Santa Susana Field Laboratory
Monthly Status Report
November 2016

This monthly update is to inform the community about Santa Susana Field Laboratory (SSFL) investigation and cleanup activities that occurred in November 2016 as well as those that are planned for December 2016 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.

1 SSFL Activities Completed During NOVEMBER 2016

DTSC

California Environmental Quality Act (CEQA)

DTSC's CEQA contractor, Environmental Science Associates (ESA), is gathering information to develop a Programmatic Environmental Impact Report (PEIR) for the SSFL project. DTSC anticipates DTSC's draft PEIR will be available for public review in late 2016.

Site Wide Air Monitoring Plan

Boeing, DOE and NASA submitted a joint *Baseline Air Monitoring Work Plan* in April 2016 to evaluate baseline concentrations of dust, volatile organic compounds, and radionuclides in the vicinity of SSFL before cleanup activities begin. This data will be used to evaluate what, if any, impacts to air quality are caused by cleanup activities. DTSC is currently reviewing this document, and anticipates providing comments during late 2016.

NASA

Soils:

NASA is preparing revisions to the May 2015 *Draft Data Summary Report*, based on comments provided by DTSC in March and July, 2016. The report summarizes the results of soil samples collected to define the extent of chemical contamination at NASA-administered sites at SSFL. NASA's revised report is anticipated to be submitted for review in late 2016 early 2017.

Groundwater:

NASA is preparing reports for the four major groundwater areas which were investigated between 2013 and 2016, (the Former Liquid Oxygen (LOX) Plant Area, the Expended Launch Vehicle (ELV)-Building 204 Area, and the former Alfa-Bravo and Coca-Delta Test Stand Areas). The results of these investigations will be reported in 2016 or early 2017, and will contribute to the site-wide SSFL Groundwater Remedial Investigation effort.

DEMOLITION:

NASA is performing scoping and contractor selection for planned future demolition activities at non-test stand locations at SSFL Area II. Storm water Pollution Prevention Plan (SWPPP) measures are being maintained and monitored at the active NASA demolition sites. NASA demolition activities at SSFL are conducted under Ventura County authority.

PERMITTING:

In June 2016, NASA submitted a draft post-closure permit renewal application for the Area II Surface Impoundments. DTSC is currently reviewing the Area II Surface Impoundment post-closure permit application for technical adequacy.

The post-closure requirements for the Area II Surface Impoundments are regulated by DTSC under RCRA laws and regulations because the impoundments are former hazardous waste facilities. The required cleanup levels for the impacted soil and groundwater will continue to be dictated by the 2010 AOC.

DOE

SOILS:

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. In coordination with DTSC, DOE completed the Phase 3 Soil Chemical Data Gap Investigation sampling in subareas located throughout Area IV and the Northern Buffer Zone (NBZ).

It is anticipated that The DOE draft Chemical Data Summary Report will likely be submitted in early 2017. The results of the chemical and radionuclide investigations are being used for remediation planning.

SOILS TREATABILITY STUDIES:

The Administrative Order on Consent for Remedial Action (AOC) required the DOE to conduct soil treatability testing to develop data for assessing treatment of soils in place or on-site that could achieve the AOC cleanup goals. Data collected during the soil treatability studies could be used 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 Soils Treatability Investigation Group (STIG) meeting documents and the soil treatability studies study plans, evaluation reports and Summary Report have been uploaded to the DTSC-SSFL DOE Soil Treatability Studies web page.

The Soil Treatability Studies Summary Report (CDM Smith, September 2015), which is also posted on the DTSC-SSFL web site, provides a summary for each of the studies and their findings. The findings from the soil treatability studies are being used for remediation planning.

GROUNDWATER:

The "Final RCRA Facility Investigation (RFI) Groundwater Work Plan, Portion of Area IV under DOE Responsibility" (CDM Smith, November 9, 2015) presents the results and recommendations of DOE's groundwater data gap evaluation with respect to DOE's 2007 Consent Order responsibilities. The Work Plan presents the rationale and approach for data collection to fill identified data gaps for DOE sites in Area IV. The Work Plan also addresses the activities DOE is implementing to answer questions raised by DTSC during review of the site-wide 2009 Groundwater Remedial Investigation Report (MWH, 2009) in terms of seeps, springs, faults, and flow and transport modeling specific to Area IV. The findings from the RFI groundwater investigation will be presented in a future SSFL Groundwater RFI Report. DTSC has reviewed and approved the Final RCRA Facility Investigation (RFI) Groundwater Work Plan, Portions of Area IV under DOE Responsibility.

