

ELLISON, SCHNEIDER & HARRIS L.L.P.

CHRISTOPHER T. ELLISON
ANNE J. SCHNEIDER
JEFFERY D. HARRIS
DOUGLAS K. KERNER
ROBERT E. DONLAN
ANDREW B. BROWN
GREGGORY L. WHEATLAND
CHRISTOPHER M. SANDERS
LYNN M. HAUG
PETER J. KIEL

ATTORNEYS AT LAW
2600 CAPITOL AVENUE, SUITE 400
SACRAMENTO, CALIFORNIA 95816
TELEPHONE (916) 447-2166 FAX (916) 447-3512

ELIZABETH P. EWENS, OF COUNSEL
BRIAN S. BIERING
TERESA W. CHAN
SHANE E. GONWAY
KATHRYN C. COTTER
JEDEDIAH J. GIBSON
CHASE B. KAPPEL
SAMANTHA G. POTTENGER

February 17, 2010

DOCKET	
09-AFC-5	
DATE	FEB 17 2010
RECD.	FEB 17 2010

Commissioner Anthony Eggert, Presiding Member
Vice Chair James D. Boyd, Associate Member
Mr. Craig Hoffman, Project Manager
Abengoa Mojave Solar Project (09-AFC-5)
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Abengoa Mojave Solar Project (09-AFC-5): Second Supplemental Written Response to Data Request Set 1B (Nos. 1-86) for Cultural Resources

Dear Commissioners Eggert and Boyd:

Abengoa Solar Inc. (“the Applicant”) hereby files these written responses to certain Data Requests in Set 1B promulgated by Staff on October 26, 2009. This supplemental response contains responses to several Data Requests in Set 1B regarding Cultural Resources. The Applicant requested additional time to respond to several Data Requests in Set 1B regarding Cultural Resources in a Notice filed on November 16, 2009, and has discussed the need for additional time for this second supplemental response with Staff and the Project Manager. This supplemental response contains the Final Testing Report, *Evaluation of Cultural Resources for Mojave Solar Project, San Bernardino County, California*, which formalizes responses to Data Requests 10, 11, 14, 15, and 16.

The DPR 523 forms, in response to Data Requests 12 and 17, are provided under separate confidential cover from AECOM.

The Applicant appreciates Staff’s time and efforts reviewing the enclosed materials. The Applicant looks forward to continuing to work with Staff as the project moves forward to achieve complete and satisfactory resolution of all issues in a timely manner.

February 17, 2010
Page 2

Thank you for your time and consideration of this matter.

Sincerely,



Christopher T. Ellison
Shane E. Conway
Attorneys for Abengoa Solar Inc.

Attachment

**EVALUATION OF CULTURAL RESOURCES
FOR MOJAVE SOLAR PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA**

Mojave Solar Project Docket 09-AFC-05

Prepared for:

Abengoa Solar
13911 Park Avenue, Suite 206
Victorville, California 92392

Prepared by:

EDAW/AECOM, Inc.
1420 Kettner Boulevard, Suite 500
San Diego, California 92101
Phone: (619) 233-1454

Authors:

Theodore G. Cooley, M.A., R.P.A.
Matt Tennyson, M.A., R.P.A.
M.K. Meiser M.A.

U.S.G.S. Quadrangle: Lockhart 7.5'

February 2010

Key Words: San Bernardino County, Historic Dump Debris, Historic Scatter, Lithic Scatter

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
EXECUTIVE SUMMARY	v
CHAPTER 1 – INTRODUCTION	1
Project Location	1
Site Description.....	1
Project Description.....	1
Regulatory Setting	6
Personnel.....	6
Native American Participation.....	6
Report Organization.....	8
CHAPTER 2 – ENVIRONMENTAL AND CULTURAL SETTING	9
Natural Setting	9
Physiography and Geology	9
Flora	10
Fauna.....	10
Hydrology	10
Climatic History.....	11
Cultural Setting	11
Prehistory	11
Ethnographic Background	13
Historical Background	13
CHAPTER 3 – RESEARCH DESIGN.....	19
Research Issues	19
Prehistoric Research Issues.....	19
Research Questions.....	22
Prehistoric Research Potential of Project Sites and Isolates.....	23
Historical Research Issues	24
Research Context	24
Related Topic Areas.....	25
Research Questions.....	26
Historic Research Potential at the Project Sites	27
CHAPTER 4 – FIELD AND ANALYTICAL METHODS	29
Introduction.....	29
General Field Methods.....	29
Surface Documentation.....	29
Excavations	29
Diagnostic Isolated Prehistoric Artifact Recovery	30
Analytical Methods.....	30

Special Studies	30
Curation.....	30
Site Specific Testing Field Methods	31
Diagnostic Isolate Recovery	32
CHAPTER 5 – TESTING RESULTS AND DISCUSSION	33
Introduction.....	33
Testing and Evaluation Program Results.....	33
Resource Descriptions and Results – Historic Resources.....	34
Site CA-SBR-13,537H.....	34
Site CA-SBR-13,620H.....	46
Resource Descriptions and Results – Prehistoric Sites.....	46
Site CA-SBR-13,538.....	46
Resource Descriptions and Results – Prehistoric Diagnostic Isolated Artifacts.....	51
Introduction.....	51
Obsidian Artifacts	52
Ground Stone Artifacts	56
Discussion.....	56
Historic Period Sites	57
Prehistoric Sites and Isolates	58
CHAPTER 6 – MANAGEMENT RECOMMENDATIONS.....	63
Introduction.....	63
Evaluation Criteria	63
Evaluations.....	64
Management Recommendations.....	66
CHAPTER 7 – REFERENCES	67

ATTACHMENTS

- 1 Resumes of Key Personnel
- 2 Native American Contact Program (*Confidential Attachment*)
- 3 Project Maps (*Confidential Attachment*)
- 4 DPR Site Forms (*Confidential Attachment*)
- 5 Catalogs (*Confidential Attachment*)
- 6 Obsidian Sourcing Hydration

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1 Regional Map.....	2
2 Project Area	3
3 Archaeological Sites and Isolates	Attachment 3 Confidential
4 CA-SBR-13,537H.....	37
5 West and South Wall Profiles.....	45
6 CA-SBR-13,620H.....	47
7 CA-SBR-13,538.....	50

LIST OF PLATES

<u>Plate</u>	<u>Page</u>
1 Historic Dump at Site CA-SBR-13,537H.....	35
2 Posts and Scatter of Boards at Site CA-SBR-13,537H.....	35
3 Unit 1 (1 by 1 m) location at right in refuse dump.	36
4 Unit 1 before beginning excavation.....	38
5 Unit 1 at 0 to 20 cm level.....	38
6 Unit 1 through the deposit at 20 to 40 cm.....	39
7 Brown Translucent Cryptocrystalline Flake at Site CA-SBR-13,538.	48
8 Excavation of STP 2, Backfilled STP 1 is at Center, at Site CA-SBR-13,538.....	49
9 Excavation of STP 2 at Site CA-SBR-13,538.	49
10 Biface MI-P-006.	52
11 Biface MI-P-232.	53

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 Consulting Parties and Public Participation Contacts by Affiliation.....	7
2 Archaeological Sites to be Tested.....	33
3 Historic Artifacts by Activity.....	40
4 Glass in TEU 1.....	41
5 Vessels in TEU 1.....	41
6 Metal artifacts from TEU1.....	41
7 Ceramics in TEU 1.....	42
8 Metal Artifacts in STP 2.....	42
9 Glass from STP 7 by Level.....	43
10 Vessel Fragments identified in STP 7.....	44
11 Metal Artifacts from STP 7.....	44
12 Glass Bottles with Maker’s Marks from Site CA-SBR-13537H.....	57
13 Obsidian Hydration Results.....	59
14 Management Recommendations for Sites Potentially Affected by the Project.....	64

EXECUTIVE SUMMARY

Mojave Solar, LLC proposes to develop the Mojave Solar Project (Project) that would be located near Harper Dry Lake, San Bernardino County, California. The proposed Project would use parabolic trough technology to collect solar thermal energy for a combined nominal electrical output of 250 megawatts (MW) from twin 125-MW power blocks. The primary solar energy facilities and associated construction and operations footprint are located within a 1,765-acre plant site (Project area). Project facilities would include a solar array field, steam turbine generator, cooling tower, and a variety of ancillary equipment and facilities. Natural gas for the Project's ancillary purposes will be supplied by a SoCal Gas-owned pipeline that runs to the Project boundary. No offsite pipeline facilities are proposed as part of this Project. The Project would use groundwater for cooling. The Project interconnection is proposed to connect to the Southern California Edison-owned Kramer-Coolwater 230-kilovolt (kV) transmission line located adjacent to the southern border of the Project. Offsite linear facilities would not be required for this Project (e.g., pipelines for water or gas, or transmission lines); therefore, no offsite linear facilities are currently planned.

EDAW/AECOM (AECOM) was retained to conduct cultural resources studies, including archaeological and historic architectural surveys in support of preparation of an Application for Certification, which is required by the California Energy Commission (CEC) for power generating plants that produce an excess of 50 MW of energy. In accordance with applicable laws, ordinances, regulations, and standards, an archaeological resources survey and a historic architecture field survey were conducted for the Project area and buffer areas as specified in CEC regulations. A portion of the study area within the required buffer was conducted on lands managed by the Bureau of Land Management (BLM) under AECOM's Cultural Use Permit (CA-06-21) and Fieldwork Authorization dated June 18, 2009. Because so many of the archaeological and built resources appear to be potentially associated, a single, integrated report has been prepared documenting archival and survey results. This integrated survey report addressed the inventory and significance of both archaeological and historic architectural cultural resources identified within the Project, and identified potential impacts on cultural resources as a result of this Project.

The archaeological survey identified a total of 27 sites and 39 isolates. Five sites and 25 isolated finds were located within the Project area, and an additional 22 sites and 14 isolated finds in the 200-foot buffer area (outside the Project area). The five sites in the Project area that could be impacted by the Project include one prehistoric archaeological site (CA-SBR-13,538) and four historic archaeological sites (P-36-007429, CA-SBR-13,526H, CA-SBR-13,537H, and CA-SBR-13,539H). The 22 sites identified in the buffer include two previously recorded historical sites that were relocated (P-36-007430 and P-36-006553), one multi-component site (MS-M-225), and 20 newly identified historic sites. Three of the five sites within the Project area that could be impacted by the project were identified as being potentially significant cultural sites (Meiser and Cooley 2009). Sites CA-SBR-13,620H, CA-SBR-13,537H, and CA-SBR-13,538 were identified as possibly eligible for inclusion on the California Register of Historical Resources (CRHR) based on the potential for subsurface deposits and/or their likelihood to contribute additional data

that may be important to history or prehistory. Of these three resources, one is a prehistoric lithic scatter and two are historic dump sites (Meiser and Cooley 2009).

Based on data requests from, and discussions with CEC cultural resource staff, a testing program for sites CA-SBR-13,537H and CA-SBR-13,538 incorporating additional documentation and hand excavation was developed and implemented. Included in this plan was subsurface testing in an area of the Project mapped as containing a portion of site CA-SBR-13,620H. While site CA-SBR-13,620H is almost entirely in the project buffer area, a small portion appeared to possibly lie within the area affected by Project. Consequently, an aspect of the testing plan included subsurface testing to determine the presence or absence of a portion of site CA-SBR-13,620H within the area affected by Project. If a portion of the site was found to be present in the Project, then this portion was to also be evaluated in the testing program. Also included, as part of the testing and evaluation program, was the collection of seven potentially diagnostic prehistoric artifact isolates. This document presents the results from the implementation of the testing program including the testing and evaluation of sites CA-SBR-13,537H, and CA-SBR-13,538, the subsurface testing to determine the presence or absence of a portion of site CA-SBR-13,620H within the area affected by Project, and the collection and analysis of the potentially diagnostic prehistoric artifact isolates collected from the Project.

Based on the results from these investigations it is determined that site CA-SBR-13,537H and site CA-SBR-13,538 do not meet the criteria for the CRHR or CEQA criteria for uniqueness and are recommended not eligible, and that site CA-SBR-13,620H did not extend into the area of the project that could potentially be affected by Project. This report is intended to supplement the Archaeological Resources Report (Meiser and Cooley 2009) that was provided in the Application for Certification.

CHAPTER 1

INTRODUCTION

EDAW/AECOM (AECOM) was retained by Mojave Solar, LLC to provide cultural resources studies including archaeological and historic architectural field surveys for the proposed Mojave Solar Project (Project), a combined nominal electrical output of 250-megawatt (MW) from twin 125-MW power blocks. This report was prepared to support an Application for Certification (AFC) submitted to the California Energy Commission (CEC), which must license all thermal power plants over 50 MW proposed in California. This report will also support Federal permits or conditions of certification associated with Federal and State cultural resource agencies. The current investigation was undertaken to evaluate archaeological resources that may be affected by the Project.

PROJECT LOCATION

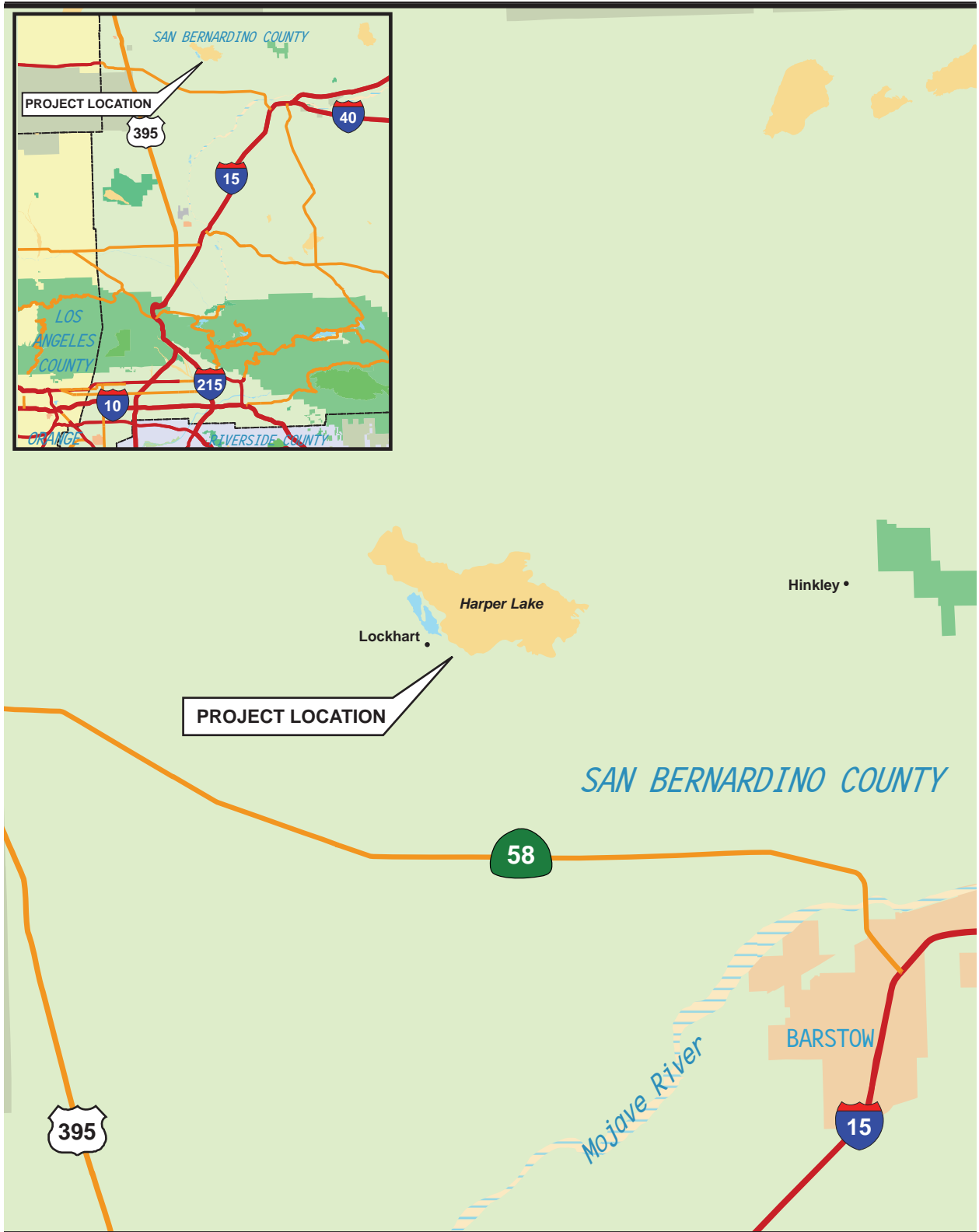
The Project is located approximately 15 miles northwest of Barstow, California, and approximately 9 miles northwest of Hinkley, California, in an unincorporated area of San Bernardino County (Figure 1). The Project is situated near the southwest corner of Harper Dry Lake, an ephemeral alkali lake bed, in the southern section of the Lockhart U.S. Geological Survey (USGS) 7.5" topographical map and the northern section of the Twelve Gauge Lake USGS 7.5" topographical map. The Project area is generally southwest of Harper Dry Lake, surrounding the intersection of Harper Lake Road and Lockhart Road (Figure 2). The extent of the Project area is approximately 1,765 acres and consists of contiguous parcels of private property.

SITE DESCRIPTION

The Project area has a flat topography with elevations ranging from approximately 2,100 feet at the southwest corner to approximately 2,030 feet at the northeast corner. Soils within the Project area were characterized by Ninyo and Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore 2006). The Project area is covered in older alluvium consisting of dry, loose-to-medium dense, silty fine-to-coarse sand with occasional gravel. Ninyo and Moore hypothesizes that layers of silt and possibly clay are likely present within the older alluvium.

PROJECT DESCRIPTION

Mojave Solar, LLC proposes to develop approximately 1,765 acres for a 250-MW solar energy plant. The Project will use parabolic trough solar thermal technology to produce electrical power, which uses a steam turbine generator fed from a solar steam generator (SSG). SSGs receive heat transfer fluid (HTF) from solar thermal equipment composed of arrays of parabolic mirrors that collect energy from the sun. This is based on the technology that has been successfully used for



Source: Thomas Guide, 2007

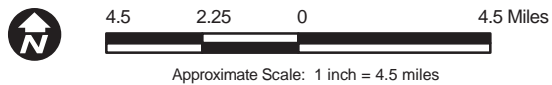
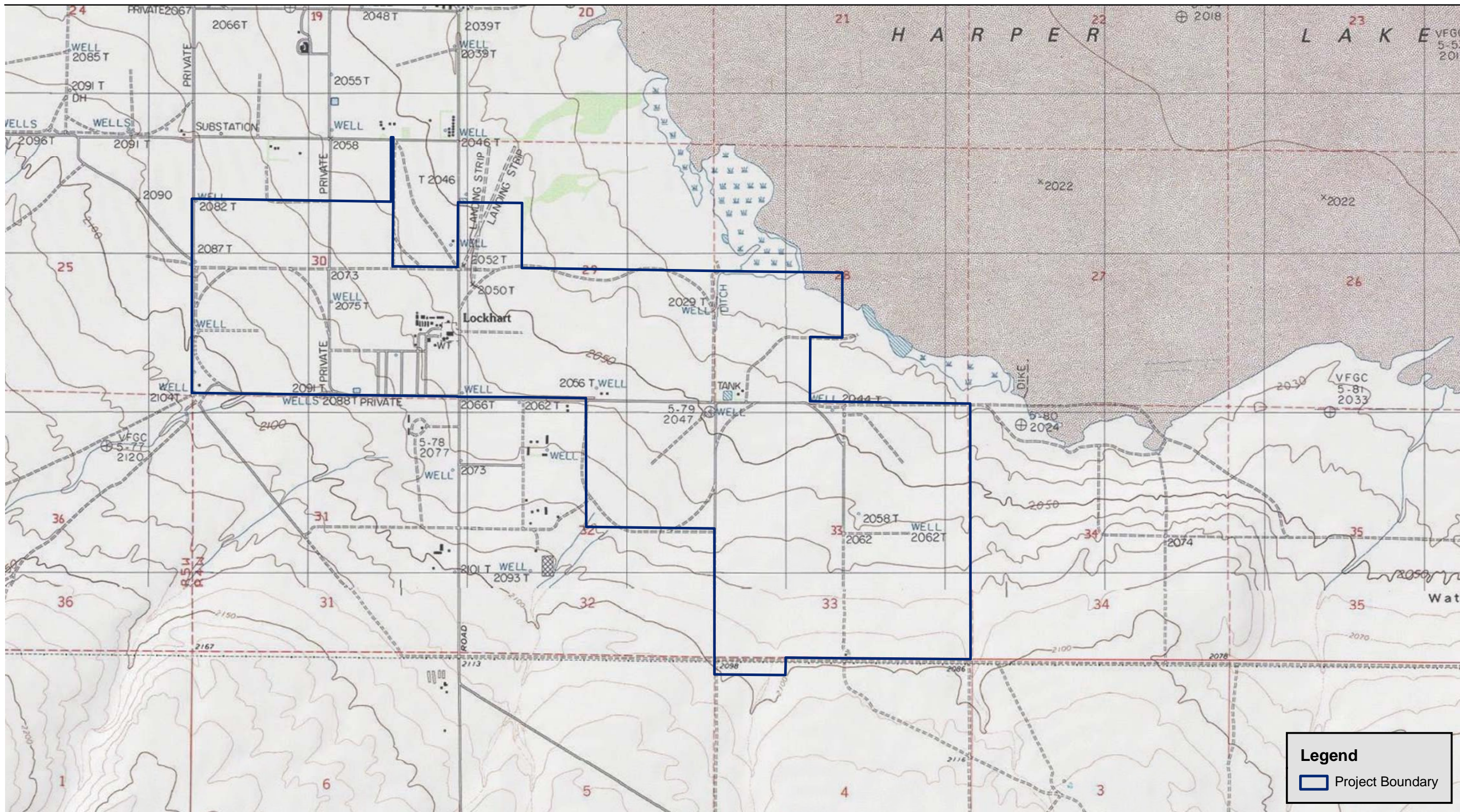


Figure 1
Regional Map



Source: USGS 7.5' Topo Quad Lockhart 1986, Twelve Gauge Lake 1973

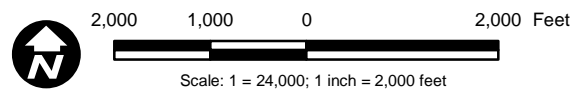


Figure 2
Project Area

nearly 20 years at the nine existing Solar Energy Generating System (SEGS) facilities located at Harper Lake, Kramer Junction, and Daggett in the Mojave Desert. This technology involves a modular solar array field composed of many parallel rows of solar collectors normally aligned in a north-south horizontal axis. Each solar collector has a linear parabolic-shaped reflector that focuses the sun's radiation on a receiver located at the focal point of the parabola. The solar collectors track the sun from east to west during the day to ensure that the sun is continuously focused on the linear receiver. The linear receiver contains HTF, a synthetic oil that heats up to approximately 740 degrees Fahrenheit (°F) as it circulates through the receiver and returns to a series of heat exchangers where the HTF is used to generate steam that drives a turbine, which generates electrical power.

The Project will have a combined nominal electrical output of 250 MW from twin 125-MW power blocks. The power blocks will be joined to a transmission line to form one full-output transmission interconnection. Start of commercial operation is subject to timing of regulatory approvals and Applicant achievement of Project equipment procurement and construction milestones. The solar-thermal technology will provide 100 percent of the power generated by the plant; no supplementary energy source (e.g., natural gas to generate electricity at night) is proposed to be used for electric energy production. Each power block will have an auxiliary boiler fueled by natural gas to reduce startup time and for HTF freeze protection. The auxiliary boiler will supply steam to the HTF freeze protection heat exchangers as required during nighttime hours to keep the HTF in a liquid state when ambient temperatures are not sufficient to keep the HTF above its relatively high freezing point (54°F). Each power block will also have a diesel-fueled firewater pump for fire protection and a diesel-driven backup generator for power plant essentials.

The Project interconnection is proposed to connect to the Southern California Edison (SCE) owned Kramer-Coolwater 230-kilovolt transmission line located adjacent to the southern border of the Project. SCE will lead the permitting effort for the transmission improvements past the Project-specific interconnection to the statewide system as a separate process. All Project-related transmission facilities are within the Project boundaries.

The Project proposes to use wet cooling towers for power plant cooling. Water for cooling tower makeup, process water makeup, and other industrial uses such as mirror washing will be supplied from onsite groundwater wells, which also will be used to supply water for employee use (e.g., drinking, showers, sinks, and toilets). A package water treatment system will be used to treat the water to meet potable standards. A sanitary septic system and onsite leach field will be used to dispose of sanitary wastewater. Project cooling water blowdown will be piped to lined, onsite evaporation ponds in a common Project area. The ponds will be sized to retain all solids generated during the life of the plant.

Natural gas for the Project's ancillary purposes will be supplied by a SoCal Gas-owned pipeline that runs to the Project boundary. No offsite pipeline facilities are proposed as a part of this Project.

REGULATORY SETTING

Numerous laws, ordinances, regulations, and standards (LORS), on Federal, State and local levels, seek to protect and target the management of cultural resources. The BSEP will comply with applicable LORS throughout construction and operation. CEC Siting Regulations provide direction for project environmental compliance and projects licensed by the CEC are reviewed for compliance with applicable laws. For this project, where there is no federal involvement, the applicable LORS are State and local. Applicable LORS are summarized in the survey report provided as Appendix D in the AFC (Meiser and Cooley 2009).

All resources nominated for listing must have integrity, which is the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling and association. It must also be judged with reference to the particular criteria under which a resource is proposed for nomination.

PERSONNEL

M.K. Meiser, M.A., managed the project and field survey, conducted the archival research and evaluation of historic architectural resources, and is a co-author of this report. Theodore Cooley, M.A., R.P.A., acted as field director for the archaeological survey and testing, conducted the evaluation of prehistoric archaeological sites, and is a co-author of this report. Matt Tennyson, M.A., R.P.A., supervised the research and analysis of the historic archaeological resources and contributed to this report. Rebecca Apple, M.A., R.P.A., provided senior review for this report. Resumes of key personnel are provided in Attachment 1.

NATIVE AMERICAN PARTICIPATION

Consultation with local Native American groups and interested parties has been initiated. A letter was sent to the Native American Heritage Commission on June 1, 2009, requesting information on sacred lands and traditional cultural properties, and a list of Native American individuals and organizations that might have knowledge of or concerns with cultural resources within the Project area. A records search of the Sacred Lands File did not reveal any specific site information or specific sites in the Project area and 1-mile buffer. Thirteen Native American representatives were identified by NAHC. Results of correspondence with these representatives are indicated in Table 1 and copies of the correspondence are provided in Attachment 2.

Table 1. Consulting Parties and Public Participation Contacts by Affiliation

Name/Title	Affiliation	Dates of Contact	Response
Linda Otero, Director	AhaMaKav Cultural Society, Fort Mojave Indian Tribe	07/14/09	07/14/09 – initial letter sent.
		07/22/09	07/22/09 – left phone message.
		07/27/09	07/27/09 – Ms. Otero requested more information and additional time before she could respond.
		07/28/09	07/28/09 – forwarded response to Ms. Otero.
Charles Wood, Chairperson	Chemehuevi Reservation	07/14/09 07/22/09	07/14/09 – initial letter sent 07/22/09 – left message. No response to date.
Tim Williams, Chairperson	Fort Mojave Indian Tribe	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – spoke with Ms. Terri Medrano, Chairman’s Secretary, and she requested the information packet again, which was then emailed to her.
Esadora Evanston, Environmental Coordinator	Fort Mojave Indian Tribe	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – left phone message.
Robert Robinson, Historic Preservation Officer	Kern Valley Indian Council	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – Mr. Robinson stated that they are a non-recognized tribe and do not have the resources to gather enough information necessary to comment on this project. They are also concerned that the Project area and buffer evaluated for the Project are not large enough to determine the entire effect the Project would have on the area.
Ernest H. Silva, Tribal Elder	Morongo Band of Mission Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – left phone message.
Michael Contreras, Cultural Heritage Program Manager	Morongo Band of Mission Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – left phone message.
Joseph Hamilton, Chairman	Ramona Band of Cahuilla Mission Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – Spoke with Chairman Hamilton’s secretary and she requested the information packet again, which was then emailed to her.
John Valenzuela, Chairperson	San Fernando Band of Mission Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – left phone message.
James Ramos, Chairperson	San Manuel Band of Mission Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – referred cultural resource matters to Ann Brierty (see below).
Ann Brierty, Cultural Resources Coordinator	San Manuel Band of Mission Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – left phone message.

