



# NASA Receives Regulatory Approval for its Plan to Complete Groundwater Cleanup

## A MAJOR MILESTONE

An approved Record of Decision (ROD) is a major milestone for NASA and the groundwater cleanup program at the Jet Propulsion Laboratory (JPL). The final ROD is the culmination of years of work and a key step in the lengthy process required at federal cleanup sites under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). In 1992, JPL was officially listed as a so-called “Superfund” cleanup site. Since then, NASA has pressed onward through the CERCLA process, first investigating and then beginning extensive cleanup of soil at JPL and groundwater chemicals deep beneath and in areas adjacent to JPL.

The ROD, available at <http://go.nasa.gov/2DdbQ1i>, was executed on February 26, 2018. Signatories of the ROD include the U.S. Environmental Protection Agency, the California Department of Toxic Substances Control, the California Regional Water Quality Control Board, and NASA.

### A SIGNED FINAL ROD advances groundwater cleanup in three ways:

**Underscores**  
that regulators  
approve of  
NASA’s final  
cleanup plans.

**Affirms**  
the significant  
cleanup activities  
NASA has  
accomplished  
to date.

**Moves**  
NASA closer to  
the end goal  
for cleanup  
of the site.

Typically, the design and construction phase of the approved site remedy begins after the ROD is signed. At the JPL site, that work – extensive in scope – has already been done. Each well drilled, sample taken, technology pilot-tested, and each of three treatment systems installed was done with purpose – to gain a thorough understanding of the chemicals that were present, where they were located, and how they might migrate in the environment. These activities informed NASA on what to propose as the cleanup plan, and at the same time resulted in removing some of the unwanted chemicals from soil and groundwater in the process. NASA’s proposed plan, which was made available for public comment, was then reflected in a draft ROD and submitted for approval. With a signed ROD now in hand, NASA moves even closer to completing cleanup.

The groundwater chemicals being addressed by NASA are volatile organic compounds (VOCs) and the chemical compound perchlorate. These originated during the 1940s and 1950s when liquid wastes generated at JPL were disposed of into seepage pits, a [long-discontinued] practice considered common at the time.

Extensive  
investigation &  
cleanup  
have already  
been done

# NASA'S CLEANUP PLAN

## The approved, final ROD means that regulators concur with how NASA implements cleanup:

Continue ongoing groundwater treatment by operating three existing NASA-funded groundwater treatment systems;

Continue the existing groundwater monitoring program;

Use institutional controls (non-engineering measures that prevent access to chemicals that exist in deep groundwater).

These are administrative or legal steps to ensure that local groundwater is not used without appropriate evaluation.

They include agreements with State and local agencies who oversee installation of new wells in the basin.



## A Closer Look at NASA-Funded Groundwater Treatment Systems

The on-site groundwater treatment system (shown here) is one of three NASA-funded systems in operation.

### Source Area Treatment:

This system is located on site at JPL at the “source area” where the highest concentrations of chemicals exist in groundwater.

NASA pilot-tested cleanup technologies on site beginning in 1999 and has been operating a large-scale cleanup system at JPL since 2005 using liquid-phase granular activated carbon (LGAC) to remove VOCs and a fluidized bed reactor to remove perchlorate.

### On-site Soil Cleanup Goal Was Met During CERCLA Process

In 1998 NASA pilot-tested soil vapor extraction (SVE) technology to remove VOCs from on-site soil. Based on its success, NASA implemented full-scale operation and soil cleanup was completed in 2007.

This prevented further release of chemicals into the groundwater.

### Monk Hill Treatment System:

This system was constructed in 2011 and uses four City of Pasadena drinking water wells at the Monk Hill Treatment System in Pasadena. It is located at roughly the midpoint of the affected groundwater area and uses ion exchange to remove VOCs and LGAC to remove perchlorate.

### Lincoln Avenue Water Company:

This system uses three Lincoln Avenue Water Company (LAWC) wells in nearby Altadena, located at the farthest reaches of the affected groundwater.

NASA has funded groundwater treatment to remove VOCs since 1992, and in 2004 added an ion exchange system at the LAWG wells to remove perchlorate.

## Innovations & Improvements

# MAKING A DIFFERENCE



Installation of a solar array (shown here) in Pasadena is one of the ways NASA is optimizing the cleanup process.

