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CALICO SOLAR

Applicant's Response to the CEC Transmission Line Upgrades Memo-Cultural Resources Responses

Application for Certification (08-AFC-13)

January 2010

Submitted to:
Bureau of Land Management
2601 Barstow Road
Barstow, CA 92311

Submitted to:
California Energy Commission
1516 9th Street, MS 15
Sacramento, CA 95814-5504

Submitted by:
SES Solar Three, LLC
SES Solar Six, LLC

Stirling Energy Systems
4800 N. Scottsdale Road, Suite 5500
Scottsdale, AZ 85251

Tessera Solar
power from stirling energy systems

January 29, 2010

Mr. Christopher Meyer
CEC Project Manager
Attn: Docket No. 08-AFC-13
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Mr. Jim Stobaugh
BLM Project Manager
Attn: Docket No. 08-AFC-13
Bureau of Land Management
P.O. Box 12000
Reno, NV 89520

RE: Calico Solar (Formerly Solar One) Project
Applicant's Responses to the CEC Memo Regarding Transmission Line Upgrades – Cultural Resources

Dear Mr. Meyer and Mr. Stobaugh,

Tessera Solar hereby submits the Cultural Resources Responses to the CEC Memo Regarding Transmission Line Upgrades. I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge.

Sincerely,

Felicia L Bellows

Felicia Bellows
Vice President of Development

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 5: With regards to cultural resources, provide appropriate additions to background sections to cover regions not covered in the original Cultural Resources Technical Report.

Response: Presented below is a general summary of the existing setting for the archeological and the architectural history background as it relates to the transmission line corridor for Calico Solar (formerly SES Solar One). It includes an overview of the area of potential effect, prehistoric context, ethnography, regional historic context and a review of site records and literature for the entire corridor. The information was collected through the current literature search and record check at the San Bernardino Archaeological Information Center (SBAIC) for the transmission line data request, as well as from desk-top research. In addition, the *Setting* section of the March 2009 report entitled *Draft Final Class III Cultural Resources Technical Report for the (Calico Solar) Project, San Bernardino County, California (Nixon and Glenn 2009)* was used for the cultural history portion of this Data Response. Additional information has been added to the cultural history section where appropriate given that the transmission line covers a much broader extent of the Mojave Desert than the original cultural resources setting that was prepared for the Calico Solar project site. This approach was sent to the CEC and BLM on December 17th, 2009 for concurrence. The Applicant has not yet received a response.

Regional Prehistoric Context

The project's Area of Potential Effect (APE) passes through several regions, beginning in the Mojave Desert and ending near the Cajon Pass in the Transverse Ranges near San Bernardino. During the Late Pleistocene and Holocene periods, the desert regions were subjected to dramatic climactic fluctuations that shaped much of the early history of human occupation and adaptation in the area, especially as they directly impacted the availability of prehistoric food resources and surface water. Other aspects of the prehistory of the area are related to influences from the agriculturalists to the east and the coastal peoples to the west.

Recorded archaeological sites in the Mojave Desert include evidence for villages and camps, trails, special purpose sites (e.g., hunting blinds, bedrock mortars and grinding slicks), burials, quarries, rock features, and petroglyphs. Sites may be readily visible on the desert floor, a function of sparse vegetation and continual use of the desert. Though early archaeological remains are rare, when found they are usually located along the margins of pluvial lakes or in areas of dune deflation. Conversely, artifacts on the desert floor may be sparse, widely scattered, and not easily recognized among the desert pavement. Archaeologists have reached a broad consensus regarding the region's basic cultural chronology on the basis of an observed sequence of assemblages that are predominantly identified by the presence of distinctive projectile point types (Bamforth 1990:72).

The Cajon Pass and surrounding regions, in contrast to the adjacent desert, contains a variety of resources that reflect its unique location along the Transverse Ranges and the variation in elevation exhibited. The pass acted as a conduit for prehistoric peoples moving from the Los Angeles and San Bernardino basins to the Mojave Desert. Little evidence of early (Paleoindian) populations has been documented in the Cajon Pass region; however, later periods are better represented and exhibit a mixture of coastal and desert traditions (Moratto 1984). Because the Project APE crosses such a board and varying expanse of territory, no single chronology, many of which have been developed within a limited geographical scope, can summarize developments for the entire project area. Regional sequences of the cultural complexes for the Mojave Desert have been proposed by Warren (1980, 1984) and Warren and Crabtree (1986), who divide the prehistoric era into temporal periods based on projectile point typology: Lake Mohave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. Sequences proposed for the Mojave Desert do not serve the entire project area well. For example, Warren's (1980) "Shoshonean" includes the ethnographic era, while the four earlier periods encompass the Archaic of the Great Basin and, in the Saratoga Springs period, an influx of formative influences from the Southwest (Lyneis 1982, 1995). The Mojave Desert sequence has recently been addressed by Sutton *et al.* (2007), who provide a useful concordance of terms for the temporal periods and complexes identified in the Mojave Desert in relation to the history of climactic change in the region.

The chronological sequence of the cultural complexes for the Mojave Desert initially proposed by Warren (1980, 1984) and Warren and Crabtree (1986), divides the prehistoric era into five temporal periods: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. The four earlier periods encompass what is called the Archaic Period of the Great Basin and, in the Saratoga Springs period, formative influences from the Southwest (Lyneis 1982), while the Shoshonean period includes the ethnographic era. Claims have been made for archaeological assemblages dating to periods earlier than Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

The Mojave Desert sequence has recently been expanded by Sutton *et al.,* (2007) to include elements more closely aligned to prehistoric cultural complexes in the Central Mojave Desert. Similar to Warren and Crabtree (1986), Sutton *et al.,* (2007) notes little evidence of a "Pre-Clovis" occupation of the Mojave Desert during the Pleistocene, but does not discount the possibility of such evidence existing in the region. In contrast to the earlier sequence, Pleistocene era occupation is identified and termed the hypothetical "Pre-Clovis" and "Paleo-Indian" Complexes. Other elements of the Sutton *et al.,* (2007) Mojave Desert chronology for the Holocene period include the Lake Mojave complex, Pinto complex, Dead Man Lake complex, Gypsum complex, Rose Spring complex, and Late Prehistoric complex, as described below. As used herein, "climactic periods (*e.g.,* Early Holocene) [refers] to specific spans of calendric time and cultural complexes (*e.g.,* Lake Mojave Complex) to denote specific archaeological manifestations that existed during (and across) those periods" (Sutton *et al.,* 2007:233).

Additionally, Sutton *et al.,* (2007: Table 15.1 and 15.2) provide good summaries of major archaeological research conducted in the Mojave Desert since 1982. Due to the advent of cultural resource management projects, primarily on military bases and on federal land in the Mojave, more than 3 million acres have been surveyed with more than 20,000 sites identified in the last twenty-seven years. These include surveys at China Lake Naval Weapons Center, Edwards Air Force Base, Fort Irwin, Twenty-Nine Palms Marine Corps Center, and federal BLM Land (Basgall and Glambastiani 2000; Basgall 2004; Hall 1993; Warren 1991). In terms of excavation projects in the Mojave, work has been conducted on a wide range of site types, from Paleo-Indian sites to Late Prehistoric sites, several of which have provided radiocarbon dates that support the cultural chronology that has evolved with these more recent investigations (Sutton *et al.,* 2007: Table 15.3). The chronological sequence presented below is based on both the earlier and more recent archaeological survey and excavation projects in the Mojave.

Paleo-Indian Complex (10,000 to 8000 cal B.C.)

The Paleo-Indian Complex was an era of environmental transition between the late

Pleistocene and early Holocene. The beginning of the Paleo-Indian Complex was characterized by increased rainfall and cooler temperatures, which formed deep lakes and marshes, even in the interior desert regions of California. As temperatures warmed at the start of the Holocene, glaciers slowly retreated, sea levels rose, and the interior lakes and marshes gradually evaporated over the millennia (Moratto 1984:78).

The earliest, clear evidence for human occupation of the Mojave Desert begins at about 12,000 years ago, while claims for earlier, pre-Holocene era occupations such as those made for the Calico Early Man site (Duvall and Venner 1979), Tule Springs (Harrington and Simpson 1961), Lake China (Davis 1978), and Lake Manix (Simpson 1958, 1960, 1961) remain unsubstantiated.

In 1926, a fluted point found in Folsom, New Mexico transformed the debate about the antiquity of the earliest inhabitants of the New World, pushing the date back to approximately 15,000 years before present (B.P.) Since that time, many other sites containing this type of point have been identified throughout the United States. Many of these sites contain variations of the fluted point tradition including the Clovis.

The Paleo-Indian Complex within the Mojave Desert is, thus far, represented exclusively by the Clovis Complex, though the relationship with the later Great Basin stemmed series points is also a consideration. The Paleo-Indian Complex experienced profound environmental changes, as cool, moist conditions of the terminal Wisconsin glacial age gave way to a warmer, drier climate of the Holocene (Spaulding 1990).

The China Lake site remains the only presumed occupation of the Paleo-Indian complex in the Mojave Desert for the late Pleistocene Period. China Lake is located near an ancient Pleistocene lake. Excavations at this site began in 1968 and lasted through the end of the 1970s (Moratto 1984:66-70). China Lake has a well-sealed stratigraphic context with prehistoric tools intermixed with the fossilized remains of extinct mammals. The tool sequence from the site suggests that China Lake was inhabited from as early as 9,200 cal. Before Christ (B.C.) (Sutton *et al.,* 2007: 234). The earliest calibrated dates for China Lake are from habitation debris at the Pleistocene lakeshore that continued through 10,000 B.C., where Proto-Clovis and Clovis cultures were identified. Nearly all of the tools identified at this site were produced from obsidian and fine-grained cryptocrystalline silicates (cherts and jaspers).

