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NASA-JPL
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National Aeronautics and Space Administration

History

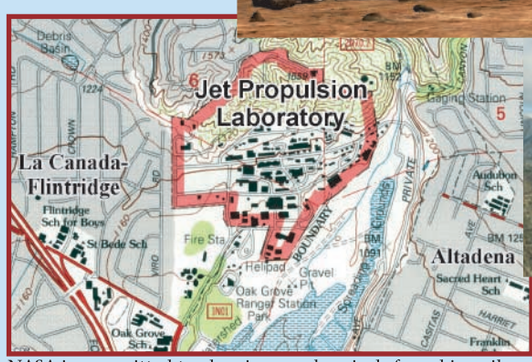
Today at the Jet Propulsion Laboratory (JPL) engineers and scientists develop and use robotic spacecraft for NASA's exploration of the solar system.

In the 1940s and 1950s, wastes from JPL were collected in ground seepage pits. Later in the 1950s, waste management practices changed:

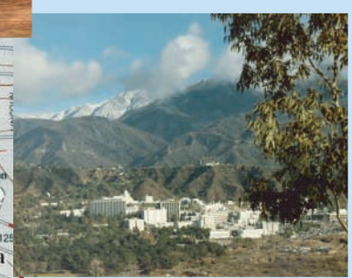
- A sewer system was installed
- Seepage pits stopped being used

Some chemicals disposed in the seepage pits have been found in soil and groundwater beneath JPL and in nearby groundwater.

Developed at JPL, NASA's "Spirit" rover landed on Mars in January, 2004.



NASA is committed to cleaning up chemicals found in soil and groundwater beneath and near JPL from past disposal practices that stopped decades ago.



The Jet Propulsion Laboratory (JPL) is located on a 176-acre site in the foothills of the San Gabriel Mountains near Pasadena, California.

What are these chemicals?

Volatile Organic Compounds (VOCs)
A group of chemicals widely used in industry, primarily as cleaning solvents.

Perchlorate
A chemical used as an ingredient in solid rocket fuel, fireworks, flares, dyes and fertilizers.

Altadena and Pasadena water supply officials continue to provide safe, clean drinking water to their communities.

Making Progress with CERCLA

In 1992, the cleanup effort at JPL became regulated by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), sometimes called Superfund. CERCLA requires a set of specific site investigations and evaluations - a process that can take years of work before cleanup is done. CERCLA gives the public opportunities for review and comment.

Learn more about CERCLA at www.EPA.gov/superfund, or

Get regular updates on NASA's JPL CERCLA cleanup at http://JPLwater.nasa.gov.

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Cleaning Up Groundwater Beneath JPL

NASA's new on-site treatment plant is removing volatile organic compounds (VOCs) and perchlorate from groundwater beneath JPL.

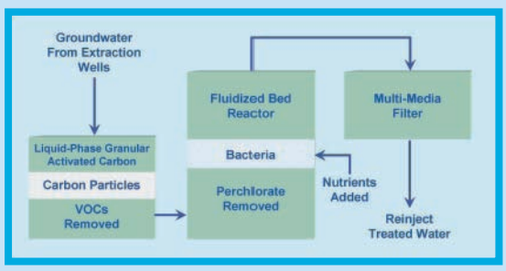
Benefits

Reduces highest levels of chemicals at the source area.

Limits the spread of chemicals in groundwater.

Helps reduce time needed for operating water treatment plants offsite.

NASA's new on-site water treatment plant is located in the north-central section of JPL. The highest levels of VOCs and perchlorate in groundwater have been found in this area.



How it Works:

Removing VOCs

Liquid-Phase Granular Activated Carbon (LGAC)

- Groundwater is pumped from wells.
- The water flows through very porous carbon particles that attract VOCs.
- Collected VOCs are properly disposed.
- Fresh carbon particles are placed in the tanks and the process continues.

Removing Perchlorate

Fluidized Bed Reactor

- "Starter" bacteria (initially gathered from a food production plant) are put in the tank.
- Added food and nutrients make the bacteria multiply.
- As water flows past, the bacteria destroy the perchlorate.
- A final filtering eliminates bacteria from the treated water.

A Fluidized Bed Reactor is removing perchlorate.

NASA's on-site facility can treat groundwater at flows of 250 gallons per minute.

A Liquid-Phase Granular Activated Carbon system (blue tanks) is removing VOCs.

