Appendix A
Program Management Plan

ESA

Draft
SSFL Program Management Plan

August 2017

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REVISION HISTORY

This Program Management Plan (Plan) is a living document. The table below presents a record of changes.

Revision Number	Effective Date	Sections Affected	Description
0	TBD	All	Baseline Document

List of Acronyms

AIG	Area of Impacted Groundwater
AIP	Agreement in Principle
AOC	2010 Administrative Orders on Consent
BMP	Best Management Practice
Boeing	The Boeing Company
CDFW	California Department of Fish and Wildlife
CAO	Cleanup and Abatement Order
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFOU	Chatsworth Formation Operable Unit
CMI	Corrective Measures Implementation
CMI WP	Corrective Measures Implementation Work Plan
CMS	Corrective Measures Study
Consent Order	2007 Consent Order for Corrective Action
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DSFR	Data Summary and Findings Report
DSR	Data Summary Report
DTSC	Department of Toxic Substances Control
EcoRA	Ecological Risk Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELV	Expendable Launch Vehicle
FSDF	Former Sodium Disposal Facility
FS Work Plan	Feasibility Study Work Plan
GETS	Groundwater Extraction Treatment System
GWIM	Groundwater Interim Measures
HHRA	Human Health Risk Assessments
HWMF	Hazardous Waste Management Facility
ISCO	In-Situ Chemical Oxidation
ISE/RA	Imminent and Substantial Endangerment Determination/Remedial Action
ISRA	Interim Source Removal Action
LARWQCB	Los Angeles Regional Water Quality Control Board
LOX	Liquid Oxygen
LUT	Look-up Table
MMRP	Mitigation Monitoring and Reporting Program
NAC	Native American Council
NASA	National Aeronautics and Space Administration
NBZ	Northern Buffer Zone
NEPA	National Environmental Policy Act

List of Acronyms (Continued)

NOA	Notice of Availability
NOD	Notice of Determination
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
OPR	Office of Planning and Research
PAH	Polycyclic Aromatic Hydrocarbons
PEIR	Program Environmental Impact Report
ppb	Parts per Billion
PRA	Preliminary Remediation Areas
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RMHF	Radioactive Materials Handling Facility
ROD	Record of Decision
SAA	Streambed Alteration Agreement
SHPO	State Historic Preservation Officer
SMOU	Surficial Media Operable Unit
SOP	Standard Operating Procedures
SRAIP	Soils Remedial Action Implementation Plan
SRAM	Standardized Risk Assessment Methodology
SSFL	Santa Susana Field Laboratory
SVE	Soil Vapor Extraction
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethene
TTF	Thermal Treatment Facility
US EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Services
VOC	Volatile Organic Compound
WQSAP	Water Quality Sampling and Analysis Plan

1 INTRODUCTION

The California Environmental Protection Agency (Cal EPA), Department of Toxic Substances Control (DTSC) has prepared this Program Management Plan (Plan) as a framework to describe investigation and cleanup decisions at the Santa Susana Field Laboratory (SSFL). This Plan describes how the cleanup will be undertaken in accordance with Chapters 6.5 and 6.8 of the California Health and Safety Code as further described in the individual cleanup orders described below. DTSC will determine the final framework after reviewing and considering all public comments submitted during the public comment period for this Plan as part of DTSC's California Environmental Quality Act (CEQA) process. Subsequent decision documents, which will include individual public comment periods, will be prepared consistent with the framework included herein for each discreet cleanup project at SSFL.

This Plan is intended to assist DTSC, the SSFL Responsible Parties (The Boeing Company [Boeing], National Aeronautics and Space Administration [NASA], U.S. Department of Energy [DOE]) and the community in understanding the coordination and scheduling of the various aspects of the SSFL cleanup documentation process, much of which is predicated on completion of the CEQA document in advance of the more specific remediation planning documents.

This Plan will also serve as a roadmap to aid DTSC and the SSFL Responsible Parties in completing cleanup at SSFL. Additionally, this Plan will serve as a tool to assist in managing the complex nature of the project including different soils cleanup goals, independent Responsible Party schedules and multiple regulatory agency involvement at the Site. As such, this Plan will be a living document that will be updated annually to allow incorporation of the best information available, especially as it relates to schedule and the roles of supporting agencies. A record of revisions is included after the table of contents.

As lead agency, DTSC will ensure that remedial and corrective action activities for SSFL are completed in accordance with applicable laws and regulations, the 2007 Consent Order for Corrective Action (Consent Order) (DTSC, 2007a), and the 2010 Administrative Orders on Consent (AOCs) (DTSC, 2010b), (DTSC, 2010c).

This Plan is organized into the following sections:

- Introduction - Describes the purpose of the document, presents a brief description of the Site and of regulatory environment.
- Process - Provides an overview of the regulatory processes.
- Work conducted under the AOCs – Describes the DOE and NASA SSFL soil investigation and cleanup efforts.
- Resource Conservation and Recovery Act (RCRA) Corrective Action process for surficial media. - Describes the Boeing soil investigation and cleanup efforts, and the DOE and NASA SSFL investigation and cleanup efforts not covered by the AOCs.
- RCRA Corrective Action process for groundwater - Describes the groundwater investigation and cleanup efforts by Boeing, DOE and NASA.

- RCRA Permitted Facilities - Describes the SSFL permitted facilities and associated investigation and cleanup work.
- Non RCRA-Permitted Demolition - Describes the SSFL demolition activities that are not regulated under RCRA Corrective Action authority.
- California Environmental Quality Act - Discusses the environmental review process.
- Supporting Agency Role and Responsibilities – Identifies the roles and responsibilities of Federal, State and Local departments and agencies at SSFL.
- Public Participation – Provides an overview of DTSC's SSFL public participation program.
- Cleanup Implementation Schedule – Provides an anticipated schedule of the SSFL Responsible Party cleanup activities.
- Works Cited – References to documents cited in this Plan.

1.1 SITE DESCRIPTION

SSFL (Site) is an approximately 2,850-acre property located approximately 30 miles northwest of downtown Los Angeles, California, in the southeast corner of Ventura County.

Activities at SSFL have ranged from rocket engine testing to research and development of fuels and propellants, nuclear power and lasers.

SSFL is divided into four administrative areas (I through IV) based on ownership and operations and includes undeveloped land areas to the north and south. Within the Site, there are areas (referred to as sites in this Plan) where chemicals were used and their release contaminated the soils, bedrock, surface water and/or groundwater. The three Responsible Parties are Boeing, NASA, and DOE.

- Boeing owns most of Area I, all of Areas III and IV, the Southern Buffer Zone (SBZ), and the Northern Buffer Zone (NBZ). Boeing administers Area I (excluding the NASA portion of Area I), all of Area III, and the southern buffer zone (total of 1,935 acres). Boeing is responsible for the soil and groundwater cleanup in Area I (excluding the NASA portion of Area I) and Area III and some groundwater in Area IV.
- Area IV (290 acres) includes a 90-acre section with facilities owned by DOE, and is bounded to the north by the NBZ (182 acres). DOE is responsible for cleaning up soil in Area IV and the NBZ. Both Boeing and DOE have groundwater cleanup responsibilities in Area IV.
- A portion of Area I (42 acres) and all of Area II (404 acres) are owned by the federal government. NASA administers the property and is responsible for soil and groundwater cleanup.

Figure 1 presents the Site boundaries and surrounding vicinity. Figures 2 through 4 present each administrative area.

1.2 REGULATORY ENVIRONMENT

In 2007 DTSC, NASA, DOE, and Boeing entered into a Consent Order (DTSC, 2007a), that identified RCRA Corrective Action requirements for SSFL. The Consent Order organizes the Site into two Operable Units:

- Surficial Media Operable Unit (SMOU): saturated and unsaturated soil, sediment, surface water, near-surface groundwater, air, biota, and weathered bedrock.
- Chatsworth Formation Operable Unit (CFOU): saturated and unsaturated unweathered (competent) bedrock of the Chatsworth Formation.

In 2010, DOE and NASA entered into separate but similar AOCs for Remedial Action (DTSC, 2010b), (DTSC, 2010c), with DTSC that govern characterization and remedial action activities for soils in their respective portions of SSFL.

Attachment 5 of the Consent Order identifies 50[1] sites containing 106 Solid Waste Management Units and Areas of Concern. Two additional sites were added in Area I during site characterization. Soils in 21 sites in Area I and Area III will be cleaned up by Boeing under the regulatory authority of the Consent Order. The remaining 31 sites (NASA's liquid oxygen (LOX) site in Area I, 15 sites in Area II and DOE's 15 sites in Area IV) will be cleaned up under the respective NASA and DOE AOCs. Additionally, Boeing will be cleaning up the former Rocketdyne Employee Shooting Range in Area I and the adjacent property.

[1] During the characterization phase, two sites were added in Area I: Happy Valley was divided into two sites and the Area I Burn Pit was added as a site.

The table below presents the regulatory authorities assigned to the cleanup of contaminated media at SSFL.

Media	Regulatory Authority for	
	Boeing Areas	**DOE, NASA Areas**
Surficial Media Operable Unit (SMOU)		
weathered bedrock	Consent Order	AOCs[2]
saturated and unsaturated soil	Consent Order	AOCs[2]
Sediment	Consent Order	AOCs
surface water	Consent Order	Consent Order
near-surface groundwater	Consent Order	Consent Order
Air	Consent Order	Consent Order
biota	Consent Order	Consent Order
Chatsworth Formation Operable Unit (CFOU)		
saturated unweathered bedrock	Consent Order	Consent Order
unsaturated unweathered bedrock	Consent Order	Consent Order
Additional media included in AOCs		
Debris[1]		AOCs
Structures[1]		AOCs
other anthropogenic materials[1]		AOCs

Notes:

1. Additional media shown are included in the AOCs, not in the Consent Order.
2. The AOCs state that the cleanup of soils does not include the cleanup of volatile organic compounds (VOCs) that emanate from groundwater contaminated with volatile organic contaminants that migrate into and through the saturated and unsaturated soil and bedrock at the Site.

In addition to the corrective action requirement for the cleanup of the environmental media described above, the Responsible Parties are also owners and/or operators of multiple RCRA permitted hazardous waste management units. The RCRA Permits and Interim Status Authorizations are listed in Attachment 2 of the Consent Order, the surface impoundments included in the Boeing and NASA RCRA Permits are listed in Attachment 3 of the Consent Order, and a summary of the permit information is presented below:

Boeing holds a post closure permit addressing five surface impoundments in Areas I and III and the Thermal Treatment Facility (Permit Number: PC-94/95-3-02), U.S. EPA 1.0. Number: CAD093365435).

NASA holds a post closure permit addressing four surface impoundments in Area II (Permit Number: PC-94/95-3-03, U.S. EPA 1.0. Number: CAD1800090010).

DOE owns two sites in Area IV undergoing closure:

- The Hazardous Waste Management Facility (HWMF) (Permit Number:

  93-3-TS-002),
  U.S. EPA 1.0. Number: CAD000629972); and

- The Radioactive Materials Handling Facility (RMHF) (Interim Status Document

  U.S. EPA 1.0. Number: CA3890090001).

The project's potential environmental impacts are evaluated under CEQA in a Program Environmental Impact Report (PEIR). The PEIR focuses primarily on environmental effects that will result from the project, considering all phases of the project including planning, construction, and operation. Project-specific analyses are evaluated to the extent possible in the PEIR. The PEIR is discussed in more detail in Section 8.

2 REGULATORY PROCESS

The Consent Order and the AOCs outline the SSFL investigation and cleanup requirements.

- All Boeing media is regulated under the Consent Order.
- DOE and NASA soils[2] are regulated under the AOCs.
- All other media in DOE and NASA areas are regulated under the Consent Order.

Regulated Units are subject to the unit's RCRA permit/interim status authorizations, or post-closure permit. As described above, Boeing holds a post closure permit addressing five surface impoundments in Areas I and III and for the Thermal Treatment Facility, NASA holds a post closure permit addressing four surface impoundments in Area II, and DOE owns two sites in Area IV undergoing closure. Cleanup levels for Regulated Units are developed using the cleanup criteria for the property on which the regulated unit is located. Thus, the Consent Order dictates soil cleanup criteria for Boeing's Regulated Units, and the AOCs dictate soil cleanup criteria for Regulated Units administered by NASA and DOE in Areas II and IV. Cleanup criteria for groundwater at all Regulated Units are regulated under the Consent Order.

Figure 5 includes a process flow chart that illustrates the required documents under the cleanup and permitting process, including CEQA and this Plan.

2.1 ADMINISTRATIVE ORDERS ON CONSENT - DOE AND NASA SOILS

DOE and NASA soils (including backfill), are regulated under their respective AOCs, and are subject to those agreements which are consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and RCRA requirements. Cleanup levels are based on the Draft Provisional Look-Up Table (LUT) concentrations (DTSC, 2013a), (DTSC, 2013e). The LUTs were developed based on chemical and radiological background studies conducted near the Site, at locations representative of natural background conditions not impacted by Site operations. By agreement, risk assessments are not required to implement the AOCs for soils in Areas II and Area IV.

Soils Remedial Action Implementation Plans (SRAIPs) are the AOC cleanup decision documents and serve as the requirement for Corrective Measures Study (CMS), Statements of Basis, Corrective Measures Implementation (CMI), and Soil Confirmation Sampling Plan documents for soils in Areas II and IV. The chemical LUT values and draft provisional radiological LUT values will be presented in the respective draft SRAIPs. Draft SRAIPs will be made available for public comment.

The AOCs set the remediation goal as: "The cleanup of soils at the Site shall result in the end state of the Site after cleanup to be consistent with 'background.' That is, at the completion of the cleanup, no contaminants shall remain in the soil above local background levels, with the

2 Per the AOCs "Soils" shall mean saturated and unsaturated soil, sediment, and weathered bedrock, debris, structures, and other anthropogenic materials. "Soils" does not include unweathered bedrock, surface water, groundwater, air, or biota.

exception of the exercise of the exemptions that are specifically expressed in the Agreement in Principle (AIP)" (DTSC, 2010b), (DTSC, 2010c).

2.1.1 DOE

The AOC investigation and cleanup process for DOE includes the following steps:

- Radiological Investigation
- Chemical Investigation
    - Phase 1 – Co-located Samples
    - Phase 2 - Co-located Samples from Random Locations
    - Phase 3 – Chemical Data Gap Investigation
- Treatability Studies
- Radiological Summary Report
- Chemical Data Summary Report
- Building Demolition
- SRAIP and
- Implementation of Remedial Action (design, implementation, operations and maintenance, and monitoring).

2.1.2 NASA

The AOC investigation and cleanup process for NASA includes the following steps:

- Remedial Investigation
- Treatability Studies
- Building Demolition
- Chemical and Radiological Data Summary Reports
- SRAIP, and
- Implementation of Remedial Action (design, implementation, operations and maintenance, and monitoring).

2.2 RCRA CORRECTION ACTION PROCESS FOR SURFICIAL MEDIA

Media covered by the Consent Order will be regulated pursuant to Section 25187 of the Health and Safety Code following the RCRA corrective action process. As presented above, all media for Boeing areas of responsibility are regulated through the RCRA corrective action process under the Consent Order. All media in NASA and DOE areas not regulated under the respective AOCs are regulated through the RCRA corrective action process under the Consent Order.

The RCRA corrective action process includes the following steps:

- RCRA Facility Assessment
  - Identification of hazards
- RCRA Facility Investigation (including human health and ecological risk assessment)
  - Work Plan
  - Facility Characterization
  - Risk Assessment
  - Treatability Studies
- Corrective Measures Studies
  - Development and Screening of Alternatives
  - Detailed Analysis of Remedies
  - Public Notification of Proposed Remedy
- Statement of Basis
  - Present Proposed Remedy
  - Present Discussion of Remedial Alternatives
  - Indicate Cleanup Levels or Goals
  - Public Comment Period
  - Public Meeting
- Finalize Remedy Selection
  - DTSC Responds to Comments on Proposed Remedy
  - DTSC Identifies Selected Remedy
- Corrective Measures Implementation
  - Remedial Design
  - Remedial Construction
- Operations and Maintenance
- Remedy Completion

2.3 RCRA Correction Action Process - Saturated and Unsaturated Unweathered Bedrock

Saturated and unsaturated unweathered bedrock are covered by the Consent Order and will be regulated pursuant to Section 25187 of the Health and Safety Code following the RCRA corrective action process. As presented above, the Chatsworth Formation Operable Unit is regulated through the RCRA corrective action process under the Consent Order. The RCRA corrective action process is described in Section 2.2, above.

2.4 Additional Project Elements to be Considered during the Project

- RCRA permitted facilities;
- Demolition and debris waste management, non-RCRA structures and infrastructure;
- CEQA and National Environmental Protection Act (NEPA) (see below);
- Other authorities and supporting agencies;
- Public Participation.

2.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The selection and approval of final remedial and corrective actions to remediate the contaminants is a DTSC discretionary decision. The cleanup activities may result in direct or indirect effects on the physical environment. When state agencies make discretional cleanup decisions, the project is subject to environmental analysis under CEQA. CEQA is a law that requires public agencies to evaluate and disclose potential impacts to the environment that may occur as a result of project implementation.

Under CEQA, an Environmental Impact Report (EIR) must be prepared if there is substantial evidence that significant effects may occur. An EIR is an informational document intended to inform regulatory agency decision makers and the public of the significant environmental effects of a project, and the possible ways to avoid, mitigate or reduce significant effects. The EIR also presents alternatives to the proposed project that could feasibly attain most of the basic objectives of the project, while avoiding or substantially reducing significant environmental impacts.

CEQA authorizes lead agencies to prepare a program-level analysis for approval of a series of actions that are related geographically or as part of a suite of activities (Title 14, California Code of Regulations [*CEQA Guidelines*], Section 15168). By contrast, a project-level analysis evaluates a specific discretionary action that may result in significant environmental effects (*CEQA Guidelines*, Section 15161).

CEQA Guidelines, Section 15168(a), define a Program EIR as an EIR prepared for a series of actions that can be characterized as one large project and are related either:

- Geographically,
- As logical parts in the chain of contemplated actions,
- In connection with rules, regulations, plans, or other general criteria to govern the conduct of a continuing program,
- As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.

The PEIR provides a program-level analysis of the various conceptual remediation technologies and corrective actions to be employed at the project sites in order to remediate impacted groundwater and soil. The PEIR can also consider project-specific elements that have been prepared to the extent that information is available regarding the remediation approach and available technologies.

Separate evaluations of project-specific actions can then be compared to the PEIR to confirm the adequacy of the PEIR in addressing the project-specific actions (e.g., did the PEIR adequately address the volume estimates and truck routes that will be used by the project-specific action). If the project-specific action is covered under the PEIR, then no further CEQA evaluation is

required. If the project-specific action is not covered by the PEIR, then a project-specific CEQA evaluation document, or a PEIR supplement or addendum will likely be required.

The EIR process begins with a Notice of Preparation (NOP) which is used to inform the public, responsible agencies, trustee agencies, and the Office of Planning and Research (OPR) that an EIR will be prepared for a given project. The NOP includes both project description details and likely environmental effects so that other public agencies, resource trustees and communities can provide meaningful comments on the proposed project.

When the lead agency's Draft EIR is ready for public release, the Draft EIR is submitted to OPR. At the same time, the lead agency provides public notice of the Draft EIR. The public notice must include the location of any public meetings intended to solicit comments on the Draft EIR as well as the dates of the public comment period. The public comment period must be a minimum of 45 days if the Draft EIR is circulated through the State Clearinghouse.

After the close of the public comment period, the lead agency develops responses to any public comments which have been received. The responses to the Draft EIR comments are included in the Final EIR, either as changes to the Draft EIR, or as a separate section in the Final EIR. The CEQA regulations state that the lead agency shall prepare a Final EIR before approving the project. The lead agency can then certify the Final EIR and make written findings and rationale for each significant effect of the project.

CEQA requires the lead agency to balance, as applicable, the economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of a proposed project against its unavoidable environmental risks when determining whether to approve the project. If significant and unavoidable impacts remain after mitigation, a statement of overriding considerations must be prepared and supported by substantial evidence.

Finally, the lead agency must file a Notice of Determination (NOD) with OPR within five days of deciding to approve the project.

Additional discussion on the SSFL-specific PEIR can be found in Section 8.

2.6 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

DOE and NASA are federal agencies and are required to comply with NEPA for the cleanup of their respective areas of responsibility within the Site. NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions.

Federal agencies prepare an Environmental Impact Statement (EIS) if a proposed major federal action is determined to significantly affect the quality of the human environment.

To start the process, the federal agency publishes a Notice of Intent in the Federal Register. The Notice of Intent informs the public of the upcoming environmental analysis and describes how the public can become involved in the EIS preparation.

This Notice of Intent starts the scoping process, which is the period in which the federal agency and the public collaborate to define the range of issues and possible alternatives to be addressed in the EIS.

A Draft EIS is published for public review and comment for a minimum of 45 days. Upon closure of the comment period, agencies consider all substantive comments and, if necessary, conduct further analyses.

A Final EIS, which provides responses to substantive comments, is then published. Publication of the Final EIS begins the minimum 30-day "wait period," in which agencies are generally required to wait before making a final decision on a proposed action.

Federal agencies publish a Notice of Availability in the Federal Register, announcing the availability of both the Draft and Final EISs to the public. Public comments or summaries of the comments made on the Draft EIS must be attached.

The EIS process ends with the issuance of the Record of Decision (ROD). The ROD:

- Explains the agency's decision,
- Describes the alternatives the agency considered, and
- Discusses the agency's plans for mitigation and monitoring, if necessary.

The SSFL cleanup project is subject to CEQA, regardless of the information in the NEPA documents. DTSC retains primary and ultimate approval authority for the NASA and DOE SSFL cleanup projects.

3 WORK CONDUCTED UNDER THE AOCS

The AOC project elements for DOE and NASA soils are described below. The AOCs set the remediation goals for the DOE and NASA portions of the Site as: "The cleanup of soils at the Site shall result in the end state of the Site after cleanup to be consistent with 'background.' That is, at the completion of the cleanup, no contaminants shall remain in the soil above local background levels, with the exception of the exercise of the exemptions that are specifically expressed in the Agreement in Principle (AIP)" (DTSC, 2010b) (DTSC, 2010c).

Soils are defined as saturated and unsaturated soils, sediment, and weathered bedrock, debris, structures, and other anthropogenic materials. "Soils" does not include surface water, groundwater, air or biota. Similarly, soils do not include buildings, structures or other above ground infrastructure slated to be removed by DOE or NASA as part of their demolition activities.

Data collected during characterization was evaluated against the Chemical LUT (DTSC, 2013e) and the Draft Provisional Radiological LUT (DTSC, 2013a) to identify and address data gaps and remediation planning.

3.1 DOE AOC WORK

DOE's cleanup of soils in Area IV at SSFL shall result in the end state after cleanup being consistent with "background" (i.e., at the completion of the cleanup, no contaminants shall remain in the soil above local background concentrations) with specific exceptions to accommodate: (1) natural resources including protected species or habitat protected under the Endangered Species Act, (2) laboratory detection limits that exceed background levels, (3) cultural resources, and (4) technological limitations. The exception for technological limitations is limited to five percent of the total soil volume cleanup as defined in the DOE AOC. Final estimated cleanup volumes will be presented in DOE's project SRAIPs.

3.1.1 AREAS AND SITES

In accordance with the AOC, the U.S. Environmental Protection Agency (US EPA) conducted the radiological characterization for Area IV and NBZ. The US EPA subdivided Area IV into 10 RFI subareas (3, 5A, 5B, 5C, 5D North, 5D South, 6, 7, 8 North, 8 South, and NBZ) for the radiological characterization study. These subarea designations were also used when DOE conducted the investigation for chemicals in soils.

3.1.2 CHARACTERIZATION WORK

Prior to the Site AOC related investigation work, US EPA and DTSC conducted radiological and chemical background studies, respectively, to define "background" levels at the Site. Based on these studies, LUTs were developed. A Draft Provisional Radiological LUT was published in January 2013 (DTSC, 2013a) and the Chemical LUT (DTSC, 2013e) was published in June 2013. The final radiological LUT is pending procurement of an analytical laboratory to support radiological cleanup efforts, and the chemical LUT will be presented in the SRAIPs.

DOE conducted the soils characterization work for its areas of the Site (Area IV and the NBZ) in accordance with the AOC. Figure 3 illustrates the DOE subareas while Table 2 summarizes DOE's subareas shown as Historical Site Assessment subareas and sites. As part of the radiological characterization study, the US EPA collected surface and subsurface soil samples throughout Area IV and the NBZ. US EPA's "*Final Radiological Characterization of Soils Area IV and the Northern Buffer Zone*" will serve as the Data Summary Report (DSR) for radionuclides in Area IV and NBZ soils (HydroGeologic, Inc., 2012b).

The Master Work Plan / Field Sampling and Analysis Plan Co-Located Chemical Sampling at Area IV (CDM Smith, 2011), (DTSC, 2010a) and subsequent addenda to address individual Subareas and Phase 2 random sampling were prepared for characterization of chemical contaminants in Area IV and NBZ soils.

Based on the results of those studies the "*Work Plan for Chemical Data Gap Investigation Phase 3 Chemical Sampling at Area IV*" (CDM Smith, 2012), (DTSC, 2012d) was prepared to address identified data gaps and confirm the nature and extent of contamination for cleanup remedy evaluation.

On December 29, 2016, DOE submitted a Draft Chemical Data Summary Report (DSR) (CDM Smith, 2017). The AOC required submittal of this document to summarize the entirety of the chemical data collection efforts and define the vertical and horizontal extent of contamination above background for Area IV.

3.1.3 TREATABILITY STUDIES

Under the AOCs, both NASA and DOE are required to conduct soil treatability studies for any treatment technologies or methods they considered using in order to achieve the LUT cleanup levels. These studies were implemented during the latter part of their respective investigations.

DOE conducted five soil treatability studies under the AOC to evaluate onsite treatment for achieving soil cleanup goals:

- Soil Partitioning (Matsumoto, 2015),
- Mercury Valence State Determination (Liu, 2015),
- Bioremediation (Nelson, Y. M., Billings, M., Croyle, K., Kitts, C., & Hamrick, A. C., 2015),
- Phytoremediation (Nelson, Y. M., Poltorak, M., Curto, M., Waldburger, P., Koivunen, A., & and Dowd, D. C., 2015), and
- Natural Attenuation (Nelson, Y. M., Croyle, K., Billings, M., Caughey, A., Poltorak, M., Donald, A., & and Johnson, N. C., 2014) and (Nelson, Y. M., Croyle, K., Billings, M., & and Poltorak, M. C., 2015).

In addition, DOE contracted to assess the chemical constituents in total petroleum hydrocarbons, as well as the difficulties and possible ways to improve the accuracy of measuring TPH at low levels.

- Characterization of Residual Fuel Hydrocarbons (Nelson, Y. M., Cronin, S., Cochran, K., & Varni, A. C., 2015).

Study Reports for each of the six studies and the overarching Soil Treatability Study Summary Report (CDM Smith, 2015a) were provided to DTSC for review; however, they are not subject to DTSC-approval requirements per the AOC.

3.1.4 SOILS REMEDIAL ACTION IMPLEMENTATION PLAN

Following DTSC approval of the DSR, DOE will prepare a draft DOE First Project SRAIP. The DOE First Project SRAIP will describe the excavation of radiologically impacted soils (e.g., exceeds local background) and the contiguous areas of the most chemically contaminated soils (e.g., exceeds respective risk-based screening levels). DOE has elected to remove these soils first as part of their overall site cleanup.

After DTSC review and comment, the draft SRAIP will be made available for public comment. After considering and addressing public comments, DTSC will approve the SRAIP for implementation.

DOE will develop a subsequent draft SRAIP to describe the remaining Area IV chemical cleanup of impacted soils for DTSC review, public comment, and approval as described above.

3.1.5 BUILDING DEMOLITION

Per the AOC, after receiving relief from the legal judgement that has delayed DOE from completing building demolition, DOE will submit to DTSC for review and approval, a demolition plan, demolition schedule and detailed procedures that describe DOE's activities to sample and characterize the remaining DOE buildings in Area IV. DOE has indicated that debris related to buildings with a history of radionuclide use will be sent to a low-level radioactive waste or mixed low-level radioactive waste disposal facility.

3.1.6 CORRECTIVE MEASURES IMPLEMENTATION

DOE may conduct soil vapor extraction (SVE) work ahead of soil excavation for soils with multiple contaminants including VOCs. That way, the ex-situ handling of soil will have lower VOC emissions, resulting in lower impacts to air quality and reducing workers' potential exposure.

The excavation process will consist of the excavation and stockpiling of impacted soils. Dust mitigation measures (e.g., wetting during excavation, tarping soil piles, etc.) will be applied to minimize potential dust emissions. After confirmation sampling confirms that the impacted soils have been removed, the excavated areas will be backfilled from surrounding non-impacted soils, supplemented with clean backfill. After waste characterization and manifesting of the stockpiled soils, contaminated soils will be placed in labeled U.S. Department of Transportation (DOT)-approved, 20 cubic yard transport bins or other DOT-approved containers for disposal at an appropriate landfill.

3.2 NASA AOC WORK

NASA's soil cleanup in Area II and the LOX site at SSFL shall result in the end state after cleanup being consistent with "background" (i.e., at the completion of the cleanup, no contaminants shall remain in the soil above local background concentrations) with specific exceptions to accommodate: (1) natural resources including protected species or habitat protected under the Endangered Species Act, (2) laboratory detection limits that exceed background levels, (3) cultural resources, and (4) technological limitations. The exception for technological limitations is limited to five percent of the total soil volume cleanup as defined in the NASA AOC. Final estimated cleanup volumes will be presented in NASA's SRAIPs.

3.2.1 CHARACTERIZATION WORK

NASA has completed the soil investigation for its areas of the Site (Area II and LOX in Area I) in accordance with the AOC. Sampling results from investigations collected prior to the AOC were used to generate preliminary remediation areas (PRAs). Figure 4 illustrates the PRAs and Table 3 summarizes the PRAs. To address the AOC requirements, sampling to fill data gaps was documented in six field sampling plans (FSP-1 through FSP-6) (NASA, 2011b), (NASA, 2011c), (NASA, 2012a), (NASA, 2012b), (NASA, 2012c), (NASA, 2013g) that were approved by DTSC (DTSC, 2011e), (DTSC, 2012a), (DTSC, 2012b), (DTSC, 2012c), (DTSC, 2012e), (DTSC, 2014a).

NASA submitted a revised *Soil Data Summary Report* to DTSC on February 22, 2017 (NASA, 2017). This document is a revision to an earlier draft document (NASA, 2015a) that was reviewed and commented on by DTSC in both March and July, 2016.

3.2.2 TREATABILITY STUDIES

Under the AOC, NASA evaluated a series of treatment technologies for remediation of contaminated soils. (NASA, 2016a). This evaluation included:

- An evaluation of land-farming for petroleum and semi-volatile organic compound contamination;
- Bench scale tests for Soil Washing and Thermal Desorption technologies; and,
- Field testing of Bioventing with Oxidation, In-situ Chemical Oxidation, and SVE.

In addition, NASA conducted a large-scale bedrock vapor extraction treatability study in 2015 as part of the CFOU/groundwater program (NASA, 2015b).

3.2.3 SOILS REMEDIAL ACTION IMPLEMENTATION PLAN

Following DTSC approval of the DSR, NASA will prepare a NASA First Project draft SRAIP that will describe the remediation plan for chemically impacted soils in the LOX Plant Area. NASA has elected to remove these soils first as part of their overall site cleanup.

After DTSC review and comment, the draft SRAIP will be made available for public comment. After considering and addressing public comment, DTSC will approve the SRAIP for implementation.

NASA will develop a subsequent draft SRAIP to describe the remaining cleanup of impacted soils for DTSC review, public comment, and approval as described above.

3.2.4 CORRECTIVE MEASURES IMPLEMENTATION

NASA may conduct SVE work ahead of soil excavation for soils with multiple contaminants including VOCs so that the ex-situ handling of soil will have lower impacts to air quality and reduce worker's potential exposure.

The excavation process will consist of excavation and stockpiling of impacted soils. Dust mitigation measures (e.g., wetting during excavation, tarping soil piles, etc.) will be applied to minimize potential dust emissions. After confirmation sampling confirms the impacted soils have been removed, the excavated areas will be backfilled from surrounding non-impacted soils, supplemented with clean backfill. After waste characterization and manifesting of the stockpiled soils, contaminated soils will be placed in labeled DOT-approved, 20 cubic yard transport bins or other DOT-approved containers for disposal at an appropriate landfill.

4 RCRA INVESTIGATION & CLEANUP PROCESS - SURFICIAL MEDIA

This section presents a summary of soils investigation and cleanup work conducted to date as well as the work that will be conducted to complete soils cleanup under the Consent Order. As detailed in Section 2 above, cleanup of soils at SSFL is regulated under the Consent Order (Boeing) and the AOCs (DOE and NASA). A discussion of the investigation and cleanup groundwater process is presented in Section 5.

4.1 RCRA FACILITY ASSESSMENT

In July 1991, US EPA Region IX issued an Interim Final RCRA Facility Assessment Report (RFA) that identified 122 areas of SSFL for designation as Solid Waste Management Units (SWMUs) and Areas of Concern. On November 12, 1992, DTSC issued a Stipulated Enforcement Order to Rockwell International Corporation (predecessor to Boeing) that imposed corrective action requirements at SSFL based on the 1991 RFA (Science Applications International Corporation (SAIC), 1994). The Consent Order issued in 2007 further identified the sites and media to be cleaned up at SSFL.

4.2 PREVIOUS RCRA FACILITY INVESTIGATION WORK

The Consent Order identifies 11 group reporting areas for SSFL, referred to as RCRA Facility Investigation (RFI) groups (1A, 1B, and 2 through 10). The group reporting areas were established to facilitate a comprehensive, integrated description of RFI site data from all media across large, interrelated areas of SSFL.

Between 2007 and 2009, draft RFI Reports for each of the RFI group reporting areas were submitted by the Responsible Parties for DTSC review. DTSC provided comments on the draft RFI reports between 2008 and 2012. In 2010, DOE and NASA signed AOCs for Remedial Action with DTSC. These AOCs govern the characterization and remedial action activities for soils in DOE and NASA's respective portions of SSFL. Following the applicable authority, the Responsible Parties will complete characterization of their respective areas and submit investigation reports for DTSC review and approval.

4.3 PREVIOUS REMEDIATION AND REMOVAL ACTIVITIES

Several contaminated soil remediation and removal activities have been conducted at SSFL. Below is a description of the major soil remediation and removal activities conducted to date.

4.3.1 FORMER SODIUM DISPOSAL FACILITY INTERIM MEASURE

The approximately 4.3-acre Former Sodium Disposal Facility (FSDF) site is located in the western portion of Area IV. Interim Measure activities were conducted at the site from 1992 to 1993, and again from 2000 to 2001.

A total of 14,928 tons of contaminated soil and sediment from the FSDF and associated drainages were excavated and shipped offsite for disposal. Soil containing polychlorinated biphenyls, dioxin, and mercury were shipped offsite to a licensed hazardous waste landfill. In addition to the excavation and disposal of contaminated soil, the activity included cleaning

exposed bedrock, backfilling and installing an engineered cover, and the re-vegetation of the FSDF and drainages. Additionally, pan lysimeters and piezometers were installed in the FSDF area to monitor performance of the engineered cover (IT Corporation, 2002).

4.3.2 HAPPY VALLEY INTERIM MEASURES

Three adjacent RFI sites in Area I - Building 1359 (B359), Happy Valley North (HVN) and Happy Valley South (HVS) - were the subject of related interim measure activities in the 1990s and 2000s.

Two phases of interim measures were conducted at the HVN RFI site. Between 1999 and 2000, an interim measure was implemented to screen debris and remove suspected energetic and ordnance items. Small piles of sand (approximately 5 cubic yards of material) near the Tunnel Facility, sediment from concrete lined drainages, and sediment within the detonation sump at Building 1315 were excavated, sifted, and disposed of offsite.

From 2003 to 2004, approximately 800 cubic yards of metals-impacted shallow soil at the Building 1316 and Tunnel Facility area were excavated to address elevated arsenic concentrations. Additionally, 30 cubic yards of perchlorate-impacted soil were excavated from the hillslope east of Building 1316.

Between 2004 and 2006, perchlorate-impacted soils were bioremediated *in situ* in the Building 1316 area.