Table 1. (continued)

Name/Title	Affiliation	Dates of Contact	Response
Goldie Walker	Serrano Band of Indians	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – Ms. Walker stated she would look further into this matter and requested a copy of the technical report when completed.
Ron Wermuth	Affiliated with the Tebatulabal, Kawaiisu, Koso, and Yokuts	07/14/09 07/22/09	07/14/09 – initial letter sent. 07/22/09 – Mr. Wermuth stated “No comment at this time.”

REPORT ORGANIZATION

Chapter 1 of this report provides a description of the proposed Project. Chapter 2 is a discussion of the physical and cultural setting. Next, a research design is provided in Chapter 3. Field and analytical methods are summarized in Chapter 4. Chapter 5 includes evaluation efforts and a discussion of the results. Chapter 6 provides management recommendations. A copy of the report is also being sent to the San Bernardino Archaeological Information Center (SBAIC) at the San Bernardino County Museum in Redlands as a permanent record.

CHAPTER 2

ENVIRONMENTAL AND CULTURAL SETTING

Detailed information regarding the environmental and cultural setting of the Project is provided in the survey report (Meiser and Cooley 2009). The following briefly summarizes this information. For more information the reader is directed to Meiser and Cooley (2009).

NATURAL SETTING

Physiography and Geology

The Project area is located in San Bernardino County, west of Barstow and Harper Dry Lake, in the western portion of the Mojave Desert. The Mojave Desert is the southwestern-most extension of the physiographic Great Basin and forms part of the larger Basin and Range province. As such, the natural environment of the Mojave Desert is characterized by isolated mountain ranges, low valleys, and internally drained basins.

The Project area is in proximity to Harper Dry Lake. The once pluvial lake, which is now a playa, formed during the Pleistocene (Cox et al. 2003; Grayson 1993). Current evidence suggests that Harper Lake served as the terminal lake of the ancestral Mojave River prior to 500,000 years ago. Relict shorelines of at least two late Pleistocene deep water lakes have been documented in the Harper Lake basin, most recently about 25,000 years before present (B.P.) (Cox et al. 2003). It is possible that shallower lakes formed periodically thereafter during major flood events. The last glacial maximum occurred about 18,000 B.P. and deglacial climatic change occurred by 14,000 B.P. (Koehler et al. 2005). Studies of ancient packrat middens in the eastern Mojave Desert demonstrate that the vegetation changes during the Late Holocene are indicative of much cooler and wetter conditions than today (Koehler et al. 2005). The final desiccation of another dry lake in the area, Lake Mojave, occurred between approximately 8350 ± 300 and 9160 ± 400 B.P. (Wallace 1978). Today, the southern coast of the lakebed contains protected marshlands (Bureau of Land Management n.d.). The last wet sections of the lake dried up in the 1990s when a main source of water (nearby alfalfa farming) closed down (Donovan 2003).

Within the Project area, only alluvium and lacustrine sedimentary deposits of late Cenozoic age are present at the surface. The oldest identified rock formations in the Mojave Desert consist of metamorphosed sedimentary rocks, including gneiss, marble, quartzite, mica schist, gabbro, and conglomerates of pre-Cambrian age. Rock types of the Paleozoic era (230 to 620 million years ago [mya]) include scattered sedimentary and carbonate rock, chert, limestone, sandstone gypsum, and dolomite. Materials of this nature typically formed at the bottom of an ocean and yield fossils ranging from Cambrian to Permian in age. These rock materials are not abundant in the western Mojave, but small outcrops are present within 3 to 5 miles of the Project area, and substantial sections of Paleozoic rock do occur within the El Paso Mountains (Hewett 1954).

Flora

The Mojave has a typical mountain-and-basin topography with sparse vegetation. Although a large portion of the Project area is marked by creosote bush (*Larrea tridentate*) which is the dominant plant species of the Mojave Desert (Warren 1984), extant vegetative resources are characterized by moderate species diversity. Lower elevations are dominated by creosote bush, while higher elevations contain yuccas and agaves and then pinion-juniper habitats (Warren 1984). Plant communities within proximity of springs, marshes and streambeds produce tules, cattail and various grass species (Warren 1984).

The majority of the Project area has low vegetative cover, with large expanses of barren areas and some patches of desert scrub dominated by Atriplex (saltbush) species that exhibit an aerial cover ranging from 5 to 50 percent (Meiser and Cooley 2009). Desert saltbush scrub growing within the Project Area is mainly the result of re-colonization of saltbush species into areas left barren and disturbed following decades of agricultural practices.

Fauna

Large fauna species are rare in the Mojave Desert. Rodents, reptiles and birds are more common and are found along the desert floor. Rodent species include various pocket mice (*Perognathus* spp.), whitetail antelope squirrel (*Ammospermophilus leucurus*), and kangaroo rats (*Dipodomys* spp.). Reptile species present include the desert tortoise (*Xerobates agassizii*), desert iguana (*Dipsosaurus dorsalis*), common king snake (*Lampropeltis getulus*), and the Mojave rattlesnake (*Crotalus scutulatus*). More than 300 species of birds are found in the Mojave Desert. A few species more common to the open desert are the prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), roadrunner (*Geococcyx californianus*), and horned lark (*Eremophila alpestris*). Other species found in the Mojave include the blacktail jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and coyote (*Canis latrans*).

Hydrology

There are no perennial streams in the Mojave Desert west of the Colorado River and east of the Transverse Ranges. The Mojave River, originating in the San Bernardino Mountains approximately 30 miles to the south, and located approximately 12 miles from the Project boundary, is, and has been for several millennia, the primary water source in the area. The groundwater hydrology of the region is principally by subsurface flow from the Mojave River. The Mojave River groundwater basin, beneath the greater Mojave River surface-water drainage basin, is bounded by the San Bernardino and San Gabriel Mountains to the south, extends to Afton Canyon to the northeast, and is bounded by the Lucerne Valley to the east, and the Antelope Valley to the west.

Historic groundwater flow into Harper Valley was through these unconsolidated sediments northward from the Mojave River into the playa lake in the valley. Historically the groundwater table was shallow, with scattered artesian springs more common prior to the advent of Euroamerican land use practices. Prehistorically, such springs may have offered water sources in

the vicinity of Harper Lake. While the Mojave River is the main source of recharge to the groundwater system in the valley, in historic times the river only flowed intermittently.

Climatic History

Knowledge of the paleoenvironment is essential in understanding prehistoric human occupation patterns on the landscape. Evidence of paleoenvironmental change for the Great Basin, Mojave Desert and Sierra Nevada region has been well documented (Anderson 1990; Anderson et al. 1985; Mehringer 1986). Through these studies a general picture of environmental change has emerged for the last 10,000 years.

During the late Pleistocene (25,000–10,000 B.P.), temperatures in California were cool and moist resulting in widespread glaciations and the creation of numerous pluvial lakes (Antevs 1955). Archaeological evidence has shown that early sites are often found in association with fluvial shorelines, possibly reflecting a dependency on lacustrine resources (Sutton 1991).

With the Holocene epoch (10,000 years ago to present) came a general rise in temperatures, bringing warmer conditions to the desert valleys and less precipitation to the surrounding mountains (Chartkoff and Chartkoff 1984). Conditions during the early Holocene (circa 10,000 to 7500 B.P.) were, however, still somewhat cooler and moister than today. Evidence from the central Mojave has shown that water routinely traveled the entire course of the Mojave River. Although climatic conditions were becoming more arid during the early Holocene, a series of shallow lakes formed within the area of Lake Mojave (Grayson 1993). These mesic conditions would have provided exploitable resources such as waterfowl, fish, and some plant species for prehistoric populations. As conditions became more arid, lakes retreated and woodlands began to withdraw to higher elevations, being replaced by desert scrub (creosote bush) (Grayson 1993).

The middle Holocene (circa 7500 to 4000 B.P.) saw a much warmer and drier climate than modern times. Evidence from packrat middens (Koehler and Anderson 1995) suggest that throughout much of the Great Basin, a period of high temperatures and low precipitation was evident during the middle Holocene (Grayson 1993). The late Holocene (circa 4000 B.P. to present) is characterized by moderately cooler and wetter conditions with punctuated periods of drought (Sutton et al. 2007).

CULTURAL SETTING

Prehistory

Prehistoric human settlement patterns in the Mojave Desert have been influenced by environmental change. Major climatic periods influenced prehistoric spatial settlement patterns and resource exploitation. In the terminal Pleistocene (circa 18,000 to 10,000 years ago), conditions in the Mojave Desert were relatively cool and wet, and although variable, the early Holocene (circa 10,000 to 7,500 years ago) remained, generally, cooler and moister than today. The middle Holocene (circa 7,500 to 4,000 years ago) saw a much warmer and drier climate than

that of modern times, and the climate became moderately cooler and wetter during the late Holocene (circa 4,000 to present), with punctuated periods of drought (Sutton et al. 2007).

Chronologies for the Mojave Desert have been proposed by a number of researchers (Basgall 2000; Bettinger and Taylor 1974; Lanning 1963; Rogers 1939; Sutton 1996; Wallace 1962, 1977; Warren 1980, 1984; Warren and Crabtree 1986; Sutton et al. 2007). There continues to be considerable discussion about each of these chronologies and the dates assigned to the various stages. None of the recent chronologies, however, differ in critically significant respects from the Warren and Crabtree (1986) chronology, which forms the basis for the following summary.

Lake Mojave (circa 12,000–7000 B.P.)

The Lake Mojave period is considered to be one of extreme environmental change, where the relatively cool and moist conditions of the terminal Wisconsin geological period changed to the drier and warmer climate of the Holocene. The artifact assemblages considered typical of the period include fluted points, leaf-shaped points, and long-stemmed, narrow-shouldered points of the Lake Mojave series as well as crescents, abundant bifaces, and various large, well-made scrapers, and other flake tools. York (1995) states that the use of obsidian is relatively common, with the majority of the material derived from the Coso source. Milling equipment is rarely found at Lake Mojave sites.

From the available evidence, it appears that Lake Mojave period groups had settlement patterns focused on pluvial lake shorelines (Hester 1973; Warren 1991; Willig 1988; York 1995). Tool assemblages are consistent with a subsistence system based on hunting, particularly of large game (Cleland and Spaulding 1992; Kelly and Todd 1988; Warren 1986), but not exclusive of other smaller mammals and reptiles (Basgall 1990; Simms 1988; Warren 1990; Willig and Aikens 1988; York 1995).

Pinto Period (circa 7000–4000 B.P.)

Increasingly arid conditions occurred during the middle Holocene. Warren (1984) sees this as the beginning of cultural adaption to extreme desert conditions. There is an ongoing debate on whether the central Mojave was abandoned at this time (Donnan 1964; Kowta 1969; Wallace 1962) or whether occupation continued (Jenkins 1987; Jenkins and Warren 1984; Susia 1964; Sutton 1996; Tuohy 1974; Warren 1984) but with changes in population density, subsistence practices, and technology (Warren 1986). The artifact assemblages associated with this period include Pinto points; heavy-keeled scrapers; choppers; small, flat milling stones; and manos (Warren 1986). Warren (1986) suggests that the population moved to the desert margins and oasis sites such as water holes, springs, and streams where the occupations tended to be temporary and seasonal.

Gypsum Period (circa 4000–1500 B.P.)

The Gypsum period corresponds to the onset of late Holocene neoglacial cooling, sometimes referred to as the Little Pluvial. In the Mojave, this was a time of increased effective moisture and was marked by a significant increase in the occupation of the area, especially new streams (Elston 1982; Sutton 1996). The artifact assemblage diversified, including several Projectile point types (Elko Eared and Corner-notched, Gypsum Cave and Humboldt Concave Base),

increased use of manos and metates, and the introduction of new technologies such as the mortar and pestle and the bow and arrow. In addition, evidence of contact with other cultural areas, such as the California coast, is indicated by *Haliotis* and *Olivella* shell beads (Warren 1986). Warren (1984) also suggests that mesquite processing was first exploited during this period and that the greater productivity of this period, coupled with the refinement of hunting and seed processing technologies, increased the ability of the region to support increased population growth (Warren 1986).

Saratoga Springs Period (circa 1500–750 B.P.)

The Saratoga Springs period is one of strong regional developments according to Warren (1986). The artifactual assemblage is characterized by Eastgate and Rose Spring Projectile points in the northwestern and northeastern areas, while to the south along the tributaries of the Colorado River, Anasazi influence is seen in Cottonwood and Desert side-notched Projectile points and the introduction of paddle-and-anvil brown and buff ceramics (Lyneis 1989). Subsistence appears to rely more heavily on small fauna such as rabbit and tortoise and less on deer (Warren 1986). There is an intensified use of vegetal resources as evidenced by the high frequencies of ground and battered stone, and the milling assemblages contain larger numbers of nonportable, expedient milling slabs and utilized handstones (Basgall and Hall 1992).

Late Prehistoric Period (circa 750–200 B.P.)

It has been suggested that Numic-speaking Paiute and Shoshone groups entered and occupied the area at this time (Bettinger and Baumhoff 1982; Fowler 1972; Miller 1986; Warren and Crabtree 1986), based on a widely distributed artifact assemblage that included Desert Side-notched points and brownware ceramics, as well as linguistic evidence.

Ethnographic Background

Ethnographic evidence suggests that the Vanyume, a subgroup of the Serrano Indians (Hopa 1980; Macko et al. 1993) were the prehistoric occupants of the region. By 1900, the group was largely extinct as a result of pressures from the Euroamerican settlement. Although little is known of the Vanyume (Bean and Smith 1978; Strong 1929), it is believed that they primarily occupied the areas around the Mojave River where water and plant resources were available.

In addition to the Vanyume, this portion of the Mojave Desert was visited by members of several native groups. Sutton et al. (2007) indicate the Project area to be marginal to three groups: the Serrano (Vanyume), the Kitanemuk, and the Desert Kawaiisu. As Earle (2003) discusses in his study of native use and occupation of the Fort Irwin area, the Central Mojave Desert has been reportedly exploited by people from a number of groups, including the Chemehuevi/Southern Paiute, Mohave, and perhaps the Desert Kawaiisu.

Historical Background

Regional History

As early as the 1770s, when the Spanish explorers came through the area utilizing existing Native American trails, the region began to play a large role in the development of a western

transportation corridor. Most who wished to travel into or out of southern California passed through the Barstow area. This travel route remained a major link between Los Angeles and points east until the railroad arrived in the desert in the 1880s.

Development in the area was directly connected to the arrival and growth of the railway lines. The Southern Pacific Railroad tracks reached Waterman Junction (later named Barstow) in 1882. Southern Pacific selected Calico Junction (now known as Daggett) for its depot, telegraph office, and eating establishment (Moon 1980). The arrival of the Southern Pacific Railroad contributed to a growing number of miners, merchants, and professionals in the area (Keeling 1976). In addition, the discovery of silver and borax in the Calico mines drove the construction of branch railroads.

As the influence of the railroad declined, Route 66, which runs through downtown Barstow, brought visitors to the area via automobile. The popularity of the automobile and the construction of the Interstate Highway System contributed to the growth of the area as well as transformed Barstow into a transportation hub.

Agriculture in California

The following information is taken from *A Historic and Archaeological Context for Agricultural Properties in California* and *Water Conveyance Systems in California* created by the California Department of Transportation (Caltrans 2000, 2007). These contexts provide the framework for identifying rural development in California.

Agricultural production has always had a strong role in the development of California. However, it was large-scale agricultural production that had the greatest impact on the political, environmental, and economic prognosis of the state (Pincetl 1999). The event that officially gave rise to large-scale agriculture in California was the discovery of gold in 1848 and the subsequent Gold Rush. This brought a wave of entrepreneurial settlers looking to make a new life and means to an income, and bringing experimental ideas for agricultural production (Caltrans 2007).

This coincided with the end of the Mexican-American War and the passage of large tracts of land from the previous rancho pattern of ownership into new hands (Caltrans 2007). The subdivision of large tracts of land for private ownership was facilitated again through the Homestead Act of 1862. The Mojave Desert, which encompasses parts of San Bernardino, Riverside, Inyo, and Kern Counties, has a climate and geomorphic characteristics that made access to water and agricultural development challenging. Regardless, the region became a primary producer of alfalfa early on.

History of the Project Area

The history of the early Harper Lake homestead community and its transition into the Lockhart ranching community has been comprehensively documented in previous studies conducted by Greenwood and Associates. Most notably of these is Mark T. Swanson's *History of the Harper Lake Community*, researched and written in 1988. In that study and in subsequent studies, Swanson interviewed several local long-term residents and compiled a baseline history for the

area. The following narrative relies on much of the research conducted in the Greenwood and Associates studies.

In 1872, C.S. Black established a cattle ranch just east of Harper Lake. Black built an adobe house, and the Black Ranch was the only settlement within the Harper Lake Valley for decades. The west side of Harper Lake was not settled until the early part of the 20th century. The first homesteaders on the west side were Henry and Emma Spenker, who arrived in 1911 and filed for a homestead patent on the southwest quarter of Section 28. The Spenkers hoped to create a small farming community based on irrigation. They maintained an alfalfa ranch by creating irrigation ditches and building an irrigation reservoir, and also planted orchards and raised chickens and turkeys (Swanson 1988).

Eleven additional homestead patents were issued by the Bureau of Land Management (BLM) between 1921 and 1929. A patent for the southern half of Section 30 (Township 11 North, Range 4 West) was awarded in 1921 to James M. Maclachlan, who in turn sold portions to William A. and Elsie Davis and James T. Weatherald (Hampson 1990). The Davis and Weatherald families constructed homesteads on this land. In 1921, a two-room school was constructed from the lumber of an abandoned homestead. This building was also used as a community center and a church (Swanson 1988). Although BLM listed all homesteaders as residents of Hinkley, local residents considered themselves a separate community. However, many homesteaders were not permanent residents.

In 1925, business partners Victor York and L.M. (Lester) Lockhart obtained a desert land entry patent that became the core of the York Ranch, with the York house and reservoir located on this land. York served as president of the York-Smullin Oil Company that operated the ranch, and Lockhart served as the secretary. The York Ranch used diesel pumps to dig deep wells for flood irrigation. Likewise, the Evans Ranch, established by Hugh Evans in 1930, developed an extensive irrigation system. Evans had obtained the former Davis property and established a ranch and alfalfa farm that included his residence and several new buildings. Evans constructed a water tower, reservoir, two hay sheds, and a horse barn. Together, the enterprises of the Lockhart and Evans ranches dominated the area, eventually edging out smaller farms, including the Spenker farm. By the end of the 1930s, alfalfa was only grown on the York and Evans ranches.

During Prohibition in the early 1930s, the York Ranch became a local center of moonshining until it was raided in 1932. The property then changed ownership several times until it reverted to the sole ownership of L.M. Lockhart in 1937. Three years later, Lockhart also acquired the Evans Ranch, giving Lockhart the vast majority of land holdings in the community. Lockhart's influence was widespread, and the community began to be known as Lockhart. Lockhart's land holdings increased in the early 1940s. However, he sold the York Ranch and made an effort to sell the Evans Ranch (Hampson 1990).

The introduction of electricity into the valley after World War II had a tremendous impact on ranching and farming activities. The first California Electric substation was constructed in Harper Lake in 1947. Once electricity was available, the area developed as more settlers arrived. Among those to arrive, the Most family purchased the York Ranch in 1946 and lived in the old

York house until 1955 when the family sold the property back to Lockhart. With this purchase, Lockhart again owned the largest cattle ranch and farm complex in the area. In 1949, Lockhart invested the money from the sale of an oil company into expanding and improving the cattle ranch. By 1951, it was one of the largest farming industries in the Mojave Desert (Hampson 1990).

Lockhart Ranch was projected to have the potential to accommodate up to 5,000 cattle and six sub-industries, including alfalfa farming, a mixing plant, a dehydrator, a general store, a poultry ranch, and a hog farm. Only three of these industries came to fruition as the failure of the dehydrator did not allow for the establishment of a poultry or hog farm (Hampson 1990). In 1951, the ranch had seven wells and a large flood irrigation system, and plans for installing seven additional wells. In 1953, with the opening of the General Merchandise Store, Lockhart became a destination. The building cost \$365,000 to construct and was one of the largest buildings in the valley (Hampson 1990). Visitors came from places as far away as China Lake to shop and buy prize cuts of meat. Though Lockhart became more visible, the community remained a small enclave of approximately 200 people, most of whom worked for the Lockhart Ranch. The social life of the ranch revolved around the Lockhart family. The Howard Hughes airstrip located on the dry lake bed provided access to and from the community. The decline of Lockhart Ranch in the late 1950s can be attributed to several factors, including the fact that the ranch never really returned a profit (Hampson 1990). Other factors included Lockhart's divorce settlement from his second wife, a number of bad oil investments, the failure of the dehydrator to function properly, and the fact that the ranch was overstaffed. Lockhart parted with the ranch in 1958.

Boys Town International, a corporation operated by Arnold J. and Willie Mae Dittmar, briefly owned the ranch. The Dittmars ran the ranch in the same manner as Lockhart, though there were rumors they were going to convert it to a boys' ranch. However, they sold off all the movable goods acquired by Lockhart. When the Dittmars failed to pay Lockhart, the ranch reverted back to Lockhart. Lockhart in turn sold the ranch to the Orita Land and Cattle Company in 1962 (Hampson 1990).

Milton Most managed the ranch for the Orita Land and Cattle Company and lived in Lockhart's large ranch house from 1963 to 1972. Most made some changes to the ranch, tearing down unnecessary structures, including the dehydrator and 16 houses for married employees (Hampson 1990). The mill complex was abandoned, and only a minimal crew worked the ranch. Most also introduced the pivot system of irrigation, which allowed the watering of nearly an entire quarter section from one horizontal pipe revolving in a circular motion from a center point in the field. The use of the pivot irrigation system reduced the need for employees and also deemphasized cattle ranching. The Orita Land and Cattle Company operation reached its peak in the late 1960s and early 1970s with 2,800 acres farmed with 22 employees (Hampson 1990). It was a much more successful operation than the Lockhart operation. There were only 500 to 600 cattle on the ranch during this period (Hampson 1990). In 1977, the Orita Land and Cattle Company sold the ranch to Al Cotton. Cotton went bankrupt and in 1979 Milton Most purchased the ranch.

When Most purchased the ranch in 1979, he obtained the area south of Hoffman Road, which separates Sections 19 and 30 (Hampson 1990). This ranch was approximately 1,650 acres. Most

continued to farm alfalfa with the pivot irrigation system, but he only raised cattle in the winter months. Alfalfa grown on the farm was sold on the open market. Most constructed the airplane hangar on the complex, but otherwise he left the buildings that were present during Lockhart's tenure. In 1986, surveyors updating the USGS quadrangle map offered to change the name of the community to Most as he had been associated with the ranch for so long. Most declined and the area is still known as Lockhart (Hampson 1990).

In June 1988, Luz Development and Finance Corporation purchased most of the ranch (Hampson 1990). The ranch was leased back to Most until the early 1990s. Luz installed solar energy panels within Sections 19 and 24 on the old ranch land. The remainder of the old ranch and the Project area changed hands before it was purchased by Abengoa Solar, Inc. in 2008 with the intent of installing more solar energy panels. Since the 1990s, the former York, Lockhart, and Most properties, as well as smaller farmsteads and associated buildings in the Project area, have been abandoned and have rapidly deteriorated. Currently, there are no ranching or residential activities in the Project area. The northwest quarter of Section 32 continues to be farmed, and is the only agricultural activity within the Project area.

CHAPTER 3 RESEARCH DESIGN

To apply the CRHR criteria to archaeological sites, the sites' cultural and historical associations must be determined to the extent possible, and the potential importance of the information contained in the sites must be evaluated. This chapter presents a Research Design for making these determinations, laying out current regional research issues and specific research questions that will be addressed in the evaluation program.

RESEARCH ISSUES

Prehistoric Research Issues

Research Context

Human occupation in the Mojave Desert extends from the end of the Pleistocene until historic contact, spanning at least some 11,000 years. This substantial time depth provides the potential for research encompassing the entire prehistory and history of humans in the New World. At the end of the Pleistocene Epoch and the last ice age, the Mojave Desert area had a very different climate and habitat, with numerous large pluvial lakes, fed by both abundant rain and melt-water from adjacent glaciers to the north. This environment provided an abundance of resources for the first humans in the New World. By the onset of the Holocene Epoch, circa 10,000 B.P., this environment had begun to change, gradually becoming dryer, and with the eventual disappearance of the glaciers, the desiccation of most of the lakes in the area had occurred by the end of the early Holocene, circa 7500 B.P. The individual history, however, of each of these lakes has been the subject of considerable archaeological research as they apparently did not all disappear at the same time. Fluctuations in the climate through this time may have allowed several to temporarily revive subsequent to the end of the early Holocene. From the early Holocene and into the early middle Holocene, circa 9000 B.P. to 5000 B.P., archaeological sites along the prehistoric shorelines of these lakes show evidence of occupation at different intervals with a broad resource procurement strategy that included both small and large game, indicating that a range of habitats occurred through time (Sutton et al. 2007). During this period, changes in the archeological assemblages indicate a subsistence transition from a mainly lacustrine focus to a more diversified use of other habitats. This is signified by the new occurrence of ground stone and seed milling tools, indicating an increased use of vegetal resources during the late early Holocene and early middle Holocene (Warren and Crabtree 1986; Sutton et al. 2007).

During the latter part of the middle Holocene, from circa 6000 to 4000 B.P., an extremely dry period appears to have occurred in the Mojave Desert area that lasted at least 1,000 years and may have lasted as long 3,000 years in the western Mojave, to possibly 3000 B.P. During this time, human occupation of much of the Central Mojave Desert may have essentially ceased. Following this period, at the onset of the late Holocene, circa 4000 to 2000 B.P., a time of increased effective moisture occurred in the Mojave Desert. During the late Holocene, this increase in viable living conditions in the western Mojave allowed for an expansion of human

activity to the area over the next 3,000 to 4,000 years, approximately. During this period, the exploitation of a variety of new habitats with a variety of new subsistence strategies occurred, accentuated by the use of several significant new technologies (Sutton et al. 2007).

The location of the Project area adjacent to an ancient pluvial lake bed (Harper Lake) provides the possibility of a contribution to on-going archeological research for the western and central Mojave Desert concerning the earliest period of human occupation of the area. The unique pluvial history of Harper Lake needs to be considered in this regard. The latest dated late Pleistocene pluvial lake occurred there approximately 25,000 B.P., which is before the earliest generally accepted date of human entry into the Mojave Desert. New World sites dating prior to 15,000 B.P. are all controversial, although sites as early as 30,000 B.P. cannot be discounted totally. Hence, the late Pleistocene shorelines of Harper Lake hold the potential to elucidate the question of whether humans were occupying the Mojave Desert as early as 25,000 B.P. Subsequently, Mojave River overflow could have created shallower lakes or wetlands of sufficient duration to have been of subsistence interest to Native American groups.

Research Domains and Related Topic Areas

Chronology Building

Chronology building continues to be a major research emphasis in the Mojave Desert. Consequently, one of the most important aspects of a prehistoric research program for the Mojave Desert should continue to be to aid in the refinement of the regional chronological framework. The occurrence of diagnostic artifacts, particularly artifacts made of obsidian, in the Project area and vicinity provides the opportunity to verify, and potentially expand, the known parameters of the various complexes defined for the Mojave Desert area. Harper Lake is one of the lesser known and archaeologically explored pluvial lakes in the Mojave Desert area, and so its potential for a contribution of new information could be considerable. While not currently verified by any known sites in the area, sites originally situated along ancient lake shores with the likely build-up of lacustrine sediments and sediments from the in-flow from the surrounding basin creates the potential for buried resources along ancient shorelines. Such sites more often contain materials suitable for radiometric dating. A site that contains organic cultural remains suitable for radiocarbon dating could prove useful to aid in the refinement of the regional chronological framework.

Within the Project area, then, the following chronology-associated data sets may be relevant to establishing temporal affiliation:

- Presence of organic materials suitable for radiocarbon dating – Radiocarbon dating remains the most reliable chronometric tool available. Presence of suitable organic material substantially increases a site's research value.
- Presence of stratified deposits – Stratified cultural deposits, which are quite useful in developing regional chronological sequences, are relatively rare in the region. Many habitation sites are found on relatively stable surfaces, resulting in a lack of clear stratigraphic separation between occupation periods.

