

FATE OF TRACE POLLUTANTS IN PCC-FGD POWER PLANTS

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ABSTRACT

The partitioning and abatement capacity of trace pollutants in wet limestone-based flue gas desulphurization (FGD) facilities were investigated in two Spanish pulverized coal (co) combustion (PCC) power plants. The results were obtained from simultaneous sampling of solid, liquid and gaseous streams during two days in the power plants. High abatement of most pollutants (>90% as fly ash and slag) is allowed by the electrostatic precipitators (ESP) but Hg, Cl and F (78-98 %) and As, Se and B (0.01-7 %) still displaying a highly and displayed a volatile behavior. The different ESP temperature between power plants mainly account for an unlike volatile/particulate matter (PM) ratio for Se, As and Hg. Together with a high S capture (80-95 %), both FGD facilities showed high retention efficiencies (in gypsum and effluent) for gaseous Cl, F, and B (>95 %), As (78-90 %), Se (84-94 %) and relatively high for Hg (64-74 %) and PM (55-74 %). The high retention allowed reducing their volatile fractions down to 0.01-20 %, upon trace pollutant. The FGD gypsum also retains high fractions (76 -100 %) of Ca, Nd, Ti, Ce, La, Y, Nb, Fe, Pb, Sr, Rb, Ba, V, Cr, Cu, K and U. The PM emitted included the usual fly ash components while Mg, Na, Mn, Co, Sc, Cd, Zn, and Mo are water soluble being retained in the effluent (re-circulated to the scrubber). Major differences were produced in the partitioning of Hg, Ni, Li, Mo, Sn, Zr, Ga and Al, depending on operational conditions of the power plants (co-combustion of coal/pet-coke, purity of limestone and use of additives (Al-sulphate) in the scrubber.

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