

## Santa Susana Field Laboratory Monthly Status Report July 2018

This monthly update is to inform the community about Santa Susana Field Laboratory (SSFL) investigation and cleanup activities that occurred in July 2018 as well as those that are planned for coming months under the California Department of Toxic Substances Control's (DTSC) oversight. A project overview for The Boeing Company (Boeing), United States Department of Energy (DOE) and National Aeronautics and Space Administration (NASA) SSFL areas is included at the end of this report. Documents referenced in this monthly status report that have been reviewed and commented on by DTSC are hyperlinked for easy access. Documents that are currently under DTSC's review will be made available once DTSC's review comments have been issued.

### **1 SSFL ACTIVITIES COMPLETED DURING JULY 2018** **DTSC**

#### **CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)**

DTSC's draft Program Environmental Impact Report ([draft PEIR](#)) for the SSFL project was issued for public review on September 7, 2017. The 90-day public comment period ended on December 14, 2017. DTSC is currently compiling and reviewing comments that were submitted during the comment period as well as verbal comments received at public hearings. The responses to comments will be included in the final PEIR.

#### **PROGRAM MANAGEMENT PLAN**

DTSC's draft Program Management Plan ([draft PMP](#)) for the SSFL project was issued for public review with the draft PEIR on September 7, 2017. Comments on the draft PMP are being evaluated by DTSC, and the draft document will be finalized as part of the circulation of the final PEIR.

#### **SITE WIDE AIR MONITORING**

Air monitoring is being conducted to evaluate baseline concentrations of airborne dust, volatile organic compounds, and radionuclides at SSFL prior to commencing cleanup activities. This data will be used to evaluate what, if any, impacts to air quality are caused by cleanup activities. The baseline monitoring program is described in the [Final Baseline Air Monitoring Work Plan](#).

Data collection for the baseline air monitoring program began on April 15, 2018. The program will continue for one year, with quarterly data reporting.

## NASA

### **SOILS:**

DTSC is completing review of NASA's revised *Soil Data Summary Report*, submitted to DTSC on February 22, 2017. This document is a revision to an [earlier draft document](#) (dated May 2015) reviewed and [commented](#) on by DTSC in March 2016. The report summarizes the results of soil samples collected to define the extent of chemical contamination at NASA-administered sites at SSFL.

### **GROUNDWATER:**

On February 21, 2018, NASA submitted a [NASA-Specific Sitewide Groundwater Quality Sampling and Analysis Plan](#). This document is an update of a previous 2010 document, and reflects information gathered during NASA's 2011-2016 investigation of the NASA SSFL Areas of Impacted Groundwater (AIGs). DTSC is reviewing the document.

On May 9, NASA submitted a [draft RCRA Facility Investigation \(RFI\) report](#) summarizing the results of NASA's 2013-2016 groundwater source investigations conducted at four sites (the Former Liquid Oxygen (LOX) Plant Area, the Expendable Launch Vehicle (ELV)-Building 204 Area, and the former Alfa-Bravo and Coca-Delta Test Stand Areas).

- On April 24, 2018 DTSC issued [comments](#) to NASA on the LOX Plant Area of Impacted Groundwater volume of the draft RFI Report.
- On June 22, 2018 DTSC issued [comments](#) to NASA on the Building 204 and Expendable Launch Vehicle Area of Impacted Groundwater volume of the draft RFI Report.
- DTSC continues to review the other volumes.

On July 5, 2017, NASA submitted the [Human Health and Ecological Risk Assessments for NASA Areas of Impacted Groundwater \(AIGs\)](#), dated June 22, 2017. This document is a section of the May 2017 NASA Groundwater RI report referenced above. DTSC is reviewing the document.

On September 11, 2017, NASA submitted a [Work Plan addendum](#) to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock. On June 27, 2018, DTSC sent a letter to Boeing DOE, and NASA requesting more information about cleanup technologies and the development of alternatives to be evaluated in the CMSs.

### **DEMOLITION:**

Removal of inactive infrastructure and support equipment continued at the former Alfa and Coca areas. NASA Phase 4 demolition activities, which are scheduled to be the final major NASA demolition effort prior to the commencement of soil remediation, are beginning. Demolition activities at SSFL are conducted under the clearance permit requirements of Ventura County.

### **PERMITTING:**

In June 2016, NASA submitted a draft post-closure permit renewal application for the [Area II Surface Impoundments](#). DTSC has reviewed the documents for technical completeness. Final permit renewals are pending until recent legislative changes to post-closure permit requirements under California Code of Regulations Title 22, Article 6 are finalized and implemented.

The post-closure requirements for the Area II Surface Impoundments are regulated by DTSC under RCRA laws and regulations because these impoundments are former hazardous waste facilities. The

required cleanup levels for the impacted soil will continue to be dictated by the [2010 Administrative Order on Consent for Remedial Action \(AOC\)](#).

## DOE

### SOILS:

On December 29, 2016, DOE submitted a [Draft Chemical Data Summary Report](#). The report summarizes the results of soil samples collected to define the extent of chemical contamination in soil in Area IV and the Northern Buffer Zone at SSFL. On April 24, 2018, DTSC provided [comments](#) based on review of this report.

