

## **Airborne Concentrations of Trivalent and Hexavalent Chromium from Contaminated Soils at Unpaved and Partially Paved Commercial/Industrial Sites**

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The primary health hazard to people in areas surrounding contaminated sites is often believed to be exposure to airborne contaminants. Due to insensitive sampling or analytical methods for many chemicals, including hexavalent chromium [Cr(VI)], the only option available for quantifying the hazard posed by ambient airborne concentrations of these chemicals has been limited to predictions based on various modeling approaches. Due to the use of compounded worst-case input parameters in the models, the resulting predictions have often been of questionable accuracy and relevancy. A recent advance in the sampling and analytical methods for airborne Cr(VI) has enabled direct measurement of the low concentrations typically found in ambient air. This method was used to quantify airborne Cr(VI) levels at both indoor and outdoor locations at 21 sites in Hudson County, New Jersey which have soils containing chromite ore processing residue. Of the 21 sites evaluated, nine were unpaved or partially paved industrial/commercial sites or roadways with a moderate to high level of heavy truck traffic. Most of the remainder were commercial facilities with partially paved or unpaved parking lots and only light vehicle traffic. In addition, 15 residential sites in the area which do not have contaminated soil were sampled to characterize background levels of Cr(VI). The overall arithmetic mean values for indoor and outdoor Cr(VI) in total suspended particulates at the 21 industrial sites were 3.0 ng/m<sup>3</sup> and 9.9 ng/m<sup>3</sup>, respectively. The indoor Cr(VI) concentrations measured at the 15 residential sites ranged from 0.38 to 3.3 ng/m<sup>3</sup>. Airborne Cr(VI) levels outdoors at sites with chromite ore residue appear to be primarily influenced by the level of local vehicle traffic. Measured outdoor concentrations at sites with light vehicle traffic were generally low, within the range of levels measured indoors at the residential sites, and not strongly influenced by Cr(VI) concentrations in surface soils. At sites with a high rate of vehicle traffic, outdoor Cr(VI) concentrations exceeded background levels only on days when surface soils were dry. The average concentrations measured at these sites were more than 5,000-times lower than the current occupational exposure limit for Cr(VI) (TLV = 0.05 mg/m<sup>3</sup>); thus it may be concluded that these low concentrations of Cr(VI) do not present a significant health hazard to on-site or nearby workers.