SUMMER 2026

FieldNOTE

An Update on NASA's Cleanup Efforts at the Santa Susana Field Laboratory

NASA Advances Groundwater Cleanup with DTSC Approval of Phase 1 Remedy

Decision clears the way for implementation planning in key source areas

The enhanced in situ bioremediation system in the Alfa Test Area, shown in part above, is one of the treatment technologies in NASA's approved Phase 1 groundwater remedy.

NASA recently reached an important milestone in the groundwater cleanup at the Santa Susana Field Laboratory (SSFL). In late January, the California Department of Toxic Substances Control (DTSC) released its Final Statement of Basis and approved the remedy outlined in NASA's Phase 1 Groundwater Corrective Measures Study (CMS). The CMS selects treatment technologies to clean up key groundwater source areas within NASA-administered areas. The Final Statement of Basis and approval of the CMS mark the culmination of years of investigation, pilot studies, modeling, and technical collaboration to identify approaches best suited to site conditions.

"This milestone reflects years of dedicated work by NASA's groundwater technical team and coordination with DTSC," said NASA SSFL Program Director Peter Zorba. "With the remedy selected and approved, we look forward to finalizing the implementation plan and begining full-scale groundwater cleanup."

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- Peter Zorba, *NASA SSFL Program Director*

The Phase 1 groundwater cleanup builds on the substantial progress NASA has already made through interim actions and pilot studies, including the onsite Groundwater Extraction Treatment System (GETS) and the bedrock vapor extraction (BVE) and enhanced in situ bioremediation (EISB) pilot studies.To date, NASA has treated nearly 540 million gallons of groundwater, removing approximately 6,000 pounds of trichloroethylene (TCE) and other volatile organic compounds (VOCs) from the underlying bedrock and vadose zone beneath NASA-administered areas of SSFL.

The approved Phase 1 groundwater remedy focuses on six Target Treatment Areas with the highest TCE concentrations: ND-136, WS-09, C-6, the ND-136 Vapor Area, the Southern Seep Area, and the Northern Seep Area. Because groundwater conditions vary across the site, the selected remedy uses different technologies tailored to each area.

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GROUNDWATER PROGRESS TO DATE

~ 540 million gallons of groundwater treated through interim actions and pilot studies

~ 6,000 lbs of TCE and other VOCs removed from underlying bedrock

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Phase 6 Demolition Complete at Coca Test Area

NASA has completed another important step in its demolition program at the Santa Susana Field Laboratory (SSFL) with the removal of Coca Test Stand 4, closing out Phase 6.

Phase 6 began in early 2023 with pre-demolition preparations, including biological surveys and abatement activities, before demolition crews began deconstructing the more than 200-foot structure. To protect nesting birds, the work was paused, and NASA proceeded with Phase 7, the removal of the adjacent Coca Test Stand 1. Upon completion of Phase 7, demolition crews returned in Fall 2025 to complete the final stage of Phase 6.

While physical demolition was completed in December 2025, Phase 6 was formally completed in March 2026 when NASA received the Notice of Termination (NOT) from the State Water Board, confirming that applicable regulatory requirements had been met.

The former Coca IV (left) and Coca I (right) test stands following completion of Phase 6 and Phase 7 demolition. Remaining concrete pads foundations, and asphalt are planned for removal as part of Phase 8.

“Completing Phase 6 was a proud moment for our team and a meaningful milestone in our long-term commitment to cleaning up SSFL,” said Peter Zorba, NASA SSFL Program Director. “Demolition is the first step in NASA’s environmental cleanup and represents important progress and helps prepare the land for our comprehensive cleanup.”

With Phase 6 now complete, NASA will continue planning and sequencing the remaining demolition work in NASA-administered areas of SSFL. In the Coca Test Area, Phase 8 is planned to address the remaining concrete pads, foundations, and asphalt, as well as the Coca Control House. The timing of this work is dependent on federal funding and NASA budget allocations and will be determined once additional funding and priorities are clarified.

NASA ADVANCES GROUNDWATER CLEANUP (continued from Page 1)

At ND-136, the remedy includes enhanced in situ bioremediation, bedrock vapor extraction, monitored natural attenuation, and land use controls. At WS-09 and C-6, the remedy relies on pump-and-treat, followed by monitored natural attenuation and supported by land use controls, including institutional controls and engineering controls.At the Southern Seep Area, existing extraction infrastructure will continue to intercept contaminated groundwater before it can emerge as seeps. No remedy was recommended for the Northern Seep Area because contaminant levels are below cleanup thresholds and do not present a risk to human health or the environment.

Why the cleanup is being implemented in phases

At complex sites like SSFL, groundwater remediation typically begins in source areas, where contamination is most concentrated. Addressing these areas first helps reduce the highest concentrations and limit their movement into the broader groundwater system. Based on site modeling, NASA expects that about 10 years of active treatment in the Phase 1 areas could reduce high-concentration contamination by roughly 90 percent. After that, NASA will use adaptive site management and continued groundwater monitoring to address the remaining lower-level contamination over time. Phase 2 will evaluate cleanup approaches for remaining groundwater contamination across NASA-administered areas of the site. Information and data collected during Phase 1 will help inform NASA’s planning and evaluation of cleanup options for Phase 2.

With DTSC’s approval in place, NASA’s groundwater technical team is now developing the Corrective Measures Implementation (CMI) plan, which will outline the engineering, design, schedule, and other details needed to carry out the approved remedy. NASA expects to complete the CMI in early 2027 and will begin implementing the Phase 1 groundwater cleanup after DTSC’s approval.