In 2012, US Environmental Protection Agency (US EPA), in coordination with DTSC and DOE, [completed sampling efforts](#) to define the nature and extent of Area IV radiologic contamination.

DOE conducted soil treatability studies to evaluate onsite soil treatment technologies that could potentially reduce the volume of contaminated soil to be excavated and transported from Area IV. The treatability studies addressed soil partitioning, mercury valence state in soil, bioremediation, phytoremediation, and natural attenuation, as well as residual fuel hydrocarbon characterization methods. The soil treatability studies study plans, evaluation reports and Summary Report have been uploaded to the [DTSC-SSFL DOE Soil Treatability Studies web page](#).

### GROUNDWATER:

DOE has completed the majority of its field investigation of groundwater contamination at DOE sites at SSFL in support of the RFI's objective of defining the nature and extent of groundwater impacts. The findings from the RFI groundwater investigation are presented in "[Preliminary Draft RCRA Facility Groundwater Investigation Report \(GW RFI Report\) Area IV, Santa Susana Field Laboratory, Ventura County, California](#)", dated June 16, 2017. DTSC provided [comments dated March 23, 2018](#), to DOE regarding the draft report. On June 22, 2018, DOE provided preliminary responses to DTSC's comments. On July 17, 2018, DTSC met with DOE to discuss DOE's responses. On July 24, DTSC and DOE held a teleconference call to discuss geological issues relevant to DOE's contaminant fate and transport evaluation.

On March 12, 2018, DOE submitted the [Report on Annual Groundwater Monitoring, Area IV, 2017](#), and on June 4, 2018, DOE submitted the [Report on Quarterly Groundwater Monitoring, Area IV, First Quarter 2018](#). DTSC is reviewing both documents.

The 2007 Consent Order for Corrective Action requires submittal of Corrective Measures Study Work Plans that detail the methodology for developing and evaluating potential corrective measures to remedy chemical contamination at SSFL.

- In April of 2009, a Feasibility Study Work Plan was submitted to DTSC.
- In a letter dated June 27, 2013, DTSC conditionally approved the Feasibility Study Work Plan, and required submittal of a CMS Report, as well as submittal of CMS Work Plan Addenda that fully describe the scope of work required for multiple CMS efforts.
- In an email dated March 28, 2017, DTSC clarified that work plan addenda are required in the corrective action process at SSFL, and DOE's soil cleanup activities are regulated through the

- 2010 AOC and does not require a CMS Work Plan Addenda. A CMS Work Plan Addenda is, however, required to describe the scope of work required for site-wide groundwater cleanup required under the 2007 Consent Order, including DOE's groundwater and bedrock vadose zone CMS efforts in Area IV.
- On February 20, 2018 DOE, submitted a [draft Corrective Measures Study Work Plan addendum](#) (CMS Work Plan addendum) to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock to address groundwater issues described in the Area IV GW RFI Report that are the responsibility of DOE.
- On June 27, 2018, DTSC issued a letter to the Responsible Parties (RPs) requesting more information on remediation technology screenings and remedial alternative development for each RP's respective CMS efforts. This information is needed for DTSC to better understand and document the criteria and processes that will be used to develop remedial alternatives, and to explain and document how comparative analyses will be performed on remedial alternatives on a site-by-site basis.

While sufficient data have been gathered to date by DOE to support our general understanding of the nature and extent of groundwater impacts at DOE sites in Area IV, focused additional investigation has been conducted to refine our understanding of VOC source areas for purposes of groundwater remediation planning.

- The ["Area IV Groundwater Source Investigations – Work Plan Addendum"](#) proposed collection of passive soil gas samples to better understand the edges of the VOC plume in the vicinity of the FSDF former ponds, to better understand the source of VOCs observed in groundwater in nearby well RD-91, and to better understand the source of VOCs in the vicinity of the Hazardous Materials Storage Area [HMSA's] trichloroethene [TCE] plume. In April 2018, DOE completed the passive soil gas sampling activities. Eight bedrock core holes were completed for identification of potential VOC-impacted near-surface fractures, as well as analysis of the core to identify the potential presence of VOCs.
- DOE's ["Area IV Bedrock Investigation at the HMSA – Work Plan Addendum"](#), dated April 17, 2018, proposed installation of two open borehole bedrock wells and two shallow piezometers to (1) to define the horizontal and vertical extent and distribution of VOCs in bedrock and in near-surface groundwater, (2) determine if a VOC source exists at Building 4457, and (3) determine the location and extent of fracturing in bedrock (as observed in bedrock cores extracted during well drilling). DTSC approved the Work Plan Addendum via email on April 19, 2018. Installation of the two piezometers and two borehole bedrock wells (DD-146 and DD-147) have been completed.

On August 1, 2018, DOE submitted a revised "White Paper on Thermal Remediation Technologies for Treatment of Chlorinated Solvents". This paper was revised to address DTSC's prior comments. In an email sent to DOE on August 1, 2018, DTSC concurred with the document's analyses, findings and conclusions.

