilers from the Eesti Power Plant. The organic fraction was separated by Soxhlet extraction. The final determination of 16 priority PAH, according to the US EPA List, was performed by liquid chromatography (HPLC) with fluorescence detection. The total concentration of PAH in different ash fractions was found to be in the range of 82.2–152.1 µg/kg, including benzo[a]pyrene, 7.9–15.1 µg/kg for the PF process, whereas for the new FBC technology the total content of PAH was less, e.g. 30.2–63.7 and 2.6–6.4, respectively. The average content of PAH in all ash fractions studied was  $107.8 \pm 29.6$  µg/kg for PF and  $47.0 \pm 11.0$  µg/kg for FBC system. Thus, the amount of hazardous PAH compounds in ash, generated by combustion of oil shale, was significantly less by using the new FBC process compared to the PF technology.*

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