Ex-Situ Thermal Desorption of Highly- Impacted Mercury Soils in an Urban Area

In-Situ and Ex-Situ Thermal Desorption (ISTD and ESTD) were implemented as part of an overall design to remediate a large volume of mercury-contaminated soil that had been excavated below a building southeast of Paris. A stakeholder decision-making process was implemented to analyze remediation options and select the best methodology for all involved. The stakeholders decided to send the maximum amount of impacted soil off-site and implement thermal desorption on the highest contamination excavated soils (not landfillable) and the additional contaminated soils left in the subsurface that could not be excavated.

Prior to project start-up, the main forms of mercury identified in the soils were tested. Kinetic tests were conducted to analyze the effect of thermal desorption on the different forms of mercury. Those results ultimately led to creating the remediation objectives for thermal treatment. Out of a total of 25,000 m^3 of impacted soil, 2,500 m^3 were treated by thermal desorption on-site (In-Situ and Ex-Situ).

The previously excavated soils underwent a selective separation based on a visual test. The soil which contained small balls of mercury were stockpiled (260m^3). Due to the excessive cost to eliminate these highly impacted mercury contaminated soils, ESTD was applied to reduce the concentrations to below 50 mg/kg.

At the time of the thermopile construction, four samples were analyzed and had an average concentration of total mercury of 11,700 mg/kg with a maximal concentration of 24,000 mg/kg. After five months of treatment time, 27 control samples were taken.

The final samples had an average concentration of 48 mg/kg with a maximum concentration of 270 mg/kg. The mercury vapors from the thermopile were sent to a vapor treatment unit to be condensed and recovered in a unique tank design.

This presentation focuses on the advance mercury research/testing conducted and the ESTD implementation/results on the highly impacted mercury thermopile.