Starting in November 2017, DOE initiated extracting groundwater from well RS-54 as part of the Groundwater Interim Measure (GWIM) at the Area IV Former Sodium Disposal Facility (FSDF).

The objective of the GWIM at the FSDF is to remove contaminant mass and reduce the threat to underlying Chatsworth Formation groundwater. Well RS-54 is within the footprint of the former pond, extends 40 feet into bedrock, and has exhibited elevated concentrations of trichloroethene in groundwater. It is used to monitor shallow groundwater that is likely derived by rainfall that infiltrated to the subsurface and is impacted by contaminants contained in near-surface bedrock fractures. DOE has indicated that water levels in this well are highly dependent on seasonal rainfall. The well is dry during below average rain years, and has measurable levels of water that can be extracted during average rainfall years. Groundwater extraction from well RS-54 proceeded with waiting periods in between pumping to allow for water levels to slowly rise. Nearby core hole C-21, drilled in June to 53 ft bgs, captured a sufficient amount of shallow fracture-bearing groundwater to allow for sampling and purging. DOE will continue to monitor the water levels of these wells and will sample if a sufficient amount of water recovers. Purge water generated during the GWIM and field investigation activities is containerized onsite and will be characterized and then taken offsite for proper treatment and disposal at a licensed facility.

Evaluation of data collected during groundwater extraction continues, to better understand the sustainability of dewatering activities, as well as the hydraulic properties and distribution of the residual mass of volatile organic compounds (VOCs) in the upper bedrock that underlies the FSDF. As of the end of July 2018, approximately 344 gallons of groundwater have been removed via pumping of RS-54 and core hole C-21. DOE continues to evaluate the recent pumping and analytical results, and the findings will be summarized in a Technical Memorandum. DOE periodically meets with DTSC to discuss the ongoing implementation of the GWIM.

**BIOLOGICAL ISSUES ASSOCIATED WITH CLEANUP:**

Biological issues affect the overall SSFL cleanup project, and studies and permits will need to be done before starting cleanup. Continued communications between DTSC, agencies and RPs will be necessary to address main issues and develop a path forward for addressing biological issues associated with the proposed cleanup.

**PERMITTING:**

Draft RCRA Closure Plans (Plans) for the Radioactive Materials Handling Facility ([RMHF; Buildings 4021, 4022, and 4621 and adjacent outside storage yard](#)) and the Hazardous Waste Management Facility (HWMF; Buildings T029 and T133) will be subject to a public review and comment process. The HWMF Plan is available online as [Part 1](#) and [Part 2](#). The Plans describe closure (e.g., cleanup activities) for these buildings through decontamination and demolition (D&D). Specific methods that will be used during D&D are described in the Plans. The HWMF and RMHF will be demolished using standard construction equipment and demolition techniques, as further described in DOE's "[Standard Operating Procedure for Demolition of Facilities in Area IV at the Santa Susana Field Laboratory, Revision C](#)", dated August 2016. Any contaminated soil and groundwater remaining after demolition will be addressed under the 2010 AOC and the 2007 Consent Order for Corrective Action, respectively. The draft closure plans will not receive final approval until both DTSC's PEIR and DOE's Environmental Impact Statement (EIS) are completed and certified.

## BOEING

Boeing is finishing soils investigation work in Area I, Area III, and the southern buffer zone. Boeing's surficial media characterization work is divided into units identified as Boeing RFI Subareas:

- 1A North, 1A Central, 1A South
- 1B North, 1B Southwest, 1B Southeast
- 5/9 North, 5/9 South, and
- Group 10

### **SURFICIAL MEDIA INVESTIGATION:**

Boeing is using the Data Quality Objectives (DQOs) process and standard operating procedures for planning and conducting sampling work to complete the characterization of surficial media. The purpose of the current phase of surficial media investigation work is to collect sufficient data to fill data gaps that were identified in the 2007 and 2008 Group RFI Reports. All Boeing sites are in the data evaluation and reporting work phases.