One common theme among nearly all Paleo-Indian sites in North America is the tool assemblage: projectile points, hafted to the end of a spear and launched using a throwing tool (atlatl), made from fine-grained lithic material and fluted. Fluted points, defined as a component of the Clovis culture in California, have been found nearly throughout the entire state from coastal estuary environments to ancient Pleistocene lakeshores, which are now in desert areas. At least five sites near Cajon Pass have been identified containing fluted projectile points, suggesting an early occupation of approximately 12,000 B.P., which corresponds to the “hypothetical Pre-Clovis” complex (pre-10,000 cal B.P.) for San Bernardino County (Sutton *et al.,* 2007:236). In addition to fluted points, the Paleo-Indian tool assemblage was composed mainly of scrapers, burins, awls, and choppers, all used for the processing of animal remains and foodstuffs.

The late Pleistocene to early Holocene geological period of transition, approximately 14,000 to 8,000 B.P., was a period of global climatic change and in the California interior, pluvial lakes formed from glacial melt (Roberts 1989). Some early researchers pose the theory of two different traditions relating to interior and coastal adaptation during this transition. Based on work in the Panamint Valley, Davis (1969) posited the theory of “Paleo-Desert,” a geographic distinction from Paleo-Indian sites of the “Paleo-Coastal” tradition. In the Paleo-Desert geographic region, Paleo-Indian sites are generally located along the shorelines of these ancient pluvial lakes (Davis 1969).

One area where pluvial adaptation is not a factor is in the mountains west of the Mojave. The San Dieguito Complex artifacts found in the area around the Cajon Pass and elsewhere to the west are technically similar to the Lake Mojave assemblages. They include two forms of leaf-shaped knives, foliate to ovoid bifaces, foliate and short-bladed shouldered points, crescents, engraving tools, choppers, core hammers, pebble hammerstones, cores, and many types of scrapers (Moratto 1984).

Lake Mojave Complex (ca. 8000 – 6500 cal B.C.)

The temporal period 8000 to 6500 cal B.C. is referred to as the Altithermal Climatic Phase in which there was a dramatic shift towards a much warmer environment in the desert regions, and which appears to have witnessed a near hiatus in the occupation of the Mojave Desert. During this time it seems that people living in the desert regions migrated towards the coastal region. As the climate changed, so did the distribution of floral and faunal communities, as a result of these changes people migrated toward the coast to exploit littoral resources. A small frequency of ground stone implements is present during this time, from which infers limited hard seed grinding activities (Sutton *et al.,* 2007:237). The high incidence of extra-local materials and marine shell is interpreted as wider spheres of interaction than witnessed previously. Sutton *et al.,* (2007: 237) interprets these and other data as indicators of "a forager-like strategy organized around relatively small social units."

Cultural materials dating from this Complex encompass the Playa cultures (Rogers 1939), the San Dieguito Complex (Warren 1967), and the Lake Mojave Complex (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto Complex, representing a shift toward a more diversified and generalized economy (Sutton 1996:228). The Lake Mojave assemblages, first identified at Lake Mojave (Campbell *et al.,* 1937), include Lake Mojave series projectile points (leaf-shaped, long stemmed points with narrow shoulders) and Silver Lake points (short bladed, stemmed point with distinct shoulders), also identified at three sites at Edwards Air Force Base (deBarros 2004). Other diagnostic items include flaked stone crescents; abundant bifaces; and a variety of large, well-made scrapers, gravers, perforators, heavy core tools, and ground stone implements (Sutton *et al.,* 2007:234).

Millingstones generally occur in small numbers during this time. In the Mojave Desert and southern Great Basin, this assemblage is typically (but not exclusively) found around the margins of ancient lakes, although the role of the lakes in the overall adaptation remains unclear. According to Sutton (1996:229), Lake Mojave Complex sites occur more commonly in the eastern and central Mojave Desert, while rare occurrences have been noted within the western Mojave in the Lake China, Coso, and Owens Lake areas.

The Lake Mojave cultural pattern seems to represent relatively small nomadic social units centered on foraging strategies with undefined hunting and lacustrine resource exploitation patterns. Studies conducted at Fort Irwin show a reliance on smaller taxa with less reliance on large game based on protein residue analysis; however, these data are contradictory to the cultural constituents recorded for this complex that suggest large game exploitation (Sutton *et al.,* 2007:237). There is an overlap in time between the Lake Mojave Complex and the Pinto Complex of approximately 1,000 years, in which continuity of technology occurs with a steady introduction of technologies referred to as the Pinto Complex.

In the mountains to the west of the Mojave Desert, the early Archaic is represented by the millingstones, manos, and scraper planes found in coastal Millingstone Horizon assemblages and an intensification of seed collecting and processing (Moratto 1984). Towards the end of this period when the Mojave Desert was being more intensively utilized, Pinto Complex artifacts begin to appear. This blending of Millingstone and Pinto artifacts continues and develops into the Late Archaic and is known as the Sayles Complex (Moratto 1984).

The Pinto Complex (ca. 6500 – 4000 cal B.C.)

The Pinto Complex represents a broad continuity in the use of flaked stone technology, including less reliance on obsidian and cryptocrystalline silicates, as well as the prevalence of ground stone implements in the material culture (Sutton *et al.,* 2007:238), which distinguishes it from the Lake Mojave Complex. Climatic changes occur between the Early and Middle Holocene periods about 7500 B.P. and 5000 B.P. appears to have been more arid across the Mojave region (S. Hall 1985; Spaulding 1991). It is during this time that woodland attained its approximate modern elevation range and the modernization of desert scrub communities was completed with the migration of plant species such as creosote bush into the area (Byers and Broughton 2004). Warren (1984) sees this period as marking the beginning of cultural adaptation to the desert, as materials characteristic of the Pinto Complex gradually replace those of the preceding Lake Mojave Complex. Sites associated with this era are usually found in open settings, in relatively well-watered locales representing isolated oases of high productivity.

From the period 5000 B.C. to 3500 B.C., there was increased occupation of the desert regions during the Medithermal Climatic Period, a period of moister and cooler temperatures allowing for the intensive re-occupation of the desert region. In the desert region, the occupation is referred to as the Pinto Basin Complex. However, Sutton *et al.,* (2007:238) cite recent work conducted on Fort Irwin and Twenty-Nine Palms that produced radiocarbon dates as 6870 cal B.C., thus pushing back the inception of the complex coincidental with the Lake Mojave Complex.

The Pinto Complex is marked by the appearance of Pinto series projectile points, characterized as thick, shouldered, expanding stem points with concave bases, as well as bifacial and unifacial core tools, and an increase in millingstones. Pinto points were typically produced by percussion reduction, with limited pressure retouch. Named for the Pinto Basin site (Campbell and Campbell 1935), the points were presumably used on atlatl darts. Large numbers of such artifacts were also recovered from the Stahl site near Little Lake (Harrington 1957; Schroth 1994). Earle (1997) reports differences between artifact assemblages between the eastern and western Mojave Desert, with the eastern area seemingly devoid of milling equipment but this is not the case for the western Mojave. In general, milling stones are rare during the Pinto Period (Warren 1984, Wallace 1962).

Major technological shifts for this Complex include a significant increase in the use of millingstones (Warren and Crabtree 1986; Sutton *et al.,* 2007:238). Warren (1990) attributes the latter development to the exploitation of hard seeds, part of a process of subsistence diversification brought on by increased aridity and reduced ecosystem carrying capacity. Big game hunting probably continued as an important focus during this time, but the economic return of this activity likely decreased as mountain sheep and deer (artiodactyls) populations declined in response to increased aridity (Warren and Crabtree 1986). During this transitional period there is faunal evidence that indicates exploitation of rabbit, rodent, reptile, and fresh water mussel resources.

The majority of Pinto Complex archaeological sites have been found near pluvial lakes, adjacent to fossil stream channels, near springs, and in upland regions. Many of these sites contain substantial midden deposition and cultural debris, which indicates larger groups and prolonged occupation for this time period (Sutton *et al.,* 2007:238).

A new complex has been proposed by Sutton *et al.,* (2007) that appears to be a variation of the Pinto Complex: the Dead Man Lake Complex (7000-3000 cal. B.C.), based on archaeological findings from the Twenty-Nine Palms area. The primary variation between Pinto and the Dead Man Complex is the presence of small to medium sized contracting stemmed or lozenge shaped points, battered cobbles, bifaces, simple flaked tools, milling implements, and shell beads (Sutton *et al.,* 2007:239).

Prior to 3000 B.P., Basgall and True (1985) note the presence of several millingstone sites in the general western San Bernardino region west and southwest of San Bernardino and in Los Angeles County. Millingstones tend to increase in frequency as one moves from the mountains to the desert during this time (Basgall and True 1985).

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Based on the current archaeological data there appears to have been a gap between the Middle and Late Holocene period, since few sites have been found that date between 3000 and 2000 cal B.C. It is believed that climatic changes during this period resulted in hotter and drier conditions, which may have led to the abandonment of this region for approximately 1,000 years (Sutton *et al.,* 2007:241). People migrated to areas with more suitable climates (*e.g.,* San Bernardino Mountains).

Gypsum Complex (ca. 2000 cal B.C. – cal A.D. 200)

Gradual amelioration of the climate began by around 5000 B.P., culminating in the Neoglaciation at about 3600 B.P., with a period of increased moisture dating to the latter part of the Middle Holocene (Spaulding 1995). This increase in moisture would have presumably resulted in favorable conditions in the desert and may have influenced changes in cultural adaptations, including increasing population, trade, and social complexity (Sutton 1996: 232; Sutton *et al.,* 2007:241).

Gypsum Complex sites are characterized by medium to large stemmed and corner notched projectile points, including Elko series, Humboldt Concave Base, and Gypsum. In addition, rectangular-based knives; flake scrapers; occasional large scraper planes, choppers and hammerstones; handstones and milling tools become relatively commonplace and the mortar and pestle appear for the first time.