- Presence of typable projectile points and other formal tools – Despite challenges to the basic assumptions of projectile point seriation in the Great Basin (Flenniken and Wilke 1989), cross-dating of point types through associated radiocarbon dates and, in the western Great Basin, directly through obsidian hydration dating, continues to support the temporal utility of point types (Bettinger et al. 1991). However, several types, including some Pinto/Gatecliff and Elko series points, appear to vary in their temporal placement across the broad expanse of the Great Basin (see Beck 1994). Notwithstanding this problem, the point sequence used by Warren and Crabtree (1986) remains generally valid for the Mojave Desert.
- Presence of obsidian suitable for hydration dating – The Project area is relatively close to the Coso obsidian source, and it might be expected, therefore, that flaked tools and debitage from this source would be recovered. This source of volcanic glass has been intensively studied for hydration dating purposes (Basgall, 1990; Cleland 2006; Gilreath and Hildebrandt 1997; Rogers 2006). Despite numerous problems, hydration analysis of Coso obsidian has been generally successful producing results accurate enough for chronological ordering (seriation) and placement of assemblages within a reliable range of dates. Other sources include Casa Diablo, north of Coso, and Obsidian Butte to the south in the Salton Basin.

Settlement and Subsistence Patterns during the Early and Middle Holocene

Archaeological research in the Mojave Desert has also not fully answered questions regarding early occupation and subsistence adaptations to fluctuating, and eventual disappearance of, lacustrine environments. The differences in the Lake Mojave and Pinto complexes archaeological assemblages of the Early Holocene suggest a period of transition in subsistence strategies from a pluvial lake subsistence focus to a more diversified one encompassing vegetal resources to a greater degree. Warren (1991) proposed that the two complexes are a single cultural tradition with adaptation to changing conditions resulting in a shift to a more broad-based economy over time. The occurrence of artifacts in the Project area dating from the Early Holocene, if associated with these early complexes, could indicate a potential to contribute information to this area of on-going research.

The Project area is located in an area that has been categorized as not containing a substantial human presence during the late Middle Holocene. This period, from circa 6000 to 4000 B.P., was an extremely dry period during which human occupation of the Mojave Desert may have essentially ceased. Following this period, at the onset of the Late Holocene, approximately 4,000 years ago, a period of greater precipitation and elevated lake levels began.

Settlement and Subsistence Patterns during the Late Holocene

Beginning approximately 2,000 years ago, according to Sutton et al. (2007), “cultural systems changed dramatically across the Mojave Desert, most notably in the western part of the region.” The complex associated with this change is the Rose Spring Complex. Archaeological evidence from sites associated with this complex include well-developed middens indicative of major population increases, and dramatic and distinctive changes in the artifact assemblages from previous complexes, indicating the presence of new technologies and tool inventories. Pre-

eminent of these new technologies was the presence of small projectile points indicative of the use of the bow and arrow as a hunting tool.

Research Topic Areas

Based on these research domains the following prehistoric research topic areas might be addressed by resources in the Project:

- Chronology
- Site Structure and Formation Processes
- Subsistence and Settlement during the Early Prehistoric and Archaic Periods in the Region
- Lithic Technology and Utilization
- Trade and Travel

Research Questions

For the evaluation effort the following general research questions can be asked for the prehistoric resources evaluated:

Chronology Questions

1. What is the best available information relevant to the temporal placement of the resource?
2. Is there evidence that a site is single chronological component? If not, can the components be clearly temporally distinguished (vertically and/or horizontally) for analytical purposes?
3. Is there evidence relevant to the length of occupation of the resource and is more than one time period represented?

Site Structure and Formation Processes Research Questions

1. Is there evidence of a subsurface component, and if so, what depositional mechanism may account for it?
2. Are cultural materials in their primary context or substantially redeposited?
3. Are there distinct artifact concentrations indicative of distinct loci of human activity?
4. Are there buried features such as fire-hearths that have retained integrity after plowing?

*Subsistence and Settlement during the Early Prehistoric and Archaic Periods in the Region
Research Questions*

1. What subsistence related activities, if any, are represented?
2. Are there nonportable artifacts or features present?
3. Is there evidence of domestic habitation debris indicative of residential use? If so, is there any evidence present relevant to the length of stay or seasonality?
4. To what degree can the archaeological remains in the Project area aid in the classification of regional settlement and mobility systems with respect to mobility type, frequency, and range?
5. Is there evidence to suggest that the site is primarily related to nonsubsistence functions?

Lithic Technology and Utilization Research Questions

1. What types of raw materials were utilized in the production of flaked and groundstone tools?
2. Can the sources of these materials be identified?
3. Is the use and/or production of bifaces present? If so, what production stages are present?
4. Are expedient core/flake technologies present? If so, what stages of production are present?
5. Is there evidence on-site for procurement of locally available toolstone?
6. What can be inferred about prehistoric settlement and mobility patterns from the toolstone assemblages?

Trade and Travel Research Questions

1. Is there evidence of exotic materials such as shell artifacts or non-local toolstone that would indicate prehistoric import from, or trade with distant areas?
2. Is there evidence of reorganization of economic networks? Changes in the frequency of Coso obsidian might be particularly relevant to this issue, since the frequency of this toolstone declines fairly rapidly to the east.

Prehistoric Research Potential of Project Sites and Isolates

Site CA-SBR-13,538

If a site such as CA-SBR-13,538 is determined to contain a subsurface deposit, then it could, potentially, contribute new information to many of the research topic areas enumerated above. If a deposit at the site contains organic materials suitable for radiometric dating, then it could contribute to improving the reliability of regional dating methods, possibly help address issues

regarding the earliest phases of human occupation of the region, and problems related to Archaic period occupation in the area. If additional lithic tools and manufacturing debris are found in a deposit at the site, then topics concerning prehistoric lithic technology and can be addressed. Depending on the nature of the deposit at the site, information from the site may be able to address questions concerning site formation processes. If exotic materials such as obsidian are found to be present at the site then trade and travel can be addressed. If the content of the site can possibly address some or all of these research areas then the results could contribute significantly to the broader areas of chronology building, and settlement and subsistence in the Mojave Desert.

Diagnostic Isolates

Also contributing potentially important information to address some of these topics are several diagnostic isolated artifacts from the project area. Seven artifacts recommended for collection and analysis are: MI-P-006 (obsidian biface fragment), MI-P-019 (bifacial mano), MI-M-202 (two metate fragments), MI-P-205 (milling slab metate), MI-P-222 (obsidian flake), MI-M-225 (obsidian flake), and MI-P-232 (obsidian biface fragment). While not within a site context, these items can certainly contribute information regarding reliability of regional chronology and dating methods, the earliest phases of human occupation of the region, Archaic period occupation, lithic technology, and trade and travel.

Historical Research Issues

The two historic period resources included in the evaluation program include the historic dump and possible wooden structure(s) of site CA-SBR-13,537H, and a possibly marginal portion of historic dump site CA-SBR-13,620H. When the historical context of refuse deposits, such as CA-SBR-13,620H and CA-SBR-13,537H, can be determined, then analysis of the assemblage content can yield important insight into social and economic behavior that is difficult or impossible to gain through the study of the documentary record alone (Caltrans 2007; Praetzelis 1994; Spencer-Wood 1987). Deetz (1988:367) pointed out, "... [the] refinement [of historical explanation] is best accomplished by maintaining a balance between the documentary and the material evidence, being always mindful that, to be a productive exercise, the results should provide a more satisfactory explanation than would be forthcoming from either set of data alone." With regard to refuse deposits, historical documents may assist in identifying the household or commercial unit that was likely the consumer of the waste products deposited at the site and, in addition, can outline the socioeconomic characteristics of that unit. By contrast, the archaeological record preserves a glimpse of the actual consumption patterns that occurred in the past and often sheds light on the everyday lives of common people whose stories remain largely untold in historical documents. The research context and historical archaeology research domains and topic areas are discussed below.

Research Context

Recorded history of the Project area begins with the first homesteaders who arrived in the 1910s, and agricultural development of the arid Harper Lake basin would necessarily be the focus of historical research. Within this context, key research domains would address:

- The early homesteading period, including the introduction and development of family farming and development of initial irrigation systems.
- Subsequent consolidation of landholdings into larger enterprises, supported by larger irrigation systems.
- The mid-20th century development of a small desert community based on significant capital investment in a large-scale cattle ranching enterprise during the Lockhart era.
- The post-Lockhart era of specialized alfalfa production.

Material culture from the early homesteads permeates the landscape. A wave of settlement occurred in the 1910s and 1920s. Remains of historic residential and farm complexes have been previously documented in varying states of integrity. The materials used in construction inform the means by which settlers built and managed their homesteads. Methods of subsistence were an important factor in the success of the early homesteads, and the remains of ploughed fields, irrigation systems, animal pens, and corrals are indicative of historical farming methods. Historic debris and refuse deposits associated with the homesteads are also abundant in the area, and may indicate the availability of goods and the relative wealth of residents at particular dates.

The introduction of farming and ranching in this desert climate area required effective wells and irrigation systems. The technology used by early homesteaders that evolved to eventually accommodate a large-scale ranching and agricultural operation has not been comprehensively defined, and irrigation systems are a significant research issue. When the consolidation of properties under the York, Lockhart, and Most ranches dominated water sources, smaller farms suffered and many folded as a result of the reduction in water levels. Groundwater depletion has been a constant issue, particularly for the area surrounding Harper Lake. The remains of several wells, standpipes, and various related objects have the potential to yield information about the exploitation of limited water resources.

The graduated development of ranching into a hegemonic enterprise by the 1950s affected settlement patterns in the area. It also altered the types of buildings and activities located within the Project area. Material culture from that era informs the past community development associated with the Lockhart Ranch, its predecessors, and its successors. It also indicates the relative wealth and preferences of community members during a prosperous era.

Related Topic Areas

Documentary Research

Documentary research focused on determining whether there is record of a household residence or commercial activity associated with site CA-SBR-13,537H, and with the purpose through time of the road(s) leading past CA-SBR-13,620H. Accordingly, the following research questions will be addressed:

Patterns of Refuse Disposal

In rural/desert contexts such as at sites CA-SBR-13,620H and CA-SBR-13,537H, household refuse was often simply dumped on the surface in a deserted area accessible by car or pick-up truck. In the case of site CA-SBR-13,537H, though, it appears that more effort went in to disposal practice, that is, a pit or pits were dug to contain the refuse. The archaeological investigation will more fully describe this disposal practice, addressing the following questions:

Consumer Behavior

Detecting the kinds of items purchased or owned by a population, and the ways in which these items are obtained, has been termed “consumer studies.” Historical archaeologists have noted the development of a consumer-oriented culture within the United States during the late 19th century, due to a general wide availability of consumer goods (Spencer-Wood 1987). This trend has continued into the 20th century and is discernable in both rural and urban contexts, although some researchers have noted different emphases on purchasing behavior (Van Wormer 1991). Cultural items from a recognizable historical context have potential for illuminating behavioral patterns and preferences of a residential population.

Research Questions

Documentary Research Questions

1. Can a socioeconomic unit be identified as the likely depositor of the refuse at the sites?
2. If so, is it from a domestic residence or commercial establishment?
3. What does the documentary record indicate about the dates of occupation?
4. Are the sites associated with 20th century agricultural use of the area?

Patterns of Refuse Disposal Research Questions

1. Can the depth of the disposal pit be determined?
2. Was it mechanically excavated?
3. What kinds of materials were disposed of in the trash dumps? Are there sets of artifacts not represented in the trash refuse?
4. What can be determined about the socioeconomic unit responsible for the disposal

Consumer Behavior Research Questions

1. Does the artifact assemblage reflect the range of artifacts expected to be consumed in a rural household?
2. Do the artifacts identified give any indication of the economic status of the household unit?

3. How do the types and numbers of artifacts compare with other known rural sites in southern California?
4. Is there evidence of food consumption?
5. Is there evidence of products consumed by specific age, gender or ethnic groups?
6. What can the archaeological deposits tell us about the daily life of the residents, and their choices of available consumer goods?

Historic Research Potential at the Project Sites

Sites CA-SBR-13,537H and CA-SBR-13,620H

Sites such as CA-SBR-13,537H and CA-SBR-13,620H can, potentially, elucidate occupation in the Harper Lake/Lockhart area during early mid and mid 20th century. Analysis of refuse can identify various groups according to gender, vocation and status, as well as by settlement type and settlement function. Ranch/farm owners versus workers, and domestic versus work-related activities can be defined for the inhabitants with a possible association to particular time periods. Such information can serve to add to the historic record of the first homesteaders who arrived in the 1910s, to the subsequent agricultural and ranching development of the arid Harper Lake basin, the town of Lockhart, and the post-Lockhart era during the mid 20th century.

CHAPTER 4 FIELD AND ANALYTICAL METHODS

INTRODUCTION

This chapter outlines the basic approaches used for the acquisition of data necessary to address the research questions identified in the research design. This program has three main constituents: identification of intact deposits, acquisition of datable materials, and an assessment of CRHR eligibility. These constituents are dictated by management needs and the desire to increase our understanding of human activity in the area. To meet the information requirements of each of the questions identified within the research design, surface and subsurface investigations were conducted accordingly for each of the sites.

GENERAL FIELD METHODS

Surface Documentation

Prior to any subsurface work or collection, a resurvey at 3-m intervals was conducted of the site area and its immediate surroundings. The site boundaries were refined based upon the surface findings. The spatial relationship among features and artifacts within possible multi-component sites is considered critical information in evaluating the sites. Accurate mapping is necessary to assess whether spatial associations are fortuitous or represent different activities within a single period of occupation. Mapping of cultural features, artifacts, and excavation units was accomplished with the assistance of a submeter Global Positioning System (GPS). California Department of Parks and Recreation (DPR) primary and archaeological site records were completed to reflect the results of the surface mapping and subsurface investigations.

Excavations

Shovel Test Pits (STPs)

At all three sites there was a potential for a subsurface deposit. Initial subsurface exploration was accomplished through the excavation of shovel test pits (STPs). An STP, as defined herein, consists of a 30-cm-in-diameter circular excavation, removed in 10 cm increments, designed to detect the presence or absence of subsurface artifacts or of a cultural deposit (midden). Excavated soils were dry-screened through 1/8-inch wire mesh. All excavations were backfilled. STPs were placed at 10 m intervals along the north-south and east-west axes of site CA-SBR-13,620H and were placed in selected locations within sites CA-SBR-13,537H and CA-SBR-13,538. Each STP was excavated to a depth sufficient to demonstrate the presence or absence of a subsurface component. The depth excavated in the STPs at each site was determined several factors including soil conditions, the purpose of the investigation at the site, and/or by the maximum extent to which it was physically feasible to manually excavate a 30-cm diameter hole. In the two historic site contexts, an excavation depth of 30 to 40 cm was sufficient, while at the prehistoric site, the maximum depth physically feasible to excavate, 80 cm, was attained.

STP recordation forms were completed and the STPs were backfilled. A submeter GPS unit was used to map the STP locations. All recovered cultural materials were recorded by provenience and transported to the EDAW/AECOM facilities for processing.

Test Excavation Units (TEUs)

A subsurface refuse deposit was explored and sampled at one site (Site CA-SBR-13,537H) through the use of a manually excavated 1 by 1 m unit. The unit was excavated in 20 cm levels and stratigraphic profiles were made of two sidewalls upon completion of the unit. The profiled sidewalls were also photographed. A unit excavation notebook was completed and the unit was backfilled. A submeter GPS unit was used to map the unit location. All recovered cultural materials were recorded by provenience and transported to the EDAW/AECOM facilities for processing.

Diagnostic Isolated Prehistoric Artifact Recovery

Seven isolated prehistoric artifacts with potentially diagnostic attributes were collected for analysis. A submeter GPS unit was used to relocate the artifacts. Each artifact was then placed in a bag labeled with its isolate number and date of recovery. A total of seven such artifacts were recovered.

ANALYTICAL METHODS

Identification and cataloging of materials was completed by EDAW/AECOM staff under the direction of the project archaeologist. A standard system of cataloging cultural material was used to document the recovered artifacts.

Each artifact or group of artifacts was counted, weighed, and/or measured and given consecutive catalog numbers. Each item was analyzed for specific attributes particular to that material class. A computerized master catalog was created in a database program and is included in Attachment 5. All items are temporarily stored at EDAW/AECOM.

SPECIAL STUDIES

Four isolated obsidian artifacts were collected and submitted for sourcing and hydration analysis. Copies of specialist studies are appended to this report as Attachment 6.

CURATION

Material collected from the Project will be curated at qualified curatorial facility in southern California. Material will be labeled and stored in archival materials. A copy of the catalog will accompany the collection.

SITE SPECIFIC TESTING FIELD METHODS

Site CA-SBR-13,537H

Site CA-SBR-13,537H was recorded in 2009 as a small, but dense, historic refuse dump and the remnants of a possible adjacent wooden structure and corral, in a 60 m (east-west) (195 ft) by 35 m (north-south) (120 ft) area. The site is situated approximately 170 m east of Edie Road. Several in-place posts and a scatter of milled, wooden structure debris were also present to the west of the dump (Meiser and Cooley 2009).

The deposit at site CA-SBR-13,537H appears to pre-date the 1960s. Adjacent wood materials (boards) and posts appeared to have possibly derived from a wooden shed or small residence building(s). Some of the posts may also represent the remnants of a livestock corral. Most, if not all, of the historic materials appear to date to the mid-20th century with the earliest possibly dating to circa 1925 to 1940, and the latest to circa 1950 to 1960. Therefore, the goals of testing site CA-SBR-13,537H were as follows:

- To determine the content, age, extent, and affiliation of the dump deposit at site CA-SBR-13,537H
- To determine if an associated residence structure is present and whether it has a subsurface component.

Testing at site CA-SBR-13,537H included eight STPs. Four of the STPs were excavated to identify the vertical and horizontal extent of the dump deposit. An additional four STPs were excavated within the area(s) of the possible structure(s) to ascertain if any subsurface evidence of a structure is present. A 1 m by 1 m unit was excavated to provide a controlled exposure and/or profile of the vertical (stratigraphic) nature of the deposit or features.

Site CA-SBR-13,538

This site was recorded in 2009 as a lithic scatter that consists of four cryptocrystalline silicate (CCS) flakes in an area 37 m (east-west) by 36 m (north-south) area (Meiser and Cooley 2009). The flakes were present in an alluvial/lacustrine setting adjacent to the Palen Dry Lake shoreline. Two of the flakes appeared to be in rodent extrusions suggesting a possible subsurface deposit origin. The flakes ranged in size from 2.5 cm by 2 cm to 10 cm by 7 cm.

Site CA-SBR-13,538 has the potential to yield information important to history or prehistory because little is known about the prehistory of Palen Lake, especially along its western shoreline. Therefore, the goals of testing site CA-SBR-13,538 were as follows:

- To determine if an intact subsurface deposit existed at the site.
- If an intact subsurface deposit existed at CA-SBR-13,538, to determine its vertical and horizontal extent and to collect a sample of the deposit assemblage to determine, if possible, the age, and cultural affiliation of the site.

Testing at CA-SBR-13,538 involved placing four STPs throughout the site based on observed surface artifact occurrence and other surface conditions.

STPs excavated were mapped-in using a submeter Trimble GPS instrument. All artifacts collected from will taken to EDAW/AECOM's San Diego office for cataloging and curation.

Site CA-SBR-13,620H

Site CA-SBR-13,620H was recorded in 2009 as a large, historic dump and refuse scatter, containing both historic artifacts and modern refuse materials, in a 160 m (east-west) (520 ft) by 110 m (north-south) (360 ft) area along Lockhart Road and Lockhart Ranch Road. Within the dump area, seven concentrations were noted with a less dense scatter of materials in the surrounding area (Meiser and Cooley 2009). Based on survey observations, most, if not all of the site lies outside of the direct impact area.

Site CA-SBR-13,537H consists of an extensive historic dump deposit that was in use mostly during and after the 1950s. The materials found in site CA-SBR-13,620H may well be associated with one or more of four mid-20th century homestead sites along Lockhart Road (CA-SBR-6552H, CA-SBR-6555H, CA-SBR-6557H, and CA-SBR-6558H). Based on surface observations, most of the site is outside of the Project area. Therefore, the goals of testing site CA-SBR-13,620H were as follows:

- To determine the presence or absence of a historic refuse deposit within the Project area.
- If a deposit is present, then to determine the content, age, extent, affiliation and significance of the dump deposit within the project area.

Testing at CA-SBR-13,620H involved excavation of four STPs at 10 m intervals, within the area of possible deposit within the Project.

Diagnostic Isolate Recovery

Also incorporated in the testing plan was the recovery, for laboratory analyses, of seven of the isolated prehistoric artifacts identified during the field survey. These artifacts, while isolated (i.e., lacking any other prehistoric cultural materials within 30 m), still have potentially important information that can contribute incrementally to the archaeological record. The lithic material of four of these artifacts is obsidian. Two types of laboratory studies can be performed on the obsidian. Hydration analysis that can yield important chronological information and trace element analysis that can provide quarry source and trade network information. Two of these obsidian artifacts also have potentially diagnostic, stylistic features that can provide important chronological and/or cultural information. The three other prehistoric artifacts are ground stone tools, which are relatively rare in the local archeological record and might yield information regarding use based on residue analysis.

The seven artifacts recommended for collection and analysis are: MI-P-006 (obsidian biface fragment), MI-P-019 (bifacial mano), MI-M-202 (two metate fragments), MI-P-205 (milling slab metate), MI-P-222 (obsidian flake), MI-M-225 (obsidian flake), and MI-P-232 (obsidian biface fragment).

CHAPTER 5 TESTING RESULTS AND DISCUSSION

INTRODUCTION

The archaeological survey identified a total of 27 sites (5 in the Project and 22 in the buffer) and 39 isolates (Meiser and Cooley 2009). The five archaeological resources located in the Project area that could be impacted by the Project, include one prehistoric archaeological site (CA-SBR-13,538) and four historic archaeological sites (P-36-007429, CA-SBR-13,526H, CA-SBR-13,537H, and CA-SBR-13,539H). Three of these five resources are not eligible for the CRHR. The remaining two sites, CA-SBR-13,537H and CA-SBR-13,538, were identified as potentially eligible for inclusion on the CRHR (Meiser and Cooley 2009). In addition, one of the 22 sites located in the buffer, CA-SBR-13,620H also identified as potentially eligible for inclusion on the CRHR may extend into the Project impact area. Site CA-SBR-13,538 consists of a prehistoric lithic scatter, and sites CA-SBR-13,537H and SBR-13,620H of historic dump sites (Meiser and Cooley 2009).

This testing and evaluation program was conducted to make assessments of sites CA-SBR-13,538, CA-SBR-13,537H and SBR-13,620H. Also incorporated in the testing plan was the recovery, for laboratory analyses, of seven of the isolated prehistoric artifacts identified in the Project area during the field survey. The seven artifacts collected for analysis are: MI-P-006 (obsidian biface fragment), MI-P-019 (bifacial mano), MI-M-202 (two metate fragments), MI-P-205 (milling slab metate), MI-P-222 (obsidian flake), MI-M-225 (obsidian flake), and MI-P-232 (obsidian biface fragment) (Attachment 3, Figure 3).

TESTING AND EVALUATION PROGRAM RESULTS

A testing/evaluation program was recommended for three sites that possess a potential to qualify for the CRHR and that will be potentially impacted by the Project. These sites are listed and summarized in Table 2.

Table 2. Archaeological Sites to be Tested

P-Number/Trinomial or Temporary Number	Site Type	Date	Project Impact
CA-SBR-13,537H	Refuse dump/historic occupation	Mid-20th century	Less than significant with mitigation
CA-SBR-13,538	Lithic scatter/ prehistoric occupation	Prehistoric	Less than significant with mitigation
CA-SBR-13,620H	Debris dump/historic occupation	Mid-20th century	Possible impact?

RESOURCE DESCRIPTIONS AND RESULTS – HISTORIC RESOURCES

Site CA-SBR-13,537H

Survey Site Description

This site was recorded during the survey phase of the project as a historic refuse dump with the remnants of a possible adjacent structure and corral, in a 60 m (195 ft) by 35 m (120 ft) area (Meiser and Cooley 2009). This site is situated south of Hoffman Road. Vegetation in the site area is principally saltbush. One intense concentration (dump), measuring approximately 15 m by 12 m (Plate 1), was noted with a scatter of trash materials in the adjacent area to the east of the concentration and some in-place posts and a scatter of milled, wooden structure debris to the west of the dump (Plate 2). The substantial density of the dump deposit and the deteriorated condition of many of the materials precluded achieving an accurate estimate of trash items, but it can be assumed that more than 500 items are present. It also appears that the dump may have originally begun as a pit. Burning is also evident. Historic materials include beverage cans; sanitary food cans; condensed milk cans; a large quantity of crockery sherds of various wares and vessel functions; and bottles and jars of various types including soda, ketchup, liquor, bleach, and mason canning jars. The deposit did not appear to contain items clearly modern (e.g., aluminum items, pull tops), suggesting that it was not in use after the 1950s. The wood materials and posts to the west appeared likely to have derived from a wooden shed or small residence building(s). Some of the posts may represent the remnants of a livestock corral.

Several kinds of disturbance were evident. Several holes in the deposit, and bottles laid out in groups at the edge of the deposit, indicated that bottle hunters had been at work in the deposit. Subsequent to original deposition, materials were moved around by erosion and by people using them for target practice. Cans, mostly away from the deposit, have bullet holes and bottles are shattered. Past farming activities may have also occurred which have served to deform or crush many of the cans and other items, and break the bottles. Many of the metal items (cans in particular) are in a high state of deterioration due to corrosion. Despite these disturbances, it appears that the significant portions of the deposit may be intact.



Plate 1. Historic Dump at Site CA-SBR-13,537H.



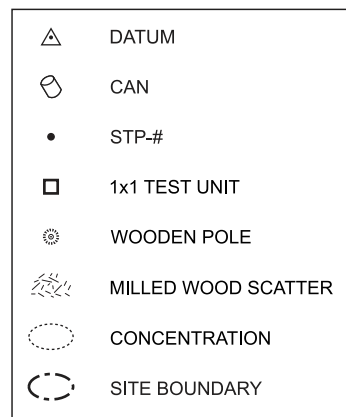
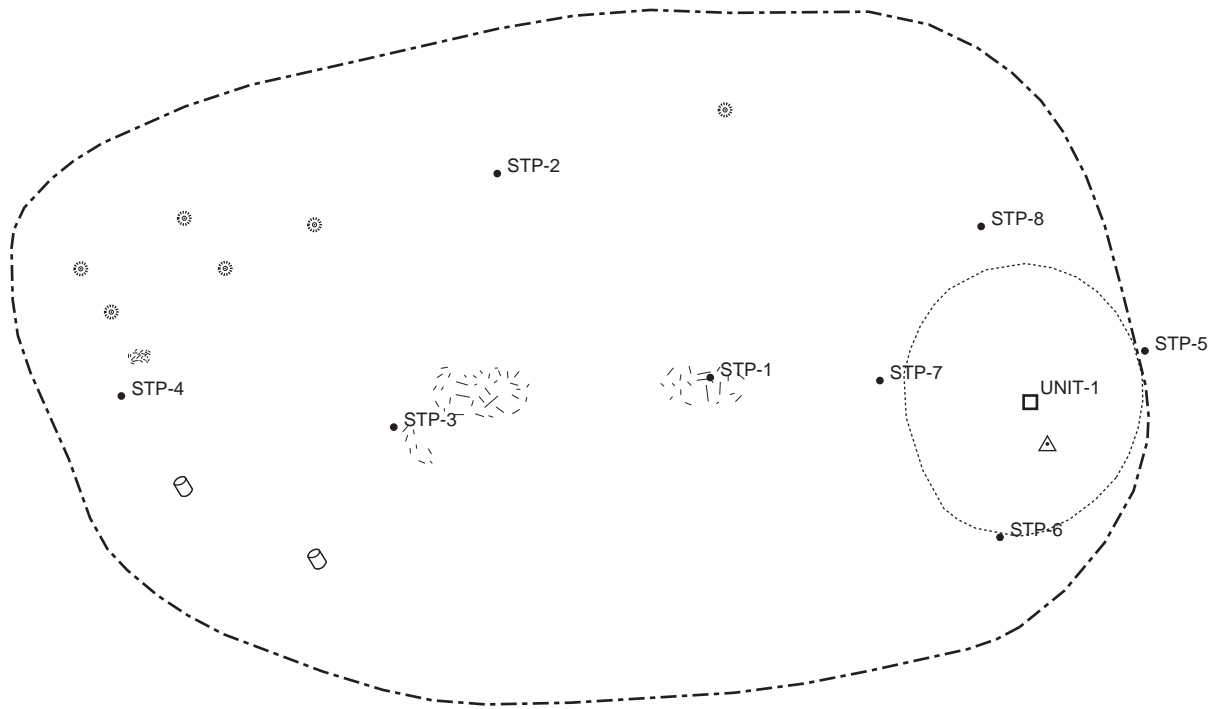
Plate 2. Posts and Scatter of Boards at Site CA-SBR-13,537H.

