SPRING 2025

FieldNOTE

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

DTSC Announces Public Comment Period for NASA Phase 1 Groundwater Cleanup Plans

DTSC to release Statement of Basis April 29, public meeting May 13

Pictured above: NASA's solar-powered BVE system. The Groundwater CMS recommends including BVE as part of an integrated approach to treat groundwater in NASA areas.

The California Department of Toxic Substances Control (DTSC) has announced that next month they will release the Statement of Basis for NASA's Phase 1 Groundwater Corrective Measures Study (CMS), a key milestone in the decision-making process for NASA's groundwater cleanup at the Santa Susana Field Laboratory (SSFL). The Statement of Basis summarizes NASA's Phase 1 CMS and outlines DTSC's preferred cleanup approach for groundwater contamination in NASA areas.

The April 29 release of the Statement of Basis initiates a 45-day public comment period, during which community members are invited to review the proposed cleanup plan and provide feedback. Additionally, DTSC has announced a public meeting on May 13, during which stakeholders can learn more about the proposed remedy and share feedback.

"Community feedback is an important part of the cleanup process, and we encourage the public to participate in the upcoming comment period and provide input on our proposed plan to remediate groundwater," said Peter Zorba, NASA SSFL Program Director.

A Phased Approach

NASA and DTSC determined that splitting the groundwater cleanup into two phases would expedite efforts in high-concentration source areas. NASA's groundwater cleanup plans reflect this phased approach: Phase 1 focuses on contamination in source zones with the highest concentrations of trichloroethylene (TCE) and other volatile organic compounds (VOCs), such as in former rocket engine test areas. Phase 2 will address the remaining contamination in NASA areas.

Recommended Actions

The Phase 1 CMS evaluates multiple technologies and recommends an integrated approach, applying the following over the duration of the groundwater cleanup:

Enhanced In Situ Bioremediation (EISB) & Bedrock Vapor Extraction (BVE). EISB uses naturally occurring microbes to break down contaminants, and BVE removes vapor contamination trapped in the bedrock.

Pump and Treat with BVE. This method extracts and treats groundwater to remove contamination and prevent migration.

Hydraulic Control for Seep Areas. Manages groundwater movement to prevent the spread of contamination.

Monitored Natural Attenuation & Land Use Controls. Uses natural processes to reduce contamination over time, with ongoing monitoring and restrictions to ensure protection of public health and the environment.

HOW TO GET INVOLVED

REVIEW THE DOCUMENTS

Review DTSC's Statement of Basis and NASA's Phase 1 CMS starting **APRIL 29**. For more information, visit https://dtsc.ca.gov/santa_susana_field_lab/santa-susana-field-laboratory-nasa-phase-1-groundwater-cms/

ATTEND THE PUBLIC MEETING

Learn more about the Statement of Basis and NASA's Phase 1 Groundwater Cleanup at a virtual public meeting from **6 - 8 P.M. TUESDAY, MAY 13.** Register at https://bit.ly/NASAGWCMSSBPH1

SHARE YOUR FEEDBACK

Submit written comments starting **APRIL 29 through JUNE 10** or provide comments at the upcoming public meeting hosted by DTSC on Tuesday, **MAY 13**.

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NASA Completes Backfill Sampling for Soil Study

Study Seeks Suitable Soil for Restoration Following SSFL Cleanup

NASA recently completed its portion of backfill source sampling, a key step in an ongoing study conducted in collaboration with the Department of Energy (DOE) and Boeing at the request of DTSC. This effort is critical for identifying suitable soil materials to restore the SSFL site following excavation and cleanup activities.

Backfill is essential for stabilizing the landscape, supporting re-vegetation, and ensuring long-term ecological recovery at SSFL. However, finding soil in the necessary quantities that meets the cleanup standards required by the 2010 Administrative Order on Consent (AOC) and is capable of restoring the native habitat has proven to be a challenge. Multiple evaluations completed to date have not identified a source of soil that meets both chemical and ecological requirements.

"NASA is eager to resolve outstanding challenges related to soil cleanup, including identifying suitable backfill," said NASA SSFL Program Director Peter Zorba. "Finding soil that meets the necessary chemical and ecological standards is critical for moving forward with soil cleanup and site restoration, and we remain committed to working with DTSC and the community to find solutions."

A worker collects soil samples as NASA aims to find backfill that meets soil cleanup standards and can support regvegetation following cleanup activities.

Restoring a Critical Habitat

SSFL is a vital wildlife corridor in Southern California, supporting diverse plants and animals, including State and Federally protected species. With more than 74 plant species, 60 bird species, and various mammals, reptiles, amphibians, and butterflies in NASA's area alone, the site provides critical habitat in an increasingly urbanized landscape. Restoring the land after cleanup is essential to ensuring that these species—and the rich ecosystems of the Simi Hills—can continue to thrive for future generations.