This Complex is marked by population increases and broadening economic activities as technological adaptation to the desert environment evolved. Hunting continued to be an important subsistence focus, but the processing of plant foods took on greater importance as evidenced by an increase in the frequency and diversity of ground stone artifacts. Later, the bow and arrow were introduced, increasing hunting efficiency. Perhaps due to these new adaptive mechanisms, the increase in aridity during the late Gypsum Complex (after ca. 2500 B.P.) seems to have had relatively little consequence on the distribution and increase in human populations (Warren 1984; Warren and Crabtree 1986). In addition to open sites, the use of rockshelters appears to have increased at this time. Base camps with extensive midden development are a prominent site type in well-watered valleys and near concentrated subsistence resources (Warren and Crabtree 1986). Additionally, evidence of ritualistic behavior during this time exists through the presence of rock art, quartz crystals, and paint (Sutton *et al.,* 2007:241).

A shift in subsistence orientation and mobility near the end of the Gypsum Complex is suggested, with increased emphasis on the hunting of smaller mammals (Basgall *et al.,* 1986; Sutton 1996:234). Rock art suggests that the hunting of mountain sheep was important during the Gypsum Complex (Grant *et al.,* 1968); mountain sheep and deer, rabbits and hares, rodents, and reptiles remains are reported from Gypsum Complex sites in the central Mojave Desert (Hall and Basgall 1994). Evidence from the western Mojave Desert suggests that there was a major population increase ca. 3000 to 2300 B.P. (Gilreath and Hildebrandt 1991; Sutton 1988).

Rose Spring Complex (ca. cal A.D. 200 – 1100)

The climate during the Rose Spring Complex remains relatively stable and consistent during the middle of the Late Holocene period. In the western Mojave Desert, some regions show an increase in lake stands, such as at Koehn Lake during this time (Sutton *et al.,* 2007:241). At the beginning of this period lakes were at high points; as the environment began to shift towards the end of this period, lakes began to desiccate and recede, which marked the end of the Rose Spring Complex around Anno Domini (A.D. 1100).

The Rose Spring Complex is characterized by small projectile points, such as the Eastgate and Rose Spring series, stone knives, drills, pipes, bone awls, various milling implements, and marine shell ornaments; the use of obsidian is prevalent during this time (Sutton *et. al.,* 2007:241). Smaller projectile points appear to mark the introduction of a bow and arrow technology and the decline of the atlatl and spear weaponry (Sutton 1996: 235). Sutton (1996: 235; 2007:241) notes that Rose Spring Complex sites are common in the Mojave Desert and are often found near springs, washes, and lakeshores.

Subsistence practices during the Rose Spring Complex appear to have shifted to the exploitation of medium and small game, including rabbits/hares and rodents, with a decreased emphasis on large game. At the Rose Spring archaeological site, numerous bedrock milling features, including mortar cups and slicks, are associated with rich midden deposits, indicating that milling of plant foods had become an important activity. In addition, evidence of permanent living structures are found during this time and include wickiups, pit houses, and other types of structures (Sutton *et al.,* 2007:241). In the eastern Mojave Desert, agricultural people appear to have been present, as Anasazi populations from Arizona controlled or influenced a large portion of the northeastern Mojave Desert by cal A.D. 700 (Sutton *et al.,* 2007:242).

Late Prehistoric Complexes (cal A.D. 1100 - Contact)

Paleoenvironmental studies conducted within the western Mojave Desert point to increased effective moisture beginning just after 2000 B.P., as evidenced by a shoreline bench feature at Koehn Lake (Sutton 1996:238). The Koehn Lake site appears to have been abandoned by 1,000 years ago, as Koehn Lake desiccated during a major "medieval drought." This drought may have influenced the movement of people from this area north and east across the Great Basin (Sutton 1996:239). Population began to decrease, due in part to a drier climate, and later as a result of European contact.

Characteristic artifacts of this Complex include Desert series projectile points (Desert

Side-notched and Cottonwood Triangular), Brownware ceramics, Lower Colorado Buff Ware, unshaped handstones and millingstones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986). The faunal assemblages typically contain deer, rabbits/hares, reptile, and rodents. The use of obsidian dropped off during this time with the increased use of cryptocrystalline silicates.

Between 1,000 and 750 years ago, ethnic and linguistic patterns within the Mojave Desert increased in complexity. One of the most important regional developments during the Late Prehistoric Period was the apparent expansion of Numic-speakers (Shoshonean groups) throughout most of the Great Basin. Many researchers accept the idea that sometime around A.D. 1000 the Numa spread westward from a homeland in the southwestern Great Basin, possibly from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little dispute that the Numic spread occurred, there is much disagreement over its mechanics and timing (see Madsen and Rhode 1995).

The Late Prehistoric Complexes mark the first recorded historical documentation of Native American inhabitants at European contact. The ethnohistoric record provides valuable data for understanding Late Prehistoric archaeology. The Late Prehistoric Complexes reveal a significantly different suite of material culture than that seen in earlier Complex assemblages. Manos and millingstones became more frequent, as did mortar and pestles. In addition, bow and arrow technology with the use of Desert Side-notched and Cottonwood points, both emerge during the Late Prehistoric Complexes. Large occupation sites, representing semi-permanent and permanent villages, emerge during this time as well.

During this time the first locally produced pottery is seen in the Mojave Desert Region, likely coming from the Anasazi in the southwest. Also, smaller projectile points, Cottonwood and later Desert Side- Notched points were introduced to use with bow and arrow technology. Plant food processing is indicated by the presence of manos and metates.

Ethnography

Prehistorically, there was a large movement of people across the Mojave Desert and ethnographically several groups are associated with the Project APE and surrounding Mojave Desert region. The Kawaiisu, Kitanemuk, Southern Paiute, Serrano, Chemhuevi, Tabtulabal, and Panamint occupied the Mojave Desert region, north, south, west, and east of the Project. In this region there were four major linguistic groups originating from northern Uto-Aztecan groups; Tubatulabalic, Hopic, Numic, and Takic (Sutton *et al.,* 2007:243). The Mojave River appears to have been a major boundary between Takic and Numic speaking groups during prehistoric times. Groups occupying the Central Mojave Desert were of the Takic and Numic linguistic groups. Takic speaking groups originated in the southwestern Mojave Desert, expanding south and east sometime around 500 cal. B.P., and include the Serrano and Kitanemuk (Sutton *et al.,* 2007:243). At time of contact, groups south of the Mojave River and much of southern California were part of the Takic linguistic group. The groups north and east of the Project were of the Numic linguistic group, which included the Kawaiisu, Chemhuevi, and Southern Paiute.

During the ethnographic period, the Serrano, Vanyume (Beñeme) and the Chemehuevi occupied the region in which the Project is located. The Vanyume were a small division of the Serrano, about whom little ethnographic information is known. The Chemehuevi entered the Mojave Desert much later in time. Other groups that could have entered the Project area were the Kawaiisu, the Kitanemuk, the Southern Paiute, the Mohave, and the Ancestral Pueblo. Eerkens (1999:301) states that the area around Fort Irwin, northeast of the Project Site, was inhabited by the Kawaiisu, Chemehuevi, Las Vegas Paiute, and the Vanyume, although he acknowledges that all groups in the area maintained flexible settlement patterns based on availability of resources (1999:302). The Project APE and surrounding valleys were not conducive for large scale inhabitation based on the fluctuating environmental conditions and overall arid nature of the region; therefore groups occupying/utilizing the area would have been small and nomadic (Zigmond 1986:398).

Serrano

The Project APE is situated within the traditional boundaries associated with Mission San Gabriel during the Spanish Period (1769–1821) (Bean and Vane 1979). The natives in this area were known as the Yucaipaiem clan of the Serrano (Altschul, Rose and Lerch 1984; Kroeber 1925; Strong 1929; Bean and Smith 1978). They spoke a language that falls within the Takic family of the Uto-Aztecan language group. This language family is extremely large and includes the Shoshonean groups of the Great Basin. Due to the proximity of the Serrano and Gabrieliño bands in the area and their linguistic similarities, ethnographers have suggested that these two bands shared the same ethnic origins (Kroeber 1925; Bean and Smith 1978). For this reason, they will be referred to as the Serrano.

According to Kroeber (1976:611), the Serrano comprised five groups or bands: Kitanemuk, Alliklik, Vanyume, Kawaiisu and Serrano. They inhabited lands from the San Bernardino Mountains, part of the Transverse Mountains east of the Cajon Pass, across the Mojave Desert east as far as Twenty-Nine Palms, and from the Tehachapi Mountains to the northern Colorado Desert. They occupied most of modern day San Bernardino County (Bean and Smith 1978). Relatives of the Serrano included the Gabrieliño and Luiseño to the west at the Pacific Coast, and the Cahuilla inhabiting the Colorado Desert. For much of the Late Prehistoric Complex, the Serrano band of the much larger Serrano tribe were the likely inhabitants of the western Mojave Desert, what is today the Cajon Pass and Barstow area. Most of what is known about the Serrano has been based upon the work done by Hicks (1958) and by later researchers working on a site known as CA-SBR-1000, located near Yucaipa, San Bernardino County, California. Studies indicate that the village had been occupied for thousands of years and that it was a major trading center both prehistorically and historically. Little is known about early Serrano social organization because the band was not studied until the 1920s (Kroeber 1925) and enculturation had seriously compromised their native lifeway. Kroeber (1925) indicates that the Serrano were a hierarchically ordered society with a chief who oversaw social and political interactions both within their own culture and with other groups. The Serrano had multiple villages ranging from seasonal satellite villages to larger, more permanent villages.

Resource exploitation was focused on village-centered territories and ranged from gathering to hunting with occasional fishing. The primary staple varied depending on locality. Acorns and piñon nuts were gathered by groups in the foothills; honey mesquite, piñon nuts, yucca roots, mesquite and cacti fruits were gathered by groups in or near the desert (Bean and Smith 1978). The Serrano hunted deer, mountain sheep, antelope, rabbits, other small rodents, birds, with the most desired game bird being quail (Bean and Smith 1978).

