

APPENDIX C

**Cultural Resources Study for Environmental
Cleanup and Demolition at Santa Susana Field
Laboratory, NASA Areas I and II, Ventura County,
California**

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Confidential

**Cultural Resources Study
for Environmental Cleanup
and Demolition at Santa Susana Field
Laboratory, NASA Areas I and II,
Ventura County, California**

Prepared for
National Aeronautics and Space Administration
Huntsville, Alabama

February 2014

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Cultural Resources Study for Environmental Cleanup and Demolition at Santa Susana Field Laboratory, NASA Areas I and II, Ventura County, California

Report Prepared For:

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National Archeological Database (NADB)

Type of Study: Literature Search, Survey, and Evaluation

Sites Recorded: [REDACTED]

Isolates Recorded: None

USGS Quadrangle: Calabasas, CA;

Acreage: 490 acres

Level of Investigation: NEPA and Section 106

Key Words: Simi Valley, NASA, Alfa Test Area, Bravo Test Area, Coca Test Area, Historic Districts, Burro Flats, NEPA, Isolate, prehistoric site, Chumash, Gabrieleño, Tataviam

STATEMENT OF CONFIDENTIALITY:

Due to the sensitive nature of cultural resources described herein, this report is confidential and should be withheld from public distribution, in accordance with 43 CFR 7.18[a][1] and Section 304 of the National Historic Preservation Act.

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Executive Summary

This report provides the results of several phases of work designed to locate and document historic properties within the National Aeronautics and Space Administration (NASA)-administered Liquid Oxygen (LOX) Plant Area I and Area II at the Santa Susana Field Laboratory (SSFL) in Ventura County, California. This study has been prepared in support of Section 106 of the National Historic Preservation Act (NHPA), which requires federal agencies to identify historic properties and take into account the effects of their undertakings on historic properties, as well as the National Environmental Policy Act (NEPA). NASA has prepared an Environmental Impact Statement (EIS) for the undertaking, or Proposed Action, that includes the results of this study.

Cultural resources include prehistoric and historic archeological sites, districts, and objects; standing historic structures, buildings, districts, and objects; locations of important historic events; and Native American sites and cultural properties such as sites of traditional cultural importance to various groups. 36 *Code of Federal Regulations* (CFR) 800 defines a historic property as any prehistoric or historic district, site, building, structure, or object listed in, or eligible for listing in, the National Register of Historic Places (NRHP).

Under Section 110 and Section 106 of the NHPA, NASA conducted cultural resource inventories of the NASA-administered portion of SSFL in 2007, 2008, 2009, and 2011. These inventories together include the entirety of the NASA-administered portion of SSFL and some areas outside this area that likely will need to be remediated as a part of this undertaking, covering a total of 198.3 hectares (ha) (490 acres). Previous work consisted of using the Universal Transverse Mercator (UTM) coordinate system to record the locations of the features at the Burro Flats Site [REDACTED] with a handheld Trimble global positioning system (GPS) unit, recordation of [REDACTED] site (Emmick and Bard, 2008; McClintock, Wilt, and Emmick, 2009), and recordation of [REDACTED] in 2010 (Hogan and Tang, 2010). [REDACTED] and [REDACTED] are being considered potentially eligible for listing in the NRHP for this undertaking.

An assessment of the built environment was conducted in 2007 by Archaeological Consultants, Inc., and Weitze Research (ACI and WR). This survey assessed 135 federally owned buildings, structures, and sites within NASA-administered LOX Plant Area I and Area II of SSFL. The results of this investigation identified three historic districts—the Alfa, Bravo, and Coca Test Areas—and nine individually eligible structures within the districts (ACI and WR, 2009). The Alfa, Bravo, and Coca Test Area historic districts are eligible for listing in the NRHP, and within these three historic districts, six test stands and three associated control houses are individually eligible for the NRHP. The California State Historic Preservation Officer (SHPO) concurred with the eligibility of these three districts and their contributing elements, as well as with the individual eligibility of the nine structures, on May 15, 2008. Correspondence summaries are included in Appendix B.

NASA initiated NHPA Section 106 consultation with the California SHPO and the Advisory Council on Historic Preservation (ACHP) on June 30, 2011. The initiation letter notified SHPO and ACHP of NASA's intent to use the NEPA process and documentation to comply with Section 106, in accordance with 36 CFR 800.8. The Area of Potential Effects for this project was developed in consultation with the SHPO in 2011 and 2012.

NASA has found that the Proposed Action—demolition of up to 100 percent of structures, soil cleanup to background levels, and groundwater cleanup—would result in an adverse effect on historic properties, as detailed in the effects analysis and findings in the cultural resources subsection of Section 4 of the EIS. Consultation with the SHPO, ACHP, Native Americans, and other consulting parties is ongoing. This consultation will culminate in measures to avoid, minimize, or mitigate adverse effects on historic properties that will be formalized in either an agreement document or in the Record of Decision associated with the EIS.

A copy of this report will be filed with the South Central Coastal Information Center of the California Historical Resources Information System located at California State University, Fullerton, in accordance with the Office of Historic Preservation's Information Management program.

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Acronyms and Abbreviations

ACI	Archaeological Consultants, Inc.
ACHP	Advisory Council on Historic Preservation
AFP	Air Force Plant
amsl	above mean sea level
AOC	Administrative Order on Consent
APE	area of potential effects
Boeing	The Boeing Company
CEQA	California Environmental Quality Act of 1970
CFR	<i>Code of Federal Regulations</i>
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DMJM	Daniel, Mann, Johnson & Mendenhall, Inc.
DPR	Department of Parks and Recreation
DoD	U.S. Department of Defense
EIS	Environmental Impact Statement
EO	executive order
ft	feet
GH2	gaseous hydrogen
GN2	gaseous nitrogen
GPS	global positioning system
GSA	General Services Administration
ha	hectare
ICRMP	Integrated Cultural Resources Management Plan
JP4	jet-propulsion fuel
km	kilometer
m	meter
LH2	liquid hydrogen
LOX	Liquid Oxygen Plant
n.d.	not dated
NAA	North American Aviation
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAHC	Native American Heritage Commission
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
OHP	California Office of Historic Preservation
PA	Programmatic Agreement
ROD	Record of Decision
SCCIC	South Central Coastal Information Center
SHPO	State Historic Preservation Officer
SSFL	Santa Susana Field Laboratory
U.S.	United States
U.S.C.	United States Code
USAF	U.S. Air Force
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator

WR
yd³

Weitze Research
cubic yards

SECTION 1**Introduction**

This report provides the results of several phases of cultural resource assessments within the National Aeronautics and Space Administration (NASA)-administered Liquid Oxygen (LOX) Plant Area I and Area II at the Santa Susana Field Laboratory (SSFL) in Ventura County, California (Figure 1). 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 SSFL. This report has been prepared in support of Section 106 of the National Historic Preservation Act (NHPA), as well as the National Environmental Policy Act (NEPA). Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings (the Proposed Action) on historic properties. NASA has prepared an Environmental Impact Statement (EIS) for the undertaking that includes the results of this study. The Integrated Cultural Resources Management Plan (ICRMP) for SSFL, published in 2009, also provides guidance about how to identify, evaluate, and treat cultural resources at SSFL in compliance with NASA policy and state and federal regulations (NASA, 2009).

SSFL is located on 1,153 hectares (ha) (2,850 acres) in Ventura County, California, approximately 11.3 kilometers (km) (7 miles) northwest of Canoga Park and approximately 48.3 km (30 miles) northwest of downtown Los Angeles. SSFL is composed of four administrative areas known as Areas I, II, III, and IV and two unnumbered areas known as "Undeveloped Area." NASA administers 16.9 ha (41.7 acres) within LOX Plant Area I and all 165.7 ha (409.5 acres) of Area II. The Boeing Company (Boeing) owns the remaining property within Areas I, III, and IV, and the two undeveloped areas. Specifically, the project area is located within Township 2 North, Range 17 West, of an unsectioned area of the 1952 (photo revised 1967) *Calabasas, California 7.5'* U.S. Geological Survey (USGS) quadrangle maps.

Since the mid-1950s, when Areas I and II were acquired by the United States (U.S.) Air Force (USAF), this site has been used for developing and testing rocket engines. Four test stand complexes (Alfa, Bravo, Coca, and Delta) were constructed in Area II between 1954 and 1957. Area II and the LOX Plant portion of Area I were transferred to NASA from the USAF in the 1970s.

This assessment includes a review of previous studies and pedestrian surveys within the Area of Potential Effects (APE) and the results of these investigations, as well as a summary of effects on historic properties from the Proposed Action. The full analysis of the effects of the Proposed Action on historic properties is contained in Section 4 of the EIS.

This report includes several appendixes: Appendix A contains representative photographs from the 2011 field survey; Appendix B contains a summary of the consultation record; Appendix C provides project personnel qualifications; and Confidential Appendix D depicts the cultural resources located within the APE. The maps in Appendix D are kept confidential to protect the archeological sites because of their sensitive nature. Section 9 of the Archaeological Resources Protection Act of 1979 and 36 *Code of Federal Regulations* (CFR) 800.11(c) provide discussions regarding the confidentiality of sites. The public version of this report has been redacted in certain sections in order to protect the archeological sites.

Project personnel included Principal Investigator/Field Director for the 2011 investigation Gloriella Cardenas, M.A., RPA, cultural resources specialist Michelle Kaye, Ph.D. Senior cultural resources specialist Clint Helton, M.A., RPA, provided senior technical review. Secretary of the Interior-qualified architectural historians Lori Price and Sara Orton contributed to this analysis. Additional review and research was conducted in 2013 by Natalie Lawson, M.A., RPA.

1.1 Proposed Action

NASA entered into an Administrative Order on Consent (AOC) for Remedial Action with the California Department of Toxic Substances Control (DTSC) on December 6, 2010, "to further define and make more specific NASA's obligations with respect to the cleanup of soils at Santa Susana Field Laboratory (SSFL)." As such, NASA prepared

an EIS to analyze the potential environmental impacts of demolition and cleanup activities on the NASA-administered portion of SSFL. The Proposed Action analyzed and evaluated in the EIS includes demolition of up to 100 percent of structures within the APE, as well as ancillary structures, including 55 structures within the boundaries of the three historic districts. It should be noted that even if demolition is not necessary to meet cleanup goals, removal of a structure might occur as NASA prepares the site for disposition. The Proposed Action also includes soil cleanup to background levels through excavation and offsite disposal of the contaminated soil, and ex situ and in situ soil remediation technologies. The total area of the soil remediation footprint is approximately 105 acres and entails cleanup of approximately 500,000 cubic yards (yd³) of contaminated soil within the APE. Finally, the Proposed Action includes groundwater cleanup within the APE. Section 2 of the EIS describes the Proposed Action and cleanup technologies in greater detail.

As part of excavation and offsite disposal, approximately 320,000 yd³ of soil (64 percent of the total contaminated soil) must be removed from SSFL because it is considered non-treatable contaminated soil and must be disposed of offsite. Stratification (or layering) of the contamination could require that the majority of contaminated areas would have to have the top 2 feet (ft) of non-treatable soil excavated, removed, and disposed offsite. The remaining approximately 180,000 yd³ of contaminated soil (36 percent of the total contaminated soil) is considered treatable, but might need to be excavated if none of the remediation technologies are found to be effective in meeting the cleanup goals. The ex situ soil remediation technologies being considered (Thermal Desorption, Soil Washing, Chemical Oxidation, and Land Farming) would be used only after the 320,000 yd³ or more of non-treatable soil has been excavated and removed. These technologies would be used to remediate the remaining 180,000 yd³ of treatable soil. The in situ soil remediation technologies (Soil Vapor Extraction, Anaerobic or Aerobic Biological Treatment, and Chemical Oxidation or Reduction) also would only be used for treatable soils; the soils would be treated in place and would not require excavation.

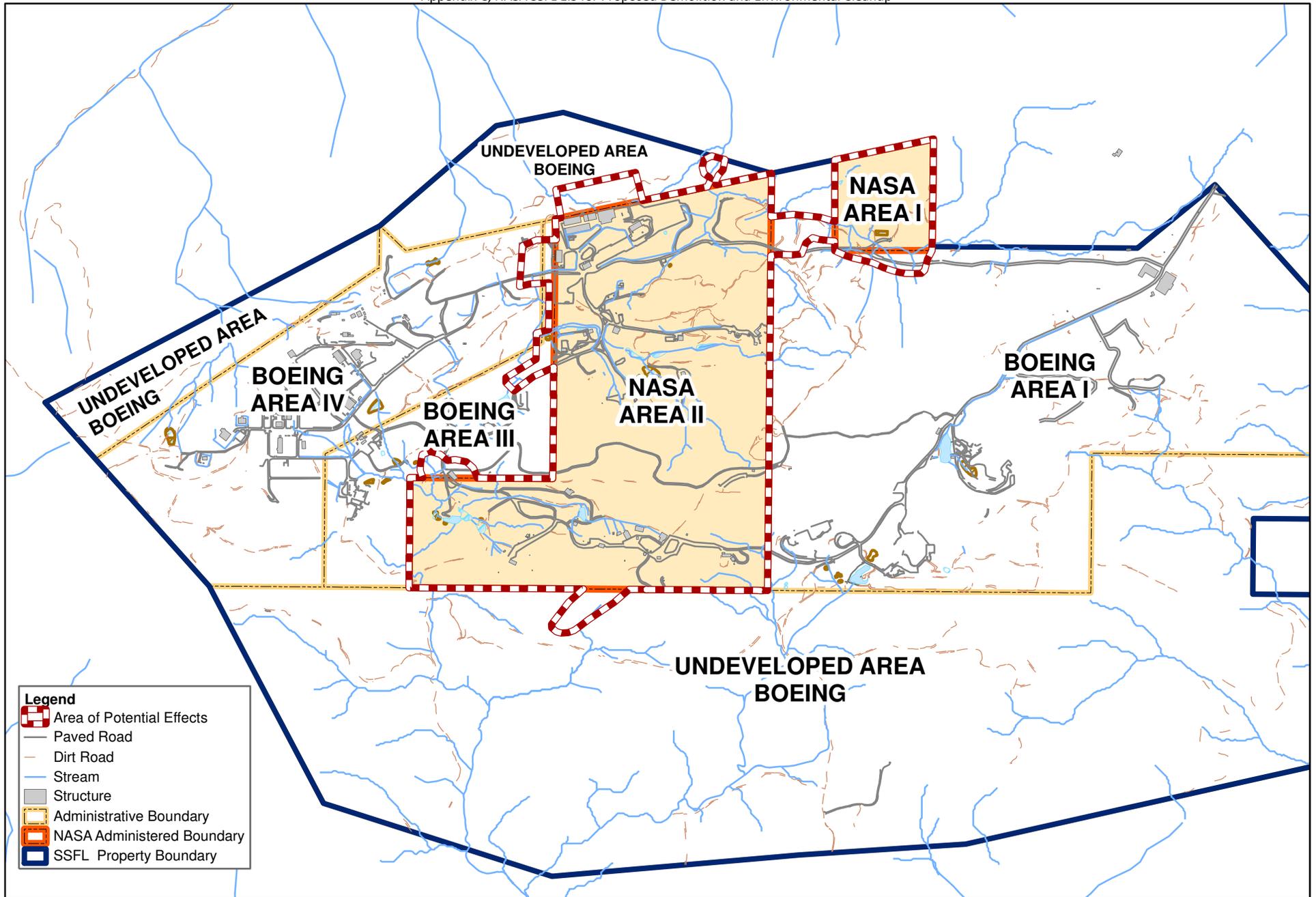
The groundwater remediation technologies to be considered include Pump and Treat, Vacuum Extraction, Iron Particle Injection, Heat-Driven Extraction, In situ Chemical Oxidation, In situ Enhanced Bioremediation, Monitored Natural Attenuation, and Institutional Controls. One or a combination of these technologies might be applied to meet the groundwater cleanup goals. Some ground disturbance would be necessary for the installation of wells, boreholes, piping, manifolds, tanks, or a power source, but this work could be done in discrete locations to minimize impacts. Depths of wells and boreholes for these technologies could range from approximately 50 to 900 ft below ground surface. The drills for the wells would be 8 inches or less in diameter, more likely 4.5 to 5 inches in diameter. The piping would be above ground and would be on small concrete pilings.

1.2 National Register of Historic Places Eligibility

The preservation of historic properties became national policy first with the passage of the Antiquities Act of 1906. The Historic Sites Act of 1935 continued the goal of preserving historic properties. Finally, the NHPA was passed in 1966. The National Register of Historic Places (NRHP) was established as part of the NHPA.

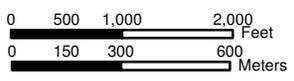
Cultural resources include prehistoric and historic archeological sites, districts, and objects; standing historic structures, buildings, districts, and objects; locations of important historic events; and sites of traditional or cultural importance to various groups. 36 CFR 800 defines a historic property as any prehistoric or historic district, site, building, structure, or object listed in, or eligible for listing in, the NRHP. The criteria used to evaluate properties for the NRHP are provided in 36 CFR 60 and listed in the following bullets. A resource must meet one or more of these criteria to be considered for eligibility:

- Be associated with events that have made a significant contribution to the broad patterns of history (Criterion A).
- Be associated with the lives of persons significant to our past (Criterion B).
- Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components might lack individual distinction (Criterion C).
- Have yielded, or have the potential to yield, information important to prehistory or history (Criterion D).



Legend

- Area of Potential Effects
- Paved Road
- Dirt Road
- Stream
- Structure
- Administrative Boundary
- NASA Administered Boundary
- SSFL Property Boundary



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 A. Cooley

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

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Generally, properties must be 50 years old to be eligible for the NRHP, but those that have achieved significance within the past 50 years may be eligible under Criteria Consideration G, which states that a property achieving significance within the last 50 years can be eligible if it is of exceptional importance.

In addition to meeting one or more of these criteria, a resource must retain integrity to be considered a historic property. Integrity is the authenticity of the physical identity, as evidenced by the survival of characteristics that existed during the resource's period of significance. Historic properties must retain enough of their historic character or appearance to be recognizable and to convey the reasons for their significance. The seven aspects of integrity, presented in 36 CFR 60, are location, design, setting, materials, workmanship, feeling, and association. A resource that has lost its historic character or appearance and is not eligible for the NRHP still might have sufficient integrity for the California Register of Historical Resources (CRHR), if it maintains the potential to yield significant scientific or historic information or specific data.

The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify state historical resources and to decide which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the California Public Resources Code, automatically includes those California properties already listed in the NRHP. It also includes those formally determined to be eligible for listing in the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), as well as specific listings of State Historical Landmarks and State Points of Historical Interest. The CRHR also might include other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historic resources
- Resources that contribute to a historic district
- Resources identified as significant in historic resource surveys
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance)

The CRHR follows the lead of the NRHP in using the general 50-year threshold. A resource usually is considered for its historic significance after it reaches the age of 50 years. This threshold is not absolute, but was selected as a reasonable span of time after which a professional evaluation of historic value or importance can be made.

1.3 Area of Potential Effects

The APE for historic properties includes approximately 198.3 ha (490 acres), including 182.6 ha (451.2 acres) of NASA-administered property; 16.9 ha (41.7 acres) in Area I, and 165.7 ha (409.5 acres) in Area II (Figure 2). An additional 15.7 ha (39 acres) of Boeing property are included in the APE, because these areas likely would be part of NASA's cleanup activities. The APE is the area in which the direct and indirect effects of a project may cause alterations to the character of historic properties. The APE for this project was developed in consultation with the State Historic Preservation Officer (SHPO). It incorporates the entirety of the NASA-administered property in LOX Plant Area I and Area II, as well as a few areas outside those boundaries that likely will need to be remediated as a part of the environmental cleanup.

NASA initiated NHPA Section 106 consultation with the California SHPO and the Advisory Council on Historic Preservation (ACHP) on June 30, 2011. This letter notified SHPO and ACHP of NASA's intent to use the NEPA process and documentation to comply with Section 106, in accordance with 36 CFR 800.8. The APE for this project was developed in consultation with the SHPO in 2011 and 2012. Consulting parties received the APE in May 2012 and were afforded the opportunity to comment on the APE for this undertaking.

1.4 Sacred Sites

In December 2012, NASA received notice from the federally recognized Santa Ynez Band of Chumash Indians (Santa Ynez) of the tribe's designation of the NASA portion of SSFL as an Indian sacred site, in accordance with Executive Order (EO) 13007 (*Federal Register*, 1996). The EO aims to "protect and preserve Indian religious practices" and states that agencies managing federal lands shall:

- (1) Accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and
- (2) Avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites (*Federal Register*, 1996).

The definition of an Indian “Sacred Site” according to the EO is:

Any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site” (*Federal Register*, 1996).

NASA continues consultation with the Santa Ynez regarding the Proposed Action and the potential impacts to the designated Indian Sacred Site, as well as appropriate mitigation measures to address impacts to the Sacred Site. This is a confidential process.

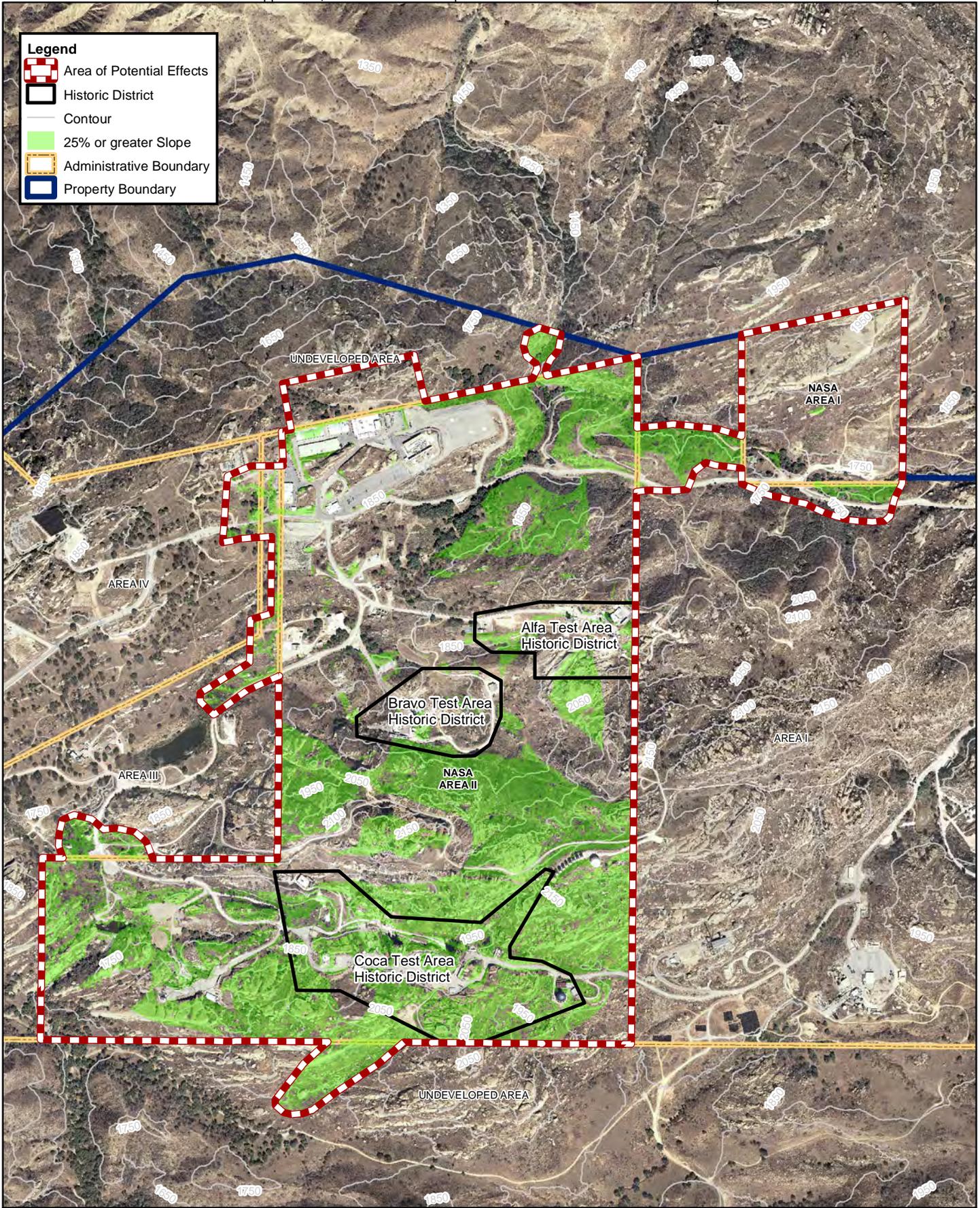
1.5 Traditional Cultural Properties

The following definition is adapted from the *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (National Park Service [NPS], 1998): Traditional Cultural Properties (TCPs) consist of sites that have significance in beliefs, customs, and practices with a living community of people that have been passed down through the generations, usually orally or through custom. Traditional use properties can include cultural use areas such as harvesting sites, cemeteries, or religious sites, and their significance is derived from the role the property plays in the community’s historically rooted beliefs, customs, and practices.

A preliminary Traditional Cultural Property and Cultural Landscape Assessment has been completed. This assessment includes an investigation and evaluation of the existence and extent of a potential Traditional Cultural Property together with an assessment of a potential cultural landscape. Individuals with knowledge of the region conducted the assessment, which included interviews with local, state, and national tribes. For the purposes of the EIS analysis, NASA has assumed a TCP to exist that meets the criteria of the NRHP and encompasses the entire APE. The TCP assessment report is confidential and is not attached to this report.

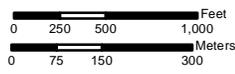
1.6 Cultural Flora and Fauna

NASA submitted the SSFL 2011 biological inventory of species identified during the 2010 and 2011 biological surveys to the Santa Ynez for input regarding historically used flora and fauna found on SSFL. Six plants and five animals were identified by the Santa Ynez as having known cultural uses by the tribe. Table 1 lists these species, along with the noted cultural uses. The Traditional Cultural Properties and Cultural Landscape Assessment investigation identified additional flora and fauna historically used by Native Americans in the region.



Legend

-  Area of Potential Effects
-  Historic District
-  Contour
-  25% or greater Slope
-  Administrative Boundary
-  Property Boundary



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Figure 2
Area of Potential Effects
NASA - Santa Susana Field Laboratory
Ventura County, California

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TABLE 1

Flora and Fauna with Recognized Native American Cultural Uses*Cultural Resources Study for Environmental Cleanup and Demolition for SSFL, NASA Areas I and II*

Species Name	Common Name	Cultural Use
Flora Species		
<i>Asclepias eriocarpa</i>	Broad leaved Milkweed, Jumete sp.	Culturally recognized for material culture use and ceremonial use; currently used
<i>Asclepias fascicularis</i>	Narrow leaved Milkweed, Jumete sp.	Culturally recognized for material culture use and ceremonial use; currently used
<i>Amsinckia menziesii</i>	Common Fiddleneck	Culturally recognized as a food source and ceremonial use
<i>Marah macrocarpus</i>	Wild cucumber, Manroot, Chilicote sp.	Culturally recognized for material culture use, medicinal, edible and ceremonial use; currently used
<i>Quercus agrifolia.</i>	Coast Live Oak, Encino sp.	Culturally recognized as a staple food source and ceremonial use; currently used
<i>Salvia columbariae</i>	Chia Sage, Chia sp.	Culturally recognized as a food source and ceremonial use; currently used
Fauna Species		
<i>Phrynosoma blainvillii, Anota coronatum</i>	Coast Horned Lizard	Culturally recognized in song and ceremony
<i>Melanderpes formicivorus</i>	Acorn woodpecker	Culturally recognized in oral tradition and ceremonially recognized
<i>Corvus brachyrhynchos</i>	American Crow	Culturally recognized in oral tradition, song, and ceremony
<i>Corvus corax</i>	Common Raven	Culturally recognized in oral tradition and ceremonially recognized
<i>Geococcyus californianus</i>	Greater Roadrunner	Culturally recognized in oral tradition and ceremonially recognized

Source: Santa Ynez Band of Chumash Mission Indians (2011)

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SECTION 2

Setting

2.1 Environmental Setting

SSFL is in southeastern Ventura County near the crest of the Simi Hills between the Simi and San Fernando Valleys. SSFL is bordered by Bell Canyon to the south and Meier and Runkle Canyons to the northwest. The Simi Hills are part of the Santa Monica Mountains, which run east-west across Southern California and form part of the California Coast Range of the Pacific Mountain System physiographic region. The mountains consist mainly of late-middle to early Tertiary sedimentary rocks (8 to 70 million years old). The mountains are low in elevation, which results in mild, rainy winters and warm, dry summers.

