



NASA GROUNDWATER CLEANUP PROJECT

This year in review is part of NASA's ongoing efforts to keep the community informed about NASA's progress in cleaning up groundwater at and in the vicinity of the Jet Propulsion Laboratory. Investigation and cleanup efforts are conducted under the Federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund.

In 2023, NASA Continued Steady Progress on Groundwater Cleanup

The groundwater chemicals being addressed at and near JPL are volatile organic compounds (VOCs) and the chemical compound perchlorate. Removal of chemicals from groundwater advanced on schedule at three NASA-funded treatment plants – one located on JPL property, another in Altadena operated by the Lincoln Avenue Water Company (LAWC), and a third plant in the Arroyo Seco operated by the City of Pasadena. NASA continues to follow closely its final cleanup plan, as outlined in the 2018 Record of Decision (ROD) approved by federal and state government agencies as the best approach to reaching the cleanup goals and to maintaining protection of human health and the environment.

At the “Source Area,” Groundwater Cleanup Continued Without a Hitch

In 2023, the source area treatment system at JPL continued to operate unimpeded and effectively. More than 2202 pounds of perchlorate and more than 49.7 pounds of VOCs have now been removed from groundwater beneath JPL since system startup in January 2005. The total amount of unwanted chemicals in groundwater beneath JPL has been reduced by more than 96 percent.

While chemical removal has been significant, it can be difficult to remove the lower levels of contaminants. NASA remains committed to continue with treatment cleanup objectives set forth in the ROD until achieved. Continued operation of the system to achieve that cleanup goal in groundwater is expected to take another five to ten years. This is typical in groundwater remediation because chemical removal is more difficult as concentrations decrease. It takes a long time to flush enough water through the aquifer to achieve the very low cleanup goals (i.e., in the parts-per-billion concentration).

Progress Also Continued at LAWC Wells in Altadena, With Cleanup at the Outer Edges of the Affected Area

The Lincoln Avenue Water Company (LAWC) system, with three drinking water wells located at the leading edge of the affected groundwater, has now removed more than 1451 pounds of perchlorate and more than 356 pounds of VOCs since startup in 2004. Chemical concentrations in the LAWC groundwater have now been reduced by more than 91 percent. Operation of the LAWC system ensures that chemicals in groundwater do not migrate further in the aquifer.

Groundwater Cleanup Progress in the Arroyo Seco

The NASA-funded Monk Hill Treatment System (MHTS) consists of four City of Pasadena drinking water wells in the Arroyo Seco and a treatment plant located on Windsor Avenue. Pasadena Water and Power (PWP) continued in 2023 with planning to construct a new NASA-funded drinking water well located in the northern portion of the Arroyo. Since system startup in 2011, the MHTS has removed more than 1478 pounds of perchlorate from groundwater and more than 247 pounds of VOCs. Chemical levels in groundwater extracted by the MHTS in the Arroyo have been reduced by more than 92 percent.

Design of the new MHTS well – to be named “Explorer” – was finalized in 2023, with permitting and California Environmental Quality Act (CEQA) requirements scheduled for completion in early 2024. Bidding on the project, awarding it, and drilling is scheduled to begin in 2024 as well. Explorer would increase removal of targeted chemicals, and it would reduce the time needed to clean up the aquifer.

2023 YEAR IN REVIEW

Continued Groundwater Monitoring

With 25 monitoring wells on and in the vicinity of JPL, NASA can demonstrate that the **treatment systems in place continue to be effective in remediating the affected groundwater**. Quarterly monitoring reports for 2023 continued to be filed and are posted at the groundwater cleanup website, <https://jplwater.nasa.gov>. NASA also continued weekly monitoring of perchlorate levels in wells at the nearby Rubio Cañon Land and Water Association (RCLWA).