Serrano structures were situated near water sources and consisted of large, circular thatched and domed structures of willow, covered with tule thatching. These living structures were often sufficient to house a large family. In addition to the living structure, a ramada, an open air structure for outdoor cooking, was located adjacent to the home (Benedict 1924; Kroeber 1925; Drucker 1937; Bean and Smith 1978). A large ceremonial structure was often present and was used as the religious center where the lineage leader resided. Additional structures, such as granaries for food storage and sweathouses for ritual activities, were often located adjacent to pools or streams (Strong 1929; Bean 1962-1972; Bean and Smith 1978).

The Serrano, like the neighboring groups, were primarily semi-nomadic, hunter-gatherers. Because of their inland location, Serrano society was left relatively intact during the period of initial Spanish colonialization, unlike the Gabrielino, who inhabited the coastal area. In 1772, Spanish explorer Pedro Fagès traveled through the Cajon Pass to the Mojave Desert in an attempt to identify the native groups in this region. Fages' ultimate goal was to place the Serrano under supervision of a mission. By 1819, the Serrano were relocated to the Estancia of the Mission San Gabriel in Redlands (Bean and Smith 1978:573). At the time of relocation, there were likely on the order of 3,500 Serrano inhabiting the Mojave Basin. Between 1840 and 1860 a smallpox epidemic decimated the population. By 1885, there were only "390 Serranos [sic] remaining in all of southern California" (AccessGenealogy.com 2005) and the census of 1910 recorded only 100 Serrano (Kroeber 1976:616).

Vanyume (Beñeme)

Limited information is available on the Vanyume during the historic period. What information exists describes the Vanyume as a small division of the Serrano living in the Mojave Desert, north of Serrano territory. They were referred to as the "Serrano of the Mohave River" (Kroeber 1925:614). The name Vanyume is a Mohave word; the name Beñeme was given to the entire Serrano cultural group by Father Garcés. The Vanyume spoke a Takic language related to the Kitanemuk to the west and the Serrano to the South. Kroeber reported that the Vanyume were occasionally friendly with the Mohave and Chemehuevi, but hostile to the Serrano (Kroeber 1925:614). Kroeber also stated that the population of the Vanyume was very small at the time of historic contact. The "chief" of the Vanyume reportedly lived in one of the villages at the upper reaches of the Mojave River near Victorville. The Vanyume were hunters and gatherers, and shell beads and millingstones were known to have been used. The Vanyume are generally associated with similar life ways as the Serrano to the south (Yohe II and Sutton 1991).

Chemehuevi

The Chemehuevi were a band of the Southern Paiute that possibly entered the eastern Mojave Desert area from the north in fairly recent prehistoric times. The Chemehuevi, also called the Pah-Utes, were closely related to the Southern Paiute in Death Valley and the Southern Nevada region. At the time of ethnographic contact, the Chemehuevi claimed a large portion of the eastern and central Mojave Desert, perhaps as far west as Afton Canyon on the Mojave River (Kelly and Fowler 1986:368). Although the Chemehuevi territory boundaries are unclear, it is certain that they inhabited the Providence Mountains. Based on archaeological data, the Chemehuevi entered the Mojave Desert sometime in the 17th century (Yohe II and Sutton 1991).

The Chemehuevi were strongly influenced by the Mohave. It is possible that they displaced the Desert Mohave, a Yuman speaking group (Kelly and Fowler 1986:368). Many Chemehuevi words are related to Mohave vocabulary, along with agricultural practices, house construction, warfare, and other cultural elements such as religious practices. Like the Mohave, the Chemehuevi used square metates, paddle and anvil pottery techniques and hair dye (Kelly and Fowler 1986:369). In addition to their close association with the Mohave, the Chemehuevi traded widely with the Shoshone, Kawaiisu, Serrano, Vanyume, Cahuilla, and Diegueno (Kelly and Fowler 1986:369).

Influence from the Pueblo area to the east is seen in the form of agricultural practices of many of the Southern Paiute groups. The Chemehuevi, in more well watered areas and flood plains, grew yellow maize, gourds, beans, and winter wheat, combining Mohave and Pueblo practices (Kelly and Fowler 1986:371). Kroeber reported that the Chemehuevi occasionally farmed small areas of corn, beans, melon and pumpkins and wheat. In more arid areas the Chemehuevi were hunter-gatherers. They hunted large game, such as deer and mountain sheep, along with rabbits, rodents, lizards and other small game (Kroeber 1925:597). Plant foods were of great importance and included a variety of grass seeds, pinyon, and mescal (yucca).

The Chemehuevi had a large range associated with seasonal food practices and traveled through most of the Mojave Desert as far as the Tehachapi area and the San Bernardino Mountains. Occasionally they traveled to the Pacific coast to collect haliotis shells (Kelly and Fowler 1986:377). It was also reported that they would travel as far east as the Hopi's territory, about a two month round trip (Kelly and Fowler 1986:377).

Little is known about the Chemehuevi material culture. However, in historic times they used basketry, primarily willow, to a great extent both for storage and for carrying possessions (Kroeber 1925:97). They also made basketry hats. The Chemehuevi used some pottery but relied more on basketry.

Spanish colonization had little effect on the Chemehuevi until the early 1800s. Although other Southern Paiute groups were enculturated earlier by the Spanish, the Chemehuevi's isolated territory protected from being assimilated into the mission system. With the opening of the Old Spanish Trail, the Chemehuevi became more affected by the Spanish, and were brought to the missions to work (Kelly and Fowler 1986:386).

In 1874, the United States government established the Colorado River Reservation in an effort to move the remaining Chemehuevi onto the reservation. However, the reservation was shared with the Mohave band, with whom the Chemehuevi had differences from 1865 to 1871, the Chemehuevi were at war with the Mohave. They were therefore, reluctant to move to the reservation (Kelly and Fowler 1986:388). Some of them were forced to move to the reservation, while some of them would not move. Many stayed in their historic locations, finding work on farms and ranches and in mines. In 1901, the Chemehuevi received their own reservation in the Chemehuevi Valley.

Other Native American Groups Associated With the Region

In addition to those groups affiliated with the Project area, many other groups occupied and utilized the Mojave Desert in a variety of ways. For example, it appears that the Anasazi of southern Nevada greatly influenced the cultures within the region. By 1450 B.P., the Anasazi were exploiting turquoise deposits at Halloran Springs, approximately 25 miles northeast of the Calico Solar APE. The Anasazi Pueblo was 150 miles across the desert; therefore Anasazi miners must have spent a considerable amount of time in the area based on the amount of turquoise mined and the abundance of "Basketmaker III" pottery found near the springs (Fagan 2003: 310). Turquoise was mined up to twelve feet below the ground and for centuries Mojave turquoise was traded to the east of its source, throughout the Southwest; however, it does not appear that turquoise was traded to the west as evidence of it does not appear in the material cultural of California tribes.

About 1450 B.P., the use of bow and arrow technology spread throughout California's eastern deserts, eventually becoming the dominant hunting technology throughout California. The bow and arrow has many advantages over spears and atlatls and made hunting much more efficient. Bow and arrow technology could have been introduced to California by the Anasazi or by another Great Basin group during this time. In addition, by 1200 B.P., buff, gray, and brownware pottery, made by Ancestral Pueblo groups and other surrounding tribes of the Lower Colorado River region, entered the Mojave Desert. The trade of technology along with items such as sea shells and steatite objects probably took place along the Mojave Trail (Fagan 2003:311).

Other tribes in the region include the Mohave. The Mohave lived long both the east and west banks of the Colorado River. During the winter, they inhabited semi-subterranean houses and depended upon maize agriculture for subsistence (Kroeber 1902; 1925). Throughout the rest of the year they were a hunting and gathering group, often traveling west far into the Mojave Desert. The Mohave traveled throughout southern California and northern Arizona utilizing a large network of trails (King and Casebier 1976:281). Two major geographical features influenced the Mohave's trade routes: the location of their villages along the Colorado River, and the waterless portions of the desert, also known as the Mojave Sink or Mojave Trough. Two major trade routes were used which started at villages along the Colorado River. The first route was the Pah-Ute Creek to Soda Springs route, which later became known as the Mojave Road wagon train. The other route ran south of the Mojave Road route through Poshay Pass and the Mojave River flood plain to the southeast corner of Soda Lake. The more northern route, the Mojave Road, was more heavily used, both prehistorically and in more recent historic times by Native Americans and European and American settlers alike (King and Casebier 1976:282).

Although the Mohave lived southeast of the Project area, they had a great amount of influence over the Mojave Desert region. They were skilled traders and traveled long distances to either fight or trade with other groups (Fagan 2003:297). Their movement across the southwest promoted the spread of new technologies, beliefs and ideas throughout the desert and southwestern regions.

Three other groups occupied the San Gabriel Mountains to the west and the southern Antelope Valley during this time: the Kitanemuk, the Gabrielino, and the Tataviam (Bean and Smith 1978a: 538; Bean and Smith 1978b; Blackburn and Bean 1978: 564; King and Blackburn 1978: 535; Kroeber 1925: 611). Earle (2002) argues that the southern half of Antelope Valley may have been an area of shared use among several groups including Serrano, Tataviam, Kitanemuk and the Beñmè or Vanyume. The Kitanemuk occupied the upper Tejon and Paso Creeks, the streams on the rear side of the Tehachapi Mountains, and the northern Antelope Valley and part of the westernmost end of the Mojave Desert (Blackburn and Bean 1978:564).

The Gabrielino are named after San Gabriel Mission which was established in their territory and inhabited the area of modern day Los Angeles and Orange counties to the west of the transmission line. Tataviam territory was south of the Kitanemuk and north of the Gabrielino in modern day Los Angeles and Kern counties. Their territory included the upper reaches of the Santa Clara River King and Blackburn 1978:535).

Regional Historic Context

Spanish Period (1540 to 1821)

The Spanish had explored much of the California coast and San Francisco and Monterrey bays by 1769, but paid little attention to the California interior. Several factors were detrimental to European exploration in the Project area: travel and communication were slow; there were few roads, trails and maps; and no supply stations existed in California's interior deserts (King and Casebier 1976).