- **Subarea 5/9 South** - Systems Testing Lab (STL-IV), Compound A, Sewage Treatment Plant (STP)-3, and Environmental Effects Laboratory (EEL), and areas not associated with RFI sites in Subarea 5/9 South
  - Boeing submitted [responses to comments](#) and [revised RFI Data Summary Reports](#) for Subarea 5/9 South on April 27, 2017.
  - DTSC sent [comments](#) to Boeing on April 25, 2018 and received [responses](#) to the comments on May 24, 2018. On June 12, 2018 DTSC received supplemental information associated with the responses. DTSC reviewed the responses to comments and supplemental information and [responded to the comments](#) on July 11, 2018.
- **Subarea 1A Central** - Building 359, Advanced Propulsion Test Facility (APTF), and Happy Valley North and areas not associated with RFI sites in Subarea 1A Central
  - Boeing submitted [responses to comments](#) and [revised RFI Data Summary Reports](#) for Subarea 1A Central on May 24, 2017. DTSC sent [comments](#) to Boeing on June 20, 2018.
- **Subarea 10** (Southern Buffer Zone)
  - Boeing submitted the [RFI Data Summary Report](#) for Subarea 10 on June 19, 2017.
  - DTSC is reviewing the report.
- **Subarea 5/9 North** - Silvernale, Engineering Chemistry Laboratory (ECL), and areas not associated with RFI sites in Subarea 5/9 North
  - Boeing submitted the [RFI Data Summary Report](#) for 5/9 North on July 26, 2017.
  - DTSC is reviewing the report.
- **Subarea 1A South** - Canyon, Happy Valley South, Laser Engineering Testing Facility (LETF)/CTL-I, and areas not associated with RFI sites in Subarea 1A South
  - Boeing submitted the [RFI Data Summary Report](#) for 1A South on August 22, 2017.
  - DTSC is reviewing the report.
- **Subarea 1B Southeast** - Chemical Test Lab (CTL)-III, Perimeter Pond, and areas not associated with RFI sites in Subarea 1B Southeast.
  - Boeing submitted the [RFI Data Summary Report](#) for 1B Southeast on September 29, 2017.
  - DTSC is reviewing the report.
- **Subarea 1B North** - Bowl, R-1 Pond, and areas not associated with RFI sites in Subarea 1B North
  - Boeing submitted the [RFI Data Summary Report](#) for 1B North on November 19, 2017.
  - DTSC is reviewing the report.

- **Subarea 1A North** - B-1, Instrument & Equipment Laboratory (IEL), Area 1 Landfill, and areas not associated with RFI sites in Subarea 1A North
  - Boeing submitted the [RFI Data Summary Report](#) for 1A North on December 18, 2017.
  - DTSC is reviewing the report.
  - Former Shooting Range
    - The Former Shooting Range is not part of Subarea 1A North but the site information is included here as the Former Shooting Range is located on the Mountains Recreation Conservancy Authority, Sage Ranch property which is adjacent to Subarea 1A North and some soil data overlap between the Former Shooting Range area and Subarea 1A North.
    - The work is being conducted under an [approved work plan and addendum](#).
    - Field work to investigate soils to define the extent of lead shot and clay pigeons as well as characterize the soil for lead, arsenic, antimony, and polynuclear aromatic hydrocarbon concentrations began in late September 2016 and was completed on January 18, 2017.
    - Laboratory analysis for soil sampling is complete.
    - Boeing constructed a fence to prevent access to a 1,200-foot section of the Sage Ranch Loop Trail where sampling results indicate remediation is necessary to address lead concentrations in soil.
    - Boeing released a statement to community members regarding the status of the sampling results, the need for remediation, and the closure and re-routing of a portion of the trail.
    - The [Draft Former Rocketdyne-Atomics International Rifle and Pistol Club Shooting Range Investigation Area Data Summary Report and Findings Report](#) was submitted to DTSC on April 11, 2017. DTSC provided [comments on the report to Boeing](#) on May 5, 2017. DTSC received responses to DTSC comments on July 11, 2017. DTSC sent a [letter](#) dated November 15, 2017 requiring Boeing to conduct further characterization and evaluation of the impacted media that may have entered the Northern Drainage from the Former Shooting Range. DTSC received the [Work Plan Addendum](#) for additional field work on February 28, 2018. DTSC provided [comments](#) to Boeing on April 13, 2018. DTSC received the [Revised Work Plan Addendum](#) and [Responses to DTSC comments](#) on May 4, 2018. DTSC approved the Work Plan Addendum with additional requirements in a [letter](#) on May 23, 2018. The additional field work was conducted between June 18-20, 2018. Boeing is revising the DSFR to incorporate the newly collected data.
    - On September 12, 2017 DTSC and the Los Angeles Regional Water Quality Control Board conducted a site inspection of recently installed storm water best management practices (BMPs) used to control storm water runoff from the Former Shooting Range into the Northern Drainage. Based on the site inspection and recommendations from DTSC and the LARWQCB the BMPs were evaluated by the Expert Panel and subsequently upgraded.
- **Subarea 1B Southwest** - Area I Burn Pit, CTL-V, and areas not associated with RFI sites in Subarea 1B Southwest
  - Boeing submitted the [RFI Data Summary Report](#) for 1B Southwest in late December. It was received by DTSC on January 2, 2018.
  - DTSC is reviewing the report.

- **Risk Assessment**
  - Risk Assessments were included in the two draft RFI Data Summary and Findings Reports submitted to date (Subareas 5/9 South and 1A Central).
  - Based on DTSC review comments and changes in risk assessment input parameters by the USEPA, the risk assessment process will need to undergo some changes.
    - Boeing submitted a [draft risk assessment work plan](#) [draft Standardized Risk Assessment Methodology, Revision 3 (draft SRAM-3)] on May 18, 2017.
    - DTSC sent Boeing a [letter](#) on January 16, 2018 rejecting the revised work plan. Boeing contested DTSC's rejection of the draft SRAM-3 in a letter dated March 15, 2018. DTSC responded in a letter dated April 4, 2018 and agreed to calculate the risk for the resident and resident with garden. Boeing further contested items in the April 20, 2018 letter. These letters can be viewed at the following [link](#). Then conceded these items in a letter dated May 21, 2018. Boeing submitted a [revised SRAM-3](#) in July 2018. DTSC is reviewing the revised SRAM-3.
  - DTSC requested 95 UCLs for [5/9 South](#) in May 2018 and [1A Central](#) in June 2018. Boeing provided the [95 UCLs for 5/9 South sites](#) and 95 UCLs for 1A Central sites in July 2018. DTSC responded with a [letter requesting additional information](#) in July 2018.