Also during 2003 and 2004, soils with elevated concentrations of perchlorate from the HVS RFI site were excavated and transported to the B359 RFI site for biotreatment. Prior to the transportation of these soils from the HVS RFI site, soils with elevated concentrations of metals within the B359 RFI site were excavated and disposed of offsite. Biotreatment activities were then conducted between 2004 and 2006 (MWH, 2007).

4.3.3 BUILDING 2203 INTERIM MEASURES

Building 2203 is located on an upland hill north of Building 2203 (B203) at the Expendable Launch Vehicle (ELV) RFI Site that slopes northwest toward an intermittent stream. This area receives surface water runoff from the western portion of the ELV RFI site. The B203 interim measure activities were conducted from July to October 2004 (MWH, 2005).

Approximately 3,000 cubic yards of mercury contaminated soil and bedrock were excavated and sent for offsite disposal. Approximately 250 cubic yards of this material also contained VOCs. In most areas, the soil was excavated down to and including the upper weathered portion of bedrock using excavators, vacuum trucks, and hand shovels (MWH, 2005).

4.3.4 NORTHERN DRAINAGE AND LOX REMOVAL ACTIONS

The Northern Drainage area includes the North Drainage, which extends east to west from the former Rocketdyne-Atomics International Rifle and Pistol Club, Inc. shooting range (former shooting range) located on Sage Ranch property, immediately north of SSFL, to the former

Liquid Oxygen (LOX) Plant RFI site, past the Area II Landfill, and finally turns north onto Jewish American University, Brandeis-Bardin Institute property. Two interim removal actions have been performed in the area to date (MWH, 2008a).

The LOX removal action was implemented in fall 2007 to remove debris and soil containing antimony and asbestos-containing material. Approximately 2,500 cubic yards of debris and soil were excavated and transported offsite for disposal. The Northern Drainage clay target debris removal associated with the former shooting range, initiated in August 2007 and continued through December 2008, included the removal of approximately 9,400 cubic yards of soil and debris (Haley & Aldrich, 2009).

Clay target debris from the former shooting range (discussed in Section 4.3.5) was the suspected source of polycyclic aromatic hydrocarbon (PAH) contamination found in the Northern Drainage during previous sampling events. A removal action was conducted to remove remnants of clay targets used in skeet and trap shooting from the former shooting range area and from the Northern Drainage banks and streambed deposits (Haley & Aldrich, 2010d).

4.3.5 FORMER SHOOTING RANGE

The Rocketdyne-Atomics International Rifle and Pistol Club, Inc. Trap Skeet shooting range (Former Shooting Range) is located on the Mountains Recreation and Conservation Authority (MRCA), Sage Ranch property which is adjacent to Subarea 1A North. Some soil data overlap between the Former Shooting Range area and Subarea 1A North (MWH, 2016a).

In 1992, Rocketdyne and MRCA agreed to participate in voluntary maintenance cleanup activities to remove visible lead shot in the Former Shooting Range (Rockwell, 1992). Below is a summary of visible lead shot cleanup activities performed since 1992 (Haley & Aldrich, 2013):

- 34,000 pounds (17 tons) removed in 1992
- 714,085 pounds (357 tons) removed in 1993/1994
- 13,007 pounds (6.5 tons) removed in November/December 1998
- 33,450 pounds (16.7 tons) removed in 2006
- 14,513 pounds (7.3 tons) removed in November/December 2009
- 9,573 pounds (4.8 tons) removed in May 2010
- 2,908 pounds (1.5 tons) removed in May 2011
- 321 pounds (0.15 tons) removed in August 2012
- 837 pounds (0.42 tons) removed in June 2013

Voluntary cleanup activities conducted by Boeing in or after 2009 were completed in accordance with the DTSC-approved Former Shooting Range Overshot Area Visible Lead Shot Removal Work Plan (Haley & Aldrich, 2009).

In October of 2014 Boeing submitted a work plan to DTSC for the characterization of lead potentially emanating from the Former Shooting Range. Lead shot and clay pigeons observed during the sampling activities were removed by hand (MWH, 2016a).

Because of the continuing presence of lead shot and clay fragments at the former shooting range, a more focused characterization and cleanup activity is being conducted under an approved work plan (MWH, 2016a) and addendum (MWH, 2016b). 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 PAH concentrations began in late September 2016 and was completed on January 18, 2017. Locations that require further study and/or potential remedial action will be identified based on the results of the characterization and risk assessment evaluation (MWH, 2017).

4.3.6 INTERIM SOURCE REMOVAL ACTION (ISRA)

The Regional Water Quality Control Board, Los Angeles Region (LARWQCB) issued a 13304 Order on December 3, 2008 to perform interim/source removal actions to remove wastes that are causing or contributing to violations of limitations contained in the National Pollutant Discharge Elimination System (NPDES) Permit, Order No. R4-2004-0111, in the Outfalls 008 and 009 Drainage areas. The ISRA cleanup occurred on both Boeing and NASA property.

Site-wide cleanup of soil, soil vapor, and groundwater was not part of the scope of the ISRA Order. The purpose of the ISRA and Best Management Practice (BMP) programs is to improve compliance with NPDES permit limits at Outfalls 008 and 009 and water quality in these watersheds. This is done through the dual approach of remediation of surface soils that are above defined thresholds for NPDES constituents of concern, and through control and/or treatment of stormwater runoff from prioritized subareas, respectively.

ISRA activities were implemented in three phases between 2009 and 2013 and included the removal of approximately 25,664 cubic yards (*ex situ*) from 36 ISRA areas (MHW, 2014a). Restoration activities at Phase I, II, and III ISRA areas included backfilling excavations using a local soil borrow source and/or gravel, re-contouring using adjacent soils, and/or installing erosion control BMPs, including re-vegetation of the areas.

4.4 BOEING SOILS RFI WORK

Characterization work, including developing reports for the Boeing soils areas of the Site (most of Area I, all of Area III, and the southern buffer zone), continues in accordance with the Consent Order.

4.4.1 AREAS AND SITES

In 2013, the portions of land not subject to the DOE or NASA AOCs were reorganized into the nine Boeing RFI subareas (5/9 South, 5/9 North, 10, 1A North, 1A Central, 1A South, 1B North, 1B Southeast, and 1B Southwest) to complete the RFI. Table 1 presents the Boeing RFI subareas and site designations. Figure 2 illustrates these subareas.

4.4.2 CHARACTERIZATION WORK

To address the data gaps identified for the Boeing subareas and to complete the RFI, Boeing prepared a *Master RFI Data Gap Work Plan* (CH2M Hill, 2013b) and a *Comprehensive Data*

Quality Objectives Report, RFI (CH2M Hill, 2013a). Using the framework provided in these documents, Boeing prepared Addenda to the Master RFI Data Gap Work Plan for each of the RFI sites. The Boeing responses to DTSC's comments on the draft RFI Group Reports were included in the *Master RFI Data Gap Work Plan* (CH2M Hill, 2013b) and in the associated addenda. Sampling and data evaluation based on the work plans presented in each addenda were then conducted in an iterative fashion, as necessary. The results from each successive iteration were evaluated, and if needed, additional step out sampling was proposed via e-mail and/or conference call until all remaining data gaps were filled.

The RFI results will be presented for DTSC review in draft Data Summary and Findings Reports (DSFRs) for each subarea and Boeing RFI site, most of which are expected to be submitted in 2017. The submittal and approval process to be followed is specified in Section 4.3 of the Consent Order. DTSC will either approve or provide comments on the document, and the document will be revised in accordance with DTSC's written comments. The specific path to approve DSFRs is still being evaluated; DTSC may provide a conditional approval of the DSFRs to move forward, but DTSC will not make a final decision granting no further action for any subareas until the cleanup levels are finalized in a subsequent Statement of Basis. Boeing will submit DSFR report packages for each of the nine subareas identified in Section 4.4.1 and for the Former Shooting Range.

Human Health Risk Assessments (HHRAs) and Ecological Risk Assessments (EcoRAs) will be performed using the data collected during the RFIs. The risk assessment process will follow the Standardized Risk Assessment Methodology (SRAM) Revision 2 Addendum (MWH, 2014b) which was approved by DTSC (DTSC, 2014c) to serve as a technical basis for conducting the HHRAs and EcoRAs for the portions of SSFL regulated under the Consent Order. The HHRAs and EcoRAs results will be submitted in reports for DTSC review and approval.

4.5 CORRECTIVE MEASURES STUDIES

The RFI results, treatability study results and risk assessment methodology will be used in the CMS. Additionally, potential risks to ecological large-home-range receptors will be evaluated on a subarea-wide and facility-wide basis. After corrective measures alternatives are identified for the media and contaminants reported in the RFI results, the alternatives will be evaluated on their effectiveness to reduce human health and ecological risks to the appropriate goals.

Proposed remedial alternatives will be evaluated to meet the three performance standards:

- Attainment of media cleanup standards;
- Control of the sources of releases; and
- Protection of human health and the environment.

Balancing factors are also considered (not ranked in order of importance):

- Long-term reliability and effectiveness;
- Reduction of toxicity, mobility, or volume of wastes;
- Short-term effectiveness;
- Implementability;
- Cost; and
- State and community acceptance.

4.5.1 2009 FEASIBILITY STUDY WORK PLAN

In June 2013, DTSC conditionally approved (DTSC, 2013f), the Feasibility Study Work Plan (FS Work Plan) (MWH, 2009b), for use as the CMS work plan. Following are the conditions of DTSC's approval:

- The evaluation and selection of remedies shall comply with the regulations and guidance for a CMS and the document submittal shall be a CMS Report.
- All media having contamination above screening levels shall be evaluated in the CMS unless specifically covered by DOE's and NASA's AOCs (soils in the LOX area, and Areas II and IV.)
- Site-wide remedies shall be identified and evaluated as appropriate in compliance with the single facility designation in the Consent Order.
- Work plan addenda that fully describe the scope of work are required for multiple CMS efforts.
- CMS evaluations shall recognize that the primary remedial objective for groundwater contamination is restoration of the aquifer.

Eight potential soil remediation technologies have been identified to be evaluated for cleanup of Boeing soils:

- Excavation and off-site disposal (identified for maximum impact analysis);
- Excavation, physical separation of surface water/sediments, and off-site disposal;
- Excavation of hot spots and shallow soil for off-site disposal, and capping;
- SVE;
- Biotreatment (*in situ* and *ex situ* applications);
- Thermal desorption;
- Monitored natural attenuation; and
- Phytoremediation.

Currently, the human health goals are a one-in-a-million excess lifetime cancer risk for a resident and a non-cancer hazard index no greater than one. The process to evaluate risk from the exposure caused by the consumption of homegrown produce is under development and will be finalized prior Boeing's submittal of HHRAs.

DTSC anticipates that Boeing will submit multiple CMSs for soil. In November 2015, Boeing submitted a draft CMI Work Plan (MWH, 2015b) to DTSC proposing the early excavation and disposal of soil in areas that are clearly contaminated and where excavation and offsite disposal

appear to be the only feasible solution. The targeted removal will be followed by a single subarea level effort; as well as subsequent efforts to cover Boeing's remaining surficial media cleanup activities. The process for assigning subareas, sites and areas to CMS efforts and the schedule to conduct the CMS and CMI efforts is in progress. DTSC's preference is for each RFI DSFR grouping to proceed through the CMS process so that some CMSs can be in development while RFI DSFRs for other subareas are still being prepared.

4.6 DECISION DOCUMENTS - STATEMENTS OF BASIS

Based on an evaluation of the recommendations of CMS reports, DTSC will select remedial alternatives or combinations of alternatives that will make up the remedies. DTSC's remedy decisions as well as justification for the remedy selections will be documented in Statements of Basis.

Statements of Basis (including CMS Reports) are public review documents, and DTSC will provide the public with an opportunity to review and comment (both in writing and at a public meeting) on the Statements of Basis and final drafts of the CMS Reports.

Following the public comment period, DTSC may select a final corrective action or require the Responsible Parties to revise the CMS Reports and/or perform additional studies.

4.7 CORRECTIVE MEASURES IMPLEMENTATION

Implementation of the Corrective Measure will begin after the public comment process is complete. Like the CMS reporting and Statements of Basis processes, DTSC anticipates multiple Corrective Measures Implementation (CMI) Work Plans will be submitted for DTSC review and approval for Boeing soils. CMI Work Plans will be prepared as necessary based on final cleanup levels approved by DTSC. It is currently anticipated that Boeing's soil cleanup program will involve an initial effort to remove soil requiring disposal as hazardous waste, a single subarea level effort, and subsequent efforts to cover Boeing's remaining surficial media cleanup activities. The exact phasing of Boeing soil cleanup is under development.

The CMI and Construction Process consists of four activities:

1. Corrective Measure Implementation Planning
    - The purpose of the CMI WP is to develop and design the construction, operations, maintenance, and performance monitoring of the corrective measure or measures selected to protect human health and the environment.
2. Corrective Measure Design
    - Includes Design Plans and Specifications, Operations and Maintenance Plans, Cost Estimates, and Project Schedule. Additionally, Construction Quality Assurance Plan and Health and Safety Plans will be developed.

3. Corrective Measure Construction
    - Includes preconstruction and construction activities covered by the plans, as well as inspection, monitoring, testing, and documentation to verify compliance with the plan goals.
4. Reporting
    - Bi-weekly progress reports are required to document progress of the CMI, to include:
        - A description and estimate of the percentage of the CMI completed;
        - Summaries of findings and data;
        - Summaries of problems or potential problems encountered during the reporting period;
        - Actions being taken to rectify problems;
        - Projected work for the next reporting period;
        - Summaries of changes made in the CMI during the reporting period;
        - Copies of daily reports, inspection reports, laboratory/monitoring data, etc.
    - After corrective actions activities have been completed, the Responsible Parties will submit Corrective Measures Completion Reports to document the work completed and to refine future operations and maintenance requirements.

Additional plans anticipated to be submitted for DTSC approval for use in CMI activities include:

Plans for cleanup and soil removal activities:

- Health and Safety Plan
- Site-Wide Traffic Management Plan
- Greenhouse Gas Emissions Reduction Plan
- Perimeter Air Monitoring Plan
- Soil Management Plan
- Weed Management Plan
- Revegetation Plan
- Groundwater Operations and Maintenance Plan

Plans for protection of resources:

- Biological Resources Worker Environmental Awareness Program Training
- Cultural Resources Management Plan
- Worker Cultural Resources Sensitivity Program
- Paleontological Resources Monitoring and Mitigation Plan

Miscellaneous plans:

- Hazardous Materials Business Plan
- Fire Management Plan

CMI WPs will be finalized after the public comment processes for the respective Statements of Basis and CMS Reports are complete. All plans will be submitted to DTSC for review and approval. In cases where similar plans are prepared by the individual Responsible Parties, DTSC will request written acknowledgement that the development of the documents was coordinated between parties.

The potential soil remediation technologies most likely to be in widespread use include some form of excavation and off-site disposal and SVE. Ideally, the SVE work will be conducted ahead of excavation for soils with multiple contaminants including VOCs. That way, the ex-situ handling of soil will have lower VOC emissions and result in lower impacts to air quality and reduce workers' potential exposures.

The excavation process will consist of excavation, stockpiling and offsite disposal, as well as backfilling excavation areas with surrounding soils, supplemented with clean backfill. After waste characterization and manifesting of the stockpiled soils, contaminated soils will be placed in labeled DOT-approved, 20- cubic yard transport bins or other DOT-approved containers for disposal at an appropriate landfill.

5 RCRA INVESTIGATION AND CLEANUP PROCESS - GROUNDWATER

SSFL Site-wide groundwater activities are regulated under RCRA through the Consent Order and two post-closure RCRA permits. As such, a risk-based cleanup will be conducted. However, it should be noted that cleanup goals will be based on state and federal maximum contaminant levels, and LARWQCB Basin Plan requirements including non-degradation policy. The authority and intent of the Consent Order and subsequent correspondence define SSFL as a single Site, and a single summary groundwater characterization report is required to meet the intent and provisions of the Consent Order. This approach does not preclude development of individual site or plume specific reports. To that end, the Responsible Parties are currently working to complete groundwater contaminant characterization, while concurrently conducting regular Site-wide groundwater monitoring and post-closure monitoring as described below.

Post-closure responsibilities, dictated in the Area I, II and III post-closure permits, are in addition to, not in lieu of, the regulatory responsibilities each Responsible Party has under the Consent Order as described below.

5.1 RCRA POST-CLOSURE MONITORING

A portion of the groundwater contamination at the Site that is to be monitored and cleaned up is due to historical operations of the nine closed RCRA surface impoundments. Boeing is responsible for five of the impoundments and NASA is responsible for the other four. One aspect of the post-closure permits will be the preparation of updated Regulated Unit Water Quality Sampling and Analysis Plans (WQSAPs) (one from each Responsible Party) that will be specific to the vicinity of each Responsible Party's closed impoundments. The Regulated Unit WQSAPs will be aimed at monitoring contamination from the closed impoundments to demonstrate that the contamination is not increasing, expanding or threatening human health or the environment. The impoundments are currently regulated under expired, yet still in effect, post-closure permits (DTSC, 2011c), (DTSC, 2013h). DTSC is currently reviewing Surface Impoundment post-closure permit applications for technical completeness.

5.2 GROUNDWATER INTERIM MEASURES

The purpose of the Groundwater Interim Measures (GWIM) is to control groundwater and remove contaminant mass at source areas where trichloroethene (TCE) plumes exceed 1,000 parts per billion (ppb). The project includes the operation of 14 groundwater extraction wells (WS-9A, C-1, RD-72, RD-84, HAR-07, HAR-18, RD-1, RD-4, RD-41B, RD-46A, RD-49A, RS-54, WS-9, and HAR-20).

The water from 13 of the 14 extraction wells (Boeing and NASA wells) will be sent to the existing Groundwater Extraction Treatment System (GETS) in accordance with the approved GWIM Work Plan and subsequent addendum (MWH, 2008b), (MWH, 2009a), (DTSC, 2013b). Water from the one DOE GWIM extraction well (RS-54) in Area IV will be treated at a dedicated treatment plant and discharged through either injection or infiltration. The stand-alone

system proposed by DOE is currently in the work plan phase. Discharge will be regulated by the LARWQCB.

After treatment at the GETS, water will be discharged under a NPDES permit from the LARWQCB and a Streambed Alteration Agreement (SAA) from the California Department of Fish and Wildlife (CDFW).

Currently, the NPDES permit for GETS discharge is in place and the SAA is in the application review process. The currently permitted NPDES discharge points include both the existing Outfall 19, located in the eastern reach of the Bell Creek drainage, and a future Outfall 20, located in the western reach of the Bell Creek drainage.

Boeing is also applying for a permit to discharge the treated effluent from the GETS by injecting it back into the aquifer. A Waste Discharge Permit for the injection option is currently under review by the LARWQCB. Startup of the Boeing and NASA portion of the GWIM is expected to commence after LARWQCB Permit conditions are met.

5.3 GROUNDWATER MONITORING

Site-wide water quality samples are collected pursuant to the:

- 2011 Boeing Post-Closure Permit for SSFL Areas I and III (DTSC, 2011c),
- NASA Post-Closure Permit for NASA Area II (DTSC, 2013h),
- associated Regulated Unit WQSAPs (Haley & Aldrich, 2010a), (Haley & Aldrich, 2010b), and
- DTSC-approved (DTSC, 2011b) Site-Wide WQSAP (Haley & Aldrich, 2010c).

Water level measurements are collected quarterly, and groundwater samples are generally collected semi-annually (in the first and third quarters). Sampling requirements for 2016 and 2017 have been modified to include sampling of seeps and springs, in response to DTSC comments on the 2014 Annual Groundwater Monitoring Reports (DTSC, 2016a) and to address the need for a consistent monitoring report format as clarified in a letter from DTSC to all three Responsible Parties (DTSC, 2016b).

5.4 DRAINAGES

This section describes the technical aspect of the decision process to characterize and remediate both on and offsite drainages at SSFL. Some sediment in offsite drainages may be above the AOC cleanup values, though the concentrations do not pose an adverse risk to human health, and addressing the impacted sediment adds additional coordination requirements for the Responsible Parties. Under state and federal law, the Consent Order and both AOCs, contiguous contamination or soil impacts emanating either offsite or to neighboring Administrative Areas is the responsibility of the appropriate Responsible Party.

5.5 ONSITE SURFACE WATER SYSTEMS

In general, surface water is captured and monitored and surface water discharged from SSFL is regulated by the LARWQCB under NPDES Permit Number CA0001309. DTSC anticipates that these activities will continue while cleanup activities are ongoing.

Surface water from SSFL does not enter the nearby Black Canyon due to the presence of a ridge that physically separates runoff from the Site. Figure 6 provides a map of the various watersheds and outfalls at SSFL.

SSFL does not have an extensive, naturally occurring surface water network. Most of the surface water features were built to manage and support facility operations. There are six surface water ponds on Site and one excavation (Building 56 excavation), for a building that was never built, that collects surface water. Most of the natural onsite drainages are dry except during winter rain events.

Sediment within the various surface water ponds was investigated and will be remediated within each Responsible Party's soil program under the authority of the Consent Order and the AOCs.

5.5.1 NORTHERN DRAINAGE

Between 2007 and 2009 Boeing and NASA completed a cleanup in response to a Cleanup and Abatement Order (CAO) from the LARWQCB and an Imminent and Substantial Endangerment Determination/ Remedial Action (ISE/RA) Order from DTSC in the upper reaches of the Northern Drainage to reduce potential antimony, asbestos, PAH and various debris (Boeing, 2012b), (DTSC, 2007b), (LARWQCB, 2007). Lead was not a contaminant of concern but was included as part of the cleanup action where it was co-located with PAHs or antimony. The ISE/RA cleanup actions were certified complete in 2012.

As described in Section 4.3.5, Boeing has conducted several subsequent voluntary cleanup actions for lead as summarized in the *Draft Former Shooting Range Visible Lead Shot Cleanup Report* (Haley & Aldrich, 2013). In 2017, Boeing submitted a report summarizing the investigation work conducted at the Former Shooting Range in preparation for a final cleanup of the area (MWH, 2017). DTSC reviewed the report and submitted comments.

5.6 SITE-WIDE GROUNDWATER RCRA FACILITY INVESTIGATION

A *Draft Site-wide Groundwater Remedial Investigation Report* (MWH, 2009c) was submitted to DTSC to present an assessment of the nature and extent of site-related chemicals and radionuclides in groundwater and vadose zone bedrock across SSFL in accordance with the Consent Order. DTSC submitted comments on the 2009 Draft Site-wide Groundwater Remedial Investigation Report via a letter dated December, 21, 2011 (DTSC, 2011d). Boeing, DOE, and NASA are addressing data gaps identified in DTSC's comments through a series of work plans and technical memorandums. The strategy to complete this series of work plans and technical memorandums was memorialized in a letter from Boeing to DTSC dated March 19, 2012

(Boeing, 2012a). Results from the work to be completed under these plans will be presented in a revised Site-wide Groundwater RFI Report.

Based on the groundwater data gaps that DTSC identified, Boeing, DOE, and NASA proposed completing characterization by grouping the data gaps into six categories as listed in DTSC's September 30, 2014 letter (DTSC, 2014d) and detailed in Sections 5.6.1 through 5.6.6.

5.6.1 2009 Draft Site-Wide Groundwater Remedial Investigation Report Data Gaps

Investigations associated with data gaps identified in the 2009 Draft Site-wide Groundwater Remedial Investigation Report have been conducted jointly by Boeing, DOE, and NASA under a conditionally approved work plan (MWH, 2010), (DTSC, 2011a). This work is substantially complete and the results are currently being used in Site-wide and source zone evaluations. The results and conclusions of the work will be presented in the upcoming source zone and Site-wide groundwater investigation deliverables.

5.6.2 Source Zones

Boeing, DOE, and NASA are currently conducting work to characterize source zones to complete the RFI:

- Boeing is investigating source zones in the SMOU characterization program for Boeing sites in Area I and Area III (CH2M Hill, 2013a), (CH2M Hill, 2013b), (DTSC, 2013d). Boeing will also be characterizing source zones at selected sites in Area IV as described in the next bullet item.
- DTSC directed DOE and Boeing to prepare a plan and describe how the RFI for groundwater will be completed in the vicinity of Building 4100 and 4009 in Area IV as these areas were not listed as SWMUs or Areas of Concern in the Consent Order (DTSC, 2015b), and subsequent clarification (DTSC, 2015c).
- NASA is investigating source zones using an approach where areas of impacted groundwater (AIGs) are characterized from source to plume extent (AIG work plan series). The four approved AIG Work Plans are for: LOX Plant (CH2M Hill, 2013c), (DTSC, 2014b); ELV/Building 204 (CH2M Hill, 2014a), (DTSC, 2014e); Coca/Delta (CH2M Hill, 2014b), (DTSC, 2014f); and Alfa/Bravo (CH2M Hill, 2015a), (DTSC, 2015a).
- DOE is also using an AIG approach. The final work plan for portions of Area IV under DOE responsibility was approved by DTSC in a letter dated November 20, 2015 (CDM Smith, 2015b), (DTSC, 2015d).

5.6.3 Seeps and Springs

Boeing, DOE, and NASA conducted work under an approved work plan (University of Guelph, 2012) (DTSC, 2012f) to complete characterization of seeps and springs. Seventeen well clusters were installed for seep characterization, and Boeing submitted a Report on Seeps Investigation to DTSC (University of Guelph, 2015).

Monitoring of seeps and springs is being conducted based on modifications to the WQSAP. The modifications are proposed by the Responsible Parties, typically in response to DTSC comments on the annual monitoring reports.

5.6.4 FAULTS

Boeing is investigating faults under a conditionally approved work plan (MWH, 2013), (DTSC, 2013c). The primary activities described in the work plan are listed below;

- Additional literature review on local and regional geology and fault structures.
- Additional analysis of existing Site data, including evaluating data transects along and across faults.
- Field investigation work:
    - Fault zone and fracture mapping and structural analysis
    - Fault zone trenching
    - Installation of monitoring wells and probes
    - Groundwater sampling for isotopes and noble gases
    - Estimation of fault-zone permeability from groundwater level responses to earth tides, seismicity, and barometric changes
    - Other fault zone hydraulic testing
    - Surface seismic pilot study

Boeing submitted an "Updated Map of Geologic Faults in Administrative Areas I and III and the undeveloped lands at Santa Susana Field Laboratory" on September 2015 (MWH, 2015a). DTSC is currently reviewing the document.

NASA is investigating and evaluating faults as a part of its AIG studies. DOE also plans to use an area of impacted groundwater approach in conjunction with its source zone evaluation work.

5.6.5 GROUNDWATER FLOW MODEL

The groundwater flow model work plan (Aqua Resources, 2013) presents an approach for a mountain scale groundwater flow model. DOE and NASA are conducting the work jointly under the work plan which was conditionally approved by DTSC in September 2013 (DTSC, 2013g), but required that model updates be performed during design of the Site-wide groundwater remedy. As a result, DTSC expects that the work plan will be finalized during the design of the remedy. Work from aquifer testing and fault studies will be used in the groundwater flow model.

5.6.6 CONTAMINANT TRANSPORT MODEL

The work plan for modelling contaminant transport has not yet been submitted. There are significant difficulties in conducting a mountain scale contaminant transport model for such a large, geologically complex project. Therefore, DTSC is considering requiring that transport modeling be conducted on a plume or site scale by the respective Responsible Party.

5.7 SITE-WIDE GROUNDWATER RFI REPORT

Although Boeing, DOE and NASA originally proposed to revise and complete the 2009 Draft Site-Wide Groundwater Remedial Investigation Report as a single effort, during the process they

proposed conducting area-specific activities independently. On January 13, 2017, DTSC approved a report structure for the Site-wide Groundwater RFI Report (DTSC, 2017). Each Responsible Party will prepare a report section that summarizes their respective RFI groundwater work. The three sections will be combined in a single Site-wide RFI Groundwater Report that includes a summary addressing Site-wide features and conditions.

Boeing's methodology to complete groundwater characterization in its areas involves source zone level evaluations included with the subarea and site RFI reports. The groundwater source zone characterization results and conclusions will in turn be summarized in Boeing's section of the revised Site-wide Groundwater Remedial Investigation Report. DOE is conducting groundwater characterization work for their areas of responsibility as a single effort with a focus on site-level release areas. NASA is conducting groundwater characterization work for their areas of responsibility using a plume scale AIG approach.

The results and conclusions for the groundwater RFI work will be reported in 2017.

5.8 CORRECTIVE MEASURES STUDIES

The RFI results, treatability study results and risk assessment methodology will be used in the CMS for groundwater. After corrective measures alternatives are identified for the media and contaminants reported in the RFI results, the alternatives will be evaluated on their effectiveness to achieve the appropriate cleanup goals.

Proposed remedial alternatives will be evaluated to meet the three performance standards:

- Attainment of media cleanup standards;
- Control of the sources of releases; and
- Protection of human health and the environment.

Balancing factors are also considered (not ranked in order of importance):

- Long-term reliability and effectiveness;
- Reduction of toxicity, mobility, or volume of wastes;
- Short-term effectiveness;
- Implementability;
- Cost; and
- State and community acceptance.

5.8.1 2009 FEASIBILITY STUDY WORK PLAN

In June 2013, DTSC conditionally approved (DTSC, 2013f), the FS Work Plan (MWH, 2009b), for use as the CMS work plan. Following are the conditions of DTSC's approval:

- The evaluation and selection of remedies shall comply with the regulations and guidance for a CMS and the document submittal shall be a CMS Report.
- All media having contamination above screening levels shall be evaluated in the CMS unless specifically covered by DOE's and NASA's AOCs which generally consists of soils in the LOX area, Areas II and IV.

- Site-wide remedies shall be identified and evaluated as appropriate in compliance with the single facility designation in the Consent Order.
- Work plan addenda that fully describe the scope of work are required for multiple CMS efforts.
- CMS evaluations shall recognize that the primary remedial objective for groundwater contamination is restoration of the aquifer.

5.8.2 TREATABILITY STUDIES

The FS Work Plan proposed treatability studies of appropriate technologies for further evaluation that will be considered in the CMS efforts. To satisfy requirements in the Consent Order to identify and evaluate innovative technologies for potential corrective measures, four treatability studies were proposed and conducted to evaluate technologies for treating VOCs in unsaturated bedrock and groundwater. Work plans for four treatability studies were submitted to DTSC in June 2009 (MWH, 2009d).

The four technologies proposed for study include:

- A vapor extraction field test in unsaturated bedrock;
- A field study of in-situ chemical oxidation in CFOU groundwater, including a laboratory study of the geochemical effects on CFOU rock core;
- A laboratory study of enhanced biological reduction of VOCs using CFOU rock core and groundwater; and
- A laboratory study of thermal treatment on CFOU rock core.

The vapor extraction field test was conducted and a report was submitted to DTSC. DTSC reviewed the report and submitted comments. The vapor laboratory study of thermal treatment test was conducted, the report was submitted to DTSC and DTSC reviewed it and submitted comments. The in-situ chemical oxidation test was conducted, the report was submitted to DTSC and DTSC is currently reviewing it. The laboratory study of enhanced biological reduction test was conducted, and the report is being developed.

The technologies will be evaluated in the CMS for their effectiveness to achieve the appropriate cleanup goals.

5.9 DECISION DOCUMENTS - STATEMENTS OF BASIS

Based on an evaluation of the recommendations of CMS reports, DTSC will select remedial alternatives or combinations of alternatives that will make up the remedies. DTSC's remedy decisions as well as justification for the remedy selections will be documented in Statements of Basis.

Statements of Basis (including CMS Reports) are public review documents, and DTSC will provide the public with an opportunity to review and comment (both in writing and at a public meeting) on the Statements of Basis and final drafts of the CMS Reports.

Following the public comment period, DTSC may select a final corrective action or require the Responsible Parties to revise the CMS Reports and/or perform additional studies.

5.10 CORRECTIVE MEASURES IMPLEMENTATION

CMI is the process where the corrective measure or measures selected to protect human health and the environment are planned, performed and documented.

It is currently anticipated that multiple groundwater CMI efforts will be conducted. At a minimum, Boeing, NASA and DOE will each construct and implement groundwater cleanup remedies for their respective areas of groundwater responsibility.

As described in Section 4.7, the CMI and Construction Process consists of Corrective Measure Implementation Planning, Corrective Measure Design, Corrective Measure Construction, and Reporting.

Additional plans anticipated to be submitted for DTSC approval for use in groundwater CMI activities include:

Plans for groundwater cleanup and related soil removal activities:

- Health and Safety Plan
- Soil Management Plan
- GW Operations and Maintenance Plan

Plans for protection of resources:

- Biological Resources Worker Environmental Awareness Program Training
- Cultural Resources Management Plan
- Worker Cultural Resources Sensitivity Program
- Paleontological Resources Monitoring and Mitigation Plan

Miscellaneous plans:

- Hazardous Materials Business Plan
- Fire Management Plan

All plans will be submitted to DTSC for approval. In cases where similar plans are prepared by the individual Responsible Parties, written acknowledgement that the development of the documents was coordinated between parties must be provided.

6 RCRA PERMITTED FACILITIES

In addition to the Consent Order and the two AOCs, there is one permitted hazardous waste facility and two interim status authorized facilities at SSFL that await closure. There are also two post-closure permitted hazardous waste facilities that require ongoing post-closure care under a renewed permit. All five of these facilities are listed in Attachment 2 of the Consent Order and are under various stages of closure or post-closure; none are actively operating. The proposed activities that will be undertaken by the Responsible Parties to comply with permits and the interim status document are dictated by RCRA and state law and regulations. In general, the RCRA closure process will dictate how the facilities themselves are regulated; however, the Consent Order and AOCs will remain in full effect and will dictate how releases to soil and groundwater from the permitted facilities are investigated and ultimately cleaned up.

In conjunction with each of the proposed activities described below, DTSC is also preparing a PEIR to assess the effects of each proposed project, in accordance with CEQA. The details of the CEQA process are described in Section 8.

6.1 BOEING

Boeing is the owner and operator of the Thermal Treatment Facility (TTF) and the five surface water impoundments in Areas I and III.

6.1.1 THERMAL TREATMENT FACILITY

The TTF is an Interim Status Facility, meaning that the facility was granted Interim Status while DTSC evaluated the permit application. Before the permit was finalized, operations at the TTF were discontinued and closure under the RCRA program began; thus a permit was never issued.

Closure of the TTF will include additional sampling, excavation and disposal of the soils and debris that were contaminated by TTF operations, followed by confirmation sampling and restoration. It is anticipated that Boeing will conduct closure activities at the TTF at about the same time as Consent Order cleanup activities are conducted at the remainder of the Area I Burn Pit. While the physical activities of the TTF closure and the Area I Burn Pit corrective action are closely interrelated, they will be conducted under separate remediation planning documents to ensure requirements under both programs are met. The cleanup goals for both the TTF and the Area I Burn Pit will be the same and will be based on the latest DTSC approved SRAM.

The details of the TTF closure will be described in a Closure Plan to be submitted to DTSC and subsequently made available for public review and comment, and will be presented during a public meeting or hearing. DTSC will make a determination regarding approval of the TTF Closure Plan after public input is considered and the PEIR is certified.

6.1.2 AREA I AND III SURFACE IMPOUNDMENT POST-CLOSURE PERMIT

The Area I and III Surface Impoundments (Engineering Chemistry Laboratory, Advanced Propulsion Test Facility-1, Advanced Propulsion Test Facility-2, System Test Laboratory-IV-1, and System Test Laboratory-IV-2) were closed in the late 1980s. Boeing is responsible for maintaining the impoundment covers and conducting ongoing groundwater monitoring under the RCRA program and intends to update their post-closure permit (No. PC-94/95-3-02), (DTSC, 2011c).

The post-closure permit application package will include:

- Post-closure Permit Application
- Post-closure Permit Groundwater Monitoring Sampling and Analysis Plan
- Post-closure Permit demonstration report describing how plume scale monitoring, if proposed by Boeing, is equally protective of human health and environment and more technically sound than ongoing monitoring of individual Regulated Units.

Post-closure activities will be described in the permit application package, which will be submitted to DTSC and subsequently made available for public review and comment, and will be presented during a public meeting or hearing. DTSC will make a determination regarding approval of the final post-closure plan after considering public input and after the PEIR is certified.

6.2 DOE

DOE is the current owner and co-operator[3] of the RMHF and Hazardous Waste Management Facility (HWMF). The facility buildings will be closed, demolished and disposed of under the RCRA hazardous waste management program and Section 2.3 of the AOC. The soil and groundwater that may have been impacted by operations at the RMHF and HWMF will continue to be investigated and remediated under the AOC and Consent Order, after closure of the facilities is completed. Both the RMHF and the HWMF closure plans will present a plan for transition, tracking and documentation of activities between the RCRA closure process and the AOC investigation and cleanup.