Between 1775 and 1776, Father Francisco Garcés, a Franciscan missionary originally stationed near present-day Tucson, Arizona, explored the Mojave Desert as part of Spain's effort to forge an overland route to its settlements in Alta California. Garcés traveled with the 1775 Anza expedition until it crossed the Colorado River near present-day Yuma, Arizona (King and Casebier 1976:283). Garcés left the expedition at the Colorado River crossing and traveled north to the Mohave Villages near present-day Needles, California, while Anza continued west. Garcés, in the company of Mohave guides, proceeded west to Mission San Gabriel in Los Angeles along the Mohave Trail, in the approximate location of the Mojave Road wagon route. The corridors of the Mojave Trail and the later Mojave Road are approximately 15 miles north of the Burlington Northern Santa Fe Railroad, north of the Cady Mountains near Interstate Highway 15 (I-15) (Figure 2.8-1). On his return trip he visited several Mohave villages on the banks of the Colorado River. The journal Garcés kept during this expedition is the earliest written record of the eastern Mojave Desert (King and Casebier 1976; Robinson 2005). Spanish contact with the Mohave and Colorado Desert peoples likely came from both the east and west during this time (Vane and Bean 1994:1-8), as evidenced by the Anza/ Garcés expeditions, as well as known contacts made on the California coast.

The closest Spanish mission, Mission San Gabriel in Los Angeles, was too far away to have an every day effect on the Native Americans in the Mojave Desert. Native Americans who fled the missions often escaped into the Mojave Desert and exposed the Mohave tribe to Spanish influences, including the use of horses, which led to raids on the missions and horse thievery. In 1819, Lieutenant Gabriel Moraga led an expedition of fifty soldiers into the Mojave Desert in an attempt to retrieve stolen horses, to exact revenge against the Mohave for their raids on the coastal Spanish settlements, and to counter their ability to spread unrest against the Spanish and other Native American groups (King and Casebier 1976:284). Moraga's expedition was only the second Spanish-sponsored trip into the Mojave Desert. Lack of water in the arid Mojave Desert forced Moraga and his soldiers to turn back.

During the Spanish period, no permanent European settlements were established in the project vicinity, although there were reports that the Spanish had active mines in the Barstow area. It is unknown if the mines were being worked by the Spanish, Native Americans, or later Mexican or American prospectors because only mine shafts remained and no written records have been discovered (King and Casebier 1976:300).

Mexican Period (1821 to 1848)

In 1810, an independence movement began as many rancheros sought to split Mexico (and California) from Spain. In 1821, this desire came to fruition when New Spain (Mexico) became independent. Following Mexico's independence, the Alta and Baja California missions received less financial support from Spain and Mexico, and ultimately, independence from Spain was a catalyst for Mexico to secularize all California missions. Secularization would free vast amounts of land that had been under mission control and the land would become civilian pueblos or large land grants awarded to Mexican, American, or European settlers. In 1831, Governor Jose Maria Echeandia announced the secularization of a number of missions, and by 1834, all the missions were secularized, including Mission San Gabriel in Los Angeles, the nearest mission to the Project. Within ten years, the mission system had failed, the neophytes had left, and the buildings were in disrepair. Following secularization, San Gabriel mission became a parish for the City of San Gabriel and had little further effect on the Native Americans in the Project vicinity (Rolle 2003).

During Mexican control of Alta California, Americans started to enter California through the Mojave Desert, many of them using the Mojave Trail located north of the Project Area (Confidential Appendix A, Figure 2.8-1). Jedediah Smith, mountain man and fur trapper, was the first American to reach California using an overland route. Smith followed a route from the Great Salt Lake in Utah south to the Virgin and Colorado rivers and across the Mojave Desert to Spanish southern California. Smith arrived at the Mohave Villages in October 1826, then proceeded west on the Mojave Trail. After Smith's initial visit other American mountain men and trappers ventured into the desert, including William Wolfskill, George C. Yount, Christopher "Kit" Carson, James Ohio Pattie, and Ewing Young (Brooks et al. 1981; King and Casebier 1976:285; Robinson 2005).

Jedediah Smith's ventures down the Virgin and Colorado rivers, combined with Garcés' route across the Mojave Desert, linked the Spanish settlements in New Mexico and California, stimulating trade between these regions (Wright 1982). In 1829, New Mexico merchant Antonio Armijo reached the Las Vegas Valley via the Virgin River, pioneering a route that became known as the Old Spanish Trail. Armijo's route followed the Mojave Trail in the project vicinity, but later routes of the Old Spanish Trail turned southwest out of Utah and headed toward the Mojave River through the San Bernardino Mountains. This route became known as the Northern Route of the Old Spanish Trail (Confidential Appendix A, Figure 2.8-1). The Mohave Indians had become increasingly hostile to travelers through their territories, and blazers of the northern route most likely took this path to avoid conflicts. The junction of the Northern Route of the Old Spanish Trail and the Mojave Trail was approximately 18 miles east of present-day Barstow, at a location historically called Fork of the Roads, northwest of the project area (Confidential Appendix A, Figure 2.8-1). Trade along the trail ended in 1848 with the Mexican-American War (Nystrom 2003; Robinson 2005; Rogge 2008).

American Period

Transportation

Mojave Road

The term "Manifest Destiny" was one of the likely causes for the Mexican-American War, which took place between 1846 and 1848. Jacksonian Democrats coined the phrase in the 1840s as a political philosophy whereby the United States would control all of the land between the Atlantic and Pacific oceans. The focus for expansion was on the northwest coast in Oregon territory and on the Texas territory. In 1845, during the Presidency of James K. Polk, the United States annexed Texas; the following year, the U.S. invaded Mexico. In 1848, the United States, victorious over the Mexican Army, signed the Treaty of Guadalupe Hidalgo, and acquired all Mexican territory north and west of the Rio Grande and Gila Rivers, which included Texas, New Mexico territory, and Alta California. American settlers began to migrate to the newly acquired territory, and the discovery of gold in 1848 and the ensuing Gold Rush in 1849 brought numerous settlers to California. Most of these travelers likely used the northern route of the Old Spanish Trail to enter California from New Mexico, Utah, and Nevada, although some likely followed the Mojave Trail as well (Robinson 2005).

Soon after California was granted statehood in 1850, the government wanted to recognize all of the trails running through California to promote immigration to the state, facilitate trade and communication, and develop routes of defense. A year after the Treaty of Guadalupe Hidalgo was signed, Lieutenant James H. Simpson of the Army Corps Topographical Engineers attempted to follow Father Garcés direct route across the Mojave Desert (Mohave Trail), and in 1851, the U.S. Army Corps of Engineers sent another expedition to explore the area. During the 1840s and 1850s, the Union Pacific Railroad also contemplated using Gracés' route in an attempt to find the most practical course for a railroad line across the desert. Several explorers, hired by railroad companies, traveled throughout the Mojave Desert during the 1840s and 1850s. Eventually, a more northern route was selected for the transcontinental railroad line. In the late 1850s the General Land Office in California began the process of mapping the Mojave Desert area, and at that time several groups of surveyors mapped the desert (King and Casebier 1976:288-289).

Beale's Wagon Road was built in 1857 north of the Project APE, along the 35th Parallel, and was in use between 1857 and 1861. Edward Fitzgerald Beale was a famous American Frontiersmen and was superintendent of the wagon road development. Beale, along with his party and 25 camels, crossed the Colorado River into California 15 miles north of present-day Needles, California, and followed the Mojave Trail west. In 1859, the U.S. Army established Fort Mojave near the location of Beale's river crossing in an effort to protect travelers from Mohave Indian attacks. As a result, the Mojave Trail developed into a wagon road, which allowed supplies to be brought to Fort Mojave overland from Los Angeles. The wagon road was called the Mojave Road or the Government Road and was actively used until the beginning of the Civil War in 1861 (Figure 2.8-1).

During the Civil War, troops stationed at Fort Mojave were ordered to abandon the fort and report for duty in Los Angeles. The fort remained abandoned until the middle of 1863, when California Volunteers occupied it to protect travelers on the Mojave Road. Traffic had increased along the road as a result of gold discoveries about 100 miles south of Fort Mohave in the La Paz Mining District. Other travelers along the Mojave Road in the 1860s were members of the military on their way to Arizona to fight in the Apache Wars or merchants and ranchers hauling supplies and livestock to Prescott, the capital of the Arizona Territory. The Mojave Road also was used as a mail route between 1866 and 1868 (King and Casebier 1976; Nystrom 2003; Robinson 2005).

Although there was considerable traffic through the Mojave Desert into Southern California, most followed the Old Spanish Trail to the west of the Project APE or the Mojave Road to the north, and any settlements associated with these routes would have been located adjacent to the trails. Except for miners, most other settlers did not stay in the desert until a railroad was constructed. Only a few early homestead claims were filed. These early homesteads consisted mainly of ranches raising sheep and cattle. The arid environment prohibited large scale agriculture except on the banks of the Mojave or Colorado Rivers (Walthall and Keeling 1986).

Atlantic & Pacific Railroad

Plans for a transcontinental railroad had been delayed due to the Civil War, but once the war ended, interest in the construction of transcontinental railroads resumed. In 1866, Congress contracted the Atlanta & Pacific Railroad (A&P) to construct a railway from the east to the California border. In 1879, the A&P partnered with the St. Louis & San Francisco Railroad and the Atchison, Topeka, & Santa Fe Railroad to facilitate construction of the transcontinental railroad. The A&P began construction of their track in Albuquerque, New Mexico in 1880 and reached Needles, California in May 1883. The A&P constructed a bridge over the Colorado River at Needles in August 1883 (Gustafson and Serpico 1992; Myrick 1992; Robinson 2005).