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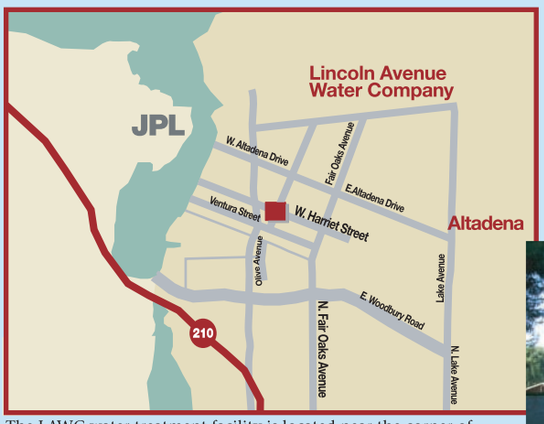
Cleaning Up Groundwater Beyond JPL

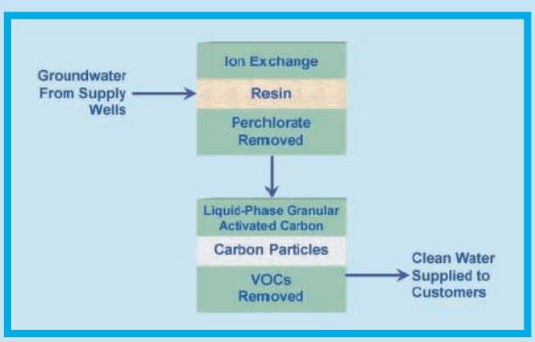
A NASA-funded water treatment plant is removing volatile organic compounds (VOCs) and perchlorate from Lincoln Avenue Water Company (LAWC) wells in Altadena. NASA is proposing a similar system for City of Pasadena wells.



The LAWC water treatment facility is located near the corner of Harriet Street and North Olive Avenue in Altadena.

On July 28, 2004, NASA's Deputy Administrator Frederick Gregory (left) and LAWC General Manager Bob Hayward (right) launched an Ion Exchange system in Altadena to remove perchlorate from drinking water. A VOC removal system has been operating there since the early 1990s.

The LAWC Ion Exchange treatment system.



Ion Exchange Advantages

- Being used effectively at several locations in California
- Approved by the State for removing perchlorate from drinking water
- Technology was successfully pilot-tested at JPL
- Offers flexibility to meet seasonal water demand

How it Works:

Removing Perchlorate

Ion Exchange (IX)

- Groundwater is pumped from LAWC wells at up to 2,000 gallons per minute.
- Groundwater runs through tanks filled with tiny plastic beads, or resin.
- Perchlorate attaches to the resin.
- About once a year old resin is removed and properly disposed.
- New resin is placed in tanks.

Removing VOCs

Liquid-Phase Granular Activated Carbon (LGAC)

- Water flows through very porous carbon particles that attract VOCs.
- Every few months the old carbon is replaced with fresh carbon.
- The spent carbon is properly disposed.
- Clean treated water is supplied to customers.

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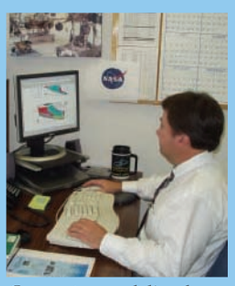
Understanding Groundwater Conditions

Using information gathered from extensive site investigations, NASA is conducting a comprehensive cleanup effort at the JPL site.

NASA is committed to cleaning up chemicals in groundwater from JPL.

NASA uses several integrated methods to understand underground conditions and the extent of chemicals in groundwater.

Computer Models



- Computer modeling has been used to identify the optimal location for drilling new monitoring wells.
- Modeling also gives information about water flows and effects of pumping.

Advanced Chemistry

- NASA is using advanced technologies such as isotopic analysis to study the nature of chemicals in groundwater.
- Laboratory analysis helps define distinct chemical makeup.

Well Water Sampling

- Technicians regularly sample groundwater as part of NASA's ongoing water cleanup effort.

The installation of a new NASA monitoring well.

Installing two new monitoring wells southeast of JPL gives NASA additional data on the extent of chemical movement in groundwater.

These investigations guide the NASA groundwater cleanup effort in many ways:

- Determining the types and amounts of chemicals in groundwater
- Understanding what influences the movement of chemicals in groundwater
- Pinpointing the best location for installing wells and water treatment systems
- As cleanup nears completion, validating its effectiveness

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Community Outreach

NASA is providing regular project updates in a variety of easy-to-use ways.

IN YOUR NEIGHBORHOODS

Pasadena Altadena La Cañada Flintridge

NASA is listening to what people have to say and is updating a comprehensive Community Involvement Plan.

NASA hosts Public Meetings and Community Information Sessions.

Pasadena resident and NASA Water Cleanup Outreach Manager Merrilee Fellows (left) with Northwest Pasadena City Councilmember Joyce Streator at the Pasadena Museum of History water exhibit, "Flowing Waters, Fruitful Valley."

At local libraries you'll find JPL water cleanup documents (including Spanish-language documents) on CD or in a user-friendly filing cabinet.

Information Repositories:

- La Cañada Flintridge Public Library
- Pasadena Central Library
- Altadena Public Library
- JPL Library (JPL employees only)

In the Mail

Nearly 17,000 area households are receiving NASA's bilingual newsletters and fact sheets. Call (818)393-0754 to begin receiving these and other timely mailings.

On the Web

At **http://JPLwater.nasa.gov** the latest reports, documents and transcripts are at your fingertips. Ask questions and send comments directly to NASA on our website.

By Phone

For more information at any time, contact:

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(818)393-0754

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