The elevation ranges from 503 to 663 meters (m) (1,650 to 2,175 ft) above mean sea level (amsl) in the APE, which consists of a diverse terrain of ridges, canyons, and sandstone rock outcrops (Figures 3 and 4). The geology of the area is composed of the Chatsworth Formation, which consists of sediments that range from hard sandstone bedrock to clay, shale, and crushed sandstone; topsoils are alluvially deposited sand, silt, and clay from erosional processes. Vegetation includes Venturan coastal sage scrub, chaparral, annual grasses, oak woodland, southern coast live oak riparian forest, and non-native eucalyptus. The banks of ephemeral streams also are lined with sycamores. Native animals in the area include mule deer, bobcats, mountain lions, coyotes, gray foxes, turkey vultures, hawks, California quail, and ring-tailed cats.



FIGURE 3
NASA Area I Overview
October 2011

Cultural Resources Study for Environmental Cleanup and Demolition for SSFL, NASA Areas I and II



FIGURE 4
NASA Area II Overview
 October 2011

Cultural Resources Study for Environmental Cleanup and Demolition for SSFL, NASA Areas I and II

2.2 Cultural Context

Abundant evidence exists that humans were present in North America for at least the past 11,500 years. In addition, fragmentary, but growing, evidence exists that humans were present long before that date. Linguistic and genetic studies suggest that human colonization of North America may have occurred 20,000 to 40,000 years ago. Evidence of this earlier occupation is not yet conclusive, but is beginning to be accepted by archeologists. The Meadowcroft Rock Shelter in Pennsylvania, Saltville and Cactus Hill in Virginia, and the Topper site in South Carolina, for instance, are sites that have produced apparently reliable dates as early as 12,500 years before present (Goodyear, 2005).

Ancient sites are known in southern California. In January 1936, Work Projects Administration workers digging a storm drain along the Los Angeles River (north of Baldwin Hills) recovered human bones from an ancient streambed (Moratto, 1984). In March 1936, imperial mammoth teeth were exposed at the same depth as the human remains (Moratto, 1984:53). The next oldest site in southern California where both human skeletal remains and artifacts occur is the La Brea Tar Pits (CA-LAN-159). The Arlington Spring site on Santa Rosa Island has provided occupation dates as early as 13,000 years ago; the discovery of Arlington Spring Man is the second find in North America that has dated to this period (NPS, 2012). Evidence for Paleo-Indian occupation in California exists, but particularly along the coast of southern California, remains scanty (Byrd and Raab, 2007).

The general trend throughout California prehistory was an increase in population density over time, coupled with greater sedentism and the use of a greater diversity of food resources. Chartkoff and Chartkoff (1984) identified three major periods of prehistory observed throughout California: Pre-Archaic, Archaic, and Pacific. These patterns are roughly correlated with the Paleoindian, Archaic, and Emergent periods developed by Fredrickson (1984) for north coastal California. Southern California has had multiple proposed chronological sequences, but no overall accepted model exists. The lack of an unchallenged and accepted chronology is due to problems dealing with gaps in the archeological record such as the unavailability of continuous dateable materials, inconsistencies

in the data and their recordation, and a lack of cultural elements that are definitive of a temporal period or a specific cultural group.

To obtain prehistoric chronologies, group territories, and hallmarks of cultural periods, adaptations from other regions, cultures, and studies have been synthesized to create a chronological overview for prehistoric southern California.

The following chronology is based on Byrd and Raab's updated synthesis of the southern bight cultures, a region that encompasses the California coast from Point Conception in the north to the American/Mexican border in the south and that includes the project area (2007).

2.2.1 Early Holocene (9,600 cal B.C. to 5,600 cal B.C.)

The first groups to inhabit California (for which there is significant evidence) are described as hunters and gatherers with specialized bifacial projectile points, well-made scrapers, knives, and many other tools designed for subsistence-related tasks (food processing). They adapted to a number of environments and developed a variety of secondary subsistence strategies that enabled them to live in a changing environment (Pleistocene to Holocene). As the (Wisconsin) Ice Age ended, previously stable water sources began to dry up in inland California, prompting migrations to the coast. California's islands were occupied as early as 9,600 to 9,000 (calibrated) B.C., as indicated by the oldest levels at Daisy Cave on San Miguel Island. Southern California dwellers exploited a wider range of plants and animals and the archeological record shows that a greater emphasis was placed on gathering wild grasses and seeds, rather than on hunting large mammals. Groups with coastal territories used marine resources such as shellfish, fish, sea lions, and dolphins. Shell midden sites of the early Holocene are characterized by cobble tools, basin metates, manos, discoids, and flexed burials (Byrd and Raab, 2007).

2.2.2 Middle Holocene (6,000 cal B.C. to cal A.D. 500)

At the start of the Middle Holocene, millingstone cultures appeared throughout central and southern California. The Millingstone Horizon represents an adaptive subsistence shift indicated by the first occurrence of millingstones (mano and metate), which were used to process hard seeds like *Salvia* sp. (sages) and *Eriogonum fasciculatum* (wild buckwheat). Sites from this period are characterized by the majority of artifacts being manos and metates, suggesting the importance of vegetal resources. Most of these sites are located in grassland and sagebrush communities where these hard seeds could support small populations on a yearly basis. Late fall and winter were difficult seasons when vegetal foods were scarce and diets had to be supplemented with deer and small mammal hunting and shellfish collecting (Tartaglia, 1976).

Middle Holocene cultures were quite diverse. Large middle Holocene sites have been well documented along the coast, as well as inland. Archeological evidence of extensive trade networks between southern California and the Southwest has been found. Rare artifact types, including the marine purple olive shell, indicate that trade networks extending from Catalina Island through the Mojave Desert and into Oregon were extant in the Middle Holocene (Byrd and Raab, 2007).

Temporary settlements for a few nuclear families (10 to 25 individuals) have been recorded. These sites were seasonal campsites for exploiting yucca and acorns from April through September. The seasonal pattern has been documented as a regional variation in the Millingstone Horizon sites in southern California (King, 1967). These sites are characterized by plant processing tools (scraper planes, millingstones, and earth ovens—necessary to prepare yucca—and an absence of hunting implements. People intensively exploited their environment, with reliance on no particular food resource. Characteristic features of this period included crude chopping tools, large projectile points, manos and metates, *Olivella* shell beads, quartz crystals and cog stones, few ornaments, earth roasting pits, extended posture burials, reburials (secondary interment), and rock cairns (Wallace, 1955:219-221). The first evidence of cemeteries is recorded during this period, and based on the relative absence of non-utilitarian artifacts; an egalitarian social system was likely to have been in operation (Tartaglia, 1976). Recent evidence indicates that the first permanent villages may have been erected during the Middle Holocene on San Clemente Island (Byrd and Raab, 2007). The presence of daub at Middle Holocene coastal sites indicates that at least some of the villages along the coast likely had permanent structures (Strudwick, 2005).

Sites in southern coastal California, specifically within the southern bight region, associated with this period are Little Sycamore Shellmound (CA-VEN-1) and Glen Annie Canyon Site (CA-SBA-142).

2.2.3 Late Holocene (cal A.D. 500 to Historic Contact)

The Late Holocene is characterized by a larger number of more specialized and diversified sites. Population increased substantially and is reflected in a greater number of sites recorded during this time. This period is characterized by (Wallace, 1955:223-226) large village sites, tightly flexed burials, bow and arrow, arrowshaft straighteners, *ollas* (jars) and *comals* (cooking flats), personal ornaments, pottery vessels, circular shell fishhooks, an extensive trade network, a wide variety of ritual objects, and large stone bowls. Elaborate mortuary artifacts are recovered from sites of this period.

Villages occurred in the same general locations as they did in earlier periods, but increased in size and decreased in frequency; base camps often were associated with villages. There was also an increase in the number of specialized and/or diversified sites. Trade was extensive during this period and long distances are reflected in artifacts recovered from the American Southwest (pottery) in California sites, while steatite objects and Pacific Coast seashells occur in American Southwest sites. During the Late Period, many more classes of artifacts are found in the archeological record that reveal a higher order of workmanship. Larger and more extensive settlement systems are evident, likely a byproduct of a more intensive subsistence base exploiting all the available food resources. The bow and arrow was introduced, along with other aspects of the culture being expanded (population growth and more complex social system and trade network).

New studies indicate that culture change in southern California may have been rapid, rather than gradual. Overexploitation of resources may have caused shifts to new resources that occurred in greater amounts (Byrd and Raab, 2007). On the coast, intensified fishing and small sea mammal hunting replaced hunting of large sea mammals and shellfish collection. Fish resources were concentrated on smaller, near-shore species, rather than on deep sea resources. Vegetal resources focused on grasses rather than acorns and direct evidence for acorn use is minimal at Late Holocene sites. Changes in subsistence strategies in prehistoric California appear to be related to overexploitation of preferred resources, leading to a shortage of the desired resource, followed by shifts to more costly resources (Byrd and Raab, 2007).

Several NRHP listed sites have been recorded in the immediate region, including [REDACTED]

2.3 Ethnohistory

SSFL is prehistorically and historically within a territory transitional zone for three Native American groups (the Ventureño Chumash, the Tataviam, and the Fernandeano); documentation as well as tribal oral histories indicate that the three groups visited the SSFL locale to some degree (NASA, 2009).

The prehistoric site known as Burro Flats Painted Cave was occupied at the very least from A.D. 1100 through 1810 to 1820 (Emmick and Bard, 2008; NASA, 2009). This site has been associated with the Chumash of Simi Valley and Simi Hills and the Fernandeano of the San Fernando Valley. The Tataviam, who may have occupied areas near Burro Flats, may also claim a connection with Burro Flats (Emmick and Bard, 2008; King, 2012; Knight, 2012; NASA, 2009). Burro Flats Painted Cave is a prehistoric archeological site in Area II that also extends into Boeing-managed undeveloped lands. This site is famous for its many panels of pictographs, or rock art paintings, and petroglyphs, which are rock art that has been scored or incised into the rock surface, in sandstone rock shelters. It also includes many bedrock milling features that may have been used for grinding acorns and smaller cupules that may have been used for processing food or pigments or served an aesthetic function. Much of the site consists of midden, which is debris associated with human habitation. While documenting the middens at the site, Rozaire (1959; 1960a) noted that the midden consisted of debitage, burned bone, and shell fragments. Rozaire also excavated a cremation burial that revealed a mortuary practice used by the Fernandeano. Recent analysis of the artifact assemblage recovered from the excavation investigations has provided occupation dates that now state occupation of this site has been ongoing for approximately 5,000 years (King, 2012).

During late prehistory and into ethnohistoric times, two known Native American villages were near SSFL—the settlement of Huwam (likely Chumash), also known as El Escorpion (Spanish), and Hukxa’oynga’ (Fernandeño).

2.3.1 Chumash

The Chumash occupied the territory between Point Conception and Malibu, including three of the Channel Islands. This span of territory afforded the Chumash large trade networks that webbed into central California (King, 1971). The Chumash economic activities produced great wealth and possibly allowed for population increase; the largest villages of the pre-contact Chumash reportedly contained a thousand members (Moratto, 1984).

The Chumash were a maritime people who exploited all coastal resources with accomplishment. Like all maritime cultures, successful marine resource procurement was heavily dependent on the seaworthiness of fishing vessels; the Chumash were master plank canoe, or *tomal*, builders (Gamble, 2002). Plank canoe building is credited with establishing the sociopolitical power the Chumash held amongst their neighbors, with the exception of the Gabrieleño, who also were a maritime culture and seem to have been sociopolitical equals to the Chumash (Gamble, 2002; McCawley, 1996). Along with marine resource procurement, control of waterways provided the Chumash with a command of transportation and goods distribution to the interior, resulting in the Chumash controlling various trade networks (Gamble, 2002).

The Chumash society was composed of multiple bands or tribelets who followed a patrilinear social system. As with their Gabrieleño neighbors, the Chumash had a strict socio-economic hierarchy made up of elites and non-elites; only the chief could have multiple wives (Fages, 1775; McCawley, 1996). It is theorized that there was an inter-dependent relationship between those who specialized in craft production and the elites, who managed the distribution of goods (Arnold, 2004). Chester King (1971) reports that the Chumash controlled a widespread market economy in which standardized production of goods provided highly saleable materials.

Like most hunter-gatherers, the Chumash moved seasonally, primarily in the summer, to optimize their resources. It is reported that they kept permanent winter villages, confining the seasonal camps to temporary occupancy during resource procurement, harvesting, and hunting (Arnold, 2004; King, 1971). Subsistence patterns appear to be similar to those of the Gabrieleño (Arnold, 2004; Gamble, 2002; McCawley, 1996).

At the time of Missionization, baptismal records indicate an average population of 90 members per village and reports by Fages (1775) estimate a total of 3,000 Chumash at the time of contact. However, a Chumash village survey by Kroeber documented 41 villages on the coast and 25 villages in the interior; the survey results yielded population estimates at more than 10,000 members (Cooke, 1976).

2.3.2 Fernandeño

Prior to the establishment of the mission in southern California, the area in and around Los Angeles was primarily occupied by several villages whose residents spoke a Cupan language that belonged to the Takic sub-family of the Uto-Aztecan language stock. Overall, the language was eventually referred to as Gabrieleño, so named after the Mission San Gabriel. This language was actually represented by several sub-groups, and likely several dialects between different villages (Bean and Smith, 1978). Kroeber (1925) groups the Fernandeño language with the Gabrieleño and San Nicoleño languages. The Fernandeño are named after the Mission San Fernando del Rey, where area tribes were relocated shortly after European control was established. The Fernandeño referred to the Gabrieleño as *komítáhat*, which translates to “the people of San Gabriel” (Harrington 1986: Reel 106). Thus, Fernandeño appear to be distinct, albeit related to the Gabrieleño. Harrington’s informant, Juan Menendez, noted that although there are differences in the Fernandeño and Gabrieleño languages, the two were quite similar (Harrington, 1986). The territory of the Fernandeño included inland valleys and coastal plains. According to Menendez, the Fernandeño held the Tujungá and Mujunga mountains (Harrington, 1986: Reel 106). Pre-European contact population numbers are difficult to assess due to discrepancies in the record. In 1852, a Scottish-born Los Angeleno, Hugo Reid, who had married a Gabrieleño woman, published a series of letters about the Gabrieleño. Reid believed there were as many as 68 villages. Twenty-eight of these were in Los Angeles County (McCawley, 1996:25) and some of these villages were likely Fernandeño villages. Each village was reported to have contained an average of 100 people and McCawley (1996) offers an estimate of more than 5,000

Gabrieleños at the time of contact. Kroeber (1925) offers the estimate of approximately 5,000 Gabrieleños in 1770, including the Fernandeano and the San Nicoleño. Writing in the early 1900s, Kroeber (1925) did not distinguish between customs and lifeways of the Gabrieleño and the Fernandeano. The pre-contact Gabrieleño practiced a patrilinear lineage system. Members of the lineage were given access to diverse resources held by the families within their lineage, allowing the Gabrieleño to utilize multiple ecologies. The heavily hierarchical Gabrieleño social system included elites, commoners, middle-class, the poor, and slaves. The elites were the only ones to possess access to religious items and the middle-class supported the elites.

Within Gabrieleño territory, which was composed of coastal areas, islands, valleys, and foothills, there was a patterning to larger settlements; the archeological record provides data regarding large village site distribution and function. Villages were placed where there was access to varying types of environments and resources, and a system of satellite camps stemming from main villages was then established for the specific procurement of resources. The level of use of these satellite campsites was in direct response to population and village size, as well as distance from the main village to the campsite (Earle and O'Neal, 1994).

Subsistence strategies incorporated seasonal procurement of resources, both terrestrial and marine. Throughout the year, individual families would move to temporary encampments for hunting, harvesting, and collecting; depending on the season and resources that could be harvested, travel would occur through various ecological zones. In the interior, where primary habitation was thought to take place in the summers, deer and rabbit were significant resources for the Gabrieleño, who were expert hunters (McCawley, 1996). In spring and summer temporary camps would be established to gather roots, seeds, and bulbs; in the fall, acorns and other wild seeds were gathered as staples in the diet. In coastal areas that were less exposed to the elements, wintertime villages were occupied; satellite or temporary campsites would be erected near the shore to collect shellfish and other marine resources.

2.3.3 Tataviam

The Tataviam spoke a language of the Takic branch of Uto-Aztecan stock (Native-Languages, 2009). Documentation is limited, but it is believed that the Tataviam migrated into the region approximately 1,500 years ago and were possibly an offshoot of the Serrano, although there is some debate on this point. The Tataviam occupied a territory that spanned from the Santa Clarita River to Piru Creek and from the Sawmill Mountains to the Antelope Valley (Higgins, 1996; Digital Desert, 2011).

The Tataviam were hunter-gatherers and, like their Chumash neighbors, had permanent winter villages and seasonal temporary campsites used for resource gathering of plant foods such as acorns, seeds, berries, yucca, piñon nuts, and for hunting deer and rabbit (Los Angeles County, 2008). Village location, whether permanent or satellite, was dictated by availability to water, favoring more reliable and permanent sources such as springs, rivers, and lakes (Los Angeles County, 2008). Household structures were composed of circular pit-houses with willow poles to shape the structure, which then were covered by grasses. Villages were placed on the southern sides of hills and mountains to optimize exposure to sunlight (California State Parks, 2011). Large villages contained dance and gaming areas, cemeteries, sweat lodges, granaries, and specialization areas, much like their neighbors.

Of the three groups who occupied the project area in pre-contact times, the Tataviam are the least known of all Native California groups (Johnson, 2006; Los Angeles County, 2008). The written information that survives references the Tataviam in generalizations and comparisons to their neighbors. Population estimates are at less than 3,000 at time of contact, but there is no feasible manner to accurately verify that information. When it comes to population estimates at the time of contact by Europeans, these numbers are approximations and no reliable data exist (Johnson, 2006). Little was recorded about the Tataviam culture during Spanish exploration and later missionization in the 1770s; what does survive of the native language was documented by John Peabody Harrington in the early 1900s. Mission records and other historical documents often failed to distinguish the Tataviam as an individual group when multiple tribes and languages were encountered; often ethnic affiliation was not distinguished or commented upon. Many of the Tataviam were relocated to the San Fernando Mission during historic times and were assimilated with other groups into an indistinct neophyte culture. The Tataviam

language is no longer in use because there are no current Tataviam members who speak the native language. The last speaker died in 1916 (Native-Languages, 2009; University of California, 2011).

2.4 History

Generally, the historic period begins with the first documented entrance by a European into a specific region. However, due to known contact in other parts of California by Russians, Chinese, Spanish, and Portuguese, some chronologies terminate the late prehistoric for all California in 1542, when the first documented European entered the territory now known as California; this period is termed the Protohistoric Period. In 1542, Juan Rodriguez Cabrillo explored the California coast by ship, entering San Diego Bay and claiming Alta California for Spain. Cabrillo landed near Point Magu in the same year. Sixty years later, Sebastian Vizcaino sailed into the San Diego Bay. Exploration of the land was slower to come. Don Gaspar de Portola searched Alta California for suitable mission sites in 1769.

In California, the historic era generally is divided into three periods: the Spanish or Mission Period (1769 to 1834), the Mexican or Rancho Period (1821 to 1848), and the American Period (1848 to present).

2.4.1 Spanish/Mission Period (1769 to 1834)

Gaspar de Portola was appointed as the first governor of California in 1767 and his first command by the Viceroy of Mexico was to expel the Jesuits from Baja California. This action prompted the launch of military and Franciscan expeditions from Baja California into the region, and with it, the official start of the historic period in California began. Following the expulsion of the Jesuits in Baja California, Spanish Colonial military outposts were established in Alta, the first of which was El Presidio Real de San Diego in 1769, with Pedro Fages as its commander. Military outposts continued to be built as expeditions travelled north. The Portola expedition of 1769 reached what would become Orange County on July 22, was in the San Gabriel Valley by August 2, and was passing through what would become Ventura County by the end of that month (Beebe and Senkewicz, 2001).

This period introduced the era of Missionization, an era of forced conversion of the Native Americans who occupied the region. During this period, 21 missions were built in California, lined up from south to north along El Camino Real; contemporary Highway 101 follows roughly the same alignment as El Camino Real. The first mission to be built in Alta California was San Diego de Alcalá, founded by Father Junipero Serra on July 16, 1769. On March 31, 1782, Father Serra founded his last mission, the Mission San Buenaventura (San Buenaventura Mission, 2006). Mission Santa Barbara, the tenth mission to be established, was founded in December 1786 by the Franciscan Father Fermin Lasuen (California Missions Foundation, 2008). The Franciscans viewed the local population as child-like individuals who would benefit from their European instruction and Christianization (We Are California, 2011). Captured and removed from their villages, the indigenous peoples were brought to the missions and into servitude. Many perished due to ill treatment, but more from the introduction of European diseases, which ultimately decimated the Native American populations (McCawley, 1996; We Are California, 2011).

In the 1790s, the Spanish government awarded land grants to soldiers and other Spanish *Californios* (Ventura Weekly, 2005); vast tracts of land were used for livestock and farming. In 1795, the Pico family was granted 45,729.6 ha (113,000 acres) in the area now known as Simi Valley; the *rancho* was named El Rancho Simi (Simi History, 2011.). The name Simi was taken from the Chumash village name of *Shimiji*, which stood in the same location in pre-colonial times.

The last mission to be founded was San Francisco Solano in 1823. Further attempts to construct additional missions were thwarted by Spain itself due to the costly endeavor each new mission posed. Later, as Spain lost its rule over New Spain and secularization was sought by the new government, the mission system was disbanded (Weber, 2006).

2.4.2 Rancho Period (1821 to 1848)

Mexico became independent of Spain in 1821. In 1824, the Mexican government passed the Colonization Act in an effort to raise much needed funds by selling unoccupied lands in California. This law invited immigrants to settle in Mexico (including California) (Baker, 2013). However, much of the land in California belonged to the 21

missions and could not be sold by the new Mexican government. Through the Secularization Act of 1834, the governor secularized the missions of California, and the Mission land was placed under civil jurisdiction to be sold as land grants. This Act relegated the missions to only enough acreage for the church and its associated buildings and for land to support those who lived on mission property. The Secularization Act of 1834 effectively ended the Mission Period in California.

The following years were marked by the proliferation of cattle ranching throughout the region, as the Mexican governor, Pio Pico, granted vast tracts of land to Mexican (and some American) settlers. The mission lands were opened for grants by the Mexican government to citizens who would colonize the area and develop the land, generally for grazing cattle and sheep (Lech, 2004). In Ventura County, there were 19 *ranchos*, comprising thousands of acres of land each (Galvin Preservation Associates, 2011).

In 1842, Jose de la Guerra y Noriega acquired the Pico family's Rancho Simi (California State Military Museum, n.d.). De la Guerra y Noriega was one of the most prolific landowners and claimed more than 202,343 ha (500,000 acres), with ownership of land that extended from the southern end of San Luis Obispo County to the southern end of Ventura County (California State Military Museum, n.d.).

The war between the U.S. and Mexico, which began in 1846, ended with the Treaty of Guadalupe Hidalgo in 1848. Terms of the treaty established that property rights granted under the Mexican land grant system would be upheld. In 1850, California became a part of the U.S., ending Mexican control in the state. Court battles ensued over ownership of the missions and former mission property that had been divided into Mexican land grants (NPS, 2007).

2.4.3 American Period (1848 to Present)

Following the signing of the Treaty of Guadalupe Hidalgo in 1848, the U.S. took possession of California. The treaty bound the U.S. to honor the legitimate land claims of Mexican citizens residing in captured territories. On September 9, 1850, California became the thirty-first state in the Union (Moratto and Price, 2005). The Land Act of 1851 established a board of Land Commissioners to review these records and adjudicate claims, and charged the Surveyor General with surveying confirmed land grants. In order to investigate and confirm titles of California, American officials acquired the provincial records of the Spanish and Mexican governments that were located in Monterey. Those records, most of which were transferred to the U.S. Surveyor General's Office in San Francisco, included land deeds and sketch maps (Gutierrez and Orsi, 1998).

From 1852 to 1856, the board of Land Commissioners established the validity of grant claims. The commissioners rejected many of the original *ranchos* claims, which then became public domain and fair game for squatters. Although the claims of some owners eventually were substantiated, many of the original owners lost their land to the U.S. Unsurveyed land boundaries created a loophole for squatters to occupy plots on the fringes of land grants. The squatters who occupied the land eventually came to own those plots through squatters' rights (Gutierrez and Orsi, 1998).

In the 1860s, Rancho Simi passed to the Philadelphia and California Petroleum Company and, in 1887, it was parceled off and a portion was bought by the Simi Land and Water Company. The general area around former Rancho Simi became a town known as the Santa Susana Del Rancho Simi (Simi History, 2011.). By the end of the nineteenth century, a portion of the Rancho Simi adobe was still intact. The landowner, Robert Strathearn, restored the building and built onto the original structure; the Simi Adobe-Strathearn House is California Historic Landmark No. 979 and is listed in the NRHP.

Into the 1940s, the area on which SSFL is located was still used for ranching (NASA, 2009). After World War II, North American Aviation (NAA) purchased land that would be developed for rocket testing. In 1954, NAA purchased 339 ha (838 acres) from Henry Silvernale and Elizabeth Hall, which would later become part of NASA's Areas I and II (NASA, 2011).

2.4.4 Santa Susana Field Laboratory

The following is a brief summary of the detailed history of SSFL provided in the SSFL ICRMP (NASA, 2009) and the Historic Resources Survey and Assessment at SSFL (Archaeological Consultants, Inc. & Weitze Research [ACI and WR], 2009).

By the end of World War II, the Cold War had begun. This was a war fraught with political tension and a maintained military presence between the U.S. and its western allies and the Soviet Union and its allies; it would run from post-World War II (mid 1940s) through the early 1990s. The Cold War would be the catalyst for the missile program and other space developments to unfold.

In 1946, the U.S. Army, along with NAA, began to develop the Navaho guided missile. Following this contract between the two agencies, NAA began to test captured German missiles at the White Sands Proving Ground. Also, in the late 1940s, the U.S. Government and NAA had acquired the SSFL land and began research, development, and testing of liquid-fueled rocket engines. SSFL was divided into four management areas: Areas I, II, and III were reserved for rocket, munitions, and missile testing; Area IV was dedicated to nuclear power and development. Expansion of SSFL and rocket testing briefly was put on hold during the Korean War, resuming after the war with an increased demand.

The Rocket Engine Field Laboratory was built in the 1950s; in 1954, additional areas were developed for U.S. Department of Defense (DoD) programs and the Alfa, Bravo, Coca, and Delta test stands were constructed. In collaboration with NAA, the USAF established two Air Force Plants (AFPs) within the expanded SSFL acreage; these were managed as government-owned contractor-operated facilities. In 1956, the Rocket Engine Field Laboratory became known as the Propulsion Field Laboratory, and in 1957, it was changed to AFP 57, after the USAF took over the test facility.

SSFL became a renowned research and test facility and provided pivotal developments in rocket testing, weapons, and space travel; this included the Redstone rocket, the Apollo program, Atlas intercontinental ballistic missile; the USAF, Army, and NASA conducted testing at SSFL. In addition to the Navaho, Thor, and Atlas testings, Rocketdyne engineers also tested the Jupiter intermediate-range ballistic missile. The test stands for the missiles were distributed among the Alfa, Bravo, Coca, and Delta test stands; the ICRMP (NASA, 2009) states the following as the testing allocations:

Alfa test stands: Constructed during 1954-1955, the Alfa test site featured the first cluster of static test stands operational for AFP 57 at SSFL. Beginning in the mid-1950s, the Alfa test site supported early rocket engine static testing and provided pivotal data for the development and improvement of many weapons and space vehicle booster systems; Atlas on Alfa I (1955–1957), Atlas flight engine and Navaho engine on Alfa II (1956–1957), and firings of Thor (1955–1958), Atlas (1956–1957), Navaho (1956–1957), and Jupiter (1957) engines on Alfa III.

Bravo test stands: Constructed during 1955-1956, the Bravo test site featured the second cluster of static test stands operational for AFP 57 at SSFL. The test stand site is associated with multiple static engine tests run between 1956 and 1991, beginning with tests of Atlas thrust chambers in 1956, and also supporting testing of F-1 components, Lunar Module Rocket Engine assemblies, and Atlas and Delta RS-27 vernier engines and turbopumps; Atlas (1956–1957) on Bravo I and II, developmental E-1 engine (1956–1959) on Bravo I, and static firing tests of the RS-2 on Bravo IIIB (1959).

Coca test stands: Constructed in 1955-1956, the Coca test site featured the third cluster of static test stands operational for AFP 57 at SSFL. Some of the facilities were modified or redesigned between 1962 and 1964; additional facilities were designed between 1972 and 1978. The test site is associated with multiple static engine tests run between 1956 and 1988, beginning with tests of Atlas and Navaho engines in the late 1950s; the J-2 engine in the 1960s in support of Saturn

and Apollo; and the Space Shuttle Main Engine in the 1970s and 1980s in support of the Space Shuttle Program; Atlas engine on Coca I and II (1956–1957), Atlas engine on Coca II (1959), and a late version of the Navaho engine on Coca III (1956–1957).

