

## **Geochemistry of arsenic in central Massachusetts, U. S. A.**

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A contaminant leachate plume, associated with a closed and capped landfill in North Central Massachusetts, USA, contains surprisingly high levels of arsenic which at several locations within the plume can reach and exceed 15,000 ppb of As in ground water. The landfill waste material was dumped over a layer of peat of variable thickness (up to 4 m thick), originally a marshland that developed over a thick sequence of glacial lake deposits (50 to 100 ft).

During the summer of 2010 a comprehensive study of the landfill area included direct-push drilling at 18 separate locations at regular 10 ft vertical intervals. The results indicate in 3D the regions of elevated arsenic concentrations and more importantly provide a unique opportunity to delineate arsenic pathways in 3D space. The study identified an existence of unexpectedly high arsenic zone with strong concentration gradients on each side of the zone. The zone is less than 3.5 m thick, contains As above 10,000 ppb (up to 16,000 ppb), and is positioned directly beneath the peat layer. One possibility for the source of As is the peat layer itself which, when covered by the waste material, gave rise to bacterial activity creating a reducing environment and remobilization of arsenic.