

## **Characterization and clean-up proposal for a chromium (VI) contaminated site in Mexico**

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A severe case of superficial and underground contamination with hexavalent chromium has occurred at an abandoned chemical plant in Tultitlán, Estado de México. The characterization of the contaminated site revealed deep infiltration of highly mobile Cr (VI) into the sedimentary strata underlying the old factory site and confinement area due to the geological setting and as a result of improper sealing. Under saturated conditions part of the contamination plume has reached the water table and is transported in the direction of the regional flow, thus producing Cr (VI) values in industrial wells which surpass mexican threshold limits for drinking water of 0,05 mg/l by a factor of approx. forty. The abandoned site tops a risk-based priority list. For health and safety reasons the Mexican Government has initiated emergency measures in order to safeguard living conditions in the adjacent urban areas. The factory carcass is classified according to its grade of contamination and is undergoing demolition and proper disposal of its contaminated debris under maximum-security measures.

A much harder task for the near future will be the selection of a proper remediation technology or a secure confinement strategy for the approx. 70.000 cubicmeters of chromium (VI)-contaminated production residues, slags and by-products which have been deposited under precarious conditions in a makeshift cemetery without any underground seal, merely patched up by a layer of asphalt. As a result of rainwater infiltration, part of the highly soluble hexavalent chromium has been leached. Drill cores confirmed that it has been deposited down to at least 30 m below the confinement area.

Various reduction alternatives to Cr (III) and disposal strategies are validated and their technical applicability and economic feasibility are discussed. Alternatively, an all-encompassing reconstruction of the cemetery, including deep sidewall barriers, adequate compactation, storage, and a cover according to international standards for hazardous waste confinement is proposed.

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