Delta test stands: Constructed in 1956, the Delta test site featured the fourth cluster of static test stands operational for AFP 57 at SSFL; Atlas on Delta III in 1957, static firings of the Jupiter engine on Delta I (1960–1963), and experimental Air Force rocket engines, including firings of the E-1 engine (1958–1960), the X-1 engine (1958–1961), and the X-4 engine (1960) on Delta II. (NASA, 2009)

In addition to these developments, in 1958, the Jupiter C rocket with a Redstone engine took the Explorer I, the first American satellite into orbit; also in 1958, the Saturn I program was started. In 1961, the Mercury capsule, with an adapted Redstone engine, was launched and the Saturn Apollo program was initiated.

The period of major testing at SSFL occurred from 1950 through the 1970s; at the height of the testing during the 1960s, NASA was given to lease the AFP 57 to support the Apollo program. NASA operated many facilities within SSFL, and by 1966, four new structures within the Coca test area were built; modifications to existing structures in the Bravo and Delta test areas also were made.

Planning for the Space Shuttle Main Engine was begun in 1969 and Rocketdyne was chosen to initiate and develop the engine. To support the testing, in 1972, a high-pressure gas storage vault was added to the Coca Test area.

In 1973, Area II and a section of Area I were transferred to NASA from the USAF. Use of the test site areas varied and changed from decade to decade; by the 1980s, NASA had begun to shut down testing activities and only a few active locations continued into the 2000s. The Alfa test area continued to testing of Atlas MA-5 engines until 2000 and the Delta RS-27 and RS-27 until 2006; the Bravo test area continued to test the Delta RS-27 and Atlas until 2005; the Coca test area continued to test the Space Shuttle Main Engine until 1988; the Delta test area continued to test engines until 1974, when it was deactivated.

Today, SSFL is composed of government-owned, contractor-owned/contractor-operated, and corporate enterprise facilities, and facilities operated by the U.S. Department of Energy on land it leases from Boeing. NASA has discontinued rocket testing, and in 2007 and 2010, orders were issued to conduct environmental cleanup of NASA-administered property in LOX Plant Area I and Area II.

the NHPA and in the Secretary of the Interior's Standards and Guidelines for Identification. California State guidelines are outlined in California Environmental Quality Act of 1970 (CEQA) Public Resources Code Section 5097.2, and CEQA Guidelines Section 15064.5. Archeological survey methodologies were consistent with professional standards and in accordance with common practice for such studies in the state of California.

The first in a series of intensive, systematic pedestrian cultural resource surveys within the APE was conducted in June 2007, followed by another investigation in February 2008 of NASA's LOX Plant Area I and Area II. The findings of these investigations are contained in a single report (Emmick and Bard, 2008). Methodologies for these field investigations employed the use of site records to relocate known resources and mapping using global positioning system (GPS) units. Pedestrian transects alternated between 15 m (49.2 ft) and 30 m (98.4 ft) due to uneven, steeply sloped terrain. All rock outcrops were investigated for use, because rock shelters with evidence of use or occupation are known to occur throughout the Bell Canyon region. This investigation resulted in the collection of additional data at the Burro Flats site and in the discovery of one new site, [REDACTED]. As part of this investigation, CH2M HILL revisited the Burro Flats site during pedestrian surveys conducted for Areas II and III (CH2M HILL, 2013). CH2M HILL identified no new features at that time, but did record Universal Transverse Mercator (UTM) coordinates for most of the previously recorded Burro Flats features within the APE. A nearby rock shelter, described in previous site forms, was included in the updated site boundary drawn in 2007. This updated boundary was drawn based on the UTM coordinates taken during the 2007 site visit. California Department of Parks and Recreation (DPR) forms were also completed for the site to report the newly recorded UTM coordinates.

In June 2009, a supplemental survey of approximately 4.9 ha (12 acres) was conducted in the LOX Plant Area I using the same survey methodologies as in the 2007/2008 study (McClintock, et al, 2009); no additional resources were discovered during this investigation. To complete the surface inventory of the APE, an intensive, systematic pedestrian cultural resource survey of an additional 30.4 ha (75 acres) within the NASA-administered property at SSFL was conducted from October 24 through October 28, 2011. NASA arranged for Mr. Randy Guzman-Folkes of R. Indigenous Consultants Tribal Monitoring to be present during the 2011 archeological field survey.

The topography of the APE consists of hilly and rugged terrain. SSFL is located at the crest of the Simi Hills, the foothills to the Santa Monica Mountains. Topographic elevations range from 503 to 663 m (1,650 to 2,175 ft) and SSFL is crossed with ridges, canyons, rocky uplands, deep alluvial channels, drainages, ravines, and washes. Because of the rugged terrain typical throughout the NASA-administered property of SSFL, including severe drops, ravines, and other inaccessible terrain, traditional 15-m (49.2 ft) transects were not feasible in all areas. In low flat areas where pedestrian navigation was feasible, transects spaced at 15-m (49.2-ft) intervals were conducted. Areas with greater than a 25-percent slope (shown in Figure 2, the APE) were surveyed differently as equally spaced transects were not feasible in these greater than a 25 percent slope areas. Therefore, in areas where the slope was greater than 25 percent and the terrain was unsafe for regular pedestrian survey, an opportunistic reconnaissance level survey was employed. Particular attention was given to outcrops and overhangs because known rock shelters are located within Area II (Figures 5 and 6). Subsurface exposures, including rodent burrows and cut banks, were examined carefully for cultural remains. Ground visibility throughout the survey area ranged from 0 to 75 percent because of the dense woodland scrub, a carpeting of poison oak, and other vegetation. Disturbances to the survey area consist of construction and demolition, NASA and Boeing facilities, roads, parking lots, maintenance, utilities, water and erosion control, and test areas with their associated activities.



FIGURE 5

NASA Area II, Example of Vegetation Onsite

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FIGURE 6

NASA Area II Rock Outcrop, an Example of an Opportunistically Surveyed Area

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For the October 2011 archeological survey, the field crew navigated via a Trimble Geo XH GPS unit. The GPS unit contained the survey area shape files, the previously recorded site boundaries, and the previously recorded resources. Appendix A contains representative photographs of the APE from this 2011 survey.

With the completion of the October 2011 survey, 182.5-ha (451.2-acres) of NASA-administered property at SSFL have been investigated for cultural resources. In addition to the 182.5 ha (451.2 acres) of NASA property, 15.7 ha (39 acres) of adjacent Boeing property were surveyed because NASA's cleanup activities likely would extend into these areas.

For the purpose of defining a site, the guidelines provided in the California Office of Historic Preservation's (OHP's) *Information Center Procedural Manual* (1995), which defines a site as the location of a prehistoric or historic occupation or activity, were used. Per this definition, and following OHP guidelines, areas with five or more items are recorded as sites, while areas with four or less items are recorded as Isolated Finds. Features are recorded as sites. Resources separated by more than 50 m (164 ft) or located on different landforms generally are recorded as distinct sites or as isolates.

Cultural resources consisting of new sites and isolated finds were recorded on appropriate California DPR forms, mapped using a Trimble Geo XH GPS, and photographed. Information regarding the appearance and physical characteristics of the resources, as well as their locations, was gathered and included on the appropriate California DPR forms. No artifacts were collected during any episode of survey; they were mapped and photographed in place.

In addition to archeological investigations, NASA-administered properties at SSFL have been surveyed for architectural resources. In 2007, a historic resources survey and assessment of NASA-administered Areas I and II was performed to identify and evaluate NASA-owned facilities. The methodology employed in this study included the following archival research: historic documents and photographs at the Marshall Space Flight Center History Office, Huntsville, Alabama; the Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama; the Rocketdyne Historic Photograph Collection at SSFL; the Boeing Company office in Canoga Park, California; and the DMJM office in Los Angeles, California. Interviews with current and former employees of Rocketdyne and Boeing also were conducted as a part of this investigation.

The field survey of buildings and structures in NASA-administered LOX Plant Area I and Area II was conducted from August 13 to 18, 2007, and facilities were documented via description and photography (ACI and WR, 2009). According to the 2009 report, structures within the survey area were evaluated for NRHP-eligibility. As a result of this study, three historic districts were documented: the Alfa, Bravo, and Coca Test Area Historic Districts, as well as nine individually eligible structures (ACI and WR, 2009).

3.3 Results of Previous Investigations

3.3.1 Archeological Resources

3.3.1.1

The Burro Flats site was listed in the NRHP and the CRHR in May 1976. The Burro Flats site was first recorded in 1959 (Rozaire, 1959). At that time, NRHP significance criteria had not been developed. The NRHP website indicates that the site is significant for its informational potential, which today would be Criterion D (NRHP, 2013).

[REDACTED]

[REDACTED]

The Burro Flats site could have been visited by John Peabody Harrington as early as 1917 (Harrington, 1986: Reel 106, Fr. 153). Richard Van Valkenburgh, an archeologist working in the area during the 1930s and into the 1950s listed the painted cave and midden site on a map of sites in Ventura County that dated circa 1935 (King and Parsons, 2000). The earliest documented investigations at Burro Flats began in 1953, with excavations carried out by the Archaeological Survey Association of Southern California, which made five trips to the site between 1953 and 1954. The site was formally recorded and limited excavations were completed by Rozaire in 1959 and 1960 (Rozaire, 1959), but only a short article was published. In the 1960s, Campbell Grant visited and recorded the site, publishing information about the rock art in 1965. The site was listed in the NRHP in 1976, largely due to Dr. Clement Meighan from University of California, Los Angeles. In 1991, Albert Knight combined 10 site numbers into one site to clarify that the site is a single village site with multiple loci (Knight, 1991). The site was visited again in 2006 and 2007 by W&S Consultants for the express purpose of cataloguing the condition of the rock art (Whitley, 2007). In 2007, CH2M HILL revisited the site during pedestrian surveys conducted in Areas II and III. CH2M HILL identified no new features at the site, but did record UTM coordinates for most of the features previously recorded at the site on the NASA property. California DPR forms were completed for the site to report the newly recorded UTM coordinates (Emmick and Bard, 2008).

Table 5 lists the sites and loci from previous investigations that were re-recorded and consolidated into the single site [REDACTED]

TABLE 5
Site [REDACTED] Cross-Reference for Site Numbers, Loci, Galleries, and Features
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Rozaire Site #	Knight #	Fenenga #	Description
[REDACTED]	[REDACTED]		[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED] Much of the ground visibility in the area is limited by thick vegetation. The site is in good condition and there is a possibility that the site has an intact subsurface component.

Hogan and Tang (2010) state:

The archaeological data potential [REDACTED] largely depends upon the presence or absence of subsurface cultural deposits. Therefore, their historical significance and qualifications as historical properties under Section 106-cannot be determined without further archaeological investigations, including subsurface testing. (Hogan and Tang, 2010)

Therefore, the site is recommended as potentially eligible for listing in the NRHP under Criterion D pending further study, because of its potential to yield information important to prehistory. The California SHPO has not yet reviewed this recommendation.

3.3.2 Historic Architectural Resources

In the fall of 2007, ACI conducted an assessment survey of the built environment within NASA-administered LOX Plant Area I and Area II of SSFL (ACI and WR, 2009). This survey assessed 135 federally owned buildings, structures, and sites. ACI and WR identified one structure, a well, in Area I, but there is also a truck scale with a small operators shed in Area I, which are owned by Boeing (NASA, 2013). The remaining surveyed structures were all in Area II. The survey results indicated that 60 of the structures within Area II are temporary; small storage sheds, roadways, pipelines, and objects such as light fixture poles that are generic in use. The results of this investigation identified three historic districts—the Alfa, Bravo, and Coca Test Areas—and nine structures within the districts that are considered individually eligible for listing in the NRHP (ACI and WR, 2009).

See the *Historic Resources Survey and Assessment of the NASA Facility at Santa Susana Field Laboratory, Ventura County, California* (ACI and WR, 2009) for a more detailed history of SSFL and the development of each of the historic districts.

3.3.2.1 Alfa Test Area Historic District

The Alfa Test Area Historic District was recorded as part of the historic resource assessment survey conducted in August 2007 (ACI and WR, 2009). The following is paraphrased from that report.

Designed by Daniel, Mann, Johnson & Mendenhall, Inc. (DMJM) in 1954 and constructed between 1954 and 1955, the Alfa engine test site featured the first cluster of static test stands operational for AFP 57 at SSFL. The design and construction of the test site followed the design and construction of two similar test sites at SSFL: the Bowl Area from 1948-1950 and the Canyon Area from 1953, both for NAA. DMJM designed the test stand sites within Area II in stages between August 1954 and April 1956. For Phase I of AFP 57, DMJM designed the Alfa complex, the first of four test-stand clusters that would be constructed in Area II, as well as several basic elements of the support infrastructure necessary for the future expansion of the plant. In 1954, the Alfa site occupied 100 acres, bordering Rocketdyne property on its east (the Bowl and Canyon Areas) and with a 350-ft buffer of USAF land on its west. In September 1954, the Alfa site defined the near entirety of what would evolve into AFP 57 at SSFL (ACI and WR, 2009).

The location of the Alfa site, like that of the Bowl Area, was carefully integrated into the existing natural landscape. Three small engine test stands, each with two platform levels, sat alongside their east-west access road. The test stands stood just under 46 ft high, with a base footprint of 24 ft by 24 ft. NAA designed and fabricated the flame buckets for the test stands, with each emptying southwards via short, manmade concrete flame trenches into an east-west rocky ravine that would become the site's common spillway. The lowest elevation in the ravine was 1900 ft, with Alfa's water tanks situated at nearly 2,200 ft. Additional outcroppings of boulders and rock to the immediate south and southeast also buffered the discharged rocket engine exhaust and deluge water from the test stands, providing blast and sound protection (ACI and WR, 2009).

The Alfa site was distinct from the Bravo, Coca, and Delta sites that would complete Area II of AFP 57 in 1955-1956. Unlike the final three clusters of rocket engine test stands and their support infrastructure, the Alfa site was

stretched out along its access road, with its three test stands and blockhouse configured as a linear group east to west. DMJM designed the control house for the Alfa test site (the blockhouse) as a nearly fully underground facility to the immediate west of the line of test stands. Other original facilities at the Alfa site were a terminal house, electrical control stations at each test stand, pre-test building, electrical switching house (power substation on the ridge north of the immediate Alfa site), and enclaves of fuel system support infrastructure. The fuel tanks and associated pumping equipment were predominantly clustered at a segregated location at the western edge of the site, with much smaller fuel storage and transfer infrastructure placed at the test stands and pre-test building at the eastern end of the site. The fuel system infrastructure to the west included liquid hydrogen (LN₂) tanks, GN₂ cylinders, a LN₂/ gaseous nitrogen (GN₂) vaporizer, a hose house, and jet-propulsion fuel (JP4) tanks and their paired pumping station. At the eastern terminus of the Alfa site and immediate to Alfa III sat small, horizontal LOX tanks, small GN₂ tanks, and a helium cylinder. A pair of vertical tanks stored water for use in the deluge systems at the three Alfa test stands, located distantly to the south of the pre-test building atop an elevated site. A pipeline carried water from the tanks to the flame buckets of each of the test stands. The water kept engine temperatures acceptable during static tests, partially evaporating as steam and combining with engine exhaust as run-off into the ravine spillway. As initially designed, the Alfa test site did not include observation pill boxes. As initially designed, there were no observation bunkers within the Alfa test area. In 1955-56, during the design of the Bravo site, DMJM provided plans for the addition of a pill box for the Alfa site, located to the southeast of Alfa III. Later, a second observation bunker was built to the southwest of Alfa I (ACI and WR, 2009).

The Alfa test site is highly intact, inclusive of the land forms incorporated into its 1954 design. The primary extant buildings and structures from 1954 at the Alfa test site in 2007 during the survey were test stand Alfa I and its electrical control station (Buildings 727 and 727A), test stand Alfa III and its electrical control station (Buildings 729 and 729A), the control house (Building 208), and the terminal house (Building 209). The pre-test facility also remains at the Alfa site (Building 212), but is substantially altered. As designed and constructed, the pre-test building featured an inexpensive and expeditious cladding of plywood panels with wooden battens (ACI and WR, 2009).

The Alfa Test Area Historic District is eligible for listing in the NRHP under Criterion A for its association with early rocket testing and development and under Criterion C for its engineering and design. The district contains 18 buildings, of which 10 are contributing resources. Constructed during 1954-1955, the Alfa test site featured the first cluster of static test stands operational for AFP 57 at SSFL. Beginning in the mid-1950s, the Alfa test site supported early rocket engine static testing and provided pivotal data for the development and improvement of many weapons and space vehicle booster systems (Criterion A). The Alfa Test Area Historic District is also eligible under Criterion C for the design and engineering of the test site. The district includes the test stands and blockhouse, ancillary buildings and structures, and elements of the natural and fabricated landscape. Within the historic district, 3 of the 10 contributing structures also were determined individually eligible for the NRHP. The Alfa Control House (Building 208), Alfa I Test Stand, and Alfa II Test Stand were documented as each individually meeting the NRHP criteria for eligibility in the context of the Cold War (Military) and Space Exploration, under Criterion A for their exceptionally important role in the development and testing of various rocket engines, and under Criterion C for their specialized engineering and design. Because they have achieved exceptional importance within the past 50 years, Criteria Consideration G applies, as well. SHPO concurred on May 15, 2008, with the eligibility of the historic district and its contributing elements, as well as with the individual eligibility of the three structures.

3.3.2.2 Bravo Test Area Historic District

The Bravo Test Area Historic District was surveyed as part of the historic resource assessment conducted in August 2007 (ACI and WR, 2009). The following is paraphrased from that report.

In March 1955, DMJM completed drawings for the second cluster of static test stands, the Bravo site. Design of the Bravo site included the addition of a pill box for the Alfa site (to the southeast, up among the rocky outcroppings); a bunkered Visitors Observation Area to the west of the Alfa site; and a pill box for the Bravo site (to the south). DMJM engineers approached the layout of the Bravo site differently than they had the Alfa site

6 months earlier. At Bravo, the cluster of three test stands and their support facilities was more compact, and faced a large, aboveground control house set off to the side near the foot of a common spillway. Each test stand had manmade flame trenches that emptied into the spillway. The existing rocky terrain climbed steeply behind the test stands to provide an elevated location for the observation of engine testing, while the immediate outcroppings also helped to channel existing natural features incorporated into the spillway. The layout of both the Alfa and Bravo sites remained within the original 100 acres planned for the development of Area II in late 1954, with the Bravo site situated in the southwestern corner of the plot. The enlargement of Area II from 100 acres to 451 acres in early 1955 necessitated the realignment of the westerly boundary of AFP 57, and pushed the USAF buffer zone west (ACI and WR, 2009).

Augmenting the test stands, the original facilities at the Bravo site included a terminal house, electrical control stations at each test stand, pre-test building, fuel system infrastructure placed immediately adjacent to the other buildings at the site, and a pill box. The fuel system infrastructure was more sophisticated than that placed at the Alfa site, and as designed in early 1955 included several JP4 tanks and filter pits; a helium bottle rack; both horizontal and vertical LOX tanks (three), with a large concrete pad adjacent to the paired horizontal tanks; a LOX catch tank; and a filled, graded, and compacted pad for future gaseous hydrogen (GH₂) tanks. The test stands designed for the Bravo site were identical to those at the Alfa site. The Alfa and Bravo test stands could be adapted for the run-up of different rocket engines under evolving requirements, and in this sense would become distinct from one another over time. A 24-inch line extending from the paired Alfa-site tanks to the northeast provided water for Bravo's deluge system, complemented by a second line extending from the western edge of the Alfa site. By early 1955, there was a small dam at the Bravo site, located along the access road to the blockhouse. The dam was a "conservation dam," used for collecting deluge water after static tests. The primary extant buildings and structures from 1955-1956 at the Bravo site during the 2007 field survey were test stand Bravo I and its electrical control station (Buildings 730 and 730A), test stand Bravo II and its electrical control station (Buildings 731 and 731A), the blockhouse (Building 213), and the terminal house (Building 214). Only the foundation remains at the location of the pre-test building (ACI and WR, 2009)

Constructed along what became known as Bravo Road, the Bravo Test Area consisted of three test stands, Bravo I, Bravo II, and Bravo III, each with its own electrical control station to the northwest of its respective stand. Each stand also had a gunite run-off channel that emptied into a collection area, carved within the terrain. Unlike the other three complexes, at the outset of construction, Bravo I was designed differently from Bravo II and Bravo III, both of which resembled the stands in the other areas. Between Bravo II and Bravo III sat the Terminal House; to the southwest, across the road, were two LOX storage tanks. Between Bravo I and Bravo II sat a GN₂ bottle bank. To the west of Bravo II sat the Pre-Test Building; to its south was a GHe bottle bank. The Control House for the complex sat to the east of the test stands, and there was a run-off gathering pond in between. A pill box was placed to the southwest of the test stands. In the 1960s, a third LOX tank was added near the original two, and at an unknown date, a fourth LOX tank joined the other three. Also in the 1960s, two kerosene tanks were placed to the east of Bravo II, where the flame deflector had been. In the 1990s, an office trailer was built to the west of the Pre-Test Building (ACI and WR, 2009).

The Bravo Test Area Historic District contains 10 buildings, 8 of which are contributing resources. Constructed during 1955-1956, the Bravo test site featured the second cluster of static test stands operational for AFP 57 at SSFL. Under Criterion A, the district is eligible for listing in the NRHP for its associations with multiple static engine tests run between 1956 and 1991, beginning with tests of Atlas thrust chambers in 1956, and also supporting testing of F-1 components, Lunar Module Rocket Engine assemblies, and Atlas and Delta RS-27 vernier engines and turbopumps. The Bravo Test Area Historic District also is significant under Criterion C for the design and engineering of the test site. The district includes the test stands and blockhouse, ancillary buildings and structures, and elements of the natural and fabricated landscape. Within the historic district, three of the eight contributing structures were determined individually eligible for the NRHP. The Bravo Control House (Building 213), Bravo I Test Stand, and Bravo II Test Stand were documented as each individually meeting the NRHP criteria for eligibility in the contexts of the Cold War (Military) and Space Exploration, under Criterion A for their exceptionally important role in the development and testing of various rocket engines, and under Criterion C for their specialized engineering and design. Because they have achieved exceptional importance within the past

50 years, Criteria Consideration G applies, as well. SHPO concurred on May 15, 2008, with the eligibility of the historic district and its contributing elements, as well as with the individual eligibility of the three structures.

3.3.2.3 Coca Test Area Historic District

The Coca Test Area Historic District was recorded as part of the historic resource assessment survey conducted in August 2007 (ACI and WR 2009). The following is paraphrased from that report.

Designed in mid-1955, and constructed during 1955-1956, the Coca engine test site featured the third cluster of static test stands (Coca I, II, and III) operational for AFP 57 at Santa Susana. The design and construction of the test site followed the design and construction of four similar test sites at SSFL: the Bowl Area of 1948-1950 and the Canyon Area of 1953, for NAA; and the Alfa and Bravo sites of 1954-1955, two of four test sites for the USAF. The original complex consisted of three test stands, Coca I, Coca II, and Coca III, each with its own electrical control station to the southwest of its respective stand. Each stand also had a gunite run-off channel that emptied into a Skim Dam, carved within the terrain. Between Coca II and Coca III sat the Terminal House, and across the road were two LOX storage tanks. Southwest from Coca III sat the Pre-Test Building; south of Coca II was the GN2 and GHe bottle bank; and south of Coca I was a Vehicle Shelter. Located on a cliff to the south of the Pre-Test Building was a Pill Box. The Control House for the complex sat across the Skim Dam from the test stands, towards the northwest. To the southwest of the Control House, there was a JP-4 fuel storage facility (ACI and WR, 2009).

The early 1960s saw large modifications to the Coca Test Area. The Coca I stand was essentially disassembled and rebuilt as a larger facility, and the Coca IV Test Stand, which is almost identical structurally, was built to the east. The gunite channel for Coca I was enlarged, and a spillway was constructed for Coca IV. Both of these test stands were given their own terminal room, which sat underneath their respective service towers. In order to connect these terminal rooms to the Control House, an underground cable tunnel was constructed between the Control House and the Coca I terminal room, with a second tunnel between the Coca I and Coca IV terminal rooms. The Control House was also enlarged, in order to accommodate the new test stand, as well as the new engines to be tested in the complex. The remaining facilities built during the original construction period remained in place and intact, with the exception of Coca II, which was dismantled. Due to the changing nature of the complex, additional facilities were required in order to operate the stands. A second pretest shop, known as the Upper Pre-Test Building, was constructed to the east of the existing Pre-Test Building, and to the southeast of the Coca I stand. Additional fuel facilities were also constructed at this time, as the JP-4 propellant would not be needed. As such, a LH2 tank, with its own electrical control station, was built to the southwest of the test stands; a LN2 tank was placed to the east of the two LOX tanks and south of Coca II; and a third LOX tank, with its own electrical control station, was built to the southeast of Coca I. A GH2 tank, with compressor shelters, was placed well to the east of the test stands, along Test Area Road, and a Bulkhead Test Facility was built south of the Control House. In addition, two new observation bunkers were constructed, one on a cliff to the southeast, for Coca I, and the other to the northeast, off Skyline Drive, for Coca IV (ACI and WR, 2009).

In the early 1970s, further additions and modifications were made to the Coca Test Area, reflecting changes in the types of engines to be tested at the site. The two original LOX tanks and their adjacent LN2 tanks, to the southwest of Coca I, were replaced with a single LOX tank, and another LOX tank was set to the south of the Coca IV stand; a LH2 tank was installed to the northeast of Coca IV. Between Coca I and Coca IV, at the level of the spillways, a High Pressure GH2 and GN2 Vault was constructed for bottles of GN2 and gaseous helium. In addition, a Hydraulic Supply Building was constructed to the east of Coca I, and a Pump House for deflector water was built to the southeast of Coca IV. Since the 1970s renovation, no additional facilities have been constructed within the Coca Test Area. However, in 2005, a forest fire caused the destruction of the Upper Pre-Test Building and the Vehicle Shelter. Additionally, at an unknown date, the Coca III Test Stand was disassembled, as was the Bulkhead Test Facility and the JP-4 fuel shelter (ACI and WR, 2009).

The Coca Test Area Historic District contains 27 buildings, 18 of which are contributing resources. Constructed in 1955-1956, the Coca test site featured the third cluster of static test stands operational for AFP 57 at SSFL. Some of the facilities were modified or redesigned between 1962 and 1964; additional facilities were designed between 1972 and 1978. Under Criterion A, the Coca Test Area Historic District is eligible for listing in the NRHP for its

associations with multiple static engine tests run between 1956 and 1988, beginning with tests of Atlas and Navaho engines in the late 1950s; the J-2 engine in the 1960s in support of Saturn and Apollo; and the Space Shuttle Main Engine in the 1970s and 1980s in support of the Space Shuttle Program. The Coca Test Area Historic District is also significant under Criterion C for the design and engineering of the test site. The district includes the test stands (Figure 7) and blockhouse, ancillary buildings and structures, and elements of the natural and fabricated landscape. Within the historic district, 3 of the 18 contributing structures were determined individually eligible for the NRHP. The Coca Control Center (Building 218), Coca I Test Stand, and Coca IV Test Stand were documented as each individually meeting the NRHP criteria for eligibility in the contexts of the Cold War (Military) and Space Exploration, under Criterion A for their exceptionally important role in the development and testing of various rocket engines, and under Criterion C for their specialized engineering and design. Because the district and structures have achieved exceptional importance within the past 50 years, Criteria Consideration G applies, as well. SHPO concurred on May 15, 2008, with the eligibility of the historic district and its contributing elements, as well as with the individual eligibility of the three structures.



FIGURE 7
NASA Area II Coca Test Stands
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SECTION 4

Consultation

4.1 Native American Consultation

4.1.1 Native American Heritage Commission

NASA contacted the Native American Heritage Commission (NAHC) in June 2011 to request information about traditional cultural properties in the SSFL area and tribal representatives in the region. The NAHC responded on June 10, 2011, with a list of Native Americans interested in consulting on development projects. A second inquiry was sent to NAHC in April 2012 and an updated list of Native Americans with an interest in the region was sent to NASA. The correspondence between NASA and NAHC is included in the consultation record.

4.1.2 Tribal Outreach

NASA is conducting formal government-to-government consultation with Native Americans for this undertaking. On June 30, 2011, each of the 15 individuals and groups listed by NAHC, representing both federally recognized and non-federal interested tribes, was contacted by letter (see Table 6). The letter notified the tribes of NASA's intent to use the NEPA process and documentation to comply with Section 106, in accordance with 36 CFR 800.8, and to seek input regarding concerns that might be unique to each tribe. On September 30, 2011, NASA mailed a historic structures assessment package to the Santa Ynez and in May 2012, sent a map of the APE for the tribe's review. NASA received an e-mail response on July 12, 2012, from the Santa Ynez requesting to participate as a Section 106 consulting party and a letter on September 19, 2012, formally requesting consultation. Consultation with the federally recognized Santa Ynez and other tribes is ongoing. The consultation will include consideration of flora and fauna in the APE that have known cultural uses to the Santa Ynez. Appendix B contains a summary of the consultation record through December 20, 2013.