"NASA is eager to resolve outstanding challenges related to soil cleanup, including identifying suitable backfill. Finding soil that meets the necessary chemical and ecological standards is critical for moving forward with soil cleanup and site restoration, and we remain committed to working with DTSC and the community to find solutions."

- Peter Zorba, NASA SSFL Program Director

Massive Restoration Effort

The Look-Up Table (LUT) values that DTSC established in 2013 for the AOC cleanup are significantly lower than typical cleanup standards used by DTSC or the U.S. Environmental Protection Agency (EPA). These extremely low standards restrict the feasibility of on-site treatment options and require large-scale soil excavation and removal. As a result, the amount of soil requiring excavation and removal and the amount of clean backfill needed for restoration is far greater than in most cleanup projects. Across the SSFL site, an estimated 2.1 million cubic yards of soil must be excavated and disposed of off-site. At least 870,000 cubic yards would come from NASA-administered areas alone. The responsible parties (NASA, DOE, and Boeing) must find over 1.4 million cubic yards of backfill to restore the site following the massive soil excavation. NASA alone needs at least 448,000 cubic yards.

Next Steps

NASA completed its backfill sampling in early February and is awaiting laboratory results. Meanwhile, DOE and Boeing will complete their sampling efforts this spring. Once all data is collected, the responsible parties will develop a comprehensive report summarizing their findings and submit it to DTSC.

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Phase 7 Demolition complete; artifacts sent to museums

NASA's demolition activities at SSFL continue to advance in preparation for the final cleanup. Most recently, NASA completed Phase 7, a major undertaking that involved dismantling and removing the more than 200-foot Coca Test Stand 1—a key structure in the history of rocket engine testing at SSFL.

With the completion of Phase 7, NASA is preparing for the next and final phase of planned demolition. Phase 8 will involve the removal of the Coca Control House along with all remaining concrete within the Coca Test Area.

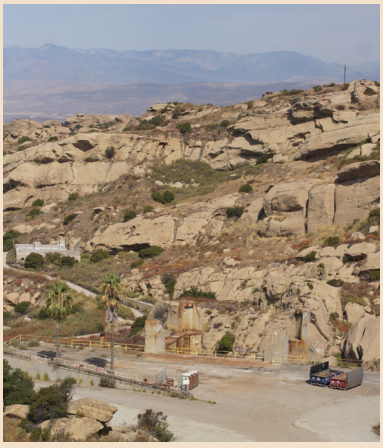
Artifacts Preserved for Future Exhibits

The Coca Test Stands supported historic space exploration programs such as the 1960s Apollo Program that sent astronauts to the moon, as well as the Space Shuttle Program in the 1980s. In recognition of the role the Coca Test Stands played in these historic achievements, NASA worked with the California Science Center in Los Angeles and the Smithsonian National Air and Space Museum in Washington, D.C., to transfer historic artifacts from the Coca Test Stands for potential public exhibition.

"NASA recognizes the critical role the test stands played in the development of America's space program, and these Coca artifacts are a testament to the historical achievements made at SSFL," said Peter Zorba, NASA SSFL Program Director. "We are grateful that these pieces will be protected and preserved for future generations."

Among the artifacts transferred to the California Science Center and the Smithsonian National Air and Space Museum were an explosion-proof camera housing and mount, an intercom box with headset, a custom fire monitor control console, and a telephone from Coca Test Stand 1.

Coca Test Stand 1, February 2024



Coca Test Stand 1, September 2024

In the SPOTLIGHT: Phil Reid

Meet NASA's onsite archeologist for SSFL

Phil Reid serves as NASA's lead archaeologist at the SSFL, where he plays a vital role in preserving the site's archaeological and traditional cultural resources. Since 2013, Reid has supported NASA's stewardship efforts, ensuring that cleanup activities respect and protect the cultural heritage of the land comprising SSFL.

As part of his work, Reid leads the implementation of NASA's Integrated Cultural Resource Management Plan and Environmentally Sensitive Area Action Plan. He also helps ensure compliance with NASA's Programmatic Agreement with the California State Historic Preservation Officer, advising on how to safeguard known cultural sites and responsibly manage any discoveries made during cleanup and demolition work.

Over the years, Reid has contributed to various cultural resource management efforts, including site security and condition assessments, archaeological monitoring during ground-disturbing work, pedestrian surveys, and numerous research and preservation projects. His work includes re-nominating the Burro Flats Painted Cave Site (CA-VEN-1072) to the National Register of Historic Places, helping secure recognition of the Traditional Cultural Property (TCP) at SSFL in 2020, and supporting advanced studies such as drone-based imaging and portable X-ray fluorescence analysis of pigments used in ancient rock art. He has also played a key role in preserving and relocating historic artifacts from NASA's test stands to several museums across the country, including the Smithsonian's National Air and Space Museum, the California Science Center, and the Flight Test Museum on Edwards Air Force Base.