**GROUNDWATER:**

- Faults
  - In 2016, Boeing submitted draft technical memorandum evaluating faults ([main document](#) and [appendices](#)) and an [update](#). The concepts presented in the faults technical memorandum have been incorporated into the draft [Remedial Investigation \(RI\) Report](#)
  - DTSC is evaluating the faults work within the context of the draft RI Report.
- Groundwater Flow Model
  - Boeing continues to work to update the 3D Groundwater Flow Model.
- Draft [Remedial Investigation Report](#)
  - In June of 2017 Boeing submitted a draft [RI Report](#) summarizing the results of groundwater characterization work for Area I, Area III and the Southern Buffer Zone. DTSC is reviewing the document.
- Boeing Sites in Area IV
  - In May of 2018 Boeing submitted a draft [RI Report](#) summarizing the results of groundwater characterization work for Boeing groundwater sites in Area IV. DTSC is reviewing the document.
  - In August of 2017 Boeing submitted a [work plan addendum](#) to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock. DTSC is reviewing the document.
- Corrective Measures Studies
  - In September of 2017, Boeing submitted a [Work Plan addendum](#) to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock. On June 27, 2018, DTSC sent a letter to Boeing DOE, and NASA requesting more information about cleanup technologies and the development of alternatives to be evaluated in the CMSs.

**BUILDING DEMOLITION:**

The Superior Court of California, County of Sacramento, continues to evaluate the ongoing litigation over the demolition of Boeing buildings in SSFL Area IV. Per the December 11, 2013, temporary injunction, DTSC will not issue correspondence regarding the matter until the court issues a decision. The court has scheduled the next hearing on the case for November 9, 2018.

**PERMITTING:**

In October 2015, Boeing submitted a draft post-closure permit renewal application for the [Areas I and III Surface Impoundments](#) and a separate Closure Plan for the Thermal Treatment Facility. DTSC is currently reviewing the Areas I and III Surface Impoundment post-closure permit application for technical adequacy. DTSC has temporarily suspended review of the Closure Plan for the Thermal Treatment Facility pending ongoing discussion of risk assessment requirements.

The post-closure requirements for the Area I and III Surface Impoundments and closure requirements for the Thermal Treatment Facility are regulated by DTSC under RCRA laws and regulations because both are former hazardous waste facilities. The required cleanup levels for the impacted soil and groundwater will continue to be dictated by the 2007 Consent Order.

**SITEWIDE GROUNDWATER CHARACTERIZATION AND CLEANUP**

The SSFL groundwater characterization and cleanup program is being conducted by the three responsible parties; Boeing, DOE and NASA. The groundwater characterization and cleanup program consists of:

- Investigation and characterization of groundwater contamination;
- Groundwater monitoring;
- Groundwater interim measures; and
- Treatment of contaminated groundwater with permitted discharge from the Groundwater Extraction and Treatment System.

**GROUNDWATER REMEDIAL INVESTIGATION (GWRI)**

Data gaps were identified in the [2009 GWRI Report](#) by the RPs. DTSC also identified additional data gaps that were presented in the GWRI comments. The data gap work has been divided into six categories:

- Data gaps identified in the Remedial Investigation (RI) Report;
- Source Zone Characterization;
- Characterization of seeps and springs;
- Characterization of faults;
- Groundwater flow model; and Contaminant transport modeling.

**STATUS OF GWRI DATA GAP WORK**

Boeing, DOE and NASA have submitted Draft RFI Reports report summarizing the results groundwater investigations conducted at their respective sites. DTSC is reviewing and issuing comments on the documents. Additionally, Boeing, DOE and NASA are working on a single, overarching site summary document for groundwater characterization at the SSFL site.

Groundwater modeling efforts are proceeding:

- Groundwater flow model
  - The conditionally approved, groundwater flow model work plan presents an approach for a mountain scale groundwater flow model.
  - Work from the fault studies and data from monitoring wells installed since 2009 will be used to supplement the groundwater flow model. DTSC, Boeing, DOE and NASA are considering applying the revised model at the remedy design stage of the project.
- Contaminant transport modeling
  - Boeing, DOE and NASA continue to develop the approach for contaminant transport modeling.

#### **SITEWIDE GROUNDWATER TREATABILITY STUDIES**

Treatability studies have been conducted on several technologies to be evaluated in the feasibility study. The treatability studies address both soil/bedrock and groundwater contamination. Treatability studies can be either field studies or laboratory studies.