TABLE 6

Native American Individuals and Groups 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

There have been several on-site consultations with the Santa Ynez as well as with other tribes identified by NAHC. NASA has been in communication with the Santa Ynez and other tribes identified by NAHC regarding appropriate protection measures for sensitive archeological sites. NASA met with the Santa Ynez and state tribes at SSFL on November 25, 2013. The group discussed the adverse effects on archeological resources disclosed in the DEIS and appropriate mitigation measures to address the adverse effects on the identified resources. Protection measures for sensitive archeological sites prior to and during cleanup activities were also discussed. NASA proposed creating a Native American Advisory Board to create a more formal mechanism for dialogue between NASA and the tribes prior to and during cleanup activities on the NASA-administered portion of SSFL. Some of the mitigation suggestions will be included in an agreement document or ROD for the EIS.

NASA has also met independently with the Santa Ynez specifically regarding the Indian Sacred Site, which was designated in December 2012. NASA continues consultation with the Santa Ynez regarding potential impacts to the Indian Sacred Site and measures to mitigate the impacts on the sacred site. This consultation is confidential and is not included in Appendix B due to the sensitive nature of the sacred site.

Native Americans in the region were contacted as a part of the Traditional Cultural Property and Cultural Landscape Assessment in the summer of 2013. Those who wished to participate in the study were interviewed as a part of this investigation and evaluation. The report of these findings and interview outcomes will remain confidential.

4.2 Section 106 Consultation

NASA formally initiated NHPA Section 106 consultation with the California SHPO and the ACHP on June 30, 2011. The initiation letter notified SHPO and ACHP of NASA's intent to use the NEPA process and documentation to comply with Section 106, in accordance with 36 CFR 800.8. On July 20, 2011, the ACHP responded to NASA by letter, confirming that it would participate in the consultation process. On August 5, 2011, the SHPO telephoned and sent an e-mail confirming its participation in the consultation. The consultation letters are summarized in Appendix B and are included in the consultation record.

NASA held the first Section 106 consulting party meeting with the identified consulting parties on March 1, 2012. The purpose of the meeting was to introduce the project to the consulting parties and to present information about the project, including the proposed APE, NASA's Proposed Action, and the identified historic properties that potentially would be affected by the project. This meeting, held at SSFL, also included a tour of the site.

Participants in the first Section 106 meeting included the following consulting parties: Mark Beason, William Preston Bowling, Wayne Fishback, John Luker, Tom McCulloch, Mark Osokow, Chris Rowe, Susan Stratton, Barbara Tejada, Christina Walsh, Abraham Weitzberg, and Ronald Ziman. Others in attendance at the meeting included Jim Biederman and Maureen Sheehan with the General Services Administration (GSA). Meeting minutes were posted on the SSFL Environmental Cleanup and Closure public website (<http://ssfl.msfc.nasa.gov>) on August 23, 2012, and the parties were notified the minutes were available for review.

There is an application process in place for individuals or groups who would like to become consulting parties. Individuals applied to be consulting parties and were accepted by NASA between the first meeting in March 2012 up until November 2013. Table 7 lists the participating consulting parties and affiliated organizations as of December 31, 2013. Appendix B contains a summary of the consultation and relevant correspondence between NASA and the consulting parties.

Eight consultation meetings were held between March 1, 2012 and February 13, 2014. On October 30, 2012, the second consultation meeting was held via teleconference. The NEPA in lieu of Section 106 consultation process was discussed, as was the simultaneous, yet largely confidential, Native American consultation process. The APE and potential soil cleanup areas were reviewed. Primarily, NASA was soliciting ideas and suggestions for potential measures to minimize impacts to historic properties and measures to mitigate the adverse effect on historic properties from the undertaking. A bullet list summary of the issues discussed at the meeting was circulated to the consulting parties for comment before the more detailed meeting summary was submitted. NASA requested

comments and suggestions by December 1, 2012. The finalized meeting notes were posted on the SSFL website on January 31, 2013.

The third consultation meeting was held at SSFL on March 15, 2013, with some people participating via teleconference. The meeting was used to discuss the definitions of traditional cultural properties and cultural landscapes. NASA also notified the consulting parties of the upcoming Traditional Cultural Property and Cultural Landscape Assessment that will include interviews of local, state, and national tribal members in the area. NASA solicited suggestions and contact information for people to be interviewed as a part of this investigation. Two consulting parties, Wayne Fishback and Christina Walsh, gave brief presentations to the group.

The next meeting was held after the August 2, 2013 release of the Draft EIS for public comment. It was held onsite at SSFL with some parties participating via teleconference. Impacts to historic properties identified in the Draft EIS were discussed, as well as appropriate mitigation measures to address the adverse effects on historic properties. NASA noted the comments received and the suggested mitigation measures, as well as stated concerns about the NEPA, demolition, and cleanup schedules.

The next consulting party meeting was held on September 11, 2013, via teleconference only. One of NASA's objectives was to have the parties concur that there would be an adverse effect on architectural and archeological resources from the Proposed Action. No vote was taken, but no comments were made to indicate disagreement the adverse effects identified in the Draft EIS. There was a continued discussion of appropriate mitigation measures to address the adverse effect on historic properties. The parties also discussed the GSA excess property process. James Biederman with GSA talked about the GSA's process for excess property and for property transfer. There will be a separate Section 106 process for the GSA property transfer after completion of the mandated cleanup activities.

The next consulting party meeting was held on site at SSFL on September 20, 2013, and included a tour of the three historic districts (Alfa, Bravo, and Coca Test Area Historic Districts) prior to the meeting. This meeting was intended to be limited to discussion of architectural resources; however, archeological resources were also discussed. Due to consulting party concerns about the NEPA, demolition and cleanup schedules, NASA indicated it was considering deferring demolition on some of the buildings in the Alfa and Bravo Test Area Historic Districts. Coca Test Area Historic District, however, would need to be demolished as part of the cleanup, due to the excessive contamination and high cost of maintenance. The Santa Ynez have also requested that Coca be demolished because of the Indian Sacred Site.

On November 1, 2013 a consulting party meeting was held onsite at SSFL. The objective of this meeting was to resolve the adverse effects on historic properties through the final discussion of appropriate measures to address the adverse effects on archeological and architectural resources. NASA indicated that the draft Programmatic Agreement (PA) would be distributed to the consulting parties for their review and comment. As such, NASA would need consulting party input on the final mitigation measures. Several parties expressed a desire to preserve Coca because of its historic significance for its association with the Apollo and Space Shuttle programs. NASA reiterated that the Coca Test Area Historic District would be demolished as part of the scheduled cleanup action because it is the most highly contaminated of the districts and would be the costliest to maintain. The consulting parties committed to sending NASA in writing their preferred mitigation measures for both the archeological and the architectural resources impacted by the cleanup activities. NASA committed to sending the consulting parties the draft PA for review in December 2013.

NASA has met with or communicated with SHPO, ACHP, and Section 106 consulting parties at strategic points of the EIS planning process to review project data, to discuss the APE, to identify historic properties, to identify effects on historic properties and to discuss measures to mitigate adverse effects on cultural, historic, archeological, and Native American resources that could result from the Proposed Action. As part of this process, there have been additional electronic communications regarding the proposed APE for comment (in May 2012); the final APE (October 2012); dispersal of meeting notes for comment; and consulting party comments on meetings, announcements, or issues raised at meetings. Meeting notes from all the consulting party meetings were posted on the NASA website by January 30, 2014.

NASA will hold a consultation meeting on February 13, 2014 on-site at SSFL and via teleconference. Consulting parties received the draft PA on December 19, 2013 and were given the opportunity to submit comments on the draft by January 17, 2014. This meeting is intended to go over the changes to the draft PA based on the comments submitted by agencies and consulting parties.

Ultimately, the consultation process will culminate in appropriate measures to address effects on historic properties. An agreement document formalizing the agreement among the parties will be a part of the Record of Decision (ROD). If the agreement document is signed and executed prior to completion of the Final EIS, it will be attached to this report and to the Final EIS. If the agreement document is not executed prior to completion of the Final EIS, the agreement or the stipulations will be included in the ROD. The executed agreement document or the ROD will close the Section 106 process for this undertaking.

TABLE 7

Santa Susana Field Laboratory Environmental Cleanup Section 106 Consulting Parties*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

First Name	Last Name	Organization
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, Santa Monica Mountains National Recreation Area
Harry	Butowsky	Private contractor
Sam	Cohen	Santa Ynez Band of Chumash Indians
Michael	Collins	EnviroReporter.com
Nicole	Doner	Ventura County Cultural Heritage Board
Wayne	Fishback	NA
Beverly	Folkes	Native American Monitoring Group
Elizabeth	Harris	NA
Luhui	Isha	NA
Nancy	Kidd	Simi Valley Historical Society
Christian	Kiillkkaa	NA
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
Gwen	Romani	Compass Rose Archaeological
Freddie	Romero	Santa Ynez Band of Chumash Indians
John Tommy	Rosas	Tongva Ancestral Territorial Tribal Nation
Bruce	Rowe	NA
Chris	Rowe	NA
Alan	Salazar	NA
Margie	Steigerwald	National Park Service
Clark	Stevens	Resource Conservation District of the Santa Monica Mountains
Susan	Stratton	California Office of Historic Preservation
Brian	Sujata	Santa Susana Field Laboratory Community Advisory Group
Barbara	Tejada	Ventura County Archaeological Society
George	Toren	Compass Rose Archaeological
Mati	Waiya	NA
Christina	Walsh	cleanuprocketdyne.org
Abraham	Weitzberg	NA
Mary	Wiesbrock	Save Open Space
Ronald	Ziman	NA

Notes:

NA = not applicable

Accepted consulting parties as of January 17, 2014

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SECTION 5

Historic Properties

5.1 Standards of Significance

Standards of significance for cultural resources in the APE were identified using standards from the following sources:

- National Register Bulletin 15—*How to Apply the National Register Criteria for Evaluation* (NPS, 1997)
- *Instructions for Recording Historical Resources* (OHP, 1995)

The protection of historic properties is governed by several federal laws and regulations, including the NHPA (1966), the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (1990).

Under Section 110 of the NHPA, historic properties under the jurisdiction or control of a federal agency must be identified and evaluated for listing in the NRHP. Section 106 of the NHPA states that federal agencies must take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP.

The enabling legislation for Section 106 is contained in 36 CFR 800, "Protection of Historic Properties." The Section 106 process entails three basic steps:

1. Identify historic properties potentially affected by the undertaking.
2. Assess adverse effects on historic properties.
3. Seek ways to avoid, minimize, or mitigate adverse effects on historic properties.

In accordance with 36 CFR 800, determinations regarding the potential effects of an undertaking on historic properties are presented to SHPO, federally recognized Native American tribes, and other interested parties. The effects analysis and findings for this Proposed Action are presented in Section 4 of the EIS and are not included in this report.

Under Section 106 of the NHPA, an adverse effect is found when an undertaking (Proposed Action) may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Following are examples of adverse effects:

- Physical destruction or damage
- Alteration inconsistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties
- Relocation of the property
- Change in the character of the property's use or setting
- Introduction of incompatible visual, atmospheric, or audible elements
- Neglect and deterioration
- Transfer, lease, or sale out of federal control without adequate preservation restrictions

Under NEPA, federal agencies are required to consider the environmental impacts of their Proposed Actions and to incorporate reasonable alternatives to those actions. NEPA requires discussion of significant environmental impacts and reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. NEPA recognizes direct, indirect, and cumulative effects. As defined by NEPA, direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action but are later in time or farther removed in distance, yet are still reasonably foreseeable. Cumulative effects are the effects

on the environment that result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. NEPA recognizes both detrimental and beneficial effects.

One of the requirements of NEPA is to “preserve important historic, cultural, and natural aspects of our national heritage” (Sec. 101 [42 United States Code [U.S.C.] § 4331]). According to NEPA regulations, in considering whether an action may “significantly affect the quality of the human environment,” an agency must consider the following, among other things:

- Unique characteristics of the geographic area such as proximity to historic or cultural resources (40 CFR 1508.27(b)(3))
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP (40 CFR 1508.27(b)(8))

5.2 National Register of Historic Places Status

5.2.1 Traditional Cultural Properties and Cultural Landscapes

To identify any additional historic properties, specifically, TCPs and cultural landscapes, NASA commissioned a Traditional Cultural Properties and Cultural Landscape Assessment for SSFL and its vicinity. The goal of this assessment was to investigate the existence and extent of a potential TCP and to assess the potential for a significant cultural landscape. This was a preliminary investigation, meaning that the majority of the historic context and ethnographic information came from existing documentation. The other element of the assessment was to conduct interviews with local individuals to ascertain the current and previous ethnohistoric use of the region and the influence of flora and fauna in area development. The interview list contained several individuals who could possess pertinent information. Authorities consulted included knowledgeable individuals within the different Native American communities with ties to the region, as well as specialists in ethnography, history, anthropology, and archeology. Additional archival research was completed for this assessment. Sources included technical journals, ethnographic accounts, historical interviews, and professional presentations.

The assessment identified a TCP. For the purposes of Section 106, and in consultation with the Santa Ynez, NASA is treating the whole of the NASA-administered area of SSFL as a TCP.



A report was prepared for this assessment in support of NEPA and Section 106 of the NHPA. Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings (the Proposed Action) on historic properties. Regulation 36 CFR 800 defines a historic property as any prehistoric or historic district, site, building, structure, or object listed in, or eligible for listing in, the NRHP. Due to the sensitive nature of the material discussed in this technical report, this report will remain confidential. Section 9 of the Archaeological Resources Protection Act of 1979 and 36 CFR 800.11(c) discusses the confidentiality of archeological sites. A copy of this report will be filed with the SCCIC in Fullerton, California in accordance with state law.

5.2.2 Archeological Resources

Three archeological sites are located within the APE. [REDACTED] the Burro Flats site, was listed in the NRHP in 1976. Two previously identified sites, [REDACTED] are potentially eligible for listing in the NRHP. These properties are discussed in greater detail in Section 3.3.1. Table 8 lists each site and its NRHP status.

TABLE 8

Identified Archeological Resources in the APE

Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II

Site Number	Property Name	NRHP/CRHR
[REDACTED]	Burro Flats	Listed
[REDACTED]	[REDACTED]	Potentially Eligible
[REDACTED]	[REDACTED]	Potentially Eligible

Notes:

CRHR = California Register of Historical Resources

NRHP = National Register of Historic Places

5.2.2.1 Site No. [REDACTED]

The Burro Flats site was first recorded in 1959 (Rozaire, 1959). At that time, NRHP significance criteria had not been developed. The NRHP nomination form from 1975 does not indicate under which criterion the site is eligible. The NRHP website indicates that the site is significant for its informational potential, which would be Criterion D (NRHP, 2013). The Burro Flats site was listed in the NRHP and the CRHR in May 1976. No change in status is recommended.

5.2.2.2 Site No. [REDACTED]

This site was recommended eligible for the NRHP under Criterion D pending further study, because of its potential to yield information important to prehistory. The California SHPO reviewed this recommendation as part of a Section 110 consultation in February 2009, and commented that the sparse collection of artifacts and lack of features appeared to indicate that the site may have been used only rarely and could represent a single episode of use. Through communications in 2009, NASA and SHPO agreed the site would be considered potentially eligible for listing in the NRHP when an undertaking was identified and potential effects on historic properties were analyzed. Correspondence between NASA and SHPO regarding [REDACTED] is included in the consultation record.

5.2.2.3 Site No. [REDACTED]

This site is recommended eligible for the NRHP under Criterion D pending further study, because of its potential to yield information important to prehistory. This recommendation has not yet been reviewed by the California SHPO. For the purposes of this undertaking, this site is being treated as potentially eligible for listing in the NRHP.

5.2.2.4 Archeological Historic District

The three archeological sites ([REDACTED]) recorded within the APE do not meet the criteria established by the NPS to be considered an archeological district. Each site contains unique and unconnected constituents and there is no clear linkage or continuity between them. To be considered a district, archeological sites must possess "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (NPS, 2000). Also as stated in Bulletin 36, "A district derives its importance from being a unified entity, even though it is often composed of a wide variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties." These three archeological sites do not readily meet any of these criteria.

5.2.3 Architectural Resources

The built environment survey conducted in the fall of 2007 (ACI and WR, 2009), included a review and reconnaissance of the 139 federally owned buildings, structures, and sites within the APE, specifically within Area II of SSFL. ACI and WR identified one structure, a well, in Area I, but there is also a truck scale with a small operators shed in Area I, which are owned by Boeing (NASA 2013).

Three historic districts were recorded and evaluated for NRHP eligibility in August 2007 (ACI and WR, 2009). The historic districts are eligible for the NRHP under Criteria A and C. Within these historic districts, nine buildings are individually eligible for listing in the NRHP. The districts and structures have achieved exceptional importance within the past 50 years, and therefore, Criteria Consideration G applies. SHPO concurred on May 15, 2008, with the eligibility of the historic districts and their contributing elements, as well as with the individual eligibility of the nine structures. No change in status is recommended for the three districts. These properties are discussed in greater detail in Section 3.3.2. Table 9 lists the NRHP-eligible historic structures in the APE.

5.2.3.1 Alfa Test Area Historic District

The Alfa Test Area Historic District contains 10 contributing resources, 3 of which are also individually eligible for the NRHP. Constructed during 1954-1955, the district includes the test stands and control house, two observation structures, a terminal house, stand talker shack, electrical control stations, and elements of the natural and constructed landscape.

5.2.3.2 Bravo Test Area Historic District

The Bravo Test Area Historic District contains eight contributing resources, three of which are also individually eligible for the NRHP. Constructed during 1955-1956, the proposed district includes the test stands and control house, one observation structure, a terminal house, electrical control stations, and elements of the natural and constructed landscape.

5.2.3.3 Coca Test Area Historic District

The Coca Test Area Historic District contains 18 contributing resources, 3 of which are also individually eligible for the NRHP. Originally constructed during 1955-1956, some of the facilities were modified or redesigned between 1962 and 1964; additional facilities were designed between 1972 and 1978. The district includes the test stands and control center, three observation structures, a pre-test building, electrical control stations, compressor buildings, a pump house, a cable tunnel, and other auxiliary structures, as well as elements of the natural and constructed landscape.

TABLE 9

National Register of Historic Places Status of Historic Structures within the APE*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Structure #	Structure Name	NRHP Status	
		Individually Eligible	Contributes to the District
<i>Alfa Test Area Historic District</i>			
208	Alfa Control House	X	X
209	Alfa Terminal House		X
727	Alfa 1 Test Stand	X	X
727A	Alfa 1 Electrical Control Station		X
2729	Alfa 3 Test Stand	X	X
729A	Alfa 3 Electrical Control Station		X
739	Stand Talker Shack		X
2X	Alfa Observation Structure (Pill Box)		X
2Y	Alfa Observation Structure (Pill Box)		X
NA	Alfa Landscape/Spillway		X
<i>Bravo Test Area Historic District</i>			
213	Bravo Control House	X	X
214	Bravo Terminal House		X
730	Bravo 1 Test Stand	X	X
730A	Bravo 1 Electrical Control Station		X
731	Bravo 2 Test Stand	X	X
731A	Bravo 2 Electrical Control Station		X
2Z	Bravo Observation Structure (Pill Box)		X
NA	Bravo Landscape/Spillway		X
<i>Coca Test Area Historic District</i>			
218	Coca Control Center	X	X
222	Coca Pre-Test Building		X
235	Coca Electrical Control Station (LOX)		X
236	Coca Electrical Control Station (LH2)		X
237	Coca GH2 Compressor Building		X
239	Coca GH2 Compressor Building		X
241	Coca Pump House		X
520	Coca High Pressure GH2 and GN2 Vault		X
614	Coca 4 Observation Structure (Pill Box)		X
733	Coca 1 Test Stand	X	X
787	Coca 4 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

TABLE 9

National Register of Historic Places Status of Historic Structures within the APE*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Structure #	Structure Name	NRHP Status	
		Individually Eligible	Contributes to the District
V108	Coca LOX Vessel #1		X
	Coca Cable Tunnel		X
NA	Coca Landscape/Spillway		X

Notes:

GH2 = gaseous hydrogen

GN2 = gaseous nitrogen

LH2 = liquid hydrogen

LOX = liquid oxygen

NRHP = National Register of Historic Places

SECTION 6

Summary of Project Effects

6.1 Effects Finding from Proposed Action

NASA is proposing to demolish existing structures and to remediate contaminated soil and groundwater on the NASA-administered property at SSFL. The purpose of the Proposed Action (the undertaking) 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. The Proposed Action calls for remediation of contaminated soils (Figure 8) to meet the 2010 AOC requirements, remediation to meet the 2007 Consent Order, and up to 100 percent demolition of structures. Because of the volume of soil removal required, and the demolition of historic structures, the Proposed Action would result in an adverse effect to historic properties. The effects analysis and findings are discussed in detail in Section 4 of the EIS.

6.1.1 Traditional Cultural Property

The ground-disturbing activities associated with demolition, soil remediation, and groundwater remediation would affect the identified TCP. Required soil remediation would result in soil removal from approximately 105 acres of the APE (Figure 8). Excavation into native soils associated with the environmental cleanup of NASA-administered LOX Plant Area I and Area II would result in an adverse effect on the TCP, which encompasses the whole NASA-Administered area. Through consultation with SHPO, ACHP, tribes, and consulting parties, NASA is in the process of determining appropriate measures to mitigate the effects on the TCP. These measures will be stipulated in the executed agreement document or in the ROD.

6.1.2 Archeological Resources

Required soil remediation would result in soil removal from approximately 105 acres of the APE (Figure 8). Not all soil within the APE would be affected. Excavation into native soils associated with the environmental cleanup of NASA-administered LOX Plant Area I and Area II has some potential to result in adverse effects to buried archeological resources. [REDACTED]

[REDACTED] Site [REDACTED] is not within the footprint of soil or groundwater remediation areas and would not be affected by the Proposed Action.

Due to the quantity of soil proposed for removal under the Proposed Action, the possibility exists that previously undiscovered archeological sites also could be affected, resulting in additional impacts on potential historic properties.

The footprint of the soil remediation areas, as depicted in Figure 2, currently shows a few cleanup areas outside the existing APE. When the remediation footprint is finalized, through consultation, the APE may need to be adjusted and these areas may need to be surveyed for cultural resources.

6.1.2.1 Potential for Undiscovered Archeological Resources

In parts of the APE, the potential exists for archeological resources to have been buried through alluviation, colluviation, or Aeolian processes, and such resources would not be found during the surface cultural resources reconnaissance surveys conducted to date. [REDACTED]

[REDACTED]

Archeological excavations [REDACTED] have resulted in the documentation of subsurface deposits. This site is listed in the NRHP and has the potential to yield further significant data about the nature of human occupation of the area. Aside from the initial recordation, neither site [REDACTED] nor site [REDACTED] has been subject to further study and the depth of deposits is unknown.

[REDACTED] An unanticipated discoveries plan will be included in the agreement document or in the ROD and will be implemented to address the possibility of impacts on previously unidentified buried resources from the undertaking.

6.1.2.2 Discovery of Human Remains

Human remains shall be treated with respect and dignity upon discovery. The County Coroner must be notified of the discovery of human remains 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.

In addition, the NASA Federal Preservation Officer in the Environmental Management Division at NASA Headquarters must be contacted. If the Coroner determines the human remains to be Native American, NASA will initiate the proper procedures under the Archaeological 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.

6.1.3 Architectural Resources

The Proposed Action calls for demolition of up to 100 percent of the structures on NASA-administered areas. It should be noted, that even if demolition is not necessary to meet cleanup goals, removal of a structure might occur as a result of other site planning or disposal requirements. Fifty-five buildings are proposed for demolition within the boundaries of the three historic districts, including the contributing elements of the districts and the nine individually eligible structures. The analysis of impacts from proposed demolition activities considers the removal of up to 100 percent of the structures on the NASA-administered property.

The demolition of contributing structures in the Alfa, Bravo, and Coca Test Area Historic Districts would result in adverse effects on each of these districts. Demolition of individually eligible or contributing structures also would have an adverse effect on historic properties. Demolition of noncontributing structures within the three districts would affect the setting and feeling of the districts due to the change in setting and visual character of the historic districts.

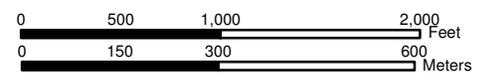
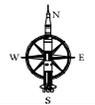
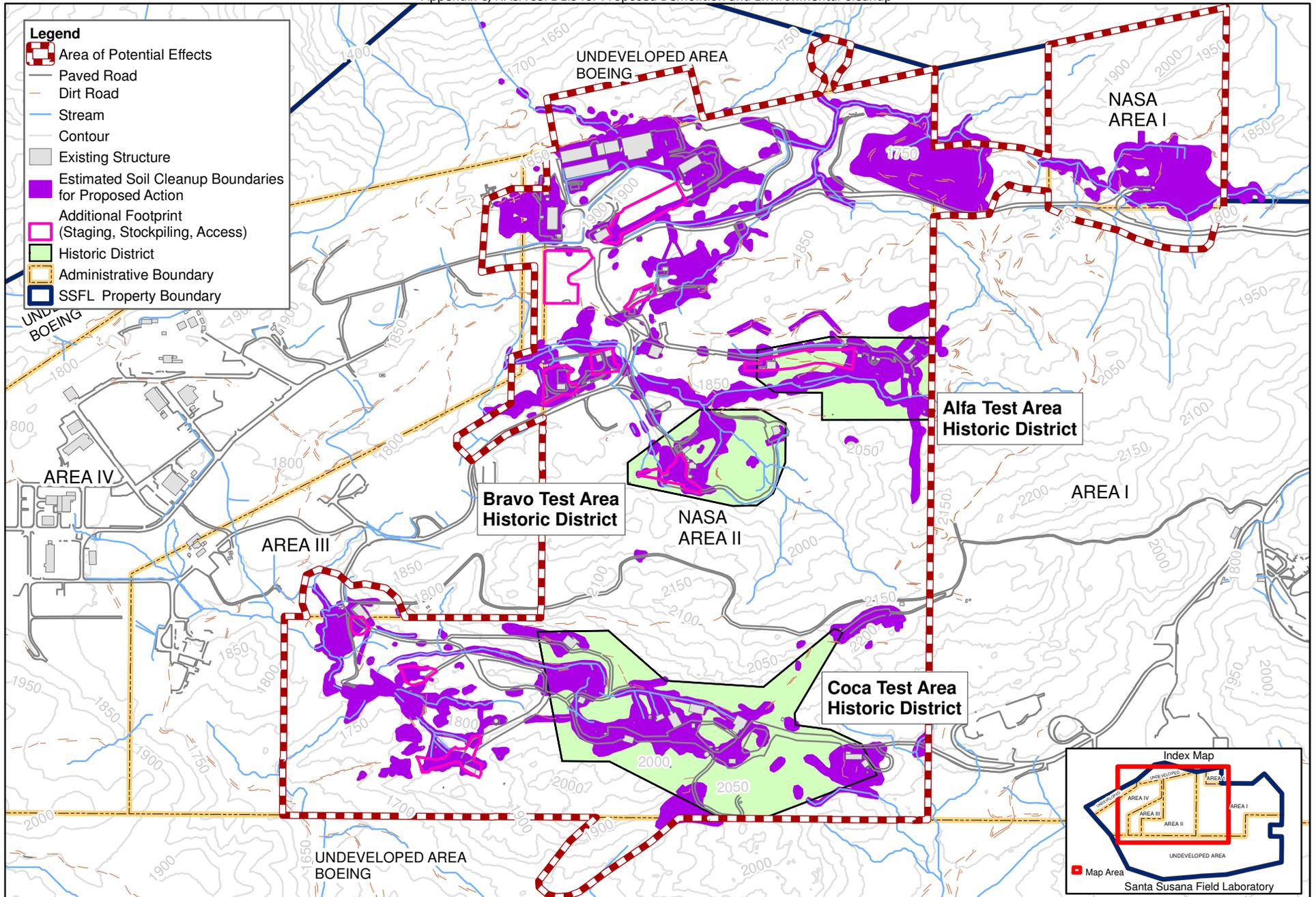
6.1.4 Indian Sacred Site

Although the boundaries of the Santa Ynez Indian Sacred Site have not formally been established, this analysis assumes that all of the APE would be included in the sacred site designation. The ground-disturbing activities associated with demolition, soil remediation, and groundwater remediation would affect the sacred site. Through consultation, NASA and the tribe will determine appropriate measures to mitigate the effects on the sacred site. This consultation is confidential and ongoing.