Field activities conducted per the approved Groundwater RFI Work Plan were completed by August 2016. Following approval from DTSC, DOE conducted additional groundwater sampling of new and select existing groundwater monitoring wells in October 2016 to further evaluate degradation of chlorinated volatile organic compounds in groundwater. Groundwater data collected to date is currently being evaluated, and will ultimately be incorporated into the future SSFL Groundwater RFI Report. In late November 2015, DOE submitted an Implementation Plan from that addresses Groundwater Interim Measures for the impacted groundwater location within the Area IV Former Sodium Disposal Facility (FSDF). The FSDF has been identified as a source area for trichloroethylene (TCE) contamination in groundwater. The scope of work for the Implementation Plan includes aquifer property testing, extended aquifer pumping, treatment of extracted groundwater, and discharge of treated water at the FSDF site. Additionally, the plan proposes treating and discharging the extracted groundwater in Area IV instead of connecting to the Groundwater Interim Measure conveyance and treatment system. DTSC approved the aquifer test portion of the plan (Appendix A), to allow collection of data regarding aquifer properties to further refine the scope of work.

DTSC provided field oversight of work associated with the FSDF GWIM. Information obtained during the field efforts was reviewed and discussed in meetings between DOE and DTSC. Data shows site conditions have changed in the vicinity of FSDF, as water levels have dropped and the shallow well within the perched zone (RS-54) that historically showed elevated concentrations of trichloroethene (TCE) in groundwater is currently dry. The historical presence of elevated concentrations of TCE in well RS-54 was the basis for including the location in the groundwater interim measures. On June 9, 2016, DOE submitted a letter summarizing their findings of this change in conditions at FSDF, and indicated their intent to suspend plans for implementing the interim measure until the perched groundwater is re-saturated and groundwater concentrations rise to levels that warrant interim measure. Because groundwater beneath the FSDF is now deeper, and other nearby monitoring wells do not exhibit elevated concentrations of TCE, DTSC and DOE are evaluating a revised approach to GWIM implementation in Area IV.

DTSC has reviewed and commented on DOE's submittal "Draft White Paper on Thermal Remediation Technologies for Treatment of Chlorinated Solvents". This document was submitted because in-situ thermal remediation has been identified as a potentially applicable remedy to address mass removal of chlorinated solvents and other contaminants of concern in groundwater.

BUILDING DEMOLITION:

The DOE *Standard Operating Procedure for Demolition of Facilities in Area IV* describes DOE's protocols and procedures for demolition decisions of DOE buildings in Area IV. DOE's Area IV demolition activities are conducted under DOE and Ventura County authority.

PERMITTING:

DOE is currently addressing DTSC's comments regarding Hazardous Waste Management Facility (HWMF) and Radioactive Materials Handling Facility (RMHF) closure plans. Once comments are adequately addressed, DTSC will issue a formal public notice and invite public review and comments as well as hold a public meeting to further describe the closure process. The closure plans will not receive final approval until both DTSC's PEIR and DOE's Environmental Impact Statement (EIS) are completed and certified.

Closure of the RMHF and HWMF buildings themselves is regulated by DTSC under RCRA laws and regulations, as both are regulated under the hazardous waste facilities program. The soils beneath the RMHF and HWMF will be investigated and remediated in accordance with the AOC.

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 of the first round work plans were presented to the public, with the first public meeting held on March 13, 2013 and the last held on December 12, 2013. The second round surficial media data gap sampling work plans have all been approved by DTSC. Sampling is now substantially complete. 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
  - DTSC released comments on the draft RFI Data Summary and Findings Reports on August 23, 2016.
- ***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
  - DTSC released comments on the draft RFI Data Summary and Findings Reports on September 12, 2016.

- ***Subarea 5/9 North*** - Silvernale, Engineering Chemistry Laboratory (ECL), and areas not associated with RFI sites in Subarea 5/9 North
    - Data gap sampling is complete.
    - Preparation of the summary reports is ongoing.
- ***Subarea 10*** (Southern Buffer Zone)
    - Data gap sampling is complete.
    - Preparation of the summary report is ongoing.
- ***Subarea 1B Southeast*** – Chemical Test Lab (CTL)-III, Perimeter Pond, and areas not associated with RFI sites in Subarea 1B Southeast.
    - Data gap sampling is complete.
    - Preparation of the summary reports is ongoing.
- ***Subarea 1B North*** - Bowl, R-1 Pond, and areas not associated with RFI sites in Subarea 1B North
    - Data gap sampling is complete.
    - Preparation of the summary reports is ongoing.
- ***Subarea 1B Southwest*** - Area I Burn Pit, CTL-V, and areas not associated with RFI sites in Subarea 1B Southwest
    - Data gap sampling is complete.
    - Preparation of the summary reports is ongoing.
- ***Subarea 1A North*** - B-1, Instrument & Equipment Laboratory (IEL), Area 1 Landfill, and areas not associated with RFI sites in Subarea 1A North
    - Data gap sampling is complete.
    - Preparation of the summary reports is ongoing.
    - 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 *Former Rocketdyne-Atomics International Rifle and Pistol Club Shooting Range Area Investigation Work Plan*, dated August 2016 was approved by DTSC on September 29, 2016.
        - 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 and is on-going.
- ***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
    - Data gap sampling is complete.
    - Preparation of the summary reports is ongoing.