- Four groundwater laboratory studies were conducted:
  - Chemical oxidation using potassium permanganate;
  - Thermal heating of rock core;
    - DOE submitted a revised white paper study of thermal heating of fractured bedrock to DTSC in September 2017. DTSC reviewed the document and submitted [comments](#) on February 7, 2018.
  - Microbial characterization and Bio-Stimulation of rock core, pore water;
    - Boeing submitted the report called [Laboratory Evaluation of Biostimulation to Treat Chlorinated Ethenes in the Chatsworth Formation](#) and submitted it to DTSC on July 10, 2017.
    - DTSC is reviewing the report.
  
- Two field studies were conducted:
  - In-situ chemical oxidation (ISCO) using potassium permanganate;
    - Boeing developed a [summary report](#) for ISCO and submitted it to DTSC on June 14, 2016.
    - DTSC issued [comments](#) to Boeing on June 16, 2017. Boeing provided responses to DTSC comments on August 28, 2017. DTSC reviewed the responses and provided [comments](#) on both the responses and the report on February 7, 2018. Boeing provided responses to DTSC comments on June 12, 2018. DTSC is reviewing the responses.
  - Bedrock vapor extraction (BVE);
    - Conducted at NASA's former Bravo test area in late 2014.
    - NASA has submitted the Technical Memorandum: [Results from Bravo Bedrock Vapor Extraction Treatability Study](#) dated November 2015 to DTSC.
    - DTSC has reviewed and [commented](#) on the report.

#### **GROUNDWATER MONITORING**

[Groundwater monitoring reports](#) are submitted quarterly, with the fourth submittal being an annual report. DTSC reviews the quarterly reports for completeness and compliance but may not issue written comments on the specific quarterly report if significant issues are not present. If compliance issues arise during review of the quarterly groundwater monitoring reports, DTSC directs the Responsible Parties to take action to comply and follows up to ensure compliance is achieved and maintained.

The annual reports present the results of the previous year's monitoring and undergo a more thorough review. Annual Report for [DOE](#), [NASA](#) and [Boeing](#) groundwater monitoring activities were submitted to DTSC on March 12, February 21 and February 26, 2018 respectively. DTSC is reviewing the Reports.

#### **GROUNDWATER INTERIM MEASURES (GWIM)**

The GWIM project includes the operation of fourteen groundwater extraction wells. The water will be pumped to the existing Groundwater Extraction Treatment System (GETS) for treatment. GETS effluent is regulated by the Los Angeles Regional Water Quality Control Board (LARWQCB).

- On October 2, 2017, the LARWQCB enrolled Boeing under [General Waste Discharge Requirements to regulate injection of GETS effluent to WS-5. Surface discharge of GETS effluent regulated under an NPDES permit](#) can proceed after securing a Streambed Alteration Agreement with the California Department of Fish and Wildlife.
- GWIM and GETS infrastructure is complete, and permits are in place. Operations will begin after baseline groundwater sampling and system commissioning have are complete. Full operations of the is anticipated to start in September.
- As described above, DOE is actively monitoring the slow water level recovery from pumping wellRS-54 at FSDF in Area IV. DOE is handling and disposing of the extracted groundwater as liquid waste.
- Water levels at SP-890, SP881, and SP-882 are being monitored. If seepage occurs, it is mechanically collected. When GWIM operations begin the seeps will be dewatered through operation of extraction well WS-9A.

#### **GROUNDWATER RFI REPORT**

Working toward a report [format approved by DTSC](#) in January, 2017, Boeing, DOE, and NASA prepared and submitted individual report sections for their specific groundwater characterization activities. The individual report sections were submitted by Boeing on June 2, 2017, DOE on June 15, 2017, and NASA on May 8, 2017. DTSC is reviewing the reports and submitted comments on the DOE section on March 25, 2018. The individual sections will be part of single sitewide report deliverable.

#### **FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY**

DTSC has [conditionally approved](#) the Feasibility Study work plan. Cleanup of sitewide groundwater and surficial media in Boeing areas will be regulated under Chapter 6.5 of Division 20 of the Health and Safety Code (California Hazardous Waste Control Law and the Resource Conservation and Recovery Act authorizations). Soils in DOE and NASA areas will be cleaned up under the respective AOCs, and Soils Remedial Action Implementation Plans (SRAIPs) will be prepared to describe their respective cleanup activities. DTSC has received, and is reviewing Boeing's, DOE's, and NASA's Corrective Measures Studies Work Plan addenda for groundwater and vadose zone bedrock. On June 27, 2018 DTSC sent a letter to the RPs asking for additional information regarding assessments and criteria to be used in the CMS.

### **PUBLIC OUTREACH**

In July 2018, coordination activities for the 45-day public comment period for the [United States Department of Energy Draft RCRA Closure Plans for the Radioactive Materials Handling Facility \(RMHF\) and the Hazardous Waste Management Facility \(HWMF\)](#) (Closure Plans) and supporting documents continued. The Public Comment Period for the Draft Closure Plans is scheduled to begin on Monday, August 13, 2018. Public Notices will be placed in three (3) newspapers: LA Daily News, the Simi Valley Acorn, and the Ventura County Star. In adherence to Title 22, the public will also be noticed by radio. A 60-second media ad will be purchased and aired on KABC Radio. The Community Update announcing the release of the Draft Closure Plans will be mailed to approximately 5,000 households. Hard copies of the Draft Closure Plans and supporting documents will also be available at local Information Repositories.