6.1.5 Cultural Flora and Fauna

Of the documented species inventoried on the NASA-administered property at SSFL during the biological investigations, as noted in Section 1.4, six plants and five animals were identified as having known cultural use by the Santa Ynez (Table 1). Section 3.4.4 of the EIS indicates that none of these plants or species is listed as rare, threatened, or endangered, suggesting there is no danger of extinction of these plants and animals in the region. The Proposed Action would affect specific plants of this type in the areas of remediation, but would not threaten their existence or their cultural use by the tribe.

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04-Apr-2013
 Drawn By:
 A. Cooley

Figure 8
Proposed Soil Remediation Area Under the Proposed Action
NASA - Santa Susana Field Laboratory
Ventura County, California

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6.2 Resolution of Adverse Effect

Using the NEPA process in lieu of Section 106 enables the submission of the Draft EIS to SHPO, the ACHP, and other consulting parties to suffice for environmental documentation of historic properties (36 CFR 800.8(c)(4)(i)(A)). Because the Proposed Action would result in an adverse effect to historic properties, a binding commitment to measures that avoid, minimize, or mitigate adverse effects on historic properties will be part of the ROD, in accordance with 36 CFR 800.8. Through the continuing consultation process, specific and appropriate measures to avoid, minimize, or mitigate adverse effects on historic properties are being determined and finalized. Consultation with SHPO, ACHP, Native Americans, and consulting parties is ongoing regarding the appropriate measures to mitigate the adverse effect. NASA sent the draft PA, which stipulates the mitigation measures, to the parties on December 19, 2013 for their review and comment.

Ultimately, the consultation process will culminate in appropriate measures to address adverse effects on historic properties. An agreement document formalizing the agreement among the parties or NASA's binding commitment will be a part of the ROD. If the agreement document is signed and executed prior to completion of the Final EIS, it will be attached to this report and to the Final EIS. If the agreement document is not executed prior to completion of the Final EIS, it will be included in the ROD. NASA may decide to proceed with the ROD in lieu of an agreement document per 36 CFR 800.8 due to time constraints.

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SECTION 7

Conclusions

Historic properties within the APE include the Burro Flats site [REDACTED]; the Alfa, Bravo, and Coca Test Area Historic Districts; and nine individually NRHP-eligible structures within the three districts. Sites [REDACTED] and [REDACTED] are being considered potentially eligible for the NRHP for the purposes of this undertaking. Additionally, for the purposes of NHPA Section 106, NASA is treating the whole of the NASA-administered area of SSFL as a TCP. The NASA-administered areas of SSFL also have been declared an Indian Sacred Site by the Santa Ynez, in accordance with EO 13007.

NASA initiated NHPA Section 106 consultation with the SHPO and the ACHP in June 2011. The letter notified SHPO and ACHP of NASA's intent to use the NEPA process and documentation to comply with Section 106, in accordance with 36 CFR 800.8. The APE for this project was developed in consultation with the SHPO in 2011 and 2012.

NASA has found that the Proposed Action—demolition of existing structures, soil cleanup to background levels, and groundwater cleanup—would result in an adverse effect on historic properties, as detailed in the effects analysis and findings in the cultural resources subsection of Section 4 of the EIS.

Through continuing consultation, specific and appropriate measures to avoid, minimize, or mitigate adverse effects on historic properties are being determined and finalized. Consultation with SHPO, ACHP, Native Americans, and consulting parties is ongoing regarding the appropriate measures to mitigate the adverse effect. NASA sent the draft PA (the agreement document) which stipulates the mitigation measures, to the parties on December 19, 2013 for their review and comment.

The agreement document formalizing the agreement among the parties will be a part of the ROD. If the agreement document is signed and executed prior to completion of the Final EIS, it will be attached to this report and to the Final EIS. If the agreement document is not executed prior to completion of the Final EIS, it will be included in the ROD. NASA may decide to proceed with the ROD in lieu of an agreement document per 36 CFR 800.8 due to time constraints.

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SECTION 8

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[REDACTED]

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Appendix A Representative Photographs

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Photo 1. Cultural Survey Overview, Northwest End in Area II



Photo 2. Survey Area Adjacent to Building 201



Photo 3. Overview of Survey Segment in Area II



Photo 4. Overview of Parking Lot in the Survey Area



Photo 5. Survey Area Within the Storable Propellant Area (SPA)



Photo 6. Overview of Disturbance in Survey Area



Photo 7. Overview of Area With Limited Visibility



Photo 8. Overview of Survey Area Within the Filtration Plant



Photo 9. Southern End of Survey Area (Area I) With Steep Terrain and Low Visibility

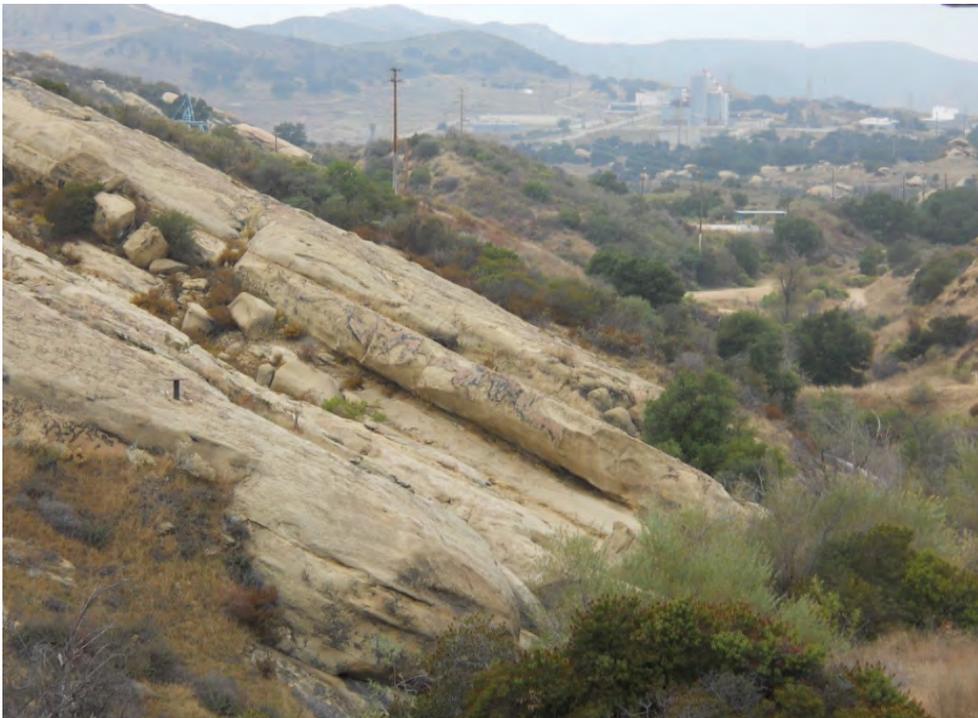


Photo 10. Overview of Survey Area South of Alfa Test Area



Photo 11. Overview of Survey Area and Disturbance



Photo 12. West of Coca Test Area, Concrete Drainage Running Parallel to the Road



Photo 13. Overview of Coca Test Area



Photo 14. Overview of Survey Area Adjacent to Service Road



Photo 15. Southern Survey Area, Overview From the Coca Test Area

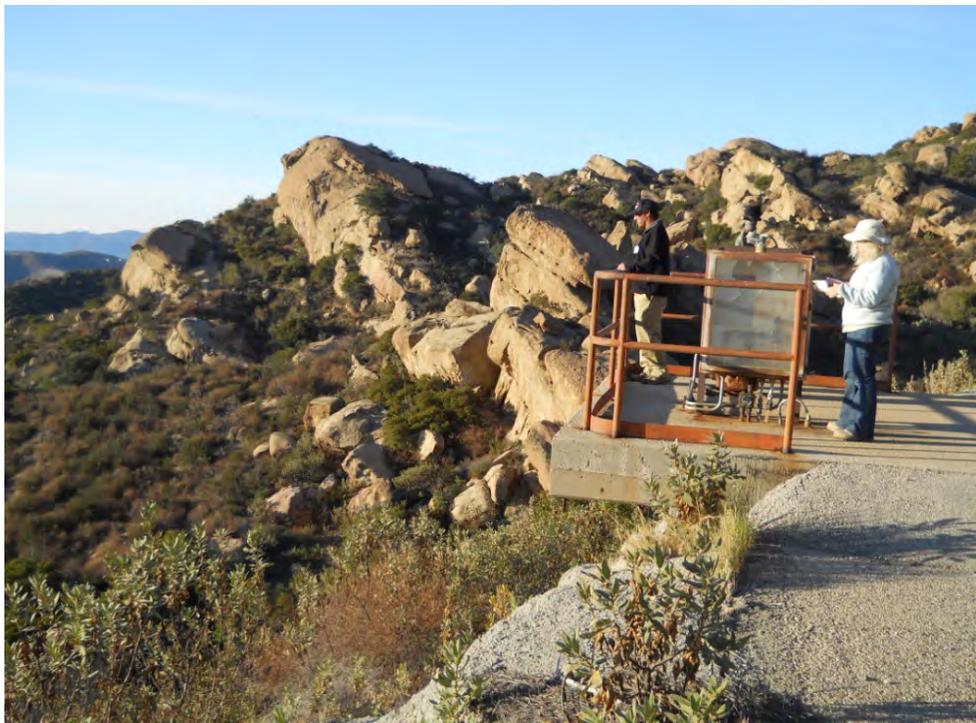


Photo 16. Overview of Survey Area, Within the Coca Test Area

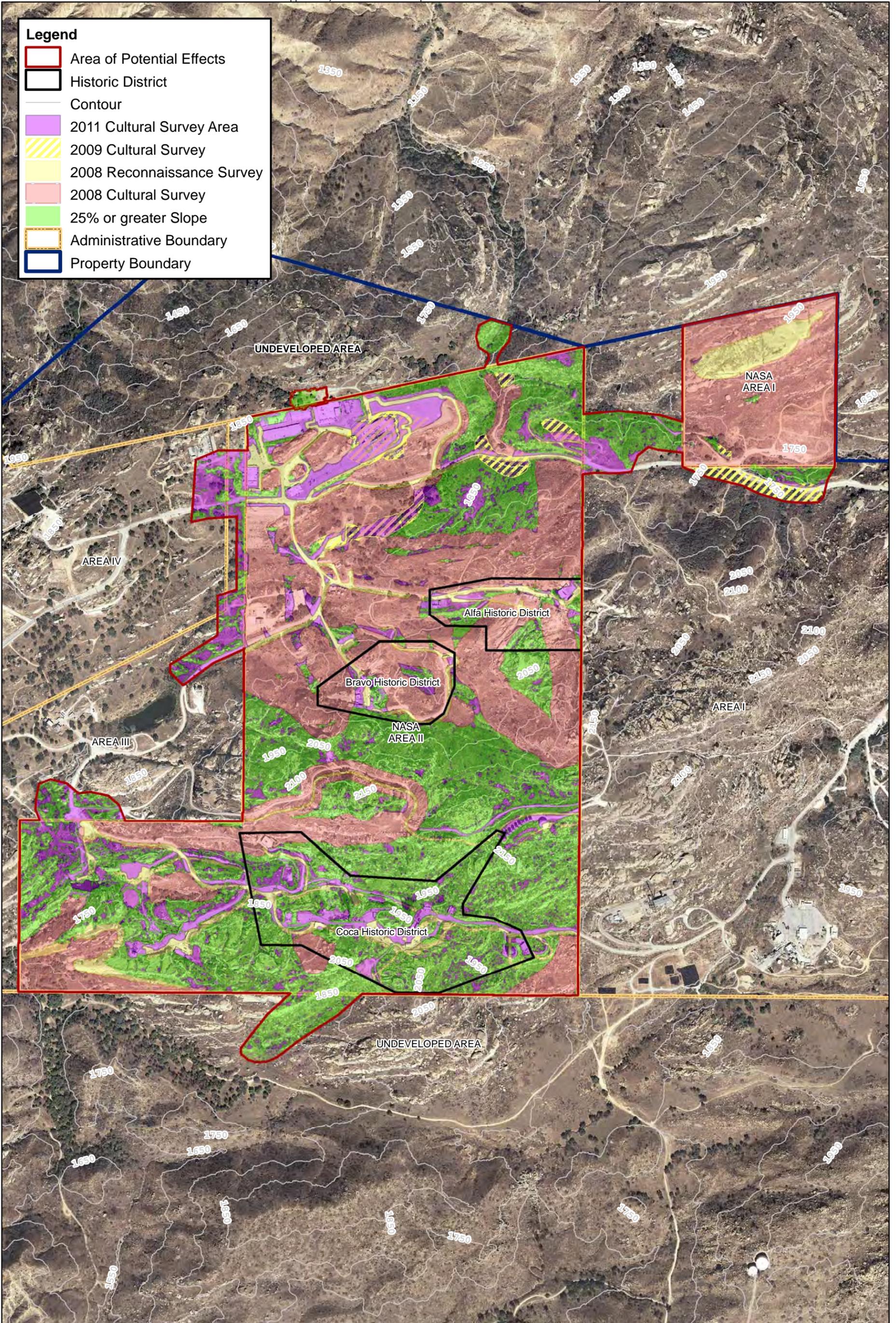


Photo 17. Overview of Coca Test Area



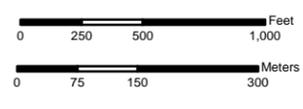
Photo 18. Test Stand in the Coca Test Area

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Legend

- Area of Potential Effects
- Historic District
- Contour
- 2011 Cultural Survey Area
- 2009 Cultural Survey
- 2008 Reconnaissance Survey
- 2008 Cultural Survey
- 25% or greater Slope
- Administrative Boundary
- Property Boundary



01-Oct-2012
 Drawn By:
 A. Cooley

Area of Potential Effects
NASA - Santa Susana Field Laboratory
Ventura County, California

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Appendix B Consultation Record

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TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
5/15/2008	SHPO	NASA	Historic Resources Survey and Assessment at SSFL	SHPO concurrence on the NRHP eligibility of Alfa, Bravo, and Coca historic districts.
12/16/2008	NASA	SHPO	Cultural Resources Inventory	Cultural resources inventory is submitted to SHPO for review and comment. Recorded one new site.
2/2/2009	SHPO	NASA	Review of and comment on Cultural Resources Inventory	SHPO is unable to concur with the finding that site CA-VEN-1800 is eligible for listing in the NRHP. SHPO recommends treating the site as potentially eligible.
4/23/2009	NASA	SHPO	Cultural Resources Inventory eligibility	NASA responded to SHPO's letter regarding the eligibility of site CA-VEN-1800. NASA agrees with SHPO's recommendation to treat the site as potentially eligible.
6/8/2011	NASA	NAHC	Request for California Native American Contact List	Letter requesting a list of recognized tribes in the SSFL area. The cleanup of SSFL could impact the Burro Flats archaeological area. NASA would like to get input from interested tribes.
6/10/2011	NAHC	NASA	California Native American Contact List	NAHC responded to NASA's request and sent NASA a list of names and contact numbers for Native Americans in Los Angeles and Ventura counties.
6/30/2011	NASA	15 letters to persons on the NAHC Contact List	Use of NEPA in lieu of Section 106 for SSFL demolition and cleanup of contaminated soil	NASA sent letters to the NAHC contact list notifying them of the undertaking, the EIS and NASA's intent to use NEPA in lieu of the Section 106 process. The letter included 6 maps: 3 overview graphics and the 3 maps of the historic districts.
6/30/2011	NASA	ACHP	Use of NEPA in lieu of Section 106 for SSFL demolition and cleanup of contaminated soil	NASA notified the ACHP of the undertaking and NASA's intent to use NEPA in lieu of the Section 106 process. Same attachments as 6/30/2011 letter to the NAHC contact list.
6/30/2011	NASA	SHPO	Use of NEPA in lieu of Section 106 for SSFL demolition and cleanup of contaminated soil	NASA notified the SHPO of the undertaking and NASA's intent to use NEPA in lieu of the Section 106 process. Same attachments as 6/30/2011 letter to the NAHC list.
7/6/2011	NASA	Public	Federal Register Vol 76, No. 129	NASA Notice 11-058. NASA Notice of Intent to conduct scoping and prepare an EIS.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
7/27/2011	ACHP	NASA	Notice of participation	ACHP responded to NASA indicating they would participate in the SSFL Demolition and Cleanup Section 106 consultation process.
8/3/2011	NASA	Memo for Record	Conversation with Freddie Romero	Record of conversation between Allen Elliott and Freddie Romero of the Santa Ynez. Mr. Romero asked about upcoming consultation meetings. He said the tribe would only be interested in private discussions with NASA.
8/5/2011	SHPO	NASA	Notice of participation	SHPO responded to NASA indicating they would participate in the SSFL Demolition and Cleanup Section 106 consultation process and requested an Area of Potential Effect (APE).
8/16/2011	Knight	NASA	Comments regarding the EIS for the former SSFL Area I	Significant structures should be considered for preservation as part of a potential historic district or park. Everything possible should be done to ensure the preservation of the entire Burro Flats site.
9/22/2011	NASA	SHPO, ACHP	Additional information on the undertaking	NASA sent SHPO and ACHP two documents (Historical Summary of Structures and Summary of Soil Remediation) with more detailed information on the demolition and cleanup activities at SSFL.
9/22/2011	NASA	Romero, Santa Ynez	Additional information on the undertaking	NASA sent Mr. Romero two documents (Historical Summary of Structures and Summary of Soil Remediation) with more detailed information on the demolition and cleanup activities at SSFL.
9/29/2011	ACHP	NASA	NEPA in lieu of Section 106	Acknowledges receipt of notification of adverse effect and NASA's intention to use NEPA in lieu of NHPA Section 106 process.
10/4/2011	NASA	Interested Parties	Notification of Section 106 information on the NASA SSFL website	NASA sent an e-mail to the people and organizations who had participated in the scoping process and who had expressed interest in the 106 process at that time, notifying them that NASA had added information to their SSFL website about the Section 106 process.
11/22/2011	NASA	Santa Ynez	Request plants or animals that are significant to the tribe	NASA asked the tribe if there were any plants or animals at SSFL the tribe considered significant for ceremonial reasons.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
11/22/2011	GSA	NASA	Section 106 consultation	GSA would like to attend the Section 106 consultation meetings for SSFL.
12/13/2011	Santa Ynez	NASA	List of flora and fauna	The tribe sent NASA a list of flora and fauna and the cultural significance of each to the tribe.
2/10/2012	NASA	11 Consulting Parties	Invitation to consulting party meeting	E-mail notification of the first Section 106 consultation meeting to be held 3/1/2012.
3/1/2012	NASA	Consulting Parties	Consulting Party Meeting Presentation	Power Point presentation of the 3/1/2012 consulting party meeting. Wayne Fishback also gave a brief presentation and gave out materials to the attendees in person.
3/1/2012	NASA	Consulting Parties	Consulting Party Meeting Sign-In Sheets	Sign in sheet from the people on site and the sign in sheet for all attendees; on-site and on the phone
3/19/2012	NASA	NAHC	List of Native Americans	NASA sent an e-mail to NAHC requesting an updated list of Native Americans in Ventura and Los Angeles Counties.
3/19/2012	NASA	Consulting Parties	Consulting Party Meeting Sign-In Sheet and presentation	NASA contacted the participants of the 3/1/2012 consulting party meeting to send them the sign in sheet and presentation.
3/19/2012	Rowe	NASA	Comments on SSFL Section 106 process	Chris Rowe sent a letter discussing the significant cultural and archaeological sites at SSFL, as well as the significant buildings and structures and her wishes for their preservation and protection.
03/22/2012	Bowling	SHPO	Response to NASA's request for comments in writing	E-mail and attachment from Bill Bowling regarding potential impacts to historic properties at SSFL. The document is headed ACME Aerospace Contamination Museum of Education. The letter discussed possible extensive contamination of the buildings and their carcinogenic potential.
4/2/2012	NAHC	NASA	Response to request for Native American list	NAHC sent the updated list of Native Americans in Los Angeles and Ventura Counties.
4/16/2012	Harris	NASA	Section 106 Committee Input	Letter from Dr. Elizabeth Harris commenting on cost considerations of soil cleanup at SSFL and the differences between the cleanup options presented at the 3/1/2012 meeting.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
5/7/2012	Bollinger	NASA	Value of preservation of some of the NASA test stands	Announcement of a presentation of the history of rocket engines, developed, built and tested at SSFL. Hopes educational presentations like this will help others understand the value of preserving NASA test stands at SSFL. Interested in NHPA Section 106 participation.
5/21/2012	NASA	SHPO	SSFL cleanup APE	NASA sent SHPO the updated SSFL demolition and cleanup APE, based on SHPO's earlier comments, for their review and comment.
5/21/2012	NASA	ACHP	SSFL cleanup APE	NASA sent ACHP the SSFL demolition and cleanup APE for their review and comment.
5/22/2012	NASA	Santa Ynez	NASA SSFL APE for review	NASA sent the APE to identify the area that would potentially be affected by the SSFL demolition and cleanup. NASA requested receipt of the APE and comments on the APE from the tribe.
5/25/2012	NASA	SHPO	SHPO request for hard copies; NASA response	NASA will send hard copies of the APE map attached to the 5/25/12 email.
5/29/2012	NASA	21 Consulting Parties	NASA SSFL APE for review	NASA sent the consulting parties the updated APE for their review and comment. This letter and APE map were sent to the 21 consulting parties at that time.
6/15/2012	NASA	Santa Ynez	Section 106 consultation	This is a follow up letter to Vincent Armenta regarding Section 106 participation in the SSFL demolition and environmental cleanup project. NASA invited input from the tribe and again invited them to participate in the Section 106 process.
6/19/2012	SHPO	NASA	APE follow up questions	SHPO responded to NASA's 5/21/2012 submittal of the APE with two questions regarding archaeological sites and the status of tribal consultations.
6/29/2012	NASA	SHPO	Response to questions regarding APE and tribal consultation	NASA's response to the archaeological question is confidential due to the sensitivity of the site. At this time, no federally-recognized tribes had expressed interest in participating in the Section 106 process.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
7/17/2012	NASA	Romero	Follow up to see if Santa Ynez want to participate in Section 106 consultation	Email to see if the Santa Ynez Council had decided they would like to participate in Section 106 consultation. Also inquired about sacred site status at SSFL.
7/21/2012	Santa Ynez	NASA	Informal request to be consulting party	Mr. Sam Cohen acknowledged receipt of an e-mail from NASA dated 5/25/2012. The tribe requested to be included in all Section 106 and other consultations regarding SSFL. They will send a formal request at a later date.
7/23/2012	NASA	Santa Ynez	Acceptance of informal request for consultation	NASA responded to the tribe's informal e-mail requesting consultation. NASA accepted their request.
8/7/2012	Larson	NASA	NASA funding for archaeological investigations	Dan Larson asked if NASA funding is available to complete the Compass Rose archaeological analysis of earlier collections gathered at Burro Flats from 1954 - 1960.
8/23/2012	NASA	24 Consulting Parties	SSFL Section 106 Consultation Meeting and Site Visit Summary	E-mail notification that the meeting summary from the 3/1/2012 meeting had been posted on the SSFL website. This record also includes the meeting summary.
8/23/2012	Walsh	NASA	Response to Section 106 Consultation Meeting and Site Visit Summary	Christina Walsh expressed concern that her views, which were stated at the meeting, were not represented in the meeting summary. She asked about how input will be considered and what can be done to save any structures.
8/24/2012	Larson	NASA	Response to NASA's e-mail regarding meeting notes	Dan Larson sent an e-mail in response to the meeting summary announcement. He suggested all of SSFL should be a discontinuous site, including some of Bell Canyon. He discussed the significance of Burro Flats.
9/19/2012	Santa Ynez	NASA	Request for consultation	The tribe is requesting NHPA Section 106 consultation with NASA. The tribe requests their consultation not be open to the public.
9/24/2012	NASA	Consulting Parties	Notification of next consulting party meeting	NASA notified the 25 consulting parties of NASA's intent to meet by phone on 10/30/2012. NASA reiterated that comments on the undertaking should be submitted to NASA in writing and supplied several electronic and regular mail addresses.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
10/1/2012	NASA	SHPO	SSFL final APE	NASA sent SHPO the APE with the survey areas and requested final comments on the SSFL demolition and cleanup APE.
10/17/2012	Bowling	NASA	Section 106 comments	The attached comments were from ACME. The structures at SSFL sit on cancerous solvents and are covered with lead paint. The only way to discover the extent of the contamination is removal of the buildings.
10/18/2012	NASA	Consulting Parties	Announcement of 10/30/2012 consulting party meeting	NASA e-mailed the consulting parties to announce the 10/30/2012 consultation meeting via teleconference. Based on an earlier request, the names of the consulting parties were attached to the e-mail.
11/01/2012	Weitzberg	NASA	Comments from the 10/30/2012 consulting party meeting	Supportive of the NEPA in lieu of Section 106 process. Emphasizes the need to minimize impacts and adverse effects on historic properties. Concerned that the AOC is not conducive to preservation of cultural resources.
11/18/2012	Bollinger	NASA	Comments from the 10/30/2012 consulting party meeting	Comments discuss an overview of SSFL, Native American cultural assets, and rocket engine test stands. Need evaluation studies to determine which test stands are feasible to preserve. A combined cultural and rocket space museum including Native American culture would be beneficial.
11/19/2012	NASA	Consulting Parties	Summary of Issues Raised at the consulting party meeting	E-mail with the meeting summary attached. Listed attendees at the 10/30/2012 meeting. Included a bullet list of issues discussed at the meeting. Requests written comments by 12/1/2012.
12/03/2012	NPS	NASA	Comments on the environmental cleanup and demolition at SSFL	Support efforts to protect known and unknown Native American archaeological sites. Recommends the EIS explore options for preserving the test stands for education and interpretation. Preservation of historic resources should be an alternative in the EIS. The EIS should include costs of stabilizing and maintaining the test stands. NPS special resource study for the Rim of the Valley Corridor is under way. SSFL is within the study area.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
12/03/2012	SHPO	NASA	Demolition and Cleanup Activities at SSFL	Written statement of concerns regarding the undertaking. The EIS should include a clear Purpose and Need statement, and explanations of the Proposed Actions, including excess property declaration. NASA should consider the possibility of an archeological district. Urges NASA to reinstate consideration of alternatives that don't result in 100 percent demolition of structures.
12/06/2012	Rowe	NASA	SSFL Section 106 consultation comments	Very important to keep the archeological sites protected and that Native American monitors be used during the sampling and remediation phases. Support the use of local archeologists. SSFL should be considered in its historic context as a whole, not just NASA areas. Supports cleaning up to Residential standards.
12/14/2012	Bowling	NASA	SSFL Section 106 consultation comments	Need to make sure the watershed is cleaned up as it is a tributary of the Los Angeles River. Wants to ensure proper cleanup of SSFL. A decision on demolition or preservation cannot be made until the extent of contamination is known.
01/02/2013	Tejada	NASA	SSFL Section 106 consultation comments	Disappointed that NASA only considering alternatives consistent with AOC. Archeological monitoring should be included in early soil testing activities and throughout the process. Produce an ethnographic study of the area; Burro Flats may be a TCP. Would like to preserve at least one test stand. Proponent of SSFL becoming parkland within the Rim of the Valley Corridor.
01/31/2013	NASA	Consulting Parties	October 2012 meeting notes	Announcement that the finalized meeting notes were posted on the SSFL website and the link to the site.
02/28/2013	NASA	Consulting Parties	Notice of Consulting Party Meeting on 3/15/2013	Announcement of the next consulting party meeting to be held at SSFL on 3/15/2013. The main topic will be the proposed Traditional Cultural Property study, to be conducted based on previous consulting party input.
03/05/2013	NASA	Consulting Parties	Agenda for Consulting Party Meeting on 3/15/2013	Attached the agenda for the consulting party meeting on 3/14/2013, including the call-in number and conference call code.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
03/13/2013	NASA	Consulting Parties	Brochure for Consulting Party Meeting on 3/15/2013	Attached a brochure on Traditional Cultural Properties to be discussed at consulting party meeting on 3/15/2013.
03/15/2013	NASA	Consulting Parties	Meeting materials for Consulting Party Meeting on 3/15/2013	Includes agenda, NASA TCP brochure, Wayne Fishback Presentation, and Christina Walsh presentation.
4/8/2013	Rowe	NASA	Re: NASA Section 106 Comments	Clarification about Section 106 comment. Keep the test stands if possible for their historic significance and the affiliated structures. Also keep the structures if more harm would be done to the sandstone outcroppings by removing them.
4/9/2013	NASA	CPs	Last call for recommendations for TCP study interviews	Reminder to send Jennifer Groman any recommendations for people to interview as part of the TCP study.
4/9/2013	Cohen	NASA	Last call for recommendations for TCP study interviews - response	Cohen of Santa Ynez Chumash sent a list of recommended names to be interviewed for the TCP study. Provided a list of names and their contact information.
4/9/2013	Kidd	NASA	Last Call: Recommendations for the TCP study interviews - response	Attached list (2Consult.doc) of possible Native American consulting individuals and agencies (included name, organizational affiliation, tribal affiliation)
4/9/2013	Luker	NASA	Last Call: Recommendations for TCP Study interviews	Recommendation to interview Beverly Folkes, Al Knight, and John Luker
4/9/2013	Salazar	NASA	Re: Last Call: Recommendations for TCP study interviews	Request to be placed on the list of recommended names to be interviewed for the TCP study.
4/12/2013	Kidd	NASA	Last Call: Recommendations for TCP Study interviews	Recommendation to include Simi Valley City Historian.
4/18/2013	Tejada	NASA	Re: Last Call: Recommendations for TCP study interviews	Recommendation to include 8 more people to be interviewed for the TCP study.
4/24/2013	John R. Johnson (UC Santa Barbara)	Cohen	Individuals of documented Chumash/Fernandeño ancestry	A list of individuals of documented Chumash and/or Fernandeño ancestry who may have direct knowledge of and/or cultural affiliation with the Santa Susana area regarding the TCP study, per Cohen's request.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
5/1/2013	NASA	Santa Ynez	APE for the Environmental Cleanup of SSFL, NASA Areas I and II, Ventura County, California	Consultation with Santa Ynez to update the previous identified APE to historic properties from the mandated environmental cleanup at SSFL. Correspondence addresses two issues: a 9-acre APE expansion and potential changes to the soil cleanup footprint. Three figures are included as attachments.
5/1/2013	NASA	Beason	CA SHPO File NASA 110705A; Updated APE for the Environmental Cleanup of SSFL, NASA Areas I and II	Consultation with SHPO to update the previously identified APE to historic properties from the mandated environmental cleanup at SSFL. Correspondence addresses two issues: a 9-acre APE expansion and potential changes to the soil cleanup footprint. Three figures are included as attachments.
5/15/2013	NASA	Consulting Parties	Draft 3/15/2013 meeting notes	Copy of the draft notes from the 3/15/2013 meeting for comment.
5/15/2013	Romero	NASA	SSFL conversation	Concurrence with NASA and proposed scope of work for the soil sampling in Area II. Will make the following recommendations to the Elders Council: scope of work plan for review, NA advisor during all ground disturbing activity, handling and treatment plan for archaeological discoveries.
5/20/2013	SHPO	NASA	Re: Comments on Archaeological Property Identification at SSFL, Ventura County, CA	SHPO finds the identification and evaluation of archaeological resources to be insufficient. SHPO requests NASA conduct additional studies prior to the issuance of the Draft EIS. Requests the archaeological survey data be revisited and more areas identified for further investigations. Also, should look into the possible presence of an archaeological district. A new DRP 523 form needs to be prepared that reconciles all of the previous recordation efforts for the Burro Flats.
5/30/2013	NASA	SHPO	May 2013 SHPO Comments on NASA SSFL Archaeological Property	Notifying Stratton that NASA submitted two reports that demonstrate that NASA completed a 100 percent survey of the APE. Confirms that NASA has met the obligations under 36 CFR 800.4 for archaeology and historic properties.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
5/31/2013	Bowling	NASA	SSFL Section 106 consultation comments	Raised concern about ensuring the proper cleanup of the SSFL, its related facilities, and their surrounding communities. Believes that the SSFL is being treated like a park before it is a clean-closed facility.
7/16/2013	NASA	NASA	Conversation Record with Freddie Romero	Freddie had a few concerns about the Cultural Resources report: only six flora and six fauna were mentioned (should be more) and Chumash language should be described as an isolate. Protection measures were discussed and he suggested other tribes should be represented during the visit site on 8/29/2013.
7/18/2013	NASA	Rosas	Re: SSFL TCP and Cultural Landscape Study	Response to concerns regarding goals of the TCP study and interviews. Any questions regarding the studies, Groman will try to answer or will forward them to the team to answer.
8/2/2013	NASA	Consulting Parties	Draft EIS and August meeting of SSFL Consulting Parties	Notice of Availability for the SSFL Draft EIS was announced in the Federal Register. Provides the website to access the draft and to submit comments. Announces the next Consulting Parties meeting (8/29/2013).
8/20/2013	NASA	Consulting Parties	SSFL: Extension of Public Comment Period for SSFL Draft EIS to October 1, 2013	In response to request from members of the public, the public comment period will not close until 10/1/2013 (extended by 15 days). Provides instructions on how to submit comments on the NASA Draft EIS.
8/26/2013	Weitzberg	NASA	Draft EIS Comments	Concerned with the contents of the Draft EIS and the negative impacts of the two (extreme) alternatives. Draft EIS is not realistic about impacts of the soil remediation. There would be excessive environmental effects of the soil removal and transport to meet the requirements of the 2010 AOC.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
8/29/2013	Compass Rose	NASA	NASA Consultant Meeting Comments	Comments address several issues: boundaries of TCP, establishing ESAs, mitigation measures and implementation of the ROD. Compass Rose would like to see all nine of the test stands preserved. Strict cleanup guidelines to "background" levels in the 2010 AOC are inappropriate for proper protection of the historic properties within Area II. Cleanup should be to "residential". Additionally, from the beginning there should not have been two separate processes (Boeing and NASA) since the SSFL is a continuous landform with a continuous history.
9/5/2013	NASA	Consulting Parties	9/11/2013 NASA SSFL Consulting Party Call	Meeting will focus only on Architectural Resources (historic structures) and the significant impacts and adverse effects of the proposed action. Provides links to materials which will be informative for the meeting.
9/8/2013	Rowe	NASA	Archaeological Survey and CEQA comments	Disappointed in the cultural resources documentation; recommends using a local archaeological firm. Does not support excavation of archaeological resources for research purposes. Consulting firm should agree to preservation in situ of archaeological materials. Site boundaries should be reviewed and formally excavated; Burro Flats should be permanently fenced in, and further archaeological monitoring will be required after any vegetation is removed.
9/9/2013	SSMPA	NASA	Public Support to Maintain NASA/SSFL Land as Open Space and Parkland	Concerned about the final disposition of the NASA land that is in the 'disposal process.' Many people and organizations have signed the petition agreeing that the NPS would be the best steward for this land. Includes petition letters and signatures.
9/12/2013	NASA	Consulting Parties	NASA SSFL Consulting Parties Meeting Sept 20th	NASA scheduled next consultation party meeting for 11 am, Pacific time, Friday 9/20/2013. There will be a tour of the test stands area at 9 am.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
9/30/2013	NASA	Consulting Parties	10/10/2013 NASA SSFL CP Call Invite	Next CP meeting is scheduled for Thursday 10/10/2013. Includes logistical conference call information. Another email in the coming week will include more follow-up information to help participants prepare for the meeting.
10/1/2013	NASA	Consulting Parties	NASA SSFL Draft EIS Comment Period Closes Tonight October 1	NASA is currently closed due to lapse in government funding. Public comment period for NASA's SSFL Draft EIS ends at midnight Pacific Time on 10/1/2013. Comments can be submitted electronically or in writing. NASA cannot respond to inquiries during the furlough period.
10/9/2013	NASA	Consulting Parties	10/10/2013 NASA SSFL Consulting Party Call -- Cancelled	The 10/10/2013 NASA SSFL Consulting Party Call has been cancelled.
10/22/2013	NASA	Consulting Parties	Nov 1st NASA SSFL Consulting Party Call Invitation	Rescheduling the Section 106 Consulting Parties meeting that was cancelled during the federal government shutdown. Meeting will now be a face-to-face meeting on Friday, 11/1/2013 at SSFL. Communication includes call in information for those who cannot attend in person.
10/23/2013	Swindall	NASA	SSFL cleanup Draft EIS comment	Site is very important to the Chumash. Before construction and disturbance a trained Native American monitor must be present to assess for human remains or artifacts. Requests to work with NASA and voice their opinion as a Tribe regarding the construction and potential for damage.
11/11/2013	Klea	NASA	Response to NASA	She would not like to participate as a Section 106 consulting party.
11/11/2013	NASA	SHPO, ACHP	Draft PA review	NASA added another stipulation to the draft PA and resent for review and comment.
11/12/2013	ACHP	NASA	Draft PA review	Comments from the ACHP on the draft PA. Comments were in the word document in track changes.
11/13/2013	NASA	Santa Ynez	Draft PA review	NASA submitted the Draft PA to the Santa Ynez for review and comment.
11/13/2013	NASA	GSA	Draft PA review	NASA submitted the Draft PA to the GSA for review and comment.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
11/13/2013	NASA	SHPO	Draft PA review	NASA sent an updated version of the draft PA with comments from ACHP and GSA incorporated for additional review and comment.
11/14/2013	NASA	Gortner	Response to inquiry about becoming a Section 106 consulting party	NASA explained the process for becoming a Section 106 consulting party and sent the NASA link to the application.
12/6/2013	NASA	SHPO, ACHP, Santa Ynez	Delivery of TCP study	NASA submitted the Draft TCP and cultural landscape assessment to SHPO, ACHP and the Santa Ynez for review and comment. This document is confidential.
12/16/2013	NASA	SHPO, ACHP	Draft PA review	NASA sent an updated version of the draft PA with additional comments from ACHP, GSA and Santa Ynez for another round of review and comment.
12/16/2013	SHPO	NASA	Comments on the Draft PA	SHPO has serious concerns about the PA. SHPO cannot sign the PA as it is currently written and will need additional time to compile comments.
12/17/2013	ACHP	NASA	Response to NASA questions regarding PA	Discusses mitigation for impacts to the TCP. NASA needs to consider the comments it has received before making a decision about the appropriate mitigation for the effect on the TCP. Also talks about the procedure if one of the parties does not sign the PA.
12/19/2013	NASA	CPs	Draft PA review	NASA submitted the Draft PA to the consulting parties for their review and comment. NASA asked for comments back from the consulting parties by Friday, 1/10/2014. Notifies them that if agreement cannot be reached with the signatories prior to completion of the Final EIS, the PA or its contents will be included in the ROD.
12/19/2013	NASA	CPs	Draft PA review clarification	Correction to the previous email submitting the PA for review. The PA does not include the Coca Historic District in the demolition deferral clause.
12/19/2013	Salazar	NASA	Comments on the Draft PA	If NASA has an archeologist on the SSFL site determining the size of the Burro Flats site and if there are other sites Chumash consultants should be with them and part of their team
12/20/2013	Romero	NASA	Request to extend deadline	Request to extend the deadline for comments on the Draft PA.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
12/20/2013	NASA	CPs	Time Extension on Draft PA review	Email to consulting parties extending the deadline for comments on the Draft PA from 1/10/2014 to 1/17/2014.
12/20/2013	Walsh	NASA	Comments on the Draft PA	The PA should be included in the Final EIS.
12/23/2013	Weitzberg	NASA	Comments on the Draft PA	If DTSC are to employ risk in their determinations it should also be employed not to remove any soil for which there is negligible risk.
1/16/2014	Kidd	NASA	Comments on the Draft PA	Disappointed that the Coca Historic District would be demolished, but understands their condition and other factors. Volunteers to be interviewed about working at Rocketdyne. Asked about additional Consulting Party meetings or consultations.
1/16/2014	NASA	SHPO	Conference Call Meeting Request	NASA would like to meet with SHPO to discuss comments on and concerns about portions of the Draft PA.
1/17/2014	Bowling	NASA	Comments on the Draft PA	Asks NASA to clean up the Coca area to background levels in accordance with the AOC. The contamination below the test stands that are proposed to stay in place will hinder a proper clean up and need to be addressed.
1/17/2014	Larson	NASA	Comments on the Draft PA	NASA, in cooperation with Boeing, should formally nominate SSFL as a Historical/ Archaeological District. PA statements mentioning Native American monitors within TCP, should include qualified archaeologists. NASA should include specialist studies as mitigation. NASA and Boeing should provide funding for the analysis and report of the 1953, 1954, 1959, and 1960 Burro Flats.
1/17/2014	Collins	NASA	Comments on the Draft PA	Comments disagree with the TCP designation and is concerned that the designation will cause NASA to fail to clean up the site as required by the AOC. All structures in Alfa, Bravo, and Coca should be demolished.
1/17/2014	Fishback	NASA	Additional time to review the PA	Requesting additional time beyond the already extended 1/17/14 deadline to review and comment on the Draft PA.

