National Aeronautics and Space Administration

Record of Decision Supplemental Environmental Impact Statement for Soil Cleanup Activities at Santa Susana Field Laboratory, Ventura County, California

Final

September 2020

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Acronyms and Abbreviations

Acronym	Definition
µg/kg	microgram(s) per kilogram
ACHP	Advisory Council on Historic Preservation
AOC	Administrative Order on Consent
bgs	below ground surface
BMP	best management practice
Boeing	The Boeing Company
Cal EPA	California Environmental Protection Agency
Cal Poly	California Polytechnic State University
CAMU	Corrective Action Management Unit
CBG	Committee to Bridge the Gap
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CESA	California Endangered Species Act
CFR	*Code of Federal Regulations*
COC	chemical of concern
CRWQCB	California Regional Water Quality Control Board
CTCP	construction traffic control plan
CWA	Clean Water Act
DEIS	draft environmental impact statement
DIOXTEQ	2,3,7,8-tetrachloro-dibenzo-p-dioxin toxic equivalency
DOE	U.S. Department of Energy
DSR	data summary report
DTSC	California Department of Toxic Substances Control
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESAAP	Environmentally Sensitive Areas Action Plan
FEIS	final environmental impact statement
FR	*Federal Register*
GSA	General Services Administration
HAER	Historic American Engineering Record
ICRMP	Integrated Cultural Resources Management Plan
LOX	liquid oxygen
LUT	Look-Up Table
mg/kg	milligram(s) per kilogram
MNA	monitored natural attenuation
MRL	method reporting limit
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NOA	notice of availability
NOI	notice of intent

Acronym	Definition
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPR	NASA Procedural Requirements
NPS	National Park Service
NRDC	Natural Resources Defense Council
NRHP	National Register of Historic Places
PA	Programmatic Agreement
PAH	polycyclic aromatic hydrocarbon
PAHTEQ	benzo(a)pyrene toxic equivalency
PEIR	program environmental impact report
pg/g	picogram(s) per gram
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
PSR-LA	Physicians for Social Responsibility - Los Angeles
RAG	Risk Assessment Guidance
ROD	record of decision
ROW	right-of-way
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Office
SIP	state implementation plan
SRAM	Standardized Risk Assessment Methodology
SSFL	Santa Susana Field Laboratory
TCDD	2,3,7,8-tetrachloro-dibenzo-p-dioxin
TCP	Traditional Cultural Property
TPH	total petroleum hydrocarbon(s)
U.S.C.	*United States Code*
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
XRA	extended remedial area
yd^3	cubic yard(s)

A. Introduction

In March 2014, the National Aeronautics and Space Administration (NASA) prepared a Final Environmental Impact Statement (EIS) for the Proposed Demolition and Environmental Cleanup Activities at the Santa Susana Field Laboratory (SSFL) in Ventura County, California (NASA, 2014a). After the required 30-day wait period, NASA issued a Record of Decision (ROD) to move forward with demolishing facilities at SSFL (NASA, 2014b). At that time, a decision was made to defer issuing RODs for the cleanup of soil and groundwater until further investigations, analysis, and planning could be completed. Upon completion of the SSFL Draft Groundwater Corrective Measure Study (NASA, 2018a), a ROD allowing groundwater cleanup at SSFL was signed on October 4, 2018 (NASA, 2018b).

The White House Council on Environmental Quality's (CEQ's) implementing regulations for the National Environmental Policy Act of 1969 (NEPA) (*Code of Federal Regulations* [CFR], Title 40, Parts 1500 through 1508) require that where significant new information relevant to environmental concerns and bearing on a proposed action or its impacts exists, a Supplemental Environmental Impact Statement (SEIS) must be prepared for the original EIS so that the U.S. Government has the best possible information to make any necessary substantive changes in its decisions regarding the proposed action. NASA initiated preparation of the Final SEIS (NASA, 2020) when it determined that pursuant to information found in the California Department of Toxic Substances Control (DTSC) Draft Programmatic Environmental Impact Review (PEIR) for the SSFL cleanup, the soil quantity that may need to be removed from the SSFL site far exceeded the estimate NASA used in its 2014 Final EIS. NASA determined this constituted significant new information relevant to environmental concerns and bearing on the Proposed Action (DTSC, 2017).

NEPA requires analysis of a range of reasonable alternatives to the proposed action. The alternatives section is the heart of any NEPA document, including the Final SEIS. In determining the scope of alternatives to be considered, NASA considered those alternatives that are: (1) practical and feasible using both the Administrative Order on Consent for Remedial Action (AOC) (State of California DTSC Docket No. HSA-CO 10/11-038) (DTSC, 2010) framework and a risk-based approach based on criteria provided in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and as set forth in applicable California state law, (2) protective both environmentally and from a human health-based perspective, and (3) feasible from a technical implementability standpoint.

As it prepared the Final SEIS (NASA, 2020) and evaluated the alternatives set forth in this section, NASA was mindful of its responsibility to implement an environmental cleanup of residual contaminants in the SSFL areas over which it has continued oversight in a manner that is fully protective of public health and the environment, preserves to the maximum extent possible the site's natural and cultural resources, and is feasible (i.e., implementable). The Final SEIS takes into account other responsible party cleanup obligations for the areas of SSFL that surround NASA's property to ensure a long-term, cohesive, and uniform remedial action is implemented.

The Final SEIS (NASA, 2020) considers the following range of alternatives that meet NASA's objectives to clean up soil at the portion of the SSFL site administered by NASA:

- Alternative A: AOC Cleanup using DTSC-proposed Look-up Table (LUT) values (similar to the Proposed Action from the 2014 Final EIS with the impacts of increased soil volumes considered).
- Alternative B: Revised LUT Cleanup (this alternative involves proposed revisions to seven LUT values to reflect California Environmental Protection Agency (Cal EPA) Office of Environmental Health Hazard Assessment screening levels, Los Angeles County screening levels for contaminants, and U.S. Environmental Protection Agency [EPA] screening levels; all other DTSC-proposed LUT values would remain the same).

- Alternative C: Suburban Residential Cleanup (based on the DTSC-approved Standardized Risk Assessment Methodology [SRAM] Revision 2 Addendum, EPA Risk Assessment Guidance [RAG] for residential land use, and Cal EPA RAG).
- Alternative D: Recreational Cleanup (based on DTSC-approved SRAM Revision 2 Addendum, EPA RAG for recreational land use, and Cal EPA RAG).

A No Action Alternative, which is required per 40 CFR Section 1502.14(d), was also included in the analysis, though it would not meet the purpose and need of the Proposed Action.

Public meetings on the Draft SEIS (NASA, 2019a) were held in the vicinity of SSFL on November 20 and 21, 2019. During the review period, NASA received approximately 1,200 comments, over 800 of which were form letters. After considering all comments received, NASA prepared the Final SEIS (NASA, 2020). NASA identified Alternative C, Suburban Residential Cleanup, as the Agency-Preferred Alternative. NASA ranked Alternative C, Suburban Residential Cleanup, and Alternative D, Recreational Cleanup equally as the Environmentally Preferred Alternative.

NASA is issuing this ROD for soil cleanup on NASA-administered areas at SSFL. This soil ROD includes a summary of the NEPA process completed in the Final SEIS (NASA, 2020), public involvement in the decision-making process, the alternatives considered, the key environmental issues evaluated, the statement of the decision made, and the basis for the decision. While this ROD documents and explains the rationale for NASA's selection of the Alternative C: Suburban Residential Cleanup, no action may be taken on NASA’s part until such time as the California DTSC completes its preparation of, and issues a decision on, its required environmental impact report (PEIR).

B. Decision Process

B.1 Summary

NASA has prepared this ROD pursuant to the regulations established in CEQ's NEPA-implementing regulations (40 CFR Parts 1500 through 1508). NASA's Proposed Action is to remediate the soil contamination in the NASA-administered portion of Area I (i.e., the Former Liquid Oxygen [LOX] Plant) and Area II (approximately 450 acres) at SSFL. NASA analyzed its Proposed Action in an SEIS prepared in accordance with NEPA, as amended (42 *United States Code* [U.S.C.] Sections 4321 *et seq*.); the CEQ's NEPA-implementing regulations (40 CFR Parts 1500 through 1508); and the NASA Procedural Requirements (NPR) 8580.1 (NASA, 2017a) for implementing NEPA (14 CFR Part 1216, Subpart 1216.3). In the Final SEIS (NASA, 2020), NASA considered several alternatives and evaluated the environmental impacts that may result from implementation of each alternative. After considering each alternative in detail, the public comments received on the Draft SEIS (NASA, 2019a), and for the reasons set forth in this ROD, NASA selects Alternative C: Suburban Residential Cleanup as its Agency-Preferred Alternative.

B.2 Background

SSFL is located on 2,850 acres of open, rocky terrain above California's Simi Valley in southeastern Ventura County, approximately 30 miles northwest of Los Angeles. SSFL is divided into four Administrative Areas (Areas I through IV) and two undeveloped areas. Area II and a small portion of Area I (the Former LOX Plant Area) are owned by the U.S. Government and administered by NASA. The remainder of the property is owned by The Boeing Company (Boeing). In Area IV, the U.S. Department of Energy (DOE) is responsible for building demolition and the cleanup of soil and groundwater.

Beginning in 1948, activities in the NASA Administrative Areas at SSFL included researching, developing, and testing liquid-fueled rocket engines and components. These activities ceased in 2006, and this testing is now conducted at other NASA facilities. In September 2009, NASA determined the property was no longer needed to support its mission. NASA notified the General Services Administration (GSA) that the property was determined to be excess to NASA's mission and requested it be transferred from NASA control. The GSA has conditionally accepted the property for transfer upon completion of the required environmental remediation.

In 2010, NASA and the California DTSC signed an AOC setting forth a remediation goal for the cleanup of soils at SSFL (DTSC, 2010). The following list details the activities related to soil cleanup that NASA has undertaken within its administrative areas since 2007 (refer to Figure B-2, which also details the timing of the NASA activities resulting from the AOC).

- **August 2007:** NASA, Boeing, DOE, and DTSC signed a Consent Order for Corrective Action that addressed the cleanup of soil and groundwater at SSFL (State of California DTSC Docket No. P3-07/08-003) (DTSC, 2007).
- **December 2010:** NASA and DTSC executed an AOC that stipulated specific remedial requirements, including the characterization and cleanup of soil contamination in the NASA-administered areas of SSFL to LUT values, which are the chemical-specific values used to assess whether SSFL cleanup objectives have been achieved (State of California DTSC Docket No. HSA-CO 10/11-038) (DTSC, 2010).
- **July 6, 2011:** To meet the 2017 deadline for cleanup in the AOC, NASA published a Notice of Intent (NOI) in the *Federal Register* (FR) (76 FR 39443) to prepare an EIS and conduct scoping for the proposed demolition and cleanup activities at the NASA-administered portion of SSFL. NASA realized it would need to conduct additional field sampling quickly to meet the 2017 soil cleanup deadline; however, official LUT values were not developed by the California DTSC in time. NASA used DTSC-approved background and instrument detection limits in its original field sampling efforts when NASA began follow-on field sampling in August 2011.

- **December 2012:** Two years after signing the 2010 AOC, DTSC released its SSFL chemical soil background study (DTSC, 2012).
- **June 11, 2013:** DTSC completed development of LUT values based on the DTSC's chemical background study and the method reporting limits (MRLs) of laboratory equipment (DTSC, 2013).
- **August 2, 2013:** NASA published a Notice of Availability (NOA) of the Draft EIS (DEIS) in the *Federal Register* (78 FR 47007). The development of the DEIS (NASA, 2013) was based on preliminary estimates from early field sampling.
- **March 14, 2014:** NASA published an NOA of the Final EIS (FEIS) in the *Federal Register* (79 FR 14545). The FEIS was published by NASA in an effort to meet the 2017 cleanup deadline; however, groundwater and soil field sampling were still ongoing.
- **April 1, 2014:** After the required 30-day wait period, NASA issued a ROD on April 1, 2014, to move forward with demolishing facilities at SSFL (NASA, 2014b). NASA deferred the soil and groundwater cleanup decisions in order to complete soil and groundwater fieldwork, additional archeology surveys, and cleanup technology feasibility studies. NASA chose to issue a ROD for demolition and defer the soil and groundwater decisions until sampling could be completed.
- **May 1, 2015:** NASA submitted the Draft Soil Data Summary Report (DSR) to DTSC, which reflected the field sampling results (NASA, 2015). Scientists working for NASA and DTSC concluded that sampling was not effective in evaluating the extent of dioxins/furans and total petroleum hydrocarbons (TPH) because the AOC LUT values are often lower than the naturally occurring values at the site, which resulted in exceedances in areas with no potential for contamination from NASA activities (e.g., uphill from operations). DTSC and NASA agreed that an alternate approach for future evaluation was necessary, and NASA estimated contamination footprints by using natural topography and physical barriers to bound the potential extent of contamination. This footprint is known as the "Extended Remedial Area (XRA)" and is shown on Figure 3.0-1 of the Draft Soil DSR (NASA, 2015) and included here as Figure B-1.

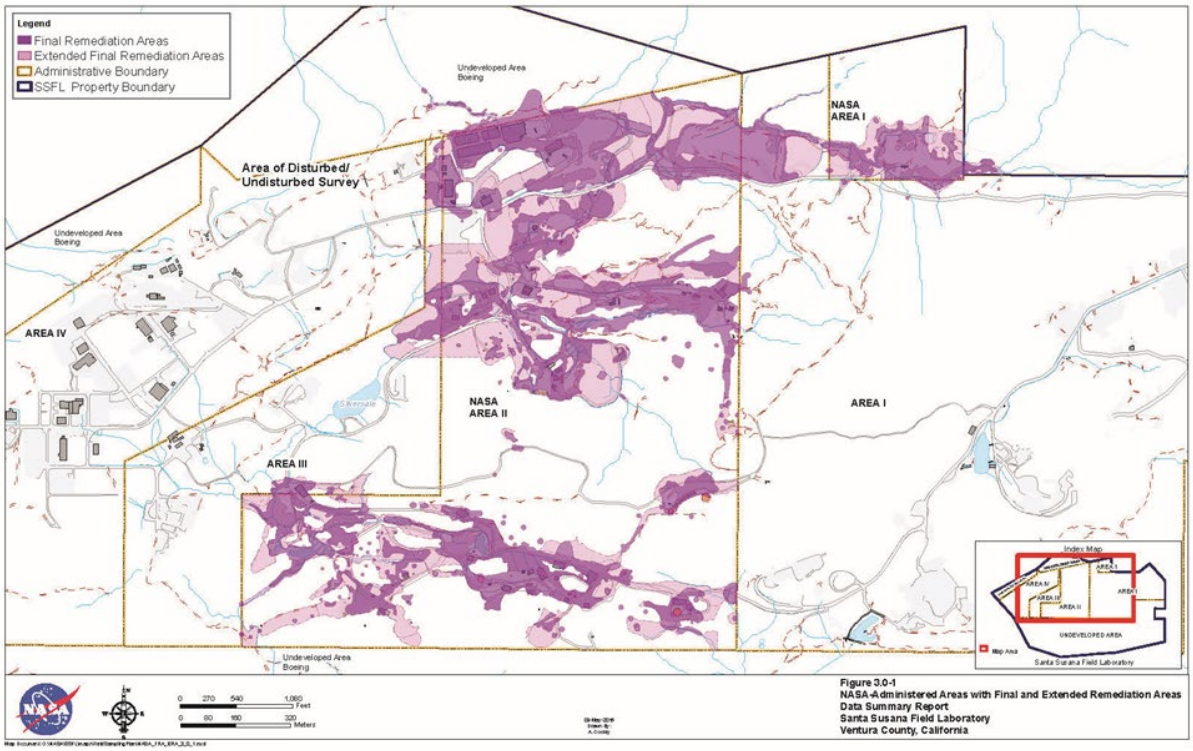


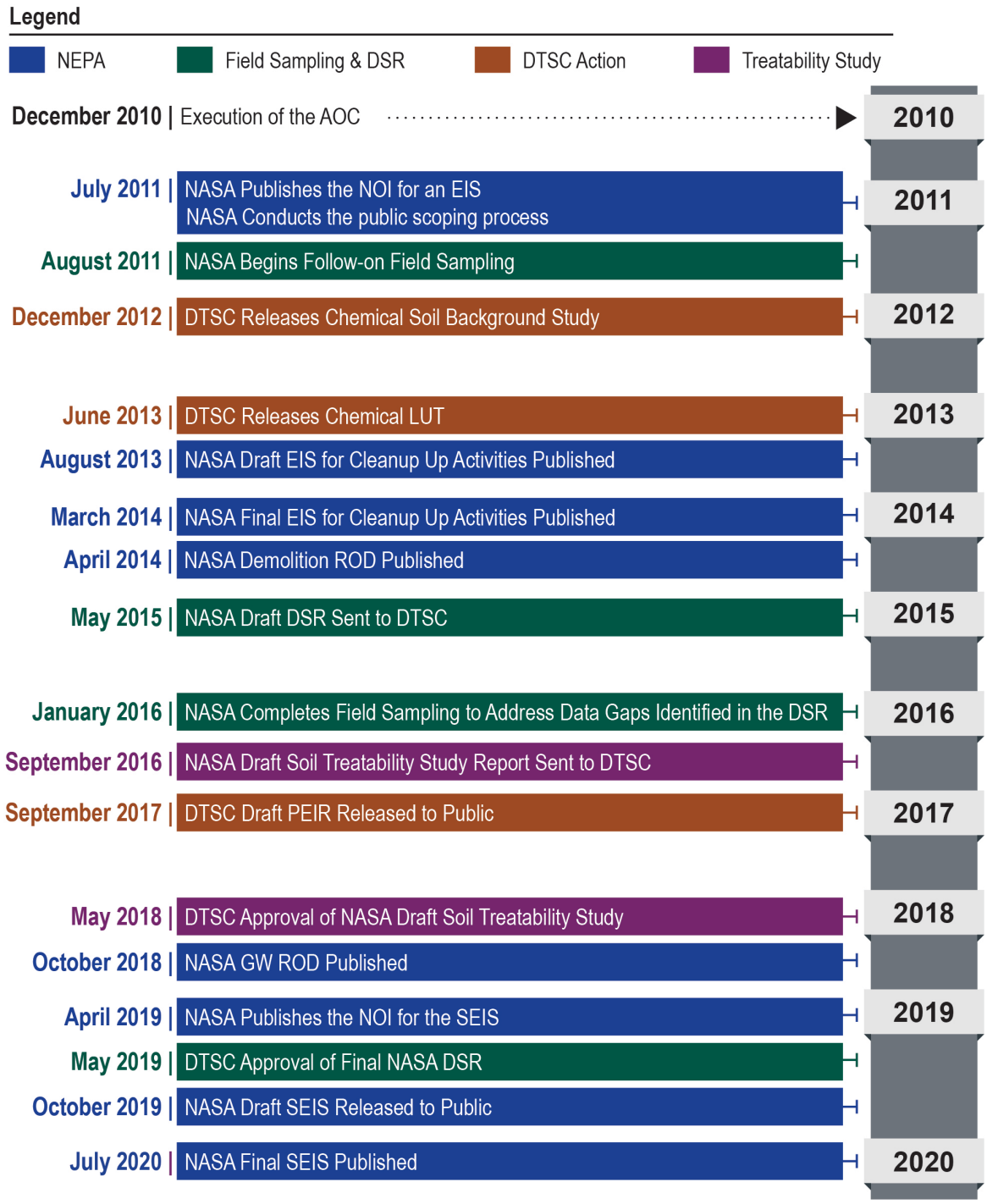
FIGURE B-1

NASA-administered Areas with Final and Extended Remediation Areas (Data Summary Report)

- **January 2016:** NASA completed field sampling to address the data gaps identified in the DSR.
- **September 1, 2016:** NASA submitted the Draft Soil Treatability Report (NASA, 2016) to DTSC. The report discusses the applicability of in situ remedial technologies for the cleanup of the NASA-administered areas of SSFL. The report concluded that some of the in situ soil treatment technologies may adequately reduce some chemicals of concern (COCs); however, excavation would still be required to address non-treatable COCs. Because only a limited amount of area contains treatable COCs, it became evident that excavation would be necessary on the majority of the cleanup site.
- **September 7, 2017:** DTSC published its Draft PEIR (DTSC, 2017), which included the soil cleanup volumes determined by using the agreed-upon XRA methodology to define the extent of the COC footprints.
- **May 2, 2018:** DTSC provided a letter to NASA approving the Soil Treatability Study (DTSC, 2018).
- **October 17, 2018:** NASA completed the field sampling necessary to conduct the groundwater cleanup and determined that there were no substantial changes to the relevant impacts shown in the 2014 NASA FEIS (NASA, 2014a). Once DTSC approved the remedial approach, a ROD allowing groundwater cleanup at SSFL was published in the *Federal Register* (83 FR 52570).
- **March 19, 2019:** The NASA Office of Inspector General released an audit titled *NASA's Progress with Environmental Remediation Activities at the Santa Susana Field Laboratory* (Report No. IG-19-013) (NASA, 2019b). The audit questioned the reasonableness and feasibility of the AOC agreement LUT requirements and recommended that all available options be pursued to ensure a soil cleanup that is protective of human health be performed in an environmentally and financially responsible manner. NASA determined that an SEIS for soil cleanup was required due to the increased probable quantity of soil requiring cleanup to meet AOC LUT values.
- **April 5, 2019:** An NOI for an SEIS was published in the *Federal Register* (84 FR 13725).
- **May 31, 2019:** DTSC provided NASA with a letter approving the 2015 DSR, including the XRA (DTSC, 2019).
- **October 25, 2019:** NASA published an NOA of the Draft SEIS (NASA, 2019a) in the *Federal Register* (84 FR 57490), which initiated a 45-day public comment period that was ultimately extended to 75 days.
- **July 2020:** NASA published an NOA of the Final SEIS in the *Federal Register* (85 FR 44930) on July 24, 2020. An explanation of the Environmentally Preferred Alternative and the Agency-Preferred Alternative was provided in the Final SEIS (NASA, 2020).

B.3 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to use the best proven science and technology to achieve soil cleanup in a timely manner that reduces impacts to the community and protects public health, the environment, and cultural resources.



AOC	Administrative Order on Consent
DSR	data summary report
DTSC	Department of Toxic Substances Control
EIS	environmental impact statement
GW	Groundwater
LUT	Look-Up Table
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act of 1969
NOI	notice of intent
PEIR	Program Environmental Impact Report
ROD	record of decision
SEIS	supplemental environmental impact statement

FES0311200911SDO

FIGURE B-2
SSFL SEIS Timeline
Record of Decision
SEIS for Soil Cleanup Activities
SSFL, Ventura County, California

B.4 Alternatives Selection

NASA's Proposed Action is to remediate soil contamination in the NASA-administered areas of SSFL using the best proven soil cleanup technologies. In 2018, NASA studied the feasibility of various cleanup technologies in the Final Soil Treatability Studies Summary (NASA, 2018c); however, the actual combination and location of the technologies will be developed as part of the soil design planning process, which will be finished after the NEPA process is completed and after DTSC finalizes its PEIR per the California Environmental Quality Act (CEQA). To allow for the appropriate flexibility in cleanup implementation, it was assumed that NASA would choose one technology or a combination of these technologies when implementing the Action Alternatives. The following technologies could be implemented to clean up soil at SSFL:

- **Excavation and Offsite Disposal:** Surface and subsurface contaminated soil would be excavated, transported, and disposed of. This technology could be used to remove soil with multiple types of contaminants or to address contaminants not treatable by other technologies. Excavation may be used as a backup approach to another technology, if that technology does not achieve soil cleanup levels. As such, excavation is considered in each of the Action Alternatives. Soil would be transported in bulk using dump trucks or similar vehicles to an approved disposal facility. Backfill material would be acquired from an onsite or offsite source, when available.
- **Ex Situ Soil Treatments:** Ex situ methodologies involve excavating soil from its original location and moving it to another location onsite where it would be treated. Ex situ treatment differs from excavation and offsite disposal in that the soil would be treated at the SSFL site and then used as backfill, to the degree possible. At the NASA-administered areas of SSFL, ex situ treatments being considered include soil washing, land farming, chemical oxidation, and thermal desorption.
- **In Situ Soil Treatments:** In situ methodologies involve treating soil at its original location. In situ treatments being considered at the NASA-administered areas of SSFL include soil vapor extraction, chemical oxidation, and anaerobic or aerobic biological treatment. In situ treatments generally present the least environmental impacts of the soil technologies.
- **Monitored Natural Attenuation (MNA):** MNA relies on natural processes to destroy contamination. It is typically used in coordination with another remedial technology. For example, MNA could be used after a remedial technology is no longer effective in reducing the chemical concentrations of organic compounds. MNA would be used only if active treatment had reduced concentrations below risk-based cleanup values or if initial concentrations were already below risk-based cleanup values and additional reductions were required to meet AOC LUT requirements.

B.4.1 Proposed Action Alternatives

NASA identified four Action Alternatives for the Proposed Action that meet Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) cleanup requirements and follow EPA- and Cal EPA-recognized methods for identifying appropriate site cleanup levels for the COCs at SSFL. These alternatives require the implementation of the soil treatment technologies described in the Final SEIS (NASA, 2020). Three of the Action Alternatives are new since the 2014 FEIS (NASA, 2014a) and would not meet the proposed LUT cleanup values; however, the CEQ implementing regulations for NEPA require that the agency evaluates all reasonable alternatives, even if they are outside an agency's authority to implement (40 CFR Section 1502.14)[1]. These three additional alternatives were identified by NASA as providing a cleanup standard in keeping with the reasonably foreseeable future uses of the SSFL property and that would be protective of human health and the environment.

[1] While this ROD documents and explains the rationale for NASA's evaluation of the Action Alternatives and the selection of the Suburban Residential Cleanup Alternative as the Agency's Preferred Alternative, no action may be taken on NASA's part until such time as the California DTSC completes the preparation of, and issues a decision on, its required environmental impact report (PEIR).

Alternative A: AOC Cleanup – Under this alternative, NASA would remediate the soil in NASA-administered areas at SSFL to the DTSC's proposed LUT values[2]. After NASA signed the 2010 AOC (DTSC, 2010), DTSC developed LUT values based on a chemical background study of the combined Chatsworth Formation and Santa Susana geological formations, as well as those chemicals most frequently identified as contaminants at SSFL or that are of interest to DTSC. The LUT values are based on either assessed naturally occurring threshold values derived from DTSC's background study or the MRL for chemicals without a background threshold value. The MRL is the minimum level that an analytical instrument can report a reliable result. These values are developed based on the capabilities of laboratory equipment; they are not based on known risks to human health and the environment or designed to ensure contaminant levels are protective. Alternative A results in the greatest impacts (i.e., significant, negative, and permanent) to natural and cultural resources.

Alternative B: Revised LUT Levels Cleanup – Under this alternative, NASA would remediate based on a revised set of AOC LUT values for seven specific COCs, as shown in Table B-1. These values were developed using the Cal EPA Office of Environmental Health Hazard Assessment screening levels, Los Angeles County screening levels for contaminants and EPA screening levels. The revised AOC LUT values are based on the seven specific COCs with values significantly different from standard agency screening levels. This alternative would reduce or eliminate many of the AOC implementation concerns, such as the availability of backfill. Additionally, while there would still be significant, negative, and permanent effects, Alternative B would reduce the scale of the environmental impacts and the effects of implementing the Proposed Action on the surrounding community compared to Alternative A.

TABLE B-1
Proposed Look-Up Table Revisions
Record of Decision, SEIS for Soil Cleanup Activities, SSFL, Ventura County, California

Analyte (soil)	AOC LUT Value	Revised LUT Value	Los Angeles County Regional Water Board Soil Screening Level	EPA Regional Screening Level for Residential Soil	California Human Health Screening Level for Residential Soil
PAHs[a]	4.47 µg/kg	**110 µg/kg**	not applicable	**110**[c] µg/kg	not applicable
TPH	5 mg/kg	**1,000 mg/kg**	**1,000 mg/kg**	Varies[e]	not applicable
Dioxin/Furans[b]	0.912 pg/g	**4.6 pg/g**	not applicable	4.8[d]pg/g	**4.6**[d] **pg/g**
Antimony	0.86 mg/kg	**30 mg/kg**	not applicable	31mg/kg	**30 mg/kg**
Silver	0.2 mg/kg	**380 mg/kg**	not applicable	390 mg/kg	**380 mg/kg**
Cadmium	0.7 mg/kg	**1.7 mg/kg**	not applicable	71 mg/kg	**1.7 mg/kg**
Acetone	20 µg/kg	**61,000,000 µg/kg**	not applicable	**61,000,000 µg/kg**	not applicable

Notes:
Bold text indicates a revised AOC LUT value.
[a] Calculated as benzo(a)pyrene toxic equivalency (PAHTEQ)
[b] Calculated as 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) toxic equivalency (DIOXTEQ)
[c] Based on benzo(a)pyrene
[d] Based on 2,3,7,8-TCDD
[e] Varies based on six TPH fractions, depending on level of aliphatic or aromatic levels
µg/kg = microgram(s) per kilogram
mg/kg = milligram(s) per kilogram
pg/g = picogram(s) per gram
PAH = polycyclic aromatic hydrocarbon
TPH = total petroleum hydrocarbon(s)

Alternative C: Suburban Residential Cleanup – This alternative considers one of the reasonably foreseeable future uses of SSFL and would apply site-specific risk-based cleanup levels to meet established Suburban Residential risk-based cleanup goals. These site-specific risk-based cleanup levels for contaminants in soil at

[2] At the time of the issuance of this ROD, the DTSC has not promulgated implementable final LUT values that NASA may evaluate and ultimately take action on.

SSFL were developed based on standard risk assessment procedures and equations provided in the DTSC-approved SRAM, EPA RAG, and Cal EPA RAG. Alternative C would result in less excavation than Alternative A and would eliminate all significant environmental impacts to natural and cultural resources and the surrounding community.

Alternative D: Recreational Cleanup – This alternative considers one of the reasonably foreseeable future uses of SSFL and would apply site-specific risk-based cleanup levels to meet established Recreational risk-based soil cleanup goals. These site-specific cleanup levels for contaminants in soil at SSFL were developed based on standard risk assessment procedures and equations provided in the DTSC-approved SRAM, EPA RAG, and Cal EPA RAG. Alternative D would result in less excavation than Alternative A and would eliminate all significant environmental impacts to natural and cultural resources and the surrounding community.

Table B-2 summarizes the associated activities with each alternative.

TABLE B-2
Alternative Comparison
Record of Decision, SEIS for Soil Cleanup Activities, SSFL, Ventura County, California

Description	Alternative A AOC Cleanup	Alternative B Revised LUT Levels Cleanup	Alternative C Suburban Residential Cleanup	Alternative D Recreational Cleanup	No Action Alternative No Soil Cleanup
Soil Excavation Volume (yd^3)[a]	870,000	384,000	247,000	176,500	0
Excavation Footprint (acres)	220	78	36	26	0
Off Haul Truckloads[b]	65,414	28,872	18,571	13,271	0
Backfill Volume (yd^3)[c]	448,000	253,000	189,000	141,000	0
Backfill Import Truckloads[b]	33,684	19,023	14,211	10,602	0
Total Truckloads [b]	**99,098**	**47,895**	**32,782**	**23,873**	**0**
Total Duration (years) [d]	**25**	**12**	**8**	**6**	**0**

Notes:
[a] These numbers are provided as a best available estimate to facilitate the assessment of environmental impacts and represent the upper levels of expected excavated soil quantities and footprint. They are calculated based on the most current data as presented in the NASA Soil DSR (NASA, 2017b) and explained in Appendix 2E of the Final SEIS (NASA, 2020). Refinements may be made during the development of the soil design planning document. If there is a significant deviation discovered during the development of the soil design planning document, or if sensitive resources, which were previously avoidable become unavoidable, NASA will determine whether supplemental NEPA documentation is required and coordinate with the appropriate resource agencies as warranted.
[b] The truckload capacity is assumed to be 19 yd^3; however, due to the expansion factor for excavated soil, 13.3 yd^3 of excavated soil is equivalent to one truckload.
[c] Backfill calculations assume that soil excavations between a 0- and 2-foot depth require 1/3 of the excavation volume for backfill, and excavations greater than a 2-foot depth require 100 percent of the excavation volume as backfill (NASA, 2018d).
[d] Duration calculation assumptions: NASA would average 16 round-trip truckloads (32 trucks total) per day, 250 days per year (NASA, Boeing, and DOE, 2015).
yd^3 = cubic yard(s)

B.4.2 No Action Alternative

The CEQ regulations (40 CFR Section 1502.14(d)) require that an EIS include consideration of a No Action Alternative. For the purpose of this analysis, the No Action Alternative considers a continuation of current activities. Under this alternative, NASA would not conduct soil remediation beyond what has already been directed under separate regulatory direction (i.e., National Pollutant Discharge Elimination System [NPDES] permit requirements). Contaminants not captured by this program would remain in place or attenuate naturally over time; however, no monitoring would occur.

The No Action Alternative would not meet NASA's Purpose and Need (Section B.3). The No Action Alternative is used as a baseline with which to assess the environmental impacts of the Proposed Action and other Action Alternatives.

B.4.3 Alternatives and Options Eliminated

During the evaluation of soil cleanup activities in the SEIS, some alternatives and options were considered but eliminated. These alternatives are described as follows:

Additional Risk-Based Cleanup Alternatives: Other risk-based cleanup scenarios such as Commercial/ Industrial cleanup levels that are between the Suburban Residential and Recreational levels were considered. However, additional risk-based cleanup levels were eliminated because the Suburban Residential Cleanup (Alternative C) and Recreational Cleanup (Alternative D) represent the most likely range of future land use scenarios. Suburban Residential Cleanup was chosen because it represented the most conservative potential land use scenario, while Recreational Cleanup was chosen because it represented the most likely future land use.

Corrective Action Management Unit (CAMU) and Encapsulation: This technology would involve excavation, as described previously. However, instead of staging and transporting soil to an approved offsite landfill facility, this remedial technology would involve siting, permitting, constructing, and encapsulating a CAMU on SSFL. A CAMU is a waste management unit specifically intended for the storage, treatment, or disposal of waste generated from onsite remediation activities and cannot be used for disposal of offsite waste or waste from onsite industrial processes. Because this approach does not remove or destroy contamination within the soil at SSFL, it would not achieve NASA's purpose for the Proposed Action, which is to use the best proven science and technology to achieve soil cleanup in a timely manner that reduces impacts to the community and protects public health, the environment, and cultural resources.

Institutional Control using Fencing and Security: Access to contaminated areas of SSFL could be restricted primarily through fencing, with signage and security being present at the site. By erecting fences with visible, hanging signage to warn trespassers to keep out of the area and restricting access to SSFL through security measures, potential exposure to humans would be limited or eliminated. The fencing and signage would require inspections at a frequency that would allow NASA to make repairs as needed. Because this approach does not remove or destroy contamination within the soil at SSFL, it would not achieve NASA's purpose for the Proposed Action, which is to use the best proven science and technology to achieve soil cleanup in a timely manner that reduces impacts to the community and protects public health, the environment, and cultural resources.

In Situ Physical Treatment Using Soil Mixing: This technology would entail using large-diameter augers or Lang-tool mixers to disturb the soil physically with a series of borehole locations. Hot air, steam, hydrogen peroxide, zero-valent iron, or other fluids would be mixed into the soil to treat the contamination in place. Typical equipment would include large drilling rigs, tanks, piping, and valves. If a heat source is required, equipment would be needed to heat either air or water. This technology primarily is used to treat organic compounds (volatile organic compounds [VOCs] and semivolatile organic compounds). This technology was eliminated because the ex situ methods for treating soil are likely to be more effective in reducing contamination than treating the soil in place, as ex situ methods offer better contact between the treatment fluids and the soil once the soil has been removed from the subsurface.

Phytoremediation: This method is primarily used in wetland areas or where the depth to groundwater is from 3 to 5 feet below ground surface (bgs). Phytoremediation has been known to treat VOCs, some metals, and polychlorinated biphenyls. Trees such as cottonwoods or poplars can uptake moisture that contains contaminants and metabolize the contaminants. An irrigation system using treated groundwater and fertilizers would be required to enhance plant growth. However, because of the dry climate and deep groundwater depths at SSFL (greater than 3 to 5 feet bgs and up to hundreds of feet bgs), as well as the slow uptake rates of moisture containing contamination, the likelihood of success is low for phytoremediation.

Approximately 3 acres of wetlands are within the NASA-administered area of SSFL (2 acres within remediation areas) and 1.9 of the 3 acres are streams that intermittently flow. Therefore, the streams may not be able to adequately support the non-native plant life required for this technology, and the uptake rates of the plants are slow. Therefore, NASA eliminated this technology from further evaluation.

Overland Conveyor and Rail Transport of Soil: This technology involves the construction and operation of an overland conveyor system that would route soil removed from SSFL to an offsite rail staging area. From that location, the stockpiled soil would be loaded onto rail cars for transport to disposal facilities. Although this soil transport alternative is considered technically feasible, the alternative was dismissed due to significant permitting challenges, eminent domain issues, and additional environmental impacts. Furthermore, in its PEIR, DTSC determined that a conveyor alternative would not meet the objective of recognizing the unique biological and cultural significance of the project site or remediate the site in an expedient and cost-effective manner (DTSC, 2017).

New Road Construction: NASA considered building a new road for use by heavy vehicles accessing and leaving SSFL. Woolsey Canyon Road is the only road accessing the site that can carry heavy construction vehicles. Although NASA considered constructing a new access road to SSFL, alternative access was dismissed from further consideration because of permitting challenges, eminent domain issues, and additional environmental impacts. DTSC also considered the construction of a new road in its PEIR; however, it also found the alternative infeasible (DTSC, 2017).

B.5 Significant Environmental Impacts

The Final SEIS evaluated a full range of environmental issues, including cultural resources; biological resources; air quality; water resources; geology; hazardous and nonhazardous materials and waste; health and safety; traffic and transportation; and noise (NASA, 2020). The Final SEIS identified the potential significant beneficial and negative environmental impacts, which are briefly described as follows:

Health and Safety (All Alternatives): Removal of existing soil contamination would significantly improve future onsite health and safety conditions, including those for children who may use the site in the future.

Cultural Resources (Alternatives A and B): The excavation and removal of soil would affect the physical integrity of the Native American sacred sites and Traditional Cultural Property (TCP) by altering the landscape through plant and soil removal. There would be physical changes to the significant characteristics of the Native American sacred site and access to the site could be impeded. There also would be temporary visual impacts to the Native American sacred site and the TCP during the equipment and excavation activities. The excavation and offsite removal of soil from the Burro Flats Site (approximately 6 acres for Alternative A and 1 acre for Alternative B), the archeological district (approximately 6 acres for Alternative A and 1 acre for Alternative B), and individual archeological sites (13 acres for Alternative A and 6 acres for Alternative B) outside the archeological district (approximately 7 total acres for Alternative A and 1 acre for Alternative B) would constitute an adverse effect under Section 106 of the National Historic Preservation Act (NHPA), because soil removal may result in the removal of archeological artifacts, and archeological artifacts lose their significance when removed from their location and context.

Biological Resources (Alternative A): Excavation of surface soil would result in the potential removal of existing soil on approximately 170 acres of native habitat (Alternative A), permanently altering the biodiversity of the site. Remediation activities could also increase the spread of invasive and noxious weed species, which could out-compete native species in areas where soil was exposed, resulting in weed species becoming dominant in areas previously suitable only for locally adapted plants.

Water Resources (Alternative A): Excavation of soil would alter site drainage conditions and potentially create new drainage and ponded areas. The soil function would be greatly affected by the removal of this quantity of soil. The filtering function offered by plants and soil chemistry would be altered at the site. While this function may return to some degree after soil replacement and the reestablishment of vegetation, it is highly unlikely the existing conditions would ever be the same.

Geology (Alternatives A and B): The existing soil profiles and corresponding functions would likely be substantially changed following excavation of up to 870,000 yd^3 of soil for Alternative A and 384,000 yd^3 for Alternative B. Proposed soil cleanup activities could increase erosion through the removal of ground cover; the loosening of soil; the temporary stockpiling of soil; increased slopes; the grading of stockpiling and staging locations; the use of unpaved temporary access roads; onsite excavation and placement of backfill material; and differential compaction from the construction and use of access roads.

B.6 Environmentally Preferred Alternative Calculation

NASA evaluated the environmental effects for each alternative using the information described in the SEIS and input obtained during the public comment period. The environmental impacts identified in the SEIS were then quantified (Table B-3) using a methodology based on the steps described in this section. A more detailed table explaining the calculations performed for Table B-3 is provided in Appendix 2G of the Final SEIS (NASA, 2020). Based on the outcome, Alternative C, Suburban Residential Cleanup, and Alternative D, Recreational Cleanup, ranked equally as the Environmentally Preferred Alternative.

1. Each of the impacts identified in the resource summary tables were counted and the totals were inserted into an Excel matrix. A decision was made not to include the timeframe when quantifying the impacts, as the timeframe is subject to many variables, which could inappropriately affect a score. For example, if an in situ technology were proven viable, then the number of truck trips would be reduced, and the duration of the cleanup would also be reduced.
2. A score was assigned to each of the identified impacts. The scores ranged from -3 to +3; for example, a significant negative impact was assigned a score of -3, a negligible impact was given a score of zero, and significant positive impact was assigned a score of +3. A negligible impact was given a score of zero because, as described in the impact justification for each resource, the impact would not be noticeable.
3. Each of the resources were then assigned a weighted value, based on the number of public comments received on that resource during the comment periods for the SEIS and the original 2014 FEIS (NASA, 2014a). The Health and Safety resource was given the highest weighting of 4 as it received the greatest number of public comments, followed by biology, cultural resources, and transportation with a weighting of 3. Water quality and air quality received the next tier with a weighting of 2, followed by geology, hazardous and nonhazardous materials and waste, and noise, which had a weighting of 1 and received the least number of public comments.
4. A final score for each alternative was generated based on the methodology defined previously. A decision was made not to include the No Action Alternative, because it will not meet the purpose and need for the Proposed Action.

TABLE B-3
Environmentally Preferred Alternative Calculation
Record of Decision, SEIS for Soil Cleanup Activities, SSFL, Ventura County, California

Alternative	Cultural	Biology	Air Quality	Water Quality	Geology	Hazardous and Nonhazardous Materials and Waste	Health and Safety	Transportation	Noise	Totals
AOC Cleanup	-54 [a]	-48	-4	-10	-5	-2	4	-12	-1	**-132**
Revised AOC LUT Cleanup	-54	-33	-4	-8	-3	-2	4	-12	-1	**-113**
Suburban Residential Cleanup	-30	-24	-4	-6	-2	-2	4	-12	-1	**-77**
Recreational Cleanup	-30	-24	-4	-6	-2	-2	4	-12	-1	**-77**

[a] Example Calculation: AOC Cleanup Cultural score = 6 significant negative impacts x score of -3 x weight of 3 = -54 (refer to Appendix 2G of Final SEIS [NASA, 2020] for a more detailed explanation)

B.7 Compliance with Laws, Regulations, and NASA Policy

NASA prepared the SEIS in accordance with NEPA, as amended (42 U.S.C. Sections 4321 *et seq*.); the NEPA-implementing regulations issued by the CEQ (40 CFR Parts 1500 through 1508); and the NPR 8580.1 (NASA, 2017a) for implementing NEPA (14 CFR Part 1216, Subpart 1216.3). The resources evaluated in the SEIS considered the laws and regulations listed in Table B-4. All of the identified Action Alternatives would be compliant with these laws to the extent applicable.

TABLE B-4
Pertinent Laws and Regulations
Record of Decision, SEIS for Soil Cleanup Activities, SSFL, Ventura County, California

Resource	Permitting or Approval Agency	Permit or Approval	Requirement	Comments
Biology	CDFW	CESA, CDFW Code Section 2081(b) permit, or Natural Community Conservation Plan Section 2835 permit	CESA prohibits the taking of threatened, endangered, or candidate species, except as otherwise provided in that statute. CDFW may permit the taking of those species pursuant to Sections 2081(b) or 2835, if specified conditions are met.	CDFW Code Section 2081 does not apply to the federal government. However, NASA is working with CDFW to meet the principles of this regulation. Refer to Section 3.2, B*iological Resources*, of the Final SEIS for further explanation (NASA, 2020).
Biology	CDFW	Lake and Streambed Alteration Agreement	California Code Section 1600 et seq. requires any person, state, or local government agency, or public utility proposing a project that may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of a river, stream, or lake to notify CDFW before beginning the project.	CDFW Code Section 1600 does not apply to the federal government. However, NASA is working with CDFW to meet the principles of this regulation. Refer to Section 3.2, *Biological Resources*, of the Final SEIS for further explanation (NASA, 2020).
Biology	USFWS	ESA Section 7 Incidental Take Statement	Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat.	NASA will comply with the requirements agreed to in the USFWS ESA Section 7 Effects Determination. Refer to Attachment 2.
Hazardous Materials	DTSC	Various permits and approvals related to hazardous materials and cleanup activities	The storage, transport, and disposal of hazardous materials are primarily regulated by DTSC under various federal and state regulations.	Applies to all cleanup activities. Refer to Section 3.6, *Hazardous and Nonhazardous Materials and Waste,* of the Final SEIS for further explanation (NASA, 2020).
Transportation	California Department of Transportation or Federal Highway Administration	Encroachment and Transportation Permits	Encroachment permits would be needed for any activities in a federal, state, or county road or highway ROW. Transportation permits would be needed for oversized vehicles or over-weight loads.	Applies to all cleanup activities. Refer to Section 3.8, *Traffic and Transportation*, of the Final SEIS for further explanation (NASA, 2020).

Resource	Permitting or Approval Agency	Permit or Approval	Requirement	Comments
Water	USACE	CWA Section 404 Permit	Section 404 of the CWA requires that a permit be obtained from the USACE before discharging dredge or fill material into waters of the United States, their tributaries, and associated wetlands. Activities regulated by 404 permits include, but are not limited to, dredging, construction activities in waterways, and flood control actions.	A USACE jurisdiction determination will be performed prior to implementation of cleanup activities. Refer to Section 3.2, *Biological Resources*, of the Final SEIS for further explanation (NASA, 2020).
Water	Regional Water Quality Control Board	CWA Section 401 Water Quality Certification	Section 401 of the CWA requires that federally authorized discharges into waters of the United States not violate state water quality standards.	Required if a CWA Section 402 or 404 Permit is required. A USACE jurisdiction determination will be performed prior to implementation of cleanup activities. Refer to Section 3.2, *Biological Resources*, of the Final SEIS for further explanation (NASA, 2020).
Water		CWA Section 402 NPDES Permit	Section 402 of the CWA authorizes states to issue NPDES permits for discharges to surface water. Compliance is required for all discharges into waters of the United States, or for construction projects that would disturb 1 acre or more.	NASA will comply with NPDES permit requirements. Refer to Section 3.4, *Water Resources* of the Final SEIS for further explanation (NASA, 2020).
Cultural Resources	The ACHP and the California SHPO	Section 106 of the NHPA	Section 106 requires federal agencies to evaluate the effects of federal undertakings on historical, archeological, and cultural resources. An agency is required to coordinate with the SHPO, Tribal Historic Preservation Officer, and other interested parties on the effects on historic, cultural, and tribal resources.	NASA will implement requirements per the 2020 Programmatic Agreement with the SHPO. Refer to Attachment 1.
Air Quality	California Air Resource Board and the Ventura County Air Pollution Control District	Clean Air Act General Conformity Determination	Clean Air Act Section 176(c) requires federal actions to conform to applicable federal implementation plans or SIPs to ensure that the actions do not interfere with strategies employed to attain the NAAQS.	The Proposed Action meets General Conformity requirements. Refer to Section 3.3, *Air Quality,* of Final SEIS for further explanation (NASA, 2020).

ACHP = Advisory Council on Historic Preservation
CDFW = California Department of Fish and Wildlife
CESA = California Endangered Species Act
CWA = Clean Water Act
DTSC = California Department of Toxic Substances Control
ESA = Endangered Species Act (federal)
NAAQS = National Ambient Air Quality Standards
NOx = nitrogen oxide
NPDES = National Pollutant Discharge Elimination System
PM_{10} = particulate matter less than 10 microns in aerodynamic diameter
ROW = right-of-way
SHPO = State Historic Preservation Office
SIP = state implementation plan
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish and Wildlife Service

B.8 Selection Criteria

NASA conducted a thorough alternative selection process to identify the soil remediation alternative to implement. The process involved the selection of criteria against which to evaluate the alternatives. The selected criteria are as follows: Protecting Public Health, Ability to Implement Cleanup Alternatives,

Potential Environmental Impacts, Compatibility with Future Land Use, Compliance with AOC, Public Input, Duration, and Cost. A brief description of each selection criterion follows.

B.8.1 Protecting Public Health

During its evaluation of the four alternatives described in the Final SEIS, NASA's most important criterion for selection of its Preferred Alternative was, and remains, the long-term protection of public health. The best scientific evidence, drawn from years of investigative work on NASA-administered property at SSFL, indicates that chemical contamination in groundwater and soil is confined to the SSFL's boundaries and has not migrated offsite[3]. The DTSC has conducted an extensive review of environmental data relating to SSFL—including measurements of air, soil, groundwater, surface water, and drinking water—as well as 13 health studies and concluded that there is no offsite contamination from SSFL that would pose a threat to human health or the environment. While there is currently no offsite risk to public health, the future onsite risk to public health resulting from the soil remediation is addressed by each alternative as follows:

- The AOC LUT values for Alternative A are based on either naturally occurring threshold values derived from DTSC's background study or an MRL for chemicals without a background threshold value. Removing soil contamination to either of these background values would be protective of human health.
- The Alternative B revised LUT values for soil cleanup were developed for the SEIS using the Cal EPA Office of Environmental Health Hazard Assessment screening levels (Cal EPA, 2005a), Los Angeles County screening levels for contaminants (CRWQCB, 1996), and EPA screening levels (EPA, 2018a). These values are based on levels used by the previously referenced agencies to help identify areas, contaminants, and conditions that require further attention at a site. These revised screening levels represent concentrations of chemicals in soil that are significantly below thresholds of concern for risks to human health (Cal EPA, 2005b) and are considered by these organizations to be protective for humans, including sensitive groups and children, over a lifetime in a residential scenario.
- Alternative C, Suburban Residential Cleanup, is considered to be protective for humans living onsite, including sensitive groups, over a lifetime (EPA, 2018b). The exposure scenario for Suburban Residential Cleanup assumes that both adults and children would be exposed to soil 24 hours per day, 350 days per year, for a total of 26 years, with no threat to health. EPA uses the target of 1×10^{-6} (or 1 in a 1,000,000) as the guide for managing health concerns related to cancer under a risk-based cleanup (EPA, 1991). In other words, there would be an approximately 1 in 1,000,000 possibility for an exposed individual to experience health concerns, such as cancer, under the Suburban Residential risk-based cleanup scenario. Exposure areas that have excess lifetime cancer risk estimates of less than 1 in 1,000,000 (1×10^{-6}) are characterized as not posing a threat to human health for the evaluated exposed populations, per established EPA guidelines (EPA, 2018b).
- Alternative D, Recreational Cleanup, is considered to be protective of humans using the site for recreational purposes, including sensitive groups, over a lifetime (EPA, 2018b). The exposure scenario for Recreational Cleanup assumes that both adults and children are exposed to soil while performing recreational activities for several hours per day, 50 days per year, for a total of 26 years, with no threat to health. Alternative D would meet the EPA's target risk requirements for future recreational users of the site, as well as offsite residents.

Using a risk-based process that takes into account a number of well-established criteria, including the reasonably foreseeable future use of the land, to identify the appropriate cleanup standard is the accepted methodology employed by EPA and the State of California when selecting a site cleanup remedy. This process is used for site cleanup activities that are conducted under CERCLA, the NCP, and applicable California state law. Employment of a risk-based assessment process is accepted practice in the United States generally, and the State of California specifically. The AOC LUT values are not based on risk of public

[3] NASA has implemented groundwater remediation activities which is ongoing.

exposure and do not take into account the reasonably foreseeable future use of the SSFL property. The use of risk-based alternatives is proven to be protective of human health and the environment, and implementation of a risk-based alternative would result in lower-intensity environmental impacts than the AOC LUT alternative.

B.8.2 Ability to Implement Cleanup Alternatives

NASA has identified the following issues regarding implementation of the 2010 AOC (DTSC, 2010) and the DTSC's proposed LUT cleanup requirements.

- **Limited In Situ Treatment Options:** NASA has evaluated multiple soil treatment options for use at SSFL. These treatment technologies are detailed in Section 2.1.1 of the Final SEIS (NASA, 2020) and include both in situ and ex situ treatment options. Although some in situ treatment options are viable under the site conditions at SSFL, no in situ soil treatments have been shown effective for cleaning metals and dioxins, which are found in most of the remedial areas (NASA, 2018c). The effective use of in situ treatment technologies is limited to soil containing only those chemicals proven to be treatable; if soil is mixed with chemicals incapable of meeting AOC LUT values, such as metals or dioxins, the treatments are no longer viable and a technology requiring excavation would need to be employed. The inability to rely on in situ treatments throughout the site results in a considerable increase in areas requiring excavation.
- **Availability of Suitable Replacement Soil:** NASA will require approximately 448,000 yd^3 of backfill and topsoil to meet the 2010 AOC LUT values and support native revegetation and habitat restoration. NASA tested soil from multiple potential offsite backfill locations. However, the only backfill materials that complied with the AOC contained predominately sand and gravel mixtures, which lack the soil structure or nutrients needed to revegetate the excavated areas. California Polytechnic State University (Cal Poly) studies have shown that amending backfill materials to produce soil that is capable of supporting the SSFL ecosystem would result in soil with chemical nutrient levels that exceed the AOC LUT values (Cal Poly, 2019). DOE observed that even store-purchased topsoil fails to meet the AOC LUT values (DOE, 2018). The implications of being unable to obtain suitable backfill materials in the necessary volumes are significant. Native plant establishment would be greatly hindered, resulting in potentially devastating effects on the natural environment at SSFL, as the site will remain barren in areas where gravel is used, and non-native plants may establish where native species are currently dominant.
- **Laboratory Screening Limitations:** AOC LUT values are significantly below conventional laboratory capabilities; for example, levels for PAHs, TPH, and dioxins are so low that laboratories are unable to distinguish potential “contamination” releases from natural “background” concentrations of these types of constituents. Furthermore, during the sampling efforts detailed in the NASA Soil DSR (NASA, 2017b), soil concentrations for these three parameters were discovered to be above LUT values, even in areas with no known source of contamination. DTSC has recognized that the ability to reliably distinguish where contamination exists may not be possible for some contaminants when using LUT values because the elevated variability of sample concentrations at low LUT values may be due to naturally occurring instances (DTSC, 2015).
- **Differing Cleanup Standards:** In the same way NASA is working with DTSC to achieve soil cleanup at SSFL, Boeing and DOE are involved in similar soil cleanup activities. Boeing is not subject to the 2010 AOC and has a different cleanup requirement for soil on the portion of the property for which it is responsible, which is approximately 1,930 acres. Boeing has announced that it will propose soil cleanup to a recreational risk-based standard, which Boeing has determined to be the future land use type (Boeing, 2017). Different cleanup standards across responsible parties pose several seemingly unresolvable issues. For example, even if NASA was able to successfully complete an AOC-based cleanup, soil that does not meet the AOC LUT cleanup values could shift onto NASA-administered property from Boeing’s adjacent property, requiring NASA to remediate soil considered clean by recreational standards.

B.8.3 Potential Environmental Impacts

NASA is committed to preserving the abundant and irreplaceable natural cultural resources at SSFL. The potential environmental impacts for each soil remediation alternative were extensively evaluated in the Final SEIS (NASA, 2020) and are summarized in Section B.6, *Environmentally Preferred Alternative Calculation*, of this ROD. The findings of the Final SEIS were used to inform NASA's ultimate decision.

B.8.4 Compatibility with Future Land Use

NASA anticipates the future land use of the NASA-administered areas of SSFL to be designated open space with a Notice of Environmental Use Restrictions, which limits potential future use and development of the property. This assumption of the reasonably foreseeable future use of the SSFL property is validated by:

- **Proximity to Boeing Property**: The majority of the property at SSFL, including Areas I, III, and IV, the Southern Undeveloped Land (Southern Buffer Zone), and the adjacent northern undeveloped areas, is owned by Boeing and undergoing soil and water contamination remediation work. Boeing's cleanup falls under the 2007 Consent Order and is risk-based according to the future land use of the property. In 2017, Boeing filed a conservation easement in partnership with the North American Land Trust for its portion of SSFL (Boeing, 2017). The easement restricts future land use by prohibiting residential or agricultural development on the site in perpetuity; however, the easement alone does not designate a cleanup standard. Subsequently, Boeing announced soil remediation plans to be designated as recreational cleanup levels for its area of SSFL. As of February 2020, the DTSC had not accepted Boeing's proposed recreational cleanup levels; however, NASA concludes that Boeing's rationale for the implementation of a recreational cleanup standard is reasonable.
- **Potential National Park Designation**: The National Park Service (NPS) conducted a special resource study and environmental assessment of the area referred to as the Rim of the Valley Corridor. The Rim of the Valley encompasses the mountains of Los Angeles and Ventura Counties, including the Santa Susana Mountains. The purpose of this special resource study was to determine whether any portion of the Rim of the Valley Corridor study area was eligible to be designated a unit of the National Park System or added to an existing national park. SSFL was included in the initial study area of the Rim of the Valley Corridor Draft Special Resource Study and Environmental Assessment, issued in April 2015 (NPS, 2015a). The NPS finalized the project with the publication of the Environmental Assessment Errata (NPS, 2015b), a Finding of No Significant Impact (NPS, 2015c), and the Final Special Resource Study (NPS, 2016). The NPS selected the Santa Monica Mountains National Recreation Area Boundary Adjustment with Cooperative Conservation Emphasis alternative, which encompasses the NASA-administered areas of SSFL as part of future national park designations by the U.S. Congress.

B.8.5 Compliance with AOC

Under the terms of agreements signed with the State of California in 2007 and 2010, NASA is responsible for remediating groundwater and soil contamination on its administered areas of the SSFL site. NASA's Final SEIS (NASA, 2020) for soil cleanup at SSFL calls into question the reasonableness and feasibility of the 2010 AOC agreement to clean the soil to a background level. This cleanup approach is not based on risks to human health and the environment or the expected future use of the land, which is the standard practice for environmental remediation at similar sites. Further, a soil cleanup to the levels currently set by the State of California is expected to cost the taxpayer more than a half-billion dollars, take as long as 25 years to complete, and significantly damage the flora and fauna at the site. In contrast, soil cleanup to the Suburban Residential level—the standard that is in line with the expected future use of the land—would cost around $135 million and take approximately 8 years to complete. In contrast, the AOC alternative would cost approximately $490 million and take approximately 25 years to complete without providing any significant increase in protection of human health or the environment.

Compounding NASA's concern is the fact that soil remediation levels envisioned by the 2010 AOC are likely not achievable. For example, the current agreement requires NASA to take steps to ensure contaminants in

the soil are reduced to an unprecedented degree, and for some contaminants, to levels that are lower than naturally occurring levels. Such a strategy would result in highly invasive and prolonged soil removal efforts and difficulty in locating soil that is sufficiently "clean" to use as backfill at the site. At a minimum, this approach would likely result in significant destruction of the property's aesthetic value, as well as its biological and cultural resources. Moreover, the significant difference in planned remediation levels between the NASA and Boeing sites, coupled with the intertwined geography of the two properties, will lead to continuous cross-contamination between the sites. Using the 2010 AOC as an instrument to impose a disparate treatment standard between federal and non-federal parties would not be in the best interest of the public or conform to well-established principles that govern CERCLA cleanup projects at other sites in California or nationally. While the analysis of the Final SEIS (NASA, 2020) and this ROD support the selection of the Suburban Residential Cleanup Alternative as the Agency-Preferred Alternative, no action may be taken on NASA's part until such time as the California DTSC completes the preparation of, and issues a decision on, its required environmental impact report (PEIR).

B.8.6 Public Input

Comments received during the public comment period for the Draft SEIS (NASA, 2019a) provide insight into the public's perception of the alternatives. The Draft SEIS was released publicly on October 25, 2019. Agency stakeholders, tribes, public officials, and members of the public were invited to comment from October 25, 2019 through January 8, 2020. The study team also hosted public open houses on November 20 and 21, 2019.

Approximately 1,009 commenters responded to the request for public comments. Of these, 863 signed a form letter submitted via email in favor of Alternative A: AOC Cleanup. Given the disperse location of the commenters, it is unclear how familiar these individuals were with the complexity of the SSFL cleanup. The remaining 146 commenters submitted comments by email, letter, or handwritten forms provided at the public meetings or orally to a court reporter during the public meetings.

The study team reviewed and evaluated all public comments. Comments that covered many topics were split according to topic, resulting in a total of 1,215 individual comments. Because many comments were similar in nature or conveyed similar themes, the comments were categorized into 16 comment categories, which are described in Section C.1. Of the 352 comments that were not form letters, 69 provided general support for the AOC and 23 provided general support for a risk-based approach.

B.8.7 Duration

The duration of cleanup for each soil cleanup alternative was calculated using the estimated volume of excavated soil, the capacity of each truck, and the number of trucks allowed to travel along the access road of the site. A Transportation and Road Agreement signed in 2015 by NASA, Boeing, and the DOE limits the maximum number of daily truck trips associated with the project to 96 round trips per day (NASA, Boeing, and DOE, 2015). It is assumed that the average trips will be half of the maximum and this quantity will be equally shared among the three responsible parties for the site, namely, Boeing, NASA, and DOE. The duration for each soil remediation alternative is as follows:

- Alternative A: up to 25 years
- Alternative B: up to 12 years
- Alternative C: up to 8 years
- Alternative D: up to 6 years

B.8.8 Cost

CERCLA and the NCP require that cost be considered in hazardous cleanup. A higher cost cleanup does not equal an increase in protection of human health and the environment and may result in other indirect and future costs, such as the loss of land to cultural, biological, residential, or recreational uses. The cost of

cleanup is ultimately funded by U.S. taxpayers, and the more money apportioned to soil cleanup means the less money there is to fund other NASA initiatives. The estimated cost for each alternative is as follows:

- Alternative A: $490,260,000
- Alternative B: $199,210,000
- Alternative C: $135,560,000
- Alternative D: $98,400,000

B.9 Selection Process

The selection process for choosing the Preferred Alternative involved evaluating the Action Alternatives described in Section B.4.1 against the selection criteria described in Section B.8. A decision matrix (Table B-5) was developed to score each of the Action Alternatives. Each Action Alternative was graded on a scale of one to three for each selection criterion based on the alternative's ability to meet the requirements of the criterion.

For each Action Alternative, the criteria score was calculated by adding together the scores for each selection criterion; the total weighted criteria score is summed at the bottom of Table B-5. Alternative C, Suburban Residential Cleanup, received the highest weighted criteria score.

TABLE B-5
NASA Decision Matrix
Record of Decision, SEIS for Soil Cleanup Activities, SSFL, Ventura County, California

Criteria	Alternative A: AOC Cleanup	Alternative B: Revised LU Cleanup	Alternative C: Suburban Residential Cleanup	Alternative D: Recreational Cleanup
Protective of Public Health	Excellent (3)	Excellent (3)	Excellent (3)	Excellent (3)
Ability to Implement Cleanup Alternatives	Poor (1)	Good (2)	Excellent (3)	Excellent (3)
Potential Environmental Impacts	Poor (1)	Good (2)	Excellent (3)	Excellent (3)
Compatibility with Future Land Use	Poor (1)	Good (2)	Excellent (3)	Good (2)
Compliance with AOC	Excellent (3)	Good (2)	Poor (1)	Poor (1)
Public Perception	Excellent (3)	Good (2)	Good (2)	Good (2)
Duration	Poor (1)	Poor (1)	Good (2)	Good (2)
Cost	Poor (1)	Poor (1)	Good (2)	Good (2)
Total score	**14**	**15**	**19**	**18**

An explanation of the rationale used to score the top scoring Suburban Residential Cleanup alternative (Alternative C) in relation to the other alternatives is provided in the following sections.

B.9.1 Protective of Public Health

All Action Alternatives were determined to be protective of human health and received an excellent score.

B.9.2 Ability to Implement Cleanup Alternatives

Alternative C, Suburban Residential Cleanup, is fully implementable and compatible with the most conservative reasonably foreseeable future use of the property. Unlike Alternatives A and B, Alternative C provides for a cleanup that is fully protective of the public's health and welfare, preserves the natural and

cultural resources at the SSFL site to the maximum extent possible, and brings the entire site (i.e., Boeing property and NASA-administered areas) into alignment through the use of functionally equivalent cleanup standards, which minimize the risk of prolonging the cleanup process indefinitely.

- **Limited In Situ Treatment Options:** The cleanup values required under a standard Suburban Residential Cleanup scenario would allow for greater use of in situ treatment methods compared to the requirements of Alternatives A or B.
- **Availability of Suitable Replacement Soil:** Alternative C would require 70 percent or 307,000 yd^3 less backfill soil than would be required in a cleanup under Alternative A's framework (25 percent or 64,000 yd^3 less backfill soil than Alternative B). Neither NASA nor the DOE has been able to identify a reliable source of available backfill that would meet the requirements of Alternative A. By failing to take this into account, Alternative A cannot be considered a reasonable alternative, because it imposes a cleanup and restoration requirement that is impossible to achieve. The lack of available backfill material directly calls into the question the ability to restore the SSFL to its natural state once the cleanup is complete. On the other hand, backfill material that is compliant with cleanup levels under Alternative C and fully protective of human health and the environment is widely available. By adopting Alternative C, NASA has made a decision that reduces the necessary amount of soil removal and replacement; virtually eliminates the need for gravel backfill, which would adversely affect the long-term restoration of the property; minimizes the risk of environmental degradation of the property through the introduction of invasive species; and allows naturally occurring flora and fauna that has evolved over millennia to remain in an environment. In choosing the Agency-Preferred Alternative, NASA, recognizing that Alternatives A, B, and C are ultimately protective of human health and the environment, balanced the significant, negative, and permanent effects of implementing Alternatives A and B against the benign effects of implementing Alternative C. Because Alternative A is functionally unimplementable, adopting it as the Agency-Preferred Alternative is not reasonable. Alternative B, while implementable, suffers from many of the significant, negative, and permanent effects that make Alternative A untenable. Consequently, not only is the required amount of backfill reduced under the Suburban Residential Cleanup alternative, but also the availability of backfill is improved, meaning the need for gravel backfill is greatly reduced, if not eliminated, and the likelihood of successful site restoration after cleanup is greatly improved.
- **Laboratory Screening Limitations:** While the AOC LUT values are significantly below conventional laboratory capabilities, most laboratories are capable of screening to a Suburban Residential standard. Alternative A presents significant difficulties in locating laboratories with the capability to test at levels set forth in the California DTSC LUT. This is because laboratories cannot distinguish potential "contamination" releases from natural "background" concentrations of these types of constituents. Alternative C provides for a risk-based cleanup that is protective of human health and the environment and allows for not only the validation of the concentration of contamination in soil being removed, but also confirmation that backfill proposed to be used to restore the property meets appropriate federal and state requirements.
- **Differing Cleanup Standards:** A Suburban Residential Cleanup is in line with the cleanup efforts being conducted by Boeing and with DOE's intended cleanup level. If different standards are applied to adjacent properties, it jeopardizes the "finality" aspect of the cleanup, which should be the ultimate goal to return the property to productive use.

B.9.3 Potential Environmental Impacts

As described in Section B.5, NASA has selected Alternative C as the Agency-Preferred Alternative and one of the Environmentally Preferred Alternatives. This selection involved consideration of the significance of the environmental impacts of each Action Alternative (i.e., major/minor; duration of the effect, and ability to achieve the purpose of the Proposed Action). NASA balanced these effects and determined that implementation of Alternative C provided for the complete protection of human health, while minimizing the significant, negative, and permanent environmental impacts of Alternatives A and B.

B.9.4 Compatibility with Future Land Use

When considering the protection of human health, Alternatives A, B, C, and D all achieve that objective. However, NASA has selected Alternative C as the Agency-Preferred Alternative as this alternative provides a conservative estimate of the most reasonably foreseeable future use of the property. Both the AOC Cleanup and Suburban Residential Cleanup alternatives would be compatible with the potential types of future land use at SSFL, however, the difficulty in re-establishing vegetation under Alternative A would limit future land use of the property. Residential and recreational areas require a degree of natural vegetation to support the use of the property, as individuals generally do not want to reside or recreate in areas with limited natural vegetation. Alternative C scored higher than Alternative D for this criterion because Alternative C allows for a suburban residential land use in addition to recreational.

B.9.5 Compliance with the AOC

NASA entered into the AOC (DTSC, 2010) in good faith that the DTSC-generated cleanup values would be reasonable and based on standard DTSC and EPA requirements. For the reasons set forth in this ROD, NASA has determined that implementation of Alternative A imposes an arbitrary standard that is not based in science; does not take into account the reasonably foreseeable use of the property; does not significantly improve outcomes related to the protection of public health; would result in significant, negative, and permanent effects on geology, soil, water, erosion, the natural and cultural resources; and would irreparably disturb the property to the detriment of future generations of potential users.

Alternative C uses a risk-based process to identify the appropriate cleanup standard and is the accepted methodology employed by EPA and the State of California when selecting a site cleanup remedy. This process is used for site cleanup activities conducted under CERCLA, the NCP, and applicable California state law. Employment of a risk-based assessment process is accepted practice in the United States and the State of California, including DTSC-regulated cleanup sites.

Alternative A is not based on risk of public exposure and does not take into account the reasonably foreseeable future use of the SSFL property. NASA's evaluation of the alternatives in the Final SEIS (NASA, 2020) demonstrates that implementation of Alternatives A and B would result in significant, negative, and permanent environmental degradation within the region and would not provide the surrounding communities with proven enhanced safeguards compared to the Suburban Residential Cleanup alternative.

B.9.6 Public Input

While it is unquestionable that most reviewers desire remediation of the contamination at SSFL, their sentiment regarding the desired level of cleanup varied. As more fully described in Section C of this ROD, NASA's public outreach was comprehensive and included the receipt of written and oral comments, two public meetings, and an extension of the comment period for the Draft SEIS (NASA, 2019a). Universally, the commenters agreed that the SSFL must be remediated to safeguard the public's health and welfare. Most commenters supported Alternative A as the preferred alternative; others supported the use of a risk-based methodology given the reasonably foreseeable use of the property to determine what the appropriate cleanup standard should be. In consideration of the public's comments, and as further discussed in this ROD, NASA determined that Alternative C, Suburban Residential Cleanup, was both the Agency-Preferred Alternative and the Environmentally Preferred Alternative.

B.9.7 Duration

Compared to Alternative C, Suburban Residential Cleanup, soil cleanup would require up to 17 more years under Alternative A and up to 4 more years under Alternative B to accomplish.

B.9.8 Cost

Compared to Alternative C, Suburban Residential Cleanup, Alternative A would cost approximately $355,000,000 more and Alternative B would cost approximately $63,650,000 more to implement.

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C. Public Involvement and Agency Coordination

As required by NEPA, NASA's implementing regulations (14 CFR Section 1216.3), and agency policy (NPR 8580.1), NASA engaged federal and state agencies, Native American tribes, non-governmental organizations, and members of the public during the development of the SSFL Final SEIS (NASA, 2020). NASA's public involvement activities included the following activities:

- On July 6, 2011, NASA published an NOI in the *Federal Register* (76 FR 39443) to prepare an EIS and conduct scoping for the proposed demolition and cleanup activities in the NASA-administered areas of SSFL. The same day, the NOI was sent to more than 600 email addresses on the SSFL Program distribution list. The NOI invited agencies, organizations, tribal governments, individuals, and interested parties to participate in developing the scope and identifying the environmental issues for the EIS.
- The NOI was published in the following local newspapers: *The Daily News*, *Simi Valley Acorn*, *Ventura County Star*, and *La Opinión*. The NOI announced public scoping meetings, which were held in Chatsworth, Simi Valley, and West Hills on August 16, 17, and 18, 2011, respectively. A fact sheet describing the SSFL EIS process was provided at the public meetings and can be viewed at https://ssfl.msfc.nasa.gov/files/Documents/Factsheets/NASA_EIS_SSFL_Factsheet_2011-08-25.pdf
- NASA accepted written and verbal comments at the scoping meetings and throughout the extended 74-day scoping period (July 8 through September 19, 2011). NASA received 231 responses from agencies, organizations, and individuals that collectively contained 756 individual comments.
- NASA published an NOA of the DEIS in the *Federal Register* (78 FR 47007) on August 2, 2013, with a 45-day public comment period.
- EPA published an NOA for NASA's DEIS (Notice 13-089) and public comment period on August 2, 2013. It can be viewed at https://www.gpo.gov/fdsys/pkg/FR-2013-08-02/html/2013-18700.htm.
- On August 27 and 28, 2013, NASA hosted public meetings in West Hills to present the DEIS (NASA, 2013) and provide the public with an opportunity to comment on the DEIS. The slides presented at these public meetings can be viewed at https://ssfl.msfc.nasa.gov/files/documents/eis/SSFL-DEIS-Presentation-20130813.pdf.
- All verbal comments were captured in meeting transcripts. As requested by the commenters, on September 11, 2013, NASA published a notice in the *Federal Register* to advise the public that the comment period would be extended to October 1, 2013 (78 FR 55763). Because of the U.S. Government shutdown on October 1, 2013, NASA accepted comments through October 17, 2013.
- NASA received 2,185 responses on the DEIS (NASA, 2013), containing 4,164 individual comments. The Native American tribes and federal, state, and local agencies that participated included, but were not limited to, the U.S. Department of the Interior, EPA, ACHP, California Office of Historic Preservation, CDFW, the Santa Ynez Band of Chumash Indians, and other state-recognized tribes. Copies of the agency comments and the responses to them are included as Appendix K of the 2014 FEIS (NASA, 2014a). NASA published an NOA of the FEIS in the *Federal Register* (79 FR 14545) on March 14, 2014.
- EPA published an NOA for NASA's FEIS (EIS No. 20140070) on March 14, 2014. It can be viewed at https://docs.regulations.justia.com/entries/2014-03-14/2014-05674.pdf. EPA issued a finding of no objection to the Proposed Action regarding NASA's FEIS on April 10, 2014.
- After the required 30-day wait period, NASA issued a ROD to move forward with demolishing facilities at SSFL (NASA, 2014b). When the 2014 FEIS (NASA, 2014a) was published, a decision was made to defer issuing RODs for the cleanup of soil and groundwater until further investigations, analysis, and planning could be completed. Subsequently, NASA completed groundwater investigations and reviewed a broad range of applicable remediation technologies that could achieve the cleanup goals for groundwater at SSFL. The groundwater technologies were developed further in a draft groundwater corrective measures

study for SSFL. A ROD allowing groundwater cleanup at SSFL was published in the *Federal Register* on October 17, 2018 (83 FR 52570).

- On April 5, 2019, an NOI for the SEIS was published in the *Federal Register* (84 FR 13725). The purpose of the NOI was to apprise interested agencies, organizations, tribal governments, and individuals of NASA's intent to prepare the SEIS.
- On October 25, 2019, an NOA of the Draft SEIS was published in the *Federal Register* (84 FR 57490), which initiated a 45-day public comment period.
- NASA published public notices in the following newspapers: *Ventura County Star, Los Angeles Daily News, Simi Valley Acorn*, and *La Opinión*; sent an email to the recipients on the SSFL Program distribution list; sent letters to elected officials; and updated the SSFL website to announce the availability of the Draft SEIS (NASA, 2019a). Individuals were also invited to the public meetings.
- NASA hosted two open house meetings in Simi Valley and West Hills California on November 20 and 21, 2019, respectively, for the Draft SEIS (NASA, 2019a). The meetings were well-attended, with approximately 100 attendees at each meeting. Members of the public were encouraged to speak directly with the individuals who work at the site and who serve as subject matter experts for the resources of concern. The subject matter experts stood next to a series of boards that explained the project specifics. A court reporter was available to accept public comments. Meeting boards can be viewed at https://ssfl.msfc.nasa.gov/files/documents/local/2020/NASA-SSFL-SEIS-Public-Meeting-Boards.pdf
- Based on a number of public comments that were received during the comment period, NASA decided to publish all references used in the Draft SEIS (NASA, 2019a) on December 11, 2019. The materials were published on the NASA SSFL website at https://ssfl.msfc.nasa.gov/about/key-documents.
- On December 9, 2019, NASA published a notice in the *Federal Register* to advise the public that the comment period would be extended to 75 days to January 8, 2020 (84 FR 67296).
- NASA received approximately 1,200 public, agency and Native American Tribe comments on the Draft SEIS (NASA, 2019a). The Native American tribes and federal, state, and local agencies that participated included, but were not limited to, EPA, Ventura County Air Pollution Control District, DTSC, County of Ventura Board of Supervisors, and the Santa Ynez Band of Chumash Indians. A more detailed explanation of the comments received on the Draft SEIS is provided in Section C.1.
- EPA published an NOA for NASA'S Draft SEIS (EIS No. 20190256) on October 25, 2019. A copy of the published NOA can be viewed at https://www.govinfo.gov/content/pkg/FR-2019-10-25/pdf/2019-23313.pdf. EPA published an amended notice to extend the comment period for NASA's Draft SEIS (EIS No. 20190256) on December 13, 2019. A copy of the amended notice can be viewed at https://www.govinfo.gov/content/pkg/FR-2019-12-13/pdf/2019-26879.pdf.
- On July 24, 2020, NASA published an NOA of the Final SEIS in the *Federal Register* (85 FR 44930).
- EPA published an NOA of NASA'S Final SEIS (EIS No. 20200147) on July 24, 2020.
- NASA received three comment letters during the 30-day wait period for the Record of Decision. A detailed explanation of the comments are provided in Section C.2.

The NHPA requires that NASA consult with federal, state, and local agencies, Native American tribes, other organizations, and members of the public having a potential interest in the Proposed Action. The purpose of the Section 106 consultation process is to evaluate the potential for effects on existing historic properties resulting from a Proposed Action. More than 35 individuals were involved in the consultation process that was conducted as part of the NEPA process for the EIS. Consulting parties have varying interests in the site and include representatives from federally recognized tribes and members of state and local tribes.

Consultation culminated with measures to address the adverse effects to historic properties stipulated in the 2014 Programmatic Agreement (PA) (amended in 2020) attached to this ROD.

C.1 Comments on the Draft SEIS

Approximately 1,200 comments on the Draft SEIS (NASA, 2019a) were received, though over 800 of these comments were form letters. All public comments were reviewed and evaluated by the study team. Many comments were similar in nature and conveyed similar themes; therefore, the comments were categorized into the themes described in this document. A brief explanation of these themes, along with an explanation of any changes in the Final SEIS (NASA, 2020) in response to the themes, is provided in this section. For a more detailed explanation of these themes and the specific responses, refer to Appendix 4A of the Final SEIS. A matrix of all the comments received, organized by the type of commenter and including their assigned category, is provided in Appendix 4B of the Final SEIS (NASA, 2020).

- **Comment Category 1: Support for AOC** – NASA received numerous comments, including many form letters, requesting that it continue to abide to the commitments stated in the 2010 AOC. No revisions to the Final SEIS were made based on these comments.
- **Comment Category 2: Support for a Risk Based Approach** – NASA received comments in support of conducting a risk-based approach for soil cleanup at SSFL. No revisions to the Final SEIS were made based on these comments.
- **Comment Category 3: Reference Availability** – A number of commenters requested that NASA make all of the references used in the Draft SEIS (NASA, 2019a) available to the public. In response to this comment, NASA published all references used in the Draft SEIS on its SSFL website (https://ssfl.msfc.nasa.gov/about/key-documents). NASA also uploaded any new reference in the Final SEIS to the website as well.
- **Comment Category 4: Public Meeting Format** – A number of individuals commented on the format of the public meetings. No revisions to the Final SEIS were made based on these comments.
- **Comment Category 5: Comment Period Extension Request** – A number of commenters requested that an extension to the public comment period be granted. NASA extended the original 45-day comment period to 75 days based on these comments.
- **Comment Category 6: Compliance with Law** – NASA received a number of comments asserting that the actions described in the Draft SEIS (NASA, 2019a) did not abide with federal law, including NEPA and CERCLA. NASA disagreed with these assertions and no changes were made to the Final SEIS based on these comments.
- **Comment Category 7: Soil Quantity Estimates (overestimates and underestimates)** – A number of commenters claimed that NASA grossly overestimated and, in a few cases, underestimated the quantity of soil to be transported. In response to these comments, NASA added a detailed explanation of the soil quantity calculations as Appendix 2E to the Final SEIS.
- **Comment Category 8: Leaving Contamination Onsite** – A number of commenters suggested NASA will leave greater than 80 percent of the contamination on site by choosing an alternative other than the AOC. In the Final SEIS, NASA provided clarification that soil contamination decreases based on the distance from the source; therefore, it is inaccurate to equate level of contamination to quantity of soil removed.
- **Comment Category 9: Resource Concerns** – NASA received comments that pertained specifically to the resources analyzed in the EIS. These comments were given to resource authors and subject matter experts and were addressed in the Final EIS, though no significant revisions were made based on these comments.

- **Comment Category 10: Land Use Categorization** – Ventura County clarified that the "Open Space Zone" allows land uses beyond recreation, including housing and agriculture. In light of this comment, NASA added an explanation that any future land use transfer would include a Notice of Environmental Use Restrictions that limits potential future use and development of the property.
- **Comment Category 11: Missing Health Studies** – A number of commenters pointed to various studies regarding potential health risks around SSFL and requested the inclusion of the studies in the SSFL SEIS. NASA added references to these studies in the Final SEIS.
- **Comment Category 12: Soil Treatment Technologies** – In these comments, the commenters implied that NASA should have more thoroughly considered potential soil technologies for the AOC or performed further analysis on the different proposed technologies. In the Final SEIS, NASA added a reference and additional detail based on the Final Soil Treatability Studies Summary (NASA, 2018c).
- **Comment Category 13: Alternative Justifications** – In these comments, the commenters questioned the validity of alternatives that do not meet the AOC LUT requirements. NASA disagreed with these assertions based on the NEPA requirement for a robust alternative assessment. No changes were made to the Final SEIS based on these comments.
- **Comment Category 14: Wildfire Concerns** – A number of commenters expressed concerns regarding the Woolsey Fire, which occurred in November 2018. NASA verified that the fire was discussed numerous times throughout the SEIS, so no changes were made to the Final SEIS.
- **Comment Category 15: Radiological Contamination** – A few comments focused on NASA's role in cleaning up radiological contamination on NASA-administered areas of SSFL. NASA confirmed that it has never conducted nuclear activities or managed radioactive materials at SSFL. No changes were made to the Final SEIS based on these comments.
- **Comment Category 16: Cancer Concerns** – A few commenters generally linked the SSFL site with personal cancer experiences. While NASA sympathizes with these individuals, SSFL is one of the most studied environmental cleanup sites in the country and no health-related studies have provided evidence of risks to nearby neighborhoods. No changes were made to the Final SEIS.

C.2 Comments on the Final SEIS

The NOA for the SSFL Final SEIS was published in the *Federal Register* on July 24, 2020, commencing a 30-day pre-decisional waiting period that concluded on August 24, 2020. During this pre-decisional period, NASA received comments from EPA Region IX, the City of Los Angeles (the City), and a joint letter from the Committee to Bridge the Gap (CBG), Physicians for Social Responsibility - Los Angeles (PSR-LA), and the Natural Resources Defense Council (NRDC). The CBG also submitted supplemental comments in support of the joint comments described previously. Prior to making its final decision, NASA considered the matters raised by each commenter, evaluated the analysis, scientific basis, and methodology used to validate the conclusions set forth in the Final SEIS (NASA, 2020), and determined the received comments do not affect the findings of the Final SEIS.

In sum, the letter from EPA confirmed the agency's receipt and review of the Final SEIS (NASA, 2020) and requested an electronic copy of the ROD once published. EPA recommended that NASA consider revising Air Quality Best Management Practice-2 (Air Quality BMP-2) to ensure contractors' vehicle fleets are equipped with Tier 4 or better diesel engines for soil transport, and to employ future air emissions reduction technologies when available and feasible. NASA is committed to reducing, to the maximum extent practicable, the environmental impact of its cleanup activities at SSFL. NASA acknowledges EPA's recommendation and, as contractors are selected for soil transport and remediation activities, NASA will implement the use of newer and cleaner air emissions reduction equipment to the degree practicable.

The CBG/PSR-LA/NRDC joint letter, and, by implication, the City of Los Angeles letter, assert that NASA's consideration of Alternatives B, C, and D, and selection of Alternative C as its preferred alternative, in the

Final SEIS (NASA, 2020) violate the 2010 AOC between NASA and DTSC and, therefore, were not appropriate for NASA's consideration. The commenters cite to the Resource Conservation and Recovery Act, 42 U.S.C. Sections 6901 *et seq.* and "other [unspecified] legal requirements" as the legal authority for the AOC and DTSC's role as "NASA's regulator." NASA considers this comment to be inapt to its obligations to evaluate the environmental impact of its proposed action under NEPA, as it conflates the legal authority the commenters assert is applicable to the SSFL cleanup with NASA's clear responsibility to consider alternatives under NEPA. Assuming *arguendo* the commenters' assertion of the applicable legal authority that governs the cleanup is correct, NASA would still be obliged to consider alternatives that are outside of its legal jurisdiction. Alternatives that are reasonable (i.e., "those that are practical or feasible from the technical and economic standpoint and using common sense") "must still be analyzed in the EIS if [] reasonable." (see generally CEQ's 40 Most Asked Questions, 1. – Range of Alternatives).

The commenters articulate a concern that selection of NASA's preferred alternative (Alternative C) would violate the AOC and leave a substantial amount of contamination remaining on site. As noted in Section C.1 of this ROD, comments related to this subject were received during the comment period for the Draft SEIS (NASA, 2019a) and were considered and responded to with specificity in Appendix 4A of the Final SEIS "Comment Category 8: Leaving Contamination Onsite" (NASA, 2020).

The commenters assert that NASA failed to address substantive comments it received on the Draft SEIS (NASA, 2019a). NASA disagrees with this comment. While the commenters do not note which specific comments NASA allegedly failed to address, Section C.1 of this ROD explains that NASA made the determination that due to the voluminous number of comments it received on the Draft SEIS, and the common themes that were articulated in those comments, a more appropriate, and administratively efficient, method of responding was to categorize the comments in accordance with their subject matter. Using this commonly accepted NEPA practice, NASA was able to provide responsive analysis to all of the comments it received. The full set of comments NASA received are published in Appendix 4B of the Final SEIS (NASA, 2020).

The City of Los Angeles asserted that NASA's response to comments failed to directly address issues raised in its letter and "technical memorandum" which should have been specifically addressed (Final EIS must "disclose and discuss responsible opposing scientific viewpoints in the final statement" citing *Center for Biological Diversity v. U.S. Forest Service*, 349 F.3d 1157, 1169 (9th Cir. 2003)). In its comment, the City failed to provide any specific examples that would support its allegation that NASA did not substantively and adequately respond to matters that may constitute an "opposing scientific viewpoint" to the scientific studies NASA used as it prepared the Final SEIS (NASA, 2020), or that establish the cited case law as relevant to the contents of the Final SEIS.

In the joint letter, the commenters faulted NASA for not disclosing its "choice of preferred alternatives, and the analysis and methodology for making that choice." 40 CFR 1502.14(e) clarifies that an agency should "[i]dentify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement…." At the time of publication of the Draft SEIS (NASA, 2019a), NASA had not identified its preferred alternative, nor was the methodology to quantify the merits and demerits of each alternative finally established at that time. As explained in Section B.6 of this ROD, the determination of the environmentally preferred alternative was heavily dependent on the impact findings that were concluded in the Final SEIS (NASA, 2020), and relied, in part, on consideration of public comment on the Draft SEIS. It would not have been possible for NASA to disclose the environmentally preferred alternative and preferred alternative, or the rationale used to make these determinations, before publication of the Draft SEIS and the completion of the public comment period.

The commenters, as supplemented by CBG's specific comment, assert misapplication of the methodology NASA used to rank the environmental impacts of each alternative considered in the SEIS. NASA disagrees with this comment. NASA applied equally weighted criteria to each alternative in a manner that was consistent and non-arbitrary. Despite assigning health and safety considerations a weighted rank of 4, with

all other environmental considerations a lesser weighted rank (see Section B.6), the commenters allege health and safety considerations were undercounted, while other environmental impact considerations were over counted. It is certainly true that receipt of public comments was an important factor that informed the evaluation of the alternatives; however, it was not the sole determinative factor in the scoring of alternatives or their final ranking.

Furthermore, the commenters assert that the importance of health and safety was undercounted because other resources considered in the SEIS contained subcategories, which they felt overlapped with one another. The commenter broadly states, “many of the negative impacts associated with performing cleanup appear to overlap or are unnecessarily duplicative, and therefore result in an inflated number of negative impacts.” This statement appears to be based only on review of the table provided in Section 2.5 of the Final SEIS (NASA, 2020), without consideration of the detailed analysis provided in Section 3.0 of the Final SEIS, which explains the rationale for each sub-resource. The analyzed sub-resources considered were based on input provided by regulating agencies (e.g., the California SHPO and USFWS), Native American tribes, public comment and expert opinion, which is explained in the Affected Environment for each resource in Section 3.0 of the Draft SEIS (NASA, 2019a) and Final SEIS (NASA, 2020).

Finally, the commenters assert that NASA inappropriately eliminated consideration of timeframe for impacts in its selection of the preferred alternative. However, NASA removed the timeframe consideration in the alternative analysis process, because it would put a considerable penalty on the AOC cleanup, which is estimated to take an estimated 25 years to complete, whereas Alternative D would take an estimated 6 years. NASA felt it was important to disclose the estimated timeframe in the SEIS, so that readers could better understand the potential duration of impacts. However, as explained in Section 2.5 of the Final SEIS (bullet number 1), NASA also recognizes that the timeframe may be influenced by a number of variables and, therefore, did not include the timeframe of cleanup in its consideration of the environmentally preferred alternative.

D. Environmental Protection Measures

NASA will implement mitigation measures and best management practices (BMPs) to reduce the magnitude of the impacts of the Proposed Action, as applicable. The activities that NASA is committed to conducting during the soil cleanup portion of the Proposed Action are summarized in Table D-1.

TABLE D-1
Best Management Practices and Mitigation Measures
Record of Decision, SEIS for Soil Cleanup Activities, SSFL, Ventura County, California

BMP or Mitigation Measure No.	BMP and Mitigation Measure Description	Affected Resources
Cultural Mitigation Measure-1 (All Action Alternatives)	Historic American Buildings Documentation – NASA will engage the NPS to complete Historic American Engineering Record (HAER) Level I documentation for all test stands in the Alfa, Bravo, and Coca Test Area Historic Districts, HAER Level II documentation for control houses in each district, and HAER Level III for all remaining structures in each district and submit the documentation to the Library of Congress for archiving. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-2 (All Action Alternatives)	Creation of a Native American Advisory Board – NASA will establish a Native American Advisory Board comprising volunteer representatives from federally recognized Indian tribes and state-listed tribes with an interest in the protection of Native American sites on NASA SSFL to advise NASA on matters relating to historic properties of interest to Native Americans on NASA SSFL. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-3 (All Action Alternatives)	Creation of an Environmentally Sensitive Areas Action Plan (ESAAP) – NASA will develop an ESAAP that will be submitted for review to SHPO and Santa Ynez Band of Chumash Indians and will be used by NASA and its contractors for sensitive cultural areas such as archeological sites to provide active protection during the undertaking to prevent inadvertent damage. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-4 (All Action Alternatives)	Native American Monitoring – NASA will use archeological and Native American monitors to oversee field sampling, vegetation clearing, and ground-disturbing activities within the Burro Flats Site and the buffer area defined by NASA in 2008 for management purposes, as well as within any other known archeological sites, and will coordinate, where feasible, any sampling within the Burro Flats Site boundary with the boundary determination work. **This mitigation measure is ongoing**.	Cultural
Cultural Mitigation Measure-5 (All Action Alternatives)	Oral Histories – NASA will conduct 12 oral history interviews of personnel who formerly worked at NASA SSFL and will include the transcripts on NASA's oral history website (https://historycollection.jsc.nasa.gov/JSCHistoryPortal/history/) with links to other NASA websites, including SSFL. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-6 (All Action Alternatives)	Video Documentation – NASA will produce a video documenting the history of the construction and use of NASA's SSFL test stands. The video will be posted on NASA's website and available on CD by request. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-7 (All Action Alternatives)	Completion of an Ethnographic Study – NASA will conduct an ethnographic history, adding to, and synthesizing the analyses from, the TCP survey and previous related ethnographic studies. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-8 (All Action Alternatives)	Updating the Burro Flats Site National Register of Historic Places (NRHP) Nomination – NASA will consult with SHPO to identify a testing plan to conduct further archeological investigations within NASA's boundary to confirm the extent of the boundary ("Burro Flats Site Boundary") on NASA-administered land, and in consultation with the Santa Ynez Band of Chumash Indians and Boeing (or its consultants), develop an updated National Register nomination form to be submitted to the SHPO and NRHP. **This mitigation measure is completed**.	Cultural

BMP or Mitigation Measure No.	BMP and Mitigation Measure Description	Affected Resources
Cultural Mitigation Measure-9 (All Action Alternatives)	Submitting an NRHP Nomination for a TCP – In consultation with SHPO, Boeing, DOE, Native American Advisory Board, Santa Ynez Band of Chumash Indians, and NPS, NASA will produce and submit an NRHP nomination for the TCP to the California State Historic Resources Commission and the NRHP. **The TCP nomination has been submitted to the Keeper of the NRHP**.	Cultural
Cultural Mitigation Measure-10 (All Action Alternatives)	Updates to the Integrated Cultural Resources Management Plan (ICRMP) for NASA-administered Areas of SSFL – NASA will update its ICRMP to include NRHP-eligible site(s), should they exist, and protection measures for use during demolition and cleanup. **This mitigation measure is completed**.	Cultural
Cultural Mitigation Measure-11 (All Action Alternatives)	Additional Archeological Investigations – NASA will conduct Extended Phase I archaeological investigations in those footprints of the cleanup areas where NASA plans to excavate soil to achieve cleanup goals. **This mitigation measure is completed**.	Cultural
Biology BMP-1 (All Action Alternatives)	Areas where soil has been removed will be backfilled based on the availability of backfill material. Remediated areas will be revegetated using the Boeing seed mix, and native trees and shrubs will be replanted in some areas. A remediation goal of 50 percent plant cover within 3 years of revegetation efforts will be established. However, it may take much longer to establish shrub and tree species and vegetation cover in areas that differ from existing soil conditions. If gravel backfill is used, native vegetation, particularly deep-rooted species, may never reestablish in these areas.	Biology; Air Quality
Biology BMP-2 (All Action Alternatives)	When possible, the least impactful soil remediation technology will be implemented in CDFW high-priority conservation areas.	Biology
Biology BMP-3 (All Action Alternatives)	Soil will not be stockpiled in designated CDFW high-priority conservation areas.	Biology
Biology BMP-4 (All Action Alternatives)	NASA will develop a weed mitigation plan for soil remediation areas. Efforts will be made as early as possible to avoid the establishment of weeds.	Biology
Biology BMP-5 (All Action Alternatives)	NASA will avoid the Santa Susana tarplant to the extent possible. Individuals working on soil cleanup activities will be trained to identify and avoid the Santa Susana tarplant.	Biology
Biology BMP-6 (All Action Alternatives)	The least impactful soil remediation technology will be implemented around coast live oaks; when possible, a vacuum truck will be used to remove soil around the oaks.	Biology
Biology Mitigation-1 (All Action Alternatives)	The following mitigation measures were identified by the USFWS to mitigate potential impacts to federally threatened or endangered species (Phillips, pers. comm., 2013). Prior to any construction activities, NASA will conduct protocol-level surveys in all suitable habitats for Braunton's milk-vetch, California red-legged frog, Least Bell's vireo, Riverside fairy shrimp, and vernal pool fairy shrimp. If a federally listed species is identified, activities will halt, and NASA will initiate formal consultation with the USFWS, during which time additional mitigation measures will be developed. Individuals working on cleanup and demolition activities will be trained to identify federally and state-listed species. Additional dialogue will occur with the USFWS if rock basins would be affected by the Proposed Action. Where rock basins occur near construction areas, exclusion fencing will be set up.	Biology
Biology Mitigation-2 (All Action Alternatives)	NASA will work to update the 2013 USACE jurisdictional determination and obtain a CWA Section 404 permit from USACE and Section 401 certification from the RWQCB for the discharge of dredge into jurisdictional waters of the United States. The Section 404 permits would include necessary measures to avoid, minimize, and otherwise mitigate impacts to wetlands and other waters of the United States.	Biology

BMP or Mitigation Measure No.	BMP and Mitigation Measure Description	Affected Resources
Air Quality Mitigation Measure-1 (All Action Alternatives)	NASA will prepare and implement a dust control plan for the excavation and construction activities at SSFL.	Air Quality
Air Quality Mitigation Measure-2 (All Action Alternatives)	NASA will comply with all applicable equipment and vehicle regulations and obtain necessary air permits.	Air Quality
Air Quality BMP-1 (All Action Alternatives)	NASA will purchase NOx offsets for affected air basins, or in Ventura County, contribute to a Transportation Demand Mitigation Fund Fee Program to reduce mobile emissions in the region.	Air Quality
Air Quality BMP-2 (All Action Alternatives)	NASA will encourage contractors to use newer model-year haul trucks or alternative-fueled construction equipment to the extent feasible.	Air Quality
Air Quality BMP-3 (All Action Alternatives)	NASA will continue air quality monitoring throughout remediation activities.	Air Quality
Water Mitigation-1 (All Action Alternatives)	NASA will prepare and implement a stormwater pollution prevention plan and appropriate BMPs for the excavation and construction activities at SSFL.	Water
Geology BMP-1 (All Action Alternatives)	NASA would use facilities currently in place and site future facilities to minimize the potential impacts of landslides.	Geology
Haz Mitigation-1 (All Action Alternatives)	Hazardous materials and wastes would be handled in compliance with the applicable federal, state, and local laws and regulations, including licensing, training of personnel, accumulation limits and times, prevention and response to spills and releases, reporting, and record keeping. Per these regulatory standards, hazardous wastes would be loaded directly into bins for transport and offsite disposal; however, if needed, containment would be used to prevent the release of material or hazardous content. Bins containing hazardous wastes would be kept securely closed during transport for offsite disposal.	Hazardous and Nonhazardous Materials and Waste
Haz Mitigation-2 (All Action Alternatives)	A hazardous materials business plan would be developed. This plan would describe the appropriate storage, containment, and safety protocols to use for hazardous materials during the remediation; emergency procedures to be followed in the event of a release; instructions for performing fueling and maintenance operations on vehicles and equipment onsite; and other protocols so that hazardous materials would be stored and handled appropriately.	Hazardous and Nonhazardous Materials and Waste
H&S BMP-1 (All Proposed Action Alternatives)	A health and safety plan, which would include general hazard controls, project-specific hazard controls, and controls for physical and biological hazards, would be created for all remediation activities. Workers would be required to use personal protection equipment and attend appropriate training.	Health and Safety
H&S BMP-2 (All Proposed Action Alternatives)	Emergency spill response procedures will be developed for the offsite transportation of hazardous materials.	Health and Safety
H&S BMP-3 (Alternatives C and D)	To ensure that future land use is in alignment with the EPA's requirements for a suburban residential or recreational cleanup, conditions restricting potential uses will be applied to any future land transfers.	Health and Safety

BMP or Mitigation Measure No.	BMP and Mitigation Measure Description	Affected Resources
Transportation BMP-1 (All Action Alternatives)	As a standard industry practice for efficient and safe traffic management, NASA would develop a construction traffic control plan (CTCP). The CTCP would incorporate the agreements in the Transportation and Road Agreement signed by NASA, Boeing, and DOE in 2015. NASA's CTCP would be similar to Boeing's existing CTCP, which includes a traffic control plan, parking plan, existing and construction traffic operations, motorist information strategies, truck safety plan, hazardous materials transport plan, and ridesharing plan. NASA will coordinate traffic control plans with Boeing and DOE.	Health and Safety; Transportation
Transportation Mitigation-2 (All Action Alternatives)	In accordance with the Transportation and Road Agreement signed by NASA, Boeing, and DOE in 2015, NASA will adhere to the repair plan outlined for onsite road pavement repair during soil cleanup activities.	Transportation
Noise BMP-1 (All Action Alternatives)	NASA would limit the proposed soil cleanup activities and truck traffic along haul routes to daytime hours.	Noise
Noise BMP-2 (All Action Alternatives)	Construction equipment and trucks would be maintained in good working order; construction equipment and trucks would be maintained per the manufacturers' recommendations.	Noise

E. Decision

After carefully considering the information and analysis provided in the SSFL Final SEIS (NASA, 2020), as well as the comments and recommendations received from the public, non-governmental organizations, Native American tribes, and federal, state, and local government officials, NASA has selected Alternative C, Suburban Residential Cleanup, as the Agency-Preferred Alternative for the remediation of soil contamination at SSFL. The selection of Alternative C will allow NASA to restore the NASA-administered areas in a manner that fully safeguards human health and welfare, preserves SSFL's existing and irreplaceable natural and cultural resources to the maximum extent possible, and allows the areas to be used by future generations for recreational or residential purposes. In making this decision, NASA applied the criteria set forth in Section B of this ROD, summarized as follows:

- Alternative C is as protective of human health and the environment as Alternative A with regard to the reasonably foreseeable future use of the SSFL property.
- Alternative C is more implementable than Alternative A, because under Alternative C, greater use can be made of in situ soil treatments, backfill materials would be more aligned with naturally occurring soils, conventional measurement capabilities for contaminants would be available, and cleanup standards would be more aligned with the adjacent property.
- Alternative C has fewer potential negative environmental impacts and the same potential beneficial impacts compared to Alternative A. Alternative C has no significant negative environmental impacts.
- Alternative C offers greater flexibility in land use once the GSA transfers the property to another owner because Alternative C is compatible with suburban residential, industrial, and recreational land uses, while Alternative A is compatible only with industrial land use, given the reduction in natural vegetation under Alternative A will lessen the desirability of the area for residential and/or recreational purposes.
- The duration of soil cleanup at SSFL will be 17 years shorter under Alternative C compared to Alternative A.
- Alternative C will save NASA and U.S. taxpayers $354,700,000 compared to Alternative A.

NASA's decision is to proceed with Alternative C, Suburban Residential Cleanup, as described in Section 2.2.3 of the Final SEIS (NASA, 2020).

Robert Gibbs
Associate Administrator for Mission Support Directorate

9/25/2020
Date

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Attachment 1
Programmatic Agreement Among the National Aeronautics and Space Administration, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Demolition and Soil and Groundwater Cleanup at Santa Susana Field Laboratory

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AMENDMENT #1 TO

PROGRAMMATIC AGREEMENT

AMONG

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,

THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER,

AND

THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

REGARDING DEMOLITION AND

SOIL AND GROUNDWATER CLEANUP AT

SANTA SUSANA FIELD LABORATORY

VENTURA COUNTY, CALIFORNIA

WHEREAS, the Programmatic Agreement (PA) was fully executed on April 17, 2014; and

WHEREAS, the PA is set to expire on April 16, 2020; and

WHEREAS, the National Aeronautics and Space Administration (NASA), Santa Susana Field Laboratory (SSFL) has determined that additional time will be required to complete the Undertaking and implement the remaining stipulations in accordance with the PA;

NOW, THEREFORE, in accordance with Stipulation XI of the PA, the purpose of this Amendment is to (1) add ten (10) years to the term of the PA, (2) update the annual reporting requirements, and (3) update the process for amending this PA.

1. Stipulation VI DURATION is amended by substituting the following:

   A. This PA will expire in sixteen (16) years from the original date of execution of the PA or when the Undertaking and stipulated activities are complete, whichever occurs first.
   B. One year prior to expiration, if the Undertaking and/or stipulated activities are not complete, NASA will consult with the other Signatories to extend the PA in accordance with Stipulation XI.

2. Stipulation VIII ANNUAL REPORTING is amended by adding the following:

   A. Within 30 days of receipt of each annual report, the Signatories will convene to discuss the annual report and to address any issues or concerns. The meeting may be cancelled if:

      1. All Signatories agree in writing to cancel, or
      2. A mutually agreeable meeting time cannot be found within 60 days of receipt of the annual report

3. Stipulation XI AMENDMENTS is amended by adding the following:

   Amendments to the PA will be circulated to Consulting Parties, as identified in Attachments 5 and 6 of the PA, for a 30-day review period prior to execution.

SIGNATORIES:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

By: Joan A. Singer Date: 3/31/2020

Jody Singer, Director

AMENDMENT #1 TO PROGRAMMATIC AGREEMENT AMONG NASA, CA SHPO, AND ACHP REGARDING DEMOLITION AND SOIL AND GROUNDWATER CLEANUP AT SSFL VENTURA COUNTY, CA

CALIFORNIA STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: 19 March 2020

Julianne Polanco, SHPO

AMENDMENT #1 TO PROGRAMMATIC AGREEMENT AMONG NASA, CA SHPO, AND ACHP REGARDING DEMOLITION AND SOIL AND GROUNDWATER CLEANUP AT SSFL VENTURA COUNTY, CA

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: __April 6, 2020_____

John M. Fowler, Executive Director

AMENDMENT #1 TO PROGRAMMATIC AGREEMENT AMONG NASA, CA SHPO, AND ACHP REGARDING DEMOLITION AND SOIL AND GROUNDWATER CLEANUP AT SSFL VENTURA COUNTY, CA

INVITED SIGNATORY

SANTA YNEZ BAND OF CHUMASH INDIANS

By: X _____ Date: 4/1/20

Kenneth Kahn, Chairman

PROGRAMMATIC AGREEMENT
AMONG
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER,
AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING DEMOLITION AND
SOIL AND GROUNDWATER CLEANUP AT
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WHEREAS, This Programmatic Agreement ("PA") is made among the National Aeronautics and Space Administration ("NASA"), the California State Historic Preservation Officer ("SHPO"), and the Advisory Council on Historic Preservation ("ACHP") (referred collectively herein as the "Signatories" or individually as a "Signatory"), pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended ("NHPA"), 16 United States Code ("U.S.C.") § 470f and its implementing regulations, 36 Code of Federal Regulations ("CFR") Part 800.

WHEREAS, NASA notified the SHPO, the ACHP, and the public that it would follow 36 CFR 800.8 and used the process and documentation required for the preparation of an Environmental Impact Statement ("EIS") to comply with Section 106 in lieu of the procedures set forth in 36 CFR 800.3 through 800.6, and the National Environmental Policy Act ("NEPA"); and

WHEREAS, in accordance with the Administrative Order on Consent ("AOC") (See Attachment 1) signed by NASA and the Department of Toxic Substances Control for the State of California on December 6, 2010, and the Consent Order for Corrective Action ("Consent Order") signed by NASA in August 2007 (See Attachment 1), NASA plans to (a) remediate the environment at the NASA-administered portion of the Santa Susana Field Laboratory ("NASA SSFL" or "NASA Property") which includes ongoing environmental testing, soil, and groundwater cleanup, and (b) to demolish the majority of extant structures (hereinafter defined as "Undertaking") necessary to support remediation of the NASA property; and

WHEREAS, NASA is the agency responsible for the Undertaking, including demolition, cleanup actions, and mitigation measures and compliance with Section 106 of the NHPA and the implementing regulations with respect to the Undertaking; and

WHEREAS, the United States General Services Administration ("GSA"), is responsible for the disposition of the NASA SSFL and compliance with Section 106 of the NHPA for a conveyance outside of federal ownership; and

WHEREAS, GSA will conduct its own Section 106 process for the separate disposition undertaking; and

WHEREAS, the NASA SSFL is 451 acres located in Ventura County, California, within the Simi Hills, south of Simi Valley, west of West Hills, and north of Bell Canyon. NASA SSFL is part of a larger complex also known as the Santa Susana Field Laboratory the remainder of which is owned by The Boeing Company ("Boeing" and "Boeing SSFL" or "Boeing Property"), which owns a portion of Area I, and all of Areas III and IV, as well as buffer areas to the north and south of NASA's Property. NASA SSFL comprises all of Area II and a portion of Area I (See Attachments 2

and 3). The Department of Energy ("DOE") leases land in Area IV from Boeing. NASA SSFL includes multiple buildings and facilities that supported the testing of rocket engines from the 1950s until 2006, including laboratory buildings, offices, test stands, control houses, support facilities, and associated roads and utilities; and

WHEREAS, in consultation, NASA defined the Undertaking's Area of Potential Effects ("APE") as the entirety of the NASA Property (Area I and Area II), which constitutes 451 acres, plus 39 acres within the Boeing Property that may require soil cleanup as a part of the Undertaking (Attachment 3, Area of Potential Effects); and

WHEREAS, in consultation with SHPO, on May 15, 2008, NASA determined that the NASA SSFL contains three (3) National Register of Historic Places ("NRHP" or "National Register")-eligible historic districts: Alfa, Bravo, and Coca Test Area Historic Districts. Each historic district includes two test stands and a control house, all of which are also individually NRHP-eligible under Criteria A and C and Criteria Consideration G. These historic properties ("NASA Historic Properties") are from the Cold War (Military) and Space Exploration period of significance, circa mid-1950s to 1991 (Attachment 4); and

WHEREAS, there are three (3) recorded archeological sites within the APE, which was surveyed by NASA and other entities to include "Burro Flats Site" (CA-VEN-1072), a "Rock Shelter" (CA-VEN-1800), and a "Sparse Lithic Scatter" (CA-VEN-1803). The Burro Flats Site (CA-VEN-1072) was listed in the NRHP and the California Register of Historic Resources in 1976. It has since been updated to include 16 separate loci. The Burro Flats Site (CA-VEN-1072) and Sparse Lithic Scatter (CA-VEN-1803) have the potential to be adversely affected by the Undertaking.

WHEREAS, NASA conducted a preliminary Traditional Cultural Property ("TCP") investigation and, in consultation with the Santa Ynez Band of Chumash Indians ("SYBCI"), a federally-recognized Indian tribe, determined that a TCP exists within the APE that likely meets National Register Criterion A in addition to Criterion D for TCPs and has determined that these qualifying characteristics will be adversely affected by NASA's Undertaking; and

WHEREAS, the locations of the archeological sites noted above and the TCP are sensitive information and must remain confidential; and

WHEREAS, the SYBCI has designated the NASA Property part of a larger Indian Sacred Site under Executive Order 13007 and has been invited by NASA to sign this PA as an invited signatory ("Invited Signatory"); and

WHEREAS, the DTSC, having a major role as the regulator responsible for many requirements associated with the AOC and this PA has been invited to sign this PA as an invited signatory ("Invited Signatory") and declined to sign; and

WHEREAS, NASA published an Integrated Cultural Resources Management Plan ("ICRMP") for the NASA Property (See Attachment 1); and

WHEREAS, in consultation with the SHPO, the SYBCI, and the Consulting Parties (hereinafter defined), NASA determined that the Undertaking will have an adverse effect on Historic Properties; and

WHEREAS, in accordance with 36 CFR 800.6(a)(1), NASA has notified the ACHP of its adverse effect determination providing the specified documentation, and the ACHP has chosen to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii); and

WHEREAS, NASA also contacted by letter and telephone multiple non-federally recognized tribes within California (See Attachment 5 for a list of Tribes NASA notified), that were identified by the California Native American Heritage Commission ("State-Listed Tribes"), and invited them to participate in consultation on the Undertaking, and some members of these tribes elected to participate as "Consulting Parties", while others State-Listed Tribes did not respond; and

WHEREAS, NASA has consulted with over thirty (30) Section 106 Consulting Parties in accordance with Section 106 of the NHPA, and its implementing regulations (36 CFR 800.6(b)(2)) to resolve the adverse effects of the Undertaking on historic properties (See Attachment 6 for a list of Consulting Parties); and

WHEREAS, NASA also provided for public involvement in accordance with 36 CFR 800.8(a)(1) by coordinating Section 106 review with public review and consultation via an EIS for the Undertaking under provisions of NEPA, 42 U.S.C. §4321 et. seq.; and

WHEREAS, together with the Signatories and the Invited Signatories, NASA consulted with the Consulting Parties, to resolve the adverse effects of the Undertaking on historic properties; and

NOW, THEREFORE, the Signatories agree that the Undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the Undertaking on historic properties.

STIPULATIONS

NASA shall ensure that the following measures are carried out by or under the direct supervision of a person or persons who meet(s) or exceed(s) the pertinent qualifications in the Secretary of the Interior's Professional Qualification Standards (http://www.nps.gov/history/local-law/arch_stnds_9.htm) in those areas in which the qualifications are applicable for the specific work performed.

I. TEST STANDS AND ASSOCIATED SUPPORT FACILITIES

A. Demolition Actions

1. Immediate Demolition. Upon completion of the EIS, NASA will demolish all non-historic properties, including all non-contributing historic structures within the NASA SSFL historic districts, and NASA will demolish the entirety of the Coca Test Stand Historic District (See Attachments 3 and 4)

2. Items for Display. Prior to demolition of any test stands, NASA will consult with NASA's artifacts officer and the Signatories and Invited Signatories in accordance with the Consultation and Review Stipulation (Stipulation V) to identify several

special or representative pieces of the test stands for display in local museums or through the NASA artifacts module at http://gsaxcess.gov/nasawel.htm.

3. Monitoring. NASA's archeologist in consultation with SYBCI will identify locations where demolition activities may require monitoring by Native American and archeological monitors. NASA will use Native American and archeological monitors, as appropriate, to oversee ground disturbing work in areas of archeological concern. Their goal will be to minimize impacts to cultural materials, artifacts and intact site deposits and to assure proper protection of any encountered during the Undertaking.

B. Retention of Historic Test Stands and Facilities

1. Retention. NASA will retain and preserve one of the remaining test stands and control house and possibly other contributing elements within the related historic district (Alfa or Bravo).

2. Consultation. NASA will consult with SYBCI, the State of California Department of Toxic Substances Control ("DTSC"), and SHPO to choose which test stand and control house and contributing elements will remain based on the following criteria:

   a. Meeting the 2010 AOC conditions; and

   b. Abatement, operations, and maintenance costs; and

   c. NASA, SYBCI, or SHPO provides input that identifies concerns related to impacts to the TCP or any newly identified cultural deposits,

3. Hazardous Materials Identification. Within one (1) year of the execution of this PA, NASA will conduct a cost estimate for the abatement (including full abatement and/or encapsulation) for the Alfa and Bravo historic districts.

4. Retained Property Identification. NASA will identify one test stand and associated control house at a minimum and other contributing historic properties if feasible to preserve/retain based on information developed for Stipulation I.B.2. NASA will notify the Consulting Parties which facilities will be retained. The other historic district will be demolished upon completion of the selection process.

5. Proviso: If NASA's efforts fail to retain a test stand and control house identified in Stipulation I.B.4 due to constraints posed by execution of the AOC or reasons outside of NASA's control, such as (but not limited to) fiscal or legislative, NASA will retain several representative pieces of demolished test stands for display in local museums or through the NASA artifacts module at http://gsaxcess.gov/nasawel.htm.

6. Fencing. Upon completion of soil cleanup and demolition activities, based on consultation with the SHPO, NASA will provide and maintain a fenced enclosure around any test stand(s) not demolished until the property is transferred.

C. Mitigation Measures for Demolition

1. Structural Documentation. Within six (6) months of the execution of this PA, NASA will engage the National Park Service ("NPS") to complete Historic American Engineering Record ("HAER") Level I documentation of all test stands in Alfa,

Bravo, and Coca Test Area Historic Districts and will complete HAER Level II documentation for control houses within each district, and HAER Level III for all remaining contributing structures to the Alfa, Bravo, and Coca Test Area Historic Districts and submit the documentation to the Library of Congress ("LOC") for archiving.

2. Photography and Narrative. NASA will post on the NASA website within two (2) years of the signing of this PA a collection of historic photos and the historic narrative from existing surveys of NASA SSFL, and will provide the same in an appropriate format that will be available on written request to NASA for five (5) years for interpretive displays at museums, schools, other organizations, or a potential interpretive center. Photos and narrative related to HAER documentation will be included in archival material submitted to the LOC.

3. National Register Determination of Eligibility. NASA will update the National Register Determination of Eligibility for the retained test stand and control house and any other facilities retained in accordance with Stipulations I.B.1 through I.B.4 upon completion of all demolition activities within twelve (12) months of finalization of the decision to retain the structures.

4. Video Documentation. Within twenty-four (24) months of the execution of the PA, NASA will produce a video documenting the history of the construction and use of NASA's SSFL test stands; the video will be posted on NASA's website for three (3) years minimum and available on CD by request for up to three (3) years after posting on the website. The video will include a virtual model or "fly-through" of the test stands.

5. Oral Histories. Within twenty-four (24) months of the execution of the PA, NASA will conduct twelve (12) oral history interviews of personnel who formerly worked at NASA SSFL and will include the transcripts on NASA's oral history website http://www.jsc.nasa.gov/history/nasa_history.htm with links to other NASA websites, including SSFL.

II. TREATMENT OF TRADITIONAL CULTURAL PROPERTY

A. Native American Advisory Board. Within six (6) months of execution of this PA, NASA will establish a Native American Advisory Board ("NAAB") comprising volunteer representatives from federally recognized Indian tribes and State-Listed Tribes with an interest in the protection of Native American sites on NASA SSFL to advise NASA on matters relating to historic properties of interest to Native Americans on NASA SSFL. The NAAB will provide expertise on and input to the development of the ethnographic history described below in Stipulation II.B and in the identification of any ongoing issues related to the management and protection of Native American sites, including the TCP. The NAAB will remain in effect for the duration of this PA, unless the NAAB and NASA agree that the advisory board is no longer needed.

B. Ethnographic History. Within thirty-six (36) months of execution of this PA, NASA will conduct an ethnographic history (adding to and synthesizing the analyses from the TCP Survey and previous related ethnographic studies). The ethnographic history will include

in-depth research of archeological investigations in the area, interviews, and other research methods based on consultation with the NAAB and local experts to provide a greater understanding of the historic use and associations of the Burro Flats area and SSFL. A public version of the ethnographic history will be published on NASA's website for a minimum of five (5) years, with digital copies available upon request. Copies of the ethnographic history will be provided to all Signatories.

C. TCP Nomination. In consultation with SHPO, Boeing, DOE, NAAB, SBYCI, and NPS, NASA will produce and submit a NRHP nomination of the TCP to the California State Historic Resources Commission and the NRHP for the TCP within eighteen (18) months of the completion of the ethnographic history.

D. Access. In accordance with Executive Order 13007, Indian Sacred Sites, NASA will continue to provide access to ceremonial sites for Native Americans. Written requests for access will be processed by NASA until the land is transferred to the next owner. NASA will endeavor to provide such access to Native Americans for ceremonies unless there is safety or health risks associated with the demolition and cleanup activities or concerns regarding the protection or preservation of the site due to weather conditions, fire hazard, or other hazards.

E. Reseeding. NASA will backfill a portion of the removed soil and reseed areas affected by cleanup and demolition activities using a native seed mix similar to the seed mix being used on the adjacent Boeing property to encourage plant regrowth in the TCP.

III. BURRO FLATS SITE (CA-VEN-1072)

A. Boundary Determination and National Register Nomination. Prior to any cleanup excavation activities on the NASA Property, NASA will consult with SHPO to identify a testing plan to conduct further archeological investigations within NASA's boundary to confirm the extent of the boundary ("Burro Flats Site Boundary") on NASA land and, within twelve (12) months of publishing the final report, in consultation with the SYBCI and Boeing (or its consultants), develop an updated National Register nomination form to be submitted to the SHPO and NRHP.

B. Monitoring. NASA will use archeological and Native American monitors to oversee field sampling, vegetation clearing, and ground disturbing activities within Burro Flats Site and the buffer area defined by NASA in 2008 for management purposes, as well as within any other known archeological sites, and will coordinate, where feasible, any sampling within Burro Flats Site Boundary with the boundary determination work.

C. Environmentally Sensitive Areas Action Plan. NASA will develop an Environmentally Sensitive Areas Action Plan ("ESAAP") that will be submitted for review in accordance Stipulation V to SHPO and SYBCI for use by NASA and its contractors for sensitive cultural areas such as archeological sites to provide active protection during the undertaking to prevent inadvertent damage. The ESAAP will be developed by qualified archeologists and will delineate areas to be protected, document protective measures required, identify responsible parties and their appropriate tasks, and outline an anticipated schedule and process. The ESAAP will be developed in coordination with the Implementation Plan required by the AOC to ensure coordination of the cleanup

activities. The ESAAP will provide provisions for conducting the Undertaking within an archeological site, which will be protective of those areas of the site that are not planned to be affected by the Undertaking.

D. AOC Exception Consideration. Prior to commencing the soil cleanup activities in and around Burro Flats, NASA will submit to DTSC the revised Burro Flats Site Boundary that lies within NASA's APE and request that any cleanup required to meet DTSC standards identified in the AOC within the Burro Flats Site Boundary be considered part of the "Native American Artifacts" exceptions clause identified in the Agreement In Principle of the AOC and be exempted from the cleanup requirement.

E. Exemption Override. If DTSC determines that there is an unacceptable health risk that requires environmental cleanup within the Burro Flats Site Boundary, even in view of an exception otherwise available, NASA and DTSC will identify which areas will require cleanup to meet the prescribed health risk identified by DTSC. NASA will determine the most effective cleanup methodology to achieve the goals while being as sensitive as possible to the site, and promptly inform the SYBCI and SHPO of their determination in writing.

F. Data Recovery Consideration. If the cleanup requires excavation within the Burro Flats Site Boundary, NASA will promptly notify the NAAB, SHPO, and SYBCI that it intends to develop a Research Design for a Phase III data recovery plan in accordance with the Consultation and Review Stipulation (Stipulation V).

   1. NASA will consult with the NAAB, SHPO, and SYBCI to develop a Research Design for a Phase III data recovery plan, which will include a provision for Native American monitors. The submission package will be submitted by NASA to SYBCI and SHPO in accordance with the Consultation and Review Stipulation (Stipulation V). NASA will proceed with the Phase III data recovery plan prior to proceeding with cleanup within the archeological site boundaries.

   2. If the SHPO and/or SYBCI requests, in writing within 30 days of notification, that NASA refrain from conducting data recovery, as described in III.F, within or around the Burro Flats Site Boundary, NASA will work with SYBCI and SHPO to identify an alternative mitigation. Alternative mitigation will be agreed to in a request for concurrence letter sent from NASA and concurred by SYBCI and SHPO prior to commencement of cleanup activities within the Burro Flats Site Boundary.

G. Documentation and Curation. NASA shall ensure that all records resulting from excavation of any National Register-eligible archeological site(s) are curated by an institution meeting the standards set forth in 36 CFR 79, and that all artifacts and other material resulting from the same excavation are maintained in accordance with 36 CFR 79 and curated with previous federal collections associated with SSFL within the State of California.

H. Protection. NASA will update its Standard Operating Procedures ("SOP") for Archeological Resource Protection Act Compliance Review and Preventing Vandalism to Archeological Sites within NASA's ICRMP to include protection during demolition and

cleanup activities, and the update will be submitted by NASA to SYBCI and SHPO in accordance with the Consultation and Review Stipulation (Stipulation V).

IV TREATMENT OF OTHER ARCHEOLOGICAL PROPERTIES

In order for NASA to conduct environmental remediation and demolition activities, NASA will ensure the following stipulations are implemented:

A. Field Sampling. NASA will provide archeological and Native American monitors for field sampling conducted to identify soil contaminants within NASA SSFL.

B. Further Archeological Investigation. Within six (6) months of the completion of the final environmental field sampling or testing, NASA will commence Extended Phase I archeological investigations in those footprints of cleanup areas where NASA plans to excavate soil to achieve cleanup goals. Where necessary, to allow archeological investigation beneath building footprints, some archeological investigations may be delayed. These investigations will include Native American monitors. All archeological investigations will be completed prior to conducting ground disturbing activities (other than minor disturbance in and around structures being demolished.)

C. Archeological Site Discovery and Evaluation. Any newly identified archeological sites within the Extended Phase I investigations will be evaluated by NASA in accordance with 36 CFR 63 and bulletins, guidance, and documents produced by the NPS, in consultation with NAAB, SHPO, and SYBCI, to determine if they are historic properties. NASA will submit the report for review in accordance with the Consultation and Review Stipulation (Stipulation V).

D. In the event the final cleanup footprint includes a portion of the Sparse Lithic Scatter (CA-VEN-1803) or an archeological site is found meeting the National Register eligibility criteria within the final footprint of other cleanup areas, or NASA determines the site eligible for the NRHP for the purposes of this Undertaking, NASA will consult with DTSC and request that the site be considered part of the "Native American Artifacts" exceptions clauses identified in the AIP of the AOC and be exempted from the cleanup requirement.

   1. If the DTSC decides that the AOC Exception Consideration does not apply and NASA is required to conduct cleanup that will adversely affect the archeological site, NASA will proceed in the same manner as Stipulations III.D through III.G.

E. ICRMP Updates. NASA will update its ICRMP to include the National Register-eligible site(s), should they exist, and to include in the ICRMP protection measures during demolition and cleanup per Stipulation III.H. The updated ICRMP will be submitted by NASA to SYBCI and SHPO in accordance with the Consultation and Review Stipulation (Stipulation V).

F. Protection Measures. If active protection measures are needed such as fencing to protect a newly found site during demolition and/or cleanup activities, and NASA's Qualified Personnel determine that certain protection measures can be installed without adverse effects to the National Register-eligible archeological site(s), then NASA will proceed with installation using Native American and archeological monitors. Such protection

activities will be summarized by NASA in writing, and submitted to SHPO, SYBCI, and the NAAB, for their information, prior to installation.

1. If NASA determines the protection measure is likely to cause an adverse effect, NASA will consult with SHPO, SYBCI, and the NAAB to identify ways to avoid, minimize, or mitigate the effects prior to installation.

G. Training Module. NASA will develop a training module within six (6) months of the signing of this PA for all demolition and cleanup personnel, including new personnel coming on site to preform cleanup activities throughout the life of the project, who will be working at NASA SSFL for the protection of cultural resources that includes the procedures identified in NASA's ICRMP for inadvertent discoveries and human remains.

V. CONSULTATION AND REVIEW

A. NASA will consult with SHPO, DTSC, SYBCI, and the NAAB as required by the stipulations within this PA.

1. NASA will submit reports and requests to SHPO and SYBCI for review. Respondents will have thirty (30) calendar days to review submissions, after which NASA will respond, in writing, to written comments within thirty (30) calendar days and provide a (15) day final review opportunity for written comments.

2. In the event of disagreement by SHPO, SYBCI, or NAAB with NASA or each other regarding the stipulations contained within the PA, the matter will be addressed in accordance with the Dispute Resolution Stipulation (Stipulation IX).

3. In the event of disagreement between NASA and DTSC regarding issues related to this PA, the matter will be referred to the dispute process outline in the 2010 AOC or 2007 Consent Order, as appropriate and NASA will inform SHPO, SYBCI, or NAAB of the outcome as reasonably practical.

VI. DURATION

This PA will expire in six (6) years from the date of its execution or when stipulations are complete. Prior to such time, NASA may consult with the other Signatories and Invited Signatories to reconsider the terms of the PA and amend it in accordance with the Amendments Stipulation (Stipulation XI).

VII. UNANTICIPATED DISCOVERIES

A. In the event management, demolition, or cleanup activities uncover any unanticipated discoveries, NASA will proceed in accordance with the procedures outlined in Attachment 7. All work within 30 meters of the location will be suspended and the procedures outlined in Attachments 7 and 8 will be followed.

B. In the event of the discovery of human remains and/or cultural items (funerary objects, sacred objects, objects of cultural patrimony) which are subject to the Native American Graves Protection and Repatriation Act ("NAGPRA") (25 U.S.C. § 3001-3013, 18 U.S.C. § 1170) and the Archeological Resources Protection Act ("ARPA") (16 U.S.C. § 470aa-470mm); NASA will implement Attachment 8 regarding the Treatment of Human

Remains and Funerary/Sacred Objects until such time as a Plan of Action is developed in accordance with NAGPRA. The plan shall include provisions for in-place preservation, excavation, and analysis, in accordance with a data recovery plan (identified in Stipulation III.G-H), and disposition of the remains, as appropriate. In development of the Plan NASA will, in good faith, consult with the relevant parties such as the NAAB and SYBCI in accordance with applicable law. The Plan of Action will supersede Attachment 8 upon completion. If the remains are determined to be non-native, NASA shall follow the procedures outlined in the applicable California unmarked burial law.

VIII. ANNUAL REPORTING

Each year, following the execution of this PA until it expires or is terminated, upon completion of the cleanup, NASA shall provide all parties to this PA a summary report detailing work carried out pursuant to its terms. Such report shall include any proposed scheduling changes, any problems encountered, and any disputes and objections received in NASA's efforts to carry out the terms of this PA.

IX. DISPUTE RESOLUTION

Should any Signatory or Invited Signatory to this PA object at any time to any actions proposed or the manner in which the terms of this PA are implemented, NASA shall consult with such party to resolve the objection. If NASA determines that such objection cannot be resolved, NASA will:

A. Forward all documentation relevant to the dispute, including NASA's proposed resolution, to the ACHP. The ACHP shall provide NASA with its comments on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, NASA shall prepare a written response that takes into account any comments regarding the dispute from the ACHP, Signatories and Invited Signatories, and provide them with a copy of this written response. NASA will then proceed according to its final decision.

B. If the ACHP does not provide comments regarding the dispute within the thirty (30)-day period, NASA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, NASA shall prepare a written response that takes into account any timely comments regarding the dispute from the Signatories and Invited Signatories, to the PA, and provide them and the ACHP with a copy of such written response.

C. NASA's responsibilities to carry out all other actions subject to the terms of this PA that are not the subject of the dispute remain unchanged.

X. ANTI-DEFICIENCY

NASA's obligations under this PA are subject to the availability of appropriated funds, and the stipulations of this PA are subject to the provisions of the Anti-Deficiency Act. NASA will make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. If compliance with the Anti-Deficiency Act alters or impairs NASA's ability to implement the stipulations of this PA, NASA will consult in accordance with the Amendments Stipulation (Stipulation XI) or Termination Stipulation (Stipulation XII) of this PA.

XI. AMENDMENTS

This PA may be amended when such an amendment is agreed to in writing by all Signatories of the PA. The amendment will be effective on the date a copy signed by all of the Signatories and Invited Signatories is filed with the ACHP.

XII. TERMINATION

A. If any Signatory or an Invited Signatory that signed this PA determines that the terms of the PA will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation XI, above. If within thirty (30) days (or another time period agreed to by all Signatories and Invited Signatories that signs the PA) an amendment cannot be reached, any Signatory and/or an Invited Signatory that signed this PA may terminate the PA upon written notification to the other Signatories and Invited Signatories.

B. In the event of termination of this PA, NASA shall comply with the provisions of 36 CFR Part 800 for all portions of the Undertaking that have not already begun. For any new undertakings or changes in the Undertaking, NASA must either (a) execute a PA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. NASA shall notify the Signatories and Invited Signatories that signed the PA, to the course of action it will pursue.

XII. CONFIDENTIALITY

All parties to this PA acknowledge that information about historic properties, prospective historic properties, or properties considered historic for purposes of this PA are or may be subject to the provisions of Section 304 of NHPA and Section 6254.10 of the California Government Code (Public Records Act), relating to the disclosure of sensitive information, and having so acknowledged, will ensure that all actions and documentation prescribed by this PA are, where necessary, consistent with the requirements of Section 304 of the NHPA and Section 6254.10 of the California Government Code.

EXECUTION of this PA by NASA, ACHP, and SHPO and implementation of its terms evidence that NASA has taken into account the effects of this Undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

NASA:

Patrick E. Scheuermann
Director

Date: 4/2/14

California State Historic Preservation Officer:

Carol Rowland-Nawi

Date: 4-10-14

Advisory Council on Historic Preservation:

Pat Gay

John Fowler
for Director

Date: 9/17/14

INVITED SIGNATORY:

Santa Ynez Band of Chumash Indians

Vincent Armenta, Chairman

Date: 4/23/14

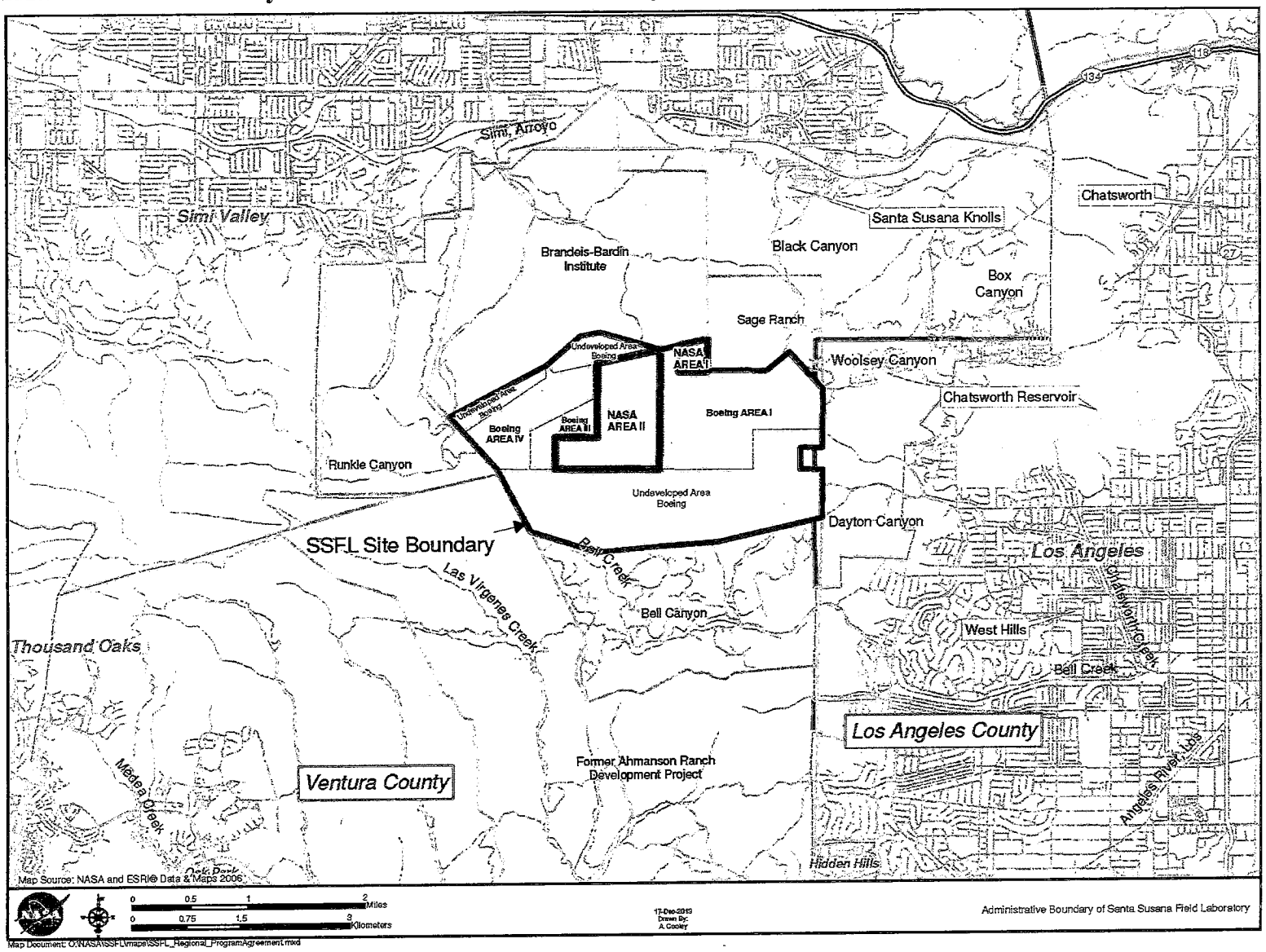
ATTACHMENT 1
Resources

Administrative Order on Consent, ("AOC") signed by NASA and the Department of Toxic Substances Control for the State of California on December 6, 2010. Copy is available at http://ssfl.msfc.nasa.gov/documents/governance/NASA_DTSC_Final_AOC_Dec_2010.pdf or upon request at SSFL Program Director, NASA MSFC AS01, Building 4494, Huntsville, AL 35812.

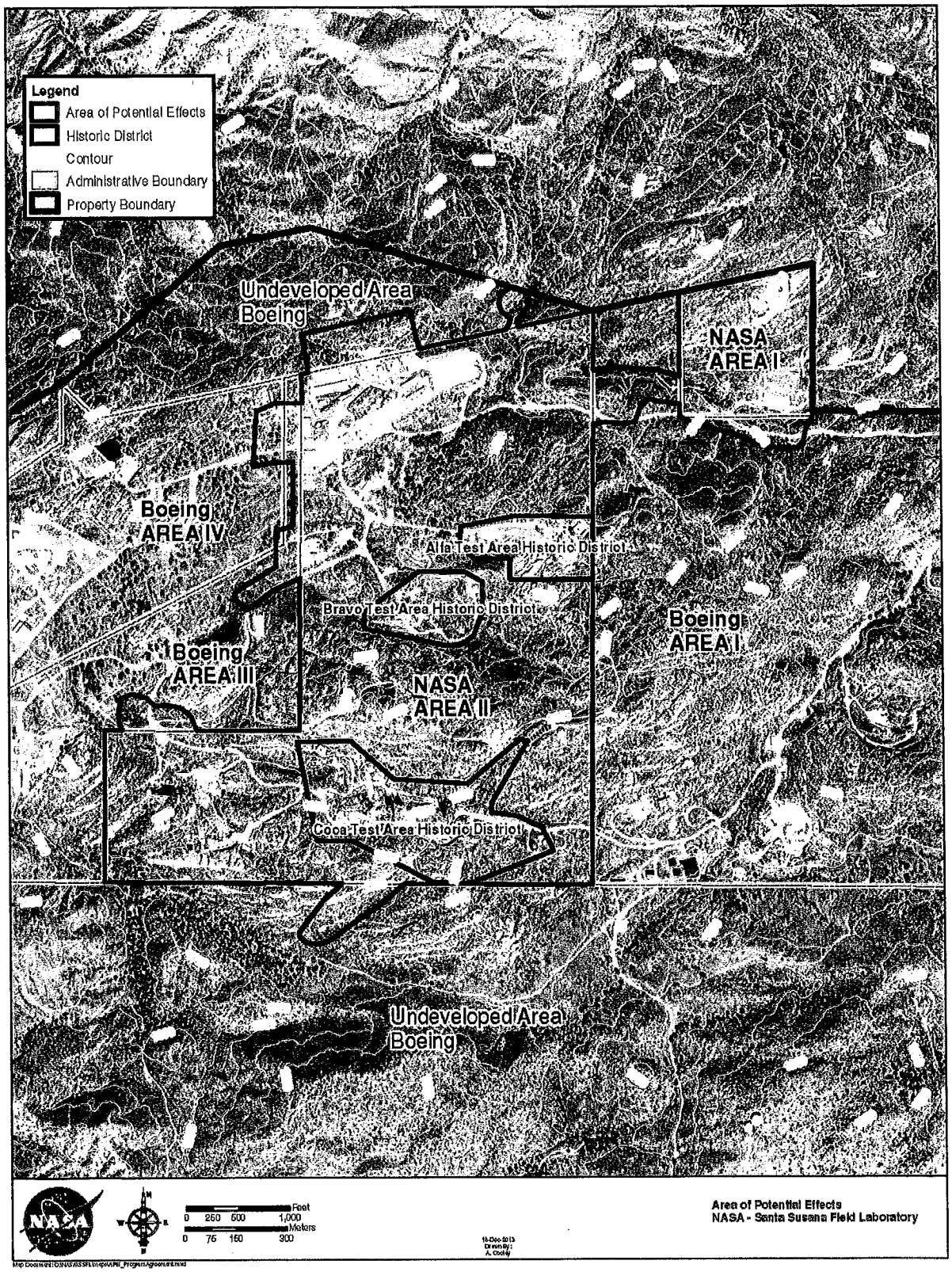
Consent Order for Corrective Action ("Consent Order") signed by NASA in August 2007. Copy is available at http://www.dtsc.ca.gov/SiteCleanup/Projects/upload/SSFL_COCA.pdf or upon request at SSFL Program Director, NASA MSFC AS01, Building 4494, Huntsville, AL 35812.

Integrated Cultural Resources Management Plan for Santa Susana Field Laboratory, Ventura County, California, January 2009-2013. Copy is available at http://ssfl.msfc.nasa.gov/documents/factsheets/ICRMP_SSFL_2009-2013.pdf or upon request at SSFL Program Director, NASA MSFC AS01, Building 4494, Huntsville, AL 35812.

ATTACHMENT 2
Administrative Boundary of Santa Susana Field Laboratory



ATTACHMENT 3
Area of Potential Effects Map



ATTACHMENT 4
Historic Structures and Districts in the NASA-administered Areas at Santa Susana Field Laboratory

Structure No.	Structure Name	NRHP Status	
		Individually Eligible	Contributes to a Historic District
Alfa Test Area Historic District			
2208	Alfa Control House	X	X
2209	Alfa Terminal House		X
2727	Alfa I Test Stand	X	X
2727A	Alfa I Electrical Control Station		X
2729	Alfa III Test Stand	X	X
2729A	Alfa III Electrical Control Station		X
2739	Standtalker Shack		X
2X	Alfa Observation Structure (Pill Box)		X
2Y	Alfa Observation Structure (Pill Box)		X
	Alfa Landscape/Spillway		X
Bravo Test Area Historic District			
2213	Bravo Control House	X	X
2214	Bravo Terminal House		X
2730	Bravo I Test Stand	X	X
2730A	Bravo I Electrical Control Station		X
2731	Bravo II Test Stand	X	X
2731A	Bravo II Electrical Control Station		X
2Z	Bravo Observation Structure (Pill Box)		X
	Bravo Landscape/Spillway		X
Coca Test Area Historic District			
2218	Coca Control Center	X	X
2222	Coca Pre-Test Building		X

ATTACHMENT 4
Historic Structures and Districts in the NASA-administered Areas at Santa Susana Field Laboratory

Structure No.	Structure Name	NRHP Status	
		Individually Eligible	Contributes to a Historic District
2235	Coca Electrical Control Station (LOX)		X
2236	Coca Electrical Control Station (LH2)		X
2237	Coca GH2 Compressor Building		X
2239	Coca GH2 Compressor Building		X
2241	Coca Pump House		X
2520	Coca High Pressure GH2 and GN2 Vault		X
2614	Coca IV Observation Structure (Pill Box)		X
2733	Coca I Test Stand	X	X
2787	Coca IV Test Stand	X	X
2A	Coca North Observation Structure (Pill Box)		X
2B	Coca Observation Structure (Pill Box)		X
V99	Coca GH2 Vessel		X
V100	Coca LH2 Vessel #1		X
V108	Coca LOX Vessel #1		X
	Coca Cable Tunnel		X
	Coca Landscape/Spillway		X

Notes:
GH2 = gaseous hydrogen
GN2 = gaseous nitrogen
LH2 = liquid hydrogen
LOX = liquid oxygen
NRHP = National Register of Historic Places

ATTACHMENT 5
List of Non-federally Recognized Tribes Contacted by NASA

Name	Affiliation
Charles Cooke	Chumash, Fernandeño, Tataviam, Kitanemuk
Beverly Salazar Folkes	Chumash, Tataviam, Fernandeño
James Ramos, Chairperson	Serrano
Ronnie Salas, Cultural Preservation Department	Fernandeño, Tataviam
Julie Lynn Tumamait	Barbareno/Ventureño Band of Mission Indians, Chumash
Patrick Tumamait	Chumash
Chief Mark Steven Vigil, San Luis Obispo County Chumash Council	Chumash
Owl Clan, Qun-tan Shup	Chumash
John Valenzuela, Chairperson San Fernando Band of Mission Indians	Fernandeño, Tataviam, Serrano, Vanyume, Kitanemuk
Randy Guzman - Folkes	Chumash, Fernandeño, Tataviam, Shoshone Paiute, Yaqui
Vennise Miller, Chairperson Coastal Band of the Chumash Nation	Chumash
Carol A. Pulido	Chumash
Melissa M. Parra-Hernandez	Chumash
Frank Arredondo	Chumash
Freddie Romero, Santa Ynez Band of Chumash Indians	Chumash

ATTACHMENT 6
List of Consulting Parties

Consulting Party	Affiliation
Mark Beason	California Office of Historic Preservation
Carla Bollinger	Santa Susana Mountain Park Association
Bill Bowling	Aerospace Contamination Museum of Education
Gary Brown	National Park Service
Harry Butowsky	private contractor
Michael Collins	Self; EnviroReporter.com
Nicole Doner	Ventura County Cultural Heritage Board
Wayne Fishback	Self, neighboring property owners
Beverly Folkes	Self
Elizabeth Harris	Self; Research Psychologist on Government-Funded Public Health Contracts
Luhui Isha	Self
Nancy Kidd	Simi Valley Historical Society
Christian Kiillkkaa	Self
Al Knight	Self
Dan Larson	Compass Rose Archaeological
John Luker	Santa Susana Mountain Park Association
Tom McCulloch	Advisory Council on Historic Preservation
Mark Osokow	San Fernando Valley Audubon Society
Carol Rowland-Nawi	California State Historic Preservation Officer
Gwen Romani	Compass Rose Archaeological
John Tommy Rosas	Tongva Ancestral Territorial Tribal Nation
Bruce Rowe	Self
Chris Rowe	Self
Alan Salazar	Self
Margie Steigerwald	National Park Service
Clark Stevens	Resource Conservation District of the Santa Monica Mountains
Susan Stratton	California Office of Historic Preservation
Brian Sujata	SSFL Community Advisory Group
George Toren	Compass Rose Archaeological
Barbara Tejada	Self, Ventura County Archeological Society
Mati Waiya	Self

ATTACHMENT 6
List of Consulting Parties

Consulting Party	Affiliation
Christina Walsh	Cleanuprocketdyne.org
Abraham Weitzberg	Self
Mary Wiesbrock	Save Open Space
Ronald Ziman	Self
Tribes	
Vincent Armenta	Santa Ynez Band of Chumash Indians, Tribal Chairman
Sam Cohen	Santa Ynez Band of Chumash Indians
Freddie Romero	Santa Ynez Band of Chumash Indians, Elders Council
SSFL Participating Agencies	
James Biederman	General Services Administration
Jane Lehman	General Services Administration
Maureen Sheehan	General Services Administration
Other Agencies	
Paul Carpenter	Department of Toxic Substances Control
Richard Hume	Department of Toxic Substances Control
Ray Leclerc	Department of Toxic Substances Control
Mark Malinowski	Department of Toxic Substances Control

Note: Listing as a Consulting Party does not necessarily indicate agreement with the stipulations codified in this document.

ATTACHMENT 7
Inadvertent Discovery Plan

AMMENDED Excerpt from the Integrated Cultural Resources Management Plan for Santa Susana Field Laboratory, Ventura County, California

SOP 3: Responding to Inadvertent Discovery of Archeological Deposits

Regardless of whether an archeological inventory has been completed and regardless of whether a planned undertaking has been assessed for its effect on known historic properties, every undertaking that disturbs the ground surface has the potential to discover buried and previously unknown archeological deposits. This SOP outlines the policies and procedures to be followed in such cases.

Applicable Laws/Regulations/Procedural Requirements:
National Historic Preservation Act
National Environmental Policy Act
Archeological and Historic Preservation Act
Archeological Resource Protection Act
Native American Graves Protection and Repatriation Act
NASA Procedural Requirements 8580.1

Policy
Archeological deposits that are newly discovered during any undertaking shall be evaluated for their NRHP eligibility. Until NASA has determined an archeological site is ineligible, all known sites will be treated as potentially eligible and will be avoided insofar as possible. In the event that an archeological deposit is inadvertently discovered, work must cease within a 30 meter radius, the Cultural Resources Manager ("CRM") and the SHPO must be notified within two working days (e.g., letter or email notification), and a professional archeologist (meeting the Secretary of Interior's Professional Qualifications), must be consulted.

If the professional archeologist recommends that the archeological deposit is potentially eligible, the CRM will consult with the CA SHPO and federally recognized Native American tribes on the need for further testing and/or data recovery for those sites eligible under only Criterion D. If the undertakings may affect properties having historic value to any federally recognized Indian tribes with which NASA consults, the CRM will consult with the tribes and give them an opportunity to participate as interested persons during the consultation process. In the event that human remains are inadvertently discovered, work must cease in the area of the discovery and the CRM must be notified. If remains are determined to be Native American, federally recognized American Indian tribes will be notified.

Procedure.
I. Workers will notify the CRM immediately upon the discovery of possible archeological deposits. (Standard language will be placed in contracts requiring contractors to notify the CRM immediately upon discovery of possible archeological deposits.)

When notified of the possible discovery of unexpected buried archeological material, the CRM will arrange to have a professional archeologist evaluate the site. Work will cease and the site will be protected pending the results of the evaluation.

A. If fossils, natural stones, concretions, or other such items that are sometimes mistaken for archeological materials are recovered, then the CRM may allow the excavation to proceed without further action.

B. If disturbances to the deposit have been slight and that portion of the Undertaking can be relocated to avoid the buried site, the CRM shall have the site recorded and forms submitted to the appropriate California Historical Resources Information System (CHRIS) in a routine manner, having avoided adverse impact through relocation of the proposed undertaking.

C. If the location of that portion of the Undertaking cannot be changed, the CRM shall contact the CA SHPO by telephone or email within forty-eight (48) hours, report the discovery and initiate emergency consultation.

1. If the deposits are evaluated as ineligible for inclusion on the NRHP by a professional archeologist in consultation with the CA SHPO, then NASA will prepare a memorandum for record, to be included in the site record. NASA may allow the excavations to proceed and shall advise the excavation foreperson(s) of the possibility and nature of additional discoveries that would require immediate notification of the CRM.

2. If, in the opinion of the professional archeologist, the existing information is deemed insufficient to make a determination of eligibility, then an emergency-testing plan will be developed by NASA in coordination with the CA SHPO and SYBCI. Further excavation in the vicinity of the site will be suspended until an agreed testing procedure has been carried out and sufficient data has been gathered to allow a determination of eligibility.

a) If the CA SHPO and SSFL CRM agree after testing that the site is ineligible for inclusion to the NRHP, then work on the that portion of the Undertaking may resume.

b) If the site appears to be eligible for inclusion on the NRHP, or if NASA and the CA SHPO cannot agree on the question of eligibility, then NASA shall implement the following alternative actions, depending on the urgency of the action being delayed by the discovery of cultural material.

1) NASA may relocate that portion of the Undertaking to avoid adverse effect.

2) NASA may request that the site be exempted from cleanup activities if applicable to DTSC as a Native American Artifact in accordance with the AIP.

3) NASA may seek the opinion of the Keeper of the NRHP

4) -NASA may proceed with a Research Design and data recovery plan in accordance with Stipulation III.F-G

5) NASA may request comments from the ACHP and may develop and implement actions that take into account the effects of the undertaking and the comments of the CA SHPO, federally recognized tribes, and the ACHP. Interim comments must be provided to NASA within 48 hours and formal comments within 30 days.

II. If examination by a professional osteologist indicates the materials are of human origin, an archeologist must make a field evaluation of the primary context of the deposit and its probable age and significance, record the findings in writing, and document the materials.

A. If at any time human remains, funerary objects, or Native American sacred objects are discovered, the CRM will ensure that the provisions of NAGPRA, ARPA and/or AIRFA are implemented.

B. The CRM will begin consultation with federally-recognized tribes.

ATTACHMENT 8
Human Remains and Funerary/Sacred Objects Discovery Plan

AMMENDED Excerpt from the Integrated Cultural Resources Management Plan for Santa Susana Field Laboratory, Ventura County, California

SOP #4 Treatment of Human Remains and Funerary/Sacred Objects

The NAGPRA requires the inventory of human remains and funerary and sacred objects recovered from Federal lands that may be subject to claim by Native American tribal groups. The NAGPRA also requires active consultation with such groups to determine the disposition of such remains and objects. No Native American human remains or sacred/funerary objects are currently known to exist on the SSFL; however, previously undocumented excavations may have encountered human remains and/or sacred/funerary objects and future undertakings may inadvertently encounter these materials. This SOP outlines the policies and procedures to be followed to ensure future compliance with the NAGPRA.

Applicable Laws/Regulations

- Native American Graves Protection and Repatriation Act.
- American Indian Religious Freedom Act Policy.

No Native American human remains, funerary objects, or sacred objects from the SSFL will be knowingly kept in Government possession without preparation of an inventory and initiating consultation.

Consultation regarding the disposition of Native American human remains, funerary objects, or sacred objects shall be initiated as soon as feasible.

Procedure

The Cultural Resources Manager ("CRM") will ensure that NASA complies with NAGPRA requirements and the implementing regulations (43 CFR Part 10).

I. The CRM will review all records and collections to determine whether any human remains, funerary objects, or sacred objects originating from the SSFL are known to exist.

   A. If no such objects are found, no consultation is required.

   B. If any such objects are found to be uninventoried, the CRM will prepare an inventory of all such objects and will initiate consultation procedures with the Archeological Assistance Division National Park Service (Post Office Box 37127, Washington, D.C. 20013; telephone 202–343–4101; facsimile 202–523–1547) and federally recognized tribes to determine appropriate disposition.

II. If human remains or artifacts that are not currently in Government possession but that are suspected to be from the SSFL are returned to the Government, the CRM will arrange to have a qualified professional examine and evaluate them.

A. If the remains are not of human origin, then no further action by the CRM is necessary.

B. If the remains are not of Native American origin, then they will be treated as stipulated as an emergency discovery of archeological deposits (see SOP #3).

C. If the remains are of Native American origin, then the CRM will prepare an inventory of the remains and initiate consultation procedures with the Archeological Assistance Division, NPS.

III. If human remains are discovered during the course of any undertaking, the following procedures will apply:

A. Work will immediately cease in the vicinity of the human remains.

B. The site supervisor will immediately notify SSFL/MSFC Law Enforcement/Center Protective Services and the CRM.

1. SSFL Law Enforcement/Center Protective Services officers will notify the County Coroner within 48 hours, the State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98.

a) If the Coroner determines the human remains to be Native American, the Coroner is responsible for contacting the NAHC within 24 hours after the determination is made. The NAHC, pursuant to Section 5097.98, immediately will notify those persons it believes to be most likely descended from the deceased Native American so they can inspect the burial site and make recommendations for treatment or disposal. After the Coroner has established whether the remains are archeological or historical, NASA will follow the California state requirements. If the remains are prehistoric, NASA will initiate the proper procedures under the Archeological Resources Protection Act of 1979 and/or the NAGPRA to decide the disposition of the materials. If the remains are found to be Native American, the steps outlined in NAGPRA, 43 CFR 10.6 (Inadvertent Discoveries) must be followed.

b) If the remains are not of Native American origin, then the site will be treated as the discovery of emergency archeology deposits. However, it should be noted that not all human remains, cemeteries, etc., are NRHP properties.

c) If the remains are of Native American origin, then further work in the vicinity will be suspended for 30 days to allow for consultation, as required by the NAGPRA. If any photographs are taken of the undertaking, only general photographs of the site area are to be taken. Prior to removal of any remains, the CRM will prepare an

inventory of the remains and will immediately initiate emergency consultation procedures with the Archeological Assistance Division, NPS, and tribes.

C. If consultation allows the remains to be removed, then the CRM will cause the remains to be treated and disposed in accordance with the consultation.

D. Notwithstanding the results of consultation, the CRM will ensure that Section 106 procedures are adhered to with regards to evaluating sites.

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If you need help accessing this document, please contact us at msfc-ssfl-information@mail.nasa.gov.

Attachment 2
USFWS Determination

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2013-I-0372

December 13, 2013

Allen Elliott, Santa Susana Program Director
National Aeronautics and Space Administration
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Subject: Demolition and Cleanup of National Aeronautics and Space Administration-Administered Portions of the Santa Susana Field Laboratory, Ventura County, California

Dear Mr. Elliott:

We are responding to your request, dated July 11, 2013, and revised on November 6, 2013, for our concurrence with your determination that the demolition and cleanup activities at the National Aeronautics and Space Administration's (NASA) property at the Santa Susana Field Laboratory (SSFL) in Ventura County, California, may affect, but is not likely to adversely affect the federally endangered least Bell's vireo (*Vireo bellii pusillus*), Bruanton's milk-vetch (*Astragalus brauntonii*) and Riverside fairy shrimp (*Streptocephalus woottoni*), and the federally threatened California red-legged frog (*Rana draytonii*) and vernal pool fairy shrimp (*Branchinecta lynchi*). Your request and our response are made pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act).

You have also determined that the proposed project will have no effect on the federally endangered Quino checkerspot butterfly (*Euphydryas editha quino*) and Lyon's pentachaeta (*Pentachaeta lyonii*), and the federally threatened coastal California gnatcatcher *(Polioptila californica californica*), spreading navarretia (*Navarretia fossalis*), California Orcutt grass (*Orcuttia californica*), Conejo dudleya (*Dudleya abramsii* ssp. *parva*), Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*), Marcescent dudleya (*Dudleya cymosa* ssp. *marcescens*), and the candidate San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*). As NASA and the U.S. Fish and Wildlife Service (Service) are not required to consult on species for which NASA has determined that the project will have no effect, this letter will not address these species further.

The purpose of the proposed action is to remediate the environment to a level that meets NASA's environmental cleanup responsibilities and to undertake the demolition actions necessary to support both remediation and property disposition of the NASA-administered portion of the SSFL. On December 6, 2010, NASA and the Department of Toxic Substance Control executed an Administrative Order of Consent (AOC) that stipulates specific remedial requirements, including the characterization and cleanup of soil contamination on the NASA-administered

areas of SSFL to background concentrations. The cleanup of groundwater beneath SSFL and of surface water is not stipulated in the AOC. In December 2009 the Regional Water Quality Control Board issued an order to NASA and Boeing to improve the quality of storm water discharges by removing contaminated sediments associated with two outfalls. Storm water from the NASA-administered property exits SSFL through one of the two outfalls. Demolition and cleanup activities would occur on 451.2 acres, designated as Area I, the Liquid Oxygen Area II, as well as additional outlying areas that would be affected by NASA's proposed activities (Figure 1).

The project description presented in NASA's Biological Assessment (NASA 2013) describes the proposed action as it appears in the Environmental Impact Statement (EIS). A number of potential treatment options are presented in the EIS, although currently it has not been decided which specific treatments would be used. Potential groundwater cleanup technologies that could be implemented include pump and treat, vacuum extraction, iron particle injection, heat-driven extraction, in-situ chemical oxidation, in-situ enhanced bioremediation, monitored natural attenuation and institutional controls. The potential methods for soil cleanup are presented in Table 1.

NASA conducted field surveys including vegetative community mapping, plant surveys, wildlife surveys, and wetland delineation between 2010 and 2012. These field surveys included species-specific surveys for Braunton's milk-vetch throughout the project area, a habitat assessment and surveys for California red-legged frogs, and opportunistic surveys for least Bell's vireos, Riverside fairy shrimp and vernal pool fairy shrimp as described further below.

Braunton's milk-vetch

Braunton's milk-vetch and its critical habitat occurs within Area IV and the undeveloped areas of SSFL, administered by the Department of Energy. Targeted surveys for Braunton's milk-vetch were conducted on NASA-administered properties of SSFL during 2010 and 2011. Reference locations within SSFL were visited prior to the surveys on the NASA properties in order to calibrate the biologist's search image for these plants. No Braunton's milk-vetch were observed within areas that are subject to NASA-administered cleanup activities; however, soil conditions indicate that suitable habitat may exist in the northeastern portion of NASA's Area II and in the southern portion of Area I.

California red-legged frog

California red-legged frogs and their critical habitat occur south of NASA administered portions of SSFL in Las Virgenes Canyon and upper Las Virgenes Creek. A habitat assessment was conducted on NASA-administered portions of the property in 2012 in accordance with the Service's guidance (Service 2005), and opportunistic surveys for the species were conducted in 2010, 2011, and 2012 during reconnaissance activities in suitable habitat. The habitat assessment indicated that suitable habitat for the California red-legged frog exists primarily around the R-2 ponds and the detention basin north of the Coca test stand. No individuals were detected during any survey and assessment activities; however, suitable habitat exists on the site that could support California red-legged frogs at some point during the project duration.

Allen Elliott

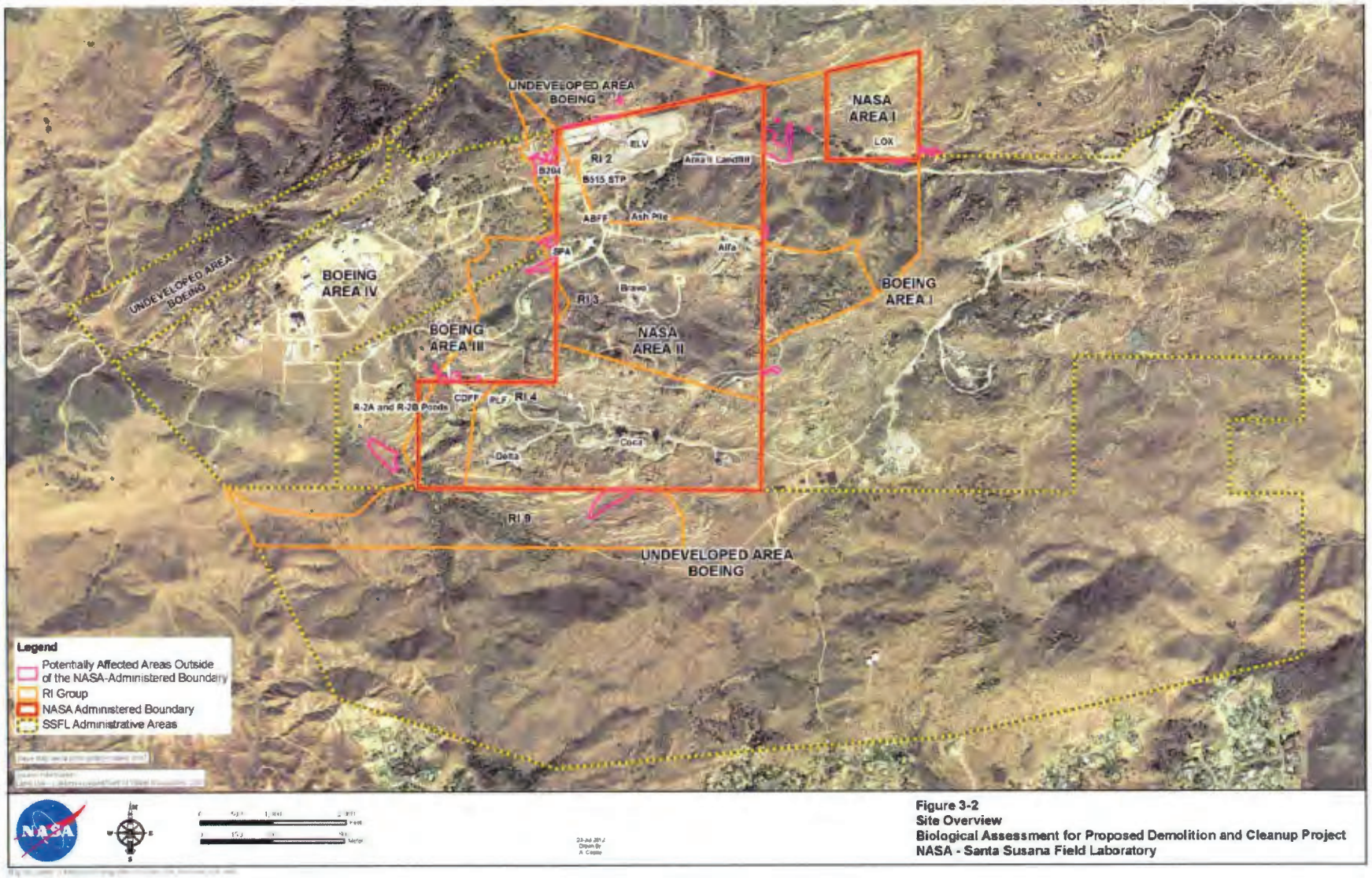

Figure 1. Site overview with NASA-administered lands outlined in Red (NASA 2013).

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Table 1. Soil Remediation Technologies (NASA 2013).

Technology	Constituent Treatment	Excavation	Site Restoration	Onsite Trucks	Stockpiling	Offsite Trucks	Permits Required?	Construction	Energy Needs	Monitoring	Duration
Excavation and Offsite Disposal	All	Yes	Backfilling and reseed with native grasses	Yes	Yes	Yes	No	Staging Area	No	No	Excavation - Several Years Transport – 5 to 10 years
Excavation, Onsite CAMU, and Encapsulation	All	Yes	Backfilling and reseed with native grasses	Yes	Yes	No	Landfill Siting Permit	CAMU	No	Yes	Excavation - Several Years CAMU – 18 months
Soil Vapor Extraction	VOCs	No	No	Yes	No	No	VOC Emission Permit	SVE Wells	Yes	Yes	Months to Years
Ex-situ Treatment Using Land Farming	VOCs	Yes	Replacement of soils and reseed with native grasses	Yes	Yes	No	No	Staging/ Treatment Area	No	Yes	Months to Years
Ex-situ Treatment Using Thermal Desorption	VOCs, SVOCs	Yes	Replacement of soils and reseed with native grasses	Yes	No	No	VOC/ SVOC Emission Permit	Temporary Thermal Desorption Chamber	Yes	Yes	Months to Years
In-situ Physical Treatment Using Soil Mixing	VOCs, SVOCs	No	Grading of disturbed soils	Yes	No	No	Injection Permit	No	No	Yes	Months to Years
In-situ Chemical Oxidation or Reduction	VOCs, SVOCs	No	Grading of disturbed soils	Yes	No	No	Injection Permit	Injection Wells or Boreholes	No	Yes	Months to Years
In-situ Anaerobic or Aerobic Biological Treatment	VOCs, SVOCs	No	Grading of disturbed soils	Yes	No	No	Injection Permit	Injection Wells or Boreholes	No	Yes	Months to Years
Phytoremediation	VOCs, some metals, and PCBs	No	Yes	Yes	No	No	No	Tree/Vegetation Planting	No	Yes	Decades
Monitored Natural Attenuation	VOCs, SVOCs	No	N/A	No	No	No	No	No	No	Yes	Hundreds of Years

Notes:
CAMU = corrective action management unit
N/A = not applicable
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
VOC = volatile organic compound

Least Bell's vireo

Least Bell's vireos are known to occur within Ventura County in the Calleguas Creek and Santa Clara River watersheds. The closest reported nesting location occurs approximately 9 miles northwest of the site. Habitat for least Bell's vireo within NASA's portion of SSFL consists of approximately 2.1 acres of fragmented mulefat riparian scrub, of this approximately 1.5 acres may be impacted by the cleanup. Opportunistic surveys for least Bell's vireos were conducted during 2010 and 2011. A single least Bell's vireo was sighted during August 2011, and was determined to possibly be a migrating individual.

Riverside and vernal pool fairy shrimp

Suitable habitat for Riverside and vernal pool fairy shrimp typically consists of vernal pool features, which usually occur in areas of heavy clay. The predominant soil type at SSFL is sand, and prominent rock outcrops covering the landscape are sandstone features. No vernal pools exist in the project area. Surveys conducted in 2010 and 2011 indicated that suitable habitat may exist for the Riverside and vernal pool fairy shrimp within the project area, near small rock basins in sandstone outcrops and two seasonally ponded wetland areas. Opportunistic surveys for the Riverside and vernal pool fairy shrimp were conducted in January 2012; however, due to low winter rainfall, the basins were dry. Although the species were not observed during surveys, Riverside and vernal pool fairy shrimp have the potential to occur within the project area. However, the quality and quantity of suitable habitat appears to be very limited onsite.

NASA proposes to implement the following measures to avoid adverse effects to listed species from the proposed project:

1. NASA will conduct protocol-level surveys in suitable habitats for least Bell's vireo prior to the anticipated construction startup date. If the surveys indicate the presence of least Bell's vireos, then consultation with the Service will be initiated before clearing or any construction activities that may adversely affect least Bell's vireo begin;

2. NASA will conduct protocol-level surveys within suitable habitat for California red-legged frogs before the anticipated construction startup date and during construction. If the surveys indicate the presence of the California red-legged frog before or during construction, then any construction activities that could adversely affect the species will be halted and consultation with the Service will be initiated before construction activities are restarted;

3. NASA will conduct surveys for Braunton's milk-vetch in suitable habitat prior to construction and will avoid any occurrence of the species during construction by erecting fences and demarcating exclusion areas; and

4. NASA will avoid the rock basins where Riverside and vernal pool fairy shrimp may occur during construction. The rock basins will not be affected by excavation for soil remediation. Where rock basins occur near construction areas, exclusion fencing will be set up. Consultation with the Service will occur if the rock basins are to be affected.

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, the least Bell's vireo, California red-legged frog, Braunton's milk-vetch, Riverside fairy shrimp and vernal pool fairy shrimp. Our concurrence is based on the following:

Braunton's milk-vetch

- Braunton's milk-vetch is not known to occur within the portion of SSFL subject to cleanup by NASA; and

- NASA proposes to conduct surveys in suitable habitat prior to construction and will avoid any occurrences of the species.

California red-legged frog

- Suitable habitat for California red-legged frogs within the project area is of limited quantity and the species has not been previously documented within the project area; and

- NASA will conduct surveys in accordance with Service guidance in all suitable habitats prior to construction and will initiate formal consultation if the species is detected.

Least bell's vireo

- The suitable habitat for least Bell's vireo within the project area is of limited quality and quantity, and nesting has not been previously documented within the project area; and

- NASA will conduct surveys in accordance with Service guidance in all suitable habitats prior to construction and will initiate formal consultation if the species is detected.

Riverside and vernal pool fairy shrimp

- The suitable habitat for Riverside and vernal pool fairy shrimp within the project area is of limited quality and quantity, and the species was not observed during opportunistic surveys;

- Rock basins, where the species may occur, will be avoided completely during construction. Where rock basins occur near construction areas, exclusion fencing will be erected. The rock basins will not be affected by excavation for soil remediation during SSFL project activities; and

- Additional dialogue and consultation with the Service will occur if rock basins would be affected.

This concludes informal consultation on the subject project pursuant to section 7(a)(2) of the Act. If the proposed action changes in any manner or if new information reveals that listed species in the project area may be affected by the proposed action, NASA should contact us

immediately and suspend all activities that may affect listed species until the appropriate level of consultation is completed. If you have any questions regarding this letter, please contact Jenny Marek of my staff at (805) 644-1766, extension 325.

Sincerely,

Jeff Phillips
Deputy Assistant Field Supervisor

cc:
John Jones, Department of Energy
Ray Leclerc, California Department of Toxic Substance Control
Mary Meyer, California Department of Fish and Wildlife