- **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. The changes to the process are to be submitted for DTSC review and approval though an addendum to the Standardized Risk Assessment Methodology (SRAM-2).

GROUNDWATER:

- Faults
  - On November 9 and 10, 2016 , DTSC met with Boeing to discuss the results of the fault evaluation work.
  - On November 18, Boeing submitted a revised draft technical memorandum evaluating faults.
- Additional Studies
  - On November 30 and December 1, 2016, DTSC met with Boeing to discuss the results of groundwater contamination source zone evaluation work in Areas I and Area III.
- Boeing groundwater characterization work in Area IV
  - Seven well were installed by Boeing in Area IV; evaluation of the hydrologic data is ongoing.

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.

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. On May 24, 2016, DTSC conducted a Site Compliance Inspection at the Area I and III Surface Impoundments. A report summarizing the findings of this inspection will be issued in October 2016.

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

Work to fill the source zone data gaps is being addressed in the data gap work plans.

- Data gaps identified in the 2009 Groundwater RI Report by the RPs
  - Field work and sampling to fill data gaps identified in section 10.9.2 of the draft RI Report is complete.
- Source Zone Characterization
  - Source zone characterization work is being conducted by Boeing, DOE and NASA under their respective surficial media characterization programs.
  - Drilling and investigation field work is substantially complete, data evaluation is ongoing.
- Seeps and Springs
  - Installation of the seventeen well clusters for seep characterization is complete. A selection of wells has been added to the groundwater monitoring program.
  - The University of Guelph submitted a report summarizing the seeps investigation to DTSC.
- Faults
  - Characterization and study of faults are being conducted by Boeing, DOE and NASA under their respective groundwater characterization programs.
    - A technical memorandum and the sitewide RFI report for groundwater will present an integrated concept of faults at the site.
- 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 are developing an approach for contaminant transport modeling.

SITEWIDE GROUNDWATER TREATABILITY STUDIES

Treatability studies are being 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 are being conducted:
  - Chemical oxidation using potassium permanganate;
  - Thermal heating of rock core;
    - DOE developed a white paper study of thermal heating of fractured bedrock and submitted it to DTSC in April 2016. DTSC has reviewed and commented on this paper.
  - Microbial characterization of rock core, pore water;
    - Testing is ongoing in university research laboratories.
    - A summary report will be submitted in the fourth quarter of 2016.
  - Bio-Stimulation.
    - On March 14 Boeing presented the preliminary findings of the laboratory studies.
    - Testing is ongoing in university research laboratories.
    - A summary report will be submitted in late 2016.
- Two field studies are being 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 is reviewing the report.
  - Bedrock vapor extraction (BVE)
    - Conducted at NASA's former Bravo test area in late 2014
    - DTSC is reviewing the Technical Memorandum: *Results from Bravo Bedrock Vapor Extraction Treatability Study* (CH2M Hill, November 2015)

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. DTSC completed review of the 2015 Annual Reports for DOE, NASA and Boeing groundwater monitoring activities, and submitted a comment letter on September 16. DTSC is reviewing the 1st and 2nd Quarter 2016 Groundwater Monitoring Reports for NASA and Boeing and DOE.

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. The GETS effluent will be discharge under an NPDES discharge permit from the Los Angeles Regional Water Quality Control Board.

- GWIM and GETS infrastructure is complete and start-up will commence when a permit that allows for continuous discharge is secured.
- Boeing is finalizing discharge requirements with the LARWQCB that will regulate injection of GETS effluent to WS-5. The conditions of the current NPDES permit do not allow for continuous discharge of treated water created by GWIM operations.
- As mentioned above, DTSC and DOE are evaluating a revised approach to GWIM implementation at RS-54A in Area IV.

OPERATION OF WS-9A

WS-9A did not pump in November, 2016. WS-9A, located in the southwest corner of Area II, north of the southern buffer zone, is on a pumping program to lower the groundwater elevation near seep SP-890 with a goal of reducing the amount of Trichloroethene (TCE) contamination in groundwater in the immediate area. When operating, groundwater extracted from WS-9A is pumped to the GETS.