DOE submitted a draft closure report for the RMHF (North Wind, Incorporated, 2015a) and for HWMF (North Wind, Incorporated, 2015b). DTSC is currently reviewing the documents and will provide comments to DOE. Once DTSC comments are adequately addressed, DTSC will release a draft-final closure plan for each facility, make it available for public comment and hold a public meeting or hearing regarding the closure plans. DTSC will make a determination regarding approval of each closure plan after public input is considered and the PEIR is certified.

[3] North Wind, Incorporated (NWI) is the other co-operator of the HWMF and RMHF per separate Class 1* modifications, approved by DTSC in two separate letters dated January 22, 2015. Since NWI is acting on DOE's behalf in regard to all HWMF and RMHF operator activities, all references in this document are to DOE alone.

6.3 NASA

NASA is the current owner and operator of four surface impoundments:

- Alfa Bravo Skim Pond (ABSP)
- Storable Propellant Area Pond 1 (SPA-1)
- Storable Propellant Area Pond 2 (SPA-2), and
- Delta Skim Pond (Delta).

The impoundments are regulated under a RCRA post-closure permit. In June 2016, NASA submitted the Draft RCRA Post-Closure Permit Application for renewal of the permit (NASA, 2016b, June). The application includes a Demonstration Report seeking alternate water quality monitoring and response programs to the prescriptive requirements of 22 CCR §66264. DTSC will review and provide comments to NASA.

6.3.1 AREA II SURFACE IMPOUNDMENT POST-CLOSURE PERMIT

The four NASA surface impoundments were closed in the late 1980s. NASA maintains responsibility for maintaining the impoundment covers and conducting ongoing groundwater monitoring under the RCRA program and intends to update their post-closure permit (No. PC-94/95-3-03) (DTSC, 2013h). The post-closure permit application package and process are described in Section 6.1.2. DTSC will make a determination regarding approval of the post-closure plan after public input is considered and the PEIR is certified.

7 NON-PERMITTED[4] DEMOLITION

All three Responsible Parties plan to remove the majority of the remaining buildings and infrastructure from the Site by 2023. The removal programs for these non-permitted buildings and associated infrastructure are separate from the environmental cleanup and closure activities that DTSC regulates at SSFL. The authority for non-permitted building removal falls under the general building and permitting authority of Ventura County. DTSC does not have discretionary authority relating to the demolition and disposal of the non-permitted, non-hazardous SSFL buildings and infrastructure.

The AOCs provide for a limited DTSC role in the general building demolition programs of the Responsible Parties. DTSC's primary role is to ensure that adequate waste characterization is performed to determine whether building debris is contaminated as hazardous waste and to determine appropriate handling methods for managing and disposing of said demolition debris.

Similarly, DTSC has acted in an advisory role for Boeing's SSFL demolition program since 2009 to ensure appropriate debris characterization and disposal, and also to ensure that the investigation and cleanup of environmental media at SSFL (such as contaminated soils) that are under DTSC authority are not adversely impacted by demolition activities. Therefore, DTSC maintains authority to stop demolition and waste disposal work if it is in violation of the law or adversely impacts DTSC-regulated soil and groundwater media at the Site. However, such actions fall under DTSC's enforcement authority and are not discretionary decisions subject to CEQA.

Non-permitted SSFL demolition activities are included in this Plan to describe the general observational and advisory role DTSC has assumed in the highly complex demolition programs at SSFL, through: (1) the provisions of the AOCs with NASA and DOE, and (2) the voluntary program for Boeing's building removal program. Discussion of demolition in this document in no way establishes or implies that DTSC has discretionary authority in the demolition process nor does it impact Ventura County's general building and permitting authority.[5]

The extent of DTSC's monitoring and advisory role in the demolition of Boeing-owned buildings in Area IV of SSFL is the subject of a lawsuit pending in the Superior Court of California, County of Sacramento, Case No: 34-2013-8001589. DTSC's election to discuss the existing DOE- and Boeing-owned non-permitted buildings and infrastructure in SSFL Area IV in this section of the Plan and in the PEIR shall in no way be construed as an admission or acknowledgement that DTSC has discretionary authority over buildings and infrastructure which, as in this case, are not associated with hazardous waste activities.

[4] "Non-permitted" refers to buildings and infrastructure that are not included within the five RCRA-permitted units described in Section 6 of this PMP.

[5] Ventura County maintains general building and permitting authority for building demolition, which is a ministerial process.

7.1 BOEING NON-PERMITTED BUILDING DEMOLITION

Boeing will demolish the following five inactive buildings and structures in SSFL Area IV:

- Concrete foundation slab of the former Uranium Carbide Manufacturing Facility (B4005)
- Former Organically Moderated Reactor/Sodium Graphite Reactor Facility (B 4009)
- Former Instrument Calibration Laboratory (B4011 Low Bay)
- Former Nuclear Materials Development Facility (B4055)
- Former Fast Critical Experiment Laboratory I Advanced Epithermal Thorium Reactor (B4100)

It is anticipated that these Boeing facilities will be demolished using procedures documented in Boeing's "*Building Demolition Standard Operating Procedure"* and associated amendments (Boeing, 2013). A Stormwater Pollution Prevention Plan will be prepared and implemented under authority of the LARWQCB to describe specific BMPs to prevent soil erosion and runoff, and to aid in dust mitigation.

Boeing has voluntarily suspended its demolition program. However; once Boeing's demolition program for its remaining five non-permitted buildings resumes, Boeing will keep DTSC informed of building and infrastructure demolition and waste disposal progress, as well as any proposed measures to prevent impacts on environmental media regulated by DTSC. DTSC has no direct authority over Boeing's demolition activities, but will continue to maintain an observational and advisory role with regard to Boeing's non-permitted building demolition activities.

7.2 DEPARTMENT OF ENERGY NON-PERMITTED BUILDING DEMOLITION

DOE will remove all 19 of the Area IV structures that it owns, under its own authority. Seven are sheds used for material storage, six are larger, non-permitted structures, one is a building slab, and the remaining five are the permitted structures within the RMHF and HWMF. The six large, non-permitted structures include the Sodium Pump Test Facility (B4462, B4463); the Energy Technology and Engineering Center office (B4038); the sodium test/warehouse (B4057); and former reactor buildings (B4019, B4024). The removal of the five permitted structures (HWMF [B4029, B4133] and the RMHF [B4021, B4022, B4621]), is a discretionary decision under DTSC authority and is discussed separately in Sections 2.3 of the AOC and 6.2 of this Plan.

Per DOE's AOC, and in accordance with the United States District Court for the Northern District of California decision entitled *Natural Resources Defense Council, Inc., Committee to Bridge the Gap, and City of Los Angeles v. Department of Energy, et al.* ("NRDC v. DOE"), Case No. C-04-04448 SC, DOE will submit to DTSC for its review and approval; a demolition plan, demolition schedule and detailed procedure that describe the activities that DOE shall perform in order to sample and characterize DOE's remaining buildings. This effort will determine whether they are contaminated with radiological or chemical contaminants, as well as the appropriate handling methods for the management and disposal of demolition debris. This

AOC requirement ensures that DTSC provides sufficient oversight of the disposal procedures for building debris; and that it does not impact DOE's responsibility to prepare their own EIS, nor their authority to conduct non-regulated building demolition under DOE's own authority. Such demolition work will be conducted under DOE's decommissioning and demolition process and requires a building demolition plan for each building under DOE's authority. The building demolition plans will be developed in accordance with standard operating procedures to address the steps leading up to, implementing, and closing out such demolition.

DOE will keep DTSC informed of building demolition progress and measures to prevent impacts to regulated environmental media at SSFL, and DTSC will provide advisory comments on DOE's expected standard operating procedures document. However; DTSC has no direct authority over DOE's demolition, except for the disposal aspect discussed above and in DOE's AOC, and thus will continue to maintain an observational and advisory role with regard to non-permitted building demolition activities.

7.3 NASA NON-PERMITTED BUILDING DEMOLITION

NASA's demolition program proposes the removal of all non-permitted buildings and structures that have been determined to be ineligible for listing in the National Register of Historic Places, including those within the NASA SSFL historic districts (Alpha, Bravo, and Coca). NASA's 2014 EIS discusses retaining and preserving one engine test stand, control house, and possibly other contributing buildings and structures within the related historic district (Alfa or Bravo).[6] Demolition of NASAs non-permitted buildings and test stands is not subject to DTSC approval and is therefore not evaluated or described in the PEIR as part of the proposed project. Impacts from the demolition are included in the cumulative analysis of the PEIR, and NASA's EIS (NASA, 2014) includes a full analysis and description of the planned NASA demolition program.

DTSC reviewed NASA's Building Demolition Standard Operating Procedures (SOP) and schedule document in 2011 (NASA, 2011a), as required by the AOC. Under the terms of the SOP, NASA released notification documents that describe the demolition and waste disposal plans for the SSFL structures. NASA's SSFL demolition program began in 2015 at the ELV area, and is continuing in 2017. As part of the ongoing demolition program, NASA will keep DTSC informed of the building demolition status and progress, and will describe any measures taken to prevent associated impacts to regulated environmental media (soil, water, and air) at SSFL.

[6] At the time of this Plan preparation (Rev 0), NASA has acknowledged a public petition for the Federal Government to preserve the SSFL engine test stands, and has adjusted their demolition schedule in recognition of these efforts.

8 CALIFORNIA ENVIRONMENTAL QUALITY ACT

This section discusses the SSFL specific PEIR and related activities. Section 2 of this document presents additional details regarding the general CEQA process.

The selection and approval of final remedial and corrective actions to remediate the contaminated media at SSFL is a discretionary action that will be made by DTSC. DTSC will make a discretionary decision regarding the SSFL cleanup, and activities associated with the cleanup may result in a significant environmental effect. For SSFL, a PEIR will be prepared to present program impacts of the cleanup, RCRA closure and post-closure activities for all three Responsible Parties. The PEIR also includes project level details of the first cleanup actions for NASA and DOE.

As the first step in the PEIR and pursuant to the provision of *CEQA Guidelines*, Section 15082, DTSC published the NOP on November 22, 2013 (see Appendix C of the PEIR). The NOP public comment period concluded on February 10, 2014. DTSC broadly announced the availability of the NOP, public scoping meetings, and extended comment period (75 days) to allow interested agencies and the public to participate. Given the regional interests in the project, as well as DTSC's goals for public involvement, two public scoping meetings were conducted:

- December 10, 2013, Chatsworth: Chatsworth High School
- December 14, 2013, Simi Valley: Simi Valley Senior Center

As discussed in Section 2, CEQA authorizes lead agencies to prepare a program-level analysis for approval of a series of actions that are related geographically or as part of a suite of activities (*CEQA Guidelines*, Section 15168). The guidelines specify that a Program EIR applies to a series of actions that can be characterized as one large project and are related either:

- Geographically
    - The three responsible parties are each responsible for their own areas within SSFL, but DTSC needs to consider the cumulative impacts of each of the Responsible Parties actions for the overall SSFL cleanup.
- As logical parts in the chain of contemplated actions.
    - All three Responsible Party cleanup activities will be conducted over a similar time period and often simultaneously.
    - The cleanup of soil, soil gas and groundwater are all part of an iterative cleanup.
- In connection with rules, regulations, plans, or other general criteria to govern the conduct of a continuing program.
    - The cleanups are being conducted under the Consent Orders, AOCs, and several permits from other Agencies (e.g., LARWQCB, CDFW, Ventura County, etc.)
- As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.
    - All of the proposed cleanup activities are being directed by DTSC.

- The approach for the cleanup for all three Responsible Parties is similar as are the mitigation measures.

DTSC has prepared a Draft PEIR to provide a program-level analysis of the various conceptual remediation technologies and corrective actions that will be employed to remediate the Site. The remediation technologies and corrective actions evaluated in the PEIR are based on various SSFL investigation and characterization documents[7] prepared to date. The documents depict the nature and extent of the contaminated media, and describe the treatability studies and framework of the likely corrective actions. The investigation and characterization document information will be used to develop the remediation planning documents.[8] The remediation planning documents will propose specific corrective actions for each respective area and media. DTSC will evaluate the specific proposed corrective actions and associated public input before selecting cleanup options to address site contamination. In conjunction with selecting cleanup options, DTSC will also confirm the adequacy of the PEIR in relation to the impacts of the cleanup option and to determine if additional project impact analysis is warranted under CEQA, as discussed further in Section 8.4.

CEQA Guidelines state that a project EIR should focus primarily on the changes in the environment that result from the remediation[9] project. A project-specific analysis will be prepared to the extent that the available investigation and characterization documents present the information regarding the remediation technologies. Remediation planning documents will be prepared based on the investigation and characterization documents and will refine the explanation of the types of activities required to implement the proposed cleanup.

The PEIR includes an environmental assessment with project-level analysis where the potential for project impacts is not tied to the exact location of project activities (such as wells or utilities) or where variability in the final designs or locations of these activities will not change the outcome of the impact analysis. Thus, the PEIR will be prepared based on a maximum project area boundary that can be conservatively determined based on investigation and characterization documents prepared to date. The identified project activities or footprints could be located anywhere within the maximum project area boundary. The exact location of the project footprint or activities will be determined and presented in the remediation planning documents. While project-specific designs for the initial, or follow-on, projects are not anticipated to be available when the PEIR is approved, the existing investigation and characterization documents provide

[7] "Investigation and characterization" documents are an all-encompassing term that refers to the multitude of documents that have been prepared by the Responsible Parties to estimate degree of site contamination, and preliminarily describe and plan for potential cleanup options. Such documents will be used to inform the eventual remediation planning documents.

[8] Remediation planning documents include the CMS for Boeing soils cleanup and Site-wide groundwater cleanup, SRAIPs for DOE and NASA soils cleanups, closure plans for the various permitted and interim status units, and post-closure permits for the closed impoundments.

[9] The term "development" is used in 14 CCR § 15161. Remediation was used instead to be consistent with verbiage used elsewhere in this document.

sufficient detail to evaluate the reasonably foreseeable impacts of the remediation at a combined project/program-level in the PEIR assuming a worst case (most impactful) clean up.

The PEIR will allow DTSC and supporting agencies to consider broad policy alternatives and program-wide mitigation measures at the early stages of planning. The PEIR includes a dual-level analysis in order to ensure the effects of developing and implementing the final cleanup are not segmented, while also recognizing that the components are at different stages of planning.

The following subsections describe the process that DTSC will implement to complete the SSFL PEIR, including disseminating project impact information and soliciting public input.

8.1 PROJECT DESCRIPTIONS

Chapter 3 of DTSC's Draft PEIR provides a description of the proposed remediation program as well as the first DOE and NASA projects that will implement under the PEIR. Boeing did not provide a first project for the Draft PEIR. DTSC will use information provided by the Responsible Parties to develop and complete project descriptions for subsequent DTSC evaluation. As a result, there will be two distinct levels of detail, one program-level and one project-level, provided in the project description to help assess the potential effects of the SSFL remediation efforts. The project level analysis will include project-specific activities details (e.g., type of remediation technology to be used, estimated schedule to complete activities, how project-specific biological or cultural resources will be addressed, etc.), to the extent possible. An analysis will be conducted where the potential for project impacts are not tied to the exact location of project facilities or where variability in the final designs or locations of these facilities will not change the outcome of the impact analysis.

8.2 TRANSPORTATION FEASIBILITY ANALYSIS

Potential significant effects of the overall SSFL project may be associated with transportation of soils and remediation equipment on and off the Site. DTSC prepared a Transportation Feasibility Analysis to support the final selected transportation option presented in the Draft PEIR. To assist with DTSC's evaluation, DTSC solicited comments from the public regarding potential transportation options (routes and methods) and evaluation criteria for the proposed project. Two public meetings were held to solicit public comment on initial transportation options:

- August 7, 2014, Simi Valley: Simi Valley Senior Center
- August 9, 2014, Woodland Hills: El Camino Real High School

The Transportation Feasibility Analysis provides a quantitative evaluation of several transportation options for the SSFL cleanup program.

8.3 FINALIZATION OF THE PEIR

Following release of the draft PEIR, and during the public comment period, DTSC will hold two public hearings to present the Draft PEIR findings and solicit public comments on the Draft PEIR.

The Final PEIR will consist of the Draft PEIR, revisions to the Draft PEIR, responses to comments addressing concerns raised by individuals, organizations and public agencies or other reviewing parties, and a Mitigation Monitoring and Reporting Program (MMRP) as required by Public Resources Code Section 21081.6. After the Final PEIR is completed, and at least 10 days prior to its certification, a copy of the response to comments on the Draft PEIR will be provided to all commenting public agencies.

In accordance with Public Resources Code Section 21081, DTSC will make specific Findings of Fact (Findings) before approving the cleanup project. If the Final PEIR identifies one or more significant environmental impacts that may result from a project, one or more of the three following findings must be made with respect to each significant effect:

- Changes or alterations have been required in, or incorporated into, the project that avoid or mitigate the significant environmental effects as identified in the PEIR.
- Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the PEIR.

If DTSC concludes that the project results in significant and unavoidable effects, which are identified in the PEIR, DTSC must adopt a "statement of overriding considerations" prior to approving the project, and provide written rationale on how DTSC balanced the benefits of the project and the significant and unavoidable environmental impacts. Where DTSC concludes that the economic, legal, social, technological, or other benefits outweigh the unavoidable environmental impacts, DTSC may find such impacts "acceptable", approve the project, and certify the PEIR.

Finally, DTSC will file a NOD with the OPR within five days after deciding to approve the project.

8.4 COORDINATION OF REMEDIATION PLANNING DOCUMENTS AND PEIR

After the PEIR is certified, the Responsible Parties will prepare several remediation planning documents, as described in the sections above, that will require public comment and DTSC approval before such remediation is implemented.

The remediation planning documents further refine the various cleanup decisions that DTSC will approve and the Responsible Parties will implement in order to remediate the sites. Each is a

discretionary decision made by DTSC in regard to the proposed project that the PEIR evaluates. Supporting permits and supporting plans, as well as the project design documents that support the remediation planning documents, will also rely on the evaluation provided in the PEIR.

Per the *CEQA Guidelines*, Section 15168(c), subsequent proposed project-specific cleanup activities at SSFL must be examined in light of the PEIR, to determine whether additional documentation needs to be prepared. As stated above, a PEIR analyzes program-wide activities. Upon development of the remediation planning documents and the final project-level designs (specific designs associated with discrete footprints within the project area), DTSC will confirm that the impacts associated with the project-level designs were adequately examined in the PEIR. If subsequent project-specific designs are not adequately examined, an environmental document tiered from the PEIR will be prepared. If DTSC finds that the project-specific impacts were sufficiently captured and analyzed in the PEIR then DTSC will approve the project-level designs as being within the scope of the PEIR. No additional environmental documents will be required and the appropriate PEIR mitigation measures will be implemented based on the project-level designs.

The PEIR will evaluate the potential consequences of implementing the project(s) based on available investigation and characterization documents and will provide program-level mitigation measures and performance criteria to guide mitigation planning as well as Site-specific impact and mitigation analyses for the initial projects expected to be implemented. In some cases, additional Site-specific mitigation may be necessary when project designs become available; such mitigation will be described in an appropriately tiered CEQA document from the PEIR.

DTSC will communicate its decision regarding the evaluation of the potential effects of each design in the approval or comment letters that are prepared based on its review of each project level design.

8.5 NATIONAL ENVIRONMENTAL POLICY ACT

DTSC is required to conduct an environmental assessment for the Site cleanup under CEQA. As federal agencies, DOE and NASA are required to comply with NEPA for the cleanup of their respective areas of responsibility within the Site. The NEPA process is described in Section 2.6.

The following text describes the status of the NASA and DOE EIS's as of June 2017.

- **NASA:** NASA completed a Final EIS for cleanup and demolition activities within their respective areas of responsibility. On July 6, 2011, NASA published a Notice of Intent (NOI) in the Federal Register to prepare an EIS and conduct scoping for the proposed demolition and cleanup activities at the NASA portion of the project site. Public scoping meetings were held in Chatsworth, Simi Valley, and West Hills on August 16, 17, and 18, 2011.

On August 2, 2013, NASA published a Notice of Availability (NOA) of the Draft EIS, which included a 45-day public comment period, in the Federal Register. At the request of the public, NASA extended the comment period an additional 15 days, thus providing a 60-day comment period which extended through October 1, 2013. NASA held two public meetings on August 27, and August 28, 2013, in West Hills, California. Because of the government shutdown that occurred on October 1, 2013, NASA accepted comments through October 17, 2013.

NASA published an NOA of the Final EIS in the Federal Register on March 14, 2014. US EPA published an NOA for NASA's Final EIS on March 14, 2014, and issued a finding of no objection to the Proposed Action on April 10, 2014. The NASA ROD to proceed with the demolition activities described in the Final EIS was issued in April 2014.

Analysis in this PEIR is in part based on information provided by NASA in its EIS. Copies of NASA's Draft and Final EIS and technical documents are available at http://ssfl.msfc.nasa.gov. NASA will prepare a second NEPA ROD on the specific techniques to accomplish the environmental (soil and groundwater) cleanup required to meet the 2010 AOC (for soils), and 2007 Consent Order (for groundwater). Preparation of the ROD was deferred in 2014 to allow NASA to complete soil and groundwater fieldwork, conduct additional archaeological surveys and perform cleanup technology feasibility studies. These studies are required to accurately identify the details and potential impacts of the proposed cleanup actions.

- **DOE:** On February 7, 2014, as part of the NEPA process, DOE issued an Amended NOI in the Federal Register for the remediation of Area IV and the NBZ of the project site. DOE held two scoping meetings (February 27, and March 1, 2014) to receive comments to be addressed in the Draft EIS. DOE published an NOA of the Draft EIS in the Federal Register on January 6, 2017 which included a 60-day public comment period. Thereafter, DOE will prepare a Final EIS, and then issue a ROD, describing the evaluation process and the basis for selection of the chosen alternative. DOE's Draft EIS and technical documents are available at http://etec.energy.gov

9 SUPPORTING AGENCY ROLES AND RESPONSIBILITIES

SSFL cleanup is a large, complex investigation and cleanup project. DTSC is the lead agency under CEQA and has overall responsibility for coordinating and approving the cleanup; however, several supporting agencies will also provide input on different portions of the overall cleanup. A brief description of supporting agency roles and responsibilities is presented below. Please note that these roles may be revised in the future as necessary.

9.1 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

US EPA may provide technical consultation to DTSC regarding radiological characterization and decontamination on a limited basis. Specifically, such consultation may include:

- Validation of Radioactive Materials Handling Facility (RMHF) closure plan procedures
- Validation of handling procedures for Boeing radiologically contaminated soils and associated confirmation sampling.

Previously, and in accordance with duties described in Section 2.4 of DOE's AOC, the US EPA prepared the following three reports to complete their characterization responsibilities at SSFL (US EPA, 2013).

- Background study
- *Final Radiological Background Study Report* (HydroGeologic, Inc., 2011)
- Two characterization studies
- Final Radiological Characterization of Soils Area IV and the Northern Buffer Zone (HydroGeologic, Inc., 2012b)
- Final Historical Site Assessment Santa Susana Field Laboratory Site, Area IV, Radiological Study (HydroGeologic, Inc., 2012a).

Moving forward, DTSC and DOE expect that US EPA will contribute to cleanup confirmation activities described in Attachment B of the AOC and in the "Confirmation Protocol; 'Not to Exceed'; Background Cleanup Standard for Soils", Attachment C of DOE's AOC.

US EPA is not a party to the AOC, thus it is DOE's responsibility to contract directly with US EPA for such services. In accordance with the DOE AOC, DTSC expects that DOE will enter into an agreement with US EPA to:

- Verify backfill soils do not exceed local background for radioactive constituents
- Conduct post cleanup confirmatory radiation assessment in areas where soil removal was conducted.

US EPA will play a similar supporting role for NASA if radiological cleanups are required.

9.2 CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

The California Department of Public Health (CDPH) has a Radiological Health Branch (RHB) and Environmental Management Branch (EMB). CDPH-EMB oversees radiological cleanup at military base closure facilities. CDPH-RHB enforces the radiation control laws and regulations

designed to protect radiation workers, the public and the environment. In addition, CDPH-RHB investigates radiation incidents and surveillance of radioactive contamination in the environment. DTSC coordinates with CDPH regarding the SSFL radiological investigation and cleanup.

Boeing's predecessor was licensed by the CDPH to handle radioactive materials at SSFL and those activities were subject to CDPH-RHB oversight. Those licenses have been closed under CDPH oversight and since there are no current California licensed activities related to the use or handling of radionuclide materials at SSFL, CDPH does not have regulatory authority over the activities at SSFL. However, DOE and Boeing have requested that the CDPH verify radiological cleanup procedures and cleanup activities. Historically, during interim cleanup actions, final sampling results were submitted to the CDPH for review. In addition, verification sampling was performed by the Oak Ridge Institute for Science and Education. These independent evaluations were made by the CDPH to confirm that standards were met. Similar arrangements may be pursued for the final cleanup in Area IV, or other areas if radionuclides are encountered.

9.3 Los Angeles Regional Water Quality Control Board

The LARWQCB is the agency responsible for regulating surface water discharge activities at SSFL. The LARWQCB prepares, monitors compliance, and enforces waste discharge requirements including the SSFL NPDES permit. The LARWQCB sets minimum standards for discharges from SSFL and the NPDES Permit must be renewed every five years.

The LARWQCB also has the authority to enforce water quality laws, regulations and waste discharge requirements and shares responsibilities with DTSC for monitoring discharges to groundwater.

9.4 California Department of Fish and Wildlife (CDFW)

DTSC consulted with CDFW when preparing the PEIR in regard to impacts related to the continued existence of any endangered species or threatened species during cleanup (See *CEQA Guidelines*, Section 15086 and Public Resources Code, Section 21104.2.) Additionally, CDFW will be responsible for reviewing and approving any necessary Streambed Alteration Agreement (Section 1602) or California Endangered Species Act (Sections 2081(b) and (c)) Incidental Take Permits. A similar process may be developed to mitigate impacts to locally sensitive species in Ventura County.

As part of the monitoring and mitigation for remediation of the Site, the Responsible Parties may need to enter into one or more Streambed Alteration Agreements with CDFW to mitigate impacts to permanent and ephemeral streams and other waterways. In addition, remediation of wetlands may require the Responsible Parties to obtain a 401 certification from the LARWQCB and a 404 permit from the Army Corp of Engineers. The details of such agreements or permits will be determined at a future date in conjunction with the monitoring and mitigation stipulations to be presented in the PEIR.

It is anticipated that CDFW will comment on the U.S. Fish and Wildlife Service (USFWS) biological opinion.

9.5 UNITED STATES FISH AND WILDLIFE SERVICE

DOE and NASA have entered into formal Section 7 consultations with USFWS in preparation of their respective EISs. In addition, USFWS will be responsible for reviewing and approving any necessary Incidental Take Permits. USFWS will also prepare a Biological Opinion in response to the SSFL-wide Biological Assessment that DOE will prepare.

DTSC will consider the Biological Opinion prepared by USFWS when establishing biological mitigation measures in the PEIR, and when determining "biological exception areas." "Biological exception areas" will be described in more detail in project-specific cleanup decision documents.

9.6 NATIVE AMERICAN TRIBAL COUNCIL (NAC)

When preparing the PEIR, DTSC consulted with the NAC, and other local tribal representatives as appropriate, in regard to determining and mitigating potential cultural resource impacts during cleanup. DOE and NASA also consulted with the NAC in preparation of their respective EISs, to comply with NEPA.

DTSC will consider NAC and other local tribal representatives when preparing cultural mitigation measures presented in the PEIR, and when determining "cultural exception areas." "Cultural exception areas" will be described in more detail in future SRAIPs. However; specific locations of cultural exception areas are confidential and will not be released to the public in accordance with *CEQA Guidelines,* Section 15120(d).

9.7 OFFICE OF HISTORIC PRESERVATION

DTSC consulted with the Office of Historic Preservation, working on behalf of the State Historic Preservation Officer (SHPO), when preparing the PEIR in regard to determining and mitigating potential cultural resource impacts during cleanup. DOE and NASA also consulted with the SHPO in preparation of their respective EIS as part of the National Historic Preservation Act Section 106 consultation process.

DTSC considered the concerns of SHPO when preparing cultural mitigation measures to be presented in the PEIR, and when determining "cultural exception areas." "Cultural exception areas" will be described in more detail in future SRAIPs in accordance with the AIP.

9.8 DEPARTMENT OF ENERGY

DOE has the authority to clean up its facilities under the Atomic Energy Act. This authority allows DOE to set cleanup criteria for radiological materials and set radiological protection standards at its facilities. DOE is subject to the AOC that governs the radiological cleanup of surficial media in Area IV.

CDPH, DTSC, and in some cases US EPA, review and provide comments on activities related to radiological contamination at SSFL in order to ensure that all regulations and the AOC are properly followed.

The DOE will also oversee the decontamination and decommissioning of facilities contaminated by radioactive or hazardous materials. DOE reviews and approves plans, conducts oversight and coordinates radiological surveys to document decontamination and decommissioning completion. All radioactive waste will be processed for disposal at a DOE-approved disposal site. DOE will also conduct periodic inspections of disposal processing activities such as packaging, labeling and temporary storage. This is done to ensure compliance with applicable DOE orders and policies regarding radiological waste disposal.

9.9 OTHER PERMITTING AGENCIES

Several other agencies are likely to issue permits in order to implement the cleanup. Their roles will be defined more clearly after the PEIR and various remediation planning documents are completed. Other permitting agencies include:

- Army Corp of Engineers
- California Department of Transportation, District 7
- Ventura County Air Pollution Control District
- Ventura County (Public Works Agency: Transportation Department; Resource Management Agency: Watershed Protection District, Division of Building and Safety, Environmental Health Division; Fire Protection Division)
- Los Angeles County (Public Works Agency, Transportation Department)
- City of Los Angeles (Public Works, Department of Transportation)

10 PUBLIC PARTICIPATION

Community involvement is a vital part of DTSC's cleanup program. This section summarizes DTSC public participation activities, however for more specific details and information the reader should review DTSC's SSFL Public Participation Plan.

DTSC continues to build and maintain a process that creates an open and ongoing dialogue with stakeholders for the exchange of ideas, comments and questions. This communication process is fostered through community meetings, face-to-face discussions, and the ongoing availability of Site documents via DTSC's SSFL website: http://www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab/index.cfm. Engaging the public in an open and transparent communication process ensures that decisions incorporate community feedback and helps to create public trust.

10.1 COMMUNICATIONS AND PUBLIC NOTICES

Electronic Communications

One way DTSC communicates with the SSFL community is through the use of electronic communication. Using electronic blasts, DTSC provides over 940 SSFL project e-list subscribers with copies of the Monthly Status Report, meeting announcements, start of public comment periods, and other important project information. The public can subscribe to this e-list by visiting the DTSC SSFL website or by contacting the DTSC Public Participation Specialist.

Additionally, DTSC provides document upload notifications to members of the community who subscribe to the document upload email notification list. The over 1,090 list subscribers are notified when project-related documents are posted to the DTSC SSFL website in real time. The public can subscribe to this email list by contacting the DTSC Public Participation Specialist.

DTSC SSFL Website

In accordance with the Consent Order, a website was developed to communicate project status and updates to the public and other stakeholders. The DTSC SSFL website serves as an electronic repository for the Site. The website's extensive Document Library provides comprehensive access to current and historical SSFL project documents, including: historical Site information, project documents, Site activity overviews, upcoming public meetings, meeting presentations, Frequently Asked Questions, Response to Comment Documents, Calendar of Events, Project Team information, and additional resources.

DTSC maintains and directs the website content, including uploading of recent Site documents and monthly reports. A contractor maintains the Document Library portion of the website at DTSC's direction. DTSC is working to develop and implement a more user-friendly website. The plan for website revisions is currently being considered by DTSC.

Hard Copy Communications
While the majority of the project communications are conducted electronically, DTSC complies with the regulatory obligations to post public notices for meetings, public comment periods or other project-related information in the following local newspapers: Ventura County Star, The Simi Valley Acorn, and the Los Angeles Daily News.

Additionally, meeting notices, public comment period notices, or other project-related information is mailed to the 4,687 addressee mailing list as needed.

Community Updates
Community Updates are fact sheets that provide:

- A brief summary of project activities, regulatory information, and upcoming opportunities for public participation;
- An easy to understand and succinct overview of relatively complex subject matter; and
- Additional resources describing where and/or how to access more detailed information.

Repositories
While the majority of the Site documents are available on the DTSC SSFL website, DTSC recognizes the importance in maintaining a physical information repository. Project reports, fact sheets, public notices, and other project documents can be found at the following community repositories:

- DTSC Regional Office, Regional Records Office, Chatsworth, CA
- California State University Northridge, Oviatt Library, Northridge, CA
- Platt Branch Public Library, Woodland Hills, CA
- Simi Valley Public Library, Simi Valley, CA

10.2 PUBLIC MEETINGS

Public meetings are one of the most effective means to provide information, engage in two-way dialogue, and obtain input from the community. Some of the meetings are topic specific, where DTSC provides information on Site activities pertaining to specific aspects of the Site or work activities.

Currently, DTSC hosts informal community meetings and open houses twice a year to provide an opportunity to share pertinent Site information and updates, and receive feedback from stakeholders and community members. Initiated in 2012, biannual community update events are designed to provide the community with an update on the Site activities that have taken place within the past six months as well as Site activities planned for the next six months. These meetings are typically held in the evenings and are sponsored by DTSC and open to the public.

Convenient locations are identified throughout the community for public meetings, and everyone is invited to attend. DTSC advertises the dates and times of upcoming public meetings through

email, hard copy traditional mail, and on the “What's New” and “Calendar of Events” links on the Project Website.

10.3 Formal Public Comment Meetings and Hearings

DTSC will hold formal public meetings and hearings to obtain and document public comments for the remediation planning documents (e.g., this draft Plan, the Draft PEIR, SRAIPs, etc.), and other significant decision points for the SSFL cleanup. Announcements regarding these formal public meetings and hearings will be announced on the DTSC SSFL website, via e-mail alerts, Community Updates, local newspaper ads, public notices mailed to nearby residents, as well as any other forms of notice required by law.

11 CLEANUP IMPLEMENTATION AND SCHEDULE

11.1 IMPLEMENTATION

Cleanup activities will be implemented by each Responsible Party within their respective areas of responsibility. DTSC will act as the lead oversight agency with support from US EPA, CDPH and various resource protection agencies as well as other federal, state and local permitting agencies. DOE also has some authority over radiological cleanup as defined in the Atomic Energy Act.

DTSC will take an active role in collecting splits of confirmation samples during the cleanup implementation process.

Such roles and responsibilities will be further defined in the various remediation planning documents, the confirmation sampling and analysis plans, and future iterations of this Plan.

11.2 SCHEDULE

The document sequencing and overall project schedule are presented in Figures 7 and 8 respectively. If the Responsible Parties are unable to meet any aspect of the document schedule, the Responsible Parties shall request a time extension in writing prior to the stated deadline.

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

This 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, 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.

