

## An Alternative to the USEPA's Proposed Inhalation Reference Concentrations for Hexavalent and Trivalent Chromium

B. L. FINLEY, D. M. PROCTOR, AND D. J. PAUSTENBACH

*ChemRisk Division, McLaren/Hart Environmental Engineering,  
1135 Atlantic Avenue, Alameda, California 94501*

*Received January 22, 1992*

The passage of the Clean Air Act Amendment of 1990 reflects a growing public concern over human exposure to air toxics. The EPA is currently identifying inhalation reference concentrations (RfCs) to be used as risk criteria for determining whether existing or predicted ambient levels of chemicals are above acceptable concentrations. This paper evaluates the risk assessment methods used by the EPA to develop the recently proposed RfC ( $0.002 \mu\text{g}/\text{m}^3$ ) for both trivalent chromium [Cr(III)] and hexavalent chromium [Cr(VI)]. Based on our evaluation, these RfC values do not appear to have been developed in accordance with standard Agency procedures or classic toxicology methods for setting RfCs. In particular, the "key" study used by the EPA [E. Lindberg and G. Hedenstierna (1983) *Arch. Environ. Health* 38, 367-374] as the basis for their proposal is not appropriate because it examined only the effects of exposure to chromic acid mist [Cr(VI)], even though most environmental exposure is to Cr(VI) and Cr(III) as a dust. The health hazards of Cr(VI) as an acid mist are significantly different from those associated with Cr(VI) as a dust. Further, the EPA's key study did not evaluate exposure to Cr(III), the toxicity of which is significantly different from both particulate Cr(VI) and chromic acid mist. Finally, the uncertainty factors used to account for data gaps were unusually high, thus providing RfC values equal to or below most naturally occurring environmental levels and standard analytical limits of detection. In this paper, we propose alternative RfCs for Cr(VI) as chromic acid mist and for Cr(VI) as a dust. Based on the Lindberg and Hedenstierna study, we derived an RfC of approximately  $0.12 \mu\text{g}/\text{m}^3$  for chromic acid mist. An RfC of  $1.2 \mu\text{g}/\text{m}^3$  is recommended for particulate Cr(VI) based on animal studies that evaluate long-term inhalation exposure to Cr(VI) dust. Due to its low toxicity, an RfC for Cr(III) is not warranted.