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Forthcoming Soil Studies to Inform Cleanup Planning

NASA is eager to move forward with soil cleanup at the Santa Susana Field Laboratory (SSFL) and continues to work with the California Department of Toxic Substances Control (DTSC) to address technical and implementation challenges associated with the current cleanup framework under the 2010 Administrative Order on Consent (AOC) that guides NASA's soil cleanup.

Two DTSC-requested studies are anticipated to provide important information to help address key technical questions before large-scale soil cleanup begins across the SSFL site. The studies focus on two issues central to implementing soil cleanup at SSFL: (1) identifying suitable backfill material for site restoration, and (2) assessing laboratory capabilities for post-cleanup confirmation sampling. The studies were a joint effort by the three SSFL responsible parties: NASA, Boeing, and the Department of Energy (DOE) for DTSC. The results are expected to help inform decisions about how to move soil cleanup forward.

IDENTIFYING BACKFILL FOR SITE RESTORATION

Backfill is the clean replacement soil brought in after excavation to replace soil removed during cleanup. It helps fill and stabilize excavated areas, restore the landscape, and support the return of native vegetation and habitat.

At SSFL, identifying suitable backfill is especially important because the site supports a diverse ecosystem and serves as a key wildlife corridor in the region. Selecting appropriate soil requires assessing both whether it meets cleanup standards and whether it can support the restoration of natural habitat that plants, pollinators, birds, and other wildlife depend on.

Previous evaluations had not been able to identify soil that met both requirements in sufficient quantities. As a result, DTSC requested a more comprehensive backfill study from NASA, Boeing, and DOE.

Last year, NASA completed its portion of the study, which included evaluating potential backfill sources across a 8,000-square-mile region and collecting samples from the most viable locations. Boeing and DOE have also completed their portions of the work. Together, the responsible parties have developed a comprehensive report analyzing all three parties' backfill study data. DTSC is currently reviewing the report.

SSFL's unique landscape supports a diverse community of native plants and wildlife, as well as important cultural resources, making protection of these resources during soil cleanup a central part of planning.

The study is critical because under the current AOC cleanup framework NASA-administered areas alone would require the excavation of approximately 870,000 cubic yards of soil and an estimated 448,000 cubic yards of backfill for restoration. Across SSFL, more than 1.4 million cubic yards of backfill would be needed.

Once finalized, the report is expected to clarify whether backfill sources are available at the required scale and what may need to be addressed to support restoration after cleanup.

ASSESSING LABORATORY CAPABILITIES

A second study is assessing laboratory capabilities under the AOC cleanup framework. Under the 2010 AOC, cleanup levels are based on chemical-specific Look-Up Table (LUT) values developed by DTSC in 2013. These values are generally much lower than cleanup levels typically required in California or nationwide.

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In the SPOTLIGHT... Meet NASA's SSFL Environmental Manager

Derek Miller serves as NASA's Environmental Manager at the Santa Susana Field Laboratory (SSFL), where he supports NASA's cleanup efforts while protecting the site's natural resources.

Since joining the NASA SSFL team in January 2015, Miller has overseen NASA's RCRA Post-Closure Permit requirements and onsite waste management programs, working closely with field crews, contractors, and regulatory agencies to help ensure site work is conducted safely and responsibly, and in compliance with environmental requirements.

Much of Miller's work is hands-on and field-focused. He supports cleanup activities in real time, conducts inspections, helps address environmental questions as work progresses, and assists with inspections and audits by local, state, and federal oversight agencies. He also prepares required environmental reports and technical documents.

Miller also plays an important role in biological resource protection at SSFL. In coordination with the onsite biologist and field teams, he helps ensure that site activities protect wildlife, sensitive habitats, and protected resources, including migratory birds, threatened and endangered species, and coast live oak trees. This coordination helps NASA adjust work as needed to protect environmentally sensitive areas as field conditions change.

"Having the opportunity to work at the remote SSFL site is like working in an unexpected wildlife refuge," Miller said. "When I'm onsite, what stands out most is seeing how much plant and animal life the site supports. I see part of my role as helping protect that habitat so it can remain intact for future generations."

Before joining the SSFL project, Miller worked on geologic investigations across the nation from 2003 to 2014. He holds a Bachelor of Science in geology from Clemson University.

SOIL STUDIES (continued from Page 3)

Some LUT values are based on laboratory method reporting limits, or MRLs — the lowest levels at which chemicals can reliably be measured by laboratories. Other LUTs are based on DTSC's background study and are also lower than those typically required for cleanups. DTSC requested the laboratory capabilities study to help clarify what MRLs the laboratories can achieve and whether the labs can consistently and reliably measure and report results at the low levels required under the AOC/LUT framework.

The study also evaluates whether laboratories can process the large number of soil samples anticipated during the cleanup, and return results on a predictable timeline. Confirmation sampling will be used by all three responsible parties after excavation to determine whether cleanup goals have been met.

The laboratory capabilities study is now complete, and the results are being summarized in a report that is expected to be submitted to DTSC soon. Once finalized, the results will provide important information about how confirmation sampling can be conducted reliably, consistently, and efficiently during cleanup.

INFORMING NEXT STEPS

As the studies are finalized and released, they are expected to help guide NASA's ongoing discussions with DTSC and inform next steps toward implementing soil cleanup.

For NASA, the goal remains to move soil cleanup forward in a way that protects public health and the environment, is grounded in science, and supports the long-term protection and restoration of the site's natural and cultural resources.

For additional background on the soil cleanup framework and implementation topics discussed in this article, visit DTSC's Soil Smarts Workshop Series.

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