

Field NOTE

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



NASA prepares for newest phase of demolition in the Bravo Test Area

NASA is preparing to kick off the next phase of its demolition program at SSFL—a necessary and important step in the cleanup process. During this fifth phase, NASA will demolish the Bravo test stands and control house.

Phase 5 is the continuation of NASA's demolition program, which began in 2015 in accordance with NASA's [2014 Record of Decision](#) and the Demolition Standard Operating Procedures, approved by DTSC in 2011.

After completing Phase 4, NASA announced its decision in April 2020 to end the previous deferral of the demolition of test stands, and to proceed with demolition of the Bravo and Coca Test Areas.

"Demolition continues to be an important step in NASA's cleanup process," said Peter Zorba, NASA SSFL Project Director. "Completing demolition will allow us to begin cleanup as soon as DTSC completes their regulatory process."

Pre-demolition work will begin in June, as crews mobilize in the field to complete biological surveys and make other preparations to ensure demolition is conducted in a



Demolition Phase 5 will include the dismantling and removal of the Bravo test stands and Control House, pictured above, in NASA's Area II at SSFL.

manner that protects the health and safety of workers, the public, and

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- Peter Zorba, NASA SSFL
Project Director

the cultural and biological resources onsite.

NASA anticipates it will complete demolition of the Bravo test stands and control house by the end of 2022. Demolition of the Coca Test Area is expected to be part of a sixth phase, that would begin sometime in 2023.

NASA is committed to keeping the public informed about Phase 5 demolition activities at Bravo. In addition to updates in future editions of this newsletter, the [demolition page](#) of the NASA SSFL website will include regular updates and photos of Phase 5 activities.

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Onsite Groundwater Treatment Resumes

Active cleanup is taking place at SSFL via a Groundwater Interim Measure

The onsite groundwater extraction treatment system (GETS) resumed continuous operation last month, marking an important milestone for groundwater cleanup. The system is now operating 24 hours a day, pumping and treating groundwater extracted from 13 wells across NASA and Boeing areas of SSFL.

The GETS was implemented as part of a groundwater interim action overseen by the Department of Toxic Substances Control (DTSC). The central treatment system utilizes multiple treatment technologies--including ion exchange, liquid and vapor phase granular activated carbon, and ultraviolet oxidation--to remove chemicals from the groundwater.

The extraction wells, from which groundwater is pulled from for delivery to GETS for treatment, are strategically located in source areas where contaminant concentrations are highest to maximize removal.

"This is an interim action, but this is active cleanup that will continue as part of NASA's final groundwater cleanup plans," said NASA SSFL Project Director Peter Zorba.

The GETS facility is located on Boeing property in Area I. Boeing is in charge of daily GETS operations, and NASA manages the infrastruc-



Workers prepare a section of GETS conveyance pipeline for installation during NASA's 2019 replacement of the entire pipeline network after it burned in the 2018 Woolsey Fire.

ture of wells and pipelines that connect NASA's extraction wells to the treatment system.

In 2019, NASA replaced over 14,000 feet of above-ground pipeline in NASA areas after nearly all of it was burned in the 2018 Woolsey Fire. These conveyance pipelines are constructed of a dou-

ble-walled high-density polypropylene (HDPE) pipe equipped with a remote leak detection system that communicates through telemetry radios and antennae to the GETS control station. With telemetry in place, NASA can monitor its wells, pumps, and pipelines to help manage the safe and effective operation of GETS.

With the completion of well optimization work in NASA areas this spring, NASA now has six wells online that pump groundwater for treatment at the GETS facility.

The GETS treats about 35 gallons of water per minute, which translates to over 50,000 gallons of water treated over a 24-hour period.

GETS GOALS

1.

REMEDIATE SOURCE ZONES

Cleanup targets the source areas where the contamination occurred and where contaminant concentrations are the highest.

2.

DE-WATER SEEP ZONES

In addition to groundwater treatment, wells in key areas pump groundwater to reduce the water level so seeps don't flow.

3.

CONTROL PLUME

The treatment of the groundwater beneath SSFL will prevent the contaminants from migrating.



Nest boxes ready for barn owls near Bravo

Barn owls (*Tyto alba*) are one of at least 60 species of birds that have been observed on NASA property at SSFL.

These cavity-nesting birds typically do not create their own nest holes. Instead, they are known to nest in sites such as caves, chimneys, barns, and open buildings, so it is no surprise that over the years, biologists and other project team members have observed signs of these creatures nesting in the test stands that remain in NASA areas at SSFL.