- Except for intermittent testing in December 2012 and January 2013, WS-9A has not been pumping since November 2012.
  - The water levels in the seep areas downstream of WS-9A are being monitored. If seepage occurs, it is mechanically collected.
  - Pumping at WS-9A will resume when the GWIM is restarted. The extraction of water at the well will be optimized to perform the intended function at as low a rate as practical.

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.

PUBLIC OUTREACH

Public Participation activities in November 2016 included:

- 1 document was uploaded to the website.

2 SSFL ACTIVITIES ANTICIPATED DURING DECEMBER 2016

DTSC

- DTSC's contractor will continue work to develop the draft PEIR.
- DTSC will work with sister agencies to review the *Baseline Air Monitoring Work Plan,* submitted jointly by all three responsibly parties.

NASA

- NASA is revising the May 2015 NASA Draft Data Summary Report for soil and soil vapor chemical data collected at the NASA-administered SSFL sites through the end of 2014. NASA's revised report is anticipated to be released in late 2016 or early 2017. DTSC's comments on the draft document were issued on March 21, 2016, and July 25, 2016.
- NASA should commence limited soil sampling around select pipelines, as proposed in the April 6, 2016 *Draft Pipeline Sampling Work Plan,* and approved by DTSC on April 27, 2016. NASA is also anticipated to submit a revised final version of this work plan. NASA will continue maintenance of storm water controls at active demolition sites. Preparations and scoping for the next phases of NASA demolition activities at non-test stand locations will proceed. NASA demolition activities are conducted under Ventura County authority.
- NASA and DTSC will continue to evaluate data from the Area of Impacted Groundwater (AIG) program and prepare the results of the investigation for release later in 2016.
- DTSC plans to release comments on NASA's Bedrock Vapor Extraction Treatability Study for groundwater.

DOE

- DOE and DTSC will continue to evaluate data generated from recent investigation activities.
- DOE's submittal of the draft Chemical Data Summary Report to DTSC is anticipated to occur in early 2017.

BOEING

SURFICIAL MEDIA INVESTIGATION

- Preparation of the RFI summary reports and Risk Assessment is ongoing for all Boeing sites and subareas.
- Field work to investigate soils within the Former Shooting Range is on-going. The field work involves some clearing of brush to make sampling locations accessible. Hand-held equipment is used to monitor soils and soil samples are collected for laboratory analysis.

GROUNDWATER

- Faults
  - DTSC is reviewing Boeing's revised, draft fault technical memorandum that includes the work conducted since the submittal of the 2009 RI Groundwater report.
- Boeing groundwater characterization work in Area IV
  - Evaluation of the hydrologic data for source zones is ongoing.
- Sitewide Groundwater Investigation and Cleanup
  - Each of the responsible parties will continue ongoing data evaluation and development of report sections for the Sitewide Groundwater RFI Report.

STORMWATER MONITORING AND SAMPLING

- Boeing will continue to monitor flow and collect samples as needed during rain events.

ISCO FIELD STUDY

- DTSC is reviewing the summary report.

FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY (CMS)

- Progress on the Corrective Measures Study will proceed when further development of characterization data and screening of remedial technologies are applied to site areas.

PUBLIC OUTREACH

Anticipated Public Participation activities in the next 30 days include:

- DTSC will post this DTSC SSFL Monthly Update Report for November online and add it to the "What's New" page.
- DTSC will invite community members to next public meeting.
- DTSC will distribute a Community Update to keep the community informed on recent developments and what to expect in the next quarter.

3 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.

Boeing owns and operates Area I, with the exception of the approximately 41 acre former Liquid Oxygen (LOX) Plant area, and all of Areas III and IV. Areas I and III are operated by Boeing. Boeing also owns the approximately 1,143 acre southern buffer zone and 182 acre NBZ. NASA is responsible for cleanup and administration of Area II and the former LOX Plant, but it is owned by the federal government. Boeing owns and operates Area IV but DOE is responsible for cleanup of soils in Area IV and the NBZ.