Testing Program

Testing at site CA-SBR-13,537H included the excavation of four STPs to verify the vertical and horizontal extent of the dump deposit and four STPs excavated within the area(s) of the possible structure(s) to ascertain if any subsurface evidence of a structure was present (Figure 4). The excavation of these latter four STPs (STPs 5 through 8) did not indicate the presence of a subsurface deposit or subsurface features such as walls or foundations in the areas of the possible structure(s), so no 1 m by 1 m unit was excavated. The excavation of the four STPs in the four cardinal directions from the margins of the dump deposit (STPs 1 through 4) indicated that the subsurface deposit did not extend horizontally, appreciably beyond the visible surface extent of the deposit. A 1 m by 1 m unit was excavated to determine the subsurface extent of this dump deposit, and to gain a controlled sample of the artifacts contained in it. The unit was also intended to provide a controlled exposure and/or profile of the vertical (stratigraphic) nature of the deposit (Plates 3, 4, 5, and 6).



Plate 3. Unit 1 (1 by 1 m) location at right in refuse dump.



10 5 0 10 Meters



Scale: 1 inch = 10 meters

Figure 4
CA-SBR-13,537H



Plate 4. Unit 1 before beginning excavation.



Plate 5. Unit 1 at 0 to 20 cm level.



Plate 6. Unit 1 through the deposit at 20 to 40 cm.

Analysis of Site Content

A single unit (TEU 1) and seven STP (STP 1-7) were excavated in to a depth of 40 cm below surface at site CA-SBR-13537H. STPs 1, 3 and 4 are located in milled wood scatter. STP 2 is located in the north central portion of the site. STPs 5, 6, 7, and 8 are located around the debris scatter identified during survey of the site.

Historic artifacts from the site were divided into groups based on use. These groups include groups such as automotive, building materials, consumer goods, hardware, household goods. Historic artifacts identified at the site appear to correspond to consumer goods and building materials, indicating that this dump site is related to household or consumer use. Table 3 shows the counts of artifacts from CA-SBR-13,537H grouped by use.

Table 3. Historic Artifacts by Activity

Activity Group	TEU 1	STP 2	STP 4	STP 5	STP 6	STP 7	STP 8	Total
Ammunition	2							2
Automotive	106							106
Building Material	229		143			2	3	377
Consumer	272	19	1	5	7	479	3	786
Fuel Material	32							32
Garment	2				1			3
Hardware	364					4	1	369
Household	207	1			1	17		226
Intrusive	12		1					13
Kitchen	143	105	1		1	15	6	271
Machinery	1							1
Other			1					1
Personal	133	36						169
Unidentified	44	26			1	1	3	75
Total	1,547	187	147	5	11	518	16	2,431

A total of 2,431 individual artifacts were recovered and cataloged from the site. This does not include bulk materials of various activity groups that were measured by weight only. The majority (n= 1,547) were from TEU 1. This represents 63 percent of the artifact recovered from the site. The majority of artifacts were consumer goods. These consist mostly of glass fragments from bottles and metal tin cans. Other common materials from the site include building materials in the form of pieces of concrete and window glass, metal hardware (metal nails, copper wire, copper pins, copper rivets, and metal light bulb fragments), household items such as bottle fragments and a cotton lantern wick, and kitchen items such as glass jar fragments.

Bulk materials identified at the site include items such as window glass shards, bottle shards, automotive parts such as pieces of headlamps, and consumer goods such as fragmentary tin cans. The vast majority of the bulk material was tin can fragments. Over 44 kilograms of tin can fragments were recovered from the site.

TEU 1

TEU 1 is a dump area located near the eastern edge of the site. It was excavated in 20 cm levels and contained large amounts of historic debris. The majority of this debris was in the form hardware, consumer goods, building materials, and household items. The most common materials obtained from the unit were glass and metal material from hardware and glass fragments from household and commercial use.

Table 4 shows glass artifacts recovered from TEU 1. The majority were vessels and vessel fragments (47 percent), but window glass and light bulb fragments (both fluorescent and incandescent) were also recovered.

Table 4. Glass in TEU 1

Depth (cm)	Head light (n=)	Marble (n=)	Vessel (n=)	Window (n=)	Vessel sherds (n=)	Fluorescent light bulb (n=)	Incandescent light bulb (n=)
0-20	12	1	130	0	0	129	0
20-40	0	0	128	147	148	27	144

Diagnostic bottles and bottle fragments recovered from TEU 1 include alcohol bottles (n=26), medicine bottles (n=1), syrup bottles (n=2), and wine bottles (n=12). Table 5 shows the distribution of bottles from TEU 1. These types of bottles indicate domestic use and are consistent with those found in domestic dumping sites.

Table 5. Vessels in TEU 1

Depth	Bottle	Medicine bottle	Syrup bottle	Wine bottle
0-20	7	1	0	3
20-40	19	0	2	9

Metal artifacts recovered from TEU 1 are listed in Table 6.

Table 6. Metal artifacts from TEU1

FERROUS							
Depth	Bolt (n=)	End cap (n=)	Miscellaneous metal (n=)	Nails (n=)	Pin (n=)	Safety pin (n=)	Tin cans (g)
0-20	1	0	10	47		1	25000
20-40	1	1	50	190	2	0	17800
ALUMINUM							
Depth	Bracket (n=)	Squeeze tube (n=)	Stove pipe top (n=)	Toothpaste tube (n=)	Vessel (n=)		
0-20		1	4	0	0		
20-40	1	0	0	20	1		
BRASS				IRON			
Depth	Bullet casing (n=)			Depth	Cast iron pipe (n=)		
0-20	2			0-20	0		
20-40	0			20-40	2		

Metal artifacts from TEU 1 are dominated by ferrous metals used as hardware or in tin cans. Tin cans from TEU 1 were fragmentary in nature and meaningful counts were not obtained. As can be seen in Table 6, tin can fragments were recovered throughout the unit and were the most

common element in the site. Other metals found in TEU 1 included fragmentary aluminum from commercially or domestically used toothpaste tubes, stove pipes, and modern soda cans; brass bullet casings; and cast iron pipe.

Ceramic artifacts recovered from TEU 1 included pieces of historic earthenware and whiteware ceramic vessel. One ceramic button was also recovered from near the bottom of the unit. Table 7 shows the distribution of ceramics throughout the TEU 1.

Table 7. Ceramics in TEU 1

Depth (cm)	Fastener	Vessel
Surface	0	12
0-20	0	34
20-40	1	4

As can be seen in the table, ceramics are most common near the top of the debris pile, and become less common near the lower portions of the unit.

STP 2

STP 2 was excavated to a depth of 40 cm below surface. The majority of items were domestic in nature and consisted of items such as glass from various vessels, metals, and ceramics.

Glass artifacts from STP 2 included three shards from three different vessels in the first level (0-10). Another glass shard was recovered in the 10-20 cm level and the 20-30 cm level was sterile. Metal artifacts in STP 2 included ferrous metal in the form of fragmentary tin cans and fragments of aluminum from an unidentified squeeze tube. Table 8 shows the metal artifacts from STP 2.

Table 8. Metal Artifacts in STP 2

FERROUS	
Depth	Tin cans (g)
0-10	2.1
10-20	0.2
20-30	0
30-40	0
ALUMINUM	
Depth	Squeeze tube (n=)
0-10	25
10-20	0
20-30	0
30-40	0

The tin cans were fragmentary in nature, making accurate counts unobtainable. The STP produced 2.1 g of can fragments in the first level and 0.2 grams in the second level. The third and fourth levels were sterile for tin can fragments. An aluminum squeeze tube was recovered in the first level of STP 2. Twenty-five fragments of a single tube were recovered, but none were found at lower depths.

Ceramics in STP 2 consisted of one piece of undecorated whiteware. It was found in the first level of the STP. The remaining levels were sterile for ceramics. In addition to glass, metal and ceramic, STP 2 also contained large mammal bone that appears to have been butchered.

STP 4

STP 4 was excavated to a depth of 40 cm below surface. It included a total of 147 artifacts, the majority of which were fragments of milled wood in the first three levels. In addition, several tin can fragments, egg shell fragments, intrusive rodent bone, and concrete were also recovered. Charcoal was also observed in the STP, suggesting that this portion of the dump may have been burned.

STP 5

STP 5 only had five artifacts. These were two pieces of clear glass in the 0-10 cm level, one piece of clear glass in the 30-40 cm level, and a tin can fragment in 0-10 cm level. No other cultural materials were recovered from the STP.

STP 6

STP 6 included a total of 11 artifacts. Most of these were consumer goods in the form of bottle glass fragments. However, egg shell, tin can fragments, and a cotton wick from a lantern was also recovered. The STP also produced a piece of intrusive plastic.

STP 7

STP 7 contained a total of 518 artifacts. The majority of these are glass shards (n=173). The shards included clear, green, brown, and blue fragments from the first three levels of the STP. Table 9 shows the distribution of glass from STP 7 by level.

Table 9. Glass from STP 7 by Level

<u>Depth (cm)</u>	<u>shards (n=)</u>
0-10	59
10-20	79
20-30	35

The glass in the STP likely represents consumer goods in the form alcohol bottles. Table 10 shows the types of glass vessels identified based on diagnostic artifacts recovered from STP 7.

Table 10. Vessel Fragments identified in STP 7

Depth	Alcohol	Jar	Wine bottle
0-10	1	0	0
10-20	0	1	1
20-30	1	0	0

Metal artifacts from STP 7 included a total of four wire nails. Bulk tin can fragments were also recovered from the first three levels of the STP. Table 11 shows the distribution of metal artifacts recovered from STP 7.

Table 11. Metal Artifacts from STP 7

FERROUS		
Depth	Nails (n=)	Tin cans (g)
0-10	0	112.2
10-20	0	509.6
20-30	4	22.3
30-40	0	0

A single piece of ceramic was also recovered from STP 7. It is a pink body sherd of whiteware that was recovered from the 20-30 cm level of the STP. In addition, nine pieces of butchered large mammal bone were recovered from the STP 8.

STP 8

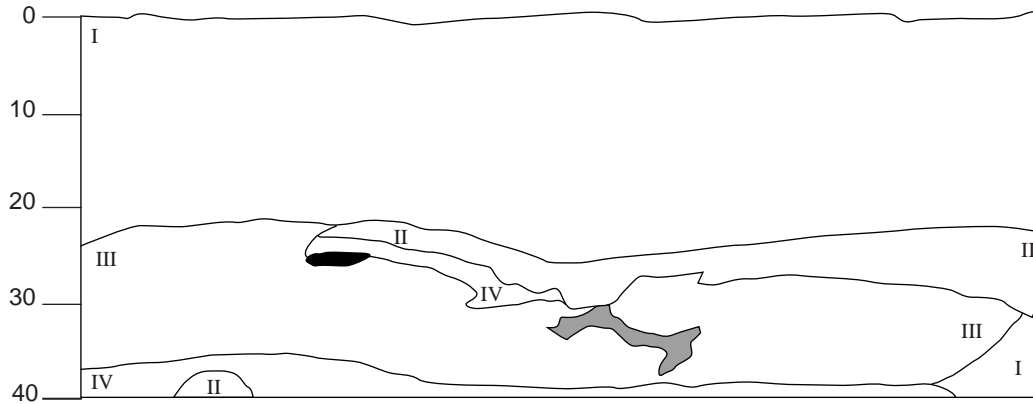
A total of 16 artifacts were recovered from STP 8. These included clear glass fragments, tin can fragments, a wire nail, concrete, and medium and large mammal bone. The STP was excavated to a depth of 40 cm below surface.

Figure 5 shows the stratigraphy of TEU 1. The first level of the unit consists of rusting cans and trash over a light gray ashy sand and dark gray ashy sand. Sterile soil is encountered at 40 cm below surface. The light gray and dark gray ashy sand indicates that the refuse near TEU 1 was burned in the past. It may be that the debris scatter at the eastern end of the site represents a single refuse deposit that was subsequently burned.

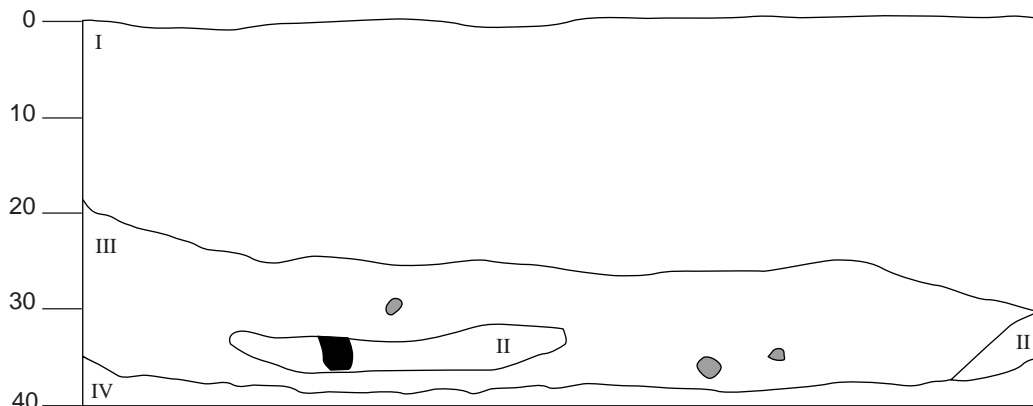
Significance Evaluation

Survey information indicated that site CA-SBR-13,537H was a small but intensive historic dump and trash scatter (see Plate 1). The site does not qualify under CRHR Criteria 1, 2, or 3. Based on the results of the current testing and evaluation program, site CA-SBR-13,537H lacks clear or significant associations with important events or people. The site condition and context is substantially disturbed by both human and natural causes and the site's data content is limited and without significant associations, so it does not qualify under Criterion 4. This site is recommended not eligible for the CRHR.

West Wall



South Wall



I	RUSTING CANS, TRASH IN LIGHT BROWN SANDY MATRIX
II	LIGHT GRAY ASHY SAND
III	DARK GRAY ASHY SAND
IV	LIGHT BROWN SAND
●	RUST STAIN
■	BLACK CHARCOAL

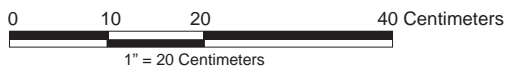


Figure 5
West and South Wall Profiles

Site CA-SBR-13,620H

Survey Site Description

Site CA-SBR-13,620H was recorded during the survey phase of the project as an extensive refuse dump deposit and scatter containing both historic artifacts and modern materials in a 160 m (520 ft) by 110 m (360 ft) area. Vegetation in the area is principally saltbush. This site is situated, principally, in the project buffer area along the south side of Lockhart Road. Within the dump area south of the road, seven concentrations were noted, with a less dense scatter of materials in the surrounding area. During the survey it appeared that a small portion of the site deposit might extend north of Lockhart Road into the project area.

Testing Program

Testing at site CA-SBR-13,620H consisted of the excavation of four STPs (STPs 1 through 4) to determine whether the dump deposit present in the buffer area south of Lockhart Road, was also present within the project area north of Lockhart Road (Figure 6). If a deposit was determined to be present, then, a 1 m by 1 m evaluation unit would be excavated. The excavation of the four STPs did not indicate the presence of a subsurface deposit in the area so no 1 m by 1 m unit was excavated.

Significance Evaluation

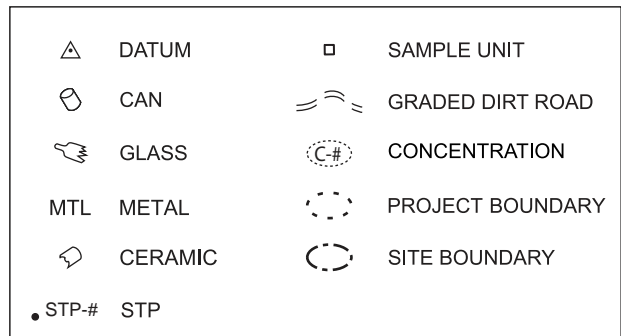
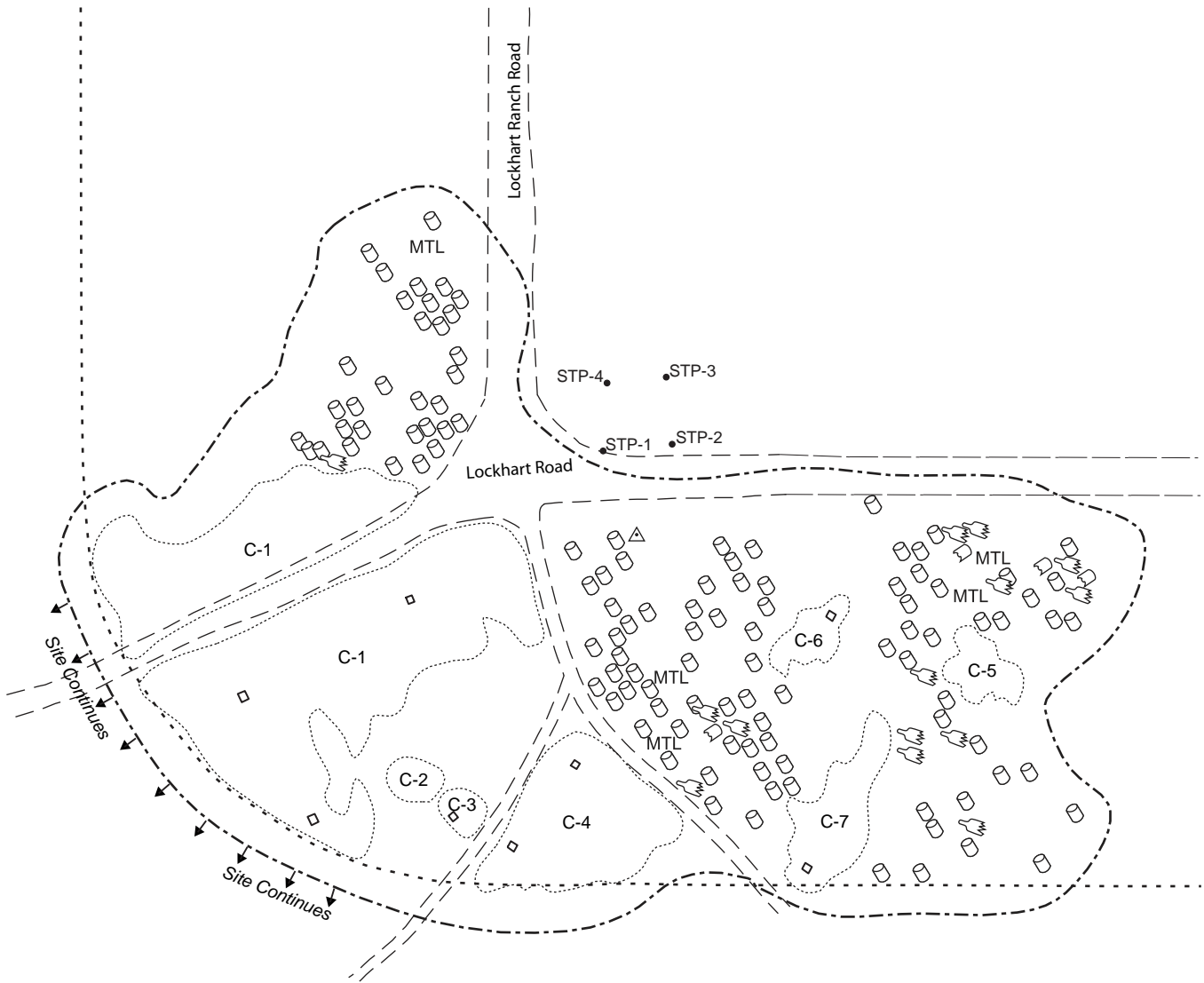
Survey information indicated that a portion of the subsurface deposit of site CA-SBR-13,620H, a large historic dump deposit and trash scatter, might extend slightly into the project area north of Lockhart Road. The testing program was intended to determine if the site extended into this area, and if so, to then to conduct further testing to ascertain the significance of the deposit in this area. The results of the initial testing were negative. As such, the site was seen as not extending into this area. Consequently, no evaluation of CRHR eligibility was required

RESOURCE DESCRIPTIONS AND RESULTS – PREHISTORIC SITES

Site CA-SBR-13,538

Survey Site Description

Site CA-SBR-13,538 was originally recorded as consisting of a sparse scatter of prehistoric lithic debitage in a 40 m (125 ft) by 35 m (120 ft) area (Meiser and Cooley 2009). The site is situated along the western shoreline margin of the Harper Lake bed, and consequently, the vegetation in the site area is principally marsh grasses with areas containing saltbush immediately adjacent. Four pieces of debitage were tallied. Three of the pieces are flakes with the other piece a flake fragment. All are CCS, with two of the flakes being a red translucent material, the third flake a brown translucent material (Plate 7), and the flake fragment an opaque brown material. At least two of the pieces appeared to derive from rodent extrusions, possibly indicating a subsurface source.



25 12.5 0 25 Meters



Scale: 1 inch = 25 meters

Figure 6
CA-SBR-13,620H



Plate 7. Brown Translucent Cryptocrystalline Flake at Site CA-SBR-13,538.

Testing Program

The testing proposed at CA-SBR-13,538 involved initially placing four STPs throughout the site based on observed surface artifact occurrence and other surface conditions (Plates 8 and 9). If these STPs indicated that a subsurface deposit existed, then, up to six additional STPs would be placed to determine the limits of the site deposit, a 1 by 1-meter test unit would be excavated to gain a controlled sample of the deposit, and the surface artifacts would to be mapped in and collected. Any surface materials collected, and STPs and units excavated, were to be mapped-in using a sub-meter Trimble GPS instrument. All artifacts recovered would be taken to AECOM's San Diego office for cataloging and curation.

The four STPS, initially excavated at the site (Figure 7), and additional scrutiny of the surface of the site, produced negative results. Each STP was excavated to a depth of 80 cm and none were found to contain cultural materials. Soils from the STPs consistently contained non-organic, sandy, silty alluvium. Because no evidence for a cultural deposit was detected in the STPS, and no additional surface artifacts were discovered, no other investigations were conducted at the site. The four original pieces of debitage noted at the site were not considered diagnostic and were not collected.

Analysis of Site Content

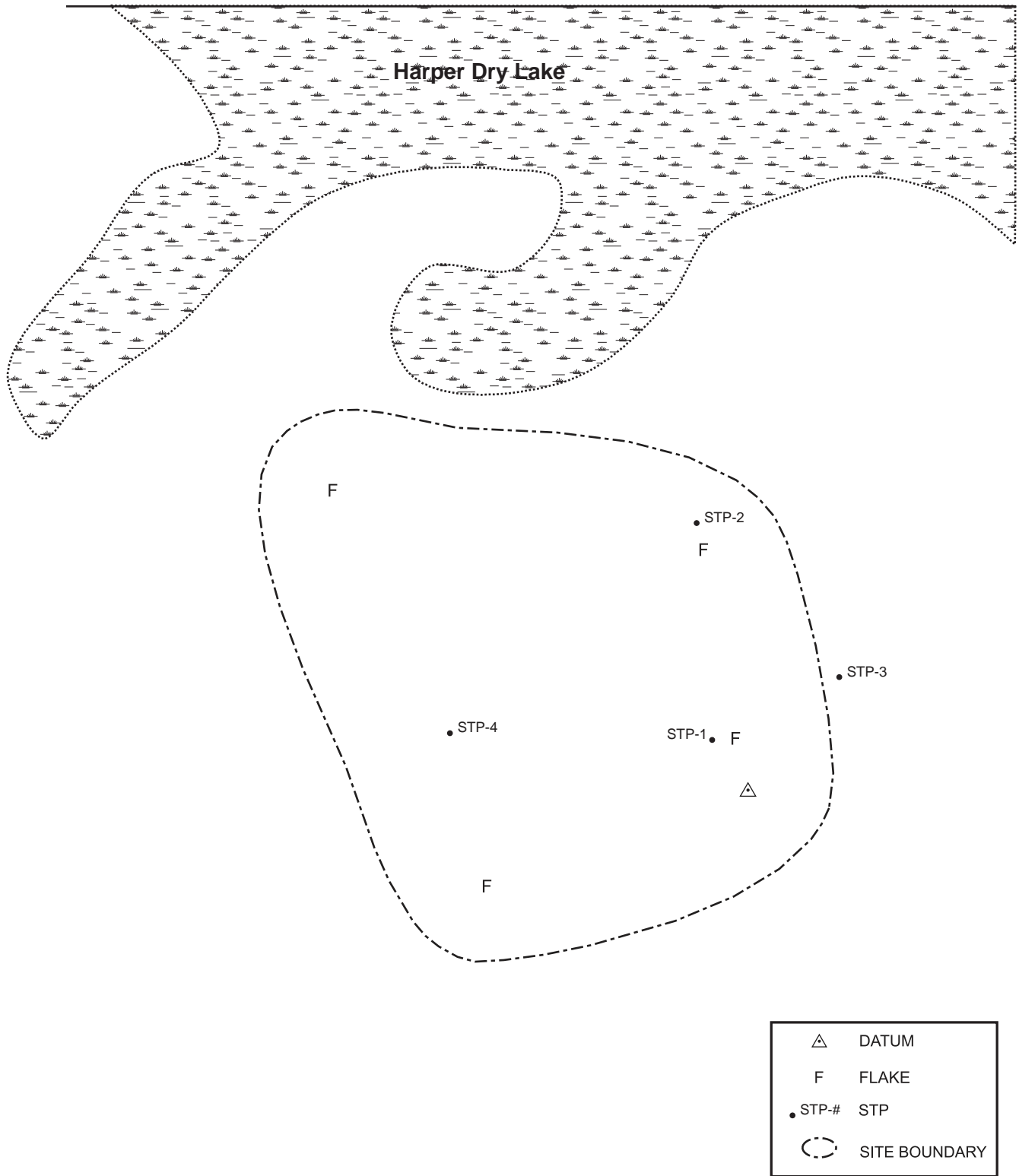
Because no cultural materials were recovered and no other evidence for a cultural deposit was detected in the STPS, and no additional surface artifacts were discovered, no analysis for site subsurface content could be conducted. Because of the negative testing results, the four pieces of non-diagnostic debitage that formed the original basis for recording site CA-SBR-13,538 were



Plate 8. Excavation of STP 2, Backfilled STP 1 is at Center, at Site CA-SBR-13,538.



Plate 9. Excavation of STP 2 at Site CA-SBR-13,538.



Scale: 1 inch = 10 meters

Figure 7
CA-SBR-13,538

not collected, but were recorded in the field. They consist of three flakes and a flake fragment. All are cryptocrystalline silicate (CCS) with two of the flakes being a reddish pink translucent material (chalcedony), the third flake a brown translucent material (chalcedony or, possibly, petrified wood), and the flake fragment an opaque yellow-brown material (jasper). The translucent brown flake is approximately 50 mm by 50 mm, roughly square in shape, and appears to be from a secondary stage of non-biface reduction. One of the reddish pink, translucent flakes is approximately 20 mm by 20 mm, is roughly triangular in shape, and appears to be from a tertiary stage of biface reduction. The other reddish pink translucent flake is approximately 20 mm by 15 mm, is irregular in shape, and appears to also be from a tertiary stage of biface reduction. The jasper flake fragment is approximately 30 mm by 23 mm, is roughly triangular in shape, and appears to be from non-biface reduction.

Evaluation

Survey data indicated that site CA-SBR-13,538 was a prehistoric lithic scatter situated along the edge of the playa shoreline. While consisting of only four pieces of lithic debitage in a 37 m by 36 m area, two of the pieces appeared to originate from rodent extrusions, possibly indicating a subsurface deposit source. While it did not appear that site CA-SBR-13,538 would qualify for CRHP under criteria 1, 2, or 3, it did appear to have potential to provide archaeological data relevant to addressing regional prehistoric research questions under Criterion 4. If subsurface investigations were able to identify a subsurface component that was not too severely disturbed by historic and/or modern activities such as plowing or flood control measures, information could, potentially, be recovered pertaining to lithic technology and settlement, and perhaps even chronology, if obsidian or organic materials suitable for dating are present. Site CA-SBR-13,538, therefore, could potentially be eligible for the CRHR under Criterion 4.