As the A&P tracks were being laid, the Southern Pacific Railroad was constructing a new railroad line between Mojave and Needles to intercept the A&P tracks at the Arizona border and protect its California interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their Mojave station (Figure 2.8-1) (Gustafson and Serpico 1992; Myrick 1992). When surveyors initially explored the project vicinity for a viable railroad route, they assessed the Mojave Road corridor, and found that the terrain was too steep and unsuitable for railroad construction. In the arid Mojave, the trail through the mountain range was preferred to the flatter terrain because more sources of water could be found in the mountainous areas. In 1868, General William J. Palmer of the Union Pacific Railroad eastern division surveyed a railroad route to the south of the Cady Mountains, where the terrain was more favorable for railroad construction. Although the Union Pacific never constructed the railroad through the Mojave Desert, it was largely Palmer’s route that the Southern Pacific used to construct the Mojave to Needles branch (Nystrom 2003; Robinson 2005).

For more than a year, the A&P and the Southern Pacific lines continued to operate independently. The Southern Pacific Railroad instituted tri-weekly service to Needles in 1883, but the trip through the Mojave Desert was long and desolate. The railroad had constructed only one station and turntable in the 124-mile stretch between Mojave and Ludlow. The Southern Pacific Railroad was reluctant to join rails with the A&P fearing that the completed line would compete with their newly constructed Sunset Route, which crossed into California further south on the Arizona border at Yuma. Passengers heading east on the Southern Pacific Railroad’s line to Needles were inconveniently required to disembark from the train with their belongings and transfer to the A&P cars. Although each of the railroads developed local business, the volume of passenger travel was not large enough to support operations. The Southern Pacific Railroad’s route through the Mojave Desert did facilitate mining operations in the area. Anticipating large future revenues from hauling bulk ore, the railroad provided water for miners at 2 cents per gallon anywhere on the route, putting an end to the water scarcity problem for mine development in the area (Myrick 1992).

By the end of 1883, the A&P began making plans to construct their own line parallel to the Southern Pacific’s line across the Mojave Desert to San Francisco. The Southern Pacific Railroad realized that if the A&P constructed a parallel line across the desolate Mojave Desert, its line would essentially become useless. In October 1884, an agreement was signed in which the Southern Pacific Railroad would sell its Needles to Mojave section to the A&P for $30,000 per mile. Until the debt was paid, the A&P would lease the line. In addition, the A&P also received an option for trackage rights between Mojave and San Francisco. The A&P received full title to the Mojave to Needles branch in 1911 (Gustafson and Serpico 1992; Myrick 1992). The construction of the railroad changed the course of travel across the Mojave Desert in the project vicinity. The railroad provided travelers with water sources across the vast desert and travel was much easier along the flat railroad corridor than along the mountainous Mojave Road to the north. A wagon road was constructed adjacent to the railroad alignment and use of the Mojave Road decreased.

The California Southern Railroad joined with the A&P in 1885 to provide service from Kansas City to San Diego. The junction of the two lines was initially called Waterman Junction, but in 1886, it was renamed Barstow. Barstow is located approximately 40 miles west of the Project APE and is the closest city. The construction of the railroad brought numerous settlers to the area and although other railroad lines were eventually constructed throughout southern California, the route passing through Barstow remained a popular line for both freight and passenger service. In addition, the railroad acted as a lifeline connecting Barstow, alone in the desert, to the rest of Southern California. Barstow was a sizable railroad hub, and the railroad was the main employer in the city for many years.

In 1897, the A&P was redesignated as the Santa Fe Pacific Railroad and later became the Atchison, Topeka, & Santa Fe Railroad. When the A&P took over the Mojave to Needles branch in 1884, there were depots at Daggett, Fenner, and Needles. During the 1880s, 1890s, and the first decade of the twentieth century, Santa Fe Pacific constructed facilities at various locations along the line. All of the structures were wood frame, with the exception of brick and reinforced concrete structures in Needles. Santa Fe Pacific railroad sidings in the project vicinity include Troy, Hector, Pisgah, and Lavic (Figure 2.8-1). The Hector siding is the closest to the Project APE. Neither the Pisgah or Troy sidings had any depot facilities. Hector had a 12-by-14-foot wood frame telegraph and train-order office that was constructed in 1906, which was closed in 1923 and moved to Earp in 1934. The Lavic siding was the largest of the four with a 24-by-34-foot frame combination passenger and freight depot that was constructed in 1901. The depot was closed in 1923 and removed (Gustafson and Serpico 1992; Myrick 1992).

The lack of water along the Mojave to Needles branch required the railroad to haul water in large tanks to the stations and construction camps. In 1897, a station was constructed at Newberry Springs, approximately 6 miles west of Troy, and this station became the railroad’s primary source of water in the region. Although freight trains typically carried surplus water cars, engineers often had to go back to Newberry Springs for additional water supply (Gustafson and Serpico 1992; Myrick 1992).

The A&P Railroad/Santa Fe Pacific Railroad/Atchison, Topeka & Santa Fe Railroad (AT&SF) is located between the Calico Solar Phase I and Phase II APEs and within the Pisgah triangle area. The railroad is now operated as the Burlington Northern Santa Fe Railway.

National Old Trails Highway and U.S. Route 66

Prior to the construction of the railroad between Needles and Barstow in 1883, travel across the Mojave Desert in the project vicinity was limited to the Mojave Road corridor, which evolved from a network of prehistoric trails, early trails developed by mountain men, early explorers, and gold seekers; and routes developed during the railroad surveys of the 1850s (Figure 2.8-1). After the railroad was completed, the travel corridor shifted south of the Cady Mountains, new roads were constructed between local mines and railroad sidings, and a wagon road was constructed adjacent to the railroad tracks from Barstow to the Arizona border (Hatheway 2001). In the first decade of the 1900s, this wagon road would be converted to an auto route, as the use and ownership of the automobile became more prevalent.

The automobile first made its appearance to the American public in the late 1890s, and by 1900 automobiles were still the toys of the wealthy, with only one for every one thousand Americans. Although Henry Ford introduced his Model T in 1907, widespread use of the automobile did not occur until after World War I. In 1914, Ford perfected full assembly line production and two years later more than half a million automobiles were sold. As the use of the automobile rose, the demand for good roads increased. Most rural roads in the 1900s had been constructed for wagon traffic and were not suited to automobile traffic (Fischer and Carroll 1988; Keane and Bruder 2004; Lyman 1999; Paxson 1946).

By 1910, national and local organizations promoted good roads in the United States, including the National Old Trails Highway (Figure 2.8-1). A precursor to U.S. Route 66, the National Old Trails Highway was part of the 2,448-mile ocean-to-ocean highway from Baltimore, Maryland to the California coast. The National Old Trails Highway also was part of the National Auto Trail System, an informal network of automobile routes marked by local organizations in the early 20th century. The National Old Trails Highway, where it traverses the Project APE, was located along and in the vicinity of the alignment of the old wagon road that was constructed adjacent to the Santa Fe Railroad tracks in the 1880s. The highway was designated by booster organizations in 1912, and by 1914 the Auto Club of Southern California had provided signage for much of the highway (Keane and Bruder 2004; Robinson 2005; Wikipedia contributors 2008).

In 1916, the Federal Highway Aid Act was passed to help fund rural roads, using a 50/50 funding match for states with a highway department. Route planning, however, remained a local matter, which usually did not include engineering surveys. In 1919, Congress liberalized the funding match requirements, and by late 1921, Congress passed the Federal Highway Act that further reduced the state match to about 26 percent (Lyman 1999) and required federal aid to be concentrated upon “such projects as will expedite the completion of an adequate and connected system of highways, interstate in character” (Paxson 1946:245). Up to seven percent of a state’s roads could be listed for reconstruction to create the national highway system. By 1923 a tentative plan had been developed linking every city with a population of 50,000 or more, with construction planned over a ten-year period (Paxson 1946).

During the early 1920s, automobile travel was an adventure for many Americans and was subsequently heavily promoted. By the late 1920s, much of the National Old Trails Highway in the project vicinity had been widened and oiled or surfaced with gravelly sand. The segment of the highway across the Mojave Desert was notorious for its poor condition, and by 1925 the highway was full of ruts and chuck holes. The highway was narrow with no road shoulders or striping, tended to follow the natural topography of the area, and was vulnerable to the effects of erosion. The State of California had designated the highway as a public highway in 1919, but did not take any responsibility for the segment between Barstow and Needles until 1923, leaving the burden of maintenance to San Bernardino County. Despite the poor conditions, motorists were never more than four miles from the railroad, where they could find help in the form of stations and section crews, and water was available every 5 to 10 miles (Bischoff 2005; Hatheway 2001; Scott and Kelly 1988).

In 1926, the American Association of State Highway and Transportation Officials designated the National Old Trails Highway in the Mojave Desert as U.S. Route 66. U.S. Route 66 was one of the main arteries of the National Highway System and was one of the first great highways in the United States, running from Chicago to the Pacific Ocean. Federal funding allowed for improvements, such as the construction of road shoulders. In the 1930s, the original alignment of the National Old Trails Highway in the Project Area was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66 (Bischoff 2005; Scott and Kelly 1988; Wikipedia contributors 2008).

The new U.S. Route 66 alignment eliminated sharp turns, reduced steep grades, and straightened the roadway to accommodate higher speeds. The use of heavy machinery allowed for large road cuts that had not been possible in the early days of road building. The section of U.S. Route 66 from Needles to Los Angeles was the most heavily traveled section of the highway, and in 1934 this segment was paved. Much of the paving of U.S. Route 66 was completed by the Works Progress Administration during the Great Depression of the 1930s. By 1938 all of U.S. Route 66 was paved (Bischoff 2005; Scott and Kelly 1988).

U.S. Route 66 was an important transportation route during the Great Depression. In his book, *The Grapes of Wrath*, John Steinbeck wrote about migration of Midwestern farmers to the Pacific coast along this roadway. World War II caused further migration to the west coast along U.S. Route 66 as millions of Americans went to work in war related jobs in California. U.S. Route 66 became so famous that it was memorialized in Bobby Troup's popular song "Get Your Kicks on U.S. Route 66" (Scott and Kelly 1988) and was featured in many Hollywood movies.