TABLE B-1

Summary of Section 106 Consultation Record*Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II*

Date	From	To	Subject	Summary
1/17/2014	Fishback	NASA	Comments on the Draft PA	Would like to preserve the Coca Test Stands. Does not agree with the reasons cited by the tribes for their preference to demolish the Coca Test Stands. Making the entire NASA site a TCP nullifies the Section 106 process and transfers control of historic preservation to NASA and Native Americans. There is also a change from transparency to secrecy.
1/17/2014	LanVen (Tejada, Brown, Luker)	NASA	Comments on the Draft PA	DTSC should be included as a signatory. ACHP role not defined in the PA recitals. Related topics should be grouped in recitals. LanVen is concerned about NASA's level of effort in identifying historic properties. An ethnographic study should not be considered mitigation. Recommends archeological and Native American monitors during sampling activities. There are many other very specific comments on the document.
1/17/2014	Luker	NASA	Comments on the Draft PA	The PA appears hastily written. Would prefer to see at least one Coca Test Stand retained. He hopes that NASA, DOE, Boeing and DTSC would combine efforts at SSFL and work toward a PA that is achievable and preserves our irreplaceable cultural and historic assets.
1/17/2014	Osokow	NASA	Comments on the Draft PA	From the San Fernando Valley Audubon Society (SFVAS). SFVAS is disappointed with the Section 106 consulting process, which did not include discussion of a critical activity affecting wildlife at the site. Also very concerned about the fence put up in the Burro Flats and the process by which that occurred. Adverse impacts on historic properties have not been resolved.
1/17/2014	Rowe	NASA	Comments on the Draft PA	Various parties (NASA, DOE, DTSC, Boeing, GSA, SHPO, ACHP, NAHC, and tribes) should come up with a new agreement to replace the 2010 AOC. Are the AOC's pre-decisional under NEPA, Section 106, CEQA, and other applicable laws? Many other questions were asked and statements made in this letter.

TABLE B-1

Summary of Section 106 Consultation Record

Cultural Resources Study for Environmental Cleanup and Demolition at SSFL, NASA Areas I and II

Date	From	To	Subject	Summary												
2011 - 2013	Consulting Parties	Consulting Parties	Applications and acceptance to become Section 106 consulting party	Applications sent to NASA to be a Section 106 consulting party for the SSFL demolition and cleanup project. NASA's responses to the requesting parties to become Section 106 consulting parties for the SSFL demolition and cleanup project.												
<p>Notes:</p> <table border="0"> <tr> <td data-bbox="131 600 779 630">ACHP = Advisory Council on Historic Preservation</td> <td data-bbox="803 600 1507 630">NEPA = National Environmental Policy Act</td> </tr> <tr> <td data-bbox="131 630 779 659">AOC = Administrative Order on Consent</td> <td data-bbox="803 630 1507 659">NPS = National Park Service</td> </tr> <tr> <td data-bbox="131 659 779 688">APE = Area of Potential Effects</td> <td data-bbox="803 659 1507 688">SHPO = State Historic Preservation Officer</td> </tr> <tr> <td data-bbox="131 688 779 718">EIS = Environmental Impact Statement</td> <td data-bbox="803 688 1507 718">SSFL = Santa Susana Field Laboratory</td> </tr> <tr> <td data-bbox="131 718 779 747">NAHC = Native American Heritage Commission</td> <td data-bbox="803 718 1507 747">SSMPA = Santa Susana Mountain Park Association</td> </tr> <tr> <td data-bbox="131 747 779 777">NASA = National Aeronautics and Space Administration</td> <td data-bbox="803 747 1507 777">TCP = Traditional Cultural Property</td> </tr> </table> <p>Consultation record through January 17, 2014.</p> <p>Comments from the EIS Scoping process and comments on the Draft EIS are not included.</p>					ACHP = Advisory Council on Historic Preservation	NEPA = National Environmental Policy Act	AOC = Administrative Order on Consent	NPS = National Park Service	APE = Area of Potential Effects	SHPO = State Historic Preservation Officer	EIS = Environmental Impact Statement	SSFL = Santa Susana Field Laboratory	NAHC = Native American Heritage Commission	SSMPA = Santa Susana Mountain Park Association	NASA = National Aeronautics and Space Administration	TCP = Traditional Cultural Property
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APE = Area of Potential Effects	SHPO = State Historic Preservation Officer															
EIS = Environmental Impact Statement	SSFL = Santa Susana Field Laboratory															
NAHC = Native American Heritage Commission	SSMPA = Santa Susana Mountain Park Association															
NASA = National Aeronautics and Space Administration	TCP = Traditional Cultural Property															

Appendix C Project Personnel Qualifications

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Gloriella Cardenas, M.A., RPA

Cultural Resources Specialist
CH2M HILL Santa Ana, California

Education

M.A., Anthropology, California State University, Fullerton, 2005
B.A., Anthropology, California State University, Los Angeles, 1999

Professional Registrations

Register of Professional Archaeologists (2005, No. 15777)
Riverside County Cultural Register (2007, No. 158)

Distinguishing Qualifications

Meets Secretary of Interior Professional Qualification Standards (36CFR61)
California BLM Cultural Use Permit (CA-10-31)

Relevant Experience

Ms. Cardenas has participated in California archaeology since 1998. She completed her Masters degree in Anthropology at California State University, Fullerton with an archaeological thesis dealing with Southern California prehistoric architecture and the use of household space. Ms. Cardenas has 7 years of experience in cultural resource management, Phase I, II and III investigations, supervision and directing field crew, laboratory processes, curation, artifact analysis, research, and report writing. Projects have been conducted throughout the American Southwest and have involved renewable energies, gas and electric, private developers and military installations in cooperation with agencies such as BLM, California Energy Commission, US Army Corps of Engineers, Native American Tribes, SHPO, and the U.S. Department of Defence. Archaeological investigations for renewable energies have focused in Florida, Georgia, Oklahoma, Texas, New Mexico, Nevada, Arizona, Colorado, and California. Investigations have been conducted in support of state and federal legislature such as Section 106 and 110 of the NHPA, CEQA, and NEPA. Ms. Cardenas meets the Secretary of the Interior's Standards for Qualifications for Archaeologists.

Professional Positions Held

Cultural Resources Specialist, 2008- Present
Project Archaeologist, 2006-2008
Crew Chief, 2005-2006
Research Assistant, 2004-2005

Project Experience

AES-Southland System Repowering Application for Certification. Cultural Lead for three projects, Huntington Beach Generating Station, Redondo Beach Generating Station and Alamos Generating Station. Lead was responsible for archaeological assessment, pedestrian survey, and report of findings in support of CEQA, PRC Chapter 2.6, Section 21083.2 and 21084.1, and the California Code of Regulations (CCR) Title 14, Chapter 3, Article 5, Section 15064.5, and author for cultural documents for the Application for Certification with the California Energy Commission,.

National Aeronautics and Space Administration (NASA), Santa Susana Field Laboratory, Areas I and II, Ventura County, California. Cultural Lead responsible for survey, assessments, the Cultural Section of

Gloriella Cardenas, M.A., RPA

the Environmental Impact Statement in support of NEPA, and the Archaeological Resource Management Report.

Federal Emergency Management Agency for the City of Moreno Valley, San Timoteo Foothill Neighborhood Flood Protection Project. Cultural Lead of an archaeological investigation and consultation in support of Section 106.

Cal Energy Black Rock 5 and 6 Geothermal Project, Imperial County, California. Cultural Resources Lead responsible for archaeological assessment, pedestrian survey, cultural documents and report of findings in support of CEQA, PRC Chapter 2.6, Section 21083.2 and 21084.1, and the California Code of Regulations (CCR) Title 14, Chapter 3, Article 5, Section 15064.5, and the Application for Certification with the California Energy Commission.

Los Angeles World Airports, Los Angeles International Airport, California. Cultural Resources Lead responsible for the monitoring activities and personnel for the modernization activities of Taxilane S and Bradley West projects. Author of technical report.

First Wind, LLC, Painted Hills IV Project, Riverside County, California. Field Director responsible for a cultural resources survey of 400 acres in support of CEQA and the County of Riverside's General Plan, for a proposed wind turbine facility on private land. Responsibilities included being permitted with the County of Riverside, leading the intense pedestrian survey, data management and authoring the technical report.

Solar Reserve, LLC, Rice Solar Energy Project, Riverside County, California. Cultural Resources Specialist and primary author for the Cultural Resources Monitoring and Mitigation Plan.

TerraGen Power, LLC, Alta Infill II Wind Energy Project, Kern County, California. Field Director responsible for a Class III cultural resources survey of 810 acres for a proposed wind turbine facility and testing and evaluation of a prehistoric lithic site. Responsibilities included producing a cultural survey report and testing report. Work was conducted in April and June of 2011.

TerraGen Power, LLC, Morgan Hills Wind Energy Project, Kern County, California. Field Director responsible for a Class III cultural resources survey of 1,200 acres. This cultural resources inventory was conducted in compliance with the California Environmental Quality Act (CEQA) as part of an application to Kern County for a Conditional Use permit to construct and operate the Morgan Hills project. Work was done in April and May of 2011.

Contra Costa County Generating Station, LLC, Oakley Generating Station Project, Contra Costa County, California. Cultural Resources Specialist, Alternate and co-authored the Cultural Resources Monitoring and Mitigation Plan submitted to the California Energy Commission. Work was done in January 2011.

TerraGen Power, LLC, Loma Verde Solar Energy Park, Riverside County, California. Field Director responsible for a Class III cultural resources survey of 1,000 acres for a proposed PV solar energy generation field. Property was comprised of both private and public lands, the latter is administered by the BLM. Work was conducted in December 2010.

NextEra Energy Resources, LLC, North Sky River Wind Project, Kern County, California. Cultural Resources Specialist involved in a Class III cultural resources survey on public lands administered by the BLM under Use Permit No. CA-10-31. Responsibilities for this project included, analysis of previous studies, systematic pedestrian survey, documentation of new discoveries, data management, and contributions to the technical report. Work was conducted between October and November 2010.

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Mariposa Energy Project, Alameda County, California. Ms. Cardenas was the Cultural Resources Specialist, Alternate and co-authored the Cultural Resources Monitoring and Mitigation Plan submitted to the California Energy Commission. Work was done in January 2011.

New River Siphon Project for the All American Canal, Calexico, California. Ms Cardenas conducted a cultural resources archival literature search for historic and archaeological resources with the CHRIS center. Work entailed an analysis of findings, evaluation of a bridge for the NRHP listing and a “critical issues” report. Work was done in January 2011.

Turlock Irrigation District, Almond 2 Power Plant, Stanislaus County, California. Ms. Cardenas was the Cultural Resources Specialist, Alternate and co-authored the Cultural Resources Monitoring and Mitigation Plan submitted to the California Energy Commission. Work was done in January 2011.

Cedar Point Windfarm, Lincoln and Washington Counties, Colorado. A literature search was conducted with the Colorado Historical Society Office of Archaeology and Historic Preservation and the report of findings was written in December 2010.

SNG Suwannee Pipeline Project, Alabama, Georgia and Florida. Ms Cardenas conducted a cultural resources archival literature search for historic and archaeological resources with the cultural resources repositories in each state. Work entailed an analysis of findings and a “critical issues” report. Work was done in November 2010.

Ivanpah Solar Generating Station, San Bernardino County, CA. Ms. Cardenas participated in additional field studies of several locations around the Ivanpah SEGS project area, including pedestrian survey and site recordation in September 2008 and was the Alternate Cultural Resources Specialist and co-author for the Cultural Resources Monitoring and Mitigation Plan submitted to the California Energy Commission and BLM in November 2010.

Southern California Edison (SCE), Tehachapi Renewable Transmission Project (TRTP) – Segments 4-11 Compliance Monitoring. Environmental Scientist involved in photo documentation of transmission line to support post construction restoration. The TRTP includes construction of new and upgrade of 173 miles of transmission lines, construction of one new substation, major upgrade of one existing substation and upgrade of other ancillary facilities. Work was done from July to October 2010.

Southern California Edison (SCE), Devers Palo Verde No. 2 Transmission Line Project. Environmental Scientist involved in environmental compliance support and development in mitigation plans in support of CPUC requirement. Ms. Cardenas’s role on this project involved authoring plans to address CPUC traffic, construction specifications, and cultural resources in response to regulatory requirements, as well as contributions in research for biological restoration, Storm Water Pollution Prevention Plans, construction scheduling and agencies’ responsibilities. Work was done from April to July 2010

Phase II Cultural Resources Evaluation of 30 Sites at Edwards, Air Force Base, California. FY09 and FY10 2009-L. Ms Cardenas was Principal Archaeologist and Director of Field and Laboratory, responsible for research design and evaluation of 30 sites consisting of historic refuse deposits, homesteads, and prehistoric camp and lithic deposits, in the Western Mojave Desert. Other project duties included setting up the laboratory facilities, creating project specific documentation forms, the implementation of procedures and training of 6 technicians in lab as well as field methods, site updates (DPR forms) for 30 sites, and report writing. The project was conducted in support of Section 106 and 110 of the National Historic Preservation Act of 1966, as amended, and Air Force Instruction 32-7065, Cultural Resource Management. JT3/CH2M HILL conducted the evaluation under Letter of Technical Direction

Gloriella Cardenas, M.A., RPA

1B0220000-0001, Environmental Management Support, as part of contract F042650-01-C-7218, under the command of the Base Historic Preservation Office.

2009-K-PLT42 Phase II Cultural Resources Evaluation of Site EAFB-3897, Air Force Plant 42, Los Angeles County, California. FY09. Project and Field Director for the test excavation and evaluation of a Gypsum Period temporary camp site. Responsibilities included, but were not limited to, coordination with Air Force Plant 42 security personnel, training of field technicians, creation and implementation of procedures for project design and methods, and writing the final report of findings. The project was conducted in support of Section 106 and 110 of the National Historic Preservation Act of 1966, as amended, and Air Force Instruction 32-7065, Cultural Resource Management. JT3/CH2M HILL conducted the evaluation under Letter of Technical Direction 1B0220000-0001, Environmental Management Support, as part of contract F042650-01-C-7218.

Archaeological Inventory FY09 2009-D, Edwards AFB, California. Archaeologist involved in Phase I investigation of 2500 Acres on EAFB, in support of the continued base-wide inventory. Work was conducted in accordance with the Integrated Cultural Resources Management Plan, under the command of the Base Historic Preservation Office.

2009-C Protection of Historic Properties, Edwards AFB, California. Archaeologist involved in support of site preservation to assist the Air Force in complying with the provisions of the National Historic Preservation Act, as amended; the Archaeological Resource Protection Act; Native American Graves Protection and Repatriation Act; American Indian Religious Freedom Act; and Air Force Instruction 32-7065, Cultural Resource Management. Work was conducted for the Site Preservation Program for Fiscal Year 2009, as specified in Letter of Technical Direction 1B022000-0001-R2, Environmental Management Support, as part of Contract F42650-01-C-7218.

Old Ridge Route Project, in the Angeles National Forest, California. Client Federal High Way Administration. July 2008 to September 2008. Archaeologist involved in the monitoring of the emergency repair of Federally Owned Roads upon the NHPA listed Old Ridge Route, 8N04.

Modesto Irrigation District, 49 MW Power Plant Project, Modesto, California. Client: Modesto Irrigation District. August 2008. Archaeologist responsible for a Phase I pedestrian survey for a 49-megawatt power plant, a cultural inventory search, and contributions to the report.

Iberdrola Renewables Biological and Cultural Assessment Support Project. Client: Iberdrola Renewables. Ms. Cardenas was responsible for conducting cultural inventories, fatal flaw reports, and field reconnaissance studies. Ten sites were evaluated for solar power plants for possible acquisitions in California, Nevada, Arizona and New Mexico. Five study areas of this overall project are located in Arizona; two are in Maricopa County, two are in La Paz County, and one project is located partially in La Paz and Yuma Counties. Project acreages range from 5,800 acres to 35,000 acres. Three of these study areas are located in California; two areas are in San Bernardino County and one is located in Imperial County. Project acreages range from 13,000 to 29,000. Three of these study areas are located in Nevada; two are in Nye County and one is located in Clark County. Project acreages range from 7,500 to 12,000. The remaining study area is located in Hidalgo County, New Mexico. Total acreage of this project is 25,000. Work was conducted in July through September of 2008.

Gloriella Cardenas, M.A., RPA

Experience Prior to CH2M HILL

Chocolate Mountains Aerial Gunnery Range, Seal Weapons and Tactics Areas 4 and 5, Imperial and Riverside Counties, California. Client: U.S. Navy, San Diego, CA. January 2008 to April 2008.

Archaeologist during a Phase I pedestrian survey of 2 areas encompassing 2,200 acres within the Naval Special Warfare Desert Training Facility. Duties included recordation of transects, GPS, field notes and documentation of discoveries, photography, DPR forms, and report writing in accordance to Section 106 guidelines.