Based on the negative results of the current testing and evaluation program, site CA-SBR-13,538 lacks a subsurface cultural deposit and diagnostic artifacts. The site's data content is limited and without significant associations, so it does not qualify under Criterion 4. This site is recommended not eligible for the CRHR.

RESOURCE DESCRIPTIONS AND RESULTS – PREHISTORIC DIAGNOSTIC ISOLATED ARTIFACTS

Introduction

In an attempt to recover potentially important information to address some of the research questions, seven diagnostic isolated artifacts were collected from the project area. While not within a site context, these items can contribute information regarding reliability of regional chronology and dating methods, the earliest phases of human occupation of the region, Archaic period occupation, lithic technology, and trade and travel. The seven artifacts collected are an obsidian biface fragment (MI-P-006), a bifacial mano (MI-P-019), two metate fragments that fit together (MI-M-202), a whole milling slab metate (MI-P-205), two obsidian flakes (MI-P-222 and MI-M-225), and an obsidian biface fragment (MI-P-232). Two types of laboratory studies can be performed on the obsidian artifacts; hydration analysis that can yield important

chronological information and trace element analysis that can provide quarry source and trade network information. Two of these obsidian artifacts also have potentially diagnostic, stylistic features that can provide important chronological and/or cultural information. The three other prehistoric artifacts are ground stone tools, which are relatively rare in the local archeological record and might yield information regarding use based on residue analysis.

Obsidian Artifacts

MI-P-006

MI-P-006 consists of a fragment of an obsidian biface tool (Plate 10). The original function of this tool is indefinite with use as a knife or as a large projectile point, both a possibility. The original biface was rather thick and coarsely-worked with somewhat irregular lateral edges. The surface of the artifact is weathered with pitting and rounding of the edges. The maximum width is 2.91 cm and the length from base to fracture line is 4.77 cm. Maximum thickness is 0.89 cm at the distal fracture edge and it weighs 12.3 g. While it is not certain, it appears likely that the fragment represents the basal portion of the original biface tool. As a basal fragment, the configuration is convex and some possibly limited basal thinning is evident with several flake removals at the apex of the basal convexity. At least two flake scars on the tool are more recent than others, possibly indicating some reworking of the fragment or possible damage from agricultural tilling activity.



Plate 10. Biface MI-P-006.

If interpreted as a tapering basal stem, this fragment could be interpreted to represent a fragment of a Lake Mojave style dart point of the Great Basin Stemmed Series of early projectile points. Suggestive of this interpretation is the presence of apparent outward-flaring of the lateral margins of the biface at the fracture line. This flaring could represent the point on a Lake Mojave projectile point where shoulders commonly begin to occur. As such, this fragment would represent the basal stem broken-off at the intersection with the triangular head of the point. The Great Basin Stemmed Series of projectile points occurred during the Lake Mojave period, which

extended from approximately 12,000 B.P. to 7000 B.P. and included both Paleoindian and early Archaic cultures (Warren and Crabtree 1986:184).

Two special studies were performed on MI-P-006; obsidian sourcing and obsidian hydration analysis (Attachment 6). The results of the sourcing study indicated that the obsidian is associated with the West Cactus Peak locale in the Coso Volcanic Field in the Coso Mountains, located approximately 80 miles to the northwest of the project area (Hughes 2010, Attachment 6). According to Gilreath and Hildebrandt (1997:70), in a study of 153 obsidian projectile points collected from sites in the Coso Mountains, the West Cactus Peak subgroup of Coso obsidian was less commonly used for projectile points relative to the varieties procured from the Sugarloaf and West Sugarloaf subgroups. Of 153 obsidian projectile points they analyzed, only 10 derived from the West Cactus Peak locale. They also noted that of these 10 projectile points, three were interpreted as Early (i.e., pre-5500 B.P.) with three of these being of the Lake Mojave style.

The results from the hydration analysis indicated a mean hydration reading of 6.0 microns. In a study on 148 obsidian projectile points from the Coso Volcanic Field, Gilreath and Hildebrandt indicate that Great Basin Stemmed points (n=21) ranged from 8.7 to 17.8 microns (1997:73). They also estimated an age of 1350 B.P. for a reading of 6.0 microns for Coso Obsidian projectile points recovered from sites in the Coso Field area (1997:83). These hydration results would seem to suggest that MI-P-006 does not represent a fragment of a Lake Mojave projectile point, and instead, is a fragment of later biface tool such as a knife.

MI-P-232

MI-P-232 consists of the basal portion of an obsidian biface tool (Plate 11). The fragment appears to represent approximately one third of the length of the original tool, the function of which was most likely as a dart-sized projectile point. The maximum width is 2.53 cm and the length from base to fracture line is 2.17 cm. It is 0.55 cm thick and weighs 3.5 g. The basal configuration is concave and the surface is considerably weathered with pitting and rounding of the edges. Some recent damage, likely from contact with agricultural equipment (e.g., a disk or a plow), has exposed a small area of non-weathered surface. The original biface was thin, flat, and finely-worked with very straight lateral edges. Some possible basal thinning is evident with a large flake removed on one side at the apex of the basal concavity. While the weathered surface makes it difficult to be certain, the lateral margins also appear to have been purposely dulled, possibly for hafting purposes.



Plate 11. Biface MI-P-232.

The basal configuration of this projectile point could be interpreted to represent at least two possible styles known to occur in the Mojave Desert and Great Basin. One style would be the Humboldt Series of Concave Base or Basal Notched configurations. This style series is associated with Archaic cultures, and in the southwestern Great Basin and Mojave Desert area, Warren and Crabtree (1986:188) indicate that the style occurs during the Gypsum period and its occurrence extended from approximately 4000 B.P. to 1500 B.P. In the southeastern Great Basin this style is attributed to a longer period of use from approximately 7000 to 1000 B.P. (Fowler and Madsen 1986:174). The problem with assignment of MI-P-232 to this style is that a considerable amount of variability is present in the basal configuration of points that have been previously attributed to it. The Humboldt Concave Based configuration has been described as having an A and a B variety, and the Basal Notched configuration represents a third variety (Heizer and Hester 1978). While a large flake has been removed on one side at the apex of the basal concavity of MI-P-232, this would not appear to represent notching, but could represent basal thinning. The broad width of the basal concavity and the finer working of the basal tangs would seem to argue against a Humboldt Concave Base assignment. While an assignment to this series cannot be ruled out, the broad width of the basal concavity and lack of notching in the production of the basal concavity would seem to argue against a Humboldt Concave Base or Basal Notched assignment.

Another possible style for the point could be as one associated with projectile points with a fluted or Clovislike basal configuration (Wallace 1978:25). According to Wallace, the close resemblance of the basal characteristics in some concave-base projectile points in California, to Clovis-Folsom, may indicate a relationship with the Great Plains Fluted Point tradition and some of the earliest human habitation in North America circa 11,000 B.P. (1978:26). Points of a very similar configuration to MI-P-232 (see Figure 3c and Figure 4f in Wallace 1978:26) have been found in a number of locations in California thought to be of Paleoindian age, including areas adjacent to the project area (see Figure 1 in Wallace 1978:26).

Two special studies were performed on MI-P-232; obsidian sourcing and obsidian hydration analysis (Attachment 6). The results of the sourcing study indicated that the obsidian is associated with the West Cactus Peak locale in the Coso Volcanic Field.

The results from the hydration analysis indicated a Variable Width (VW) reading of approximately 11.0 microns. A more accurate reading was inhibited by the highly weathered surface of the artifact. While the imprecise nature of this reading prevents making definitive comparisons, in a study on 148 projectile points from the Coso Volcanic Field, points attributed by Gilreath and Hildebrandt to the Paleoindian period (n=2) produced readings ranging from 13.4 to 21.1 microns, while Great Basin Stemmed points (n=21) ranged from 8.7 to 17.8 microns (1997:73). Gilreath and Hildebrandt indicated an estimated age of 6000 B.P. for a reading of 11.0 microns for Coso Obsidian projectile points recovered from sites in the Coso Field area. They have also noted, however, that the location of the recovered artifact may have an effect on the rate of hydration (1997:13-15; see also Rogers 2006).

MI-P-222

MI-P-222 consists of an obsidian flake. The flake is missing the distal edge and appears to be a tertiary removal as a relative early stage, biface thinning flake. It weighs 5.7 g and measures 3.9 cm, by 3.4 cm, by 0.4 cm thick, and it has a somewhat weathered surface.

Two special studies were performed on MI-P-222; obsidian sourcing and obsidian hydration analysis (Attachment 6). The results of the sourcing study indicated that the obsidian is associated with the West Sugarloaf locale in the Coso Volcanic Field (Hughes 2010, Attachment 6). According to Gilreath and Hildebrandt (1997:70), in a study of 153 obsidian projectile points collected from sites in the Coso Mountains, the West Sugarloaf and Sugarloaf subgroups were the most commonly occurring sources of obsidian. Of 153 obsidian projectile points they analyzed, 77 derived from the Sugarloaf locale.

The results from the hydration analysis indicated a VW reading of approximately 10.0 microns (Origer 2010, Attachment 6). A more accurate reading was inhibited by the weathered surface of the artifact. While the imprecise nature of this reading prevents making definitive comparisons, in the study of 148 obsidian projectile points from the Coso Volcanic Field, Gilreath and Hildebrandt indicated an estimated age of 6,000 B.P. for a reading of 11.0 microns and an estimated age of 3300 B.P. for a reading of 9.0 microns for Coso Obsidian projectile points recovered from sites in the Coso Field area (1997:83). They have also noted, however, that the location of the recovered artifact may have an effect on the rate of hydration (1997:13-15; see also Rogers 2006).

MI-M-225

MI-M-225 consists of an obsidian flake recovered as a single prehistoric artifact occurrence in a historic trash scatter site. As such, it was treated as an isolated artifact and collected. The flake is missing the distal edge and appears to be a tertiary removal as an intermediate stage biface thinning flake. It weighs 1.7 g and measures 2.2 cm, by 1.9 cm, by 0.34 cm thick, and it has a weathered surface.

Two special studies were performed on MI-M-225; obsidian sourcing and obsidian hydration analysis (Attachment 6). The results of the sourcing study indicated that the obsidian is associated with the West Sugarloaf locale in the Coso Volcanic Field (Hughes 2010, Attachment 6).

The results from the hydration analysis indicated a VW reading of approximately 10.0 microns. A more accurate reading was inhibited by the weathered surface of the artifact (Origer 2010, Attachment 6). While the imprecise nature of this reading prevents making definitive comparisons, in the study of 148 obsidian projectile points from the Coso Volcanic Field, Gilreath and Hildebrandt indicated an estimated age of 6000 B.P. for a reading of 11.0 microns and an estimated age of 3300 B.P. for a reading of 9.0 microns for Coso Obsidian projectile points recovered from sites in the Coso Field area (1997:83). They have also noted, however, that the location of the recovered artifact may have an effect on the rate of hydration (1997:13-15; see also Rogers 2006).

Ground Stone Artifacts

MI-P-019

MI-P-019 is a whole mano made from a small, nearly circular, granite cobble. It measures 8.8 cm by 8.4 cm and is 5.3 cm thick, and it weighs 574.6 g. The mano is bifacially ground with one side more substantially ground than the other. The more substantially ground side is relatively flat and has a definite shoulder, while the less ground side is convex. No cobble cortex is present on the more substantially ground side and pecking appears to be present within the flat ground surface. Several iron stain marks indicate contact with a metal agricultural tilling implement such as a disc.

MI-M-202

MI-M-202 consists of two fragments (found together) of a granodiorite, metate. MI-M-202 was recovered as a single prehistoric artifact occurrence in a historic trash scatter site. As such, it was treated as an isolated artifact and collected. The two fragments fit together, but do not result in a complete metate. It does appear, however, that before this larger fragment split in two, it may have been used as a small metate. The evidence for this is rounding or grinding on two of the older broken edges possibly resulting from usage after the earlier breakage. The two fragments, when reassembled, measure 26.0 cm, by 17.6 cm, by 7.1 cm thick, and together they weigh 4,250 g. The reassembled fragment has a relatively shallow concave use surface with an approximate maximum depth of two centimeters. No grinding is apparent on the basal side. Several iron stain marks and grooves indicate contact with a metal agricultural tilling implement such as a disc.

MI-P-205

MI-P-205 consists of a granodiorite, metate. While some breakage is apparent, the artifact appears to be essentially whole. It measure 35.4 cm, by 23.7 cm, by 11.3 cm thick, and it weighs 10,750 g. This metate does not show any definite evidence of shaping and it appears to be an irregular slab with a natural, somewhat undulating, but mostly flat surface on one side that was utilized as a milling surface. While grinding is clearly evident on this natural surface, it does not appear that this tool was used substantially. No grinding is apparent on the basal side. Several iron stain marks, grooves, and marginal breakage indicate contact with a metal, agricultural tilling implement such as a disc.

DISCUSSION

The archaeological testing and evaluation program addressed a total of three sites, consisting of a small prehistoric site located along the shore margin of Harper Dry Lake, and two historic dump sites located on the relatively flat valley floor also adjacent to the lake playa. These deposits may have been impacted by 20th century agriculture. The prehistoric site, CA-SBR-13,538 consisted of a relatively sparse artifact assemblage, and the historic sites both consisted of mid 20th century dump deposits. Also incorporated in the current testing and evaluation program was the recovery and analysis of seven diagnostic prehistoric isolated artifacts. The following discussion focuses on these sites and isolates in the context of the research issues presented in Chapter 4, but addresses briefly the other site types as well.

Historic Period Sites

Excavations conducted at site CA-SBR-13,620H determined that it does not extend into the area of project disturbance.

Artifacts recovered from various STP and a single TEU at CA-SBR-13,537H are consistent with the site's use as domestic dump where household and commercially-used goods were discarded. Glass artifacts such as window glass and bottle glass are consistent with domestic use, as are tin cans and metal hardware and butchered bone.

There is also evidence that the site may have been used as a butchering site for cattle and other animals. The original survey (Meiser and Cooley 2009) identified a number of posts in the ground. These may have been used as a holding pen or chute for cattle. STP There was also butchered animal bone on the surface. Decomposing milled lumber is located adjacent to the posts. STPs 1, 3, and were placed in these areas and did not indicate any type of structure. The milled lumber in these locations is likely associated with active dumping at the site. All other STPs indicate that dumping was taking place throughout the site. However, the results of these STPs indicate there is relatively little subsurface cultural materials when compared to the surface artifacts.

Scattered debris around the site suggests that it is a rather discrete dump, rather than a commercial or even communal dump. Its relative shallowness suggests that it was likely used by one or several individuals for a prolonged period. It is also possible that the site was used for butchering animals, which may have happened before dumping took place at the site.

Obtaining meaningful dates for use is difficult for a deposit such as this. However, bottles identified throughout the site have maker's marks that give some clues as to the age of the dump deposit. Table 12 shows the date ranges of bottles identified at CA-SBR-13537H based on Toulouse 1971.

Table 12. Glass Bottles with Maker's Marks from Site CA-SBR-13537H

Vessel Type	Manufacturer	Location	Makers Mark Date	Makers Mark Description
bottle	Owens Illinois Glass Co	Toledo, OH	1929-1954	diamond and circle "I" in center
bottle	Oil City Glass Co.	Oil City, PA	1952-1969	three "x" on tower stack
bottle	Owens Illinois Pacific Coast Co.	San Francisco, CA	1932-1945	circle over diamond shape with "I" in center
bottle	Owens Illinois Glass Co.	Toledo, OH	since 1954	"I" inside of circle
bottle	Owens Illinois Glass Co.	Toledo, OH	1929-1954	circle over diamond shape with "I" in center
wine bottle	Gallo Glass Co.	Modesto, CA	since 1966	"EJ Gallo Winery"
bottle	Owens Illinois Glass Co.	Toledo, CA	since 1954	circle with "I" in center

Table 12. (continued)

Vessel Type	Manufacturer	Location	Makers Mark Date	Makers Mark Description
bottle	Glass Containers Inc.	Los Angeles, CA	since 1945	“GC”
bottle	Alexander H. Kerr Co.	Los Angeles, CA	since 1944	AHK/2057
wine bottle	Gallo glass Co.	Modesto, CA	since 1966	“EJ Gallo”
bottle	Latchford-Marble Glass Co.	Los Angeles, CA	1939-1957	“LM” inside of circle
bottle	Alexander H. Kerr Co.	Los Angeles, CA	since 1944	“AHK”
bottle	Hazel-Atlas glass Co.	Wheeling, W. VA	1920-1964	“H” over “A”
wine bottle	Gallo Glass Co.	Modesto, CA	since 1966	“EJ Gallo Winery”
wine bottle	Gallo Glass Co.	Modesto, CA	since 1966	“EJ Gallo”
bottle	Glass Containers Inc.	Los Angeles, CA	since 1945	...”GC” 4/ 3507
bottle	Hazel-Atlas Glass Co.	Wheeling, W. VA	1920-1964	“HA”
jar	Anchor Hocking Glass	Lancaster, OH	since 1946	81-S7/5 H S/ 750

As can be seen in the table, the earliest dates begin in the 1920s and the latest dates are in the 1960s. The most common dates are between the 1940s and 1950s. The wide range of dates suggests that the dump was used over a long period of time and does not represent a single dumping episode. It is likely that the dump was in use between the 1940s and 1960s. The presence of subsurface charcoal suggests that the deposit was burned at least once in the past.

Prehistoric Sites and Isolates

Chronology

The testing results from site CA-SBR-13,538 were negative for prehistoric, subsurface, cultural deposits, and the four, flaked stone, debitage artifacts originally noted were, temporally, non-diagnostic. Consequently, the results from the site testing did not provide any information that could contribute to enhancing our knowledge of prehistoric activities in the area through time. The results of obsidian sourcing and hydration analyses performed on four obsidian isolated artifacts, on the other hand, were able to contribute new information concerning prehistoric chronology in the area. The results of the sourcing studies indicated that all of these artifacts derived from two locales within the Coso Field in the Coso Mountains. These artifacts also provided potentially useful temporal information in the form of hydration data (Table 13), which suggest that prehistoric activities around Harper Lake may extend back to the earliest period of occupation of the Mojave Desert area. While tentative, these data, along with stylistic attributes of two of the artifacts, suggest human occupation extending back to circa 6,000 B.P., with perhaps an even earlier presence also suggested by stylistic attributes. Based on the hydration readings from the four artifacts, and on analyses by Gilreath and Hildebrandt (1997), of the relationship of hydration measurements to age for Coso derived obsidian, the readings indicate

that prehistoric activities and the use of Coso derived obsidian in the Harper Lake Area could have occurred during three different periods; circa 1350 B.P., circa 3300 B.P., and circa 6000 B.P. While the analyses of Gilreath and Hildebrandt indicate these age estimates are for Coso obsidian artifacts recovered in the Coso area, the reliability of age estimates based on obsidian hydration data is still a work-in-progress (Gilreath and Hildebrandt 1997:15-16).

Table 13. Obsidian Hydration Results

Isolate	Catalog	Description	Depth	Measurements	Mean	Condition
				(microns)		
MI-P-006	1	Biface Fragment	Surface	5.9 6.0 6.0 6.0 6.1 6.1	6.0	-
MI-P-222	1	Debitage	Surface	Approximately 10.0	VW	Weathered
MS-H-225	1	Debitage	Surface	Approximately 10.0	VW	Weathered
MI-P-232	1	CCB Point Fragment	Surface	Approximately 11.0	VW	Weathered

Site Structure and Formation Processes

The testing results from site CA-SBR-13,538 were negative for prehistoric, subsurface, cultural deposits. Consequently, the results from the site testing did not provide any information that could contribute to enhancing our knowledge of site structure and formation processes. Another study, performed as part of this project, investigated the Harper Lake lakebed to a more substantial depth in order to ascertain the potential for deeply buried cultural deposits (Steinkamp 2009). For this geoarchaeological study, 20 backhoe trenches, distributed over the Project, were excavated to depths ranging from 1.5 m to 3.65 m. Two of these trenches were excavated in the general vicinity of site CA-SBR-13,538. Overall, the 20 trenches revealed that the Project area is consistently covered by “a rather thick veneer of agriculturally disturbed sediments underlain by thick Holocene and Pleistocene age alluvial fan sediments with interdigitations of lacustrine sediments” (Steinkamp 2009:24). The agriculturally disturbed layer is indicated to extend to an average depth of approximately 0.75 m. Included with the lacustrine deposits was a thin layer of dune deposits that occurred in at least two of the trenches near the current lake shore at a depth of approximately 1.7 m. Overall, results from the study indicated that “no evidence of cultural deposits or artifacts was recorded” (2009:29-30). They also noted, however, that “a sequence of buried lacustrine deposits was encountered at 80-130 cm below ground surface in six test trenches” (2009:29), and that

The presence of lacustrine (Qap) within the MSP suggests a previously high lake stand sometime in the past (possibly associated with the middle to late Holocene wet climate regime from 5-3.5 kya). The high lake stand may have extended up to a minimum elevation of 2,050 ft. (625 m). The implication of this finding is that the potential for buried archaeological deposits in association with lacustrine beach deposits is high from elevation 2,050 to elevation 2,025 ft. (625-617 m) (Steinkamp 2009:29).

In this regard, Steinkamp notes that Sutton and others (Sutton 1996; Sutton et al. 2007) have indicated that early human settlement in the Mojave Desert was focused on Pleistocene and early Holocene lakes (2009:29).

Subsistence and Settlement during the Early Prehistoric and Archaic Periods in the Region

The testing results from site CA-SBR-13,538 were negative for prehistoric, subsurface, cultural deposits. Consequently, the results from the site testing did not provide any information that could contribute to enhancing our knowledge of subsistence and settlement during the early prehistoric and archaic periods in the region. The isolated artifacts recovered, however, may be able provide some information related to these questions. In Chapter 3, it was indicated that archaeological research in the Mojave Desert has not fully answered questions regarding early occupation and subsistence adaptations to fluctuating, and eventual disappearance of, lacustrine environments (Sutton et al. 2007). The differences in the Lake Mojave and Pinto complexes archaeological assemblages of the Early Holocene suggest a period of transition in subsistence strategies from a pluvial lake subsistence focus to a more diversified one encompassing vegetal resources to a greater degree. The occurrence of artifacts in the Project area dating from the Early Holocene, if associated with these early complexes, could indicate a potential to contribute information to this area of on-going research. The Project area is located in an area that has been categorized as not containing a substantial human presence during the late Middle Holocene. This period, from circa 6000 to 4000 B.P., was an extremely dry period during which human occupation of the Mojave Desert may have essentially ceased. The Deadman Lake Complex, the only one associated with the latter part of the Middle Holocene, is currently only known from the southeastern area of the desert (Sutton et al. 2007). Following this period, at the onset of the Late Holocene, approximately 4,000 years ago, a period of greater precipitation and elevated lake levels began (Sutton et al. 2007). The Gypsum Cave Complex, the complex most associated with this period, is represented at several sites in proximity to the Project area (Sutton 1996).

Results from the current testing and evaluation program, while limited, may be able to contribute some information to address these questions. The obsidian artifacts recovered suggest that human activity, likely associated with Harper Lake, was occurring between circa 6000 B.P. and 3300 B.P. If so, this could correlate with the extremely dry period during the Middle Holocene. This possibility, of course poses new questions as to the nature and intensity of this activity in the area. The two hydration date estimates of 3300 and 1350 B.P. could also be indicative of the onset of the Late Holocene, approximately 4,000 years ago, purported to be a period when greater precipitation and elevated lake levels began to occur. While not definite, the ground stone tools recorded may also be associated with this time period. It was also indicated in Chapter 3 that beginning approximately 2,000 years ago, according to Sutton et al. (2007), “cultural systems changed dramatically across the Mojave Desert, most notably in the western part of the region.” The hydration date-estimate of 1350 B.P. would fall within this time period. These time associations are based on hydration age estimates, but it should also be noted that, while not seeming to correlate with these ages, the stylistic configurations of the two obsidian bifaces could suggest the possibility of even older Paleoindian and Lake Mojave Complex activity in the area. These results, then, though limited, may be indicative of settlement and subsistence patterns in the area, likely related to Harper Lake, extending from the Lake Mojave period (including

Paleoindian materials), through the Pinto period, and into to the Gypsum period and possibly the Saratoga Springs period, as delineated by Warren and Crabtree (1986).

Lithic Technology and Utilization

The testing results from site CA-SBR-13,538 were negative for prehistoric, subsurface, cultural deposits. Consequently, the results from the site testing did not provide any information that could contribute to enhancing our knowledge of lithic technology and utilization. The surface materials from the site and the isolated artifacts recovered, however, may be able provide some limited information related to these questions. The four pieces of debitage that formed the basis for recording site CA-SBR-13,538, while not collected, were recorded in the field. They consist of three flakes and a flake fragment. All are CCS with two of the flakes being a reddish pink translucent material (chalcedony), the third flake a brown translucent material (chalcedony or, possibly, petrified wood), and the flake fragment an opaque yellow-brown material (jasper). The translucent brown flake appears to be from a secondary stage of non-biface reduction, the reddish pink, translucent flakes from a tertiary stage of biface reduction, and the jasper flake fragment apparently from non-biface reduction.

These toolstone types indicate a usage of lithic materials likely derived from eastern desert sources. Such CCS materials are known, for example, to all be present from cobbles derived from gravels present, approximately 180 miles (290 kilometers) to the east along the Colorado River (Singer 1984:42). Closer gravels sources are also known to be present in the Mojave Desert, however, to the east within approximately 35 to 70 miles (55 to 112 kilometers) of the Project (Campbell and Campbell 1937; Heiser and Treganza 1944; Nakamura 1991). The obsidian isolates recovered were all sourced to the Coso Field in the Coso Mountains. The two pieces of obsidian debitage were both biface reduction flakes. Together with the materials at CA-SBR-13,538, four of these flakes were associated with biface reduction, with three from the later stages of reduction. The ground stone tools were all made from granitic rocks, granite and granodiorite, all available within a short distance from the Project in the adjacent mountains, but more likely from the even closer, if not onsite, alluvial fans in the valley derived from these mountains. These toolstone materials indicate both local and more distant sources suggesting a degree of the sedentary settlement, possibly associated with an extant Harper Lake, as well as mobility and/or trade for the procurement of raw materials.

Trade and Travel

The testing results from site CA-SBR-13,538 were negative for prehistoric, subsurface, cultural deposits. Consequently, the results from the site testing did not provide any information that could contribute to enhancing our knowledge of trade and travel. The surface materials from the site and the isolated artifacts recovered, however, may be able provide some limited information related to these questions for this topic. The four pieces of debitage that formed the basis for recording site CA-SBR-13,538, consisted of CCS with two of the flakes being a reddish pink translucent material (chalcedony), the third flake a brown translucent material (chalcedony or, possibly, petrified wood), and the flake fragment an opaque yellow-brown material (jasper). These toolstone types indicate a usage of lithic materials likely derived from eastern desert sources. Such CCS materials are known, for example, to all be present from cobbles derived from gravels present along the Colorado River, approximately 180 miles (290 kilometers) to the east (Singer 1984:42). Closer gravels sources are also known to be present in the Mojave Desert,

however, to the east within approximately 35 to 70 miles (55 to 112 kilometers) of the Project (Campbell and Campbell 1937; Heiser and Treganza 1944; Nakamura 1991). The obsidian isolates recovered were all sourced to the Coso Field. The ground stone tools were all made from granitic rocks, granite and granodiorite, all available within a short distance from the Project in the adjacent mountains, but more likely from the even closer, if not onsite, alluvial fans in the valley derived from these mountains. These toolstone materials indicate both local and more distant sources suggesting local procurement as well as possible travel and/or trade to/from more distant locales.

CHAPTER 6 MANAGEMENT RECOMMENDATIONS

INTRODUCTION

CEQA directs lead agencies to first determine whether a cultural resource is a “historically significant” cultural resource. The current evaluation program assessed sites that might be affected by the Project.

