

Airborne Concentrations of Chromium Due to Contaminated Interior Building Surfaces

Brent L. Finley and Douglas A. Mayhall

ChemRisk®, A Division of McLaren/Hart, 29225 Chagrin Boulevard, Cleveland, Ohio 44122

Between 1905 and 1976, millions of tons of chromite-ore processing residue (COPR) containing trivalent chromium [Cr(III)] and hexavalent chromium [Cr(VI)] were used as fill in various locations in Northern New Jersey and elsewhere in the United States. The health hazard posed by Cr(III) is negligible due to its low acute and chronic toxicity. In contrast, Cr(VI) is considered to be a human inhalation carcinogen. At a few sites in Hudson County, New Jersey where COPR was used as fill material around porous cement building basements, chromium-containing precipitates (CCP) have been observed on the interior basement walls. As many Cr(VI) salts are highly water-soluble, it is likely that Cr(VI) migrated in solution through the porous cement blocks. Accordingly, it is likely that Cr(VI) salts are constituents of the CCP. The primary health concern regarding this material is that it could be suspended into air and subsequently inhaled. In this study, the extent to which CCP present on interior wall surfaces can be suspended into ambient air was examined. Airborne particulate concentrations of Cr(VI) and total chromium were measured in a former restaurant building where CCP was visually evident on the interior of the cement block basement walls. A newly designed, highly sensitive triple impinger method (ASTM Method D 5281) was used to measure airborne Cr(VI). To simulate "worst-case" particulate scouring conditions, a large electric fan was used to blow air directly at the CCP. Furthermore, plastic streamers were attached to the fan to provide additional physical scouring of the CCP. The results of the study indicate that under ambient conditions, CCP present on interior wall surfaces does not result in higher measured levels of airborne Cr(VI) and total chromium. Under worst-case particulate scouring conditions, the airborne concentrations of Cr(VI) and total chromium are several orders of magnitude less than applicable health-based workplace standards (Occupational Safety and Health Administration permissible exposure limits and American Conference of Governmental Industrial Hygienists threshold limit values). Our results indicate that, under ambient conditions, the chromium present in the CCP on the walls or which has fallen to the floor does not become airborne. Finley, B.L.; Mayhall, D.A.: Airborne Concentrations of Chromium Due to Contaminated Interior Building Surfaces. *Appl. Occup. Environ. Hyg.* 9(6):433-441; 1994.