



Widespread Arsenic Contamination of Soils in Residential Areas and Public Spaces: An Emerging Regulatory or Medical Crisis?



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Abstract:

A critical review finds government agencies allow, permit, license, or ignore arsenic releases to surface soils. Release rates are controlled or evaluated using risk-based soil contaminant numerical limits employing standardized risk algorithms, chemical-specific and default input values. United States arsenic residential soil limits, ~0.4-~40 ppm, generally correspond to a one-in-one-million to a one-in-ten-thousand incremental cancer risk range via ingestion of or direct contact with contaminated residential soils. Background arsenic surface soil levels often exceed applicable limits. Arsenic releases to surface soils (via, e.g., air emissions, waste recycling, soil amendments, direct pesticide application, and chromated copper arsenic (CCA)-treated wood) can result in greatly elevated arsenic levels, sometimes one to two orders of magnitude greater than applicable numerical limits. CCA-treated wood, a heavily used infrastructure material at residences and public spaces, can release sufficient arsenic to result in surface soil concentrations that exceed numerical limits by one or two orders of magnitude. Although significant exceedence of arsenic surface soil numerical limits would normally result in regulatory actions at industrial or hazardous waste sites, no such pattern is seen at residential and public spaces. Given the current risk assessment paradigm, measured or expected elevated surface soil arsenic levels at residential and public spaces suggest that a regulatory health crisis of sizeable magnitude is imminent. In contrast, available literature and a survey of government agencies conducted for this paper finds no verified cases of human morbidity or mortality resulting from exposure to elevated levels of arsenic in surface soils. This concomitance of an emerging regulatory health crisis in the absence of a medical crisis is arguably partly attributable to inadequate government and private party attention to the issue.

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