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List of Tables

Table 1 - Boeing RFI Subareas and Site Designation

RFI Subarea	RFI Site
1A North	B-1
	Area I Landfill
	Instrument and Equipment Laboratory
1A Central	Building 359
	Happy Valley North
	Advanced Propulsion Test Facility Area
1A South	Canyon
	Happy Valley South
	Laser Engineering Test Facility / Component Test Laboratory-I
1B North	Bowl
	R-1 Pond
1B Southwest	Area I Burn Pit
	Component Test Laboratory-V
5/9 North	Engineering Chemistry Laboratory
	Silvernale
5/9 South	Environmental Effects Laboratory
	Systems Test Laboratory -IV
	Area III Sewage Treatment Plant
	Compound A
10	Southern Buffer Zone

Table 2 - DOE Subareas and Location Designation

Subarea	Location Designation
3	Southern California Edison Substation
5A	Kinetic Experiment Water Boiler (KEWB)
	Heavy Metal Likely Chemical Remediation Zone (LCRZ)
	Building 4005
	Building 4023
	Building 4029
	Former Building 4093 (L85 Reactor)
5B	17th Street Drainage
	Former Building 4010
	Building 4006
	Building 4011
	Building 4019
	Former Building 4356
5C	Building 4100 (also part of Subarea 8N)
	Building 4015
	Building 4462
5D-North	Hot Lab – Former Building 4020
	Former Buildings 4173/4865
	Former Building 4353
	Building 4009 (also part of Subarea 8N)
	Former Building 4353
	Former Building 4373 Leach Field
	Former Building 4875
	Building 4055
	Building 4375
	Pond Dredge Area
5D-South	No known operational areas

Table 2 (cont.) - DOE Subareas and Key Location Designations

Subarea	Location Designation
6	Sodium Reactor Experiment (SRE) Complex
	SRE Pond Area
	SRE Liquid and Gas Radioactive Storage Tanks Area
	SRE Hot Oil Sodium Cleaning Facility
	New Conservation Yard
	Fuel Element Storage Facility
	Former Building 4003 - Engineering Test Building
	Old Conservation Yard
7	Radioactive Materials Handling Facility (RMHF)
	RMHF Site 4614 Holdup Pond/Catch Basin
	RMHF Leach Field
	Subarea 7 Northern Panhandle
	Hazardous Waste Management Facility (HWMF)
	Interim Storage Facility (Building 4654)
	Former Shield Test Irradiation Reactor (STIR) Building 4028
	Outfall 3
	Southwest corner of Subarea 7 (directly north of Building 4019 of Subarea 5B)
8-North	Former Sodium Disposal Facility
	Empire State Atomic Development Associates
	4056 Landfill
	Building 4009 Leach Field
8-South	No known operational areas
Northern Buffer Zone	Northern Buffer Zone East
	Northern Buffer Zone West

Table 3 - NASA Subareas and Location Designation

Field Sampling Plan Subarea	Preliminary Remediation Area (PRA)	2007 Consent Order Group
FSP-1	Alfa/Bravo Fuel Farm (ABFF)	3
	Coca/Delta Fuel Farm (CDFF)	9
	Propellant Load Facility (PLF)	4
FSP-2	Former Area II Incinerator Ash Pile	2
	Building 515 Sewage Treatment Plant (AP/STP) Area	2
	Building 204 Area	3
	Storage Propellant Area (SPA) Area	3
	Skyline	3
FSP-3	Alfa Area	3
	Bravo Area	3
FSP-4	Liquid Oxygen (LOX) Plant Area	2
	Area II Landfill (A2LF)	2
	Expendable Launch Vehicle (ELV) Area	2
FSP-5	Coca Area	4
	Delta Area	4
	R2 Ponds Area	9
FSP-6	Other NASA Area of Responsibility	All

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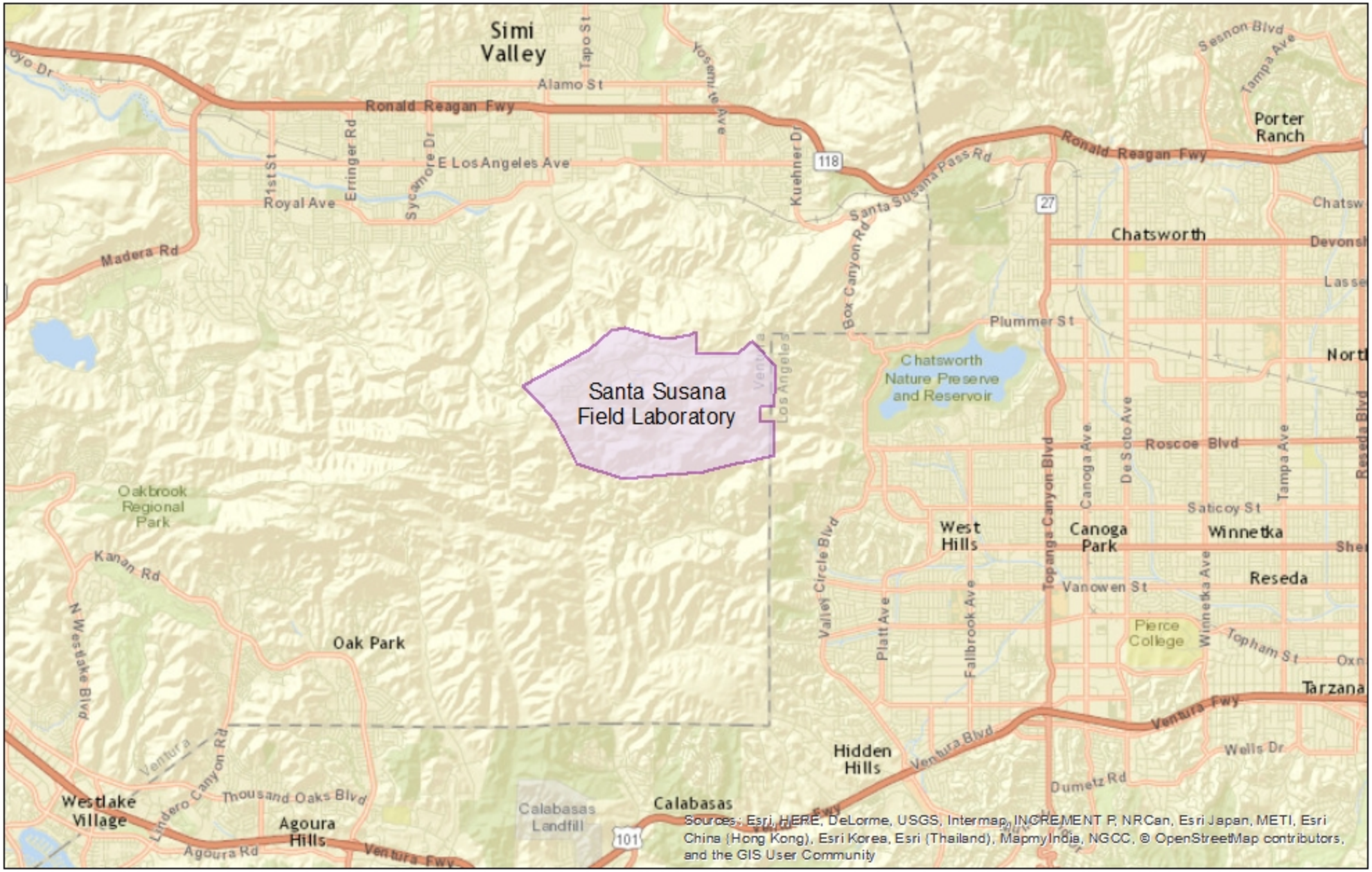


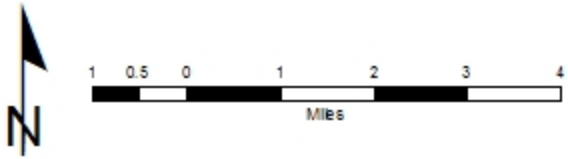
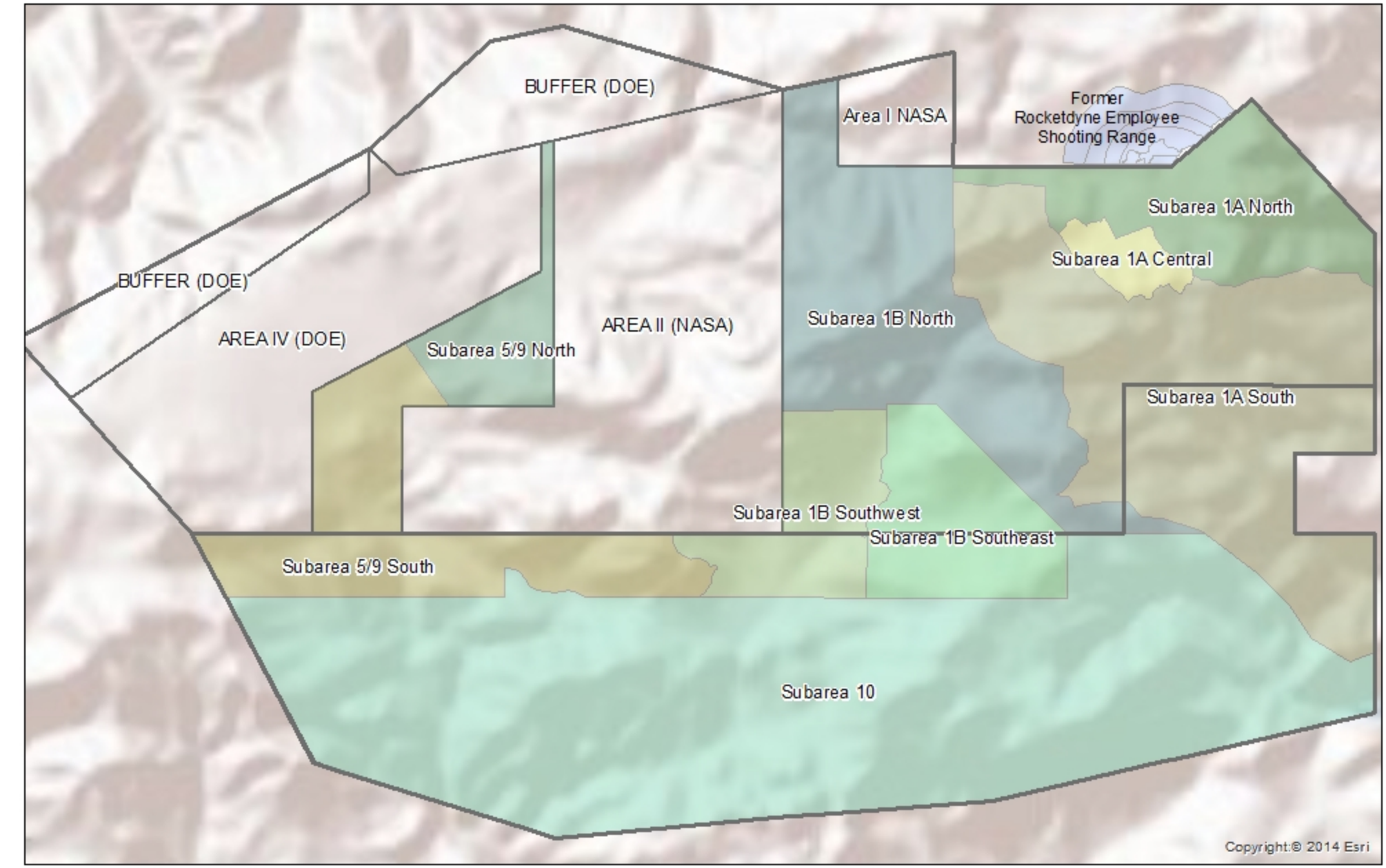


Figure 1
Regional Location Map
Santa Susana Field Laboratory
Ventura County, California



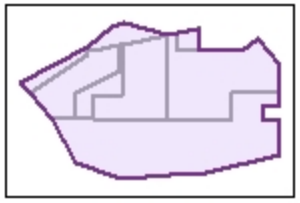
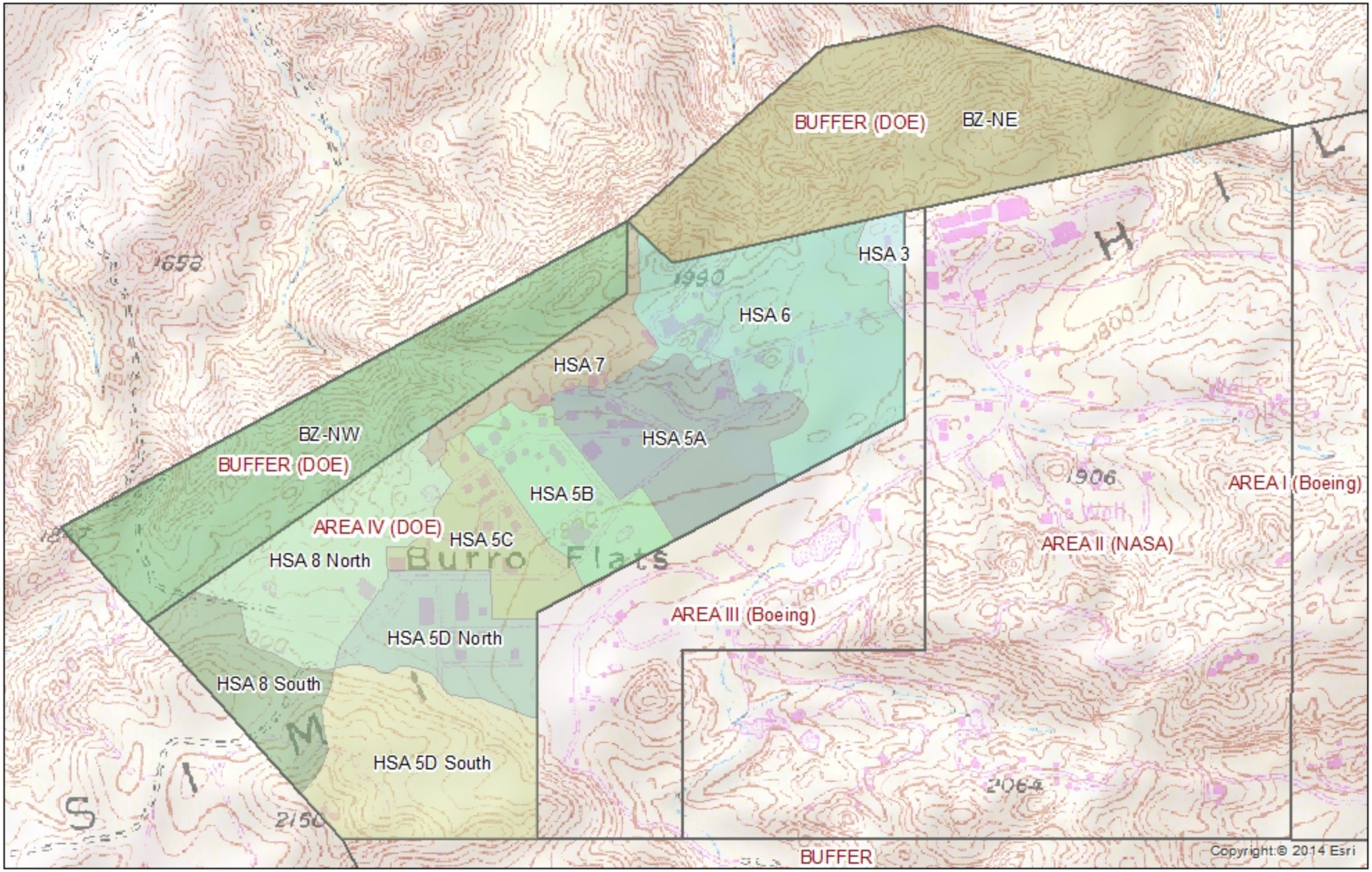
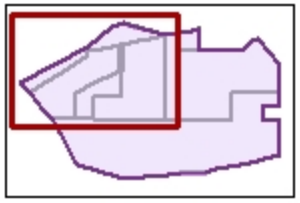


Figure 2
Boeing RFI Subareas
Santa Susana Field Laboratory
Ventura County, California





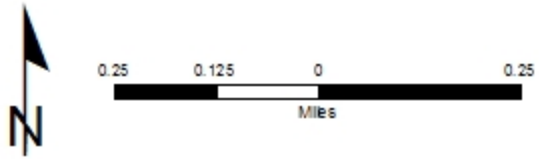
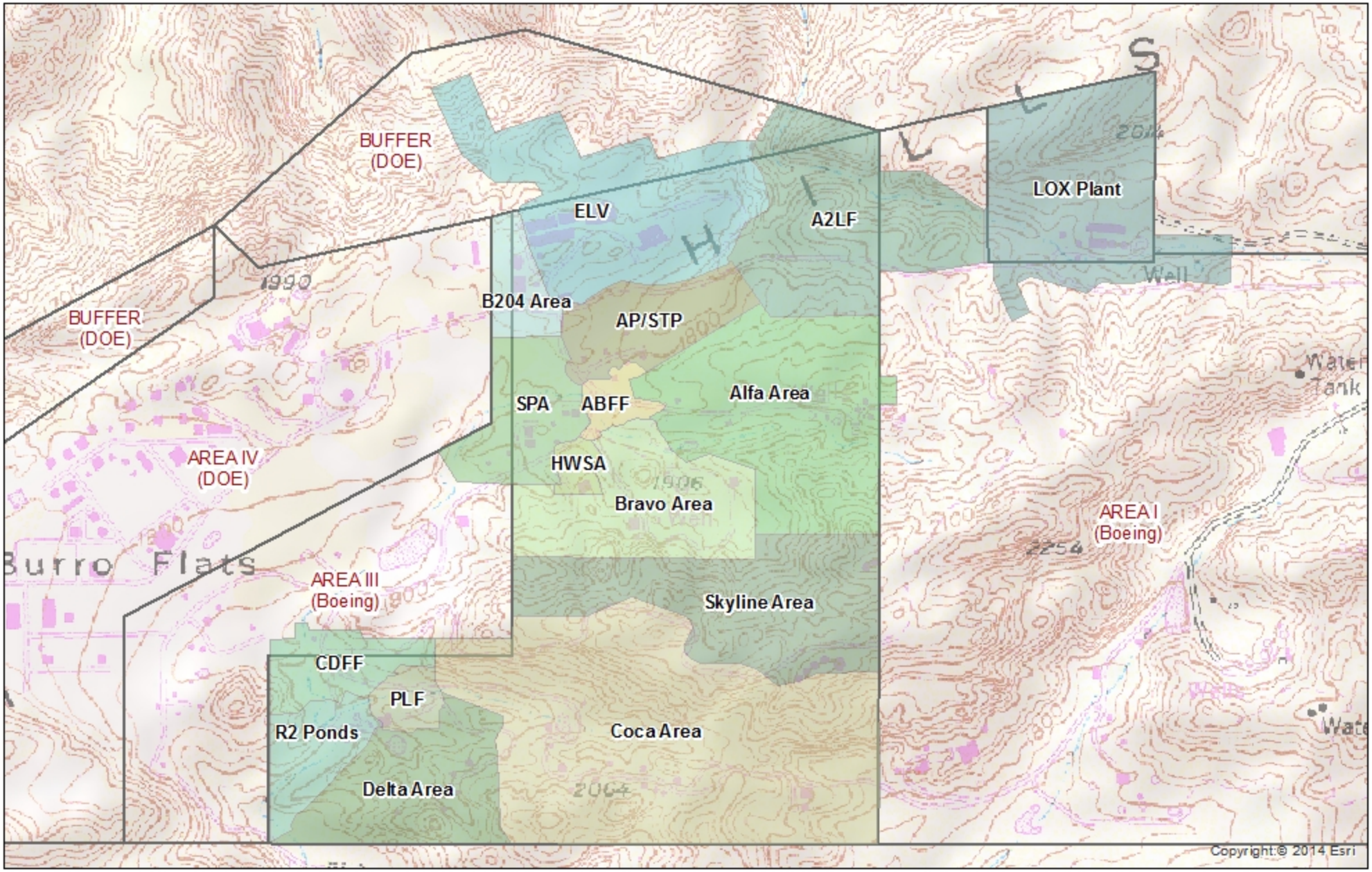
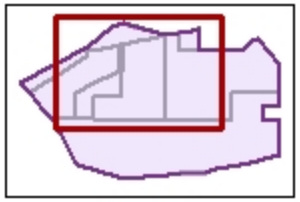


Figure 3
DOE Area IV Subareas
Santa Susana Field Laboratory
Ventura County, California





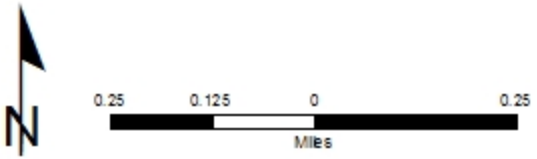


Figure 4
NASA Field Sampling Plan Areas
Santa Susana Field Laboratory
Ventura County, California

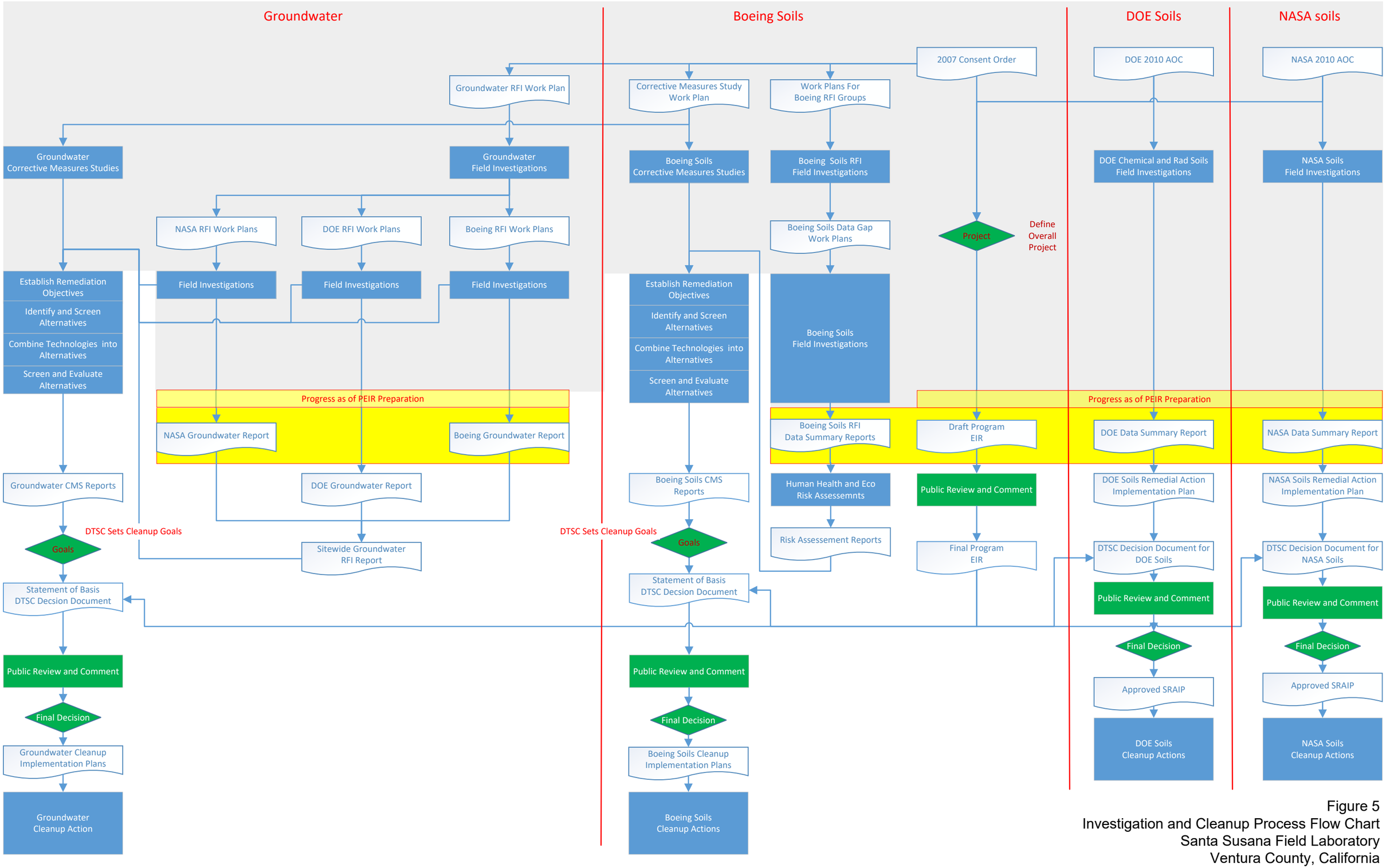
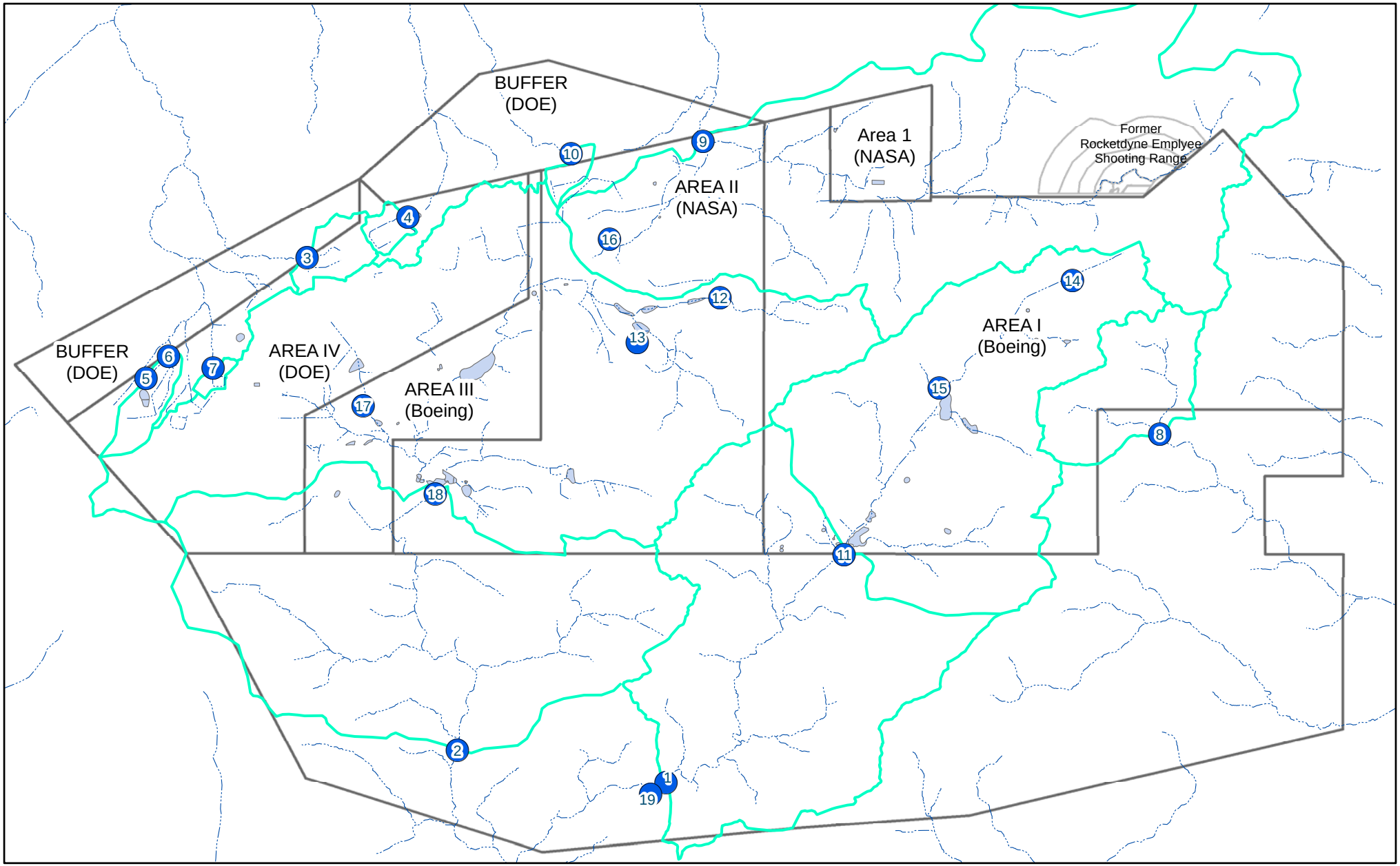


Figure 5
Investigation and Cleanup Process Flow Chart
Santa Susana Field Laboratory
Ventura County, California



Legend

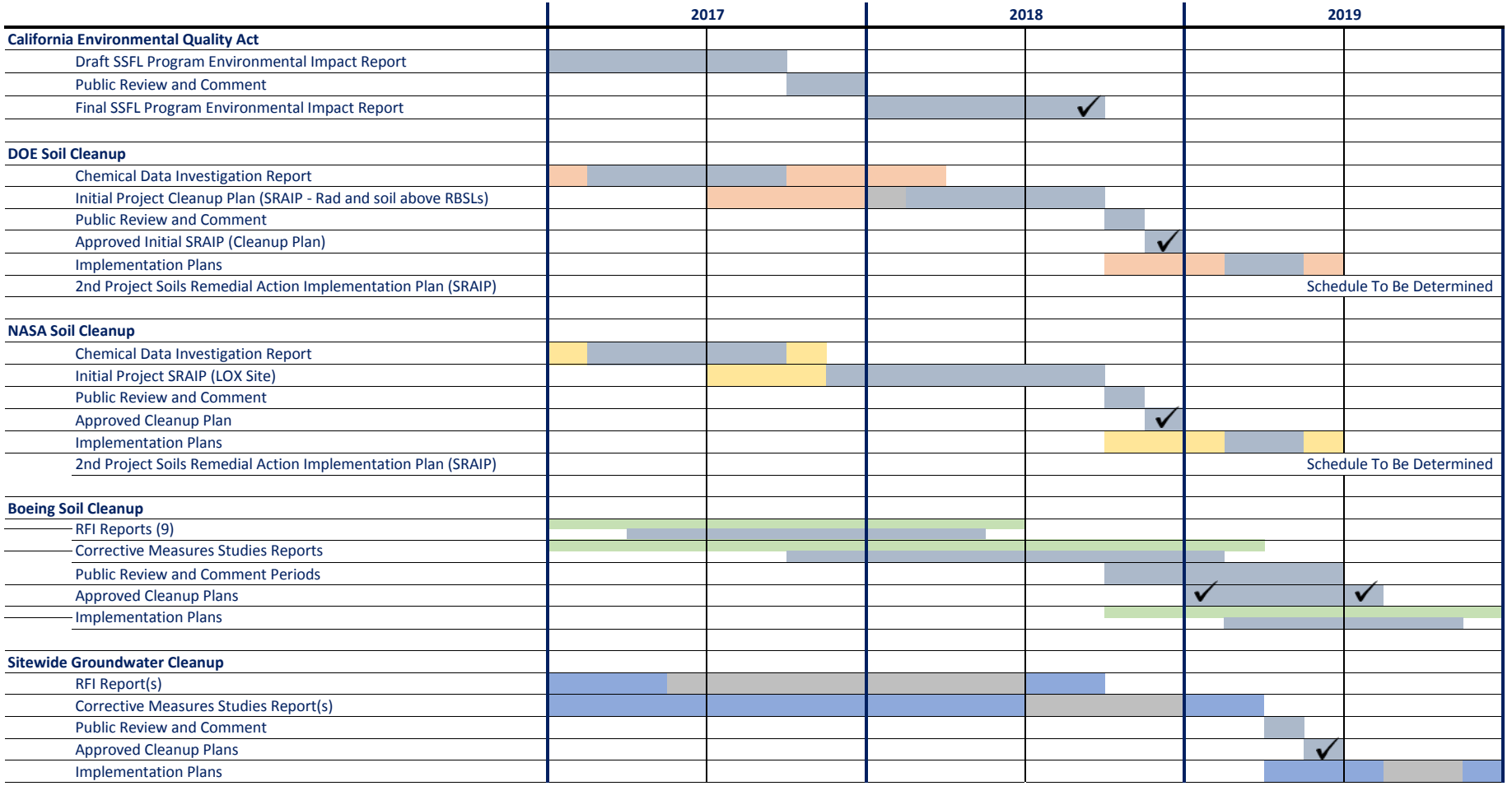
- NPDES Outfalls
- Sitewide stream
- NPDES Basins
- Ponds

N

0.25 0.125 0 0.25 0.5

Miles

Figure 6
Surface Water Outfalls and Property Boundaries
Santa Susana Field Laboratory
Ventura County, California

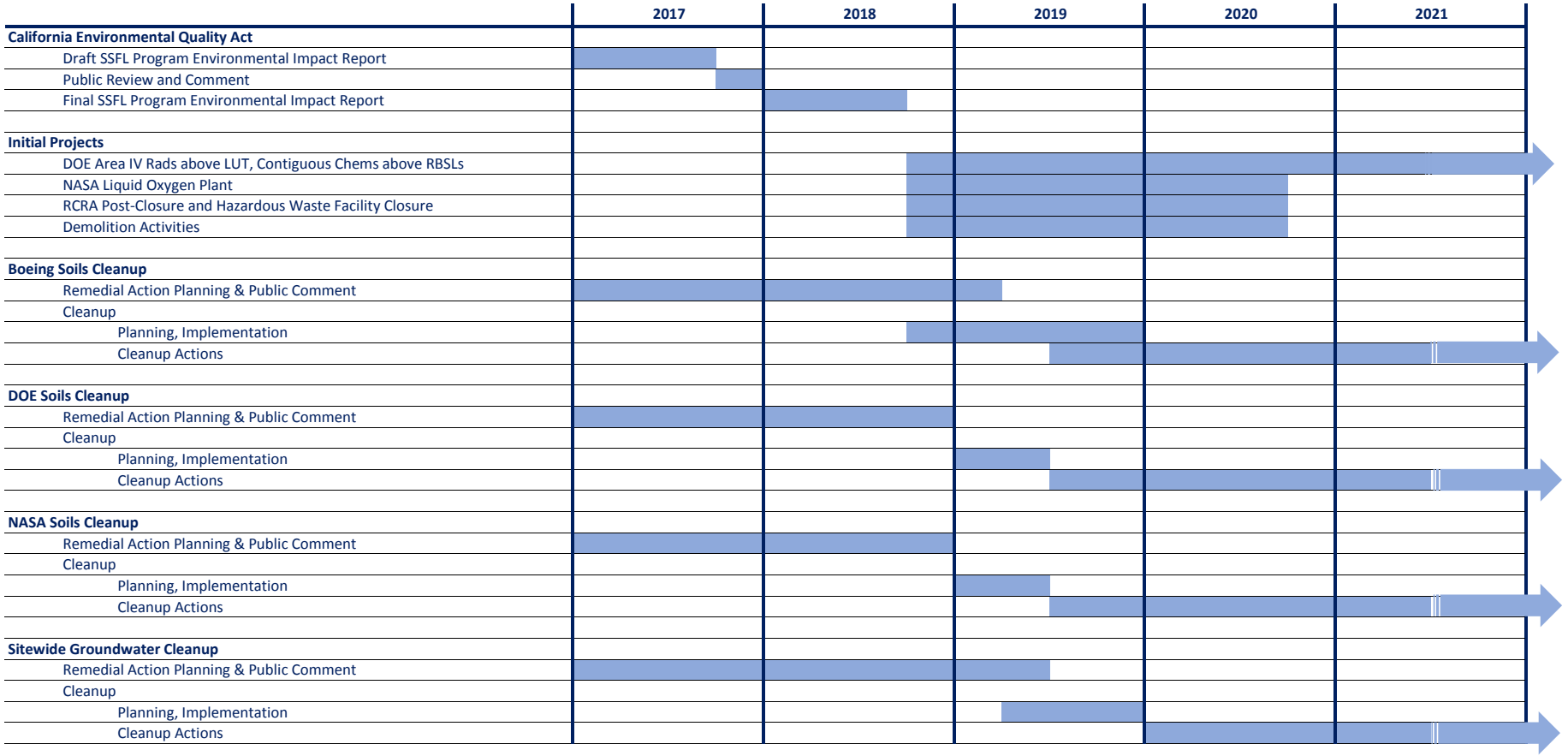


SRAIP	Soil Remedial Action Implementation Plan
RBSL	Risk Based Screening Levels
LOX	Liquid Oxygen

Legend

- ✓ Completion of Public Notice/Comment Activity
- DOE Activity
- NASA Activity
- Boeing Activity
- DTSC Activity (CEQA, Review, Planning, etc.)

