Mercury Inhalation Risks in Indoor Air from Use of Coal Combustion Products (CCPs) in Building Materials

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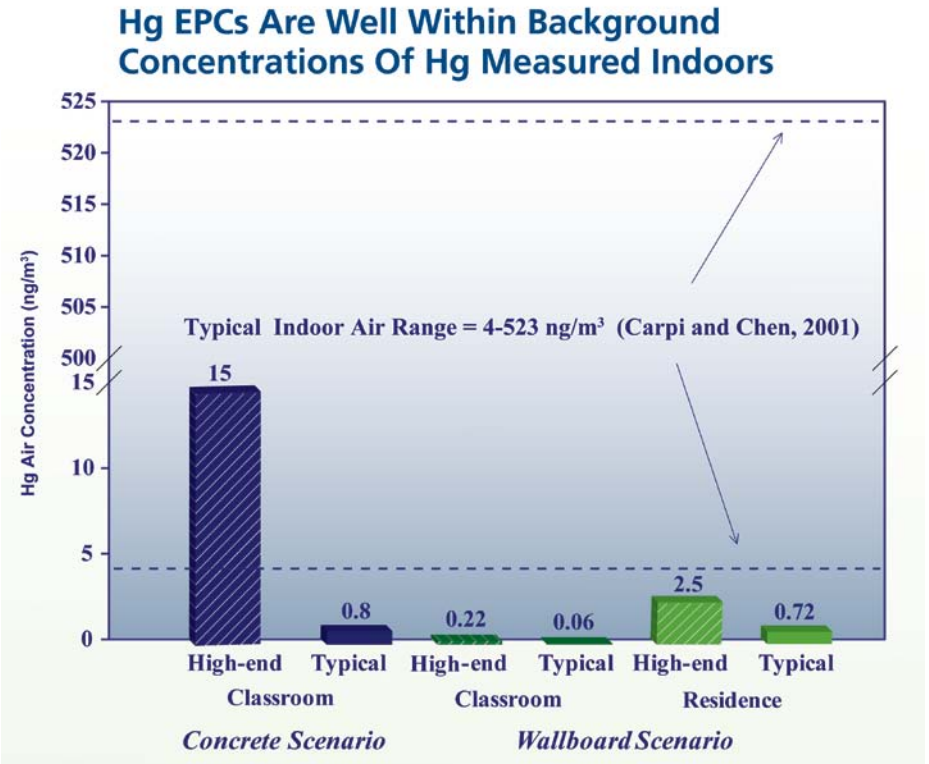
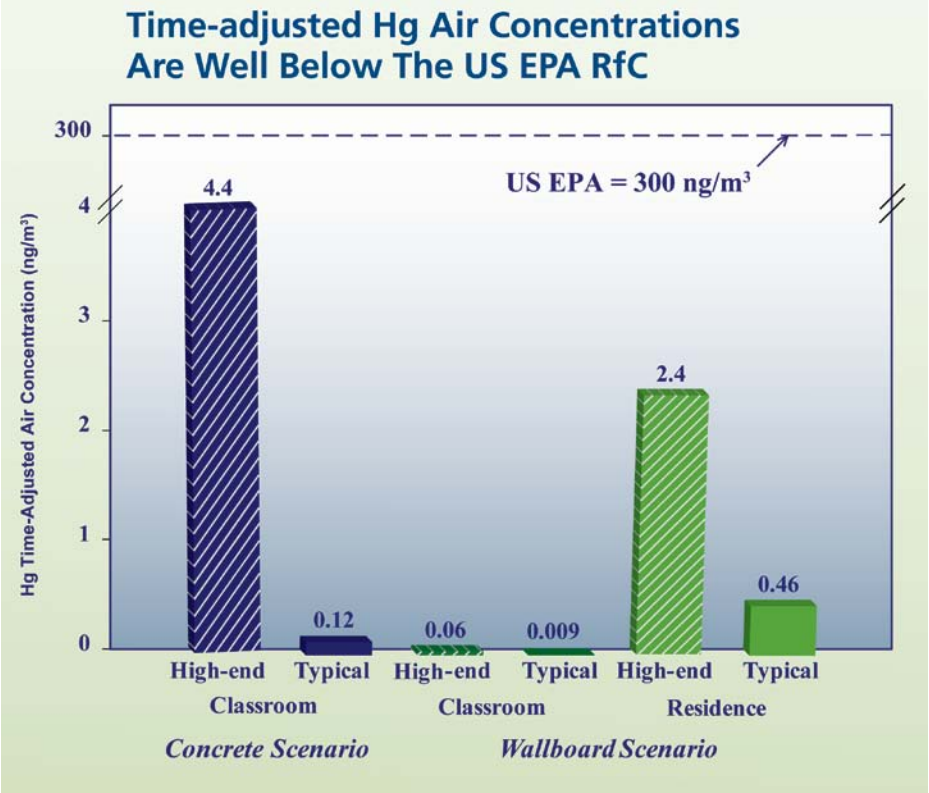
Coal combustion products (CCPs), including coal fly ash (CFA) and flue gas desulfurization (FGD) products, are increasingly being used as substitutes for traditional substances in building materials. For example, approximately 30% of US wallboard is now manufactured from FGD gypsum, while CFA has gained widespread use as a partial replacement for Portland cement in concrete. Given concerns that have been raised regarding the presence of mercury (Hg) in CCPs, and the potential for Hg releases from CCP materials into indoor air, we conducted a risk assessment to estimate inhalation risks from indoor air exposures to Hg for two CCP utilization scenarios: (1) CFA concrete blocks used in a school classroom, and (2) FGD gypsum wallboard used in a school classroom or home. For CFA concrete, we relied on data from recent laboratory studies of Hg emissions during dry curing of concrete at near-ambient temperatures to calculate two Hg release rates to indoor air, one based on the maximum 28-day curing rate from these studies to represent a high-end estimate of potential emissions and one based on extrapolated longer-term curing emissions to represent an upper-bound estimate of more typical, long-term emissions. For wallboard, we calculated a Hg release rate based on laboratory flux chamber measurements for gypsum wallboard samples. We estimated indoor air Hg concentrations using these Hg release rates and conservative values for other parameters (*e.g.*, air exchange rates, material loading ratios) in a steady-state indoor air model. Even using parameters intended to overstate potential exposures, we predicted indoor air Hg concentrations that are generally consistent with or below ambient background Hg levels. Moreover, predicted indoor Hg concentrations were well below established inhalation toxicity criteria (hazard indices ranged from 0.00003 to 0.015). Thus, based on our findings, we conclude that CCPs in concrete and wallboard building materials are unlikely to result in Hg exposures in either classroom settings or in residential homes that pose a health concern. Key results are displayed graphically below.





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