NASA recently installed three nest boxes in locations around the Bravo Test Area in preparation for upcoming demolition of the Bravo test stands. The nest boxes will provide a new nesting location for barn owls that have made nests in or around the Bravo stands.

Barn owl boxes are widely used by



Biologist Gary Santolo stands beneath one of the recently installed nest boxes in the Bravo Test Area ahead of demolition work expected to begin in June 2021.

biologists throughout the United States and around the world to provide barn owls alternative nesting environments.

Because they have been found to increase populations, nest boxes are commonly used in areas where the number of barn owls are declining. Nest boxes are also frequently used by farmers for natural rodent control, as barn owls prey almost exclusively on mice, voles, and other small mammals.

Gary Santolo, a biologist and barn owl expert with a long history with SSFL, said owl boxes create optimal nesting conditions for the owls. In fact, he said, many studies indicate that barn owls prefer boxes over other nest sites.



Barn owls are about a foot tall and weigh about a pound. They are known for their distinctive white, heart-shaped face and dark eyes. Photo credit: Homo Neuman/Audubon Photography Awards

"The nest boxes offer an ideal and very comfortable environment for the barn owls. They readily move into nest boxes because they offer a better view of hunting grounds and greater protection from predators than many natural nests," Santolo said.

Barn owls are strictly nocturnal creatures, so they can be difficult to track but based on the evidence he has seen, Santolo believes that there are one or two pairs of barn owls nesting in the Bravo test stands.

Santolo says he is confident that the owls will soon relocate their nests to the specialized boxes.

"The nest boxes offer such an ideal environment for the owls, so it's really just a matter of time before they become occupied," he said.



Update on the Burro Flats Cultural District Nomination to NRHP

NASA's 2014 Programmatic Agreement (updated in 2020), required the agency to produce and submit a Traditional Cultural Property (TCP) nomination to the California State Historical Resources Commission (SHRC) for acceptance and then to National Register of Historic Places (NRHP) for listing.

The NRHP listing would formally recognize the TCP as significant and afford it protections through the completion of the Section 106 process under the National Historic Preservation Act of 1966. An NRHP listing would in no way change NASA's commitment or responsibility to clean up the site.

To inform the development of the TCP, NASA consulted with local Tribes and conducted an Ethnographic Study documenting the prehistoric and native uses of the areas surrounding SSFL.

In September 2020, NASA fulfilled its obligation under the PA and submitted the TCP nomination to the Keeper of the NRHP at the National Park Service.

In February 2021, after addressing the Keeper's comments, NASA submitted the updated nomination to the State Historic Preservation Officer (SHPO) for a final review. The SHPO is still reviewing the nomination, and NASA is awaiting feedback. Once finalized, NASA will re-submit the nomination to the Keeper.

NASA will provide an update to the community once the Keeper makes a final determination as to the NRHP status.

Preparations continue for groundwater pilot study using natural cleanup processes

In 2020, NASA initiated a pilot study that will test the effectiveness of enhanced in situ bioremediation (EISB) to remove trichloroethylene (TCE) and other volatile organic compounds from groundwater beneath SSFL. Bioremediation refers to the use of very small, naturally occurring organisms called microbes to degrade environmental contaminants.

The pilot study will take place in the Alfa Test Area, near the spillway of Alfa Test Stand 3, where NASA is building a small, closed-loop extraction-recirculation system in the aquifer below the ground surface. The entire system and focused treatment area will take up an area approximately the size of a basketball court.

With EISB, an 'amendment' is used to enhance the growth of the naturally occurring microbes, resulting in greater contaminant degradation. For this pilot study, NASA will use food grade emulsified vegetable oil (EVO) for an amendment to create optimal conditions for the microbes. When deployed into groundwater, the EVO will ferment and produce electron donors hydrogen and acetate. The microbes will use the electron donors to sequentially reduce the groundwater contaminants of concern, using a process called reductive dechlorination, to harmless ethene gas. The overall microbial process allows the microbes to grow, which helps to provide additional microbes for reduction of contaminants. Additional byproducts of EISB treatment include hydrogen ion, water, carbon dioxide, and chloride ion.

The EISB pilot study officially commenced last fall as NASA began constructing the pilot treatment system. The first step in this process was the drilling of an injection well that will be part of the treatment system.

NASA will proceed with drilling two more injection wells and three monitoring wells for the system once it completes the permitting process through the Los Angeles Regional Water Quality Control Board. NASA expects that work to begin this summer.

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