

Soil Bioremediation at a Former Insecticide Warehouse

Rodrigo E. Guerra (reguerra@setisa.com.sv) (SETISA, San Salvador, El Salvador)

Background/Objectives. A former pesticide distribution facility, located 170 km east of San Salvador, had high levels of soil contamination due to legacy operations over more than 50 years. Some rural inhabitants proximate to the site had suffered health issues that were attributed to the site. Soil analyses performed by an authorized laboratory determined high levels of toxaphene in the soil of up to 624% of USEPA admissible content. SETISA selected an in situ chemical reduction approach to reduce toxaphene levels in soil to below USEPA standards using a soil amendment formulated with biodegradable organic carbon, microscale zero valent iron, and a food-grade emulsifying agent.

Approach/Activities. A concrete pad was removed to enable access to the contaminated soil beneath. The soil treatment procedure involved spreading the soil amendment on the surface of an area (approximately 0.41 hectare). The amendment was mixed into the soil to an approximate depth of 30 cm utilizing a specialized deep penetration rototiller driven by an agricultural tractor. Water was added to increase the moisture content to near but below the soil's water holding capacity, and then the soil was left static for one week. The procedure was repeated weekly for five weeks. The treatment area was divided in four sampling zones, and soil samples were collected at the end of each week and sent for toxaphene analysis.

Results/Lessons Learned. Toxaphene concentrations were substantially reduced by the end of the first week of bioremediation. Continued treatment resulted in additional reductions in soil toxaphene concentrations in each sampling area until concentrations were reduced to near or below the analytical detection limit. The presentation will include details on the mechanical aspects of soil treatment including soil mixing and irrigation. Details on the soil sampling and analyses for toxaphene will be provided. Issues related to soil treatment in El Salvador in general and for this specific site will be discussed. The site was declared free of pesticide contamination and has now been sold to a new owner.