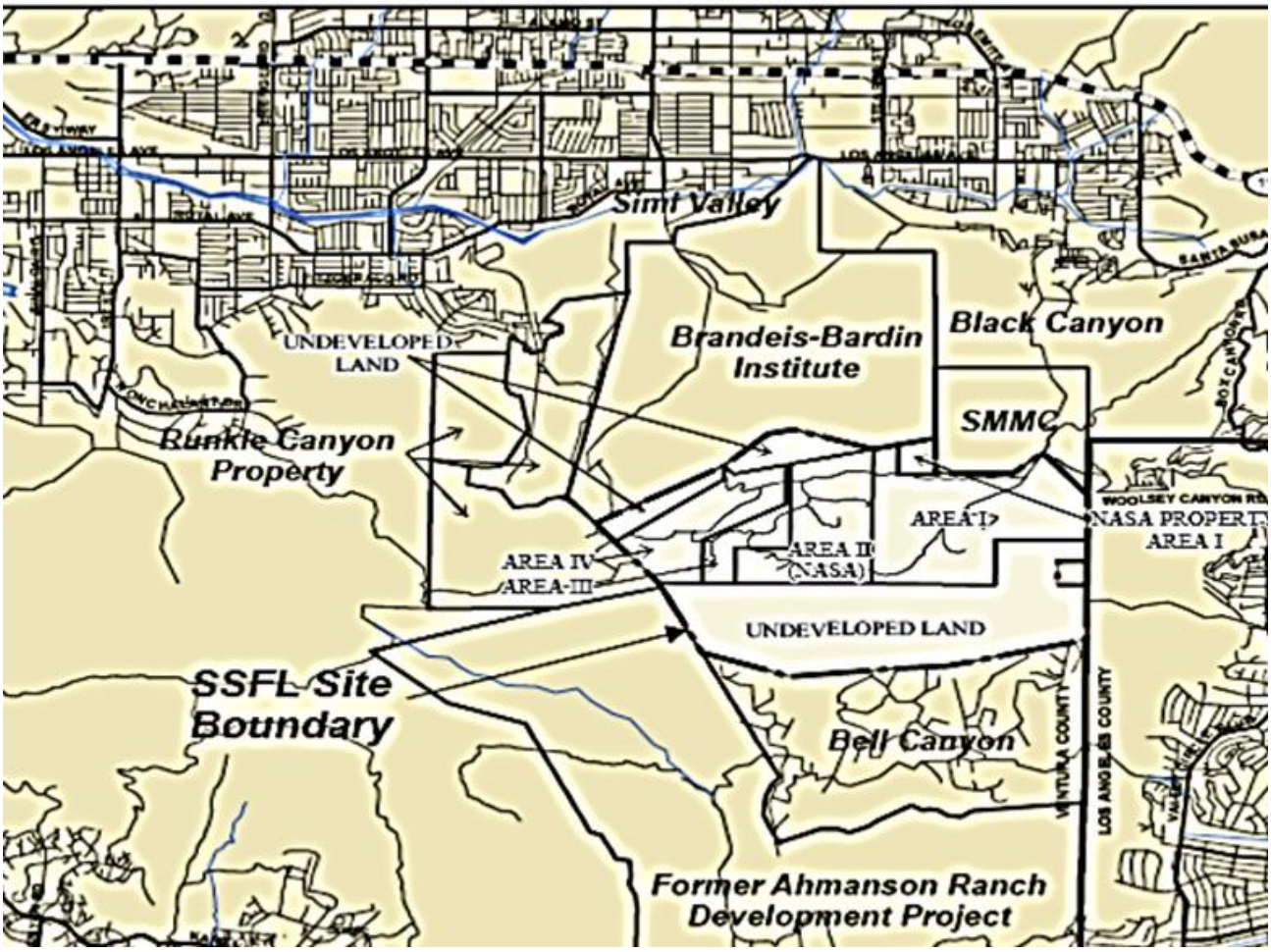

Figure 1 – SSFL and Surrounding Area

DOE

DTSC and DOE participated in chemical soil sampling efforts in Area IV of the SSFL property where former DOE activities occurred on the Site. Area IV is a 290-acre area located in the northwestern section of the site. DOE owns facilities on a 90-acre site within Area IV. Area IV includes the Energy Technology Engineering Center (ETEC) facility where nuclear research, development, and testing began in the 1950's.

The Area IV radiological soil sampling effort, conducted by the US EPA, was completed in 2012. The US EPA approached the investigation by splitting the Area IV and NBZ investigation into historical site assessment (HSA) subareas. The chemical soil sampling efforts followed the same HSA subarea 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 Phase 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 Chemical Data Summary Report is currently being prepared and is anticipated to be submitted in early 2017.

DOE has nearly completed conducting 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.

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 Ill 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 continues to investigate and characterize soils in Area I, Area III, and the southern buffer zone. Since 2013, Boeing has been implementing work plans and work plan addenda prepared to address data gaps identified in the RFI Reports submitted to date. DTSC anticipates these activities will complete the soil characterization of the Boeing sites in 2016.

Boeing sites are located 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