

Trace Elements in Coal and Fly Ash from Indiana, USA

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This study presents trace element distribution in Pennsylvanian coals and in the fly ash from two power plants in Indiana. One power plant uses a low-sulfur (0.6%) Danville coal, whereas the other plant burns a high sulfur (>5%) Springfield coal. Both coals have comparable ash contents (~11%) and R_o (0.55%). In both plants, numerous trace elements are effectively captured in the fly ash. Arsenic, averaging 1.5 ppm in the Danville coal, concentrates in the rear pass hopper fly ash to the level of 61 ppm and 17 ppm in baghouse fly ash. The Springfield coal with an arsenic content of 10 ppm yields a fly ash with As content of 68 ppm. The lead content of the Danville coal is 10 ppm, and it becomes concentrated to 102 ppm in the rear pass hopper, and to 66 ppm in the baghouse fly ash. The Springfield coal has 3-4 ppm Pb, whereas the fly ash contains 68 ppm. Zinc, on the other hand is concentrated more in baghouse than in the rear pass hopper fly ash. Mercury content in the Danville coal averages 0.03 ppm. It decreases to 0.017 ppm in the pulverized feed coal. For this plant, Hg concentrates in baghouse fly ash to the level of 0.21 ppm. Selenium content of the Danville coal is 0.81 ppm and the Springfield coal is 3.8 ppm. Similar to Hg, Se concentrates in baghouse fly ash. The concentration of Hg and Se in the fly ash can help evaluate the atmospheric emissions of these elements.