DTSC also continued our review of comments received regarding the SSFL [draft PEIR](#) and [draft PMP](#). The Office of Public Participation also responded to the public regarding general project inquiries and uploaded seven documents to the Document Library on DTSC's website:

#### **Documents submitted in July 2018**

1. 95 UCLs from 5/9 South Sites
2. Boeing Responses to DTSC Comments on the Draft Standardized Risk Assessment Methodology Work Plan, Revision 3
3. DTSC Cover Letter and Responses to Boeing RTCs on the 5/9 South RFI Report
4. Final White Paper on Thermal Remediation Technologies for Treatment of Chlorinated Solvents
5. Letter from J. Lincoln to M. Bower Re Additional Request for 95 UCL Concentrations for the 5/9 South Subarea Sites
6. Revised Standardized Risk Assessment Methodology Work Plan, Revision 3
7. SSFL Monthly Update - June 2018

### **SSFL ACTIVITIES ANTICIPATED AFTER JULY 2018**

#### **DTSC**

DTSC is compiling comments received on the Draft PEIR and Draft PMP and will generate responses to those comments.

#### **NASA**

- o DTSC will complete review of NASA's February 2017 revision of the Soil Data Summary Report. It is anticipated that our review will conclude late in 2018.
- o NASA will continue demolition and removal of ancillary infrastructure and buildings at the Alfa and Coca sites. NASA does not plan to demolish any historic test stand structures as part of their current program. Demolition activities at SSFL are conducted under the clearance permit requirements of Ventura County

- DTSC will continue to review sections of NASA's May 2017 Remedial Investigation (RI) Report, June 2017 Human Ecological Risk Assessment and February 2018 Sampling and Analysis Plan for groundwater investigations conducted at NASA sites.
- DTSC will complete review of NASA's 2017 Annual Groundwater Monitoring Report (dated February 2018).
- DTSC and NASA will meet to discuss ongoing NASA groundwater CMS planning.

## **DOE**

- DOE will revise and submit the Draft Chemical Data Summary Report.
- DOE and DTSC will continue data evaluation and groundwater discussions.
- DOE will continue GWIM operations, as well as associated data evaluation.
- DTSC will continue to coordinate and meet with the federal and state biologists to discuss state and federal requirements for protection of natural resources at SSFL.
- DTSC will solicit public review and comment on the HWMF and RMHF draft Closure Plans. The draft closure plans will not receive final approval until both DTSC's PEIR and DOE's Environmental Impact Statement (EIS) are completed and certified.

## **BOEING**

### **SURFICIAL MEDIA INVESTIGATION**

- Preparation of the RFI summary reports and Risk Assessments is ongoing for all Boeing sites and subareas. RFI summary reports and risk assessments are being submitted separately. Boeing has submitted all nine Data Summary and Findings Reports for Areas I and III. DTSC anticipates continuing to review the RFI DSFRs in May 2018.
- DTSC is reviewing the responses to comments on the 5/9 South RFI DSFRs.
- DTSC is reviewing the Subarea 10, 5/9 North, 1A South, 1B Southeast, 1B North, 1A North, and 1B Southwest RFI DSFRs.
- DTSC is reviewing responses to comments on the Final Report of Results on the ISCO Field Experiment.
- DTSC is reviewing the report on Laboratory Evaluation of Biostimulation to Treat Chlorinated Ethenes in the Chatsworth Formation.

### **GROUNDWATER**

- Faults
  - DTSC is evaluating the concepts presented in the faults technical memorandum within the context of the draft RI Report.
- Boeing groundwater characterization work in Area IV
  - DTSC is reviewing the draft report submitted in May 2018.
- Groundwater flow model.
  - The groundwater flow model continues to be developed.
- Groundwater Report.
  - DTSC is reviewing the Boeing section of the site-wide Groundwater RFI Report submitted in June 2017.

### **STORMWATER MONITORING AND SAMPLING**

- To comply with Los Angeles Regional Water Quality Control Board requirements, Boeing will monitor flow and collect samples as needed during rain events.

### **FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY (CMS)**

- DTSC is waiting for Boeing, DOE and NASA to provide additional information regarding assessments and criteria to be used in their respective CMSs.

### **SITEWIDE GROUNDWATER**

DTSC is reviewing and commenting on the individual report sections for Boeing's, DOE's and NASA's specific groundwater characterization activities. The individual sections are intended to be part of single sitewide report deliverable that is under development.

### **PUBLIC OUTREACH**

The following Public Participation activities are anticipated in the next 30 days:

- The DTSC SSFL Monthly Update Report for July will be posted online and added to the "What's New" page;
- Coordination and planning activities will continue for the 45-day public comment period for the Draft Closure Plans;
- The 45-day public comment period for the Draft Closure Plans will commence with notification of the public hearings, where to access information, and how to provide public comment; and
- Revisions to the Public Participation Plan will include the outreach process for the [draft PEIR](#) and [draft PMP](#), the April bi-annual meeting, and the draft Closure Plans, next steps, and the outreach strategy moving forward.

