



Santa Susana Field Laboratory

Phase 1 Groundwater Corrective Measures Study

Background

NASA is working with the California Department of Toxic Substances Control (DTSC) under the 2007 Consent Order for Corrective Action (Consent Order), which outlines the process for the investigation and cleanup of groundwater at the Santa Susana Field Laboratory (SSFL).

This Consent Order follows the Resource Conservation and Recovery Act (RCRA) framework to guide the development and implementation of cleanup plans. Alongside RCRA, NASA follows the National Environmental Policy Act (NEPA), a U.S. law ensuring that government projects consider environmental impacts before proceeding. In 2018, NASA completed the NEPA process for groundwater at SSFL and issued a Record of Decision (ROD) outlining a multi-faceted cleanup approach.

With the certification of DTSC's Final Programmatic Environmental Impact Report (PEIR) in July 2023, conditions are now in place to initiate full-scale groundwater cleanup.

Through interim actions and pilot studies to date, NASA has treated approximately 540 million gallons of groundwater and removed nearly 6,000 pounds of TCE and other VOCs trapped in the underlying bedrock matrix in the vadose zone beneath NASA areas of SSFL.

Phase 1 Groundwater Cleanup

NASA is eager to begin full-scale groundwater cleanup at the Santa Susana Field Laboratory (SSFL), and the completion of the Phase 1 Groundwater Corrective Measures Study (CMS) is a critical step in that process. Serving as the foundation for the Department of Toxic Substances Control (DTSC) decision document, the CMS evaluates multiple remediation alternatives, assessing their effectiveness, implementability, and feasibility to meet regulatory cleanup objectives and achieve a cleanup that is protective of public health and the environment. It ultimately recommends preferred measures to address contamination located in the groundwater beneath NASA-managed areas at SSFL.

Focus on TCE Source Areas

The Phase 1 CMS focuses on cleaning up source areas with the highest concentrations of trichloroethylene (TCE) — the primary driver of NASA's groundwater remediation at SSFL. Additional areas will be addressed in Phase 2. TCE is a volatile organic compound (VOC) commonly used as an industrial solvent, particularly for degreasing metal parts. At SSFL, TCE was historically used to flush rocket engines immediately before and after engine tests. Over time, some of the TCE used in these operations moved deep into groundwater, via migration through fractures, and was absorbed in the sandstone rock matrix. Because TCE was only used for cleaning kerosene-fueled engines, it was not employed during the Space Shuttle Main Engine tests conducted at SSFL in the 1970s and 1980s. In fact, the vast majority — approximately 97 percent — of TCE released in NASA areas occurred prior to 1961. As a result, Phase 1 targets treatment areas located within the NASA test areas most active during the 1950s and early 1960s.

Target Treatment Areas

The Phase 1 CMS includes six Target Treatment Areas (TTAs) grouped into three categories:

High TCE Concentration Groundwater TTAs

ND-136 TTA – Located in the Alfa Area

WS-09 TTA – Located in the Bravo Area

C-6 TTA – Located in the Delta Area

High TCE Concentration Bedrock Vapor TTA

ND-136 Vapor Area TTA – Located in the Alfa Area (overlaps geographically with ND-136 groundwater TTA but is treated as a distinct vapor source)

Seep TTAs

Southern Seep Area TTA – Near the Coca/Delta Area

Northern Seep Area TTA – North of the Building 204/Expendable Launch Vehicle (B204/ELV) Area of Impacted Groundwater

Phase 1 Cleanup Objectives

The Draft Phase 1 CMS uses California and federal maximum contaminant levels (MCLs) as a target cleanup goal for TCE and its daughter products in the TTAs. Final cleanup criteria will be developed as part of Phase 2 and in coordination with DTSC and the Los Angeles Regional Water Quality Control Board. NASA will follow the regulatory process to ensure the cleanup meets all federal and state standards and protects public health and the environment.

Recommended Cleanup Methods

The Draft Phase 1 CMS evaluates multiple cleanup alternatives, per the RCRA process, and assesses their effectiveness, implementability, and feasibility to meet regulatory cleanup objectives. The alternatives were selected to use various cleanup methods identified in NASA's 2018 Groundwater ROD. Based on NASA's analysis in the CMS, the following are the recommended treatments for each of the TTAs:

ND-136 TTA – For ND-136, NASA recommends using enhanced in situ bioremediation (EISB), followed by monitored natural attenuation (MNA) for groundwater, and BVE for soil vapor. Land use controls (LUCs) will also be applied to prevent access to groundwater and limit future site use until cleanup objectives are achieved (Alternative 2a). This recommendation is contingent upon the effectiveness demonstrated by EISB pilot tests. If pump-and-treat is more effective, it may be utilized in place of EISB in the future.

WS-09 TTA – The recommended approach for WS-09 TTA involves groundwater treatment using pump-and-treat technology, followed by MNA. LUCs would also be applied to prevent exposure (Alternative 3). This multi-pronged approach leverages existing infrastructure to actively remove contaminants from groundwater while monitoring natural processes to achieve long-term cleanup goals.

C-6 TTA – The recommended approach for C-6 TTA involves groundwater treatment using pump-and-treat technology, followed by MNA, along with LUCs to prevent exposure (Alternative 3). This TTA is located very close to the existing Groundwater Extraction Treatment System (GETS) conveyance pipeline, offering convenient access to supporting infrastructure.

Southern Seep Area TTA – For the Southern Seep Area TTA, NASA recommends using existing GETS Well ND-138A to extract and intercept contaminated groundwater before it expresses as seeps. MNA would follow once hydraulic control has achieved its practical application limits. In addition, LUCs will be applied to limit future site use until cleanup objectives are achieved (Alternative SP-2). This is already in place at the Southern Seep Area TTA.

Northern Seep Area TTA – Because contaminant levels were below cleanup thresholds and no risk to human health or the environment was identified, no remedy is recommended. This TTA was included only as a contingency, and future action would depend on new evidence of potential migration.

To read the Phase 1 Groundwater CMS and associated documents, please visit https://dtsc.ca.gov/santa_susana_field_lab/santa-susana-field-laboratory-nasa-phase-1-groundwater-cms/

NASA is committed to a cleanup of SSFL that prioritizes public health and environmental protection, uses the best available science and technology, and preserves the site's natural and Native American cultural resources for future generations.

FOR MORE INFORMATION CONTACT

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