Several of the monitoring wells are multi-level helping to understand the distribution of chemicals in groundwater throughout the entire depth of the aquifer. Precipitation over the past year has helped reverse declining water levels in the basin associated with the ongoing drought. Some monitoring wells that were not able to be sampled in 2022 were able to be sampled in 2023 as water levels rose. Even with the rain events over the past year, drought impacts on the local aquifer continue to be a concern to local water purveyors and NASA. Of note, during 2023, the Raymond Basin Management Board (RBMB), the authority that manages storage water in the area surrounding JPL, instituted a mandatory 24 percent reduction in water rights allocations to water purveyors in the Raymond Basin. NASA is working with water purveyors to make sure containment and treatment of chemicals in groundwater near JPL continue.

PFAS Investigations Continued in 2023

Since 2019, NASA has been proactively investigating PFAS (per- and polyfluoroalkyl substances) at JPL using existing environmental investigation frameworks (CERCLA) to understand the historical use, storage, and possible release of PFAS-containing materials to the environment. Results from a preliminary assessment at JPL identified five locations as potential PFAS source areas: an area where AFFF (aqueous film forming foam) was historically stored and released, and four areas where PFAS-containing material may have been used and disposed of.

In August 2022, EPA designated two PFAS as hazardous substances and as a result, the PFAS investigation at JPL is now considered part of NASA JPL's CERCLA groundwater cleanup program. In November 2022, NASA performed follow-up groundwater and soil sampling in the five potential source areas and in early 2023, NASA analyzed the additional samples using EPA's eight PFAS regional screening levels (RSLs) for groundwater and soil. In July 2023, a Draft Site Inspection (SI) Report was submitted to EPA and after responding to comments, NASA submitted the Draft Final SI Report to regulators in late October. The report indicated PFAS were present at slightly above screening levels in a few groundwater and soil samples. NASA is recommending conducting more comprehensive PFAS sampling of monitoring wells within and near JPL in 2024, taking advantage of recent rains that have replenished some previously dry wells.

Systems in Place Prove Effective

As part of the JPL CERCLA water cleanup program, the two technologies in use at the three NASA-funded treatment plants - liquid granular activated carbon (LGAC) and ion exchange (IX) - have been shown to be effective in removing certain PFAS from groundwater. In California, the Regional Water Quality Control Board requires drinking water suppliers to monitor for PFAS and to take the water source out of service or provide public notification within 30 days if PFAS are detected greater than the health advisory limit. PFAS have not been detected above California state notification levels in the Monk Hill Treatment System (MHTS) in Pasadena or in the Lincoln Avenue Water Company (LAWC) wells. Currently, EPA is proposing national drinking water standards for six PFAS known to occur in drinking water. Until national drinking water standards are established, EPA includes nearly 30 PFAS on its list of unregulated contaminants to be monitored by public water purveyors. In the Draft Final SI Report, NASA is recommending a coordinated effort with MHTS and LAWC water purveyors on routine sampling for PFAS.

2023 YEAR IN REVIEW

Community Outreach

NASA remains committed to ongoing open communication in all groundwater cleanup activities at JPL, and community outreach remains a cornerstone of the program.

During 2023, NASA community outreach activities included the following:

2022 Year-in-Review posted to the CERCLA Project website, <https://jplwater.nasa.gov>;

Presentations to community groups and other organizations continued in 2023;

Hosted several site visits during the year;

Posted routine CERCLA Project Website updates. These included document updates, software/programming/security updates, and posting of other content;

Continued maintenance of the CERCLA Project website;

Completed and posted to the CERCLA website the 2022 annual Institutional Controls (IC) Report. IC reports examine whether new drinking water wells have been opened in the affected area with a discussion of actions taken, if any, to prevent exposure of those wells to impacted groundwater.

During 2023, NASA posted to the CERCLA Website updates on its PFAS site Investigations; and

Preparation of the 2023 CERCLA Project Year-in-Review.

“NASA remains committed to ongoing open communication in all groundwater cleanup activities at JPL”

For additional information on NASA activities during 2023, or for general background information regarding the CERCLA Groundwater Project, please see the project website at <https://jplwater.nasa.gov> or contact:

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