EVALUATION CRITERIA

CEQA defines a historical resource as:

- A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in the CRHR.
- A resource included in a local register of historical resources identified as significant in a historical resources survey shall be presumed to be historically or culturally significant, Public agencies must treat any resource significant unless the preponderance of evidence demonstrated that it is not historically or culturally significant.
- Any object, building, structure, site area, record, or manuscript which a lead agency determines to be historically significant to significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency’s determination is supported by substantial evidence in light of the whole record. Generally, a cultural resource shall be considered by the lead agency to be “historically significant” if the resources meets the criteria for listing on the CRHR, including the following:
 - (1) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
 - (2) Is associated with the lives of persons significant in our past;
 - (3) Embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of an important creative individual, or possesses high artistic value; or
 - (4) Has yielded, or may be likely to yield, information important in prehistory or history.

For most archaeological resources this involves evaluation of their ability to address important research questions (Criterion 4). For sites with built or historic period components, this can involve assessment under one or several of the other criteria.

Under CEQA, an archaeological resource can also be a “unique archaeological resource” as defined as:

An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person. [Public Resources Code Section 21083.2(g)]

EVALUATIONS

Three other sites, CA-SDR-13,537H and CA-SBR-13,538 were subject to an evaluation program documented herein. Based on the testing, neither of the sites qualify for the CRHR and nor do they meet the criteria as a unique resource under CEQA. Excavations associated with CA-SBR-13,620H determined that the site does not extent into the Project’s area of disturbance. Table 14 provides a summary of all the Project archaeological sites and their significance and anticipated impacts.

Table 14. Management Recommendations for Sites Potentially Affected by the Project

P-Number/Trinomial (Temporary Number)	Type	Date	Significance	Project Impact
P-36-006553 (CA-SBR-6553H)	Debris scatter and concrete foundation/ historic occupation	Early to mid-20th century (1922–1950)	Potentially eligible for CRHR under Criterion 4	No impact
P-36-007429* (CA-SBR-7430H)	Debris scatter/historic occupation	Early to mid-20th century	Not significant	No impact
P-36-007430/ CA-SBR-7430H	Debris scatter/historic occupation	Early to mid-20th century	Not significant	No impact
P-36-020985/ CA-SBR-13,517H (MS-H-001)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020986/ CA-SBR-13,518H (MS-H-004)	Debris scatter/historic occupation	Mid-20th century	Potentially eligible for CRHR under Criterion 4	No impact

Table 14. (continued)

P-Number/Trinomial (Temporary Number)	Type	Date	Significance	Project Impact
P-36-020987/ CA-SBR-13,519H (MS-H-005)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020988/ CA-SBR-13,520H (MS-H-011)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020989/ CA-SBR-13,521H (MS-H-013)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020990/ CA-SBR-13,522H (MS-H-017)	Debris pile/historic occupation	Mid-20th century	Not significant	No impact
P-36-020991/ CA-SBR-13,523H (MS-H-023)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020992/ CA-SBR-13,524H (MS-H-024)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020993/ CA-SBR-13,525H (MS-H-025)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-021096/ CA-SBR-13,620H (MS-H-026)	Debris dump/historic occupation	Mid-20th century	Potentially eligible for CRHR under Criterion 4	No impact
P-36-020994/ CA-SBR-13,526H (MS-H-207*)	Reservoir/foundation s/ debris scatter	Mid- to late 20th century	Not significant	No impact
P-36-020995/ CA-SBR-13,527H (MS-H-210)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020996/ CA-SBR-13,528H (MS-H-211)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020997/ CA-SBR-13,529H (MS-H-214)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020998/ CA-SBR-13,530H (MS-H-216)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-020999/ CA-SBR-13,531H (MS-H-217)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-021000/ CA-SBR-13,532H (MS-H-218)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact

Table 14. (continued)

P-Number/Trinomial (Temporary Number)	Type	Date	Significance	Project Impact
P-36-021001/ CA-SBR-13,533H (MS-H-221*)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-021002/ CA-SBR-13,534H (MS-H-225)	Lithic artifact scatter/ prehistoric occupation; Debris scatter/historic occupation	Prehistoric and Mid- 20th century	Potentially eligible for CRHR under Criterion 4	No impact
P-36-021003/ CA-SBR-13,535H (MS-H-238)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-021004/ CA-SBR-13,536H (MS-H-245)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact
P-36-021005/ CA-SBR-13,537H (MS-H-246*)	Refuse dump/historic occupation	Mid-20th century	Not significant	No impact
P-36-021006/ CA-SBR-13,538 (MS-P-250*)	Lithic scatter/prehistoric occupation	Prehistoric	Not significant	No impact
P-36-021007/ CA-SBR-13,539H (MS-H-252*)	Debris scatter/historic occupation	Mid-20th century	Not significant	No impact

MANAGEMENT RECOMMENDATIONS

No known CRHR-eligible sites will be impacted by the project as currently designed. There are three potentially eligible sites in the buffer. If project plans change to include any of these three areas, the resources would need to be evaluated. If any of the resources are found to be eligible and cannot be avoided, appropriate mitigation/treatment would be required prior to construction.

CHAPTER 7 REFERENCES

- Anderson, R. S.
1990 Holocene Forest Development and Paleoclimates within the Central Sierra Nevada, California. *Journal of Ecology* 78:470–489.
- Anderson, R. S., O. K. Davis, and P. L. Fall
1985 Late Glacial and Holocene Vegetation and Climate in the Sierra Nevada of California, with particular reference to the Balsam Meadow site. In *Late Quarternary Vegetation and Climates of the Southwestern United States*, edited by B. F. Jacobs, P. L. Fall, and O. K. Davis. *American Association of Stratigraphic Palynologists Contributions Series* 16:127–140.
- Antevs, Ernst
1955 Geologic-Climatic Dating in the West. *American Antiquity* 20(4):317–335.
- Basgall, Mark E.
1990 Early Holocene Faunal Exploitation in the Mojave Desert: Models Versus Data. Paper presented at the 24 Annual Meeting of the Society for California Archaeology, Foster City.

2000 The Structure of Archaeological Landscapes in the North-Central Mojave Desert. In *Archaeological Passages: a Volume in Honor of Claude Nelson Warren*, edited by Joan S. Schneider, Robert M. Yohe II, and Jill K. Gardner. Western Center for Archaeology and Paleontology, Publications in Archaeology, Number 1, pp. 123–137.
- Basgall, Mark E., and M. C. Hall
1992 Fort Irwin Archaeology: Emerging Perspectives on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 26:1–7.
- Bean, Lowell J., and Charles R. Smith
1978 Serrano. In *California*, edited by Robert F. Heizer, pp. 570–574. *Handbook of North American Indians*, Vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington D.C.
- Beck, Charlotte
1994 Functional Attributes and Differential Persistence of Great Basin Dart Points. Paper presented at the 24th Great Basin Conference, Elko, Nevada.
- Bettinger, Robert L., and Martin A. Baumhoff
1982 The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 47:485–503.

- Bettinger, Robert L., and R. E. Taylor
1974 *Suggested Revisions in Archaeological Sequences of the Great Basin in Interior California*. Nevada Archaeological Survey Research Papers 5, pp. 1–26. Reno.
- Bettinger, Robert L., James F. O’Connell, and David Hurst Thomas
1991 Projectile Points as Time Markers in the Great Basin. *American Anthropologist* 93(1):166-172.
- Bureau of Land Management (BLM)
n.d. Wetland and Marsh Restoration at Harper Dry Lake. Electronic document, www.dgm.gov/documents/dirt_conf04/Wetland%20and%20Marsh%20Restoration%20at%20Harper%20Dry%20Lake_%20Croft.pdf, accessed August 29, 2006.
- California Department of Transportation (Caltrans)
2000 *Water Conveyance Systems in California: Historic Context Development and Evaluation Procedures*. Environmental Program/Cultural Studies Office, California Department of Transportation, Sacramento, California.

2007 *A Historical Context and Archaeological Research Design for Agricultural Properties in California*. Division of Environmental Analysis, California Department of Transportation, Sacramento, California.
- Campbell, Elizabeth W. Crozer, and William H. Campbell
1937 *The Archaeology of Pleistocene Lake Mojave, A Symposium*. Southwest Museum Papers 11. Los Angeles.
- Chartkoff, J. and K. K Chartkoff
1984 *The Archaeology of California*. Stanford University Press.
- Cleland, James H.
2006 A Tale of Two Glasses: The Convergence of Induced Hydration and Archaeological Data at Coso and Grasshopper Flat. Paper presented at 30th Great Basin Anthropological Conference, Las Vegas, Oct 20, 2006.
- Cleland, James H., and W. Geoffrey Spaulding
1992 An Alternative Perspective on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 16:1–6.
- Cox, B. F., J. W. Hillhous, and L. A. Owen
2003 Pliocene and Pleistocene Evolution of the Mojave River, and Associated Tectonic Development of the Transverse Ranges and Mojave Desert, Based on Borehole Stratigraphy Studies and Mapping of Landforms and Sediments near Victorville, California. in *Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts*. Edited by Yehouda Enzel, Stephen G. Wells, and Nicholas Lancaster. The Geological Society of America, Special Paper 368.

- Deetz, James
1988 American Historical Archaeology: Methods and Results. *Science* vol. 239: 362-7.
- Donnan, Christopher B.
1964 A Suggested Culture Sequence for the Providence Mountains (Eastern Mojave Desert). *University of California Archaeological Survey Annual Report*, pp. 1–26.
- Donovan, Kelly
2003 Harper Lake could go from dry to wet. Electronic document, www.dailypress.com/2001-2003/10452785377343.html, accessed August 29, 2006.
- Earle, David D.
2003 *Draft Ethnohistorical and Ethnographic Overview and Cultural Affiliation Study of the Fort Irwin Region and the Central Mojave*. Prepared for TRC Solutions, Salt Lake City, Utah. Prepared by Earle and Associates Palmdale, California.
- Elston, Robert G.
1982 Good Times, Hard Times: Prehistoric Culture Change in the Western Great Basin. In *Man and the Environment in the Great Basin*, edited by David B. Madsen and James F. O’Connell. SAA Papers No. 2. Society for American Archaeology, Washington, D.C.
- Flenniken, Jeffery J. and Phillip J. Wilke
1989 Typology, Technology, and Chronology of Great Basin Dart Points. *American Anthropologist* 91:149-158.
- Fowler, Catherine S.
1972 Some Ecological Clues to the Proto-Numic Homelands. In *Great Basin Cultural Ecology*, edited by Don D. Fowler. Desert Research Institute Publications in the Social Sciences No. 6, Reno.
- Fowler, Donald D. and David B. Madsen
1986 The Prehistory of the Southeastern Area. In *Great Basin*, edited by Warren L. D’Azevedo, pp. 173–182. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Gilreath, A. J., and W. R. Hildebrandt
1997 *Prehistoric Use of the Coso Volcanic Field*. No. 56, Contributions of the University of California Archaeological Research Facility. Berkeley.
- Grayson, Donald K.
1993 *The Desert’s Past: A Natural Prehistory of the Great Basin*. Smithsonian Institution Press, Washington, D.C.

Hampson, R. Paul

1990 *Cultural Resources Survey: Luz Solar Energy Generating System (SEGS) XI and XII, Harper Lake, San Bernardino County*. Greenwood and Associates. Submitted to Luz Construction, Inc. Unpublished report on file at San Bernardino County Museum, 2024 Orange Tree Lane, Redlands, California 92374.

Hester, Thomas R.

1973 *Chronological Ordering of Great Basin Prehistory. Contributions of the University of California Archaeological Research Facility 17*. Berkeley.

Heiser, Robert F. and Thomas R. Hester

1978 *Great Basin Projectile Points: Forms and Chronology. Ballena Press Publications in Archaeology, Ethnology, and History 10*. Socorro, New Mexico.

Heiser, Robert F. and Adan E. Treganza

1944 *Mines and Quarries of the Indians of California. California Journal of Mines and Geology 40:291-359*.

Hewitt, D. F.

1954 *General Geology of the Mojave Desert Region, California*. In *Geology of Southern California*, Bulletin 170, Chapter II, *Geology of the Natural Provinces*, edited by Richard H. Jahns, pp. 5–19. State of California, Department of Natural Resources, Division of Mines, San Francisco.

Hopa, Ngapare

1980 *Ethnographic Overview*. In *An Overview of the Cultural Resources of the Western Mojave Desert*. E. Gary Stickel and Lois J. Weinman-Roberts, eds. Prepared by Environmental Research Associates for the U.S. Department of the Interior, Bureau of Land Management, Desert Planning Program, Riverside, California.

Jenkins, Dennis L.

1987 *Dating the Pinto Occupation at Rogers Ridge: A Fossil Spring Site in the Mojave Desert, California. Journal of California and Great Basin Anthropology 9(2)*.

Jenkins, Dennis L., and Claude N. Warren

1984 *Obsidian Hydration and the Pinto Chronology in the Mojave Desert. Journal of California and Great Basin Anthropology 6(1)*.

Jennings, Charles W. (compiler)

1977 *Geologic Map of California*. Division of Mines and Geology: Sacramento.

Keeling, Patricia Jernigan (editor)

1976 *Once upon a Desert : a Bicentennial Project*. Barstow, California. Mojave River Valley Museum Association.

- Kelly, Robert L., and L. C. Todd
1988 Coming into the Country: Early Paleoindian Hunting and Mobility. *American Antiquity* 53(2):231–244.
- Koehler, Peter A., and R. Scott Anderson
1995 Late-Wisconsin to Modern Vegetational Changes from the Alabama Hills, Owens Valley, California. In *Final Report on the Evaluation of Twelve Archaeological Sites in Southern Owens Valley, Inyo County, California*, by Michael G. Delacorte, M. C. Hall, and Mark E. Basgall, Submitted to California Department of Transportation, District 9, Bishop.
- Koehler, Peter A., R. Scott Anderson, and W. Geoffrey Spaulding
2005 Development of Vegetation in the Central Mojave Desert of California during the Late Quaternary. *Palaeogeography, Palaeoclimatology, Palaeoecology* 215:297–311.
- Kowta, Makoto
1969 The Sayles Complex: A Late Milling Stone Assemblage from Cajon Pass and the Ecological Implications of Its Scraper Planes. *University of California Publications in Anthropology* 6.
- Lanning, Edward P.
1963 Archaeology of the Rose Spring Site INV-372. *University of California Publications in American Archaeology and Ethnology* 29(3):237–336.
- Lyneis, Margaret M.
1989 Ceramics from Conise Basin. In *Archaeological Investigations at CA-SBR-6017, 6018, and 128, Near East Cronise Lake, San Bernardino County, California*. Report submitted to Dames and Moore, San Diego.
- Macko, Michael, Jeanne Binning, and Ronald Dorn
1993 *Report of Cultural Resource Evaluations for National Register Eligibility Determinations at CA-SBR-7127, near Barstow, San Bernardino County, California*. Macko Archaeological Consulting. On file at the San Bernardino Archaeological Information Center, San Bernardino County Museum, Redlands, California.
- Mehring, P. J., Jr.
1986 Prehistoric Environments. In *Great Basin*, edited by Warren d’Azevedo, pp. 31–50. *Handbook of North American Indians*, vol. 11, W. G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Meiser, M.K., and Theodore G. Cooley
2009 *Cultural Resources Report for the Mojave Solar Project, San Bernardino County, California*. Report prepared by and on file at EDAW, Inc., San Diego, California.

Miller, Wick R.

1986 Numic Languages. In *Great Basin*, edited by Robert F. Heizer, pp 368–397. Handbook of North American Indians, Vol. 11, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Moon, Germaine L. Ramounachou

1980 *Barstow Depots and Harvey Houses*. Mojave River Valley Museum Association, Barstow, California.

Nakaumra, N. Nobora

1991 The Baker Site: a Non-Projectile Point Assemblage at Pleistocene Lake Mojave. In *Papers on the Archaeology of the Mojave Desert: 2*. Edited by M. Sutton. *Coyote Press Archives of California Prehistory* 32:11-42.

Ninyo & Moore

2006 Geotechnical Reconnaissance Harper Lake Dairy Park, Lockhart, California. Prepared by Ninyo & Moore Geotechnical and Environmental Sciences Consultants. Prepared for Metcalf & Eddy. July 7.

Pincetl, Stephanie S.

1999 *Transforming California: A Political History of Land Use and Development*. The Johns Hopkins University Press. Baltimore, Maryland.

Praetzellis, Mary (ed).

1994 West Oakland, A Place to Start From: Research Design and Treatment Plan, Cypress I-880 Replacement Project, Volume 1, Historical Archaeology. Report prepared by the Anthropological Studies Center, Sonoma State University. Prepared for California Department of Transportation, Oakland.

Rogers, Alexander K.

2006 A Reassessment of Obsidian Hydration Ages of Projectile Point Types from the Coso Volcanic Field. *Pacific Coast Archaeological Society Quarterly* 39 (4): 23-38.

Rogers, Malcolm J.

1939 *Early Lithic Industries of the Lower Basin for the Colorado River and Adjacent Desert Areas*. Museum of Man Papers 3, San Diego.

Singer, Clay A.

1984 The 63-kilometer Fit. In *Prehistoric Lithic Quarries and Lithic Production*, edited by J.E. Ericson and B.A. Purdy, 35-48. Cambridge: Cambridge University Press.

Simms, S. R.

1988 Conceptualizing the Paleo-Indian and Archaic in the Great Basin. In *Early Human Occupation in Far Western North America: the Clovis-Archaic Interface*, edited by J. A. Willig, C. M. Aikens, and J. L. Fagan, pp. 41–52. Nevada State Museum Anthropological Papers 21, Carson City.

Spencer-Wood, Suzanne

1987 Miller's Indices and Consumer Choice Profiles: Status-Related Behaviors and White Ceramics. In *Consumer Choice and Socio-Economic Status in Historical Archaeology*, edited by Suzanne Spencer-Wood, pp. 321-358. Plenum Press, New York.

Steinkamp, Matthew J.

2009 *Geoarchaeological Testing Report for the Mojave Solar Project, Lockhart, California*. Report prepared by SWCA Environmental Consultants, South Pasadena, California.

Strong, William D.

1929 *Aboriginal Society in Southern California*. University of California Press, Berkeley.

Susia, Margaret L.

1964 *Tule Springs Archaeological Surface Survey*. Nevada State Museum Anthropological Papers 12, Carson City.

Sutton, Mark Q.

1991 Archaeological Investigations at Cantil, Fremont Valley, Western Mojave Desert, California. *Occasional Papers in Anthropology*. No. 1. California State University, Bakersfield.

1996 The Current Status of Archaeological Research in the Mojave Desert. *Journal of California and Great Basin Anthropology* 18(2):221–257.

Sutton, M. Q., Mark. E. Basgall, Jill K. Gardner, and Mark W. Allen

2007 Advances in Understanding Mojave Desert Prehistory. *California Prehistory, Colonization, Culture, and Complexity*. Edited by T.L. Jones, and K.A. Klar, Altamira Press, New York.

Swanson, Mark

1988 *History of the Harper Lake Community*. Prepared for Luz Development and Finance Corporation. Unpublished report on file at S.B. Co. Museum, 2024 Orange Tree Lane, Redlands, California 92374.

Toulouse, Julian H.

1971 *Bottle Makers and Their Marks*. New York: Thomas Nelson & Sons.

Tuohy, Donald R.

1974 A Comparative Study of Late Paleo-Indian Manifestation in the Western Great Basin. *Nevada Archaeological Survey Research Papers* 5:91–116.

Van Wormer, Stephen R.

1991 Even the Kitchen Sink: Archaeological Investigations of SDi-10,258, the 1908 to 1913 San Diego City Dump. Prepared by RECON, San Diego. Prepared for W. Wolf industries, Inc., San Diego.

Wallace, William J.

1962 Prehistoric Cultural Developments in the Southern California Deserts. *American Antiquity* 28(2):172–180.

1977 *Death Valley National Monuments Prehistoric Past: An Archeological Overview*. Report to the National Park Service, Tucson.

1978 Post-Pleistocene Archaeology, 9000 to 2000 B.C. In *California*, edited by Robert F. Heizer, pp. 25–36. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Warren, Claude N.

1980 The Archaeology and Archaeological Resources of the Amargosa-Mojave Basin Planning Units. In *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units*. U.S. Department of the Interior, Bureau of Land Management, California Desert District, Riverside.

1984 The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, pp. 339–430. Academic Press.

1986 *The Research Overview, Volume Two, Fort Irwin Historic Preservation Plan*. USDI National Park Service, Western Region, San Francisco.

1991 *Archaeological Investigations at Nelson Wash, Fort Irwin, California*. Fort Irwin Archaeological Project Research Report Number 23, volumes I and II. Interagency Archaeological Services, National Park Service Western Region. San Francisco.

Warren, Claude N., and Robert H. Crabtree

1986 The Prehistory of the Southwestern Area. In *Great Basin*, edited by Warren L. D’Azevedo, pp. 183–193. Handbook of North American Indians, Vol.11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Willig, J. A.

1988 Paleo-Archaic Adaptations and Lakeside Settlement Patterns in the Northern Alkalai Basin, Oregon. In *Early Human Occupation in Far Western North America: the Clovis-Archaic Interface*, edited by J. A. Willig, C. M. Aikens, and J. L. Fagan, pp. 417–479. Anthropological Papers 21. Nevada State Museum, Carson City.

Willig, J. A., and C. M. Aikens

1988 The Clovis-Archaic Interface in Far Western North America. In *Early Human Occupation in Far Western North America: the Clovis-Archaic Interface*, edited by J. A. Willig, C. M. Aikens, and J. L. Fagan, pp. 1–40. Anthropological Papers 21. Nevada State Museum, Carson City.

York, Andrew L.

1995 *Class III Cultural Resource Inventory for Los Angeles Department of Water and Power - Mead to Adelanto Transmission Line Project: Cronese and Calico Divisions*. Document on file with the Los Angeles Department of Water and Power.

ATTACHMENT 1
RESUMES OF KEY PERSONNEL

Theodore Cooley, RPA

Archaeologist

Education

MA, Anthropology, California State University, Los Angeles, 1982
BA, Anthropology, California State College, Long Beach, 1970

Professional Registration

Registered Professional Archaeologist (RPA)

Professional Affiliations

Member, Society for American Archaeology
Member, Society for California Archaeology
Member, Register of Professional Archaeologists

Certifications

County of San Diego Certified Consultant List for Archaeological Resources
City of San Diego, Certified Principal Investigator for Monitoring Projects
County of Riverside Certified Cultural Resources Consultant Principal Investigator
County of Orange Certified Cultural Resources Consultant Principal Investigator
Approved lists in San Luis Obispo, Santa Barbara, Ventura, and Los Angeles Counties

Training

40-Hour HAZWOPER Training

Mr. Cooley has more than 39 years of experience in archaeological resource management. He has directed test and data recovery investigations, monitoring programs, and archaeological site surveys of large and small tracts, and has prepared reports for various cultural resource management projects. He is well-versed in NHPA, NEPA, and CEQA regulations and processes. Mr. Cooley also has extensive experience with Native American consultation and monitoring for archaeological field projects involving human remains and reburial-related compliance issues.

Project Experience

County of San Diego Department of Parks and Recreation Boulder Oaks, Sycamore/Goodan, and Lusardi Open Space Preserves and Regional Parks, Cultural Resources Inventories, San Diego County, CA

Supervisory Archaeologist for Phase I pedestrian survey and cultural resource inventories of Open Space Preserves and Regional Parks in unincorporated central San Diego County. The projects involved the identification and documentation of prehistoric and historic resources, built environment features, and existing infrastructure to assist the Department of Parks and Recreation in resource management. Inventory reports included extensive archival research and historical narrative, an inventory of identified sites, and management guidelines for potentially significant cultural resources developed in consultation with Native Americans where appropriate. Work performed prior to joining this firm.

Parsons Brinkerhoff State Route 94 Operational Improvements Inventory and Evaluation, San Diego County, CA

Supervisory Archaeologist of cultural resources field survey efforts, and documentation and evaluation related to proposed operational improvements along an 18-mile

stretch of State Route 94 in San Diego County. Development of Caltrans-format documentation for archaeological and built environment resources. Work performed prior to joining this firm.

Southern California Edison As-Needed Archaeological Services, Statewide, CA

Supervisory Archaeologist for surveys, resource identification, documentation, testing, and evaluation efforts related to Southern California Edison infrastructure replacements and development throughout the state on both private and public lands, including BLM, USACE, and USFS. Project involved completion of State of California DPR forms, assessment of resource significance according to NRHP eligibility and CEQA significance criteria, and management recommendations. Work performed prior to joining this firm.

Blackwater USA West Cultural Resources Phase I and Phase II Studies, Potrero, CA

As Supervisory Archaeologist, supervised the survey of an approximately 850-acre area in eastern San Diego County and the test excavation of identified prehistoric sites. Supervised the archaeological documentation, Extended Phase I testing, and Phase II testing efforts under the County of San Diego Guidelines implemented in September 2006. Work performed prior to joining this firm.

Circle P Ranch Housing Development Project, San Diego County, CA

Principal Investigator for a Phase I cultural resources inventory and survey, and extended Phase I site testing program, involving a prehistoric and historic site, CA-SDI-17,910/H, located within the approximately 15-acre project property near Valley Center, San Diego County, California. Project duties consisted of supervision of fieldwork personnel, interaction with Native American monitors, and supervision and participation in the analysis and technical report preparation. The program was conducted under CEQA and local guidelines of the County of San Diego for the implementation of CEQA. Work performed prior to joining this firm.

Blossom Valley Housing Development Project, San Diego County, CA

Principal Investigator for a Phase I cultural resources inventory and survey, and extended Phase I site testing program, involving a prehistoric site, CA-SDI-17,968 within the approximately 50-acre project property in Blossom

Valley, San Diego County, California. Project duties consisted of supervision of fieldwork personnel, interaction with Native American monitors, and supervision and participation in the analysis and technical report preparation. The program was conducted under CEQA and local guidelines of the County of San Diego for the implementation of CEQA. Work performed prior to joining this firm.

County of San Diego Department of Public Works (DPW) Jacumba Community Park Restroom Facility National Register and CEQA Testing Program, San Diego County, CA

Principal Investigator for a National Register and CEQA significance-testing program conducted at prehistoric archaeological site CA-SDI-17,979, to be impacted by the construction of a restroom facility within the Jacumba Community Park. Directed all project archaeological activities including analysis and report preparation. The project required interaction with DPW personnel and with Native American monitors. Work performed prior to joining this firm.

City of Goleta General Plan EIR Cultural and Paleontological Resources Section, Santa Barbara County, CA

Task Manager for, and participant in, the preparation of the cultural resources section of the EIR for the Goleta General Plan. The project required the gathering and synthesis of background information, existing conditions, paleontological data, and regulatory requirements, and interaction with local individuals and interest groups, and with personnel of the City of Goleta. Work performed prior to joining this firm.

Big Sandy Rancheria Casino, Fresno County, CA

Supervisory Archeologist for a field survey and cultural resources site-testing program at a location for a proposed gaming facility near Friant, Fresno County, California. Project responsibilities included assisting in the supervision of field survey and site testing, and participation in report preparation.

Otay Water District 30-inch Recycled Water Pipeline, Reservoir, and Pump Station, San Diego, CA

Principal Investigator for a Historic Properties Inventory and Survey for a 6.1-mile 30-inch recycled water pipeline route, and for a reservoir site pump station, located in southeastern San Diego County, California. A National Register and CEQA significance-testing program was conducted at prehistoric archaeological site CA-SDI-17,668 to be impacted by the construction of the recycled water pipeline. Directed all project archaeological activities

including analysis and report preparation. The project required interaction with the Otay Water District and private contractor personnel, and with Native American monitors. Work performed prior to joining this firm.

Emerald Oaks Housing Development Project, Ramona, CA
Project Supervising Archaeologist and Co-Principal Investigator for a cultural resources survey and extended Phase I site boundary testing and Phase II evaluation program involving five prehistoric sites within the 311-acre project property in Ramona, California. Project duties consisted of supervision of fieldwork personnel, and supervision and participation in the analysis and technical report preparation. The program was conducted under CEQA and local guidelines of the County of San Diego for the implementation of CEQA. Work performed prior to joining this firm.

Starwood Development Company Crosby Estate Golf Course Development, San Diego County, CA
Project Supervising Archaeologist for a cultural resources evaluation and site-indexing program involving the C.W. Harris Site Complex and other adjacent historic and prehistoric sites within the project property and adjacent Open Space areas, in San Diego County, California. Project duties consisted of direction of fieldwork, monitoring of construction activities, and supervision and participation in the analysis and technical report preparation. The program was conducted for U.S. Army Corps of Engineers (USACE) 404 Permit compliance. Work performed prior to joining this firm.

