

Assessment of Human Health and Ecological Risks Posed by the Uses of Steel-Industry Slags in the Environment

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ABSTRACT

Steel-industry slag, a co-product of iron and steel production, is produced and sold for use in a wide range of applications. A comprehensive study of the potential human health risks associated with the environmental applications (*e.g.*, fill, roadbase, landscaping) of iron- and steel-making slag was performed using characterization data for 73 samples of slag collected from blast furnaces, basic oxygen furnaces, and electric arc furnaces. Characterization data were compared to regulatory health-based "screening" benchmarks to determine constituents of interest. Antimony, beryllium, cadmium, trivalent and hexavalent chromium, manganese, thallium, and vanadium were measured above screening levels and were assessed in an application-specific exposure assessment using standard U.S. Environmental Protection Agency risk assessment methods. A stochastic analysis was conducted to evaluate the variability and uncertainty in the inhalation exposure and risk estimates, and the oral bioaccessibility of certain metals in the slag was quantified. The risk assessment found no significant hazards to human health as a result of the environmental applications of steel-industry slag. However, site-specific ecological risk assessment may be required for slag applications in and around small water bodies with limited dilution volume, because high pH and aluminum were found to leach at levels that may be harmful to aquatic life.

Key Words: steel slag, environmental health risk assessment, metals, bioavailability, stochastic analysis.