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This fact sheet briefly updates NASA's efforts for cleaning up chemicals from groundwater beneath the Jet Propulsion Laboratory. A more detailed description of all JPL cleanup activities is available at local Information Repositories (listed on the back), and online at **http://JPLwater.nasa.gov.**

NASA Begins Construction at JPL of Groundwater Treatment Unit

Treating Up to 250 Gallons of Groundwater Per Minute and Removing Volatile Organic Compounds and Perchlorate

NASA has begun construction of an Expanded Treatability Study multi-million-dollar treatment plant for groundwater cleanup at the Jet Propulsion Laboratory (JPL).

The treatment plant, to be located in a parking lot on the JPL campus, will remove volatile organic compounds (VOCs) and perchlorate found in groundwater directly beneath JPL, the area where the highest concentrations of the chemicals are located. Treating groundwater at that location will not only begin to clean up the chemical source area within JPL boundaries, but it will also help keep chemicals from spreading further through the groundwater outside of the JPL fence-line, according to NASA Remedial Project Manager Steve Slaten.

From Small-Scale Study to Expanded Treatability Study

From the late 1990s through 2001, NASA conducted five small-scale tests on its property to determine what technologies would be best for the groundwater cleanup job. In early summer and fall of 2001, NASA, with US Filter and Envirogen, conducted one of those pilot studies, a small six-gallons-per-minute test combining the Liquid-phase Granular Activated Carbon (LGAC) and Fluidized Bed Reactor (FBR) processes to remove VOCs and perchlorate, respectively, from the water. This combined system was judged to be the most promising of the technologies tested and has been selected for the larger scale or "Expanded" Treatability Study.

NASA's Expanded Treatability Study will help further determine the best technologies for the long term and complete cleanup of groundwater affected by chemicals from JPL. Slaten said the unit will be "up and running" in the summer of 2004 and will be pumping and treating as much as 125 gallons of groundwater per minute in its first phase and, if the first phase is successful, as much as 250 gallons per minute when coupled with an anticipated second phase. VOCs and perchlorate entered the groundwater beneath JPL decades ago when liquid and solid wastes were disposed of in ground seepage pits - the accepted waste management practice in the 1940s and 1950s. Some of the chemicals may have traveled underground to nearby water supply wells that have been turned off. NASA is working with State and federal environmental regulators to treat the affected groundwater.

Technologies to be Used

The LGAC process to remove VOCs from groundwater is a proven system in use at hundreds of sites across the country. The FBR biological process is a newer technology used to remove perchlorate.

The treatment unit will operate in a "closed loop" system, Slaten said. Water will be extracted from two levels of the groundwater table — which is actually saturated soil — hundreds of feet beneath JPL, and treated to remove the chemicals. The clean water, with VOCs and perchlorate removed, will be reinjected into the water table about 200 feet upgradient, or upstream.

Four multi-level extraction wells and four injection wells will operate in the system at its peak. In the LGAC system, groundwater flows through vertical tanks where porous carbon particles attract and accumulate the molecules of VOCs for removal from the water and proper disposal. In the FBR system, vertical tanks contain a bed of granular activated carbon. Nutrients are added, and naturally occurring bacteria multiply to form a thin layer, or biofilm, over the activated carbon. As groundwater is pumped upward through the biofilm, the bacteria take in perchlorate and destroy it, reducing it to water and chloride. The water then passes through a filter to remove the bacteria.

"The results of this study will be evaluated by NASA and our federal and state regulators to guide us in proposing a plan for a removal action or final remedy," Slaten said.

The work is being carried out through a partnership of NASA contractors, Battelle Memorial Institute of Columbus, OH, and Envirogen's successor company, Shaw Environmental Inc. of Lawrenceville, NJ.

To Learn More About It

Information on these technologies and other JPL cleanup activities is available on line at http://JPLwater.nasa.gov and at the following Information Repositories:

La Cañada Flintridge Public Library
4545 Oakwood Ave.
La Cañada Flintridge,
California 91011
818-790-3330

Pasadena Central Library
285 E. Walnut St.
Pasadena, California 91101
626-744-4052

Altadena Public Library
600 E. Mariposa Ave.
Altadena, California 91001
626-798-0833

JPL Repository
(JPL Employees Only)
4800 Oak Grove Dr.
Bldg. 111
818-354-4200

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