As a consequence of its heavy use, thousands of businesses opened along U.S. Route 66, mostly serving cross-country travelers. Businesses varied from grocery stores, service stations, restaurants, and motels to dance halls and tourist attractions. One of these tourist attractions in the project vicinity may have been the Pisgah Crater, a young volcanic cinder cone located south of the Project APE (Figure 2.8-1). A road was constructed from U.S. Route 66 to the Pisgah Crater between the late 1930s and early 1950s from U.S. Route 66 either to provide access for travelers along the highway or for local aggregate miners (Scott and Kelly 1988).

Barstow was the last stop from Los Angeles before crossing the desert or the first stop after the desert, and was a popular rest area along the highway even during the Depression. During that time, business from U.S. Route 66 was an important part of the economies of many towns and small cities. By World War II, many businesses along U.S. Route 66 competed for travelers' money. Native American crafts sales became an important industry along the route. During the war, military use of the road increased in conjunction with development of military training bases in the Mojave Desert (Scott and Kelly 1988).

The Golden Age of U.S. Route 66 was the era after World War II and before the opening of other major east-west interstate highways, such as I-40. The increased traffic along U.S. Route 66 also led to its demise. Although the highway was an important east-west thoroughfare, it could no longer handle the volume of traffic and heavy military equipment using the road. After World War II, a new national interstate highway system was planned, which eventually replaced much of U.S. Route 66 (Scott and Kelly 1988).

There are no historic buildings associated with U.S. Route 66 along the segment of the road that is within 0.5 miles of the Project APE. There are historical buildings associated with U.S. Route 66 in the town of Ludlow, located about 12 miles east of Pisgah and about 11 miles east of the Project, and in Newberry Springs, about 15 miles west of the I-40 Hector exit and about 13 miles west of the Project.

Interstate Highways

Throughout the 1950s and 1960s, U.S. Route 66 remained the main road between the Midwest and the West Coast. Increased traffic and the narrowness of the roadway eventually led to the downfall of the road. On August 2, 1956, President Dwight D. Eisenhower signed the Federal Aid Highway Act which provided funding to upgrade America's roads. Eisenhower based his vision of a more connected America on Germany's Reichautobahen rural super highways. Eisenhower and his advisors originally envisioned creating a 40,000 mile interstate system costing approximately twenty-seven billion dollars. Construction began almost immediately throughout the United States (Weingroff 2008).

On December 13, 1958, I-15 opened between Victorville and Barstow. This marked the beginning of the modern highway era in the Barstow area. The entire length of I-15 from Los Angeles to Las Vegas was opened by July 1961. At that time, the stretch between Baker and Las Vegas was used by more than 500 vehicles an hour in one direction (Swisher 1997).

I-40 begins at its junction with I-15 in Barstow, then runs through the Mojave Desert to Needles and into Arizona. I-40 is located along the southern edge of the Project APE. Although the I-40 is now a cross-country highway, its last sections were not built until 1980. In the southwest, much of present day I-40 absorbed U.S. Route 66. Many of the western portions of I-40 also follow the Beale Wagon Road. The segment of I-40 in the project vicinity was not constructed until 1968.

Mining in the Mojave Desert

Since the 1860s, mining has been the most important commercial industry near the Project APE. Silver was discovered in 1863, although it is possible the Spanish had mined in the area almost a century before. Prospectors attempted to establish mines in the area to sell to investors with sufficient capital. In the following decade, smaller operators attempted to compete with larger corporations, but without railroad transportation, very little money was made until the early 1880s with the coming of railroad through the eastern Mojave Desert (Brooks and others 1980; King and Casebier 1976:300-305).

The period between 1900 and 1919 was known as the "the Great Years" for mining in northeastern San Bernardino County (King and Casebier 1976:305) as it was more profitable than any other time. Copper, lead, zinc, and other base metals, as well as gold and silver, were mined throughout the Mojave Desert and San Bernardino County. Also, during World War I, chromium, manganese, tungsten, and vanadium were mined. Several large mining districts were developed, including Copper World, near Valley Wells; gold mines at Hart; lead, zinc, and copper in the Mohawk mines near Mountain Pass; copper mines near Von Trigger Spring; and gold mines at the north end of Old Dad Mountain (King and Casebier 1976).

During the Great Depression, a resurgence of gold mining took place, but World War II caused a return to the mining of base metals. The Vulcan Iron mine, in the Providence Mountains northeast of the Project, was excavated during that time. Since the end of World War II, mining in the area has considerably slowed. More recently, other nonmetals such as clay, talc and cinder mining have gained popularity, especially around the Kingston Mountains in the vicinity of I-15. Aggregate mining for sand and gravel has become prevalent in the area (King and Casebier 1976).

Manganese Mining in the Project Vicinity

Manganese metal is essential for manufacturing iron and steel, and was first mined in earnest in the United States during World War I. Because of the absence of high-grade ores, more than 95 percent of the manganese used in the United States was imported from the Union of Soviet Socialist Republics, the Gold Coast of Africa, Cuba, Brazil, and India. The onset of World War I threatened the foreign supply of manganese, stimulating development of domestic manganese mining. During World War I, low-grade deposits were mined in Montana and California, and in 1918, the United States produced 16.8 percent of the world supply of manganese, 35 percent of which was used domestically (Jones 1994; Time Magazine 1940a).

After World War I, domestic manganese mining decreased substantially because of the high costs compared to foreign production. Between 1930 and 1940, about 37 percent of the manganese imported into the United States came from the Union of Soviet Socialist Republics. When World War II began in Europe in 1939, domestic manganese mining once again increased. Imports from Russia were curtailed when Italy entered the war in June 1940 and prevented Russian ore shipments from traveling through the Mediterranean Sea, and later war blockades further thwarted manganese imports (Jones 1994; Time Magazine 1940a; Tucker and Sampson 1943; Williams 1940).

Beginning in 1940, the federal government took steps to build stockpiles of strategic metals, including manganese. In June 1940, the Metals Reserve Company, a branch of the Reconstruction Finance Corporation, was established to stockpile critical metals and subsidize domestic producers. The Metals Reserve Company awarded a contract to the Anaconda Copper Company for 240,000 tons of manganese from the company's Emma Mine in Butte, Montana. The Emma Mine produced much of the domestic manganese during World War II, but the Metals Reserve Company stimulated additional domestic production by offering $48 per ton for high grade ore (48 percent or more manganese), $35.20 per ton for low grade A ore (44 percent manganese), and $26.00 per ton for low grade B ore (40 percent manganese). Ores containing 35 to 39 percent manganese also were purchased at a reduced price (Jones 1994; Life Magazine 1942; Time Magazine 1940a, 1940b; Williams 1940).

During World War II, California was the second largest producer of domestic manganese, behind Montana. By the end of 1946, more than 168,000 tons had been produced from 800 known deposits in 675 locations in 44 counties. More than 80 percent of this production occurred during World War I and World War II (70,000 tons between 1915 and 1919 and 79,000 tons between 1941 and 1945). Between 1930 and 1940, production was limited to a few hundred tons because of the small size and low grade of California's deposits. Manganese mining was profitable during times of war because prices were subsidized to cover the costs of concentrating the ore and buyers were willing to accept ores with high silica content (Trask 1950). A new flotation process developed in Cuba after World War II enhanced recovery of manganese from lower grade ores.

Between 1867, when manganese was first mined in California, and 1946, six California counties each produced more than 10,000 tons of manganese ore. San Bernardino County was sixth on the list, with 12,989 tons of low-grade ore, much of which was produced during World War II. The county with the highest production numbers was Stanislaus County with 40,647 tons, followed by San Joaquin County with 34,917 tons, Trinity County with 16,634 tons, Riverside County with 14,906 tons, and Mendocino County with 13,087 tons (Trask 1950).

Manganese deposits have been documented in San Bernardino County in the following areas:

1. South end of the Owlshead Mountains (about 60 miles north of the Project APE)
2. Avawatz and Silver Lake region about 25 miles south of the Owlshead Mountains (about 30 miles north of the Project APE)
3. South slope of the Cady Mountains between Newberry and Ludlow (includes the Project APE)
4. Newberry Mountain south of Newberry (about 15 miles east of Project APE)
5. Whipple Mountains north of Parker (about 120 to 130 miles southeast of the Project APE)
6. Needles area (about 95 miles east of the Project APE) (Tucker and Sampson 1943; Wright et al. 1953).

Reports of the California Division of Mines and Geology in 1943 and 1953 provided specific information about eleven manganese mines in San Bernardino County (Table 2.9-1). (There likely were other manganese deposits worked at some point within the county that either were not substantial enough to be mentioned or were unknown to the Division of Mines and Geology.) At least four of these mines were in operation toward the end of World War I; the rest of the mines began operation during World War II, with the exception of the Logan Mine, which was located in 1930. Manganese mines in San Bernardino County typically were small operations owned by individuals residing in nearby communities. During World War II, many of the property owners leased their mines to corporations or other individuals. Only five of the documented manganese mines in San Bernardino County were part of larger mining districts. Four of these are in the Monumental District in the Whipple Mountains in the vicinity of Parker, Arizona and the fifth is in the Ibex District northwest of Needles (Tucker and Sampson 1943; Wright et al. 1953).

During World War II, manganese producers in San Bernardino County shipped their ore to Metals Reserve Company stockpile points in Parker and Phoenix, Arizona and to Sacramento. Lower grade ores with 15 to 35 percent manganese were shipped to the Kaiser Steel Corporation in Fontana, California. After the war, the U.S. government continued to stockpile manganese, but domestic production decreased. Several manganese deposits continued to be sporadically worked in San Bernardino County after World War II. California as a whole produced less high grade ore (greater that 35 percent manganese) after World War II. In 1949 and 1950, the state produced less than 500 tons and none in 1951. Between 1952 and 1958, 70,000 tons were shipped from California mines, but no additional manganese shipments were recorded between 1959 and 1990 (Jones 1994; Tucker and Sampson 1943; Wright et al. 1953).