Figure 7
Document Schedule
Santa Susana Field Laboratory
Ventura County, California



Note

End of the soil cleanup activities to be determined

Acronyms and Abbreviations

SSFL	Santa Susana Field Laboratory
Rads	Radionuclides
LUT	Look-up Table
Chem	Chemicals
RBSL	Risk Based Screening Level

Figure 8
Cleanup Schedule
Santa Susana Field Laboratory
Ventura County, California

Appendix B
Preliminary Screening Levels

ESA

Appendix B

Preliminary Screening Levels

- B-1: Boeing Proposed Human Health Risk Based Screening Levels
- B-2: Boeing Proposed Ecological Risk Based Screening Levels
- B-3: Responsible Party Proposed Groundwater Screening Reference Values
- B-4: Preliminary Chemical Lookup Table Values
- B-5: Draft Provisional Radiological Lookup Table Values

Appendix B-1

Boeing Proposed Human Health Risk Based Screening Levels

(Source: Appendix B of the Finalized Standardized Risk Assessment Methodology, Revision 2 Addendum, Santa Susana Field Laboratory, Ventura County, California dated October 2014)

Table 1

Summary of the Human Health Risk-Based Screening Levels for Chemicals in Soil at the SSFL

Analyte	CAS #	Analyte Synonym [a]	Suburban Residential Soil RBSL ($RBSL_{so\_res}$) [b]			SRAM-based Suburban Residential Garden RBSL ($RBSL_{so\_res\_g}$) [c]			USEPA default-based Suburban Residential Garden RBSL ($RBSL_{so\_res\_g}$) [c]			40-year Rural Residential Soil RBSL ($RBSL_{so\_RR}$) [d]			30-year Rural Residential Soil RBSL ($RBSL_{so\_RR}$) [d]			Recreational Soil RBSL ($RBSL_{so\_rec}$) [b]		
			Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Recreator Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)
Inorganic Compounds																				
Aluminum	7429905	Aluminum, Total	-	7.53E+04	7.53E+04	-	-	- [e]	-	-	- [e]	-	7.53E+04	7.53E+04	-	7.53E+04	7.53E+04	-	3.54E+05	3.54E+05
Antimony	7440360	Antimony, Total	-	2.64E+01	2.64E+01	-	1.39E-01	1.39E-01	-	3.68E+00	3.68E+00	-	6.99E-01	6.99E-01	-	6.99E-01	6.99E-01	-	1.23E+02	1.23E+02
Arsenic	7440382	Arsenic, Total	6.58E-02	2.16E+01	6.58E-02	9.92E-05	1.04E-01	9.92E-05	2.91E-03	2.76E+00	2.91E-03	1.70E-04	3.07E-01	1.70E-04	2.28E-04	3.07E-01	2.28E-04	2.46E-01	1.01E+02	2.46E-01
Barium	7440393	Barium, Total	-	1.10E+04	1.10E+04	-	7.15E+01	7.15E+01	-	1.89E+03	1.89E+03	-	8.77E+01	8.77E+01	-	8.77E+01	8.77E+01	-	5.19E+04	5.19E+04
Beryllium	7440417	Beryllium, Total	1.48E+03	3.12E+01	3.12E+01	-	7.16E-01	7.16E-01	-	1.89E+01	1.89E+01	1.03E+03	3.95E+00	3.95E+00	1.38E+03	3.95E+00	3.95E+00	2.07E+04	1.46E+02	1.46E+02
Boron	7440428	Boron, Total	-	1.52E+04	1.52E+04	-	1.49E+01	1.49E+01	-	3.94E+02	3.94E+02	-	4.62E+01	4.62E+01	-	4.62E+01	4.62E+01	-	7.10E+04	7.10E+04
Cadmium	7440439	Cadmium, Total	8.44E+02	4.60E+00 [f]	4.60E+00	-	1.65E-03 [f]	1.65E-03	-	5.46E-02 [f]	5.46E-02	5.91E+02	2.34E-03 [f]	2.34E-03	7.88E+02	2.34E-03 [f]	2.34E-03	1.18E+04	9.06E+00 [f]	9.06E+00
Chromium	7440473	Chromium, Total	-	3.72E+04	3.72E+04	-	5.42E+02	5.42E+02	-	1.43E+04	1.43E+04	-	3.02E+03	3.02E+03	-	3.02E+03	3.02E+03	-	1.74E+05	1.74E+05
Cobalt	7440484	Cobalt, Total	3.94E+02	2.28E+01	2.28E+01	-	9.97E-02	9.97E-02	-	2.63E+00	2.63E+00	2.76E+02	2.17E-01	2.17E-01	3.68E+02	2.17E-01	2.17E-01	5.52E+03	1.06E+02	1.06E+02
Copper	7440508	Copper, Total	-	3.04E+03	3.04E+03	-	1.11E+01	1.11E+01	-	2.92E+02	2.92E+02	-	1.99E+01	1.99E+01	-	1.99E+01	1.99E+01	-	1.42E+04	1.42E+04
Cyanides	57125	Cyanide, Total;	-	4.56E+01	4.56E+01	-	2.78E-02	2.78E-02	-	7.34E-01	7.34E-01	-	1.81E-01	1.81E-01	-	1.81E-01	1.81E-01	-	2.13E+02	2.13E+02
Fluoride	16984488	-	-	3.04E+03	3.04E+03	-	-	-	-	-	-	-	3.04E+03	3.04E+03	-	3.04E+03	3.04E+03	-	1.42E+04	1.42E+04
Hexavalent chromium	18540299	Chromium, Hexavalent; Chromium VI	1.29E+00	2.34E+02	1.29E+00	1.94E-03	1.08E+00	1.94E-03	5.70E-02	2.84E+01	5.70E-02	7.54E-03	5.02E+00	7.54E-03	9.89E-03	5.02E+00	9.89E-03	6.27E+00	1.09E+03	6.27E+00
Lead	7439921	Lead, Total	-	8.00E+01 [g]	8.00E+01 [g]	-	6.90E+00 [h]	6.90E+00 [h]	-	7.20E+00 [i]	7.20E+00 [i]	-	6.00E+00 [j]	6.00E+00 [j]	-	6.00E+00 [j]	6.00E+00 [j]	-	3.60E+02 [k]	3.60E+02 [k]
Lithium	7439932	Lithium, Total	-	1.52E+02	1.52E+02	-	7.06E-01	7.06E-01	-	1.87E+01	1.87E+01	-	8.95E-01	8.95E-01	-	8.95E-01	8.95E-01	-	7.10E+02	7.10E+02
Manganese	7439965	Manganese, Total	-	6.13E+03	6.13E+03	-	4.00E+01	4.00E+01	-	1.06E+03	1.06E+03	-	1.08E+02	1.08E+02	-	1.08E+02	1.08E+02	-	2.96E+04	2.96E+04
Mercury	7439976	Mercury, Total	-	1.68E+01	1.68E+01	-	5.04E-02	5.04E-02	-	1.33E+00	1.33E+00	-	2.44E-01	2.44E-01	-	2.44E-01	2.44E-01	-	7.82E+01	7.82E+01
Methyl Mercury	22967926	-	-	7.61E+00	7.61E+00	-	1.31E-03	1.31E-03	-	3.46E-02	3.46E-02	-	6.55E-03	6.55E-03	-	6.55E-03	6.55E-03	-	3.55E+01	3.55E+01
Molybdenum	7439987	Molybdenum, Total	-	3.80E+02	3.80E+02	-	1.38E+00	1.38E+00	-	3.65E+01	3.65E+01	-	4.36E+00	4.36E+00	-	4.36E+00	4.36E+00	-	1.78E+03	1.78E+03
Nickel	7440020	Nickel, Total	1.36E+04	9.08E+02	9.08E+02	-	6.07E+00	6.07E+00	-	1.60E+02	1.60E+02	9.55E+03	6.10E+00	6.10E+00	1.27E+04	6.10E+00	6.10E+00	1.91E+05	4.28E+03	4.28E+03
Selenium	7782492	Selenium, Total	-	3.80E+02	3.80E+02	-	1.31E+00	1.31E+00	-	3.45E+01	3.45E+01	-	6.88E-01	6.88E-01	-	6.88E-01	6.88E-01	-	1.78E+03	1.78E+03
Silver	7440224	Silver, Total	-	2.30E+02	2.30E+02	-	1.81E+00	1.81E+00	-	4.77E+01	4.77E+01	-	2.19E+00	2.19E+00	-	2.19E+00	2.19E+00	-	1.07E+03	1.07E+03
Strontium	7440246	Strontium, Total	-	4.56E+04	4.56E+04	-	1.21E+02	1.21E+02	-	3.20E+03	3.20E+03	-	2.48E+02	2.48E+02	-	2.48E+02	2.48E+02	-	2.13E+05	2.13E+05
Thallium	7440280	Thallium, Total	-	7.61E-01	7.61E-01	-	3.60E-03	3.60E-03	-	9.51E-02	9.51E-02	-	5.93E-04	5.93E-04	-	5.93E-04	5.93E-04	-	3.55E+00	3.55E+00
Tin	7440315	Tin, Total	-	4.56E+04	4.56E+04	-	1.01E+02	1.01E+02	-	2.66E+03	2.66E+03	-	1.69E+02	1.69E+02	-	1.69E+02	1.69E+02	-	2.13E+05	2.13E+05
Vanadium	7440622	Vanadium, Total	-	1.88E+02	1.88E+02	-	1.80E+00	1.80E+00	-	4.75E+01	4.75E+01	-	1.07E+01	1.07E+01	-	1.07E+01	1.07E+01	-	8.78E+02	8.78E+02
Zinc	7440666	Zinc, Total	-	2.28E+04	2.28E+04	-	5.38E+01	5.38E+01	-	1.42E+03	1.42E+03	-	3.16E+01	3.16E+01	-	3.16E+01	3.16E+01	-	1.07E+05	1.07E+05
Zirconium	7440677	Zirconium, Total	-	6.09E+00	6.09E+00	-	2.89E-02	2.89E-02	-	7.64E-01	7.64E-01	-	1.74E-01	1.74E-01	-	1.74E-01	1.74E-01	-	2.84E+01	2.84E+01
Energetic Constituents																				
1,2-Dinitrobenzene	528290	o-Dinitrobenzene	-	6.11E+00	6.11E+00	-	8.82E-03	8.82E-03	-	2.33E-01	2.33E-01	-	4.00E-02	4.00E-02	-	4.00E-02	4.00E-02	-	2.85E+01	2.85E+01
1,3-Dinitrobenzene	99650	m-Dinitrobenzene	-	6.11E+00	6.11E+00	-	7.18E-03	7.18E-03	-	1.90E-01	1.90E-01	-	4.33E-02	4.33E-02	-	4.33E-02	4.33E-02	-	2.85E+01	2.85E+01
2,4,6-Trinitrotoluene	118967	-	2.07E+01	3.59E+01	2.07E+01	7.26E-03	4.02E-02	7.26E-03	2.13E-01	1.06E+00	2.13E-01	1.20E-02	1.17E-01	1.20E-02	1.61E-02	1.17E-01	1.61E-02	7.65E+01	1.67E+02	7.65E+01
2-Amino-4,6-dinitrotoluene	35572782	-	-	1.54E+02	1.54E+02	-	2.04E-01	2.04E-01	-	5.40E+00	5.40E+00	-	9.94E-01	9.94E-01	-	9.94E-01	9.94E-01	-	7.18E+02	7.18E+02
HMX	2691410	-	-	3.85E+03	3.85E+03	-	7.26E-01	7.26E-01	-	1.92E+01	1.92E+01	-	4.77E+00	4.77E+00	-	4.77E+00	4.77E+00	-	1.79E+04	1.79E+04
Hydrazine	302012	-	1.73E-01	4.25E+04	1.73E-01	6.67E-07	-	6.67E-07	1.96E-05	-	1.96E-05	3.73E-06	4.25E+04	3.73E-06	4.89E-06	4.25E+04	4.89E-06	4.79E-01	5.96E+05	4.79E-01
RDX	121824	Hexahydro-1,3,5-trinitro-1,3,5-triazine	5.94E+00	2.25E+02	5.94E+00	8.67E-04	1.06E-01	8.67E-04	2.54E-02	2.79E+00	2.54E-02	4.16E-03	6.39E-01	4.16E-03	5.47E-03	6.39E-01	5.47E-03	2.45E+01	1.05E+03	2.45E+01
Perchlorate	14797730	-	-	5.33E+01	5.33E+01	-	1.58E-02	1.58E-02	-	4.18E-01	4.18E-01	-	1.18E-04	1.18E-04	-	1.18E-04	1.18E-04	-	2.49E+02	2.49E+02
Volatile Organic Compounds																				
1,1,1,2-Tetrachloroethane	630206	-	2.87E+00	7.01E+02	2.87E+00	2.36E-02	6.81E+00	2.36E-02	6.93E-01	1.80E+02	6.93E-01	2.48E-02	1.34E+01	2.48E-02	3.34E-02	1.34E+01	3.34E-02	3.29E+01	6.14E+03	3.29E+01
1,1,1-Trichloroethane	71556	-	-	5.74E+03	5.74E+03	-	3.50E+02	3.50E+02	-	9.25E+03	9.25E+03	-	6.58E+02	6.58E+02	-	6.58E+02	6.58E+02	-	7.49E+04	7.49E+04
1,1,2,2-Tetrachloroethane	79345	-	2.88E-01	3.95E+02	2.88E-01	1.64E-03	3.27E+00	1.64E-03	4.80E-02	8.62E+01	4.80E-02	7.99E-04	3.26E+00	7.99E-04	1.08E-03	3.26E+00	1.08E-03	3.29E+00	3.67E+03	3.29E+00
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	Freon 113	-	2.88E+04	2.88E+04	-	7.56E+03	7.56E+03	-	2.00E+05	2.00E+05	-	4.92E+03	4.92E+03	-	4.92E+03	4.92E+03	-	3.94E+05	3.94E+05
1,1,2-Trichloroethane	79005	-	5.33E-01	7.21E-01	5.33E-01	4.03E-03	4.29E-01	4.03E-03	1.18E-01	1.13E+01	1.18E-01	4.61E-03	4.06E-01	4.61E-03	6.21E-03	4.06E-01	6.21E-03	6.71E+00	1.01E+01	6.71E+00
1,1-Dichloroethane	75343	-	1.89E+00	8.16E+02	1.89E+00	4.63E-02	1.95E+01	4.63E-02	1.36E+00	5.15E+02	1.36E+00	3.55E-02	2.92E+01	3.55E-02	4.79E-02	2.92E+01	4.79E-02	2.57E+01	1.03E+04	2.57E+01
1,1-Dichloroethene	75354	-	-	5.58E+01	5.58E+01	-	6.64E+00	6.64E+00	-	1.75E+02	1.75E+02	-	5.68E+00	5.68E+00	-	5.68E+00	5.68E+00	-	7.59E+02	7.59E+02
1,1-Dimethylhydrazine	57147	Unsymetrical Dimethyl Hydrazine	-	7.80E+00	7.80E+00	-	2.48E-04	2.48E-04	-	6.54E-03	6.54E-03	-	1.58E-03	1.58E-03	-	1.58E-03	1.58E-03	-	3.65E+01	3.65E+01
1,2,3-Trichlorobenzene	87616	-	6.11E+01	3.90E+01	3.90E+01	2.40E-01	2.55E-01	2.40E-01	7.04E+00	6.74E+00	6.74E+00	6.06E-02	1.37E-01	6.06E-02	8.21E-02	1.37E-01	8.21E-02	5.21E+02	2.43E+02	2.43E+02
1,2,4-Trichlorobenzene	120821	-	3.09E+01	2.92E+01	2.92E+01	2.39E-01	3.18E+00	2.39E-01	7.01E+00	8.39E+01	7.01E+00	1.08E-02	3.13E-01	1.08E-02	1.47E-02	3.13E-01	1.47E-02	3.26E+02	3.81E+02	3.26E+02
1,2,4-Trimethylbenzene	95636	-	-	3.97E+01	3.97E+01	-	2.93E+00	2.93E+00	-	7.75E+01	7.75E+01	-	2.25E+00	2.25E+00	-	2.25E+00	2.25E+00	-	5.05E+02	5.05E+02
1,2-Dibromo-3-chloropropane	96128	1,2-Dibromo-3-CPA	9.78E-02	1.56E+01	9.78E-02	8.91E-05	4.61E-02	8.91E-05	2.61E-03	1.22E+00	2.61E-03	3.32E-05	3.59E-02	3.32E-05	4.50E-05	3.59E-02	4.50E-05	4.56E-01	7.30E+01	4.56E-01
1,2-Dibromoethane	106934	1,2-Dibromoethane	1.04E-01	5.43E+01	1.04E-01	8.60E-05	1.03E+00	8.60E-05	2.52E-03	2.72E+01	2.52E-03	5.84E-05	1.37E+00	5.84E-05	7.90E-05	1.37E+00	7.90E-05	6.96E-01	6.59E+02	6.96E-01
1,2-Dichlorobenzene	95501	o-Dichlorobenzene	-	1.70E+03	1.70E+03	-	2.50E+01	2.50E+01	-	6.59E+02	6.59E+02	-	1.05E+01	1.05E+01	-	1.05E+01	1.05E+01	-	1.61E+04	1.61E+04
1,2-Dichloroethane	107062	-	2.61E-01	1.51E+01	2.61E-01	4.07E-03	4.24E-01	4.07E-03	1.19E-01	1.12E+01	1.19E-01	5.17E-03	9.55E-01	5.17E-03	6.96E-03	9.55E-01	6.96E-03	3.53E+00	1.99E+02	3.53E+00
1,2-Dichloroethene	540590	1,2-Dichloroethenes	-	9.69E+01	9.69E+01	-	1.16E+00	1.16E+00	-	3.05E+01	3.05E+01	-	1.78E+00	1.78E+00	-	1.78E+00	1.78E+00	-	1.06E+03	1.06E+03
1,2-Dichloropropane	78875	-	4.39E-01	7.19E+00	4.39E-01	8.76E-03	1.05E+01	8.76E-03	2.57E-01	2.77E+02	2.57E-01	6.74E-03	4.98E+00	6.74E-03	9.10E-03	4.98E+00	9.10E-03	5.88E+00	1.00E+02	5.88E+00
1,3,5-Trimethylbenzene	108678	-	-	1.75E+02	1.75E+02	-	2.77E+00	2.77E+00	-	7.30E+01	7.30E+01	-	2.46E+00	2.46E+00	-	2.46E+00	2.46E+00	-	1.69E+03	1.69E+03
1,3-Dichlorobenzene	541731	m-Dichlorobenzene	-	9.15E+02	9.15E+02	-	8.57E+00	8.57E+00	-	2.26E+02	2.26E+02	-	8.68E+00	8.68E+00	-	8.68E+00	8.68E+00	-	7.20E+03	7.20E+03
1,4-Dichlorobenzene	106467	p-Dichlorobenzene	1.33E+00	2.53E+03	1.33E+00	1.40E-01	1.95E+01	1.40E-01	4.09E+00	5.14E+02	4.09E+00	6.05E-03	1.87E+00	6.05E-03	8.21E-03	1.87E+00	8.21E-03	1.82E+01	1.84E+04	1.82E+01
2-Chloroethylvinyl ether	110758	2-Chloroethyl vinyl	4.20E-03	-	4.20E-03	5.45E-05	-	5.45E-05	1.60E-03	-	1.60E-03	1.48E-04	-	1.48E-04	1.97E-04	-	1.97E-04	5.71E-02	-	5.71E-02
2-Hexanone	591786	Methyl butyl ketone	-	1.70E+02	1.70E+02	-	3.18E-01	3.18E-01	-	8.39E+00	8.39E+00	-	1.06E+00	1.06E+00	-	1.06E+00	1.06E+00	-	1.27E+03	1.27E+03
Acetone	67641	-	-	6.01E+04	6.01E+04	-	7.79E+00	7.79E+00	-	2.06E+02	2.06E+02	-	4.63E+01	4.63E+01	-	4.63E+01	4.63E+01	-	3.11E+05	3.11E+05
Benzene	71432	-	1.15E-01	3.61E+01	1.15E-01	3.60E-03	5.31E-01	3.60E-03	1.05E-01	1.40E+01	1.05E-01	4.06E-03	1.14E+00	4.06E-03	5.47E-03	1.14E+00	5.47E-03	1.56E+00	4.11E+02	1.56E+00
Bromobenzene	108861	-	-	2.36E+02	2.36E+02	-	1.87E+00	1.87E+00	-	4.94E+01	4.94E+01	-	3.24E+00	3.24E+00	-	3.24E+00	3.24E+00	-	1.89E+03	1.89E+03
Bromodichloromethane	75274	-	1.95E-01	1.85E+02	1.95E-01	2.47E-03	2.37E+00	2.47E-03	7.24E-02	6.26E+01	7.24E-02	2.05E-03	3.83E+00	2.05E-03	2.77E-03	3.83E+00	2.77E-03	2.54E+00	2.09E+03	2.54E+00
Bromoform	75252	-	6.22E+01	1.56E+03	6.22E+01	4.05E-02	3.29E+00	4.05E-02	1.19E+00	8.68E+01	1.19E+00	6.71E-02	9.51E+00	6.71E-02	9.00E-02	9.51E+00	9.00E-02	2.90E+02	7.30E+03	2.90E+02
Bromomethane	74839	-	-	5.16E+00	5.16E+00	-	7.19E-02	7.19E-02	-	1.90E+00	1.90E+00	-	2.83E-01	2.83E-01	-	2.83E-01	2.83E-01	-	6.61E+01	6.61E+01
Carbon disulfide	75150	-	-	5.42E+02	5.42E+02	-	1.12E+01	1.12E+01	-	2.97E+02	2.97E+02	-	7.58E+00	7.58E+00	-	7.58E+00	7.58E+00	-	6.66E+03	6.66E+03
Carbon tetrachloride	56235	-	7.10E-02	8.74E+01	7.10E-02	3.89E-03	8.63E-01	3.89E-03	1.14E-01	2.28E+01	1.14E-01	3.32E-03	1.50E+00	3.32E-03	4.47E-03	1.50E+00	4.47E-03	9.65E-01	7.85E+02	9.65E-01
Chlorobenzene	108907	Monochlorobenzene	-	1.35E+02	1.35E+02	-	4.34E+00	4.34E+00	-	1.15E+02	1.15E+02	-	4.30E+00	4.30E+00	-	4.30E+00	4.30E+00	-	1.62E+03	1.62E+03
Chloroform	67663	Trichloromethane	7.33E-01	2.98E+02	7.33E-01	1.01E-02	1.16E+00	1.01E-02	2.96E-01	3.05E+01	2.96E-01	4.36E-03	1.04E+00	4.36E-03	5.90E-03	1.04E+00	5.90E-03	9.62E+00	2.37E+03	9.62E+00
Chloromethane	74873	Methyl chloride	-	4.51E+01	4.51E+01	-	5.18E-02	5.18E-02	-	1.37E+00	1.37E+00	-	2.19E-01	2.19E-01	-	2.19E-01	2.19E-01	-	3.46E+02	3.46E+02
cis-1,2-Dichloroethene	156592	cis-1,2-	-	9.22E+00	9.22E+00	-	2.09E-01	2.09E-01	-	5.51E+00	5.51E+00	-	2.20E-01	2.20E-01	-	2.20E-01	2.20E-01	-	1.15E+02	1.15E+02
Cumene	98828	Isopropylbenzene	-	1.51E+03	1.51E+03	-	2.96E+01	2.96E+01	-	7.81E+02	7.81E+02	-	6.31E+01	6.31E+01	-	6.31E+01	6.31E+01	-	1.53E+04	1.53E+04
Dibromochloromethane	124481	-	7.28E+00	1.56E+03	7.28E+00	3.92E-03	2.73E+00	3.92E-03	1.15E-01	7.20E+01	1.15E-01	2.37E-03	3.32E+00	2.37E-03	3.20E-03	3.32E+00	3.20E-03	3.40E+01	7.30E+03	3.40E+01

Table 1

Summary of the Human Health Risk-Based Screening Levels for Chemicals in Soil at the SSFL

Analyte	CAS #	Analyte Synonym [a]	Suburban Residential Soil RBSL ($RBSL_{so\_res}$) [b] Composite Resident Cancer (10^{-6}) (mg/kg)	Suburban Residential Soil RBSL Child Noncancer (HQ=1) (mg/kg)	Suburban Residential Soil RBSL Lowest (mg/kg)	SRAM-based Suburban Residential Garden RBSL ($RBSL_{so\_res\_g}$) [c] Composite Resident Cancer (10^{-6}) (mg/kg)	SRAM-based Child Noncancer (HQ=1) (mg/kg)	SRAM-based Lowest (mg/kg)	USEPA default-based Suburban Residential Garden RBSL ($RBSL_{so\_res\_g}$) [c] Composite Resident Cancer (10^{-6}) (mg/kg)	USEPA default-based Child Noncancer (HQ=1) (mg/kg)	USEPA default-based Lowest (mg/kg)	40-year Rural Residential Soil RBSL ($RBSL_{so\_RR}$) [d] Composite Resident Cancer (10^{-6}) (mg/kg)	40-year Child Noncancer (HQ=1) (mg/kg)	40-year Lowest (mg/kg)	30-year Rural Residential Soil RBSL ($RBSL_{so\_RR}$) [d] Composite Resident Cancer (10^{-6}) (mg/kg)	30-year Child Noncancer (HQ=1) (mg/kg)	30-year Lowest (mg/kg)	Recreational Soil RBSL ($RBSL_{so\_rec}$) [b] Composite Recreator Cancer (10^{-6}) (mg/kg)	Recreational Child Noncancer (HQ=1) (mg/kg)	Recreational Lowest (mg/kg)
Dibromomethane	74953	-	-	2.23E+01	2.23E+01	-	8.91E-01	8.91E-01	-	2.35E+01	2.35E+01	-	2.60E+00	2.60E+00	-	2.60E+00	2.60E+00	-	2.95E+02	2.95E+02
Dichlorodifluoromethane	75718	Freon 12	-	6.62E+01	6.62E+01	-	2.73E+01	2.73E+01	-	7.20E+02	7.20E+02	-	3.89E+01	3.89E+01	-	3.89E+01	3.89E+01	-	9.20E+02	9.20E+02
Ethylbenzene	100414	-	2.31E+00	2.98E+03	2.31E+00	6.17E-02	2.51E+01	6.17E-02	1.81E+00	6.62E+02	1.81E+00	1.38E-02	1.20E+01	1.38E-02	1.86E-02	1.20E+01	1.86E-02	3.01E+01	2.37E+04	3.01E+01
Methyl ethyl ketone	78933	2-Butanone; 2-Butanone (MEK)	-	2.33E+04	2.33E+04	-	1.03E+01	1.03E+01	-	2.71E+02	2.71E+02	-	5.12E+01	5.12E+01	-	5.12E+01	5.12E+01	-	1.64E+05	1.64E+05
Methyl isobutyl ketone (MIBK)	108101	MIBK; 4-Methyl-2-	-	4.96E+03	4.96E+03	-	4.70E+00	4.70E+00	-	1.24E+02	1.24E+02	-	1.66E+01	1.66E+01	-	1.66E+01	1.66E+01	-	2.69E+04	2.69E+04
Methylene chloride	75092	Dichloromethane	2.97E+00	2.90E+02	2.97E+00	1.06E-02	3.30E-01	1.06E-02	3.12E-01	8.71E+00	3.12E-01	3.83E-03	2.50E-01	3.83E-03	5.19E-03	2.50E-01	5.19E-03	3.71E+01	1.82E+03	3.71E+01
Monomethylhydrazine	60344	Monomethyl Hydrazine	1.24E-03	7.80E+01	1.24E-03	1.47E-08	2.98E-03	1.47E-08	4.30E-07	7.87E-02	4.30E-07	7.64E-08	1.89E-02	7.64E-08	1.00E-07	1.89E-02	1.00E-07	5.81E-03	3.65E+02	5.81E-03
m-Xylene & p-Xylene	136777612	meta- and para-Xylenes; m, p-Xylene	-	4.28E+02	4.28E+02	-	4.96E+01	4.96E+01	-	1.31E+03	1.31E+03	-	1.11E+02	1.11E+02	-	1.11E+02	1.11E+02	-	5.69E+03	5.69E+03
n-Butylbenzene	104518	-	-	8.45E+02	8.45E+02	-	1.67E+01	1.67E+01	-	4.40E+02	4.40E+02	-	1.08E+01	1.08E+01	-	1.08E+01	1.08E+01	-	8.26E+03	8.26E+03
n-Propylbenzene	103651	-	-	3.16E+03	3.16E+03	-	2.98E+01	2.98E+01	-	7.86E+02	7.86E+02	-	2.87E+01	2.87E+01	-	2.87E+01	2.87E+01	-	2.44E+04	2.44E+04
o-Chlorotoluene	95498	2-Chlorotoluene	-	3.37E+02	3.37E+02	-	5.53E+00	5.53E+00	-	1.46E+02	1.46E+02	-	5.26E+00	5.26E+00	-	5.26E+00	5.26E+00	-	3.30E+03	3.30E+03
o-Xylene	95476	-	-	2.86E+02	2.86E+02	-	4.96E+01	4.96E+01	-	1.31E+03	1.31E+03	-	6.06E+01	6.06E+01	-	6.06E+01	6.06E+01	-	3.87E+03	3.87E+03
p-Chlorotoluene	106434	4-Chlorotoluene	-	3.10E+02	3.10E+02	-	5.37E+00	5.37E+00	-	1.42E+02	1.42E+02	-	5.70E+00	5.70E+00	-	5.70E+00	5.70E+00	-	3.10E+03	3.10E+03
p-Cymene	99876	p-Isopropyltoluene	-	1.94E+03	1.94E+03	-	3.22E+01	3.22E+01	-	8.50E+02	8.50E+02	-	1.07E+01	1.07E+01	-	1.07E+01	1.07E+01	-	1.82E+04	1.82E+04
p-Nitroaniline	100016	4-Nitroaniline	3.42E+01	3.13E+02	3.42E+01	8.72E-03	2.58E-01	8.72E-03	2.56E-01	6.80E+00	2.56E-01	3.24E-02	1.33E+00	3.24E-02	4.29E-02	1.33E+00	4.29E-02	1.60E+02	1.46E+03	1.60E+02
sec-Butylbenzene	135988	-	-	1.73E+03	1.73E+03	-	3.39E+01	3.39E+01	-	8.96E+02	8.96E+02	-	1.52E+01	1.52E+01	-	1.52E+01	1.52E+01	-	1.68E+04	1.68E+04
Styrene	100425	Vinylbenzene	-	1.14E+04	1.14E+04	-	4.59E+01	4.59E+01	-	1.21E+03	1.21E+03	-	2.68E+02	2.68E+02	-	2.68E+02	2.68E+02	-	6.49E+04	6.49E+04
tert-Butylbenzene	98066	Dibenzo[b,e][1,4]dioxin, octachloro-	-	1.73E+03	1.73E+03	-	3.22E+01	3.22E+01	-	8.51E+02	8.51E+02	-	1.26E+01	1.26E+01	-	1.26E+01	1.26E+01	-	1.68E+04	1.68E+04
Tetrachloroethene	127184	-	4.16E-01	5.20E+01	4.16E-01	1.38E-03	1.65E+00	1.38E-03	4.04E-02	4.35E+01	4.04E-02	1.53E-04	3.96E-01	1.53E-04	2.07E-04	3.96E-01	2.07E-04	3.52E+00	5.96E+02	3.52E+00
Tetralin	119642	-	8.29E+00	2.78E+02	8.29E+00	-	5.31E+00	5.31E+00	-	1.40E+02	1.40E+02	5.80E+00	2.73E+01	5.80E+00	7.73E+00	2.73E+01	7.73E+00	1.16E+02	2.87E+03	1.16E+02
Toluene	108883	Toluol	-	3.74E+03	3.74E+03	-	1.63E+01	1.63E+01	-	4.31E+02	4.31E+02	-	2.78E+01	2.78E+01	-	2.78E+01	2.78E+01	-	2.39E+04	2.39E+04
trans-1,2-Dichloroethene	156605	-	-	8.53E+01	8.53E+01	-	2.57E+00	2.57E+00	-	6.78E+01	6.78E+01	-	2.57E+00	2.57E+00	-	2.57E+00	2.57E+00	-	1.08E+03	1.08E+03
Trichloroethene	79016	Trichloroethylene	7.97E-01	2.99E+00	7.97E-01	9.81E-03	8.34E-02	9.81E-03	2.88E-01	2.20E+00	2.88E-01	5.52E-03	9.33E-02	5.52E-03	7.46E-03	9.33E-02	7.46E-03	1.01E+01	3.63E+01	1.01E+01
Trichlorofluoromethane	75694	-	-	5.30E+02	5.30E+02	-	5.40E+01	5.40E+01	-	1.43E+03	1.43E+03	-	3.44E+01	3.44E+01	-	3.44E+01	3.44E+01	-	7.10E+03	7.10E+03
Vinyl chloride	75014	-	2.04E-02	5.05E+01	2.04E-02	8.23E-04	2.46E-01	8.23E-04	2.41E-02	6.51E+00	2.41E-02	7.70E-04	4.63E-01	7.70E-04	1.04E-03	4.63E-01	1.04E-03	2.82E-01	4.94E+02	2.82E-01
Xylenes, Total	1330207	Xylene (Total) Isomers	-	4.28E+02	4.28E+02	-	4.96E+01	4.96E+01	-	1.31E+03	1.31E+03	-	1.11E+02	1.11E+02	-	1.11E+02	1.11E+02	-	5.69E+03	5.69E+03
Semi-Volatile Organic Compounds																				
1,4-Dioxane	123911	-	1.93E+01	1.83E+03	1.93E+01	8.37E-04	2.51E-01	8.37E-04	2.46E-02	6.62E+00	2.46E-02	4.45E-03	1.61E+00	4.45E-03	5.83E-03	1.61E+00	5.83E-03	5.32E+01	8.55E+03	5.32E+01
2,4,5-Trichlorophenol	95954	-	-	6.11E+03	6.11E+03	-	3.00E+01	3.00E+01	-	7.92E+02	7.92E+02	-	2.29E+01	2.29E+01	-	2.29E+01	2.29E+01	-	2.85E+04	2.85E+04
2,4,6-Trichlorophenol	88062	-	7.43E+00	6.11E+01	7.43E+00	1.15E-02	2.98E-01	1.15E-02	3.38E-01	7.86E+00	3.38E-01	1.46E-03	8.17E-02	1.46E-03	1.97E-03	8.17E-02	1.97E-03	2.05E+01	2.85E+02	2.05E+01
2,4-Dimethylphenol	105679	-	-	1.22E+03	1.22E+03	-	3.05E+00	3.05E+00	-	8.05E+01	8.05E+01	-	1.80E+01	1.80E+01	-	1.80E+01	1.80E+01	-	5.70E+03	5.70E+03
3,5-Dimethylphenol	108689	-	-	4.40E+02	4.40E+02	-	1.37E+00	1.37E+00	-	3.61E+01	3.61E+01	-	4.82E+00	4.82E+00	-	4.82E+00	4.82E+00	-	2.05E+03	2.05E+03
Benzoic acid	65850	-	-	2.44E+05	2.44E+05	-	4.21E+02	4.21E+02	-	1.11E+04	1.11E+04	-	8.18E+02	8.18E+02	-	8.18E+02	8.18E+02	-	1.14E+06	1.14E+06
Benzyl alcohol	100516	-	-	6.11E+03	6.11E+03	-	4.63E+00	4.63E+00	-	1.22E+02	1.22E+02	-	2.49E+01	2.49E+01	-	2.49E+01	2.49E+01	-	2.85E+04	2.85E+04
bis(2-Ethylhexyl) phthalate	117817	bis(2-	1.73E+02	1.22E+03	1.73E+02	3.26E-01	7.23E+00	3.26E-01	9.56E+00	1.91E+02	9.56E+00	2.83E-02	7.08E-01	2.83E-02	3.70E-02	7.08E-01	3.70E-02	4.79E+02	5.70E+03	4.79E+02
Butyl benzyl phthalate	85687	-	2.74E+02	1.22E+04	2.74E+02	4.89E-01	6.87E+01	4.89E-01	1.43E+01	1.81E+03	1.43E+01	1.99E+00	3.49E+02	1.99E+00	2.62E+00	3.49E+02	2.62E+00	7.56E+02	5.70E+04	7.56E+02
Carbazole	86748	-	2.60E+01	-	2.60E+01	4.06E-02	-	4.06E-02	1.19E+00	-	1.19E+00	8.98E-02	-	8.98E-02	1.20E-01	-	1.20E-01	7.19E+01	-	7.19E+01
Dibenzofuran	132649	-	-	5.47E+01	5.47E+01	-	3.23E-01	3.23E-01	-	8.52E+00	8.52E+00	-	2.93E-01	2.93E-01	-	2.93E-01	2.93E-01	-	2.74E+02	2.74E+02
Diethyl phthalate	84662	-	-	4.89E+04	4.89E+04	-	1.33E+02	1.33E+02	-	3.52E+03	3.52E+03	-	2.08E+02	2.08E+02	-	2.08E+02	2.08E+02	-	2.28E+05	2.28E+05
Dimethyl phthalate	131113	-	-	4.89E+04	4.89E+04	-	6.44E+01	6.44E+01	-	1.70E+03	1.70E+03	-	2.42E+02	2.42E+02	-	2.42E+02	2.42E+02	-	2.28E+05	2.28E+05
Di-n-butyl phthalate	84742	Di-n-butylphthalate	-	6.11E+03	6.11E+03	-	3.37E+01	3.37E+01	-	8.90E+02	8.90E+02	-	3.20E+01	3.20E+01	-	3.20E+01	3.20E+01	-	2.85E+04	2.85E+04
Di-n-octyl phthalate	117840	Di-n-octyl-phthalate	-	6.11E+02	6.11E+02	-	3.61E+00	3.61E+00	-	9.54E+01	9.54E+01	-	1.14E-01	1.14E-01	-	1.14E-01	1.14E-01	-	2.85E+03	2.85E+03
Formaldehyde	50000	-	5.91E+05	1.22E+04	1.22E+04	-	3.70E+00	3.70E+00	-	9.78E+01	9.78E+01	4.14E+05	1.78E+01	1.78E+01	5.52E+05	1.78E+01	1.78E+01	8.27E+06	5.70E+04	5.70E+04
Hexachlorobutadiene	87683	-	6.67E+00	6.11E+01	6.67E+00	1.20E-02	3.44E-01	1.20E-02	3.51E-01	9.10E+00	3.51E-01	2.32E-02	1.08E+00	2.32E-02	3.10E-02	1.08E+00	3.10E-02	1.84E+01	2.85E+02	1.84E+01
m-Cresol	108394	3-Methylphenol	-	3.06E+03	3.06E+03	-	5.72E+00	5.72E+00	-	1.51E+02	1.51E+02	-	2.02E+01	2.02E+01	-	2.02E+01	2.02E+01	-	1.43E+04	1.43E+04
N-Nitrosodimethylamine	62759	Nitrosodimethylamine	3.25E-02	4.89E-01	3.25E-02	9.49E-07	4.49E-05	9.49E-07	2.78E-05	1.19E-03	2.78E-05	4.80E-06	2.80E-04	4.80E-06	6.31E-06	2.80E-04	6.31E-06	8.98E-02	2.28E+00	8.98E-02
N-Nitrosodiphenylamine	86306	-	5.78E+01	-	5.78E+01	7.48E-02	-	7.48E-02	2.19E+00	-	2.19E+00	3.50E-01	-	3.50E-01	4.59E-01	-	4.59E-01	1.60E+02	-	1.60E+02
o-Cresol	95487	2-Methylphenol	-	3.06E+03	3.06E+03	-	5.67E+00	5.67E+00	-	1.50E+02	1.50E+02	-	1.85E+01	1.85E+01	-	1.85E+01	1.85E+01	-	1.43E+04	1.43E+04
p-Chloro-m-cresol	59507	4-Chloro-3-	-	6.11E+03	6.11E+03	-	2.46E+01	2.46E+01	-	6.48E+02	6.48E+02	-	9.94E+01	9.94E+01	-	9.94E+01	9.94E+01	-	2.85E+04	2.85E+04
p-Cresol	106445	4-Methylphenol	-	6.11E+03	6.11E+03	-	1.12E+01	1.12E+01	-	2.97E+02	2.97E+02	-	6.72E+01	6.72E+01	-	6.72E+01	6.72E+01	-	2.85E+04	2.85E+04
Pentachlorophenol	87865	PCP	2.12E+01	2.30E+02	2.12E+01	5.27E-02	1.75E+00	5.27E-02	1.55E+00	4.63E+01	1.55E+00	2.99E-03	2.18E-01	2.99E-03	4.06E-03	2.18E-01	4.06E-03	4.38E+01	1.07E+03	4.38E+01
Phenol	108952	Total Phenols	-	1.83E+04	1.83E+04	-	2.07E+01	2.07E+01	-	5.48E+02	5.48E+02	-	1.12E+02	1.12E+02	-	1.12E+02	1.12E+02	-	8.55E+04	8.55E+04
Polynuclear Aromatic Hydrocarbons																				
1-Methyl naphthalene	90120	1-Methylnaphthalene	7.29E+00	2.85E+03	7.29E+00	2.89E-02	2.17E+01	2.89E-02	8.47E-01	5.72E+02	8.47E-01	5.81E-02	7.14E+01	5.81E-02	7.78E-02	7.14E+01	7.78E-02	3.22E+01	1.61E+04	3.22E+01
2-Methylnaphthalene	91576	Naphthalene, 2-methyl-	-	1.62E+02	1.62E+02	-	1.24E+00	1.24E+00	-	3.26E+01	3.26E+01	-	3.47E+00	3.47E+00	-	3.47E+00	3.47E+00	-	9.18E+02	9.18E+02
Acenaphthene	83329	-	-	3.23E+03	3.23E+03	-	1.87E+01	1.87E+01	-	4.95E+02	4.95E+02	-	9.19E+01	9.19E+01	-	9.19E+01	9.19E+01	-	1.53E+04	1.53E+04
Acenaphthylene	208968	-	-	2.98E+03	2.98E+03	-	1.88E+01	1.88E+01	-	4.97E+02	4.97E+02	-	3.77E+01	3.77E+01	-	3.77E+01	3.77E+01	-	1.49E+04	1.49E+04
Anthracene	120127	-	-	1.64E+04	1.64E+04	-	1.01E+02	1.01E+02	-	2.66E+03	2.66E+03	-	5.07E+02	5.07E+02	-	5.07E+02	5.07E+02	-	7.70E+04	7.70E+04
Benzo(a)anthracene	56553	Benz[a]anthracene	3.87E-01	-	3.87E-01	8.05E-04	-	8.05E-04	2.36E-02	-	2.36E-02	2.03E-03	-	2.03E-03	2.67E-03	-	2.67E-03	9.39E-01	-	9.39E-01
Benzo(a)pyrene	50328	Benzo (a) pyrene	3.87E-02	-	3.87E-02	8.09E-05	-	8.09E-05	2.37E-03	-	2.37E-03	1.32E-04	-	1.32E-04	1.73E-04	-	1.73E-04	9.39E-02	-	9.39E-02
Benzo(b)fluoranthene	205992	Benz[e]acephenanthryl	3.87E-01	-	3.87E-01	8.05E-04	-	8.05E-04	2.36E-02	-	2.36E-02	1.95E-03	-	1.95E-03	2.56E-03	-	2.56E-03	9.39E-01	-	9.39E-01
Benzo(e)pyrene	192972	-	-	1.65E+03	1.65E+03	-	1.08E+01	1.08E+01	-	2.84E+02	2.84E+02	-	2.09E+01	2.09E+01	-	2.09E+01	2.09E+01	-	7.71E+03	7.71E+03
Benzo(ghi)perylene	191242	Benzo (g,h,i) perylene	-	1.65E+03	1.65E+03	-	1.08E+01	1.08E+01	-	2.85E+02	2.85E+02	-	8.61E+00	8.61E+00	-	8.61E+00	8.61E+00	-	7.71E+03	7.71E+03
Benzo(k)fluoranthene	207089	Benzo[k]fluoranthene	3.87E-01	-	3.87E-01	8.09E-04	-	8.09E-04	2.37E-02	-	2.37E-02	1.36E-03	-	1.36E-03	1.78E-03	-	1.78E-03	9.39E-01	-	9.39E-01
Chrysene	218019	-	3.87E+00	-	3.87E+00	8.06E-03	-	8.06E-03	2.36E-01	-	2.36E-01	1.93E-02	-	1.93E-02	2.53E-02	-	2.53E-02	9.39E+00	-	9.39E+00
Dibenzo(a,h)anthracene	53703	Dibenz (a,h)	1.13E-01	-	1.13E-01	2.38E-04	-	2.38E-04	6.98E-03	-	6.98E-03	1.30E-04	-	1.30E-04	1.70E-04	-	1.70E-04	2.75E-01	-	2.75E-01
Fluoranthene	206440	-	-	2.20E+03	2.20E+03	-	1.40E+01	1.40E+01	-	3.71E+02	3.71E+02	-	6.29E+01	6.29E+01	-	6.29E+01	6.29E+01	-	1.03E+04	1.03E+04
Fluorene	86737	-	-	2.18E+03	2.18E+03	-	1.30E+01	1.30E+01	-	3.44E+02	3.44E+02	-	6.52E+01	6.52E+01	-	6.52E+01	6.52E+01	-	1.02E+04	1.02E+04
Indeno(1,2,3-cd)pyrene	193395	Indeno (1,2,3-cd)	3.87E-01	-	3.87E-01	8.13E-04	-	8.13E-04	2.38E-02	-	2.38E-02	4.98E-04	-	4.98E-04	6.50E-04	-	6.50E-04	9.39E-01	-	9.39E-01
Naphthalene	91203	-	1.46E+01	6.81E+02	1.46E+01	-	5.31E+00	5.31E+00	-	1.40E+02	1.40E+02	1.02E+01	2.90E+01	1.02E+01	1.36E+01	2.90E+01	1.36E+01	2.04E+02	4.26E+03	2.04E+02
Perylene	198550	-	-	1.65E+03	1.65E+03	-	1.08E+01	1.08E+01	-	2.84E+02	2.84E+02	-	1.70E+01	1.70E+01	-	1.70E+01	1.70E+01	-	7.71E+03	7.71E+03
Phenanthrene	85018	-	-	1.64E+04	1.64E+04	-	1.01E+02	1.01E+02	-	2.66E+03	2.66E+03	-	4.99E+02	4.99E+02	-	4.99E+02	4.99E+02	-	7.70E+04	7.70E+04
Pyrene	129000	-	-	1.65E+03	1.65E+03	-	1.04E+01	1.04E+01	-	2.74E+02	2.74E+02	-	5.03E+01	5.03E+01	-	5.03E+01	5.03E+01	-	7.71E+03	7.71E+03
Pesticides																				
4,4'-DDD	72548	p,p'-DDD	2.46E+00	-	2.46E+00	4.04E-03	-	4.04E-03	1.18E-01	-	1.18E-01	2.67E-03	-	2.67E-03	3.58E-03	-	3.58E-03	8.26E+00	-	8.26E+00
4,4'-DDE	72559	p,p'-DDE	1.74E+00	-	1.74E+00	2.87E-03	-	2.87E-03	8.40E-02	-	8.40E-02	2.31E-03	-	2.31E-03	3.03E-03	-	3.03E-03	5.83E+00	-	5.83E+00