Noble Windpark Project, Great Plains, Texas. Client: Noble Environmental Power. Archaeologist during a Phase I survey of a transmission right-of-way the length of which was approximately 8 miles. Other duties included report writing in accordance with the National Historic Preservation Act, Section 106 guidelines.

Noble Mitchell County Wind Farm, Mitchell, Coke, and Sterling Counties, Texas. Client: Noble Environmental Power. Researcher responsible for conducting a cultural inventory search with the Texas Historical Commission and the National Register of Historic Places. Duties also included producing the report of findings.

Mid County Parkway, Riverside County, CA. Client: Caltrans District 8. November 16, 2007 to January 4, 2008. Archaeologist and Field Supervisor for a Phase II investigation of 9 Prehistoric sites CA-RIV-1512, 1650, 6989, and 8712, as well as 33-16678, 33-16679, 33-16680, 33-16685, and 33-16687. The nine sites investigated were comprised of milling stations in granite outcrops with surface artifacts, quarries, habitation, and multi-used sites. Evaluations are pending for potential of eligibility for the National Register of Historic Places and the California Register of Historical Resources. Responsibilities changed with the needs of the project and were site specific, but everyday duties included crew management, field direction, data management, documentation, collection and transportation of artifacts, analysis, evaluation of site boundaries and placement of STPs, surface collection grids, test units, surface scrape units, and the write-up of weekly reports, analysis and the report write up for ground stone artifacts.

Planning Area 6, Neighborhood 4A, Phase 2 Residential, Irvine, CA. Client: The Irvine Community Development Company (ICDC). January 1, 2007 – November 16, 2007. Project Archaeologist responsible for archaeological discoveries found during rough grade activities. Duties included, but were not limited to hiring technicians, coordination, site inspections, scheduling, managing documentation and finds, GIS, field direction in securing finds/sites, testing, excavation, collection, laboratory processing and curation of artifacts, weekly discoveries report to Army Corps Of Engineers, and technical report writing. Data recovery sites were CA-Ora-244, locus G with twenty three 2-by-2 meter units and PA6-15 with six 2-by-2 meter units. All units at site 15 contained thermal features.

Planning Area 40, Irvine, CA. Client: The Irvine Community Development Company (ICDC). May 2007. Project archaeologist for on call services for site inspection, resource impact analysis and field monitoring. A complete record search at a CHRIS information center was conducted using the following resources: Historical USGS and other historical maps, National Register of Historic Places, California Register of Historical Resources, California Inventory of Historical Resources, California State Historical landmarks, Directory of Properties in the Historical Resources Inventory, and quad maps showing survey footprints, sites, and isolates.

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The Irvine Company, Portola Springs (Planning Area 6 Phase II) Data Recovery Irvine, CA. Client: The Irvine Community Development Company (ICDC). December 2005 to June 2007. Project Archaeologist responsible for the supervision of 6 lab technicians, training new personnel in artifact analysis, database quality control, ground stone analysis and its corresponding chapter for the report, data management, photo archiving, further contributions to the technical report included field, wet screen and analysis methods, and an appendix for the site records which were submitted to the CHRIS information center.

The Irvine Company, Portola Springs (Planning Area 6 Phase II) Data Recovery, Irvine, CA. Client: The Irvine Community Development Company (ICDC). November 2005 to December 2006. Senior Crew Chief responsible for a 13-month-long Phase III investigation. Field responsibilities included, but were not limited to: keeping detailed data logs, photography, site documentation, equipment, directing a 20 person crew which included 2 assistant crew chiefs, scheduling, macrobotanical sampling and floatation, pollen sampling, wet screen station, artifact collections, transporting archaeological materials, maintenance of field supplies, purchasing, and general coordination. Sites investigated were: CA-Ora-244, 650, 762, 1297, 1311, 1588, and 1590 with a combined total of four hundred and forty three 2- by 2-meter units.

The Irvine Company, Portola Springs, Center Village and Lomas Valley Phase II Irvine, CA. Client: The Irvine Community Development Company (ICDC). January 2005 to September 2005. Crew Chief responsible for Phase II and III investigations, field supervisions, productivity logs, photography, site documentation, equipment, macrobotanical sampling and floating, wet screen station, artifact collections, pollen sampling, transporting archaeological materials, maintenance of field supplies, purchasing, and general coordination. Duties extended to the laboratory post excavation where responsibilities included supervising and training technicians, analysis, quality assessment, cataloging, DPR forms, scheduling maintenance of equipment, and archiving all archaeological data. All sites were tested to assess their significance per CEQA (California Environmental Quality Act) Guidelines and CRHR (California Register of Historical Resources). Sites investigated were PA6-01, 02, 03, 05, 06, 07, 08, 09, and 10.

Marblehead Coastal Development, in San Clemente, CA. Client: SunCal Company. January 2005 to April 2005. Paleontological and cultural monitor during rough grading activities, mapping, photography, GPS, scheduled and supervised other cultural and paleontological monitors

Pelican Hill in Newport Beach, CA. Client: The Irvine Company. September 2005 to November 2005. Field supervisor for rough grade activities. Duties included coordination with contractors, scheduling of paleontological and cultural monitors, and site inspections and assessment of discoveries.

The Irvine Company, Portola Springs, Center Village and Lomas Valley Phase I- Irvine, CA. Client: The Irvine Community Development Company (ICDC). June 2004 to September 2005. Crew chief responsible for providing cultural resource monitoring and evaluation services for a large scale development involving many previously recorded archaeological sites. All sites were tested to assess their significance per CEQA (California Environmental Quality Act) Guidelines and CRHR (California Register of Historical Resources). During Phase II and III investigations, field responsibilities included technician training and supervision, running field excavations and wet screen stations, macrobotanical sampling and floating, as well as lab analysis and management. Ground stone and lithic artifacts were analyzed for use and prepared for residue analysis

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County Sanitation Districts of Los Angeles County, Lancaster Water Reclamation Plant Expansion Project. Client: Los Angeles County Sanitation Districts Nos. 14 and 20. August 2005. Crew chief for Phase I and II investigations, responsible for all pre-field preparations and equipment maintenance. Phase II was conducted on three sites discovered during the Phase I pedestrian survey. Temporary sites name are LWR-01, 02, and 03. Excavation responsibilities included site documentation and mapping, surface collection, photography, transporting of data, materials and crew, supervision of field technicians, and collecting specimens for sampling. Laboratory responsibilities included technician supervision, residue analysis preparations, lithic and ground stone analysis, and macrobotanical sampling and floatation.

El Dorado County Department of Transportation, California Tahoe Conservancy, Lake Tahoe Blvd Lane Reduction & Bike Trial Project, South Lake Tahoe, CA. Client: El Dorado County Department of Transportation. July 2005. Researcher responsible for archaeological documentation and organization. Researched historic and prehistoric archaeological sites including prehistoric camps and bedrock mortar sites, and conducted record searches for the cultural inventory in the project area. A write up of the literature search was produced and submitted in the final report.

Planning area 18 in Irvine, California. Client: The Irvine Community Development Company. September 2005. Crew chief responsible for conducting ten sixty meter trench excavations for Phase II testing. Conducted ground stone and lithic analysis of materials recovered during trenching as well as from previous pedestrian surveys.

Watkins House Historical Evaluation, University of California, Riverside. Client: UC, Riverside. July 2005. Research assistant to the historical archaeologist and was responsible for recording existing room dimensions, including storage rooms, vestibules, offices, chapel, halls, and furnishings. Also recorded were the modern modifications, room elements, and original components of the Watkins house. Responsibilities included photo documentation, and historical research. Contributions were included in the final report.

Shady Canyon Development Project, Irvine, CA. Client: The Irvine Community Development Company. September 2004 to December 2004. Lab technician responsible for floating macrobotanical samples, data entry, archiving and accessioning archaeological collection from sites CA-ORA-383, 730, 732, 733, 806, 1420b, 1422, 1423, 1576, 1582, 1584, 1585, 1586, and 1587

CA-ORA-1589, Irvine, California. Client: The Irvine Community Development Company (ICDC). July 2004 to August 2004. Crew member in a Phase III data recovery of a prehistoric site consisting of thirteen two by two meter units, excavated each in quad units. Responsibilities included producing detailed level forms, soil samples, wall profiling, floating macrobotanical samples, running the wet screen station, data entry, artifact analysis in lab as well as preparing documents and other materials from the project into archival formats.

Espana, CA-RIV-7458, Indio, CA. Client: Regency Homes. August 2004. Crew member of a Phase II investigation of a prehistoric Cahuilla site. Site was surveyed and surface materials were documented prior to beginning excavation. Responsible for training field technicians in excavation, documentation, extracting soil samples, and producing wall profiles, as well as excavating three one by three meter units.

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Professional Organizations/Affiliations

Society for American Archaeology
Society for California Archaeology

Professional Development

CEQA Workshop November 2007
Section 106 Essentials Workshop September 2011

Languages

English and Spanish

Presentations

California State University, Fullerton 23th Annual Anthropology Symposium 2003: A Chronological Synthesis of Southern California

SAA 2007 Conference: Site Structure and Function of Hunter Gatherer Communities of the Tomato Springs Region: A Look at Ground Stone Artifacts

Employment History

Archaeologist May 2008 to June 2008

Applied Biology

Duties: Archaeologist responsible for conducting 7 intense pedestrian surveys in Riverside County, California for transmission lines and telecommunications projects.

Archaeologist January 2008 to April 2008

Ecology and Environment, Inc.

Duties: archaeologists filling various capacities in Phase I investigations as well as conducting record searches, writing fatal flaw reports, and technical reports in accordance with National Historic Preservation Act, Section 106 guidelines.

Archaeologist November 2007 to January 2008

LSA Associates, Inc.

Duties: Field supervisor for projects in compliance with CEQA, 36 Code of Federal Regulations and Section 106 guidelines. Responsibilities included but were not limited to, supervision and directing of crew, artifact collection, creating and managing documentation, GPS, artifact analysis, scheduling, and report writing.

Archaeologist, July 2004 to November 2007

Stantec Consulting, Inc. Irvine, California

*Project Archaeologist, December 2006 to November 2007

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Director of archaeological investigations that included, but were not limited to, survey, construction monitoring, testing of two prehistoric sites and data recovery of 9 Historic Properties under the jurisdiction of the United States Army Corps of Engineers. Responsibilities included conducting cultural inventory searches, producing research designs, artifact analysis, GIS, coordination with Native American consultants and development contractors, scheduling staff, managing documentation (digital and hardcopy), producing 23 DPR site records updates, and report writing in accordance with CEQA and ARMR guidelines.

*Senior Crew Chief, June 2005 to December 2006

Stantec Consulting, Inc. Irvine, California (Formerly The Keith Companies)

Field Supervisor for monitoring, survey, test excavations, and data recovery of Historic Properties under the jurisdiction of the United States Army Corps of Engineers. Ms. Cardenas was also responsible for the supervision of lab technicians, artifact analysis, coordinating with development contractors and staff, archiving documentation, GPS, photo documentation, DPR forms, site updates, research, and assisting in report writing.

*Junior Crew Chief and Research Assistant, July 2004 to June 2005

The Keith Companies Irvine, California

Responsibilities included supervising field crews for Phase II test excavations and data recovery, assisting in report writing, digitizing documentation, data entry, cataloging, photography, artifact analysis, curation, paleontological monitoring and coordination, mapping, site forms and record updates.

Selected Reports

- 2011 *Cultural Resources Inventory Report for the Santa Susana Field Laboratory, Areas I and II, Ventura County, California.* Prepared for the National Aeronautics and Space Administration, George C. Marshall Space Flight Center, Alabama.
- 2011 *City of Moreno Valley San Timoteo Foothill Neighborhood Flood Protection HMGP-DR-1810-CA: Finding of No Historic Properties Affected.* Prepared for the City of Moreno Valley, California and Federal Emergency Management Agency.
- 2011 *Cultural Resources Inventory Report for the Black Rock 5 & 6 Geothermal Project, Imperial County, California.* Prepared for CalEnergy, LLC and the California Energy Commission, Sacramento, California.
- 2011 *Application for Certification of the Black Rock 5 & 6 Geothermal Project: Section 5.3 Cultural Resources.* Submitted to the California Energy Commission, Sacramento, California.
- 2011 *Cultural Resources Monitoring Report for Taxilane S and Bradley West, Los Angeles World Airports, Los Angeles County, California.*
- 2011 *Draft Cultural Resources Inventory Report for the Painted Hills IV Wind Energy Project, Riverside County, California.* Prepared for First Wind Energy, LLC, by CH2M HILL, Santa Ana, California.
- 2011 *DRAFT Cultural Resources Monitoring and Mitigation Plan, Rice Solar Energy Project.* Prepared by Gloriella Cardenas and Aaron Fergusson for the U.S. Bureau of Land Management and the California Energy Commission on behalf of Solar Reserve, LLC.

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- 2011 *Cultural Testing Report for the Alta Infill II Wind Energy Project, Kern County, California: For Archaeological Temporary Site No. S-11.* Submitted to the Kern County Planning Department, Kern County, California.
- 2011 *Cultural Resources Inventory Report for the Alta Infill II Wind Energy Project, Kern County, California.* Prepared for Alta Windpower Development by CH2M HILL, Santa Ana, California.
- 2011 *Cultural Resources Monitoring and Mitigation Plan: Oakley Generating Station Project. CH2M HILL, Santa Ana California.* Prepared for Contra Costa Generating Station, LLC and California Energy Commission.
- 2011 *Cultural Resources Monitoring and Mitigation Plan: Mariposa Energy Project. CH2M HILL, Santa Ana California.* Prepared for Mariposa Energy, LLC and California Energy Commission.
- 2011 *Cultural Resources Literature Search for the All American Canal Service Bridge, Calexico, California.* CH2M HILL, Santa Ana, California. Prepared for the Imperial Irrigation District and Federal Emergency Management Agency.
- 2010 *Cultural Resources Monitoring and Mitigation Plan: Ivanpah Solar Electric Generating System. CH2M HILL, Santa Ana, California.* Prepared for Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC, U.S. Bureau of Land Management, and California Energy Commission.
- 2010 *Cultural Resources for the SNG Suwannee Pipeline Project, Alabama, Georgia and Florida.* CH2M HILL, Santa Ana, California. Prepared for Southern Natural Gas Company.
- 2010 *Cultural Resources Monitoring and Mitigation Plan: Almond 2 Power Plant Project. CH2M HILL, Santa Ana California.* Prepared for Turlock Irrigation District and California Energy Commission.
- 2010 *Devers-Palo Verde No. 2 Transmission Line Project: Construction Transportation Plan – Devers Yard.* Prepared for Southern California Edison. Prepared by CH2M HILL, Santa Ana, California.
- 2010 *Memorandum: Tehachapi Renewable Transmission Project Preconstruction Photographic Documentation Mesa Material Storage Yard.* Prepared for Southern California Edison. Prepared by CH2M HILL, Santa Ana, California.
- 2010 *Cultural Memo for the Schuyler Heim Bridge Replacement and SR 47 Expressway Project - Documentation of Project Description Changes to Land Use, Recreation, and Coastal Zone.* Prepared for Caltrans District 7. Prepared by CH2M HILL, Santa Ana, California.
- 2010 *Devers-Palo Verde No. 2 Transmission Line Project: Construction Specifications.* Prepared for Southern California Edison. Prepared by CH2M HILL, Santa Ana, California.
- 2010 *Memorandum: Tehachapi Renewable Transmission Project Preconstruction Photographic Documentation Segment 8 Telecom.* Prepared for Southern California Edison. Prepared by CH2M HILL, Santa Ana, California.
- 2010 *Phase II Cultural Resources Evaluation of EAFB-3897 (CA-LAN-2692, 19-002692), Air Force Plant 42, Los Angeles County, California.* Submitted to the Base Historic Preservation Office, Edwards AFB.

Gloriella Cardenas, M.A., RPA

- 2010 *Hidden Hills Project Fatal Flaw Analysis (Cultural)*. Prepared for Bright Source Energy, Oakland, California. Prepared by CH2M HILL, Santa Ana, California.
- 2009 *Cultural Resources Inventory Report for the 9.02 Acre Turner Parcel (Assessors Parcel Number 686-040-021), Section 2, Township 5 South, Range 4 East, Agua Caliente Indian Reservation, City of Palm Springs, Riverside County, California*. Submitted to the Agua Caliente Band Of Cahuilla Indians, Tribal Historic Preservation Office, Palm Springs, California.
- 2009 *Cultural Resources Inventory Report for the 52.27 Acre Andreas Cove Parcels (Assessors Parcel Numbers 686-040-024, 686-040-025, 686-040-026, and 686-040-027), Section 2, Township 5 South, Range 4 East, Agua Caliente Indian Reservation, City of Palm Springs, Riverside County, California*. Submitted to the Agua Caliente Band Of Cahuilla Indians, Tribal Historic Preservation Office, Palm Springs, California.
- 2009 *Cultural Resources Inventory Report for the 8.45 Acre Turner Parcel (Assessors Parcel Number 686-040-006), Section 2, Township 5 South, Range 4 East, Agua Caliente Indian Reservation, City of Palm Springs, Riverside County, California*. Submitted to the Agua Caliente Band Of Cahuilla Indians, Tribal Historic Preservation Office, Palm Springs, California.

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Clint Helton, RPA

Senior Cultural Resources Specialist

Education

M.A., Anthropology, Brigham Young University

B.A., Language and Literature, University of Utah

Professional Registration

Registered Professional Archaeologist (1999, No. 11280)

Distinguishing Qualifications

- 14 years of experience conducting environmental impact evaluations, with particular expertise in conducting cultural resources studies in California, Arizona, Nevada, and Utah
- Extensive experience in regulatory compliance, cultural resources, National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance activities
- Highly experienced managing cultural resources studies for large linear utility, energy, and transportation projects

Relevant Experience

Mr. Helton has more than 14 years of environmental management experience in the United States. He has a strong background in environmental impact evaluations, having directed technical studies; negotiated with lead agencies, responsible agencies and clients; and has written, edited, and produced a substantial number of environmental review and technical documents. Mr. Helton frequently acts as a senior technical advisor and senior reviewer for projects and clients throughout the United States, with particular expertise in Arizona, California, Nevada, and Utah.

His knowledge of regulatory compliance and cultural and paleontological resources enables him to manage National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance activities and document preparation. Mr. Helton is a particularly skilled practitioner of federal regulations governing treatment of cultural resources, especially Section 106 of NHPA (36CFR800) and the Native American Graves Protection and Repatriation Act (NAGPRA) (43CFR10). Mr. Helton has significant expertise conducting consultation with State and Federal agencies, as well as facilitating formal government-to-government consultation with Native American groups and tribes throughout the western U.S. Mr. Helton has authored numerous environmental technical reports, cultural resources management plans, cultural resources studies, Programmatic Agreements, Memorandums of Understanding (MOU), and contributed to many NEPA documents for a variety of private and public sector clients.

Mr. Helton is experienced with the challenges of preparing environmental documentation for large linear utility and transportation projects and is familiar with the process and guidelines of the California Energy Commission (CEC) and Federal Energy Regulatory Commission (FERC), Western Area Power Administration (WAPA), Bureau of Land Management (BLM), US Forest Service, Bureau of Indian Affairs (BIA) among others.

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Additionally, Mr. Helton has conducted environmental impact assessment in Mexico. Mr. Helton is native-level bilingual in Spanish and has extensive knowledge of many Spanish-speaking countries.

Representative Projects

Task Lead, Tonto National Forest Control Road Bridge Replacement Project, Gila County, Arizona.

Conducting cultural resources study in compliance with Section 106 of the National Historic Preservation Act. Coordination with Central Federal Lands, US Forest Service, Arizona SHPO, and consultation with Gila County, Arizona. Preparation of technical report.

Task Manager, US Border Patrol; Customs and Border Protection, Facilities Expansion, Multiple Locations Along United States Southern Border.

Lead preparation of numerous cultural resources studies in support of NEPA Environmental Assessments and Phase I Environmental Site Assessments in support of US Border Patrol facility expansion projects along the US/Mexico border. Included investigations for facilities in New Mexico, Texas, Arizona, and California. Received “Exceptional” performance rating.

Task Manager/Principal Investigator, SolarReserve, Rice Solar Energy Project, San Bernardino County, California.

Assisted with preparation of AFC for CEC in support of a large proposed solar power generation facility covering over 4,000 acres of land managed by the Bureau of Land Management in San Bernardino County, California. Lead Federal agency is WAPA and also included BLM coordination. Responsible for preparation of cultural resources component of project, including archival research, field surveys, report preparation, and conducting Native American consultation.

Project Principal; Parker to Blythe Transmission Line Project; Western Area Power Administration; Imperial County, California.

Provided overall management of cultural resources services for the Parker-Blythe #1 161-kilovolt (kV) transmission line project. The inventory extended from Blythe, California, to Parker, Arizona. A total of 147 sites (136 in California and 11 in Arizona) were recorded.

Task Manager, BrightSource Energy, Ivanpah Solar Electric Generating System Project, San Bernardino County, California.

Assisted with preparation of AFC for CEC in support of a large proposed solar power generation facility covering over 4,000 acres of land managed by the Bureau of Land Management in San Bernardino County, California. Responsible for preparation of cultural resources component of project, including archival research, field surveys, report preparation, and conducting Native American consultation.

Task Manager, National Science Foundation National Ecological Observation Network (NEON); Multiple Locations in Continental United States (AL, AZ, CA, CO, KS, MA, MD, MI, MN, NH, NM, FL, GA, OK, TX, WA, WI, VA) and Hawaii, Alaska, and Puerto Rico.

Task Lead and overall management of a large national cultural resources study in support of NEPA Environmental Assessment. The study is analyzing environmental impacts of a large and comprehensive network of scientific infrastructure located in a variety of ecological zones designed to monitor environmental conditions and to provide data on climate change. Work included archival research, field visits, and coordination with applicable state archives and preparation of correspondence to multiple SHPO's.

Task Manager, Terra-Gen LLC Alta Wind Project, Kern County, California.

Task Lead, quality control manager, and overall management of cultural resources studies for this 5,000-acre-plus alternative

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energy development project near the City of Tehachapi, Kern County, California. Provide regulatory guidance, regional technical expertise in cultural resources and coordination with Kern County. Supervised inventory for cultural resources, technical report preparation, and conducted Native American Consultation.

Task Manager, Iberdrola Renewables, Multiple Solar Energy Development Projects, Arizona, California, New Mexico, and Nevada. Led preparation of cultural resources assessments for solar power generation facilities in Arizona, New Mexico, Nevada, and California. Mr. Helton is acting as principal investigator for several critical issues analyses as well as full permit preparation of solar energy development projects in Arizona, California, Nevada, and New Mexico. Project acreages range from 5,800 acres to 35,000 acres.

Task Manager, PPM Energy, Solar Energy Development, Arizona, Nevada, California. Cultural resources assessments for solar power generation facilities in Arizona, Nevada, and California. Mr. Helton is acting as principal investigator for literature searches and field visits for several proposed solar energy projects in Arizona, California, and Nevada. Project acreages range from 2,000 acres to 25,000 acres.

Professional Organizations/Affiliations

Association of Environmental Professionals
Register of Professional Archaeologists
Society for American Archaeology
American Anthropological Association

Training and Certifications

CEQA Training
NEPA Training
Section 106/NHPA Training
Federal Antiquities Permit in Arizona, California, Oregon, Washington, Utah, and Nevada

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Curriculum Vitae

Michelle Kaye

Home Address:

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(707) 746-7871 (h)
(707) 315-6013 (c)
Email: mkaye_1@yahoo.com

Citizenship: U.S. Citizen and Canadian Citizen (dual nationality)

- ✓ Qualifications: Physical Anthropologist/Archaeologist with a strong background in cultural resource management, including producing reports to comply with NEPA, NHPA, CEQA, and NAGPRA. Over 10 years of experience conducting archaeological field and laboratory research, including experience with federal and defense contracts. Specialized training in human and faunal osteological analysis, forensic anthropology, forensic archaeology, DNA analysis, and journalism. Over 11 years of experience as a journalist. Recipient of a Lucas Foundation Research Grant, Forensics Science Foundation (2003) and the Geist Fund Grant (2007) among others.

Education:

- 2008: Ph.D., Biological Anthropology. University of Alaska Fairbanks, P.O.B. 757500, Fairbanks, AK. 99775. Advisor: Dr. Joel Irish.
- 2003: M.A., Biological Anthropology. San Francisco State University, 1600 Holloway Avenue, San Francisco, CA. 94132. Advisors: Drs. Steve Gabow and Mark Griffin.
- 1993: B.A., Anthropology, emphasis in Archaeology. San Francisco State University, 1600 Holloway Avenue, San Francisco, CA. 94132. Advisor: Dr. Steve Gabow
- 1993: B.A., Journalism. San Francisco State University, 1600 Holloway Avenue, San Francisco, CA. 94132. Advisor: Dr. John Burks.

Additional Education:

- Winter 2011: American Academy of Forensic Sciences, 63rd Annual Meeting, Chicago IL. Completed workshops in Geometric Morphometrics and Digitizing, and in Fordisc 3.1.
- Winter 2010: American Academy of Forensic Sciences, 62nd Annual Meeting, Seattle, WA. Completed workshop in The Forensic Investigation of Human Remains from Armed Conflicts and Catastrophes.
- Winter 2009: American Academy of Forensic Sciences, 61st Annual Meeting, Denver, CO. Completed workshop in Advances in Archaeological Approaches to Crime Scene Investigation.
- Winter 2008: American Academy of Forensic Sciences, 60th Annual Meeting, Washington, D.C. Completed workshop in Measurements, Statistics, Terminology, and Quantitative Methods: Uses and Interpretations in Physical/Forensic Anthropology.

Michelle Kaye

- Winter 2007: American Academy of Forensic Sciences, 59th Annual Meeting, San Antonio, TX. Completed a workshop in Restorative Dentistry as Evidence, and a workshop in Missing Persons.
- Winter 2006: American Academy of Forensic Sciences, 58th Annual Meeting, Seattle, WA. Completed a workshop in Advanced Topics in STR DNA Analysis, and a workshop in Recovery, Examination, and Evidence of Decomposed and Skeletonized Bodies: an Anthropological and Entomological Approach.
- Winter 2005: American Academy of Forensic Sciences, 57th Annual Meeting, New Orleans, LA. Completed workshop in Quality Assurance in Forensic Anthropology.
- Winter 2004: American Academy of Forensic Sciences, 56th Annual Meeting, Dallas, TX. Completed workshop in Forensic Human Mitochondrial DNA Analysis.
- Summer 2003: International Association for Identification, 88th International Education Conference, Ottawa, Canada. Certificate received in Forensic Entomology and the Crime Scene, Development of Latent Prints with Titanium Dioxide, and certificate received in DNA Unraveled: A Practical Guide to Crime Scene Investigators.
- Winter 2003: American Academy of Forensic Sciences, 55th Annual Meeting, Chicago, IL. Certificates received in Extracting DNA from Challenging Sample Materials and in Low Copy Number DNA Analysis.
- Fall 2002: County of Los Angeles Department of the Coroner, Los Angeles County Coroner Seminar, Los Angeles, CA. Certificate Received in Handling Death in a Diverse Society.
- Summer 2002: International Association for Identification, 87th International Educational Conference, Las Vegas, NV. Certificates received in Forensic Archaeology, Scattered Human Remains and Forensic Archaeology, Buried Human Remains.
- Summer 2002: Disaster Mortuary Operational Response Teams Regional Training Session, Region 9, Laughlin, Nevada. Attended discussions on the use of Disaster Portable Mortuary Units, site recovery, identification of unattached body parts, and the computerized Victim Identification Program.
- Summer 2000: University of New Orleans, New Orleans, LA. and Southern Institute of Forensic Science. Certificate received in Basic Forensic Pathology for Law Enforcement, Death Investigators, and Health Care Professionals.
- Summer 1999: University of New Orleans, New Orleans, LA. and Southern Institute of Forensic Science. Certificate received in Advances in Forensic Anthropology.
- Summer 1998: University of New Orleans, New Orleans, LA. and Southern Institute of Forensic Science. Certificate received in Basic Forensic Anthropology.
- Summer 1997: University of California at Berkeley, Berkeley, CA. Completed course in Archaeological Field Methods. PI: Dr. Laurie Wilke, U.C. Berkeley Department of Anthropology. Excavation conducted on an 1860's homestead and commercial development located within Annadel State Park in Sonoma County, CA.