### **GENERAL PROJECT SCHEDULE**

The current schedule goal is to finalize the PEIR in 2018 and for all three RPs to have draft cleanup decision documents to DTSC in late 2018 to early 2019. Cleanup activities are currently anticipated to begin in 2019.

The departure from the 2017 schedule presented in the Consent Order and referred to in the AOCs is due to the recognized complexity of the project, including the rugged physical nature of the site, multiple responsible parties, and the need to complete several phases of investigation to define the nature and extent of impacted soils. In addition, as described in Section 4.3 (of the Program Management Plan), during the investigation phases, several cleanup actions were taken.

Project cleanup schedules will be further defined in the remediation planning documents and associated designs, however if soil cleanup begins in early 2019, remediation of all chemically and radiologically impacted soils is anticipated to be completed by the end 2034.

## **2 PROJECT OVERVIEW**

The SSFL is located 30 miles northwest of downtown Los Angeles in southeastern Ventura County, near the crest of the Simi Hills at the western border of the San Fernando Valley. A former rocket engine test and nuclear research facility, the 2,849-acre field laboratory is currently the focus of a comprehensive environmental investigation and cleanup program, conducted by Boeing, DOE and NASA, and overseen by DTSC.



designations. DOE and DTSC participated in Area IV and NBZ co-located soil sampling for chemical contaminants.

DOE completed the chemical soil characterization sampling in 2014. The sampling included three phases, as specified in the December 2010 AOC, signed by DTSC and DOE:

- Phase 1 - co-located sampling for chemical analysis at US EPA's first phase of radiological sampling locations in Area IV and the NBZ.
- Phase 2 - sampling at randomly selected sampling locations, and
- Phase 3 - identify the locations at the Site where insufficient chemical data exists (chemical data gaps) and sample as appropriate.

In 2012, the US EPA, in coordination with DTSC and DOE, completed its second round of sampling efforts to define the nature and extent of radiologic contamination in Area IV.

US EPA's round two sampling locations were based upon the validated sampling results they received from their Round 1 sampling.

Not all of US EPA's Round 2 sample locations were sampled for chemical contaminants in 2012 and chemical data gap investigation locations may have been required where no radiological sampling was needed. In 2013-2014, the rationale and selection of chemical data gap investigation sampling locations for Area IV were provided, discussed with the community, and implemented. The Area IV chemical data gap sampling is now complete. The radionuclide and chemical results from these investigations are being used for remediation planning. A Draft Chemical Data Summary Report was submitted to DTSC on December 29, 2016. DOE Draft Environmental Impact Statement was issued to the public on January 6, 2017.

DOE has completed investigations of groundwater source areas at DOE sites in Area IV, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning. DOE's findings will be presented in a site-wide RCRA Facility Investigation Report, which is anticipated to be submitted in 2018.

## **NASA**

NASA has concluded chemical data gap investigations of soil and surficial media characterization at the 41.7-acre NASA administered portion of Area I (the former LOX Plant), and 404-acre Area II. NASA Area II was used primarily for rocket engine testing and includes the Alfa, Bravo, Coca, former Delta Test Stands and support structures. Under the terms of the December 2010 AOC, NASA implemented six Field Sampling Plans (FSPs) to complete the AOC soil investigations.

The five NASA surficial media FSPs include:

- FSP-1 - Alfa-Bravo Fuel Farm, Coca-Delta Fuel Farm, Propellant Load Facility
- FSP-2 - Incinerator/Ash Pile/STP, Building 204, Storable Propellant Area (SPA), and Skyline Road
- FSP-3 - Alfa Test Stand, Bravo Test Stand
- FSP-4 - LOX Plant, Area II Landfill, ELV
- FSP-5 - Coca Test Stand, former Delta Stand, R2 Ponds

The sampling proposed in the FSPs is complete, and DTSC is reviewing NASA's draft Data Summary Report for soils characterization work in the NASA areas of the site. NASA is conducting extensive investigations of five major groundwater source areas at Area I LOX Plant and Area II, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning.

#### **BOEING**

Boeing owns most of Area I and all of Areas III and IV. Areas I and III total 792 acres and are operated by Boeing. Boeing also owns the 1,143-acre southern buffer zone and 182-acre NBZ. Soils in Area IV and the NBZ are being characterized in the DOE portion of the project.

Boeing sites are in Reporting Groups 1A, 1B, 5, 9 and 10. Boeing has reorganized the sites in subgroups identified as Boeing RFI Groups:

- 1A North, 1A Central, 1A South
- 1B North, 1B Southwest, 1B Southeast
- 5/9 North, 5/9 South, and
- Group 10

The proposed sampling is substantially complete, and Boeing has begun submitting data summary reports for DTSC review.

Boeing is conducting investigations of groundwater source areas at Boeing sites in Area I and Area III, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning.

Additional Information can be found on DTSC's website at:  
[www.dtsc.ca.gov/SiteCleanup/Santa\\_Susana\\_Field\\_Lab](http://www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab)