

PROJECT OF THE YEAR: ENVIRONMENT LESS THAN \$2 MILLION

Harrison Landfill Soil Vapor Extraction and Air Injection Remedial System and Groundwater Remedial System

Managing Agency:

City of Tucson, Arizona, Environmental Management Division

Primary Contractor:

Hydro Geo Chem, Inc.

Primary Consultant:

S.A.S. Industrial Maintenance Corporation

Nominated By:

Arizona Chapter

and their consultants developed, designed, and implemented innovative remedial technologies targeted to remove this source of contamination while containing and cleaning up the existing VOC plume in groundwater. The innovative technologies include an SVE/AI system for removing the VOC

an air injection (AI) well surrounded by three soil vapor extraction (SVE) wells that are screened below the refuse and above the water



The Harrison Road Landfill (HLF) was closed on April 1, 1997. During its operation, many tons of residential and commercial wastes were dumped in the unlined former gravel pit. Over the years, hazardous chemicals present in the landfill refuse migrated downward and made contact with slow-moving groundwater beneath the site. As a result, there currently exists a plume of volatile organic compounds (VOCs) over one-quarter of a mile in length extending northwest from the landfill boundary. Site investigations revealed that the source of the contamination was not liquid-phase VOCs migrating downward, as was commonly thought, but a more mobile source of contamination: VOCs in the vapor phase.

Moving to prevent further and potentially more costly groundwater contamination by the vapor-phase chemicals, the Environmental Management Division of the City of Tucson



source in the vadose zone beneath refuse and a groundwater pump-and-treat bio-enhancing (PT/BE) system for containment and cleanup of VOCs in groundwater.

The SVE/AI system with approximately 600- to 900-foot well spacing consists of

table. While clean air is injected in the center, extraction wells remove contaminated soil gas at the perimeter. The system has created a cushion of clean soil gas that prevents additional dissolution of vapor-phase VOCs into groundwater, and removes VOCs from the groundwater by volatilization.

The groundwater VOC contamination caused by landfill vapor migration has been contained and cleaned up using an innovative groundwater PT/BE system. The main difference between a traditional pump-and-treat system and the PT/BE system used at HLF is the promotion or bio-enhancement of the reductive dehalogenation processes acting on VOC in groundwater. The PT/BE system achieves these reductive conditions with the addition of nutrients and electron donors to the cleaned water prior to injecting it into the contaminated aquifer.

The SVE/AI system is so successful and effective for VOC source removal in the vadose zone that similar systems have been installed at two other closed Tucson landfills, and one is under design and will be installed at Tucson's only active landfill for VOC removal in the vadose zone.