Michelle KayeAnthropology/Academic Employment:

- April 2011 – June 19, 2011: Analytical Environmental Services. Senior Archaeologist. 1801 7th Street Suite 101, Sacramento, CA. 95811. Supervisor: Miss Ryan Lee. Phone: (916) 447-3479. (Duties: Archaeological field and laboratory work, cultural resource management compliance, including writing reports to comply with CEQA, NEPA, NHPA, and NAGPRA.)
- August 2010 – April 2011: Chambers Group Inc. Senior Cultural Resources Specialist/Lead Archaeologist, U.S. Army National Training Center, Fort Irwin. NTC-DPW-Environmental-Cultural Resources. IMWE-IRW-PWE P.O. Box 105085 – Fort Irwin, CA. 92310-5085. Supervisor: Dr. Bob Yelin. Phone: 818-388-1705. Email: byelin@chambersgroupinc.com. (Duties: Supervise a staff of six archaeologists. Direct experience with all aspects of archaeology, including compliance with archaeological legislation including NEPA documentation, sections 106 and 110 of NHPA, archaeological surveys, site recordation, test excavation, and site evaluation for eligibility to the National Register of Historic Places. Human and faunal osteological analysis. Contact point for multiple agencies and contractors.)
- July 2010 – August 2010: U.S. Department of the Interior. U.S. National Park Service. Aztec Ruins National Monument. Archaeologist. Address: 84 County Road 2900 “Ruins Road” Aztec, New Mexico 87410. Supervisor: Mr. Gary Brown. Phone: 505-334-6174. Email: Gary_Brown@nps.gov. (Duties: Archaeological excavation, identification, and inventory of archaeological resources, cultural resource management, ruins stabilization, and scientific research and interpretation of archaeological resources.)
- March 2008 – September 2010: University of California Medical Center San Francisco. Department of Orthopaedic Surgery. UCSF/SFGH Orthopaedic Trauma Surgical Training Facility. Research Assistant IV. Address: San Francisco General Hospital, Department of Orthopaedic Surgery, University of San Francisco, 1001 Potrero Ave., Room 3A36, San Francisco, CA 94110. Supervisor: Mr. John Houston III, Division Manager. Phone: 415-206-8812. Email houstonj@orthosurg.ucsf.edu. (Duties: Dissection and prosection of cadavers, suturing cadavers, biomechanical research, assisting surgeons and engineers in the testing and validation of hardware on human cadavers to repair bone fractures, familiarization with orthopaedic surgical instrumentation, operation of robots for the testing of hardware, reading radiographs, operation of Philips X-ray/Fluoroscope, Philips C-Arm, Philips 3-D C-Arm, and Orthoscan Mini C-Arm.)

Michelle Kaye

- February 2010: Paleo Solutions. Archaeologist. Address: 2035 Palcentia Avenue, Suite D, Costa Mesa, CA. 92627. Supervisor: Scott Armstrong, Vice President. 526-818-7713. (Duties: Contract position. Conducted an archaeological survey along Segment 8 of the Tehachapi Renewable Transmission Project in Los Angeles and San Bernardino Counties for Southern California Edison under subcontract to Pacific Legacy. Documented historical artifacts. Project area approx. 35 miles.)
- March 17, 2009-Oct. 31, 2009: Cogstone Resource Management, Inc. Cultural Resource Management. Field Supervisor Tehachapi Renewable Transmission Project, Los Angeles and Kern County, California. Address: 1518 West Taft Avenue, Orange, CA. 92685. Field Director: David Morrill Phone: (714)-743-9206. (Duties: Supervised a team of cross-trained archaeology and paleontology field monitors in several locations in and around the Mojave Desert and Angeles National Forest, conducted as-needed archaeological surveys and field monitoring for Southern California Edison under subcontract to Pacific Legacy. Duties included reporting on site conditions, soil/geologic analysis, human and faunal osteological analysis, site recordation, site mitigation, data recovery, and documentation for environmental and archaeological impact studies. Knowledge of legislation affecting archaeological projects, incl. NEPA, CEQA, and NHPA, esp. sections 106 and 110. Served as a contact point for multiple agencies and contractors. Total project area encompassed more than 75 linear miles. Additional projects: Pixar Construction site, Emeryville, CA.)
- May 2006 – Aug. 2006: Holman and Associates, Archaeological Consultants. Archaeologist. Address: 3615 Folsom Street, San Francisco, CA. 94110. Phone: 415-550-7286. Supervisor: Mr. Randy Wiberg, Principal Investigator. Phone: 650-588-3104. Email: Rwiberg@comcast.net. (Duties: Part of a team that excavated approx. 400 human burials from a Paleo-Indian site. Survey, test pits, excavation of human remains, faunal and osteological analysis, map reading, creation of profile maps, compass reading, collection of samples for floatation, screening, accurate detailed recording of field notes, field interpretation strategies, and knowledge of legislation pertaining to archaeology (NEPA, CEQA, NHPA, and NAGPRA.)
- Aug. 2005 - Dec. 2005: University of Alaska Fairbanks, Department of Anthropology. Graduate Teaching Assistant, Human Osteology. Address: University of Alaska Fairbanks, 310 Eielson Building, P.O.B. 757720, Fairbanks, AK. 99775-7720. Supervisor: Dr. Joel D. Irish, Professor of Biological Anthropology. Phone: 907-474-6755. Email: ffjdi@uaf.edu. (Duties: Assisting with laboratory instruction in human and faunal osteology, giving occasional lectures, grading papers and examinations, holding office hours, answering student questions, organizing study sessions, supervising classroom, and processing faunal remains.)

Michelle Kaye

- Sept. 2004 - May 2005: Center for Alaska Native Health Research. Graduate Research Assistant. Address: Institute of Arctic Biology, Irving 1, rm. 311, Box 757000, University of Alaska Fairbanks, Fairbanks, AK. 99775-7000. Supervisor: Dr. Cécile Lardon, Project PI. Phone: 907-474-5272. Email: cecile@canhr.uaf.edu. Salary \$16.00/hr. Hours: 20/wk. (Duties: Statistical analysis of biological and social support data using SPSS. Helped initiate a community-based support and educational system to address diabetes and obesity in seven Yu'pik villages. Academic journal and internet research, generating memos, reports, PowerPoint presentations, and supervising one employee.)
- Jan. 2003 - May 2004: University of Alaska Fairbanks, Department of Anthropology. Graduate Teaching Assistant, Cultural Anthropology. Address: University of Alaska Fairbanks, 310 Eielson Building, P.O.B. 757720, Fairbanks, AK. 99775-7720. Email: fyanth@uaf.edu. Supervisor: Dr. Patty A. Gray, Affiliate Associate Professor of Cultural Anthropology. Phone: +353-1-708-6084. Email: patty.gray@nuim.ie. (Duties: Instructor for three discussion sections of Cultural Anthropology 100X approx. 35 students each, Teaching Assistant to large seminar on the same topic, giving lectures, grading papers and examinations, holding office hours, answering student questions, organizing study sessions, and supervising classroom.)
- Aug. 2000 – Dec. 2000: San Francisco State University, Department of Anthropology. Graduate Research Assistant, Biological Anthropology. Address: San Francisco State University, Department of Anthropology, 1600 Holloway Avenue, San Francisco, CA. 94132. Supervisor: Dr. Steve Gabow, Professor of Anthropology Emeritus. Phone: 415-338-2046. Email: antho@sfsu.edu. (Duties: Assisting professor with instruction in biological anthropology, giving occasional lectures, grading papers and examinations, holding office hours, answering student questions, organizing study sessions, and supervising large classroom, approx. 200 students.)
- Sept. 1998 – May 2000: San Francisco State University, Department of Anthropology NAGPRA Compliance Project. Graduate Research Assistant. Address: San Francisco State University, Department of Anthropology, 1600 Holloway Avenue, San Francisco, CA. 94132. Supervisor: Dr. Jeffrey B. Fentress, NAGPRA Director. Phone: 415-338-3075. Email: fentress@sfsu.edu. (Duties: Identification and analysis of human remains for NAGPRA compliance. Creation of biological profile. Determination of age, sex, ancestry, stature, and trauma of individuals from human skeletal remains. Cataloguing remains. Writing official NAGPRA reports on results of osteological analysis. Identification of common bone pathologies. Transcription of interviews with Native Americans. Expert on NAGPRA regulations.)

Michelle Kaye

- Jan. 2000 – May 2000: San Francisco State University, Department of Anthropology. Graduate Research Assistant, Biological Anthropology. Address: San Francisco State University, Department of Anthropology, 1600 Holloway Avenue, San Francisco, CA. 94132. Supervisor: Dr. Steve Gabow, Professor of Anthropology Emeritus. Phone: 415-338-2046. Email: antho@sfsu.edu. (Duties: Assisting professor with instruction in biological anthropology, giving occasional lectures, grading papers and examinations, holding office hours, answering student questions, organizing study sessions, and supervising large classroom, approx. 200 students.)
- Sept. 1998– May 2000: San Francisco State University, Department of Biology. Research Assistant, Anatomy Laboratory. Address: San Francisco State University, Department of Biology, Hensill Hall 534, 1600 Holloway Avenue, San Francisco, CA. 94132. Supervisors: Mr. Jett Chin, Laboratory Instructor, Biology. Phone: 415-338-1549. Mr. Lawrence Okumoto. Phone: 408-390-0760. Email: hinagata@hotmail.com. (Duties: Instruction in osteology. Assisting anatomy students with dissection of human cadavers and processing human remains. Macerating human and faunal remains, processing remains by heating to remove all tissue. Identification, organization, and rejoining of isolated bone components. Maintenance of a (dermestid) beetle colony.)
- May 1998 – Aug. 1998: University of California at Berkeley, Department of Anthropology. Research Assistant to Graduate Student in the Department of Anthropology. Archaeologist/Laboratory Assistant. Address: University of California at Berkeley, Department of Anthropology, 232 Kroeber Hall, Berkeley, CA. 94720-3710. Phone: 510-642-3392. Fax: 510-643-8557. (Duties: Supervised undergraduate students in the field. Excavation and test pits conducted at an 1860's homestead, a small historic cabin and at stone quarries, dating from 1887 to 1913, located within Annadel State Park in Sonoma County, CA., Test pits, excavation, faunal and human osteological analysis, map reading, creation of profile maps, compass reading, screening, accurate detailed recording of field notes, field interpretation strategies, and knowledge of legislation pertaining to archaeology.)
- May 1997 – Aug 1997: University of California at Berkeley, Department of Anthropology. Archaeologist/Laboratory Assistant (Field School). Address: University of California at Berkeley, Department of Anthropology, 232 Kroeber Hall, Berkeley, CA. 94720-3710. Supervisor: Dr. Laurie Wilkie. Professor of Archaeology. Phone: 510-643-0677. Email: lawilkie@berkeley.edu. (Duties: Excavation and test pits conducted at an 1860's homestead, a small historic cabin and at stone quarries, dating from 1887 to 1913, located within Annadel State Park in Sonoma County, CA. Site survey, use of transit, test pits, excavation, faunal osteology, map reading, creation of profile maps, compass reading, screening, accurate detailed recording of field notes, cleaning and curation of artifacts, field interpretation strategies, and knowledge of legislation pertaining to archaeology.)

Michelle KayeJournalism Employment:

- Aug. 1994 – May 2000: Contra Costa Times Newspapers/Knight Ridder. Journalist. Address: 1 Harold Court, Walnut Creek, CA. 94597. Editor: Mr. David Weinstein. Phone: 925-933-1717. Email: davidsweinstein@yahoo.com. Hours: varied. (Duties: Generating and writing stories on people and places primarily in the San Francisco Bay Area. Writing published in several sections, including Business, Community News, Health/Science, Travel/Outdoors, Features and Special Sections. Stories published in Contra Costa Times, West County Times, Valley Times, Ledger Dispatch, and San Ramon Valley Times. (Dailies). Stories also published in the Contra Costa Times magazine: Discover the Delta.)
- July 1998 - Oct. 1998: USA Hosts Destination Services. Contract Writer. Address: 657 Mission Street, Suite 202, San Francisco CA. 94105. Phone: 415-695-8000. Email: sales@usahosts.com. Hours: varied. (Duties: Responsible for updating and revising USA HOSTS Tours and Activities Tariff, delivering accurate information on tours, museums, sights, restaurants, hotels, convention facilities, and banquet options for corporate clients visiting the Bay Area.)
- Oct. 1997 - April 1998: Fodor's Travel Publications. Travel Writer. 1745 Broadway, 15th floor, New York, NY 10019. Hours: 40/wk. (Duties: Responsible for writing introduction to California and for updating and revising material covering the Sierra Nevada and Eastern Sierra, delivering accurate information on tourist resources, transportation, museums and sights, restaurants, hotels, and outdoor activities. Material published in Fodor's California 1999, as well as in the San Francisco city guide.)
- May 1996 – Aug. 1996: Fodor's Travel Publications. Travel Writer. 1745 Broadway, 15th Floor, New York, NY 10019. Hours: 40/wk. (Duties: Responsible for updating and revising material covering the Sierra Nevada and the San Joaquin Valley, L.A. Environs and Coast, Palm Springs, and the California Desert, delivering accurate information on tourist resources, transportation, museums and sights, restaurants, hotels, and outdoor activities. Material published in The Berkeley Guides to California, as well as the San Francisco and Los Angeles city guides.)
- Aug. 1994 – June 1995: The Inter-City Express/Daily Journal Corporation. Reporter. Address: 1109 Oak Street, Ste. 103, Oakland, CA. 94607-4917. Phone: 510-272-4747. (Duties: Reporting on real estate, legislative issues related to construction, finance, crime/homicides in Oakland, Oakland city government, and human interest.)
- March 1993 – March 1995: The Nose Magazine. Writer/Intern. San Francisco, CA. Editor: Mr. Jack Boulware. (Duties: Writing for various magazine sections, Editing under deadline pressure, research, fact-checking, typing, phones, mailings, filing, and general office support.)
- July 1994 – Nov. 1994: Diabetes Interview. Staff Writer. San Francisco, CA. (Duties: Medical writing on advances in the care and treatment of diabetes, academic research, fact checking, and editing.)

Michelle Kaye

- Sept. 1993 – Oct. 1993: The Polk Street Express. Staff Writer. San Francisco, CA. (Duties: Reporting on the Polk Street area, and interviewing local residents, generating stories for publication, editing, research and fact-checking.)
- Sept. 1993 – Oct. 1993: The New Fillmore. Staff Writer. Address: 2130 Fillmore Street , #202, San Francisco, CA. 94115 415-441-6070. Email: editors@newfillmore.com. (Duties: Reporting from a community perspective, writing feature and news stories for publication, editing, fact checking, and research.)
- Sept. 1993: The Petaluma Argus-Courier. Freelance Writer. Address: P.O.B. 1091, Petaluma, CA., 94953. Phone: 707-776-8453. Email: csamson@arguscourier.com. (Duties: Reporting on bike helmet safety: laws and regulations after the death of two Petaluma youngsters in biking accidents.)
- Jan. 1991 – May 1992: Prism Magazine. Staff Writer. Address: San Francisco State University, Department of Journalism, Humanities 305, 1600 Holloway Avenue, San Francisco, CA, 94132. Email: jour@sfsu.edu. Editor: Dr. John Burks, Professor of Journalism. Phone: 415-338-1689. Email: jburks@sfsu.edu. (Duties: Writing feature stories, a travel column, restaurant reviews, and reporting on San Francisco trends. Editing, fact-checking, research, conducting interviews, laying out the magazine, and photography.)
- Oct. 1989: Golden Gater Newspaper. Freelance Writer. Address: San Francisco State University, Department of Journalism, Humanities 305, 1600 Holloway Avenue, San Francisco, CA, 94132. Email: jour@sfsu.edu. Editor: Dr. John Burks, Professor of Journalism. Phone: 415-338-1689. (Duties: Reporting on the aftermath of the Loma Prieta earthquake, generating stories for publication, fact-checking, editing, and research)

Grants and Awards Received:

Geist Fund Grant. Grant entitled: Molecular Identification and Analysis of Treponematosi s in Ancient Mummified Remains from Northern Chile and Southern Peru. 2007 (\$1,000)

University of Alaska Fairbanks, Anthropology Department Fellowship, 2006 (\$6,050)

Graduate Chancellor Assistantship, 2006 (\$2,196)

University of Alaska Fairbanks, Travel Grant, 2005 (\$600)

Lucas Foundation Research Grant, Forensic Sciences Foundation 2003, (\$2,500). Grant entitled DNA Degradation in Progressively Burned Human Bone and Tissue: Recognition of Techniques for Optimal DNA Sequence Analysis. Grant awarded to (PI) Ms. Michelle Kaye, Ms. Elayne Pope, Dr. Frank Cipriano, and Dr. O.C. Smith.

Anthropology Department, San Francisco State University, Research Fund: 2000, (\$700) for Ancient DNA Research.

Michelle Kaye

California State University Grant, 1997 (\$948), 1998 (\$1,584), 1999 (\$1,506), 2000 (\$438).

College of Behavioral and Social Sciences, Grant for Graduate Research, 1999 (\$500)

Journalism Department, San Francisco State University, Award for Article Writing, spring 1993.

California Intercollegiate Press Association, Gold Press Card, Best Magazine Human Interest (Prism), 1992.

America-Israeli Friendship League Young Journalist's Exchange Program in Israel, 1992

Contiki Tours International Travel Writing Contest, Spring 1991.

Medal Winner Santa Rosa Press Democrat Editorial Contest, Spring 1988.

Public Speaking Finalist, Sonoma County, Spring 1988.

Reports and Publications:

Molecular Identification and Analysis of Treponematosi (Syphilis, Bejel, Yaws, or Pinta) in Ancient Mummified Remains from Northern Chile and Southern Peru. Ph.D. Dissertation. University of Alaska Fairbanks, Department of Anthropology, Fairbanks, AK. 2008.

Possible Treponematosi in the Nanjemoy Ossuaries, Maryland. Master's Thesis, San Francisco State University, Department of Anthropology, San Francisco, CA. 2003.

Osteological Analysis of Human Remains from Alameda sites (4-Ala-12, 4-Ala-13). Dr. Jeff Fentress, Ms. Julie Lopez, and Ms. Michelle Kaye. A report prepared for the NAGPRA Inventory, Department of Anthropology, San Francisco State University, San Francisco, CA. 1999.

Osteological Analysis of Human Remains from Alameda sites (4-Ala-328, 4-ALA-329). Dr. Jeff Fentress, Ms. Julie Lopez, Ms. Michelle Kaye, and Mr. Nathan Holton. A report prepared for the NAGPRA Inventory, Department of Anthropology, San Francisco State University, San Francisco, CA. 1999.

Chemical Contamination of Repatriated Native Californian NAGPRA Materials. Wrote and designed materials for conference held at San Francisco State University, San Francisco, CA. Sept. 30-Oct. 1, 2000.

Numerous reports produced for the U.S. Army, National Training Center/Fort Irwin for cultural resource management compliance. Reports available upon request.

Michelle Kaye

Archaeology Projects:

- *Annadel State Park, Sonoma, CA.
- *Shea Homes, Trilogy Subdivision, Brentwood, CA.
- *Tehachapi Renewable Transmission Project, multiple locations in Southern California.
- *Aztec Ruins National Monument, Aztec, NM
- *Fort Irwin National Training Center, Fort Irwin, CA.
- *Auburn Indian Rancheria Tribal Project, Auburn, CA.
- *Coyote Valley Indian Reservation, Redwood Valley, CA.
- *Pauma Indian Reservation, Pauma Valley, CA.
- *San Jose Water Company, San Jose, CA.
- *Half Moon Bay, Vicente Creek Water Diversion, Half Moon Bay, CA.
- *Wheeler Island, Solano County, CA.
- *Calaveras Telephone, Calaveras County, CA.
- *Lake Natoma Bike Trail, Folsom, CA.

Abstracts:

Mercury in Ancient Human Hair from a Chilean Mummy. Ms. Michelle Kaye, Dr. Joel Irish, Dr. Bernardo Arriaza, and Dr. Lawrence Duffy. Results of mercury analysis on a northern Chilean Chinchorro mummy. Results compared to mummies from the Karluck archaeological site in Kodiak, AK. and Barrow, AK. to provide comparative examples of dietary mercury exposure. Arctic Science Conference, Fairbanks, AK. October 2-4, 2006. (Supported in part by NSF-OCE 0525275)

Public Presentations:

Molecular Identification and Analysis of Treponematosi (Syphilis, Bejel, Yaws, or Pinta) in Ancient Mummified Remains from Northern Chile, presented at the annual meeting of the Mountain, Desert, Coastal Forensic Anthropologists, Lake Mead, NV. May 2007.

Molecular Identification and Analysis of Treponematosi (Syphilis, Bejel, Yaws, or Pinta) in Ancient Mummified Remains from Northern Chile and Southern Peru, presented at the University of Alaska Fairbanks, Fairbanks, AK. March 2007.

An Experimental Test of the Accuracy of Human Forensic Identification Techniques for Analysis of Burn-damaged Bone and Tissue, presented at the American Academy of Forensic Sciences annual meeting, New Orleans, LA. February 2005.

The Role of the Forensic Anthropologist, presented at City College of San Francisco, San Francisco, CA. February 2001.

Possible Treponematosi in the Nanjemoy Ossuaries, Maryland, presented at San Francisco State University, San Francisco, CA. Fall 2001.

Introduction to Archaeology, presented at Petaluma Valley Academy, Petaluma, CA. Fall 1999.

Additional Archaeological Experience:

- Oct. 2006: Archaeologist: University of Alaska Fairbanks. Supervisor: Dr. Joel Irish. Excavation of Alaskan Honor Chief Nagita from an unmarked grave in Fairbanks, AK. Work conducted for Alaska Natives from Nenana, AK.

Michelle Kaye

Oct. 2005: Search Crew: University of Alaska Fairbanks. Supervisor: Dr. Joel Irish. Assisted Alaska State Troopers in the search for a clandestine grave in Fairbanks, AK.

Molecular/Anthropological Research/Contract Work:

- 2011: “Elemental Analysis, Mineralogical Analysis, and DNA Recovery from Progressively Burned Human Bone and Tissue.” A grant submitted to the National Institute of Justice in response to grants relating to “Research and Development on Instrumental Analysis for Forensic Science Applications.” Drs. Greg Hampikian, Mike Davis, Matthew Kohn, Lisa Nelson, Michelle Kaye, and Celina Suarez.
- 2011: “Signatures of Burn History: Elemental Analysis, Mineralogical Analysis, DNA Profile Changes, and Electron Microscopy of Progressively Burned Human Bone and Tissue. A grant submitted to the National Institute of Justice, in response to solicitation for grants relating to “Basic Scientific Research to Support Forensic Science for Criminal Justice Purposes.” Drs. Greg Hampikian, Matthew Kohn, Michelle Kaye, Elayne Pope, Paul Olin, Samantha Evans, and Laura Wendell.
- 2008-2010: Variation in femur subtrochanteric shape in Alaska Natives. Research undertaken at the American Museum of Natural History, Department of Physical Anthropology, New York, NY. Results compared to various ancestral groups. Work conducted with Drs. Daniel Westcott and George W. Gill.
- 2006: Molecular analysis of three shrunken heads from Ecuador. Research conducted to determine through mtDNA analysis whether the skin covering the crania is human. Laboratory research conducted at the Conservation Genetics Laboratory at San Francisco State University, San Francisco, CA.
- 2006: Molecular analysis of ancient mummies from northern Chile. Research conducted to recover mtDNA and to test for treponematosi, tuberculosis, and leprosy. Molecular analysis conducted at the Paleo-DNA Laboratory, Northern Ontario Technology Center, Thunder Bay, Ontario (Canada). Bioarchaeological research conducted investigating a possible relationship between treponematosi in the Chinchorro mummies and their mortuary rituals. Osteological analysis conducted at the Museo San Miguel de Azapa in Arica, Chile.
- 2006: Recovery of mtDNA and nuclear DNA from an ancient Egyptian mummy. Analysis conducted at the Paleo-DNA Laboratory, Northern Ontario Technology Center, Thunder Bay, Ontario (Canada).
- 2006: Analysis of mtDNA from a 100-year-old skeleton from Nenana, AK. Analysis undertaken for the family of Chief Nagita. Analysis conducted at the Paleo-DNA Laboratory, Northern Ontario Technology Center, Thunder Bay, Ontario (Canada).
- 2003: Lucas Research Foundation Grant entitled DNA Degradation in Progressively Burned Human Bone and Tissue: Recognition of Techniques for Optimal DNA Sequence Analysis. Research conducted with Ms. Elayne Pope, MA, University of Arkansas and Dr. Frank Cipriano, Director, Conservation Genetics Laboratory, San Francisco State University, San Francisco, CA.

Michelle Kaye

2003: Laboratory research conducted to test the viability of ancient DNA with special concern to past conservation methods. Project conducted with Dr. Steve Gabow and Dr. Niccolo Caldararo from the Anthropology Department, and Dr. Joseph Romeo from the Clinical and Biomedical Laboratory Sciences Department at San Francisco State University, San Francisco, CA.

Special Skills:

- Familiar with mandates, guidelines, and legislation affecting archaeology/cultural resource management, and forensics (esp. ARPA, NEPA, CEQA, NHPA, NAGPRA, California Health and Safety Codes, esp. Divisions 7: Dead Bodies, 8: Cemeteries, and Division 102: Vital Records and Health Statistics).
- Computer skills: Microsoft Word, XP, MS Vista, Corel WordPerfect. Excel, PowerPoint, SPSS, EndNote, Fordisc 3.1, Calib 5.0.1., Sequencher, Paup, BioEdit, BioLign, and ClustalX.
- Administrative skills: data entry, typing, editing, fact-checking, business and scientific writing (generating technical reports, memos, manuscripts, syllabi, summaries, and scientific articles), public relations/journalism, reception, multiple phone lines, public speaking, filing, and excellent written and communication skills.
- Familiar with medical and dental terminology.
- Physical/Forensic Anthropologist. Experience in Osteology, Anatomy, and Dental Anthropology. Supervisory experience.
- Academic and Internet research and evaluation.
- Type 65 wpm.
- Experienced in the preservation and collection of evidence, including chain of custody.
- Proficient in all stages of the analysis of molecular samples (PCR, mtDNA, STRs). Experienced working with a variety of challenging samples, including ancient, degraded, inhibited, burned, and low template DNA. Cloning experience.
- Training completed in Occupational Safety and Health Administration Requirements, including Bloodborne Pathogen Standards, Biosafety Level 2 Training, and Biosafety in Microbiological and Biomedical Laboratories.
- Familiar with the equipment normally used in a morgue, and with orthopaedic surgical instrumentation.
- Proficient in the operation of Philips X-ray/Fluoroscope, Philips Mobile C-Arm, Philips Mobile 3-D C-Arm, and Orthoscan Mini C-Arm. Experience reading X-rays and CT scans.
- Completed FEMA Emergency Management Independent Study courses 100a, 200a, 700a, and 800b.

Professional Memberships:

- American Academy of Forensic Sciences
- Kenyon International Emergency Services, Team Member (under contract)

Michelle Kaye

Languages:

- English (fluent)
- French (reading and basic conversational knowledge)
- Spanish (basic reading knowledge)

Teaching:

- Introduction to Biological Anthropology (Lecture and Laboratory)
- Human Osteology (Lecture and Laboratory)
- Introduction to Cultural Anthropology
- Anatomy Laboratory

References:

Dr. Joel D. Irish, Professor of Biological Anthropology, University of Alaska Fairbanks. Address: University of Alaska Fairbanks, Department of Anthropology, 310 Eielson Building, PO Box 757720, Fairbanks, AK. 99775-7720. Phone: (907) 474-7288 or (907) 474-6755. Email: ffjdi@uaf.edu.

Dr. Jeffrey Boland Fentress, NAGPRA Coordinator, San Francisco State University, Department of Anthropology 1600 Holloway Ave. San Francisco, CA. 94132. Phone: (415)-338-3075 (NAGPRA office), Phone: (415)-338-2046 (Anthropology office), Fax: 415-338-3050. Email: fentress@sfsu.edu.

Dr. Steven A. Symes, Assistant Professor and Forensic Anthropologist, Mercyhurst Archaeological Institute, Mercyhurst College, Erie, PA. Address: Department of Applied Forensic Sciences Mercyhurst Archaeological Institute, Mercyhurst College, 119 Zurn Hall, Erie, PA. 16546 Phone: (814) 824-3369. Email: ssymes@mercyhurst.edu.

Dr. Frank Cipriano, Director Conservation Genetics Laboratory, Biology Department/Hensill Hall, San Francisco State University, 1600 Holloway Avenue, San Francisco CA. 94132. Phone: (415) 338-3453. Fax: (415)338-6245. Email: cipriano@sfsu.edu.

Ms. Sherri Gust, Principal Investigator/Project Manager Cogstone Resource Management, Inc., 1518 West Taft Avenue, Orange, CA. 92685. Phone: (714) 974-8300. Fax: (714) 974-8303. Email: sgust@cogstone.com

Mrs. Angela McArdle, Archaeologist. National Training Center/Fort Irwin. 8726 Anzio St. Fort Irwin, CA. 92310. Phone (910) 638-9777. Email: angela.bleggi@gmail.com

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Appendix D
CONFIDENTIAL Cultural Resources Maps

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End of Appendix C

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