Table 1

Summary of the Human Health Risk-Based Screening Levels for Chemicals in Soil at the SSFL

			Suburban Residential Soil RBSL ($RBSL_{so\_res}$) [b]			SRAM-based Suburban Residential Garden RBSL ($RBSL_{so\_res\_g}$) [c]			USEPA default-based Suburban Residential Garden RBSL ($RBSL_{so\_res\_g}$) [c]			40-year Rural Residential Soil RBSL ($RBSL_{so\_RR}$) [d]			30-year Rural Residential Soil RBSL ($RBSL_{so\_RR}$) [d]			Recreational Soil RBSL ($RBSL_{so\_rec}$) [b]		
Analyte	CAS #	Analyte Synonym [a]	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Resident Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)	Composite Recreator Cancer (10^{-6}) (mg/kg)	Child Noncancer (HQ=1) (mg/kg)	Lowest (mg/kg)
4,4'-DDT	50293	p,p'-DDT	1.74E+00	3.43E+01	1.74E+00	2.87E-03	1.80E-01	2.87E-03	8.42E-02	4.76E+00	8.42E-02	9.48E-04	7.34E-02	9.48E-04	1.24E-03	7.34E-02	1.24E-03	5.83E+00	1.60E+02	5.83E+00
Aldrin	309002	-	3.48E-02	2.06E+00	3.48E-02	5.73E-05	1.08E-02	5.73E-05	1.68E-03	2.85E-01	1.68E-03	4.94E-05	1.08E-02	4.94E-05	6.46E-05	1.08E-02	6.46E-05	1.17E-01	9.61E+00	1.17E-01
alpha-BHC	319846	a-Benzene	2.19E-01	5.49E+02	2.19E-01	3.06E-04	2.44E+00	3.06E-04	8.97E-03	6.45E+01	8.97E-03	2.72E-05	4.74E-01	2.72E-05	3.69E-05	4.74E-01	3.69E-05	7.34E-01	2.56E+03	7.34E-01
beta-BHC	319857	b-Benzene	3.94E-01	-	3.94E-01	5.48E-04	-	5.48E-04	1.61E-02	-	1.61E-02	4.90E-05	-	4.90E-05	6.65E-05	-	6.65E-05	1.32E+00	-	1.32E+00
delta-BHC	319868	d-Benzene	3.28E-01	2.06E+01	3.28E-01	4.87E-04	9.71E-02	4.87E-04	1.43E-02	2.56E+00	1.43E-02	5.08E-05	2.21E-02	5.08E-05	6.90E-05	2.21E-02	6.90E-05	1.10E+00	9.61E+01	1.10E+00
Chlordane (Technical)	12789036	-	1.69E+00	3.43E+01	1.69E+00	2.78E-03	1.80E-01	2.78E-03	8.14E-02	4.74E+00	8.14E-02	2.29E-06	3.28E-04	2.29E-06	3.11E-06	3.28E-04	3.11E-06	5.66E+00	1.60E+02	5.66E+00
Dieldrin	60571	-	3.69E-02	3.43E+00	3.69E-02	5.99E-05	1.77E-02	5.99E-05	1.76E-03	4.67E-01	1.76E-03	9.33E-07	6.10E-04	9.33E-07	1.27E-06	6.10E-04	1.27E-06	1.24E-01	1.60E+01	1.24E-01
Endosulfan I	959988	-	-	4.12E+02	4.12E+02	-	1.84E+00	1.84E+00	-	4.87E+01	4.87E+01	-	5.92E+00	5.92E+00	-	5.92E+00	5.92E+00	-	1.92E+03	1.92E+03
Endosulfan II	33213659	-	-	4.12E+02	4.12E+02	-	1.84E+00	1.84E+00	-	4.87E+01	4.87E+01	-	5.92E+00	5.92E+00	-	5.92E+00	5.92E+00	-	1.92E+03	1.92E+03
Endosulfan sulfate	1031078	-	-	4.12E+02	4.12E+02	-	1.77E+00	1.77E+00	-	4.68E+01	4.68E+01	-	7.28E+00	7.28E+00	-	7.28E+00	7.28E+00	-	1.92E+03	1.92E+03
Endrin	72208	-	-	2.06E+01	2.06E+01	-	1.05E-01	1.05E-01	-	2.79E+00	2.79E+00	-	2.14E-03	2.14E-03	-	2.14E-03	2.14E-03	-	9.61E+01	9.61E+01
Endrin aldehyde	7421934	-	-	2.06E+01	2.06E+01	-	1.03E-01	1.03E-01	-	2.73E+00	2.73E+00	-	5.10E-03	5.10E-03	-	5.10E-03	5.10E-03	-	9.61E+01	9.61E+01
Endrin ketone	53494705	-	-	2.06E+01	2.06E+01	-	1.05E-01	1.05E-01	-	2.76E+00	2.76E+00	-	1.07E-02	1.07E-02	-	1.07E-02	1.07E-02	-	9.61E+01	9.61E+01
gamma-BHC	58899	Lindane	5.37E-01	2.06E+01	5.37E-01	7.38E-04	9.00E-02	7.38E-04	2.16E-02	2.38E+00	2.16E-02	3.93E-04	9.73E-02	3.93E-04	5.31E-04	9.73E-02	5.31E-04	1.80E+00	9.61E+01	1.80E+00
Heptachlor	76448	-	1.44E-01	3.43E+01	1.44E-01	2.37E-04	1.79E-01	2.37E-04	6.94E-03	4.73E+00	6.94E-03	3.66E-04	3.39E-01	3.66E-04	4.81E-04	3.39E-01	4.81E-04	4.84E-01	1.60E+02	4.84E-01
Heptachlor epoxide	1024573	-	1.07E-01	8.92E-01	1.07E-01	1.71E-04	4.53E-03	1.71E-04	5.03E-03	1.20E-01	5.03E-03	2.70E-04	1.20E-02	2.70E-04	3.61E-04	1.20E-02	3.61E-04	3.60E-01	4.16E+00	3.60E-01
MCPA	94746	-	-	3.43E+01	3.43E+01	-	1.31E-01	1.31E-01	-	3.45E+00	3.45E+00	-	2.57E-01	2.57E-01	-	2.57E-01	2.57E-01	-	1.60E+02	1.60E+02
Mirex	2385855	Mirex (DeChlorane)	3.28E-02	1.37E+01	3.28E-02	5.42E-05	7.21E-02	5.42E-05	1.59E-03	1.90E+00	1.59E-03	7.89E-07	2.25E-03	7.89E-07	1.07E-06	2.25E-03	1.07E-06	1.10E-01	6.40E+01	1.10E-01
p,p'-Methoxychlor	72435	Methoxychlor	-	3.43E+02	3.43E+02	-	1.75E+00	1.75E+00	-	4.62E+01	4.62E+01	-	7.19E-01	7.19E-01	-	7.19E-01	7.19E-01	-	1.60E+03	1.60E+03
Toxaphene	8001352	-	4.93E-01	-	4.93E-01	8.05E-04	-	8.05E-04	2.36E-02	-	2.36E-02	1.48E-05	-	1.48E-05	2.01E-05	-	2.01E-05	1.65E+00	-	1.65E+00
Herbicides																				
2,4,5-T	93765	2,4,5-	-	6.86E+02	6.86E+02	-	2.67E+00	2.67E+00	-	7.04E+01	7.04E+01	-	8.88E+00	8.88E+00	-	8.88E+00	8.88E+00	-	3.20E+03	3.20E+03
2,4,5-TP (Silvex)	93721	-	-	5.49E+02	5.49E+02	-	2.44E+00	2.44E+00	-	6.45E+01	6.45E+01	-	8.97E+00	8.97E+00	-	8.97E+00	8.97E+00	-	2.56E+03	2.56E+03
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94757	-	-	6.86E+02	6.86E+02	-	2.13E+00	2.13E+00	-	5.63E+01	5.63E+01	-	4.82E+00	4.82E+00	-	4.82E+00	4.82E+00	-	3.20E+03	3.20E+03
2,4-Dichlorophenoxybutyric acid	94826	2,4-DB	-	5.49E+02	5.49E+02	-	2.29E+00	2.29E+00	-	6.04E+01	6.04E+01	-	7.09E+00	7.09E+00	-	7.09E+00	7.09E+00	-	2.56E+03	2.56E+03
Dalapon	75990	-	-	2.06E+03	2.06E+03	-	2.62E+00	2.62E+00	-	6.92E+01	6.92E+01	-	3.46E+00	3.46E+00	-	3.46E+00	3.46E+00	-	9.61E+03	9.61E+03
Dicamba	1918009	-	-	2.06E+03	2.06E+03	-	4.26E+00	4.26E+00	-	1.13E+02	1.13E+02	-	1.23E+01	1.23E+01	-	1.23E+01	1.23E+01	-	9.61E+03	9.61E+03
2,4-DP (Dichlorprop)	120365	-	-	6.86E+02	6.86E+02	-	2.77E+00	2.77E+00	-	7.33E+01	7.33E+01	-	6.49E+00	6.49E+00	-	6.49E+00	6.49E+00	-	3.20E+03	3.20E+03
Dinoseb	88857	-	-	6.86E+01	6.86E+01	-	2.88E-01	2.88E-01	-	7.61E+00	7.61E+00	-	1.14E+00	1.14E+00	-	1.14E+00	1.14E+00	-	3.20E+02	3.20E+02
MCPP	93652	-	-	6.86E+01	6.86E+01	-	2.49E-01	2.49E-01	-	6.57E+00	6.57E+00	-	6.25E-01	6.25E-01	-	6.25E-01	6.25E-01	-	3.20E+02	3.20E+02
Terphenyls																				
m-Terphenyl	92068	-	6.50E+01	2.90E+04	6.50E+01	1.07E-01	1.58E+02	1.07E-01	3.13E+00	4.17E+03	3.13E+00	7.91E-02	2.29E+02	7.91E-02	1.07E-01	2.29E+02	1.07E-01	1.80E+02	1.40E+05	1.80E+02
o-Terphenyl	84151	-	6.50E+01	2.90E+04	6.50E+01	1.07E-01	1.58E+02	1.07E-01	3.13E+00	4.17E+03	3.13E+00	7.91E-02	2.29E+02	7.91E-02	1.07E-01	2.29E+02	1.07E-01	1.80E+02	1.40E+05	1.80E+02
p-Terphenyl	92944	-	6.50E+01	2.90E+04	6.50E+01	1.07E-01	1.58E+02	1.07E-01	3.13E+00	4.17E+03	3.13E+00	7.91E-02	2.29E+02	7.91E-02	1.07E-01	2.29E+02	1.07E-01	1.80E+02	1.40E+05	1.80E+02
Glycols																				
Diethylene Glycol	111466	-	-	6.11E+03	6.11E+03	-	1.71E-01	1.71E-01	-	4.51E+00	4.51E+00	-	1.09E+00	1.09E+00	-	1.09E+00	1.09E+00	-	2.85E+04	2.85E+04
Triethylene glycol	112276	-	-	2.75E+03	2.75E+03	-	5.29E-02	5.29E-02	-	1.40E+00	1.40E+00	-	3.43E-01	3.43E-01	-	3.43E-01	3.43E-01	-	1.28E+04	1.28E+04
PCDD/PCDFs																				
2,3,7,8-TCDD TEQ	1746016-TEQ	-	4.81E-06	5.05E-05	4.81E-06	7.51E-09	2.52E-07	7.51E-09	2.20E-07	6.66E-06	2.20E-07	3.75E-09	1.43E-07	3.75E-09	4.90E-09	1.43E-07	4.90E-09	1.80E-05	2.36E-04	1.80E-05
Polychlorinated Biphenyls (PCBs)																				
Aroclor 1016	12674112	-	6.63E+00	3.86E+00	3.86E+00	1.38E-02	2.49E-02	1.38E-02	4.04E-01	6.58E-01	4.04E-01	2.83E-02	7.08E-02	2.83E-02	3.75E-02	7.08E-02	3.75E-02	1.61E+01	1.80E+01	1.61E+01
Aroclor 1242	53469219	Aroclor-1242	2.32E-01	1.10E+00	2.32E-01	4.86E-04	7.19E-03	4.86E-04	1.43E-02	1.90E-01	1.43E-02	5.32E-04	9.76E-03	5.32E-04	7.00E-04	9.76E-03	7.00E-04	5.64E-01	5.14E+00	5.64E-01
Aroclor 1248	12672296	-	2.32E-01	1.10E+00	2.32E-01	4.86E-04	7.19E-03	4.86E-04	1.43E-02	1.90E-01	1.43E-02	4.96E-04	9.03E-03	4.96E-04	6.52E-04	9.03E-03	6.52E-04	5.64E-01	5.14E+00	5.64E-01
Aroclor 1254	11097691	-	2.32E-01	1.10E+00	2.32E-01	4.88E-04	7.21E-03	4.88E-04	1.43E-02	1.90E-01	1.43E-02	2.33E-04	4.03E-03	2.33E-04	3.05E-04	4.03E-03	3.05E-04	5.64E-01	5.14E+00	5.64E-01
Aroclor 1260	11096825	-	2.32E-01	1.10E+00	2.32E-01	4.89E-04	7.23E-03	4.89E-04	1.43E-02	1.91E-01	1.43E-02	9.33E-06	1.55E-04	9.33E-06	1.22E-05	1.55E-04	1.22E-05	5.64E-01	5.14E+00	5.64E-01
Aroclor 5460	11126424	-	2.32E-01	1.10E+00	2.32E-01	4.86E-04	7.19E-03	4.86E-04	1.43E-02	1.90E-01	1.43E-02	4.96E-04	9.03E-03	4.96E-04	6.52E-04	9.03E-03	6.52E-04	5.64E-01	5.14E+00	5.64E-01
PCB TEQ	1746016-PCB	-	3.57E-06	3.86E-05	3.57E-06	7.50E-09	2.52E-07	7.50E-09	2.20E-07	6.66E-06	2.20E-07	4.79E-09	1.91E-07	4.79E-09	6.27E-09	1.91E-07	6.27E-09	8.67E-06	1.80E-04	8.67E-06

Notes:
'-' - none established/not applicable.
HQ - hazard quotient
mg/kg - milligrams per kilogram
PCDD/PCDF - polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans
RBSL - Risk-based Screening Level
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin
TEQ - toxic equivalency

a - Please note that different chemical names have been used for different programs at the SSFL, and there can be additional analyte synonyms than those presented. Therefore, any chemical synonym should be verified using the CAS number listed.
b - Suburban Residential and Recreational Soil RBSLs include the following pathways: ingestion of soil, dermal contact with soil, and inhalation of dust and volatiles from soil.
c - SRAM-based and USEPA Default-based Suburban Residential Garden RBSLs include the ingestion of fruits/vegetables pathway.
d - Rural Residential Soil RBSLs include the following pathways: ingestion of soil, dermal contact with soil, inhalation of dust and volatiles from soil, ingestion of fruits/vegetables, ingestion of beef, ingestion of milk, ingestion of poultry, ingestion of eggs, ingestion of swine, and ingestion of fish.
e - As agreed between DTSC and the Tech Team, food uptake pathways are not evaluated for this chemical.
f - The suburban residential RBSL for non-carcinogenic effect of 4.6 mg/kg was obtained from the HHRA Note Number 3 (DTSC, 2014) per the DTSC. The cadmium RBSLs for non-carcinogenic effects for other receptors were calculated using the exposure assumptions for an adult as described in Section 3.2.1.
g - DTSC, 2009a. The soil concentration (77 mg/kg) that would produce an increase of 1 µg/dL lead in a residential 90th percentile child's blood assuming that background lead contributions from air, water, and homegrown produce are negligible. The soil lead concentration of 77 mg/kg was rounded to 80 mg/kg, per communication with DTSC.
h - DTSC, 2009a. The soil concentration that would produce an increase of 1 µg/dL lead in a residential 90th percentile child's blood assuming that background lead contributions from air and water are negligible and that 100 percent of the child's diet is derived from home-grown produce. Value was estimated using LeadSpread (version 7) and doesn't include contributions from direct soil pathways (e.g., incidental ingestion, dermal contact, and inhalation of dust).
i - DTSC, 2009a. The soil concentration that would produce an increase of 1 µg/dL lead in a residential 90th percentile child's blood assuming that background lead contributions from air and water are negligible and that 25 percent of the child's diet is derived from home-grown produce. Value was estimated using LeadSpread (version 7) and doesn't include contributions from direct soil pathways (e.g., incidental ingestion, dermal contact, and inhalation of dust).
j - DTSC, 2009a. The soil concentration that would produce an increase of 1 µg/dL lead in a residential 90th percentile child's blood assuming that background lead contributions from air and water are negligible and that 100 percent of the child's diet is derived from home-grown produce. Value was estimated using LeadSpread (version 7) and doesn't include contributions from beef, milk, poultry, eggs, swine, and fish, which cannot be evaluated using the LeadSpread model. If these pathways were included, the value would likely be less.
k - DTSC, 2009a. The soil concentration (360 mg/kg) that would produce an increase of 1 µg/dL lead in a residential 90th percentile child's blood assuming that background lead contributions from air, water, and homegrown produce are negligible. An exposure frequency of 1.5 days/week was used in the LeadSpread model, per communication with DTSC.

Appendix B-2

Boeing Proposed Ecological Risk Based Screening Levels

(Source: Appendix F of the Finalized Standardized Risk Assessment Methodology, Revision 2 Addendum, Santa Susana Field Laboratory, Ventura County, California dated August 2014)

Table 12-1
Summary of the Lowest Ecological Risk-based Screening Levels by Media

Chemical	CAS#	Chemical Synonym	Water				Sediment		Soil				Soil Vapor	
					Lowest		Lowest				Lowest			
			Terrestrial Plant RBSL [g] (mg/L)	Water Column Community RBSL [g] (mg/L)	Low TRV-Based RBSL [g,h] (mg/L)	High TRV-Based RBSL [g,h] (mg/L)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Terrestrial Plants RBSL [g] (mg/kg)	Soil Invertebrates RBSL [g] (mg/kg)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Low TRV-Based RBSL [g] (mg/m^3)	High TRV-Based RBSL [g] (mg/m^3)
Inorganic Compounds														
Aluminum	7429905	Aluminum, Total	0.3	0.087	13	130	25,500	NTV	50	NTV	16	160	NA	NA
Aluminum, dissolved	7429905-D	-	0.3	0.087	13	130	NC	NC	NC	NC	NC	NC	NA	NA
Antimony	7440360	Antimony, Total	NTV	0.03	0.40	19	2	3	5	78	0.042	2.0	NA	NA
Antimony, dissolved	7440360-D	-	NTV	0.03	0.40	19	NC	NC	NC	NC	NC	NC	NA	NA
Arsenic	7440382	Arsenic, Total	0.001	0.15	2.2	32	9.79	33	18	60	2.1	31	NA	NA
Arsenic, dissolved	7440382-D	-	0.001	0.15	2.2	32	NC	NC	NC	NC	NC	NC	NA	NA
Barium	7440393	Barium, Total	NTV	0.004	110	220	48	1,490	500	330	44	89	NA	NA
Barium, dissolved	7440393-D	-	NTV	0.004	110	220	NC	NC	NC	NC	NC	NC	NA	NA
Beryllium	7440417	Beryllium, Total	0.5	0.00066	3.6	9.5	NTV	NTV	10	40	4.8	13	NA	NA
Beryllium, dissolved	7440417-D	-	0.5	0.00066	3.6	9.5	NC	NC	NC	NC	NC	NC	NA	NA
Boron	7440428	Boron, Total	1	0.0016	150	530	520	1,800	0.5	NTV	22	73	NA	NA
Boron, dissolved	7440428-D	-	1	0.0016	150	530	NC	NC	NC	NC	NC	NC	NA	NA
Cadmium	7440439	Cadmium, Total	0.1	0.00028	0.41	18	0.99	4.98	32	140	0.019	0.81	NA	NA
Cadmium, dissolved	7440439-D	-	0.1	0.00025	0.41	18	NC	NC	NC	NC	NC	NC	NA	NA
Chromium	7440473	Chromium, Total	0.05	0.086	14	84	43.4	111	1	64	1.9	14	NA	NA
Chromium, dissolved	7440473-D	-	0.05	0.074	14	84	NC	NC	NC	NC	NC	NC	NA	NA
Cobalt	7440484	Cobalt, Total	0.06	0.023	8.1	95	10	4,380	13.0	300	12	190	NA	NA
Cobalt, dissolved	7440484-D	-	0.06	0.023	8.1	95	NC	NC	NC	NC	NC	NC	NA	NA
Copper	7440508	Copper, Total	0.06	0.0094	12	280	31.6	149	70	80	1.1	24	NA	NA
Copper, dissolved	7440508-D	-	0.06	0.0090	12	280	NC	NC	NC	NC	NC	NC	NA	NA
Cyanides	57125	Cyanide, Total	NC	0.0052	0.21	2.1	NC	NC	0.9	0.9	0.18	1.8	NA	NA
Fluoride	7782414	-	5	NTV	41	170	120	490	200	NTV	35	140	NA	NA
Hexavalent Chromium	18540299	Hexavalent	NC	0.0114	62	260	NC	NC	30	0.4	7.3	30	NA	NA
Lead	7439921	Lead, Total	0.02	0.0032	0.074	46	1.1	128	115	1,700	0.062	39	NA	NA
Lead, dissolved	7439921-D	-	0.02	0.0025	0.074	46	NC	NC	NC	NC	NC	NC	NA	NA
Lithium	7439932	Lithium, Total	NC	NC	NC	NC	NC	NC	2	NTV	43	87	NA	NA
Manganese	7439965	Manganese, Total	4	0.12	93	1,070	630	1,100	220	450	79	920	NA	NA
Manganese, dissolved	7439965-D	-	4	0.12	93	1,070	NC	NC	NC	NC	NC	NC	NA	NA
Mercury	7439976	Mercury, Total	NC	0.00091	2.4	4.7	0.18	1.06	0.3	0.1	0.87	1.7	NA	NA
Mercury, dissolved	7439976-D	-	NC	0.00077	2.4	4.7	NC	NC	NC	NC	NC	NC	NA	NA
Methyl Mercury	22967926	-	NC	NC	NC	NC	NC	NC	NTV	2.5	0.18	0.82	NA	NA
Molybdenum	7439987	Molybdenum, Total	0.5	0.37	1.8	18	66	660	2	NTV	0.13	1.3	NA	NA
Molybdenum, dissolved	7439987-D	-	0.5	0.37	1.8	18	NC	NC	NC	NC	NC	NC	NA	NA
Nickel	7440020	Nickel, Total	0.5	0.052	0.90	210	22.7	48.6	38	280	0.13	30	NA	NA
Nickel, dissolved	7440020-D	-	0.5	0.052	0.90	210	NC	NC	NC	NC	NC	NC	NA	NA
Selenium	7782492	Selenium, Total	0.7	0.0050	0.34	4.9	0.84	3.4	0.52	4.1	0.10	1.5	NA	NA
Selenium, dissolved	7782492-D	-	0.7	0.0046	0.34	4.9	NC	NC	NC	NC	NC	NC	NA	NA
Silica, dissolved	7631869-D	-	NTV	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Silver	7440224	Silver, Total	0.1	0.00038	11	320	1	4.5	560	NTV	0.99	29	NA	NA
Silver, dissolved	7440224-D	-	NC	0.00032	11	320	NC	NC	NC	NC	NC	NC	NA	NA
Strontium	7440246	Strontium, Total	NTV	1.5	1,780	2,570	NTV	NTV	NTV	NTV	1,210	1,750	NA	NA
Strontium, dissolved	7440246-D	-	NTV	1.5	1,780	2,570	NC	NC	NC	NC	NC	NC	NA	NA
Thallium	7440280	Thallium, Total	0.02	0.012	1.8	9.7	6.5	65	1	1.4	1.8	8.2	NA	NA

Table 12-1
Summary of the Lowest Ecological Risk-based Screening Levels by Media

Chemical	CAS#	Chemical Synonym	Water				Sediment		Soil				Soil Vapor	
					Lowest		Lowest				Lowest			
			Terrestrial Plant RBSL [g] (mg/L)	Water Column Community RBSL [g] (mg/L)	Low TRV-Based RBSL [g,h] (mg/L)	High TRV-Based RBSL [g,h] (mg/L)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Terrestrial Plants RBSL [g] (mg/kg)	Soil Invertebrates RBSL [g] (mg/kg)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Low TRV-Based RBSL [g] (mg/m^3)	High TRV-Based RBSL [g] (mg/m^3)
Thallium, dissolved	7440280-D	-	0.02	0.012	1.8	9.7	NC	NC	NC	NC	NC	NC	NA	NA
Tin	7440315	Tin, Total	NC	NC	NC	NC	0.048	260	50	NTV	31	77	NA	NA
Titanium	7440326	Titanium, Total	NC	2	5.3	53	15	150	NTV	NTV	4.5	45	NA	NA
Titanium, dissolved	7440326-D	-	NC	2	5.3	53	NC	NC	NC	NC	NC	NC	NA	NA
Vanadium	7440622	Vanadium, Total	0.2	0.02	1.8	9.0	NC	NC	50	130	3.3	16	NA	NA
Vanadium, dissolved	7440622-D	-	0.2	0.02	1.8	9.0	NC	NC	NC	NC	NC	NC	NA	NA
Zinc	7440666	Zinc, Total	0.4	0.12	65	910	121	459	160	120	19	320	NA	NA
Zinc, dissolved	7440666-D	-	0.4	0.12	65	910	NC	NC	NC	NC	NC	NC	NA	NA
Zirconium	7440677	Zirconium, Total	NC	NC	NC	NC	NC	NC	NTV	NTV	8.0	NTV	NA	NA
Energetic Constituents														
1,2-Dinitrobenzene	528290	o-Dinitrobenzene	NC	NC	NC	NC	6.5	65	NTV	NTV	0.92	2.5	NA	NA
1,2-Diphenylhydrazine	122667	-	NC	0.27	NTV	NTV	NC	NC	NC	NC	NC	NC	NA	NA
1,3-Dinitrobenzene	99650	m-Dinitrobenzene	NC	NC	NC	NC	2.6	26	NTV	40	0.92	2.5	NA	NA
2,4,6-Trinitrotoluene	118967	-	NC	NC	NC	NC	0.092	28	NTV	55	0.13	0.65	NA	NA
2,4-diamino-6-nitrotoluene	6629294	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
2,4-Dinitrotoluene	121142	-	NC	0.23	0.053	5.1	0.0018	0.23	NC	NC	NC	NC	NA	NA
2-Amino-4,6-dinitrotoluene	35572782	-	NC	NC	NC	NC	0.0416	20	NTV	20.3	0.0060	0.46	NA	NA
2-Nitrotoluene	88722	-	NC	NC	NC	NC	4.06	NTV	NC	NC	NC	NC	NA	NA
3-Nitrotoluene	99081	-	NC	NC	NC	NC	4.06	NTV	NC	NC	NC	NC	NA	NA
4-Amino-2,6-dinitrotoluene	19406510	4-Am-2,6-DNT	NC	NC	NC	NC	0.0416	NTV	NC	NC	NC	NC	NA	NA
4-Nitrotoluene	99990	-	NC	NC	NC	NC	4.06	NTV	NC	NC	NC	NC	NA	NA
HMX	2691410	-	NC	NC	NC	NC	NTV	NTV	NTV	6.5	110	630	NA	NA
Hydrazine	302012	-	NC	NC	NC	NC	NC	NC	NTV	NTV	NTV	NTV	NA	NA
Monomethylhydrazine	60344	-	NC	NC	NC	NC	NC	NC	NTV	NTV	0.35	1.7	NA	NA
Nitroglycerin	55630	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
Perchlorate	14797730	-	NTV	NTV	43	140	200	400	107	NTV	0.50	7.7	NA	NA
PETN	78115	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
RDX	121824	-	NC	NC	NC	NC	0.013	130	NTV	19	0.30	1.5	NA	NA
Tetryl	479458	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
Volatile Organic Compounds														
1,1,1,2-Tetrachloroethane	630206	-	NC	NC	NC	NC	NTV	NTV	NTV	NTV	38	190	NA	NA
1,1,1-Trichloroethane	71556	-	100	0.011	6,760	17,100	0.03	NTV	1,000	NTV	2,460	6,240	250	760
1,1,2,2-Tetrachloroethane	79345	-	NC	0.61	140	270	NC	NC	NTV	NTV	51	100	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	Freon 113	NTV	NTV	920	NTV	NTV	NTV	NTV	NTV	220	NTV	1,210	58,900
1,1,2-Trichloroethane	79005	-	100	1.2	13	150	NC	NC	1,000	NTV	9.0	100	1.1	11
1,1-Dichloroethane	75343	-	100	0.047	91	180	0.027	530	NTV	NTV	78	160	240	480
1,1-Dichloroethene	75354	-	100	0.025	17	45	0.031	NTV	NTV	NTV	6.9	18	7.9	40
1,1-Dichloropropene	563586	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
1,2,3-Trichlorobenzene	87616	-	NC	NC	NC	NC	NC	NC	48	20	10	37	66	210
1,2,3-Trichloropropane	96184	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
1,2,4-Trichlorobenzene	120821	-	NC	0.11	50	180	NC	NC	48	20	10	37	66	210
1,2,4-Trimethylbenzene	95636	-	NC	NC	NC	NC	NTV	NTV	1,000	65	3.1	4.0	10	52
1,2-Dibromoethane	106934	-	NC	NC	NC	NC	NTV	NTV	NTV	NTV	12	62	NA	NA
1,2-Dichlorobenzene	95501	o-Dichlorobenzene	NTV	0.014	580	580	0.013	NTV	248	NTV	130	130	66	210

