2014 YEAR in REVIEW
NASA SANTA SUSANA FIELD LABORATORY

NASA continues with investigation and cleanup activities in two areas used historically for research, development and testing of rocket engines at Santa Susana Field Laboratory (SSFL). This document provides highlights of some of NASA's accomplishments in the past year and NASA's ongoing commitment to communicating with neighbors and community members about progress we make.

SOIL INVESTIGATION

NASA made significant progress with soil investigations including sampling, laboratory analyses, and treatability studies involving both laboratory and field testing in preparation for conducting a comprehensive soil cleanup effort.

Field Sampling Plan

NASA reached a milestone this year by completing soil characterization. This process was defined by the terms of the 2010 Administrative Order on Consent (AOC). The AOC requires NASA to clean up soil to Look-Up Table (LUT) values. Beginning in 2011, NASA divided the site into five areas and developed five Field Sampling Plans (FSPs). NASA collected and analyzed soil and soil vapor from these areas. The field work performed for the sixth and final FSP closed the gaps that remained from the five previous soil sampling activities. Data from all six sampling events will be summarized in a Data Sampling Report (expected in 2015) and with approval of the report, the soil investigation phase will be finished in areas that NASA administers.

Bench Scale and Field Study

Bench Scale: Soil Washing and Thermal Desorption

NASA is considering a range of soil remediation technologies and has been evaluating how effective they would be on site-specific contaminants under environmental conditions present at SSFL. These analyses also consider whether or not the technologies would be able to meet the AOC requirements of cleaning up to Look-Up Table values and meeting the 2017 cleanup deadline. Bench scale tests, conducted in a laboratory, had mixed results. Soil washing involves physically separating fine-grained from coarse-grained materials followed by a chemical process that "washes" the soil. NASA tested three wash solutions: water only, Citrikleen, and BioSolve. Results showed that the chemicals of concern were reduced to meet LUTs, with the exception of total petroleum hydrocarbons (TPH). Soil washing requires excavating soils for treatment. Washed soil that meets LUTs may be returned to the excavated site. It is a very water intensive technology and the water required per day to operate would result in a significant volume of wastewater (and multiple waste streams). NASA performed another bench scale test using thermal desorption. This technology can be performed in situ (in place treatment) or ex situ (removed for treatment) and involves heating soil to very high temperatures. NASA conducted four ex situ tests to evaluate TPH removal: two at 250 degrees Celsius (ºC) and two at 550ºC for 15 and 30 minutes each. Results showed that hydrocarbon removal improved at increasing temperature and met LUT values. This technology has high electricity needs and it results in soil being stripped of organics and nutrients that would make it challenging for re-vegetation and soil restoration in a treated area.

Field Study: Bioventing

NASA conducted a bioventing field study in July. The purpose of bioventing is to inject oxygen into the subsurface to restore favorable conditions to the bacteria that naturally degrade hydrocarbons. NASA selected the Bravo Test Stand area for the field study and installed three wells and four monitoring points to measure whether injecting air into the ground released contaminants to the surface. Air was injected and then trapped at the surface using a special cover. The study results show that mechanically, air travels through the subsurface with little to no leakage occurring. Increased oxygen levels enhance the biological breakdown of hydrocarbons in the shallow bedrock and NASA was able to raise the oxygen to over 20% at every spot measured. NASA is considering a second phase of bioventing field work in 2015 to test the success of bioventing near the Bravo Skim Pond where traces of fuel were found in the soil. NASA expects this fuel to be treatable when exposed to oxygen, followed by in-situ chemical oxidation.

CONTINUED