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## Industrial Facility Groundwater Remediation Program

### **Challenge**

Envirogen was contracted to design, construct and perform initial O&M for a 250 gallon per minute Fluidized Bed Reactor (FBR) system to remove aniline, nitrobenzene, chlorobenzene, BTEX and other organic contaminants from the groundwater at a United Technologies Corporation (UTC) Site in Hawthorne, New Jersey. This inactive site was formerly the site of a facility that manufactured chemicals for the dye industry. The project, executed in two phases, included laboratory and field treatability studies, and the subsequent detailed design, engineering, construction, start-up of the full-scale system and six months of operation.

### **Solution**

During the initial treatability studies, two of Envirogen's laboratory-scale bioreactors were tested to determine the applicability of biological remediation to the groundwater at this site and to develop preliminary process and operating parameters required for the design of a pilot scale system. In these laboratory-based activities, Envirogen also evaluated various strains of aerobic microorganisms to determine their suitability for biodegradation of the specific aromatic contaminants present.

During the ensuing 5-month on-site treatability study, a 12 in. diameter fluid bed reactor system was operated and remotely monitored by Envirogen personnel to demonstrate the feasibility on the actual site's groundwater. These studies were targeted at reducing the aniline and nitrobenzene contaminants from a combined level averaging 80 ppm to 0.5 ppm level from each component in the effluent stream. During these pilot studies complete organic removal was demonstrated (effluent: <10 ppb; aniline + nitrobenzene – non-detect level) confirming that sufficient biodegradation activity was being achieved to allow for the design of the full-scale unit. The pilot scale operations were also successful in providing critical engineering design parameters and identifying additional unit operations (e.g., pretreatment and solids removal) necessary to allow Envirogen to prepare the detailed design for the full-scale program.

### **Results**

Envirogen was awarded a contract to supply the full-scale system. Envirogen performed the detailed design, engineering and procurement activities. The system is installed and operating at better than guaranteed performance. Treated water, which is re-injected, has never exceeded permit conditions, including meeting target levels for specific organics. A solids removal system limits TSS to less than 1 ppm in effluent water to the re-injection well system. The technology has now been certified as part of the New Jersey Department of Environmental Protection's Innovative Environmental Technology Verification Program.