As an agency, NASA takes pride in its innovations. It is this same spirit that drives the groundwater cleanup program team to pursue technologies that optimize the cleanup process. For instance, NASA pursued maximizing efficiencies with the LAWC treatment system. A new and deeper drinking water well, which became fully operational in July 2017, was funded and constructed by NASA. The new well enhances groundwater cleanup efforts by operating more efficiently, and helps maintain effective containment of the leading edge of groundwater chemicals. At the same time it serves as a modern, reliable backup well for the LAWC to provide clean drinking water.

Another improvement is being made on site at JPL. NASA engineers determined that while the fluidized bed reactor technology, operating since 2004 to remove higher concentrations of perchlorate from groundwater at the source area, has done its job well, a new system using ion exchange technology would be best suited to treat the remaining perchlorate. The new treatment technology is expected to be installed and operational in the next year.

It is this innovative spirit that keeps the team thinking creatively about how to improve and enhance all aspects of the work being done. In 2017, program director Steve Slaten was presented with NASA's Blue Marble Award for spearheading a collaborative approach and implementing key initiatives that reduce water use and increase the use of renewable resources.

NASA takes pride in its innovations

## WAYS NASA IS OPTIMIZING CLEANUP

Optimizing energy through reduced pumping requirements

Supporting innovative contracting initiatives

Recycling 95 percent of the waste generated during construction of Pasadena's treatment plant

Using native, drought-tolerant plant species to landscape the new treatment plant

Recycling plant wastewater

Championing installation of a 564-kilowatt PV (photovoltaic) system at the Windsor Reservoir facility adjacent to the Monk Hill Treatment System site

## Monitoring Progress Towards the Cleanup Goal

NASA has made real and steady cleanup progress leading up to the final ROD. Having regulatory approval now validates that operating the three NASA-funded treatment systems has been effective in containing chemicals originating from JPL and enabling treated groundwater to meet drinking water standards. To monitor effectiveness and measure this progress, NASA is continuing the existing groundwater monitoring program – a network of 25 monitoring wells, many of them multi-port, to collect and analyze groundwater data on a quarterly basis.

In addition, CERCLA requires ongoing cleanup be reviewed every five years. Extensive in scope, these Five Year Reviews consist of site inspections, data analyses and reporting, and community involvement evaluations. Two such reviews, conducted in 2012 and 2017, have determined the treatment systems work effectively and are protective of human health and the environment. Fact sheets on the reviews can be found at <https://jplwater.nasa.gov>.

Treatment  
systems are  
working  
effectively to  
meet the  
cleanup goal

## Community Involvement

### A Hallmark of the Groundwater Cleanup Program



Information Sessions, as depicted here, bring the community and NASA team together for conversations about cleanup activities.

From  
the start  
NASA has been  
committed to  
involving the  
public.

NASA Groundwater Cleanup Project Manager Steve Slaten and NASA Manager for Community Involvement Merrilee Fellows began working together on the JPL groundwater cleanup program more than a decade ago. From the start they committed to involving the public in the process, knowing that good, two-way communication is key to an effective site investigation and cleanup effort.

It began with their conducting community interviews: asking people about their concerns, what they wanted to know, and how they wanted to receive information about the project. What has unfolded over the years is an informed outreach program involving meetings with residents at community centers, presentations at local organizations, and visits with neighbors – covering a range of topics about the cleanup process and what it means. For example, prior to the Proposed Plan public comment period, NASA hosted community information sessions – informal gatherings for people to ask questions and learn more about the plan. Keeping people informed is a priority and takes many forms – from updates on the JPL water cleanup website to Year In Review updates, newsletters and fact sheets, and at times, with hand-delivered notifications.

**Collaboration, cooperation, communication, and community remain the integral components in this process.**

### For information, contact

#### Merrilee Fellows

NASA Manager for Community Involvement

NASA Management Office/JPL 180-801 • 4800 Oak Grove Drive, Pasadena, California 91109

Phone (818) 393-0754 • Email [mfellows@nasa.gov](mailto:mfellows@nasa.gov) • Project Website <https://jplwater.nasa.gov>

#### Para Más Información En Español, llame a Angel Castillo

NASA JPL, Teléfono (818) 354-1585