

Title:

Is It Possible to Solve the Arsenic in Private Wells Problem? An Exploration of Sources, Sinks, and Limits to Knowledge.

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Type:

Oral Presentation

Category:

Naturally-occurring Contaminants and Private Well Water Quality

Abstract:

The spatial variability of the occurrence of arsenic in private water supplies may be a function of local geology that can vary on a small scale (<10-100m). However, limited testing of private wells in three Maine towns indicates that arsenic concentrations within a given town can vary in a non-uniform spatial pattern (As range: <2 to 119 µg/L), even though arsenic was detected in 79% of the wells tested (n=232, D.L. = 2 µg/L). These findings have implications for the overall occurrence of arsenic in drinking water wells and also for the fate of arsenic in the near surface environment in rural areas where wastewater is treated on-site. Based on mass balances, a growing quantity of arsenic is being transferred to the near surface environment. This accumulation occurs irrespective of water treatment strategies. When the mass balance aspect of arsenic is considered, managing arsenic exposure becomes more complex because of uncertainty about transfer and recycle functions. A conceptual mass-balance model being proposed can be used to direct surveillance for cumulative environmental effects. Determining how to use this knowledge to reduce exposure risks in drinking water may be the next challenge in protecting public health.