San Diego County Water Authority (SDCWA) As-Needed Surveys for Geotechnical and Water Facility Construction Projects, San Diego, CA
Project Manager and Principal Investigator for six archaeological survey and/or monitoring projects conducted over a three-year period. The programs, all situated in western San Diego County, California, consisted of evaluations through background research and field surveys of proposed drilling/boring sites, pump stations, and other facility locations, and, when required, monitoring of drilling/boring and facility construction operations situated in areas determined as sensitive. The Project included background research, field surveys, preparation of technical reports, interaction with Water Authority engineers for project redesign, and interaction with construction personnel for successful monitoring. Work performed prior to joining this firm.

Oak Country Estates, Ramona, CA

Project Supervising Archaeologist and Co-Principal Investigator for a cultural resources survey and extended Phase I site boundary testing and Phase II evaluation program involving 30 mostly late-prehistoric sites within the 648-acre project property in Ramona, California. Project duties consisted of supervision of fieldwork personnel, and supervision and participation in the analysis and technical report preparation. The program was conducted under CEQA and local guidelines of the County of San Diego for the implementation of CEQA. Work performed prior to joining this firm.

San Luis Rey Land Outfall Pipeline Alternatives Constraints Study, Oceanside, CA

Principal Investigator, and overall Field Supervisor for this archaeological resource inventory and constraints study program, conducted in compliance with CEQA. The purpose of this Project was to assess the relative cultural resources impacts within four alternative route corridors for a proposed additional outfall pipeline from an existing inland water treatment plant to the ocean through the City of Oceanside, San Diego County, California. The project was conducted as a subcontractor for Tetra Tech EM, Inc., the primary contractor working for the City of Oceanside, and consisted of background research, spot check field survey of the alternative alignment corridors, and completion of the project data analysis and technical report preparation. Work performed prior to joining this firm.

Davis-Eagle Property Archaeological Survey and Constraints Study, Ramona, CA

Project Supervising Archaeologist and Co-Project Manager of an archaeological survey of 1,231 acres for a development constraints analysis, located near Ramona in San Diego County, California. The project required the discovery and recordation of all cultural resources on the property to provide data for an analysis of the constraints that cultural resources might represent, relative to future development of the property. Served as over-all supervisor of archaeological field and site recordation activities, co-managed the project, and conducted the cultural resources constraints analysis and report preparation. Work performed prior to joining this firm.

City of San Diego Water Department San Pasqual Reclaimed Water Project Cultural Resources Inventory Study, San Diego, CA

Principal Investigator for a cultural resources study of 8.15 miles of reclaimed water pipeline route and 12 acres of water tank facility construction in the City of San Diego, California. Project responsibilities included background research, field survey direction, and technical report preparation. The Project was conducted under CEQA and local guidelines of the City of San Diego for the implementation of CEQA. Work performed prior to joining this firm.

California State Department of Parks and Recreation Point Magu State Park Water Pipeline Route Archaeological Survey, Ventura County, CA

Principal Investigator for cultural resources survey of an 8-mile water pipeline route along Big Sycamore Canyon in Point Magu State Park, Ventura County, California. Project responsibilities included background research, field survey direction, GPS site location, and technical report preparation. The program was conducted under CEQA, prior to joining this firm.

California State Department of Parks and Recreation Malibu Creek State Park Archaeological Survey, Los Angeles County, CA

Principal Investigator for cultural resources survey of the 94-acre Tapia Park Sub-unit within Malibu Creek State Park, Los Angeles County, California. Project responsibilities included background research, field survey direction, GPS site location, and technical report preparation. The program was conducted under CEQA, prior to joining this firm.

U.S.D.A. Forest Service Cleveland National Forest Archaeological Overview, CA

As Researcher/Document Co-Author, participated in the preparation of the "Archaeological Overview for the Cleveland National Forest, California." The project consisted of a review and assessment of existing archaeological resources data on file at the Cleveland National Forest. Project responsibilities included participation in background research, data analysis, and technical report preparation. The Project was conducted in compliance with Section 110 of the NHPA of 1966, as amended. Work performed prior to joining this firm.

County of San Diego DPW Ramona Soils Source Project, Ramona, CA

Principal Investigator for Phase I survey of a 30-acre property and Phase II testing/evaluation program of prehistoric site CA-SDI-16,386 and historic site CA-SDI-16,399, located in the Ramona area of San Diego County, California. Supervised all project archaeological activities including data analysis and report preparation. The Project required interaction with the Native America Heritage Commission and with County of San Diego Department of Public Works personnel. Work performed prior to joining this firm.

NAVFAC Southwest Naval Submarine Base Point Loma Data Recovery Project, San Diego, CA

Co-Author of the technical document "Archaeological Data Recovery Report For a Portion CA-SDI-48 at Buildings 139 and 158, Naval Submarine Base, San Diego." The Project consisted of a data recovery program conducted at National Register prehistoric archaeological site CA-SDI-48, located on the Point Loma Naval Submarine Base, San Diego, California. The program was conducted for the Navy through Southwest Engineering Facilities Division. Project responsibilities included participation in background research, data analysis, and report preparation. Work performed prior to joining this firm.

Metromedia Fiber Optic Line Project, CA

Project Archaeologist for cultural resources studies conducted in compliance with CEQA, as administered by the California Public Utilities Commission (CPUC), of more than 300 miles of proposed routes for the emplacement of fiber optic cable lines along existing streets and railroad rights-of-way within San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Marin, Los Angeles, Orange, and San Diego counties, California. Project involvement included background research, field surveys, site recordation, and technical report preparation. Work performed prior to joining this firm.

Calvary Lutheran Church Data Recovery Project, Solana Beach, CA

Co-Principal Investigator for a data recovery program conducted at prehistoric archaeological site CA-SDI-10,238 (SDM-W-36), important under CEQA, located in the City of Solana Beach, San Diego County, California. Program responsibilities consisted of completion of background research, overall supervision of field personnel, and data analysis and technical report preparation. The program also

required interaction with Calvary Lutheran Church personnel, Native American consultants, the City of Solana Beach, and the State Historic Preservation Office. Work performed prior to joining this firm.

SDCWA Mexico/United States Colorado River Conveyance Facility, San Diego and Imperial Counties, CA

Principal Investigator for archaeological surveys and monitoring of geotechnical drilling/boring sites. The program consisted of evaluations, background research, and field survey of 26 proposed drilling/boring site locations and the subsequent monitoring of five of the drilling/boring operations situated in areas determined as sensitive. The locations were distributed along two proposed pipeline routes between San Vicente Lake and the Yuha Basin in southernmost San Diego and Imperial Counties, California. Project involvement included background research, field surveys, preparation of technical reports, and interaction with SDCWA, BLM, and USDA Forest Service. Work performed prior to joining this firm.

Dry Creek Native American Gaming Facility, Sonoma County, CA

Project Archaeologist for cultural resources field survey of the location for a proposed gaming facility in the Dry Creek Valley area of Sonoma County, California. Project responsibilities included field surveys and report preparation. Work performed prior to joining this firm.

Bennett Consolidated Otay Travel Center Project, Otay Mesa, CA

Principal Investigator for a significance testing program of two prehistoric sites, CA-SDI-10,067 and CA-SDI-12,878, located in the Otay Mesa area of southernmost San Diego County, California. Directed all project archaeological activities including data analysis and report preparation. The Project required interaction with subcontractors and County of San Diego planning personnel. Work performed prior to joining this firm.

City of American Canyon Wastewater Facility & Sewer Line Extension Routes, Napa County, CA

Project Archaeologist for cultural resources field surveys of proposed emplacement of sewer pipelines along future and existing city streets within the City of American Canyon, Napa County, California. Project responsibilities included field surveys, site recordation, and report preparation. Work performed prior to joining this firm.

NAVFAC Southwest Fallbrook Naval Ordinance Center Historic Properties Inventory, Seal Beach, CA

Project Manager, Principal Investigator, and overall Field Supervisor for an archaeological resource inventory program in San Diego County, California, that consisted of background research, field surveys of 5,800 acres, and completion of the project data analysis and technical report preparation. The program was conducted for the Naval Weapons Station through Southwest Engineering Facilities Division, in compliance with Section 110 of the NHPA of 1966, as amended. Work performed prior to joining this firm.

Talega Associates Focused Data Recovery Project, San Juan Capistrano, CA

Co-Principal Investigator for a focused data recovery program conducted at prehistoric archaeological site CA-ORA-907, Locus A, important under CEQA, located in the City of San Juan Capistrano, Orange County, California. Program responsibilities consisted of completion of background research, direct supervision of field personnel, data analysis, and technical report preparation. The program also required interaction with Native American consultants and County of Orange personnel. Work performed prior to joining this firm.

NAVFAC Southwest Naval Air Station Miramar EIS Cultural Resources Studies for the Base Realignment and Closure Project, San Diego, CA

For more than 2 years, served as Task Manager and overall Field Supervisor for cultural resources studies with Principal Investigator responsibilities on this major cultural resource program in San Diego County, California. The program consisted of background research for, and field surveys of more than 3,500 acres for numerous proposed facility locations. Project duties consisted of overall direction of fieldwork, and supervision and participation in the project data analysis, technical report preparation, and field construction monitoring for USACE 404 Permit compliance. Work performed prior to joining this firm.

NAVFAC Southwest Marine Corps Camp Pendleton Helicopter Outlying Landing Field Project, San Diego, CA

Directed cultural resources studies as Project Manager and Principal Investigator for this three-year EA program, consisting of a Phase I inventory and Phase II evaluation for the construction of a helicopter outlying landing field on Camp Pendleton, California. Four alternative locations were inventoried and three prehistoric sites, located within the preferred alternative, were tested for National Register

eligibility. Project duties included overall direction and supervision of the project fieldwork, data analysis, technical report preparation, and interaction with various Base and agency personnel. Work performed prior to joining this firm.

SDCWA Emergency Water Storage Project, San Diego, CA

Principal Investigator for archaeological surveys and site evaluations. This large-scale project lasted for more than two years, and included field surveys of more than 3,500 acres for alternative reservoir sites and appurtenant facilities, and approximately 40 miles of alternative pipeline routes. It included interaction with local Native American groups. Work performed prior to joining this firm.

Point Loma Submarine Base Data Recovery, San Diego, CA

Project Manager and Co-Principal Investigator for a data recovery program conducted at National Register prehistoric archaeological site CA-SDI-10,945, located on the Point Loma Naval Submarine Base, San Diego, California, for the Navy. Program required interaction and coordination with Naval Base personnel, interaction with the State Historic Preservation Office and with the Advisory Council on Historic Preservation. Work performed prior to joining this firm.

Metropolitan Transit District Board Mission Valley West Light Transit Limited Data Recovery, San Diego, CA

Task Manager and Principal Investigator for a Limited Data Recovery Program conducted at National Register prehistoric archaeological site CA-SDI-11,767, located on the Star Dust Golf Course, San Diego, California. Program required interaction and coordination with Native American Monitors and USACE personnel for 404 Permit requirements. Work performed prior to joining this firm.

East Mission Gorge Interceptor Pump Station and Force Main Cultural Resources Data Recovery, San Diego, CA

Principal Investigator and Co-Project Manager for a data recovery program conducted at National Register eligible, prehistoric archaeological site CA-SDI-9,243 to be impacted by construction of a reclaimed water force main pipeline located in the City of San Diego. Directed all project archaeological activities including analysis and report preparation. The Project required interaction with City of San Diego Water Utilities personnel and Native American monitors. Work performed prior to joining this firm.

City of Chula Vista and County of San Diego Otay Ranch Planned Development Archaeological Reconnaissance Survey, Chula Vista, CA

Principal Investigator and Co-Project Manager of an archaeological survey of 6,000 acres of proposed development on three parcel areas of the 23,088-acre Otay Ranch, located in San Diego County, California. The Project required evaluation of all cultural resources on the ranch property. Directed archaeological activities, co-managed the project, supervised analysis and report preparation, and interacted with County of San Diego and City of Chula Vista personnel. Work performed prior to joining this firm.

City of San Diego Water Utilities Department Crown Point and Rose Creek Portion of the Mission Bay Sewage Interceptor System Phase V Archaeological Testing Program-Department No. 90-0540, San Diego, CA

Principal Investigator and Project Manager for a testing program of two large prehistoric sites, CA-SDI-11,571 and CA-SDI-5,017, during Phase V of the Water Utilities Mission Bay Sewage Interceptor System Project involving the emplacement of pipelines along City streets in the Crown Point and Rose Creek areas, adjacent to Mission Bay. Directed all project archaeological activities, including analysis and report preparation. The Project required interaction with construction subcontractors and City of San Diego Water Utilities personnel. Work performed prior to joining this firm.

All American Celeron Pipeline Company Pipeline Studies, Santa Barbara County, CA

Project Manager for more than 3 years on this major cultural resource program that consisted of surveys of alternative pipeline routes, testing of sites to be impacted, final data recovery on 17 prehistoric sites, monitoring of construction activities, and planning and coordination with local Native American groups and Native American monitors, in Santa Barbara County, California. Work performed prior to joining this firm.

U.S. Army Corps of Engineers Air Force Housing Archaeological Study, Los Angeles County, CA

Project Supervising Archaeologist of a testing program of three sites on the Palos Verdes Peninsula, Los Angeles County, California, for the United States Air Force. Directed field work and participated in analysis and report preparation. Work performed prior to joining this firm.

Texaco Trading and Transportation Company Marine Terminal Construction, Santa Barbara County, CA

Co-Principal Investigator and Project Supervising Archaeologist for more than 1 year for the Texaco Marine Terminal Construction Project, a cultural resources evaluation and data recovery program involving one historic and four prehistoric sites in Gaviota, Santa Barbara County, California. Project duties consisted of direction of fieldwork and construction monitoring activities, planning and coordination with local Native American groups and Native American monitors, and supervision and participation in analysis and report preparation. Work performed prior to joining this firm.

Chevron, USA Point Arguello Pipeline Studies, Santa Barbara County, CA

Project Archaeologist with responsibilities as Field Director and Co-Principal Investigator for more than 3 years on this major cultural resource program that consisted of surveys of alternative pipeline routes, testing of sites to be impacted for National Register assessment, final data recovery on 34 National Register quality sites, monitoring of construction activities, and planning and coordination with local Native American groups and Native American monitors, in Santa Barbara County, California. Work performed prior to joining this firm.

San Diego Gas & Electric Southwest Power-Link Transmission Line Corridor, Imperial County, CA

Field Director for a major, 2-year, archaeological Data Recovery Program that included monitoring of portions of 35 sites along a 27-mile transmission line corridor located in the Picacho Basin and East Mesa areas for Southwest Power-Link, Imperial County, California. Field Director responsibilities included coordination and supervision of three crew chiefs and their field crews, a field laboratory director and laboratory crew, BLM agency personnel, and local Native American groups and Native American monitors. Work performed prior to joining this firm.

Mission Viejo Land Development Company Archaeological Studies, Mission Viejo, CA

Project Archaeologist/Field Director of archaeological surveys of 2,700-acre, 3,000-acre, and 7,000-acre development properties, and of a testing and data recovery program of prehistoric archaeological site CA-ORA-947 to be impacted by planned development, located in Mission Viejo, Orange County, California. Directed the field work and

conducted the analysis and report preparation. Work performed prior to joining this firm.

Cayman Development Company Archaeological Data Recovery Program, Los Angeles County, CA

Project Archaeologist/Field Director of both the test and salvage excavations of prehistoric archaeological sites CA-LAN-844 and CA-LAN-845, located on Palos Verdes Peninsula, Los Angeles County, California. Directed the field work and conducted the analysis and report preparation. Work performed prior to joining this firm.

Signal Landmark Properties, Inc. Land Development Archaeological Studies, Huntington Beach, CA

Project Archaeologist/Field Director of test, and Co-Field Director of data recovery excavations of archaeological site CA-ORA-183, in the City of Huntington Beach, Orange County, California. Directed field work, conducted analysis and report preparation of the testing phase, and co-directed and participated in analysis and report preparation of the data recovery phase. Work performed prior to joining this firm.

Publications

Cooley, T., and Laura J. Barrie. 2004. Archaeological Excavation at the Village of Pámu, Ramona Valley, California. *Proceedings of the Society for California Archaeology*, Vol. 17, pp. 43-56.

Cooley, T. 1998. Observations on Settlement and Subsistence During the Late La Jolla Complex-PreCeramic Interface as Evidenced at Site CA-SDI-11,767, Lower San Diego River Valley San Diego County, California. *Proceedings of the Society for California Archaeology*, Vol. 11, pp. 1-6.

Cooley, T. 1995. Early Period Results from Data Recovery Conducted on a Portion of Stratified Prehistoric Site, CA-SDI-9,243, San Diego County, California. *Proceedings of the Society for California Archaeology*, Vol. 8, pp. 227-238.

Cooley, T. 1992. Observations on Hydration Measurements of Obsidian Deriving from Buried Deposits from Site CA-SBA-2028, at Gaviota, Santa Barbara County, California. *Coyote Press Archives of California Prehistory*, No. 37, pp. 27-38.

Cooley, T. 1992. Junior author with Jon M. Erlandson, Roy Dugger, and Richard Carrico. Archaeological Investigations at CA-SBA-97: a Multicomponent Coastal Site at Gaviota,

California. *Coyote Press Archives of California Prehistory*, No. 37, pp. 49–80.

Cooley, T. 1989. Contributing author. Archaeological Investigations on the Rancho San Clemente, Orange County, California. Principal author Constance Cameron. *Coyote Press Archives of California Prehistory*, No. 27.

Cooley, T. 1987. Junior author with Jon M. Erlandson and Richard Carrico. A Fluted Projectile Point Fragment from the Southern California Coast: Chronology and Context at CA-SBa-1951. *Journal of California and Great Basin Anthropology* Volume 9, Number 1, pp. 120–128.

Cooley, T. 1985. Junior author with Marie Cottrell, Constance Cameron, Vada Drummy-Chapel, and Adella Schroth. Excavations and Investigations at CA-Ora-183, the Newland House Site, Huntington Beach, California. *Pacific Coast Archaeological Society Quarterly* Volume 21, Number 1, January, pp. 1–77.

Cooley, T. 1984. The Biface Reduction Technique Exhibited at a Southern California Quarry Workshop Site: LAn-844. *Pacific Coast Archaeological Society Quarterly* Volume 20, Number 3, July pp. 5–17.

Cooley, T. 1980. Junior author with Marie G. Cottrell and Joyce M. Clevenger. Investigations of CA-SCal-137 Bulrush Canyon, Catalina Island, California. *Pacific Coast Archaeological Society Quarterly* Volume 16, Numbers 1 and 2, January and April, pp. 5–25.

Papers and Presentations

Cooley, T. 2008. Dating at the Spindrift Site Relative to Other La Jolla Sites and the Adjacent San Diego Coastal Area. Paper presented at the Society for California Archaeology Meetings, Burbank, California, March.

Cooley, T. 2006. Continuing Discoveries of the San Dieguito and Other Cultural Patterns In and Around the C.W. Harris Site (SDI-149). Paper presented at the Society for California Archaeology Meetings, Ventura, California, March.

Cooley, T., and L. Barrie. 2003. Archaeological Excavation at the Village of Pámu, Ramona Valley, California. Paper presented by the junior author at the Society for California Archaeology Meetings, Sacramento, California, March.

Cooley, T. 1998. Review of the Biface Reduction Technique Exhibited at a Southern California Quarry Site. Paper presented at the Society for California Archaeology Meetings, San Diego, California, March.

Cooley, T. 1997. Observations on Settlement and Subsistence During the La Jolla Complex-Preceramic Interface as Evidenced at Site CA-SDI-11,767, Lower San Diego River Valley, San Diego County, California. Paper presented at the Society for California Archaeology Meetings, Rohnert Park, California, March.

Cooley, T. 1994. Results of a Data Recovery Program Conducted on a Portion of Stratified Prehistoric Site CA-SDI-9,243, San Diego County, California. Paper presented at the Society for California Archaeology Meetings, Ventura, California, March.

Cooley, T. 1991. Investigations at CA-SBa-2028. Paper presented at the Society for California Archaeology Meetings, Sacramento, California, March.

Cooley, T. 1991. Description and Analysis of Biface Artifacts Recently Excavated from the C. W. Harris Site Complex, San Diego County, California. Paper presented at the Society for California Archaeology Meetings, Sacramento, California, March.

Cooley, T. 1990. Preliminary Analysis and Description of Biface Artifacts Recently Excavated from the C. W. Harris Site Complex, San Diego County, California. Paper Presented at the Society for California Archaeology Southern California Data Sharing Meeting, Riverside, California, October.

Cooley, T. 1984. Diagnostic Artifacts and Temporal Considerations at Rancho San Clemente: A Preliminary Appraisal. Paper Presented at the Society for California Archaeology Southern California Data Sharing Meeting, Fullerton, California, October.

Cooley, T. 1984. Thermal Applications and Lithic Tool Manufacture and Use at LAn-844. Paper presented at the Society for California Archaeology Meetings, Asilomar, California, March.

Cooley, T. 1983. The Biface Reduction Technique Exhibited at a Southern California Quarry Site. Paper presented at the Southwestern Anthropological Society Meetings, San Diego, California, March.

Cooley, T. 1983. Project Results of the Picacho Basin Studies. Paper presented at the Society for California Archaeology Meetings, San Diego, California, March.

Matthew Tennyson, RPA

Staff Archaeologist

Education

BA, Archaeology, History (Minor), Boston University
MA, Anthropology, San Diego State University Thesis Title: "Straight Out of Dixie": An Analysis of the Architecture of the Nate Harrison Cabin

Professional Affiliations

Member, Register of Professional Archaeologists (RPA)
Member, Society for American Archaeology
Member, Society for Historical Archaeology
Member, Society for California Archaeology

Awards + Honors

Phi Kappa Phi Honors Society, San Diego State University Chapter
Norton Allen Scholarship, San Diego State University Department of Anthropology, Spring 2006
Ethics Bowl – Society for American Archaeology 71st Annual Meeting, San Juan, Puerto Rico

Publications + Technical Papers

Cultural Interaction in the Archaeological Record: A Landscape View of Old Town San Diego. Paper presented at the Society for California Archaeology 2008 Annual Meeting, Burbank, California.
Straight Out of Dixie: The Architecture of the Nate Harrison Cabin. Presentation at the San Diego Museum of Man
Old Town San Diego on the San Diego Landscape. Paper presented at the Society for Historical Archaeology 2009 Annual Meeting, Toronto, Canada

Matthew Tennyson has 7 years of archaeological experience in historic and prehistoric archaeology and is currently a staff archaeologist. He has spent the last 7 years working in California on archaeological and historical projects across California and Nevada. His experience includes archaeological testing, data recovery, survey, GIS mapping, monitoring, report production, and historic research for private, city, county, state, and federal clients.

Mr. Tennyson also has experience teaching archaeology and anthropology at the university level, teaching introductory-level classes as well as instructing students in archaeological field schools. He also has experience in laboratory analysis and artifact curation of archaeological collections.

Mr. Tennyson has made public presentations regarding his archaeological work. He has authored or co-authored several articles and reports based on his work in both the academic and public sectors. He currently specializes in historical resources, including the assessment and recordation of historic archaeological sites and historic structures.

Project Experience

LADWP/ County of Imperial, Niland Solar Cultural Resources Evaluation

Principal investigator and field director for cultural resources surveys and evaluations of approximately 1,000 acres near Niland, California. The project included archaeological and architectural surveys, the identification and evaluation of newly and previously recorded archaeological sites, Native American consultation, and production of an evaluation report submitted to the LADWP and the County of Imperial.

Municipal Water District/ Tulare Lakes Drainage District, Tulare Lakes Drainage District Cultural Resources Surey

Principal investigator and field director responsible for archaeological survey of a proposed pipeline and water treatment plant in the San Joaquin Valley. The project included archaeological survey of a proposed water drainage pipeline and water treatment facility, research and recordation of historic irrigation canals, and preparation of a cultural resources report.

Caltrans, SR-76 Mission to I-15 CEQA and NEPA Studies

Principal investigator for a cultural resources study of two proposed alternatives for the expansion of State Route 76. The project included leading cultural resources surveys, identifying impacts to cultural resources within project area, coordinating with project engineers to avoid negative impacts to cultural resources, and conducting preliminary testing of archaeological sites within the project area. Additional duties included updating archaeological sites, authorship of an Archaeological Survey Report, and coordination with Native American tribes.

US Department of the Navy, Southwest San Clemente Island SWAT 1/TAR 4 Area Archaeological Testing

Staff archaeologist assisting in the testing and evaluation of nine archaeological sites on San Clemente Island, California. The project included auger probing of archaeological sites, test unit excavation, and GIS mapping of cultural layers using an electronic total station.

ENSR, Southern Nevada Supplemental Airport EIS, Jean, NV

Staff archaeologist for a cultural resources survey of a proposed airport in southern Nevada. The project included surveying and recording prehistoric and historic archaeological sites in the Ivanpah Valley region of southern Nevada. Additional duties included authorship of report sections and historic research related to early European and American exploration, early roads, the development of railroads, and the history of mining in the area.

Confidential Project

Archaeologist and historian for proposed solar power plant near California City, CA. Project duties included survey of pipeline alignments in order to assess potential impacts to historic structures in the area, historic research related to early exploration and the development of various social and economic activities in the Mojave Desert region, and assistance in the production of historical architecture and archaeological resources reports.

North Baja Pipeline, LLC, Yuma Lateral Pipeline Project

Archaeologist and field director for additional survey areas and addendum report for North Baja Pipeline project in Yuma, Arizona.

The Dinnerstein Companies, Collwood Pines Apartments

Principal investigator responsible for cultural resources on a private development of apartments in San Diego, California. The project included research into the project area and surrounding area to assess the likelihood of discovering cultural resources during the construction phase of the project.

County of San Diego, Valley Center Road Bridge Replacement Mitigation

Staff archaeologist responsible for Native American contacts and assisting in report preparation for a bridge replacement near Pauma Reservation in San Diego County, California.

Caltrans, Main Street Bridge Replacement HPSR

Staff archaeologist responsible for assisting in production of HPSR for a bridge replacement near Temecula, California.

Indio Water Agency, Lost Horse DMND

Project archaeologist responsible for historical research, cultural resources survey, and report for proposed water tank and pipeline near the City of Indio.

Caltrans, SR-125 Johnson Canyon Project

Conducted archaeological surveys of sites impacted by brush clearing at Johnson Canyon. Duties included investigating sites to determine whether significant impacts had occurred and reporting findings to Caltrans District 11.

California Department of State Parks, Jolly Boy Tavern Data Recovery, Old Town, San Diego, CA

Staff archaeologist for excavation of early 19th century adobes located at the Jolly Boy Tavern in Old Town San Diego. Project duties included the excavation of trenches to uncover the historic foundations of adobes, on site interpretations, and coordination with State Parks archaeologists.

Williams Communication Archaeological Services Project Williams, Elko, NV

Archaeological technician responsible for the testing of sites along a communications line outside Elko, Nevada. Project duties included survey, relocation, testing, and recordation

of sites along Highway 80. Work was performed prior to joining this firm.

Mojave Water Agency, Mojave River Pipeline Reaches 4A and 4B, Daggett, CA

Archaeological technician for a water pipeline in Daggett, CA. Project duties included survey of the proposed alignment, recordation of historic resources, historical research, archaeological monitoring for prehistoric and historic resources, laboratory analysis, cataloging and curation, and report production. Work was performed prior to joining this firm.

City of El Cajon, El Cajon Animal Shelter Survey and Testing, El Cajon, CA

Staff archaeologist for the survey and testing of milling features located near the El Cajon Animal Shelter. Project duties included locating and recording bedrock milling features and test excavation units to determine the depths of cultural materials at the site. Work was performed prior to joining this firm.

U.S. Navy, NAVFAC SW, San Diego, Testing of Lithic Quarry at CA-SDI-13655, Camp Pendleton, CA

Staff archaeologist for the testing of a quarry site located on Camp Pendleton USMC Base. Additional duties included laboratory analysis of lithic materials, artifact cataloging and curation, and assistance in report production. Work was performed prior to joining this firm.

San Diego County Department of Parks and Recreation, Tijuana River Valley, San Diego, San Diego County, CA

Staff archaeologist for proposed trail alignments in the Tijuana River Valley Regional Park, San Diego, CA. Project duties included the identification and recordation of historic and prehistoric cultural resources. Work was performed prior to joining this firm.