"SSFL has a rich history and is home to some remarkable cultural sites and artifacts," said Reid. "Being part of a NASA team that's committed to both preserving those resources and restoring the site is something I'm truly proud of."

Reid holds a Master of Arts in Anthropology, with a focus on archaeology and human osteology, and is a Registered Professional Archaeologist with more than 25 years of experience in cultural resource management throughout California. He is employed by Jacobs Engineering Group, NASA's primary contractor at SSFL.

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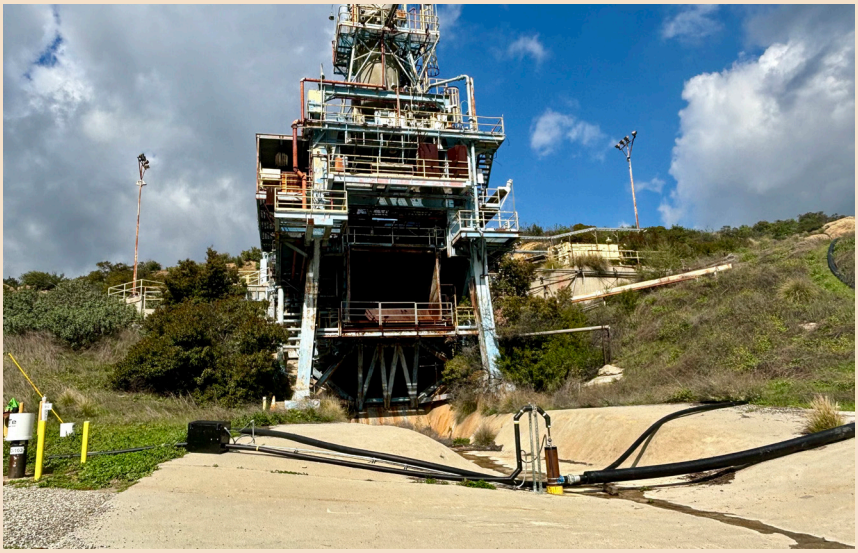
Groundwater pilot studies in Alfa Test Area complete

Cleanup Technologies Show Promise for Groundwater Remediation



The EISB pilot system relies on naturally occurring microbes to remove TCE and other VOCs from the groundwater beneath the Alfa Test Area in NASA's Area II at SSFL.

NASA has completed two key groundwater pilot studies at SSFL targeting the removal of trichloroethylene (TCE) and other volatile organic compounds (VOCs). The Bedrock Vapor Extraction (BVE) and Enhanced in Situ Bioremediation (EISB) pilot projects have yielded valuable data that will inform NASA's comprehensive groundwater cleanup at SSFL.

"NASA shares the community's urgency in seeing SSFL cleaned up, and we are pleased that the pilot studies have proven effective in removing TCE and other VOCs in the Alfa Test Area," said Peter Zorba, NASA SSFL Program Director. "We look forward to incorporating these findings into our final cleanup plans and optimizing their application in other NASA-administered areas with similar site conditions."

BVE Pilot Study Results

The BVE pilot study aimed to evaluate the effectiveness of using BVE to remove VOCs from the bedrock matrix below the Alfa Test Area, where there is a thick vadose zone with a significant bedrock fracture network and VOC concentrations. Following the system's operational phase, which ran from February 2023 to October 2024, NASA conducted a three-month rebound monitoring study, with final samples collected in late February 2025.

Preliminary results indicate that over the course of the study, the system successfully extracted approximately 1,160 pounds of TCE and over 3,000 pounds of VOCs from the bedrock within the vadose zone beneath Alfa, confirming the effectiveness of BVE technology in reducing harmful contaminants from the subsurface environment present in the Alfa area.

EISB Pilot Study Results

NASA also completed an 18-month-long EISB pilot study in December 2024 targeting the treatment of VOCs in groundwater using naturally ocurring microbes. Throughout the study, NASA extracted and recirculated approximately 426,000 gallons of groundwater within the target treatment area (TTA), another portion of the Alfa Test Area.

Preliminary data suggests that the treatment process has achieved an estimated 30 percent reduction in VOC concentrations within the TTA, demonstrating the potential for EISB as a long-term groundwater remediation solution.

NASA is developing a final performance report detailing the study's operations and monitoring for submission to DTSC and the Los Angeles Regional Water Quality Control Board. NASA expects to submit the final report to DTSC in early summer 2025.

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