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Chemical	CAS#	Chemical Synonym	Water				Sediment		Soil				Soil Vapor	
					Lowest		Lowest				Lowest			
			Terrestrial Plant RBSL [g] (mg/L)	Water Column Community RBSL [g] (mg/L)	Low TRV-Based RBSL [g,h] (mg/L)	High TRV-Based RBSL [g,h] (mg/L)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Terrestrial Plants RBSL [g] (mg/kg)	Soil Invertebrates RBSL [g] (mg/kg)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Low TRV-Based RBSL [g] (mg/m^3)	High TRV-Based RBSL [g] (mg/m^3)
1,2-Dichloroethane	107062	-	100	0.91	91	180	0.25	530	NTV	NTV	78	160	56	NTV
1,2-Dichloroethene	540590	1,2-Dichloroethenes	100	NC	NC	NC	NC	NC	NTV	NTV	130	250	25	130
1,2-Dichloropropane	78875	-	NC	5.7	48	240	NTV	NTV	NTV	700	33	160	1.7	8.3
1,3,5-Trimethylbenzene	108678	-	NC	NC	NC	NC	NTV	NTV	1,000	65	3.2	4.1	10	52
1,3-Dichlorobenzene	541731	m-Dichlorobenzene	NC	0.071	99	500	0.013	NTV	248	20	23	110	66	210
1,3-Dichloropropane	142289	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
1,3-Dichloropropene	542756	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.4	22
1,4-Dichlorobenzene	106467	p-Dichlorobenzene	NTV	0.015	24	120	0.11	NTV	248	20	5.6	28	NA	NA
2,2-Dichloro-1,1,1-trifluoroethane	306832	Freon 123	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
2-Chloroethylvinyl ether	110758	2-Chloroethyl vinyl ether	NC	0.122	240	1,340	NTV	NTV	NTV	7.4	160	910	NA	NA
2-Chloronaphthalene	91587	-	NC	1.6	840	2,030	NC	NC	NC	NC	NC	NC	NA	NA
2-Chlorophenol	95578	-	NC	4	34	340	NC	NC	NC	NC	NC	NC	NA	NA
2-Hexanone	591786	Methyl butyl ketone	NC	NC	NC	NC	0.022	NTV	NTV	NTV	23	170	6.5	33
2-Nitrophenol	88755	o-Nitrophenol	10	0.23	18	NTV	NC	NC	NC	NC	NC	NC	NA	NA
3-Chloro-2(Chloromethyl)-1-Propene	1871574	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Acetone	67641	-	NTV	1.5	68	340	0.0087	NTV	NTV	NTV	46	230	1,740	8,710
Acetic Acid	64197	-	NC	NC	NC	NC	NC	NC	NTV	NTV	410	1,660	NA	NA
Acrolein	107028		NC	0.003	0.34	3.4	NC	NC	NC	NC	NC	NC	NA	NA
Acrylonitrile	107131		NC	8	28	95	NC	NC	NC	NC	NC	NC	NA	NA
Benzene	71432	-	NTV	0.13	180	1,780	0.16	NTV	31	31	73	730	0.76	3.8
Biphenyl	92524	1,1'-Biphenyl	2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
bis(2-Chloroethyl) ether	111444	s-Dichloroethylether	NTV	0.122	240	1,340	NC	NC	NC	NC	NC	NC	NA	NA
Bromide	24959679	-	NTV	NTV	NC	NC	NTV	NTV	NTV	NTV	NTV	NTV	NA	NA
Bromobenzene	108861	-	NC	NC	NC	NC	NC	NC	31	31	25	43	NA	NA
Bromochloromethane	74975	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
Bromodichloromethane	75274	-	NTV	11	24	120	NTV	NTV	NTV	NTV	10	51	NA	NA
Bromomethane	74839	-	NTV	11	4.7	24	NTV	NTV	NTV	NTV	3.2	16	NA	NA
Carbon Disulfide	75150	-	NTV	0.00092	74	NC	0.00085	NTV	NTV	NTV	51	NTV	1.6	7.9
Carbon Tetrachloride	56235	-	NTV	0.0098	110	NTV	NC	NC	NTV	NTV	35	NTV	8.4	42
Chlorobenzene	108907	Monochlorobenzene	NC	0.064	64	130	NC	NC	1,000	40	21	43	77	230
Chloroethane	75003	Ethyl chloride	NC	NTV	310	590	NTV	NTV	NC	NC	NC	NC	1,320	4,350
Chloroform	67663	Trichloromethane	NTV	0.028	100	280	NTV	NTV	NTV	NTV	69	190	1.6	8.1
Chloromethane	74873	Methyl chloride	NTV	11	4.7	24	NTV	NTV	NTV	NTV	3.2	16	5.0	25
cis-1,2-Dichloroethene	156592	Dichloroethylene	100	0.59	310	330	0.031	NTV	NTV	NTV	210	220	25	130
cis-1,3-Dichloropropene	10061015	-	NC	0.000055	23	34	NTV	NTV	NC	NC	NC	NC	NA	NA
Cumene	98828	Isopropylbenzene	NC	NC	NC	NC	0.086	1.4	NTV	NTV	1.3	13	31	160
Dibenzofuran	132649	-	NC	NC	NC	NC	NC	NC	NTV	29	1.2	12	NA	NA
Dibromofluoromethane	1868537	-	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NTV	NTV
Dibromomethane	74953	-	NC	NC	NC	NC	NTV	NTV	NTV	NTV	27	230	NA	NA
Dichlorodifluoromethane	75718	Freon 12	NTV	NC	NC	NC	NTV	NTV	NTV	NTV	41	410	1,210	58,900
Diphenyl ether	101848	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Ethylbenzene	100414	-	NC	0.0073	330	980	0.004	NTV	55	55	79	240	31	160
Methyl ethyl ketone	78933	2-Butanone	NTV	NC	NC	NC	NC	NC	NTV	NTV	8,160	21,100	1,150	3,440

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Chemical	CAS#	Chemical Synonym	Water				Sediment		Soil				Soil Vapor	
					Lowest		Lowest				Lowest			
			Terrestrial Plant RBSL [g] (mg/L)	Water Column Community RBSL [g] (mg/L)	Low TRV-Based RBSL [g,h] (mg/L)	High TRV-Based RBSL [g,h] (mg/L)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Terrestrial Plants RBSL [g] (mg/kg)	Soil Invertebrates RBSL [g] (mg/kg)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Low TRV-Based RBSL [g] (mg/m^3)	High TRV-Based RBSL [g] (mg/m^3)
Methyl isobutyl ketone (MIBK)	108101	pentanone	NC	NC	NC	NC	0.033	150	NTV	NTV	4.5	45	NA	NA
Methyl sulfide	75183	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Methyl-tert-butyl- Ether (MTBE)	1634044	-	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
Methylene chloride	75092	Dichloromethane	NTV	2.2	40	340	0.37	NTV	NTV	NTV	27	230	12	58
m-Xylene	108383	meta-Xylene	NC	0.013	14	18	NC	NC	NC	NC	NC	NC	NA	NA
m-Xylene & p-Xylene	136777612	meta- and para-Xylenes	100	0.013	14	18	0.16	NTV	1,000	65	3.3	4.2	10	52
n-Butylbenzene	104518	-	NC	NC	NC	NC	NTV	NTV	NTV	NTV	61	180	31	160
n-Hexane	110543	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Nitrobenzene	98953	-	8	27	6.1	10	0.021	NTV	NC	NC	NC	NC	NA	NA
n-Propylbenzene	103651	-	NC	NC	NC	NC	NTV	NTV	NTV	NTV	73	220	31	160
o-Chlorotoluene	95498	2-Chlorotoluene	NC	NC	NC	NC	NC	NC	NTV	20	16	63	NA	NA
o-Xylene	95476	-	NC	NC	NC	NC	0.16	NTV	1,000	65	3.4	4.3	10	52
p-Chlorotoluene	106434	4-Chlorotoluene	NC	NC	NC	NC	NC	NC	NTV	20	16	64	NA	NA
p-Cymene	99876	p-Isopropyltoluene	NC	NC	NC	NC	0.086	2.0	NTV	NTV	3.7	37	10	52
sec-Butylbenzene	135988	-	NC	NC	NC	NC	0.026	0.26	NTV	NTV	0.98	9.8	31	160
Styrene	100425	Vinylbenzene	NC	NC	NC	NC	0.559	NTV	320	NTV	210	420	260	910
tert-Butylbenzene	98066	-	NC	NC	NC	NC	0.062	0.62	NTV	NTV	1.1	11	31	160
Tetralin	119642	-	NC	NC	NC	NC	0.18	0.56	100	29	58	290	NA	NA
Tetrachloroethene	127184	-	10	0.098	9.5	47	0.41	NTV	1,000	NTV	2.2	11	32	160
Toluene	108883	Toluol	10	0.0098	180	1,760	0.05	NTV	200	75	59	590	0.22	0.56
trans-1,2-Dichloroethene	156605	-	100	0.59	310	590	0.40	NTV	NTV	NTV	130	240	25	130
trans-1,3-Dichloropropene	10061026	-	NC	0.244	23	34	NTV	NTV	NC	NC	NC	NC	NA	NA
Trichloroethene	79016	(TCE)	10	0.047	4.7	47	0.0969	NTV	3	3	1.8	18	8.5	43
Trichlorofluoromethane	75694	-	NTV	11	470	2,360	NC	NC	NTV	NTV	170	850	1,210	58,900
Vinyl chloride	75014	-	NTV	0.93	1.1	11	NTV	NTV	NTV	NTV	0.78	7.8	0.73	3.7
Xylenes, Total	1330207	Isomers	100	0.013	14	18	NC	NC	1,000	65	3.4	4.2	10	52
Semi-Volatile Organic Compounds														
1,1-Dimethylhydrazine	57147	-	NC	NC	NC	NC	NC	NC	NTV	NTV	0.35	1.7	NA	NA
1,2-Dibromo-3-chloropropane	96128	1,2-Dibromo-3-CPA	NC	NC	NC	NC	NTV	NTV	NTV	NTV	0.28	1.4	NA	NA
1,4-Dioxane	123911	-	NTV	NC	NC	NC	NC	NC	NTV	NTV	2.3	4.6	NA	NA
2,4,5-Trichlorophenol	95954	-	NC	NC	NC	NC	NC	NC	4	9	75	220	NA	NA
2,4,6-Trichlorophenol	88062	-	10	0.97	340	1,010	NC	NC	4	10	75	230	NA	NA
2,4-Dichlorophenol	120832		NC	0.365	2.0	20	NC	NC	NC	NC	NC	NC	NA	NA
2,4-Dimethylphenol	105679	-	NC	2.12	170	840	NC	NC	NTV	NTV	65	330	NA	NA
2,4-Dinitrophenol	51285		NC	0.23	0.70	7.0	NC	NC	NC	NC	NC	NC	NA	NA
2,6-Dinitrotoluene	606202	-	NC	0.23	2.7	14	0.0416	NTV	NC	NC	NC	NC	NA	NA
2-n-Butoxyethanol	111762	Butoxycellosolve	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
3,3'-Dichlorobenzidine	91941	-	NC	NTV	2.0	20	NC	NC	NC	NC	NC	NC	NA	NA
3,5-Dimethylphenol	108689	-	NC	NC	NC	NC	NC	NC	NTV	NTV	2.6	26	NA	NA
4,6-Dinitro-o-cresol	534521	Methylphenol	NC	0.23	18	NTV	NC	NC	NC	NC	NC	NC	NA	NA
4-Bromophenyl phenyl ether	101553		NC	0.0015	NTV	NTV	NC	NC	NC	NC	NC	NC	NA	NA
4-Chlorophenylphenyl ether	7005723		NC	NTV	NTV	NTV	NC	NC	NC	NC	NC	NC	NA	NA
4-Nitrophenol	100027	-	10	0.3	18	NTV	NC	NC	NC	NC	8.0	NC	NA	NA

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Benzidine	92875	-	NC	0.0039	3.6	18	NC	NC	NC	NC	NC	NC	NA	NA
Benzoic acid	65850	-	NC	NC	NC	NC	0.065	150	NTV	NTV	4.5	45	NA	NA
Benzyl alcohol	100516	-	NC	NC	NC	NC	NC	NC	NTV	NTV	4.5	45	NA	NA
bis(2-Chloroethoxy)methane	111911	-	NTV	11	240	1,340	NC	NC	NC	NC	NC	NC	NA	NA
bis(2-Chloroisopropyl)ether	39638329	-	NC	0.122	240	1,340	NC	NC	NC	NC	NC	NC	NA	NA
bis(2-Ethylhexyl) phthalate	117817	bis(2-ethylhexyl)phthalate	20	0.003	5.8	1,240	0.000097	2.6	1,000	NTV	0.32	65	NA	NA
Bromoform	75252	-	NTV	11	60	120	0.654	NTV	NTV	NTV	23	45	NA	NA
Butyl benzyl phthalate	85687	-	NC	0.019	540	1,590	10.9	48	NTV	NTV	90	260	NA	NA
Carbazole	86748	-	NC	NC	NC	NC	NC	NC	2.0	29	1.5	15	NA	NA
Dibenzyl Ether	103504	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Dibromochloromethane	124481	-	NTV	11	72	140	NTV	NTV	NTV	NTV	29	59	NA	NA
Diethyl phthalate	84662	-	20	0.21	5.3	53	NC	NC	134	NTV	2.3	23	NA	NA
Dimethyl phthalate	131113	-	NC	0.21	5.3	53	0.006	150	134	200	4.5	45	NA	NA
Di-n-butyl phthalate	84742	Di-n-butylphthalate	20	0.035	0.58	5.8	0.0033	0.033	200	NTV	0.11	1.1	NA	NA
Di-n-octyl phthalate	117840	Di-n-octyl-phthalate	20	0.708	15	150	NC	NC	200	NTV	13	130	NA	NA
Formaldehyde	50000	-	NTV	NTV	64	550	NTV	NTV	NTV	NTV	43	380	NA	NA
Hexachlorobenzene	118741		NC	0.25	0.54	2.0	NC	NC	NC	NC	NC	NC	NA	NA
Hexachlorobutadiene	87683	-	NC	0.0093	0.14	0.68	0.0013	NTV	NTV	NTV	0.022	0.11	NA	NA
Hexachlorocyclopentadiene	77474	-	NC	0.0052	20	37	NC	NC	NC	NC	3.0	5.6	NA	NA
Hexachloroethane	67721		NC	0.012	3.4	51	NC	NC	NC	NC	NC	NC	NA	NA
Isophorone	78591	-	NC	117	510	1,210	NC	NC	NC	NC	NC	NC	NA	NA
Isopropanol	67630	Isopropyl alcohol	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
m-Cresol	108394	3-Methylphenol	NC	NC	NC	NC	NC	NC	96	NTV	5.1	51	NA	NA
n-Nitrosodimethylamine	62759	e	NTV	5.85	9.6	120	0.028	NTV	NTV	20	6.5	79	NA	NA
n-Nitrosodi-n-propylamine	621647	Nitrosodipropylamin	NTV	NTV	9.6	120	NC	NC	NC	NC	NC	NC	NA	NA
n-Nitrosodiphenylamine	86306	-	NTV	0.21	9.6	120	NC	NC	NTV	20	2.3	28	NA	NA
o-Cresol	95487	-	NC	NC	NC	NC	NC	NC	100	NTV	4.3	43	NA	NA
p-Chloro-m-cresol	59507	Methylphenol	NC	0.03	6.0	60	NC	NC	100	NTV	1.7	17	NA	NA
p-Cresol	106445	4-Methylphenol	NC	NC	NC	NC	0.10	150	100	NTV	4.3	43	NA	NA
Pentachlorophenol	87865	PCP	0.03	0.015	36	160	NC	NC	5	31	2.8	10	NA	NA
Phenol	108952	Total Phenols	10	0.2	6.0	60	NC	NC	70	30	5.1	51	NA	NA
p-Nitroaniline	100016	4-Nitroaniline	NC	NC	NC	NC	NC	NC	NTV	NTV	3.4	34	NA	NA
Tetramethylurea	632224	-	NTV	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA
Polynuclear Aromatic Hydrocarbons														
1-Methyl naphthalene	90120	1-Methylnaphthalene	NC	NC	NC	NC	NC	NC	100	29	52	260	NA	NA
2-Methylnaphthalene	91576	Naphthalene, 2-methyl-	NC	NC	NC	NC	NC	NC	100	29	53	260	NA	NA
Acenaphthene	83329	-	NC	0.023	5.3	53	0.0067	0.29	20	29	1.1	11	NA	NA
Acenaphthylene	208968	-	NC	4.84	5.3	53	NC	NC	20	29	0.33	3.3	NA	NA
Anthracene	120127	-	NC	0.00073	5.9	59	0.037	0.37	2.0	29	2.2	22	NA	NA
Benzo(a)anthracene	56553	Benz[a]anthracene	NC	0.000027	4.2	260	0.108	1.05	1.5	18	0.81	50	NA	NA
Benzo(a)pyrene	50328	Benzo (a) pyrene	NC	0.000014	4.2	260	0.15	1.45	1.2	18	5.1	310	NA	NA
Benzo(b)fluoranthene	205992	Benz[e]acephenanthrylene 1	NC	0.00907	4.2	260	1.8	NTV	1.2	18	2.4	150	NA	NA

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Chemical	CAS#	Chemical Synonym	Water				Sediment		Soil				Soil Vapor	
					Lowest		Lowest				Lowest			
			Terrestrial Plant RBSL [g] (mg/L)	Water Column Community RBSL [g] (mg/L)	Low TRV-Based RBSL [g,h] (mg/L)	High TRV-Based RBSL [g,h] (mg/L)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Terrestrial Plants RBSL [g] (mg/kg)	Soil Invertebrates RBSL [g] (mg/kg)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Low TRV-Based RBSL [g] (mg/m^3)	High TRV-Based RBSL [g] (mg/m^3)
Benzo(e)pyrene	192972	-	NC	NC	NC	NC	0.195	1.52	1.2	18	4.4	270	NA	NA
Benzo(ghi)perylene	191242	Benzo (g,h,i) perylene	NC	0.00764	4.2	260	0.17	0.3	1.2	18	7.4	460	NA	NA
Benzo(k)fluoranthene	207089	e	NC	NTV	4.2	260	0.0272	13.4	1.2	18	4.9	310	NA	NA
Chrysene	218019	-	NC	0.000014	4.2	260	0.166	1.29	1.2	18	1.2	76	NA	NA
Dibenzo(a,h)anthracene	53703	anthracene	NC	0.000014	4.2	260	0.033	0.1	1.2	18	2.3	140	NA	NA
Fluoranthene	206440	-	NC	0.00616	100	2,400	0.423	2.23	1.9	29	54	880	NA	NA
Fluorene	86737	-	NC	0.0039	5.3	53	0.056	0.536	1.2	29	0.89	8.9	0.48	2.4
Indeno(1,2,3-cd)pyrene	193395	pyrene	NC	0.00431	4.2	260	0.01732	0.33	1.2	18	4.8	300	NA	NA
Naphthalene	91203	-	10	0.012	220	1,100	NC	NC	100	29	26	130	2.5	12
Perylene	198550	-	NC	NC	NC	NC	NC	NC	NTV	29	10	220	NA	NA
Phenanthrene	85018	-	NC	0.0063	6.0	60	0.204	1.17	1.2	29	1.3	13	0.48	2.4
Pyrene	129000	-	NC	0.000025	4.2	260	0.195	1.52	1.2	18	1.2	73	NA	NA
Pesticides														
4,4'-DDD	72548	p,p'-DDD	NTV	0.000001	0.047	7.9	0.000016	0.0026	12	12	0.0051	0.85	NA	NA
4,4'-DDE	72559	p,p'-DDE	NTV	0.000001	0.047	3.2	NC	NC	12	12	0.0041	0.28	NA	NA
4,4'-DDT	50293	p,p'-DDT	NTV	0.000001	0.047	7.9	NC	NC	12	12	0.0035	0.58	NA	NA
Aldrin	309002	-	NTV	0.00030	0.68	6.8	NC	NC	NTV	NTV	0.057	0.57	NA	NA
alpha-BHC	319846	Hexachloride	NTV	0.0022	0.34	12	NC	NC	1,000	NTV	0.073	2.9	NA	NA
beta-BHC	319857	Hexachloride	NTV	0.0022	2.7	12	NC	NC	1,000	NTV	0.59	2.9	NA	NA
Chlordane (Technical)	12789036	-	NC	NC	NC	NC	NC	NC	NTV	NTV	1.1	5.6	NA	NA
delta-BHC	319868	Hexachloride	NTV	0.0022	0.34	12	NC	NC	1,000	NTV	0.067	2.6	NA	NA
Dieldrin	60571	-	NTV	0.000056	0.10	4.2	NC	NC	NTV	NTV	0.013	0.58	NA	NA
Endosulfan I	959988	-	NTV	0.000051	1.0	20	NC	NC	1,000	NTV	0.22	4.2	NA	NA
Endosulfan II	33213659	-	NTV	0.000051	1.0	20	NC	NC	1,000	NTV	0.22	4.2	NA	NA
Endosulfan sulfate	1031078	-	NTV	0.000051	1.0	20	NC	NC	1,000	NTV	0.23	4.4	NA	NA
Endrin	72208	-	NTV	0.000036	0.053	0.53	NC	NC	NTV	NTV	0.0079	0.079	NA	NA
Endrin aldehyde	7421934	-	NTV	0.000036	0.053	0.53	NC	NC	NTV	NTV	0.0092	0.092	NA	NA
Endrin ketone	53494705	-	NC	NC	NC	NC	NC	NC	NTV	NTV	0.0086	0.086	NA	NA
gamma-BHC	58899	Lindane	NTV	0.000095	0.34	25	NC	NC	1,000	NTV	0.075	5.6	NA	NA
Heptachlor	76448	-	NTV	0.0000038	0.88	35	NC	NC	1,000	NTV	0.087	3.6	NA	NA
Heptachlor epoxide	1024573	-	NC	0.0000038	0.0084	0.042	NC	NC	1,000	NTV	0.0013	0.0065	NA	NA
MCPA	94746	-	NC	NC	NC	NC	NC	NC	NTV	NTV	0.12	0.61	NA	NA
Mirex	2385855	Mirex (DeChlorane)	NC	NC	NC	NC	NC	NC	NTV	NTV	0.034	0.34	NA	NA
p,p'-Methoxychlor	72435	-	NC	NC	NC	NC	NC	NC	NTV	NTV	2.5	50	NA	NA
Toxaphene	8001352	-	NC	0.000019	54	NTV	NC	NC	NTV	NTV	5.8	NTV	NA	NA
Herbicides														
2,4,5-T	93765	2,4,5-Trichlorophenoxyacetic acid	NC	NC	NC	NC	NC	NC	NTV	NTV	4.8	16	NA	NA
2,4,5-TP (Silvex)	93721	-	NC	NC	NC	NC	NC	NC	NTV	NTV	0.55	1.8	NA	NA
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94757	-	NTV	NC	NC	NC	NC	NC	NTV	NTV	1.1	5.5	NA	NA
2,4-Dichlorophenoxybutyric acid	94826	-	NC	NC	NC	NC	NC	NC	NTV	NTV	6.2	19	NA	NA
2,4-DP (Dichlorprop)	120365	Dichlorprop	NC	NC	NC	NC	NC	NC	NTV	NTV	0.79	3.9	NA	NA

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Dalapon	75990	-	NC	NC	NC	NC	NC	NC	NTV	NTV	39	130	NA	NA
Dicamba	1918009	-	NC	NC	NC	NC	NC	NC	NTV	NTV	14	46	NA	NA
Dinoseb	88857	-	NTV	NC	NC	NC	NC	NC	NTV	NTV	0.18	1.5	NA	NA
MCPP	93652	-	NC	NC	NC	NC	NC	NC	NTV	NTV	2.5	7.4	NA	NA
Terphenyls														
m-Terphenyl	92068	-	NC	NC	NC	NC	NC	NC	68	NTV	0.67	6.7	NA	NA
o-terphenyl	84151	-	NC	NC	NC	NC	0.0043	0.043	NTV	NTV	0.67	6.7	NA	NA
p-Terphenyl	92944	-	NC	NC	NC	NC	0.0016	0.016	NTV	NTV	0.54	5.4	NA	NA
Glycols														
Diethylene Glycol	111466	-	NC	NC	NC	NC	NC	NC	NTV	NTV	NTV	NTV	NA	NA
Triethylene glycol	112276	-	NC	NC	NC	NC	NC	NC	NTV	NTV	NTV	NTV	NA	NA
Total Petroleum Hydrocarbons														
TPH-Diesel Range Organics (DRO)	DRO	Diesel	NTV	NC	NC	NC	NTV	NTV	NTV	NTV	NTV	NTV	NA	NA
TPH-Gasoline Range Organics (GRO)	GRO	Gasoline	NC	NC	NC	NC	NTV	NTV	NTV	NTV	NTV	NTV	NA	NA
TPH-Kerosene Range Organics (KRO)	KRO	Kerosene	NTV	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
TPH-Oil Range Organics (ORO)	ORO	Oil Range Organics	NC	NC	NC	NC	NTV	NTV	NC	NC	NC	NC	NA	NA
PCDD/PCDFs [i]														
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562394	1,2,3,4,6,7,8-HpCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822469	HpCDD	NTV	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673897	1,2,3,4,7,8,9-HpCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	70648269	1,2,3,4,7,8-HxCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227286	1,2,3,4,7,8-HxCDD	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	57117449	1,2,3,6,7,8-HxCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653857	1,2,3,6,7,8-HxCDD	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	72918219	1,2,3,7,8,9-HxCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408743	1,2,3,7,8,9-HxCDD	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	57117416	1,2,3,7,8-PeCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321764	1,2,3,7,8-PeCDD	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	60851345	-	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	57117314	2,3,4,7,8-PeCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
2,3,7,8-TCDD	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
2,3,7,8-Tetrachlorodibenzofuran	51207319	2,3,7,8-TCDF	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
2,3,7,8-TCDD_TEQ_Bird	1746016-TEQ_Bird	-	NA	NA	0.000074	0.00074	0.00011	0.0011	NA	NA	0.0000057	0.000057	NA	NA
2,3,7,8-TCDD_TEQ_Fish	1746016-TEQ_Fish	-	NA	0.00000001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD_TEQ_Mammal	1746016-TEQ_Mammal	-	NA	NA	0.0000068	0.000068	NA	NA	NA	NA	0.00000050	0.0000050	NA	NA
Octachlorodibenzofuran	39001020	OCDF	NTV	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	3268879	-	NTV	NC	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs) [i]														
Aroclor 1016	12674112	-	NC	0.000014	0.95	9.5	0.0598	0.34	40	500	0.12	1.2	NA	NA

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Aroclor 1221	11104282	-	NC	0.000014	0.95	9.5	NC	NC	NC	NC	0.18	1.8	NA	NA
Aroclor 1232	11141165	-	NC	0.000014	0.46	4.6	NC	NC	NC	NC	0.082	0.82	NA	NA
Aroclor 1242	53469219	Aroclor-1242	NC	0.000014	0.47	4.7	NC	NC	40	500	0.043	0.43	NA	NA
Aroclor 1248	12672296	-	NC	0.000014	0.068	0.68	NC	NC	40	500	0.0064	0.064	NA	NA
Aroclor 1254	11097691	-	NC	0.000014	0.46	4.6	0.0598	0.34	40	500	0.039	0.39	NA	NA
Aroclor 1260	11096825	-	NC	0.000014	0.46	4.6	NC	NC	40	500	0.025	0.25	NA	NA
Aroclor 5460	11126424	-	NC	NC	NC	NC	NC	NC	40	500	0.039	0.39	NA	NA
PCB_TEQ_Bird (Coplanar PCBs)	1746016-PCB TEQ_Bird	-	NA	NA	0.000074	0.00074	0.00011	0.0011	NA	NA	0.0000057	0.000057	NA	NA
PCB_TEQ_Fish (Coplanar PCBs)	1746016-PCB TEQ_Fish	-	NA	0.00000001	NA	NA	0.00000085	0.0000088	NA	NA	NA	NA	NA	NA
PCB_TEQ_Mammal (Coplanar PCBs)	1746016-PCB TEQ_Mammal	-	NA	NA	0.0000068	0.000068	NA	NA	NA	NA	0.00000050	0.0000050	NA	NA
PCB-105	32598144	2,3,3',4,4'-pentachloro-	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-114	74472370	PCB 114 (BZ)	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-118	31508006	-	NC	0.00000001	NA	NA	NC	NC	NTV	0.5	NA	NA	NA	NA
PCB-123	65510443	123-PeCB	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-126	57465288	-	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-156	38380084	1,1'-Biphenyl, 2,3,3',4,4',5-hexachloro-	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-157	69782907	PCB 157 (BZ)	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-167	52663726	167-HxCB	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-169	32774166	-	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-189	39635319	-	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-77	32598133	77-TeCB	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
PCB-81	70362504	81-TeCB	NC	0.00000001	NA	NA	0.00000085	0.0000088	NTV	0.5	NA	NA	NA	NA
Chemical Parameters														
Ammonia-N	7664417	Nitrogen, as Ammonia	NTV	NC	NC	NC	NC	NC	NTV	NTV	NTV	NTV	NA	NA
Chloride	16887006	-	NTV	230	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NA	NA
Chlorine	7782505	-	NC	0.011	97	NTV	NC	NC	NC	NC	NC	NC	NA	NA
Nitrate	NO3N	-	NTV	NTV	3,420	7,630	NTV	NTV	NTV	NTV	2,340	5,200	NA	NA
Nitrite-NO2	E-10128	-	NC	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NA	NA
Oil content	E-10140	-	NC	NTV	NTV	NTV	NC	NC	NC	NC	NC	NC	NA	NA
Orthophosphate – PO4	14265442	-	NC	NC	NC	NC	NC	NC	NTV	NTV	0.069	0.35	NA	NA
Sulfate	14808798	-	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NTV	NA	NA

Notes:

[a] Chemicals detected in Groups 4 (Coca only), 6 (SRE only), 1B, 5, 10, 3 (WCT only), and 9 (Silvernale only) surface water.

[b] Chemicals detected in site wide seeps and springs.

[c] Chemicals detected in site wide near-surface groundwater.

[d] Chemicals detected in Groups 4 (Coca only), 6 (SRE only), 1B, 5, 10, 3 (WCT only), and 9 (Silvernale only) sediment.

[e] Chemicals detected in Groups 1A, 4, 6, 7, 8, 1B, 5, 10, 3 (WCT only), and 9 (Silvernale only) surface soil.

Table 12-1
Summary of the Lowest Ecological Risk-based Screening Levels by Media

Chemical	CAS#	Chemical Synonym	Water				Sediment		Soil				Soil Vapor	
					Lowest		Lowest				Lowest			
			Terrestrial Plant RBSL [g] (mg/L)	Water Column Community RBSL [g] (mg/L)	Low TRV-Based RBSL [g,h] (mg/L)	High TRV-Based RBSL [g,h] (mg/L)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Terrestrial Plants RBSL [g] (mg/kg)	Soil Invertebrates RBSL [g] (mg/kg)	Low TRV-Based RBSL [g,h] (mg/kg)	High TRV-Based RBSL [g,h] (mg/kg)	Low TRV-Based RBSL [g] (mg/m^3)	High TRV-Based RBSL [g] (mg/m^3)

[f] Chemicals detected in Groups 1A, 4, 6, 7, 8, 1B, 3, 5, 9, and 10 soil vapor.

[g] Calculated with a target hazard quotient of 1. EcoRBSLs for surface water, soil invertebrates, sediment, and terrestrial plants are equivalent to their respective medium-specific benchmarks; therefore, these EcoRBSLs were reported in the same number of significant figures as the source documents from which the benchmarks were selected. Avian and mammalian EcoRBSLs are calculated rather than derived from published values; therefore, EcoRBSLs with values less than 1,000 were reported using two significant figures and values greater than 1,000 were reported using three significant figures.

[h] Lowest Low and lowest High TRV-based RBSLs for water and soil are selected from the EcoRBSLs for upper trophic level receptors. Lowest Low and lowest High sediment RBSLs are selected as the lower of the sediment benthic community and the great blue heron sediment EcoRBSLs.

[i] As there are no toxicity equivalency factors (TEFs) available for terrestrial plants, soil invertebrates, and the sediment bethic community, no EcoRBSLs for 2,3,7,8-TCDD TEQ and PCB TEQ (Coplanar PCBs) were derived for these receptor groups. Since EcoRBSLs for 2,3,7,8-TCDD TEQ and PCB TEQ (Coplanar PCBs) only apply to mammals, birds, and fish (i.e., the water column community), individual dioxin/furan and coplanar PCB congeners are presented for evaluation of terrestrial plants, soil invertebrates, and the sediment benthic community exposed to these chemicals in applicable media.