Market Street Village Developers, Market Street Village, San Diego, CA

Laboratory technician and curation coordinator for late-19th and early-20th century artifacts recovered during archaeological monitoring for a condominium in downtown San Diego. Project duties included cataloging and curating recovered archaeological resources, artifact quantification and analysis, and assistance in report productions. Work was performed prior to joining this firm.

Talega Associates, Talega Community Development Project, San Clemente, CA

Archaeological technician for various sites at the Talega master-planned community. Project duties included archaeological excavation of CA-ORA-907, archaeological and paleontological monitoring of construction activities, laboratory analysis of cultural materials, and the design and installation of cultural resources display at the Vista Del Mar Elementary School. Work was performed prior to joining this firm.

National Park Service, Lassen National Park Field Treatment, Lassen County/Plumas County, CA

Archaeological technician for pre-burn survey to relocate and record new cultural resources as well as updates for previously recorded cultural resources. Project duties included survey of hiking trails and open areas in Lassen Volcanic National Park and coordination of field crews. Work was performed prior to joining this firm.

Shea Homes, Armstrong Ranch Development Project, Santa Ana, CA

Archaeological monitor for proposed townhome development at the Armstrong Ranch in Santa Ana, CA. Work was performed prior to joining this firm.

Orange County Water District West End, Orange County, CA Archaeologist

Archaeological monitor for the installation of new water pipeline running from Orange, CA to Huntington Beach, CA. Work was performed prior to joining this firm.

Los Angeles County Department of Public Works, Encino Water Quality Improvement Project, Los Angeles County, CA

Archaeological monitor at the Encino Reservoir during construction activities in association with improvements to the reservoir. Work was performed prior to joining this firm.

John Laing Homes, Tustin Field 1 (Tustin PA 20) Development Project, Tustin, CA

Archaeological monitor for historic and prehistoric cultural materials encountered during grading activities. Duties included construction monitoring and recordation of prehistoric artifacts encountered during grading. Work was performed prior to joining this firm.

John Laing Homes, Tustin Field 2 (Tustin PA 21) Development Project, Tustin, CA

Archaeological monitor and lead contact with the client. Duties included construction monitoring and recordation of historic artifacts encountered during grading. Work was performed prior to joining this firm.

Selected Reports

Metropolitan Water District/Tulare Lakes Drainage District Kings County Agricultural Drainage Water Treatment Project Cultural Resources Report. EDAW, San Diego (2008).

Archaeological Survey Report for the State Route 76 Highway Improvement Project South Mission Road to Interstate 15 San Diego County, California. EDAW, San Diego (2008).

Cultural and Archaeological Resources Survey Report for the Niland Solar Energy Project Initial Study, Niland, Imperial County, California. EDAW, San Diego (2008).

Addendum 2 to the Cultural Resources and Survey Report for the Yuma Lateral Pipeline Project. EDAW, San Diego (2008).

Phase I Cultural Resources Investigation for IWA Lost Horse Reservoir and Pipeline Project, City of Indio, Riverside County, California. EDAW, San Diego (2008).

Peak to Playa: Southern Nevada Supplemental Airport Environmental Impact Statement Cultural Resources Report, Clark County, Nevada. Contributing author with James Cleland and Christy Dolan. EDAW, San Diego (2008).

CONFIDENTIAL Solar Energy Project Historic Architectural Resources Report, Kern County, California. Contributing author with Jennifer Hirsch. EDAW, San Diego (2008)

CONFIDENTIAL Solar Energy Project Archaeological Resources Report, Kern County, California. Contributing author with Rebecca Apple and Wayne Glenny. EDAW, San Diego (2008).

Monitoring and Mitigation of Seventeen Historic Features at CA-SDI-17,581, San Diego, California. Co-authored with Alex Wesson and Kevin Hunt. SWCA Environmental Consultants (2006).

Identification and Documentation of Unassociated Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony of a Late Period Kumeyaay Archaeological Collection. Co-

authored with Dr. Lynn Gamble, San Diego State University (2005).

Cultural Resources Reconnaissance of the Vereecken Property, Winchester Hills, Riverside County, California. SWCA Environmental Consultants (2004).

Archaeological Monitoring and Historic Trash Recovery During Grading For The Tomlinson Park Development, Located In Brea, Orange County, California. Co-authored with Joan Brown. SWCA Environmental Consultants (2003).

Trina Meiser

Architectural Historian

Education

MA, Historic Preservation Planning, Cornell University, 2003
BA, History, Kenyon College, 1998

Professional Affiliations

Member, National Trust for Historic Preservation
Member, Society of Architectural Historians
Member, California Preservation Foundation

Trina Meiser is a historic preservation specialist and an architectural historian with 6 years of experience in surveying, documenting, evaluating, and planning for historic structures, districts, sites, and cultural resources. Her background is based on a solid knowledge of architectural history, architectural styles and terminology, building materials conservation, and historic preservation theory. She has led seminars on architectural styles and the history of historic preservation, charrettes for the design treatments of historic districts, as well as workshops in materials conservation. She has completed cultural resource technical reports, National Register of Historic Places nominations, historic structures reports, and Federal Rehabilitation Tax Credit applications. She has consulted on a variety of historic structure rehabilitation plans with clients, architects, engineers, and agency representatives for regulatory review. Her experience in historic preservation planning provides a strong understanding of federal, state, and local historic preservation laws. She has a thorough knowledge of the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and their functions in historic preservation planning.

Ms. Meiser's areas of interest include urban and landscape preservation planning and design, building restoration, archaeology, international heritage sites, and historic district and neighborhood revitalization projects. She is a member of the Society of Architectural Historians, the California Preservation Foundation, the National Trust for Historic Preservation, and several regional historical societies and preservation organizations.

Project Experience

Historic Preservation Projects

NAVFAC Southwest National Register Eligibility Assessment for Naval Base Ventura County, Port Hueneme, CA

As Architectural Historian, recorded and evaluated 18 buildings at the Naval Construction Training Center at Port Hueneme for eligibility to the National Register. Conducted research on the Disaster Recovery Training School for incorporation into the historical context. Completed DPR forms and incorporated findings in a Historic Resources Evaluation Report.

TCR Properties Ramona Air Center Environmental Impact Report, Ramona, CA

As Architectural Historian, conducted a survey and historical research of structures more than 50 years old to evaluate and document historic resources. Results were recorded on DPR forms and summarized for inclusion in the project Environmental Impact Report.

Exposition Light Rail Authority Transit Phase 2, Los Angeles County, CA

As Architectural Historian, conducted fieldwork to record and evaluate historic resources along the Exposition Corridor ROW. Completed a Historical Resources Evaluation Report for the evaluation of historical resources for eligibility to the National Register of Historic Places and the California Register of Historical Resources. Provided cultural resources portion of Environmental Impact Statement, including mitigation measures for the treatment of evaluated historical resources.

San Diego Association of Governments (SANDAG)/Caltrans SR-76 Mission to I-15 Historical Resources Evaluation Report, San Diego, CA

As Architectural Historian, conducted fieldwork to record and evaluate ranching buildings and residences. Completed a Historical Resources Evaluation Report per Caltrans standards for the evaluation of historical resources for eligibility to the National Register of Historic Places and the California Register of Historical Resources.

City of Temecula Main Street Bridge Replacement Project, Temecula, CA

As Architectural Historian, conducted a survey and historical research of historic resources in Old Town Temecula adjacent to the Main Street Bridge. Results were recorded

on DPR forms and in a Historical Resources Survey Report per Caltrans guidelines.

Allen, Matkins, Leck, Gamble, Mallory & Matsis, LLP 301 University Avenue Historical Evaluation and Technical Report, San Diego, CA

As Architectural Historian, evaluated the condition and integrity of the former supermarket building dating from 1942. Prepared Historic Resources Evaluation Report and survey forms. Summarized findings for inclusion in the 301 University Uptown Environmental Impact Report.

Department of Veterans Affairs Environmental Assessment of Seismic Upgrades, San Francisco, CA

As Architectural Historian, consulted with architects and designers for the rehabilitation and seismic retrofit of the 1930s-era Art Deco San Francisco Veterans Affairs Medical Center buildings. Reviewed plans and rehabilitation standards to evaluate design of new additions and alterations. Engaged in consultation with the State Historic Preservation Office.

City of Del Mar North Torrey Pines Bridge "Sorrento Overpass" Restoration, Del Mar, CA

As Historic Preservation Specialist, consulted with engineers for the restoration of the 1933 North Torrey Pines Bridge to resolve significant impacts to the National Register-eligible resource. Assessed the deterioration of the bridge and established the historic character-defining features to be preserved. Evaluated restoration plans to suggest mitigation measures for its treatment in compliance with the Secretary of Interior Standards for Restoration.

National Park Service Jefferson National Expansion Memorial, St. Louis, MO

As Architectural Historian, contributed to the cultural resources section of the GMP/EIS. Provided historical context for the Native American occupation, the French colonial establishment, and the 19th century development of the built environment in St. Louis, Missouri.

New York City Department of Parks and Recreation Fort Totten Conservation Work Weekend, New York, NY

As Historic Preservation Specialist, organized a historic preservation event to perform restoration work on Officers' Quarters at retired military site along New York's East River. Oversaw the conservation of historic exterior woodwork elements. This conservation project was completed prior to joining this firm.

Federal Emergency Management Agency (FEMA) Hurricane Katrina Recovery, Disaster 1604-DR-MS, Biloxi, MS

As Architectural Historian, recorded the condition and integrity of multiple properties affected by Hurricane Katrina and performed photo documentation. Determined if structures were eligible for National Register designation. Results were summarized in a report and through a series of maps generated in GIS. This conservation work was performed prior to joining this firm.

FEMA Hurricane Katrina Recovery, Disaster 1604-DR-MS, Biloxi, MI

As Historic Preservation Specialist, completed Section 106 review and coordinated with the State Historic Preservation Office to ensure that all projects funded by FEMA complied with federal regulations and the National Historic Preservation Act. Evaluated restoration projects for National Register eligibility in compliance with Secretary of Interior's Standards for Restoration and Rehabilitation under Programmatic Agreement. This historic preservation work was performed prior to joining EDAW.

City of Ithaca Downtown Commercial Historic District National Register Eligibility Nomination, Ithaca, NY

As Historic Preservation Planner, completed research and documentation of downtown commercial buildings dating from the 1830s to the 1930s. Document included architectural descriptions of each building. Successful nomination to the National Register. This historic preservation planning project was completed prior to joining this firm.

City of Ithaca University Avenue Historic District National Register Eligibility Assessment, Ithaca, NY

As Historic Preservation Planner, completed documentation included in the survey and nomination of this residential historic district with resources dating from the 1860s to the 1950s. This historic preservation planning project was completed prior to joining this firm.

Historic Ithaca's State Theatre Restoration Project, Ithaca, NY

As Historic Preservation Specialist, evaluated restoration designs for compatibility with the historic character of the resource and for compatibility with the *Secretary of the Interior's Standards for Rehabilitation*. Performed conservation of textiles, decorative fixtures, plaster, and windows. Managed construction projects relating to

aesthetic and ADA accessibility modifications. This restoration work was completed prior to joining this firm.

Historic Ithaca, Inc. The Clinton House, Ithaca, NY

As Historic Preservation Planner/Specialist, evaluated designs for compatibility with the historic character of the resource and for compatibility with the *Secretary of the Interior's Standards for Rehabilitation*. Compiled and prepared Part 1 of the Federal Rehabilitation Tax Credit Application. Oversaw construction management for aesthetic modifications to historic elements. This planning and conservation project was completed prior to joining this firm.

City of Ithaca The Delaware, Lackawanna and Western Train Station National Register Eligibility Nomination, Ithaca, NY

As Historic Preservation Specialist, composed historic context statement and architectural description for historic train station. Photodocumented building and submitted the application to the State Office of Historic Preservation. This historic preservation planning project was completed prior to joining this firm.

Athens Exchange Hotel Stagecoach Livery Historic Structures Report, Athens, PA

As Preservation Planner, conducted comprehensive assessment of exterior and interior spaces of 1860s livery structure. Identified character-defining features and compiled historic context statement. Photodocumented building and developed recommendations for treatment and maintenance of deteriorated historic features. This conservation project was completed prior to joining this firm.

ATTACHMENT 2

NATIVE AMERICAN CONTACT PROGRAM

(Confidential – Filed under Separate Confidential Cover)

ATTACHMENT 3

PROJECT MAPS

(Confidential – Filed under Separate Confidential Cover)

ATTACHMENT 4

DPR SITE FORMS

(Confidential – Filed under Separate Confidential Cover)

ATTACHMENT 5

CATALOGS

(Confidential – Filed under Separate Confidential Cover)

ATTACHMENT 6

OBSIDIAN SOURCING AND HYDRATION

Geochemical Research Laboratory Letter Report 2010-1

January 15, 2010

Ms. Tanya Wahoff
AECOM, Inc.
1420 Kettner Boulevard, Suite 500
San Diego, CA 92101

Dear Tanya:

This letter reports the results of energy dispersive x-ray fluorescence (edxf) analysis of four obsidian artifacts recovered from archaeological sites in the Harper Lake area west of Barstow in San Bernardino County, California. This analysis was conducted pursuant to your letter request of January 12, 2010.

Analyses of obsidian are performed at my laboratory on a QuanX-EC™ (Thermo Electron Corporation) edxf spectrometer equipped with a silver (Ag) x-ray tube, a 50 kV x-ray generator, digital pulse processor with automated energy calibration, and a Peltier cooled solid state detector with 145 eV resolution (FWHM) at 5.9 keV. The x-ray tube was operated at differing voltage and current settings to optimize excitation of the elements selected for analysis. In this case analyses were conducted for the elements rubidium (Rb K α), strontium (Sr K α), yttrium (Y K α), zirconium (Zr K α), and niobium (Nb K α), and to generate iron vs. manganese (Fe K α /Mn K α) ratios. X-ray tube current was scaled automatically to the physical size of each specimen.

After x-ray spectra are acquired and elemental intensities extracted for each peak region of interest, matrix correction algorithms are applied to specific regions of the x-ray energy spectrum to compensate for inter-element absorption and enhancement effects. Following these corrections, intensities are converted to concentration estimates by employing a least-squares calibration line established for each element from analysis of up to 30 international rock standards certified by the U.S. Geological Survey, the U.S. National Institute of Standards and Technology, the Geological Survey of Japan, the Centre de Recherches Petrographiques et Geochimiques (France), and the South African Bureau of Standards. Further details pertaining to x-ray tube operating conditions and calibration appear in Hughes (1988, 1994).

Trace element values (except Fe/Mn ratios) for the artifacts in Table 1 are expressed in quantitative units (i.e. parts per million [ppm] by weight), and these were compared directly to values for known obsidian sources that appear in Hughes (1983; 1985; 1986; 1988; 1989; 1994), Jack (1976), and Shackley (1994). Artifacts are assigned to a parent obsidian type if diagnostic trace element concentration values (i.e., ppm values for Rb, Sr, Y, Zr and, when necessary Ba, Ti, Mn and Fe₂O₃) corresponded at the 2-sigma level. Stated differently, artifact-to-obsidian source (geochemical type, *sensu* Hughes 1998) matches are considered reliable if diagnostic mean measurements for artifacts fell within 2 standard deviations of mean values for source standards. The term "diagnostic" is used here to specify those trace elements that are well measured by x-ray fluorescence, and whose concentrations show low intra-source variability and marked variability across sources (see Hughes 1993). Zn and Ga ppm concentrations are not considered "diagnostic" because they don't usually vary significantly across obsidian sources (see Hughes 1984).

The trace element composition measurements presented in Table 1 are reported to the nearest ppm to reflect the resolution capabilities of non-destructive edxf spectrometry for quantitative analysis. The resolution limits of the present x-ray fluorescence instrument for the determination of Rb is about 4 ppm; for Sr about 3 ppm; Y about 3 ppm; Zr about 4 ppm; and Nb about 2 ppm (see Hughes [1994] for other elements). When counting and fitting error uncertainty estimates (the "±" value in the table) for a sample are greater than calibration-imposed limits of resolution, the larger number is a more conservative reflection of composition variation and measurement error arising from differences in sample size, surface and x-ray reflection geometry.

Edxf data in Table 1 (and Figure 1) show that all four artifacts were made from Coso Volcanic Field obsidians. Two of these, both obsidian flakes, were manufactured from West Sugarloaf volcanic glass, while the two projectile points were made from obsidian of the West Cactus Peak variety (cf. Hughes 1988: Table III, Figure 3).

Table 1

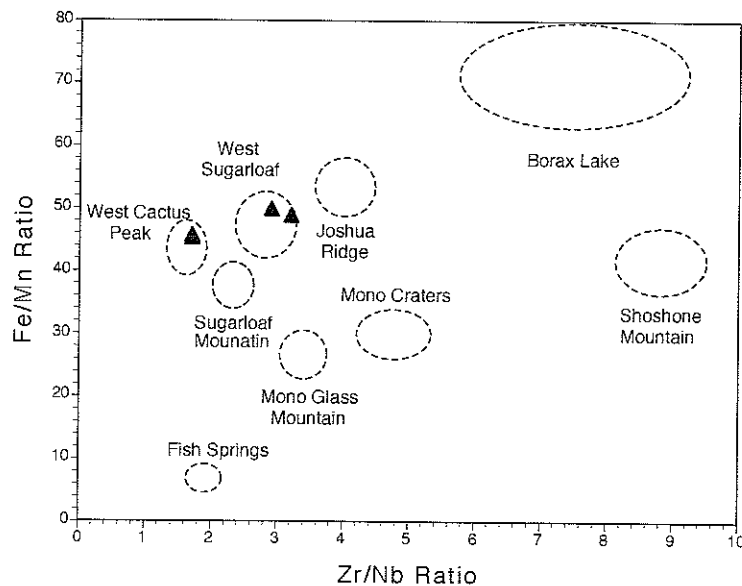
Quantitative Composition Estimates for Artifacts from the Harper Lake Area

Cat. Number	Trace Element Concentrations											Ratio	Obsidian Source (Chemical Type)
	Zn	Ga	Rb	Sr	Y	Zr	Nb	Ba	Ti	Mn	Fe ₂ O ₃ ^T	Fe/Mn	
MI-P-222, # 1	nm	nm	221 ±4	8 ±3	49 ±3	134 ±4	40 ±3	nm	nm	nm	nm	49	West Sugarloaf, Coso Volcanic Field
MI-H-225, # 1	nm	nm	248 ±4	6 ±3	52 ±3	132 ±4	42 ±3	nm	nm	nm	1.26 ±.02	50	West Sugarloaf, Coso Volcanic Field
MI-P-6, # 1	nm	nm	301 ±4	3 ±3	61 ±3	115 ±4	62 ±3	nm	nm	nm	1.11 ±.02	46	West Cactus Peak, Coso Volcanic Field
MI-P-232, # 1	nm	nm	301 ±4	2 ±3	63 ±3	114 ±4	62 ±3	nm	nm	nm	1.11 ±.02	45	West Cactus Peak, Coso Volcanic Field
<i>U.S. Geological Survey Reference Standard</i>													
RGM-1 (measured)	nm	nm	146 ±4	107 ±3	26 ±3	218 ±4	7 ±3	nm	nm	nm	1.85 ±.02	61	Glass Mtn., CA
RGM-1 (recommended)	32	15	149	108	25	219	9	807	1600	279	1.86	nr	Glass Mtn., CA

Values in parts per million (ppm) except total iron [in weight %] and Fe/Mn intensity ratios; $\pm 2\sigma$ expression of x-ray counting uncertainty and regression fitting error at 120-360 seconds livetime. nm= not measured. * = burned and patinated.

Figure 1

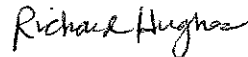
Fe/Mn vs. Zr/Nb Composition for Artifacts from the Harper Lake Area



Dashed lines represent range of variation measured in archaeologically significant geologic obsidian source samples. Filled triangles are plots for artifacts from Table 1.

I hope you will find this information useful in your overall evaluation of the significance of this site. Please contact me (lab phone: [650] 851-1410; e-mail: rehughes@silcon.com; web site: www.geochemicalresearch.com) if I can provide any further assistance or information. As you requested, I have forwarded the specimens to Tom Origer for obsidian hydration analysis.

Sincerely,



Richard E. Hughes, Ph.D., RPA
Director, Geochemical Research Laboratory

References

Hughes, Richard E.

- 1983 X-ray Fluorescence Characterization of Obsidian. *In* David Hurst Thomas, The Archaeology of Monitor Valley: 2. Gatecliff Shelter. **Anthropological Papers of the American Museum of Natural History** 59 (Part 1): 401-408.
- 1984 Obsidian Sourcing Studies in the Great Basin: Problems and Prospects. *In* Richard E. Hughes (ed.), Obsidian Studies in the Great Basin. **Contributions of the University of California Archaeological Research Facility** No. 45, pp. 1-19.
- 1985 Obsidian Source Use at Hidden Cave. *In* David Hurst Thomas (ed.), The Archaeology of Hidden Cave, Nevada. **Anthropological Papers of the American Museum of Natural History** 61 (Part 1): 332-353.
- 1986 Trace Element Composition of Obsidian Butte, Imperial County, California. **Bulletin of the Southern California Academy of Sciences** 85: 35-45.
- 1988 The Coso Volcanic Field Reexamined: Implications for Obsidian Sourcing and Hydration Dating Research. **Geoarchaeology** 3: 253-265.
- 1989 A New Look at Mono Basin Obsidians. *In* Richard E. Hughes (ed.), Current Directions in California Obsidian Studies. **Contributions of the University of California Archaeological Research Facility** No. 48, pp. 1-12.
- 1993 Trace Element Geochemistry of Volcanic Glass from the Obsidian Cliffs Flow, Three Sisters Wilderness, Oregon. **Northwest Science** 67: 199-207.
- 1994 Intrasource Chemical Variability of Artefact-Quality Obsidians from the Casa Diablo Area, California. **Journal of Archaeological Science** 21: 263-271.
- 1998 On Reliability, Validity, and Scale in Obsidian Sourcing Research. *In* Ann F. Ramenofsky and Anastasia Steffen (eds.), **Unit Issues in Archaeology: Measuring Time, Space, and Material**, pp. 103-114. University of Utah Press, Salt Lake City.

Jack, Robert N.

- 1976 Prehistoric Obsidian in California I: Geochemical Aspects. *In* R.E. Taylor (ed.), **Advances in Obsidian Glass Studies: Archaeological and Geochemical Perspectives**, pp. 183-217. Noyes Press, Park Ridge, New Jersey.

Shackley, M. Steven

- 1994 Intersource and Intrasource Geochemical Variability in Two Newly Discovered Archaeological Obsidian Sources in the Southern Great Basin. **Journal of California and Great Basin Anthropology** 16: 118-129.

ORIGER'S OBSIDIAN LABORATORY

P.O. BOX 1531
ROHNERT PARK, CALIFORNIA 94927
(707) 584-8200, FAX 584-8300
ORIGER@ORIGER.COM

January 29, 2010

Tanya Wahoff
AECOM, Inc.
1420 Kettner Boulevard, Suite 500
San Diego, CA 92101

Dear Tanya:

I write to report the results of obsidian hydration band analysis of four specimens from the Harper Lake area near Barstow, California. This work was completed following source determinations by Richard Hughes, Geochemical Research Laboratory, who forwarded the specimens to us on your behalf.

Procedures typically used by our lab for preparation of thin sections and measurement of hydration bands are described here. Specimens are examined to find two or more surfaces that will yield edges that will be perpendicular to the microslides when preparation of each thin section is done. Generally, two parallel cuts are made at an appropriate location along the edge of each specimen with a four-inch diameter circular saw blade mounted on a lapidary trimsaw. The cuts result in the isolation of small samples with a thickness of about one millimeter. The samples are removed from the specimens and mounted with Lakeside Cement onto etched glass micro-slides.

The thickness of each sample was reduced by manual grinding with a slurry of #600 silicon carbide abrasive on plate glass. Grinding was completed in two steps. The first grinding is stopped when each sample's thickness is reduced by approximately one-half. This eliminates micro-flake scars created by the saw blade during the cutting process. Each slide is then reheated, which liquefies the Lakeside Cement, and the samples are inverted. The newly exposed surfaces are then ground until proper thickness is attained.

Correct thin section thickness is determined by the "touch" technique. A finger is rubbed across the slide, onto the sample, and the difference (sample thickness) is "felt." The second technique used to arrive at proper thin section thickness is the "transparency" test where the micro-slide is held up to a strong source of light and the translucency of each sample is observed. The samples are reduced enough when it readily allows the passage of light. A cover glass is affixed over each sample when grinding is completed. The slides and paperwork are on file under File No. OOL-499.

The hydration bands are measured with a strainfree 60-power objective and a Bausch and Lomb 12.5-power filar micrometer eyepiece mounted on a Nikon Labophot-Pol polarizing microscope.

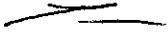
Tanya Wahoff
January 29, 2010
Page 2

Hydration band measurements have a range of +/- 0.2 microns due to normal equipment limitations. Six measurements are taken at several locations along the edge of the thin section, and the mean of the measurements is shown on the accompanying data page.

Three of the specimens had highly weathered surfaces and this made accurate measuring of the hydration impossible; however, we did obtain approximate measurements.

Please don't hesitate to contact me if you have questions regarding this hydration work.

Sincerely,



Thomas M. Origer
Director

Submitter: T. Wahoff - AECOM, Inc

January 2010

Lab#	Sample#	Description	Unit	Depth	Remarks	Measurements	Mean	Source
MI-P-006	1	Biface Fragment				5.9 6.0 6.0 6.0 6.1 6.1	6.0	
MI-P-222	2	Debitage				Approximately 10.0	VW	Weathered
MI-P-232	3	CCB Point Fragment				Approximately 11.0	VW	Weathered
MS-H-225	4	Debitage				Approximately 10.0	VW	Weathered

Lab Accession No: OOL-499

Technician: Thomas M. Origer

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

Application for Certification for the **ABENGOA**)
MOJAVE SOLAR POWER PLANT)
)
)
_____)

Docket No. 09-AFC-5

PROOF OF SERVICE

I, Karen A. Mitchell, declare that on February 17, 2010, I served the attached *Second Supplemental Written Response to Data Request Set 1B (Nos. 1-86) for Cultural Resources* via electronic mail and United States Mail to all parties on the attached service list.

I declare under the penalty of perjury that the foregoing is true and correct.



Karen A. Mitchell



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE **ABENGOA MOJAVE**
SOLAR POWER PLANT

Docket No. 09-AFC-5
PROOF OF SERVICE
(Revised 2/9/2010)

APPLICANT

Emiliano Garcia Sanz
General Manager
Abengoa Solar Inc.
11500 West 13th Avenue
Lakewood, CO 80215
emiliano.garcia@solar.abengoa.com

Scott D. Frier
Chief Operating Officer
Abengoa Solar Inc.
13911 Park Ave., Ste. 206
Victorville, CA 92392
scott.frier@solar.abengoa.com

Tandy McMannes
2030 Addison Street, Suite 420
Berkeley, CA 94704
tandy.mcmannes@solar.abengoa.com

APPLICANT'S CONSULTANTS

Frederick H. Redell, PE
Engineering Manager
Abengoa Solar, Inc.
11500 West 13th Avenue
Lakewood, CO 80215
frederick.redell@solar.abengoa.com

COUNSEL FOR APPLICANT

Christopher T. Ellison
Ellison, Schneider & Harris
2600 Capitol Ave.
Sacramento, CA 95816
cte@eslawfirm.com

INTERESTED AGENCIES

California ISO
e-recipient@caiso.com

INTERVENORS

California Unions for Reliable Energy ("CURE")
Tanya A. Gulesserian
Marc D. Joseph
Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
E-mail Preferred
tgulesserian@adamsbroadwell.com
eklebaner@adamsbroadwell.com

Luz Solar Partners Ltd., VIII
Luz Solar Partners Ltd., IX
Jennifer Schwartz
700 Universe Blvd
Juno Beach, FL 33408
jennifer.schwartz@nexteraenergy.com

ENERGY COMMISSION

*ANTHONY EGGERT
Commissioner and Presiding Member
aeqgert@energy.state.ca.us

JAMES D. BOYD
Vice Chairman and Associate Member
jboyd@energy.state.ca.us

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

Craig Hoffman
Project Manager
choffman@energy.state.ca.us

Christine Hammond
Staff Counsel
chammond@energy.state.ca.us

Jennifer Jennings
Public Adviser's Office
publicadviser@energy.state.ca.us