-- Not available, or could not be located
BHC - benzene hexachloride
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
High TRV - mid level effect toxicity reference value
HMX - high melting explosive
Low TRV - no effect toxicity reference value
MCPA - 2-methyl-4-chlorophenoxyacetic acid
MCPP - meta-Chlorophenylpiperazine
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
NA - not applicable
NC - not calculated
NTV - no toxicity value
PCB - polychlorinated biphenyl
PCDD/PCDF - polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans
PETN - pentaerythritol tetranitrate
RBSL - risk-based screening level
RDX - Research Department Explosive
TCDD - Tetrachlorodibenzo-p-dioxin
TEQ - toxicity equivalent
X - Analyte was detected in the indicated medium

Appendix B-3

Responsible Party Proposed Groundwater Screening Reference Values

(Source: 2016 Annual Groundwater Monitoring Reports from Responsible Parties with various dates)

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Reference Value	Units	Reference Type
Radiochemistry	Antimony-125	300	pCi/L	Primary MCL [a]
Radiochemistry	Barium-133	1520	pCi/L	Primary MCL [b]
Radiochemistry	Barium-137m	2150000	pCi/L	Primary MCL [b]
Radiochemistry	Carbon-14	2000	pCi/L	Primary MCL [a]
Radiochemistry	Cesium-134	80	pCi/L	Primary MCL [a]
Radiochemistry	Cesium-137	200	pCi/L	Primary MCL [a]
Radiochemistry	Cobalt-57	1000	pCi/L	Primary MCL [a]
Radiochemistry	Cobalt-60	100	pCi/L	Primary MCL [a]
Radiochemistry	Europium-152	200	pCi/L	Primary MCL [a]
Radiochemistry	Gross alpha	15	pCi/L	Primary MCL
Radiochemistry	Gross beta	50	pCi/L	Cal MCL
Radiochemistry	Gross beta	4	mrem/yr	Primary MCL
Radiochemistry	Iodine-129	1	pCi/L	Primary MCL [a]
Radiochemistry	Manganese-54	300	pCi/L	Primary MCL [a]
Radiochemistry	Neptunium-236	5960	pCi/L	Primary MCL [b]
Radiochemistry	Niobium-94	707	pCi/L	Primary MCL [b]
Radiochemistry	Radium-226/228	5	pCi/L	Primary MCL
Radiochemistry	Sodium-22	400	pCi/L	Primary MCL [a]
Radiochemistry	Strontium-90	8	pCi/L	Primary MCL
Radiochemistry	Thulium-171	1000	pCi/L	Primary MCL [a]
Radiochemistry	Tin-126	293	pCi/L	Primary MCL [b]
Radiochemistry	Tritium	20000	pCi/L	Primary MCL
Radiochemistry	Uranium-233/234	20	pCi/L	Cal MCL
Radiochemistry	Uranium-235	20	pCi/L	Cal MCL
Radiochemistry	Uranium-238	20	pCi/L	Cal MCL
Halogenated Ethenes	1,2-Dichloroethenes	130	ug/L	SWGW RBSL
Halogenated Ethenes	Tetrachloroethene	5	ug/L	Primary MCL
Halogenated Ethenes	Trichloroethene	5	ug/L	Primary MCL
Halogenated Ethenes	cis-1,2-Dichloroethene	6	ug/L	Cal MCL
Halogenated Ethenes	trans-1,2-Dichloroethene	10	ug/L	Cal MCL
Halogenated Ethenes	1,1-Dichloroethene	6	ug/L	Cal MCL
Halogenated Ethenes	Vinyl chloride	0.5	ug/L	Cal MCL
Halogenated Ethanes	1,1,2,2-Tetrachloroethane	1	ug/L	Cal MCL
Halogenated Ethanes	1,1,2-Trichloroethane	5	ug/L	Primary MCL
Halogenated Ethanes	1,1,1-Trichloroethane	200	ug/L	Primary MCL
Halogenated Ethanes	1,2-Dichloroethane	0.5	ug/L	Cal MCL
Halogenated Ethanes	1,1-Dichloroethane	5	ug/L	Cal MCL
Halogenated Ethanes	Chloroethane	16	ug/L	Taste/Odor
Halogenated Ethanes	1,2-Dibromoethane	0.05	ug/L	Primary MCL
Halogenated Ethanes	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	ug/L	Cal MCL
Halogenated Ethanes	1,2-Dichloro-1,1,2-trifluoroethane	190000	ug/L	SWGW RBSL
Halogenated Ethanes	2,2-Dichloro-1,1,1-trifluoroethane	190000	ug/L	SWGW RBSL
Halogenated Methanes	Carbon Tetrachloride	0.5	ug/L	Cal MCL
Halogenated Methanes	Chloroform	80	ug/L	Primary MCL
Halogenated Methanes	Methylene chloride	5	ug/L	Primary MCL
Halogenated Methanes	Chloromethane	5.7	ug/L	SWGW RBSL
Halogenated Methanes	Trichlorofluoromethane	150	ug/L	Cal MCL
Halogenated Methanes	Dichlorodifluoromethane	1000	ug/L	Notification Level
Halogenated Methanes	Bromochloromethane	34000	ug/L	Taste/Odor
Halogenated Methanes	Bromodichloromethane	80	ug/L	Primary MCL
Halogenated Methanes	Bromoform	80	ug/L	Primary MCL
Halogenated Methanes	Bromomethane	8.8	ug/L	SWGW RBSL
Halogenated Methanes	Dibromochloromethane	80	ug/L	Primary MCL

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Reference Value	Units	Reference Type
Non-Halogenated VOCs	2-Heptanone	280	ug/L	Taste/Odor
Non-Halogenated VOCs	Benzyl chloride	12	ug/L	Taste/Odor
Non-Halogenated VOCs	Cumene (Isopropylbenzene)	770	ug/L	Notification Level
Non-Halogenated VOCs	Ethanol	760000	ug/L	Taste/Odor
Non-Halogenated VOCs	Ethyl acetate	2600	ug/L	Taste/Odor
Non-Halogenated VOCs	Ethyl ether	750	ug/L	Taste/Odor
Non-Halogenated VOCs	Methanol	740000	ug/L	Taste/Odor
Non-Halogenated VOCs	m-Xylene & p-Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	n-Hexane	6.4	ug/L	Taste/Odor
Non-Halogenated VOCs	Pentanal	17	ug/L	Taste/Odor
Non-Halogenated VOCs	sec-Butyl alcohol	19000	ug/L	Taste/Odor
Non-Halogenated VOCs	tert-Butyl alcohol	12	ug/L	Notification Level
Non-Halogenated VOCs	1,3,5-Trimethylbenzene	330	ug/L	Notification Level
Non-Halogenated VOCs	1,2,4-Trimethylbenzene	330	ug/L	Notification Level
Non-Halogenated VOCs	2-Hexanone	250	ug/L	Taste/Odor
Non-Halogenated VOCs	Acetone	20000	ug/L	Taste/Odor
Non-Halogenated VOCs	Acetonitrile	300000	ug/L	Taste/Odor
Non-Halogenated VOCs	Acrolein	110	ug/L	Taste/Odor
Non-Halogenated VOCs	Acrylonitrile	910	ug/L	Taste/Odor
Non-Halogenated VOCs	Benzene	1	ug/L	Cal MCL
Non-Halogenated VOCs	Carbon Disulfide	160	ug/L	Notification Level
Non-Halogenated VOCs	Ethane	7500	ug/L	Taste/Odor
Non-Halogenated VOCs	Ethylbenzene	300	ug/L	Cal MCL
Non-Halogenated VOCs	Ethylene	39	ug/L	Taste/Odor
Non-Halogenated VOCs	Isopropanol	160000	ug/L	Taste/Odor
Non-Halogenated VOCs	m-Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	Methacrylonitrile	2100	ug/L	Taste/Odor
Non-Halogenated VOCs	Methane	3100	ug/L	SWGW RBSL
Non-Halogenated VOCs	Methyl ethyl ketone	3800	ug/L	SWGW RBSL
Non-Halogenated VOCs	Methyl isobutyl ketone (MIBK)	120	ug/L	Notification Level
Non-Halogenated VOCs	Methyl methacrylate	25	ug/L	Taste/Odor
Non-Halogenated VOCs	Methyl tert-butyl ether	5	ug/L	Secondary MCL
Non-Halogenated VOCs	n-Butylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	n-Propylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	o + p Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	o-Xylene	1750	ug/L	Cal MCL
Non-Halogenated VOCs	sec-Butylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	Styrene	100	ug/L	Primary MCL
Non-Halogenated VOCs	tert-Butylbenzene	260	ug/L	Notification Level
Non-Halogenated VOCs	Toluene	150	ug/L	Cal MCL
Non-Halogenated VOCs	Vinyl acetate	88	ug/L	Taste/Odor
Non-Halogenated VOCs	Xylenes, Total	1750	ug/L	Cal MCL
Halogenated Benzenes	1,2,3-Trichlorobenzene	2.1	ug/L	SWGW RBSL
Halogenated Benzenes	1,2,4-Trichlorobenzene	5	ug/L	Cal MCL
Halogenated Benzenes	1,2-Dichlorobenzene	600	ug/L	Primary MCL
Halogenated Benzenes	1,3-Dichlorobenzene	600	ug/L	Archived Advisory Level
Halogenated Benzenes	1,4-Dichlorobenzene	5	ug/L	Cal MCL
Halogenated Benzenes	Chlorobenzene	70	ug/L	Cal MCL
Halogenated Propene/Propanes	1,2,3-Trichloropropane	0.005	ug/L	Notification Level
Halogenated Propene/Propanes	1,2-Dibromo-3-chloropropane	0.2	ug/L	Primary MCL
Halogenated Propene/Propanes	1,2-Dichloropropane	5	ug/L	Primary MCL
Halogenated Propene/Propanes	1,3-Dichloropropane	130	ug/L	SWGW RBSL
Halogenated Propene/Propanes	1,3-Dichloropropene	0.5	ug/L	Cal MCL

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Reference Value	Units	Reference Type
Halogenated Propene/Propanes	Allyl chloride	8.9	ug/L	Taste/Odor
Halogenated Propene/Propanes	cis-1,3-Dichloropropene	0.5	ug/L	Cal MCL
Halogenated Propene/Propanes	trans-1,3-Dichloropropene	0.81	ug/L	SWGW RBSL
Other Halogenated VOCs	o-Chlorotoluene	140	ug/L	Notification Level
Other Halogenated VOCs	p-Chlorotoluene	140	ug/L	Notification Level
1,4-Dioxane	1,4-Dioxane	1	ug/L	Notification Level
SVOC	Diphenyl ether	630	ug/L	SWGW RBSL
SVOC	p-Cresol	63	ug/L	SWGW RBSL
SVOC	p-Dinitrobenzene	1.3	ug/L	SWGW RBSL
SVOC	Diazinon	1.2	ug/L	Notification Level
SVOC	Diethyl phthalate	10000	ug/L	SWGW RBSL
SVOC	Ethylene glycol	14000	ug/L	Notification Level
SVOC	Formaldehyde	100	ug/L	Notification Level
SVOC	Hydrazine	160000	ug/L	Taste/Odor
SVOC	m-Cresol	37	ug/L	Taste/Odor
SVOC	o-Cresol	630	ug/L	SWGW RBSL
SVOC	1,3-Dinitrobenzene	1.3	ug/L	SWGW RBSL
SVOC	2,4,6-Trichlorophenol	2.1	ug/L	SWGW RBSL
SVOC	2,4-Dimethylphenol	100	ug/L	Archived Advisory Level
SVOC	2,6-Dinitrotoluene	0.22	ug/L	SWGW RBSL
SVOC	2-Chlorophenol	63	ug/L	SWGW RBSL
SVOC	3,3'-Dichlorobenzidine	0.12	ug/L	SWGW RBSL
SVOC	4,6-Dinitro-o-cresol	1.3	ug/L	SWGW RBSL
SVOC	Aniline	65000	ug/L	Taste/Odor
SVOC	Benzidine	0.0003	ug/L	SWGW RBSL
SVOC	Benzoic acid	50000	ug/L	SWGW RBSL
SVOC	bis(2-Chloroethoxy)methane	38	ug/L	SWGW RBSL
SVOC	bis(2-Chloroethyl) ether	360	ug/L	Taste/Odor
SVOC	bis(2-Ethylhexyl) phthalate	4	ug/L	Cal MCL
SVOC	Butyl benzyl phthalate	78	ug/L	SWGW RBSL
SVOC	Di-n-butyl phthalate	1300	ug/L	SWGW RBSL
SVOC	Di-n-octyl phthalate	500	ug/L	SWGW RBSL
SVOC	Dimethyl phthalate	130000	ug/L	SWGW RBSL
SVOC	Hexachlorobenzene	1	ug/L	Primary MCL
SVOC	Hexachlorocyclopentadiene	50	ug/L	Primary MCL
SVOC	Hexachloroethane	10	ug/L	Taste/Odor
SVOC	Isophorone	5400	ug/L	Taste/Odor
SVOC	n-Nitrosodi-n-propylamine	0.01	ug/L	Notification Level
SVOC	n-Nitrosodiethylamine	0.01	ug/L	Notification Level
SVOC	n-Nitrosodiphenylamine	16	ug/L	SWGW RBSL
SVOC	Nitrobenzene	110	ug/L	Taste/Odor
SVOC	o-Toluidine	11000	ug/L	Taste/Odor
SVOC	Pentachloronitrobenzene	20	ug/L	Archived Advisory Level
SVOC	Pentachlorophenol	1	ug/L	Primary MCL
SVOC	Phenol	4200	ug/L	Archived Advisory Level
SVOC	Pyridine	950	ug/L	Taste/Odor
PAH	1-Methyl naphthalene	2.6	ug/L	SWGW RBSL
PAH	2-Methylnaphthalene	50	ug/L	SWGW RBSL
PAH	Acenaphthene	380	ug/L	SWGW RBSL
PAH	Acenaphthylene	380	ug/L	SWGW RBSL
PAH	Anthracene	3800	ug/L	SWGW RBSL
PAH	Benzo(a)pyrene	0.2	ug/L	Primary MCL
PAH	Fluoranthene	250	ug/L	SWGW RBSL

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Reference Value	Units	Reference Type
PAH	Fluorene	250	ug/L	SWGW RBSL
PAH	Naphthalene	17	ug/L	Notification Level
PAH	Phenanthrene	3800	ug/L	SWGW RBSL
PAH	Pyrene	380	ug/L	SWGW RBSL
NDMA	n-Nitrosodimethylamine	0.01	ug/L	Notification Level
Energetics	Perchlorate	6	ug/L	Cal MCL
Energetics	2,4,6-Trinitrotoluene	1	ug/L	Notification Level
Energetics	HMX	350	ug/L	Notification Level
Energetics	RDX	0.3	ug/L	Notification Level
TPH	Fuel Hydrocarbons, C4-C12, as heavy Hydrocarbons	500	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C14, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C15, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C16, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C16, C21-C24, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C6-C7	500	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C7-C10, as gasoline	5	ug/L	Taste/Odor
TPH	Fuel Hydrocarbons, C7-C14, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C7-C16, as JP-4	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C8-C10, as gasoline	5	ug/L	Taste/Odor
TPH	Fuel Hydrocarbons, C8-C12, as heavy Hydrocarbons	1800	ug/L	SWGW RBSL
TPH	Fuel Hydrocarbons, C8-C14, as heavy Hydrocarbons	1800	ug/L	SWGW RBSL
TPH	Gasoline Range Organics (C4-C12)	5	ug/L	Taste/Odor
TPH	Gasoline Range Organics (C6-C14)	5	ug/L	Taste/Odor
TPH	Gasoline Range Organics (C7-C12)	5	ug/L	Taste/Odor
TPH	Diesel Range Organics	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C12-C14)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C13-C22)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C14-C20)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C15-C20)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C20-C30)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C21-C24)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C21-C30)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C8-C11)	100	ug/L	Taste/Odor
TPH	Diesel Range Organics (C8-C30)	100	ug/L	Taste/Odor
TPH	Fuel Hydrocarbons, C6-C17, as JP-4	1800	ug/L	SWGW RBSL
TPH	Gasoline Range Organics (C8-C11)	1800	ug/L	SWGW RBSL
TPH	Jet Fuel 4 (C6-C13)	1800	ug/L	SWGW RBSL
TPH	Kerosene (C10-C12)	1800	ug/L	SWGW RBSL
TPH	Kerosene (C10-C14)	1800	ug/L	SWGW RBSL
TPH	Kerosene Range Organics (C11-C14)	1800	ug/L	SWGW RBSL
TPH	Total Petroleum Hydrocarbons (as Kerosene)	1800	ug/L	SWGW RBSL
TPH	Gasoline Range Organics	5	ug/L	Taste/Odor
TPH	Gasoline Range Organics (C6-C12)	5	ug/L	Taste/Odor
PCB	Aroclor 1016	0.5	ug/L	Primary MCL
PCB	Polychlorinated biphenyls	0.5	ug/L	Primary MCL
PCB	Aroclor 1254	0.5	ug/L	Primary MCL
PCB	Aroclor 1260	0.5	ug/L	Primary MCL
PCB	Aroclor 1221	0.5	ug/L	Primary MCL
PCB	Aroclor 1232	0.5	ug/L	Primary MCL
PCB	Aroclor 1242	0.5	ug/L	Primary MCL
PCB	Aroclor 1248	0.5	ug/L	Primary MCL
Herbicides	2,4,5-Trichlorophenoxypropionic acid (Silvex)	50	ug/L	Cal MCL
Herbicides	2,4-Dichlorophenoxyacetic Acid (2,4-D)	130	ug/L	SWGW RBSL

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Reference Value	Units	Reference Type
Herbicides	2,4,5-T	130	ug/L	SWGW RBSL
Herbicides	Dalapon	200	ug/L	Cal MCL
Herbicides	Dinoseb	7	ug/L	Primary MCL
Herbicides	Propachlor	90	ug/L	Notification Level
Pesticides	Kepone	0.0093	ug/L	SWGW RBSL
Pesticides	Endosulfan I	75	ug/L	SWGW RBSL
Pesticides	Endosulfan II	75	ug/L	SWGW RBSL
Pesticides	gamma-BHC	0.2	ug/L	Primary MCL
Pesticides	Methyl parathion	2	ug/L	Archived Advisory Level
Pesticides	p,p'-Methoxychlor	30	ug/L	Cal MCL
Pesticides	Parathion	40	ug/L	Archived Advisory Level
Pesticides	Endosulfan sulfate	75	ug/L	SWGW RBSL
Pesticides	4,4'-DDE	0.44	ug/L	SWGW RBSL
Pesticides	Aldrin	0.002	ug/L	Archived Advisory Level
Pesticides	alpha-BHC	0.015	ug/L	Archived Advisory Level
Pesticides	beta-BHC	0.025	ug/L	Archived Advisory Level
Pesticides	Chlordane	0.1	ug/L	Cal MCL
Pesticides	Dieldrin	0.002	ug/L	Archived Advisory Level
Pesticides	Dimethoate	1	ug/L	Archived Advisory Level
Pesticides	4,4'-DDD	0.62	ug/L	SWGW RBSL
Pesticides	Toxaphene	3	ug/L	Primary MCL
Pesticides	Endrin	2	ug/L	Primary MCL
Pesticides	Heptachlor	0.01	ug/L	Cal MCL
Pesticides	Heptachlor epoxide	0.01	ug/L	Cal MCL
Dioxins/Furans	2,3,7,8-TCDD	0.00003	ug/L	Primary MCL
Metals	Aluminum, Dissolved	13000	ug/L	SWGW RBSL
Metals	Boron, Dissolved	340	ug/L	SSFL Comparison
Metals	Tin, Dissolved	2.4	ug/L	SSFL Comparison
Metals	Antimony, Dissolved	2.5	ug/L	SSFL Comparison
Metals	Arsenic, Dissolved	7.7	ug/L	SSFL Comparison
Metals	Barium, Dissolved	150	ug/L	SSFL Comparison
Metals	Beryllium, Dissolved	0.14	ug/L	SSFL Comparison
Metals	Cadmium, Dissolved	0.2	ug/L	SSFL Comparison
Metals	Chromium, Dissolved	14	ug/L	SSFL Comparison
Metals	Cobalt, Dissolved	1.9	ug/L	SSFL Comparison
Metals	Copper, Dissolved	4.7	ug/L	SSFL Comparison
Metals	Hexavalent Chromium, Dissolved	10	ug/L	Cal MCL
Metals	Iron, Dissolved	4100	ug/L	SSFL Comparison
Metals	Lead, Dissolved	11	ug/L	SSFL Comparison
Metals	Magnesium, Dissolved	77000	ug/L	SSFL Comparison
Metals	Manganese, Dissolved	150	ug/L	SSFL Comparison
Metals	Mercury, Dissolved	0.063	ug/L	SSFL Comparison
Metals	Molybdenum, Dissolved	2.2	ug/L	SSFL Comparison
Metals	Nickel, Dissolved	17	ug/L	SSFL Comparison
Metals	Potassium, Dissolved	9600	ug/L	SSFL Comparison
Metals	Selenium, Dissolved	1.6	ug/L	SSFL Comparison
Metals	Silver, Dissolved	0.17	ug/L	SSFL Comparison
Metals	Sodium, Dissolved	190000	ug/L	SSFL Comparison
Metals	Strontium, Dissolved	800	ug/L	SSFL Comparison
Metals	Thallium, Dissolved	0.13	ug/L	SSFL Comparison
Metals	Vanadium, Dissolved	2.6	ug/L	SSFL Comparison
Metals	Zinc, Dissolved	6300	ug/L	SSFL Comparison
Metals	Aluminum	200	ug/L	Secondary MCL

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analyte Group	Chemical Analyte	Reference Value	Units	Reference Type
Metals	Antimony	2.5	ug/L	SSFL Comparison
Metals	Arsenic	7.7	ug/L	SSFL Comparison
Metals	Barium	150	ug/L	SSFL Comparison
Metals	Beryllium	0.14	ug/L	SSFL Comparison
Metals	Boron	340	ug/L	SSFL Comparison
Metals	Cadmium	0.2	ug/L	SSFL Comparison
Metals	Chromium	14	ug/L	SSFL Comparison
Metals	Cobalt	1.9	ug/L	SSFL Comparison
Metals	Copper	4.7	ug/L	SSFL Comparison
Metals	Hexavalent Chromium	10	ug/L	Cal MCL
Metals	Iron	4100	ug/L	SSFL Comparison
Metals	Lead	11	ug/L	SSFL Comparison
Metals	Magnesium	77000	ug/L	SSFL Comparison
Metals	Manganese	150	ug/L	SSFL Comparison
Metals	Mercury	0.063	ug/L	SSFL Comparison
Metals	Molybdenum	2.2	ug/L	SSFL Comparison
Metals	Nickel	17	ug/L	SSFL Comparison
Metals	Potassium	9600	ug/L	SSFL Comparison
Metals	Selenium	1.6	ug/L	SSFL Comparison
Metals	Silver	0.17	ug/L	SSFL Comparison
Metals	Sodium	190000	ug/L	SSFL Comparison
Metals	Strontium	800	ug/L	SSFL Comparison
Metals	Thallium	0.13	ug/L	SSFL Comparison
Metals	Tin	2.4	ug/L	SSFL Comparison
Metals	Vanadium	2.6	ug/L	SSFL Comparison
Metals	Zinc	6300	ug/L	SSFL Comparison
Inorganics	Chlorine	4000	ug/L	Primary MCL
Inorganics	Nitrate-NO3	45000	ug/L	Cal MCL
Inorganics	Nitrite-NO2	3284	ug/L	Primary MCL [(c)]
Inorganics	Ammonia-N	30000	ug/L	Taste/Odor
Inorganics	Chloride	250000	ug/L	Secondary MCL
Inorganics	Chlorate	0.8	ug/L	Notification Level
Inorganics	Cyanides	150	ug/L	Cal MCL
Inorganics	Fluoride	800	ug/L	SSFL Comparison
Inorganics	Nitrate-N	10000	ug/L	Cal MCL
Inorganics	Nitrite-N	1000	ug/L	Primary MCL
Inorganics	Sulfate	376000	ug/L	SSFL Comparison
Inorganics	Total Dissolved Solids	500000	ug/L	Recommended SMCL
Inorganics	Total Dissolved Solids	1000000	ug/L	Upper SMCL
Inorganics	Total Dissolved Solids	1500000	ug/L	Short-Term SMCL
General Parameters	Formic Acid	1700000	ug/L	Taste/Odor
General Parameters	Turbidity	5	NTU	Secondary MCL
General Parameters	Specific conductivity	900	umhos/cm	Recommended SMCL
General Parameters	Specific conductivity	1600	umhos/cm	Upper SMCL
General Parameters	Specific conductivity	2200	umhos/cm	Short-Term SMCL

TABLE 9
GROUNDWATER REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

NOTES AND ABBREVIATIONS

These values are presented only to provide general context for reported concentrations in groundwater and are not site-specific approved values for remediation/cleanup decisions.

(a) - isotope-specific MCL for beta emitters based on Primary MCL of 4 mrem/yr critical organ dose limit for gross beta (EPA, 2000)
(b) - isotope-specific MCL for beta emitters based on the 4 mrem/yr effective dose equivalent for gross beta (EPA, 2000)
(c) - conversion from Primary MCL for Nitrite-N

VOCs - volatile organic compounds	Primary MCL - Primary Maximum Contaminant Level	ug/L - micrograms per liter
SVOC - semi volatile organic compound	Cal MCL - California Primary Maximum Contaminant Level	pCi/L - picocuries per liter
PAH - polycyclic aromatic hydrocarbon	Secondary MCL - Secondary Maximum Contaminant Level	mrem/yr - millirem per year
NDMA - n-Nitrosodimethylamine	SMCL - Secondary Maximum Contaminant Level	NTU - nephelometric turbidity units
TPH - total petroleum hydrocarbons	Taste/Odor - Taste/Odor Threshold	umhos/cm - micromhos per centimeter
PCB - polychlorinated biphenyl	SSFL Comparison - site-specific values for metals developed by DTSC	
	SWGW RBSL - Site-Wide Groundwater Risk-Based Screening Level developed using process defined in GW RI Report (MWH, 2009)	

Appendix B-4

Preliminary Chemical Lookup Table Values

(Source: Chemical Look-Up Table Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California, dated June 11, 2013)

Draft Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
Alcohols - EPA Method 8015B			
Ethanol	mg/kg	0.7	BG MRL
Methanol	mg/kg	0.7	BG MRL
Anions - EPA Methods 300.0 / 9056A			
Fluoride	mg/kg	10.2	BTV
Nitrate	mg/kg	22.3	BTV
Cyanide - EPA Method 9012A			
Cyanide	mg/kg	0.6	BG MRL
Dioxin-Furans - EPA Method 1613B			
1,2,3,4,6,7,8-HpCDD	pg/g	see note[1]	---
1,2,3,4,6,7,8-HpCDF	pg/g	see note[1]	---
1,2,3,4,7,8,9-HpCDF	pg/g	see note[1]	---
1,2,3,4,7,8-HxCDD	pg/g	see note[1]	---
1,2,3,4,7,8-HxCDF	pg/g	see note[1]	---
1,2,3,6,7,8-HxCDD	pg/g	see note[1]	---
1,2,3,6,7,8-HxCDF	pg/g	see note[1]	---
1,2,3,7,8,9-HxCDD	pg/g	see note[1]	---
1,2,3,7,8,9-HxCDF	pg/g	see note[1]	---
1,2,3,7,8-PeCDD	pg/g	see note[1]	---
1,2,3,7,8-PeCDF	pg/g	see note[1]	---
2,3,4,6,7,8-HxCDF	pg/g	see note[1]	---
2,3,4,7,8-PeCDF	pg/g	see note[1]	---
2,3,7,8-TCDD	pg/g	see note[1]	---
2,3,7,8-TCDF	pg/g	see note[1]	---
OCDD	pg/g	see note[1]	---
OCDF	pg/g	see note[1]	---
2,3,7,8-TCDD TEQ			
2,3,7,8-TCDD TEQ[1]	pg/g	0.912 (see note[1])	BTV-TEQ
Energetics - EPA Method 8330			
RDX	µg/kg	300	M-L MRL
Formaldehyde - EPA Method 8315A			
Formaldehyde	µg/kg	1,870	BG MRL

Draft Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
Herbicides - EPA Method 8151A			
2,4,5-T	µg/kg	1.2	BTV
2,4,5-TP	µg/kg	0.63	BTV
2,4-D	µg/kg	5.8	BTV
2,4-DB	µg/kg	2.4	BG MRL
2,4-DP (Dichloroprop)	µg/kg	2.4	BTV
Dalapon	µg/kg	12.5	BG MRL
Dicamba	µg/kg	1.3	BTV
Dinoseb	µg/kg	3.3	BG MRL
MCPA	µg/kg	761	BTV
MCPP (Mecoprop)	µg/kg	377	BTV
Pentachlorophenol	µg/kg	170	M-L MRL
Metals - EPA Methods 6010B/6020A			
Aluminum	mg/kg	58,600	BTV
Antimony	mg/kg	0.86	BTV
Arsenic	mg/kg	46	BTV
Barium	mg/kg	371	BTV
Beryllium	mg/kg	2.2	BTV
Boron	mg/kg	34	BTV
Cadmium	mg/kg	0.7	BTV
Chromium	mg/kg	94	BTV
Cobalt	mg/kg	44	BTV
Copper	mg/kg	119	BTV
Lead	mg/kg	49	BTV
Lithium	mg/kg	91	BTV
Manganese	mg/kg	1,120	BTV
Molybdenum	mg/kg	3.2	BTV
Nickel	mg/kg	132	BTV
Potassium	mg/kg	14,400	BTV
Selenium	mg/kg	1	BTV
Silver	mg/kg	0.2	BTV
Sodium	mg/kg	1,780	BTV
Strontium	mg/kg	163	BTV
Thallium	mg/kg	1.2	BTV
Vanadium	mg/kg	175	BTV
Zinc	mg/kg	215	BTV
Zirconium	mg/kg	19	BTV
Hexavalent Chromium - EPA Methods 7199/7196A			
Hexavalent Chromium	mg/kg	2	BTV
Mercury - EPA Methods 7471A/7470A			
Mercury	mg/kg	0.13	BG MRL
Methyl Mercury - EPA Method 1630 (Mod)			
Methyl Mercury	µg/kg	0.05	M-L MRL

Draft Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
PCBs / PCTs - EPA Method 8082			
Aroclor 1016	µg/kg	17	M-L MRL
Aroclor 1221	µg/kg	33	M-L MRL
Aroclor 1232	µg/kg	17	M-L MRL
Aroclor 1262	µg/kg	33	M-L MRL
Aroclor 1254	µg/kg	17	M-L MRL
Aroclor 1260	µg/kg	17	M-L MRL
Aroclor 1268	µg/kg	33	M-L MRL
Aroclor 1242	µg/kg	17	M-L MRL
Aroclor 1248	µg/kg	17	M-L MRL
Aroclor 5432	µg/kg	50	M-L MRL
Aroclor 5442	µg/kg	50	M-L MRL
Aroclor 5460	µg/kg	50	M-L MRL
Perchlorate - EPA Methods 6850/6860			
Perchlorate	µg/kg	1.63	BTV
Pesticides - EPA Method 8081A			
Aldrin	µg/kg	0.24	BG MRL
Alpha-BHC	µg/kg	0.24	BG MRL
Beta-BHC	µg/kg	0.23	BTV
Chlordane	µg/kg	7	BTV
Delta-BHC	µg/kg	0.22	BTV
Dieldrin	µg/kg	0.48	BG MRL
Endosulfan I	µg/kg	0.24	BG MRL
Endosulfan II	µg/kg	0.48	BG MRL
Endosulfan Sulfate	µg/kg	0.48	BG MRL
Endrin	µg/kg	0.48	BG MRL
Endrin Aldehyde	µg/kg	0.7	BTV
Endrin Ketone	µg/kg	0.7	BTV
Gamma-BHC - Lindane	µg/kg	0.24	BG MRL
Heptachlor	µg/kg	0.24	BG MRL
Heptachlor Epoxide	µg/kg	0.24	BG MRL
Methoxychlor	µg/kg	2.4	BG MRL
Mirex	µg/kg	0.5	BTV
p,p-DDD	µg/kg	0.48	BG MRL
p,p-DDE	µg/kg	8.6	BTV
p,p-DDT	µg/kg	13	BTV
Toxaphene	µg/kg	8.8	BG MRL

Draft Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
Semi-Volatiles (SVOCs)/PAHs - EPA Method 8270C(SIM)			
Acenaphthylene	µg/kg	2.5	BG MRL
Anthracene	µg/kg	2.5	BG MRL
Benzo(a)anthracene	µg/kg	see note [2]	---
Benzo(a)pyrene	µg/kg	see note [2]	---
Benzo(b)fluoranthene	µg/kg	see note [2]	---
Benzo(g,h,i)perylene	µg/kg	2.5	BG MRL
Benzo(k)fluoranthene	µg/kg	see note [2]	---
Bis(2-Ethylhexyl)phthalate	µg/kg	61	BTV
Butylbenzylphthalate	µg/kg	100	BTV
Chrysene	µg/kg	see note [2]	---
Dibenz(a,h)anthracene	µg/kg	see note [2]	---
Diethyl phthalate	µg/kg	27	BG MRL
Dimethyl phthalate	µg/kg	27	BG MRL
Di-n-butylphthalate	µg/kg	27	BG MRL
Di-n-octylphthalate	µg/kg	27	BG MRL
Fluoranthene	µg/kg	5.2	BTV
Fluorene	µg/kg	3.8	BTV
Indeno(1,2,3-cd)pyrene	µg/kg	see note [2]	---
Naphthalene	µg/kg	3.6	BTV
Phenanthrene	µg/kg	3.9	BTV
Pyrene	µg/kg	5.6	BTV
1-Methyl naphthalene	µg/kg	2.5	BG MRL
2-Methylnaphthalene	µg/kg	2.5	BG MRL
Acenaphthene	µg/kg	2.5	BG MRL
Benzo(a)pyrene Equivalent			
Benzo(a)pyrene TEQ[2]	µg/kg	4.47 (see note[2])	BTV-TEQ
Other SVOCs			
Benzoic Acid - EPA 8270	µg/kg	660	M-L MRL
N-Nitrosodimethylamine - 8270C(SIM)	µg/kg	10	M-L MRL
Phenol - EPA 8270	µg/kg	170	M-L MRL
TPH - EPA Method 8015			
TPH EFH (C15-C20)[3]	mg/kg	5 (see note[3])	M-L MRL
Terphenyls - EPA Method 8015			
o-Terphenyl	mg/kg	7	M-L MRL

Draft Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
VOCs - EPA Method 8260			
1,1-Dichloroethene	µg/kg	5	M-L MRL
1,4-Dioxane - EPA 8260 (SIM)	µg/kg	10	M-L MRL
2-Hexanone	µg/kg	10	M-L MRL
Acetone	µg/kg	20	M-L MRL
Benzene	µg/kg	5	M-L MRL
cis-1,2-Dichloroethene	µg/kg	5	M-L MRL
Ethylbenzene	µg/kg	5	M-L MRL
Hexachlorobutadiene	µg/kg	5	M-L MRL
Methylene chloride	µg/kg	10	M-L MRL
Tetrachloroethene	µg/kg	5	M-L MRL
Toluene	µg/kg	5	M-L MRL
Trichloroethene	µg/kg	5	M-L MRL
Vinyl chloride	µg/kg	5	M-L MRL

Notes:

mg/kg: milligrams per kilogram (parts per million)
µg/kg: micrograms per kilogram (parts per billion)
pg/g: picograms per gram (parts per trillion)
BTV: Background threshold value
BG-MRL: Background method reporting limit
M-L MRL: Multi-Lab method reporting limit
PAH: Polyaromatic hydrocarbon
PCB: Polychlorinated biphenyl
PCT: Polychlorinated terphenyl
RDX: Research Department Explosive
SIM: Selective ion monitoring
SVOC: Semi-volatile organic compound
TEQ: Toxicity equivalency
TPH EFH: Total petroleum hydrocarbon - extractable fuel hydrocarbon
VOC: Volatile organic compound

[1] DTSC applied the World Health Organization's 2,3,7,8-TCDD toxicity equivalence approach for dixoin-furans. To evaluate 2,3,7,8-TCDD equivalence, dixoin-furans need to meet respective background study MRLs.

[2] Benzo(a)pyrene equivalence developed based on sum of carcinogenic PAHs. In order to evaluate Benzo(a)pyrene equivalence, carcinogenic PAHs need to meet respective background study MRLs.

[3] For locations where TPH is the sole contaminant, a cleanup strategy will be considered based on the findings of soil treatability study.

Appendix B-5

Draft Provisional Radiological Lookup Table Values

(Source: SSFL Document Library accessed on March 30, 2017
http://www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab/ssfl_document_library.cfm)

Draft Provisional Radiological Look-Up Table Values

			Provisional Look-Up Table Values	
Radionuclide	BTV	Provisional Look-Up Table Basis	EPA Lab A	EPA Lab B*
Am-241	0.0162	MDC	0.0815	0.039
Co-60	0.00556	MDC	0.04	0.0363
Cs-137	0.193	BTV	0.225	0.225
Eu-152	0.0169	MDC	0.105	0.0739
Eu-154	0.0251	MDC	0.217	0.198
Eu-155	0.198	MDC	0.253	0.231
Ni-59	0.344	MDC	10.9	0.875
Pu-238	0.00425	MDC	0.122	0.0254
Pu-239/240	0.0142	MDC	0.115	0.023
Sr-90	0.075	MDC	1.02	0.117
Th-228	3.67	BTV	4.27	4.27
Th-230	2.04	BTV	2.38	2.38
Th-232	2.95	BTV	3.44	3.44
U-233/234	1.87	BTV	2.18	2.18
U-235	0.13	MDC	0.249	0.152
U-238	1.68	BTV	1.96	1.96
Values in pCi/g				
Jan-30-2013				

* For the draft Provisional Look-Up Table values DTSC will apply the values from Lab B