The quality of the California manganese deposits, including those in San Bernardino County, required hand sorting to identify the higher grade ores. Hand sorting was labor intensive and operation of the mines was cost effective only at times when manganese was in great demand and prices were high. As a result, the manganese mines were only intermittently worked by small crews, and often stood idle for extended periods of time. California Division of Mines and Geology reports indicate that the smaller mines typically employed 2 men, and the larger mines employed as many as 6 to 10 men. Because of the remote locations of the mines, employees likely camped or constructed simple residential structures on site. The extraction and hand sorting of the manganese ore required little capital, and most mines were operated by individual miners who opportunistically operated their own claims or leased claims during the war periods. During World War II some mines in San Bernardino County were leased by corporations, but due to the small size of the mines and the low grade of the ore, relatively few miners were employed (Trask 1950; Wright and others 1953).

Most of the manganese deposits were shallow and often were worked to depths of 10 of feet or less. The deepest mines were the New Deal Mine (90 feet) and the Stewart Mine (50 feet). Documentation indicates that equipment at most of the mines was limited to shovels, compressors, ore carts, and structures used for sorting such as chutes and conveyor belts. Dynamite may have been used to extract ore. According to reports of the California Division of Mines and Geology, only the New Deal Mine (also known as the Owl's Hole Mine, Old Hole Mine, and Owl's Head Mine), which was the most productive mine in San Bernardino County, had its own mill. (Field investigations conducted during this study indicate that miners also operated a small mill at the Logan Mine). Although some ore from nearby mines might have been hauled to the mill at the New Deal Mine for processing, the mill was in a remote location and most of manganese ore extracted from the San Bernardino County manganese mines probably was shipped without any processing other than sorting (Jenkins 1943; Wright et al. 1953).

Southern California Edison (SCE) and the Hoover Dam

Two parallel SCE steel-tower 220kV transmission lines are located the Pisgah Substation Triangle area and the historic built environment 0.5-mile buffer of the Project APE (Figure 2.8-1). The SCE 220kV North Transmission Line was constructed between 1936 and 1939 and the SCE South 220-Kilvolt South Transmission Line between 1939 and 1941. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. The transmission lines were constructed to deliver power from the Hoover Dam to SCE service areas in southern California.

Plans for development of a hydroelectric plant on the Colorado River were conceived as early as 1902 in response to fuel shortages that were limiting the mining activities in the vicinity of the river. SCE began to investigate development of such a plant and signed an option to utilize river water for power generation. Engineers surveyed the Colorado River and a preferred dam site was selected, but at the time the technology to transport the power to the SCE's service area (a distance of 300 to 400 miles) at high voltages did not exist. Because of technological limitations and the decline in mining activity along the Colorado River, SCE abandoned this option (Myers 1983).

Throughout the next twenty years, development of a power generating facility on the Colorado River was discussed and debated by public and private power companies and the concept of the use of a dam was investigated to control the highly variable flows of the river. In 1921, SCE and U.S. Geological Survey engineers once again surveyed the river and throughout the 1920s, SCE filed licensing applications with the Federal Power Commission in an effort to obtain the right to construct dams and power generating facilities, but none were approved. In 1928, Congress passed the Boulder Canyon Act, which stipulated that the federal government would construct a dam on the Colorado River if public and private utility companies would take responsibility for the distribution of electrical hydropower. In 1930, SCE signed a contract stating that they would buy and distribute power for themselves and all other investor-owned utility companies. The Los Angeles Bureau of Power and Light agreed to purchase and distribute power for state and municipal utilities, as well as for the metropolitan water district (Myers 1983).

Construction of Hoover Dam began in 1931 and was completed in 1935. Power production for use began in 1936 when power was delivered to the cities of Los Angeles, Pasadena, Glendale, and Burbank through three parallel transmission lines constructed by the Los Angeles Bureau of Power and Light (currently Los Angeles Department of Water and Power). The second company to distribute Hoover Dam power was the Nevada-California Corporation. The power was conveyed by a 132kV transmission line that had been originally constructed in 1930 and 1931 to deliver power to the dam site during construction. This transmission line is known as the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line (Hatheway 2006; Hughes 1993; Myers 1983).

The Metropolitan Water District of Southern California was the next to distribute electrical power in 1938. This transmission line, known as the Metropolitan Water District Line, used technology similar to that used previously by SCE for 220kV transmission lines in southern California. Utility companies in southern California, such as the Pacific Light and Power Company (which merged with SCE in 1917) and SCE, were innovators in the development of high voltage systems. In 1926, Stanford University established a high-voltage laboratory and worked with PG&E and SCE in research and development. Through this collaboration insulators for California's 220kV lines were developed (Hughes 1993; Myers 1983; Schweigert and Labrum 2001).

The SCE 220kV North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its high-voltage transmission lines in southern California (including its Vincent 220kV line) and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line was energized in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001).

When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line, in 1939. SCE North and SCE South take divergent courses from the SCE switchyard at the Hoover Dam, but meet near Hemenway Wash in Nevada, and run nearly parallel to each other from north of Boulder City, Nevada to Chino, California. SCE North and SCE South are parallel within the Project APE (Figure 2.8-1). Both SCE North and SCE South delivered electricity that was essential to war-time industries in Southern California. These industries included the Douglas, Vultee, and Northrup aircraft plants, Consolidated Steel, the Long Beach Naval Shipyard, Kaiser Steel, Alcoa, Columbia Steel, as well as automobile factories, tire plants, oil refineries, ordnance works, and military bases and depots (Myers 1983; Schweigert and Labrum 2001).

Natural Gas Pipelines

Two natural gas pipelines run through the Project APE: the PG&E Pipeline and the Mojave Pipeline (Figure 2.8-1). Although it was known that natural gas could be used for fuel in the early years of the nineteenth century, it was not until 1859 when large amounts of natural gas were discovered in Titusville, Pennsylvania, that a commercial market for natural gas developed. Wide-spread use of natural gas began in the west when southwestern natural gas fields were discovered in the 1920s. Large natural gas fields found in the north Texas panhandle in 1918 and in Kansas in 1922, as well as the development of the technology needed to transport natural gas the long distances to urban areas, resulted in the development of the interstate gas pipeline industry (Castaneda 2001).

The PG&E Pipeline on the Project Site is a 33-to-44-inch natural gas pipeline. The pipeline is an interstate pipeline that carries natural gas from the natural gas fields of Texas and New Mexico to Northern California. The 502-mile long pipeline was constructed in 1948, and at the time, was the largest pipeline in the country (PG&E Corporation 2004).

The Mojave Pipeline on the Project Site is a 24-inch natural gas pipeline, owned by El Paso Natural Gas Corporation, one of the largest natural gas companies in North America. The El Paso Natural Gas Corporation expanded their services into southern California in the 1940s in response to the post World War II population growth. The Mojave Pipeline is a 450-mile-long interstate pipeline that carries natural gas from Arizona to Kern County, California. It was constructed in the late 1940s (El Paso Corporation 2008; International Directory of Company Histories 1996).

Military Use

Several military bases are located in the Mojave Desert region and within the same region as the Project, including Twenty-Nine Palms, south of the Project, and Fort Irwin, located approximately 37 miles northeast of Barstow. These, and other military installations in the area, led to an increase of traffic near the Project, and in the area population as civilians associated with the military took up residence.

During World War II, General George S. Patton established the Desert Training Center in California and Arizona, much of which was located on public land east of the Project APE. Training exercises were designed to prepare U.S. troops for combat in the hostile desert terrain and climate. The army established camps and emergency airfields, remnants of which can still be found, including rock alignments designating tent camps and emergency airfields. The Desert Training Center closed in 1944 toward the end of World War II. During desert training, the army created the first detailed maps of the Mojave Desert to facilitate training activities. The maps were created using aerial photography and land-based methods. After the war, those maps were used by the U.S. Geological Survey to create 15-minute topographic quadrangles in the late 1940s and early 1950s (Nystrom 2003). These training areas were located on public land east of the Project APE; there are no known desert training areas in the project vicinity.

Twenty years later, during the Cold War, the Mojave Desert in the vicinity of the Project APE again hosted a major training exercise. A training exercise, known as Desert Strike included troops from both the U.S. Army and Air Force and encompassed a 12 million-acre area in California and Arizona centered on the Colorado River. The two-week exercise was designed to test tactical deployment of nuclear weapons, and involved combat training between two hypothetical countries. Desert Strike occurred in May 1964 and resulted in the expenditure of approximately $60 million and 33 deaths (Garthoff 2001; Nystrom 2003; Time Magazine 1964).

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 6: Provide results from a pedestrian cultural resources survey of no less than 25 percent of the transmission line Right-of-Way and the regulatory buffer zone, with a sample survey structure developed in consultation with the BLM and CEC.

Response: URS performed a record search and literature review of the project corridor and a ¼ mile radius on either side of the corridor for the transmission line right-of-way and regulatory buffers. A pedestrian survey will be performed as part of Southern California Edison's environmental impact analysis of the proposed transmission line upgrade project once they have completed their engineering analysis and verified the specific alignment of the line and areas of disturbance including tower locations, substation location, pull sites, and lay down areas. These will be provided at a later date. This approach was sent to the CEC and BLM on December 17th, 2009 for concurrence. The Applicant has not yet received a response.

A self-directed record search and literature review was conducted by URS archaeologist Dustin Kay at the San Bernardino Archaeological Information Center (SBAIC) in January 2010. The review consisted of reviewing historic topographic maps, researching available archaeological and historical studies, and accessing federal and state listings of significant cultural resource properties and other records available at the SBAIC.

Results of the SBAIC record search are summarized in the tables below. The 65-mile long transmission line corridor was researched for previous cultural resource studies that have been conducted in and near the transmission line corridor, as well as previously recorded cultural resource sites that have been recorded along the alignment. A total of 71 cultural resource studies have been conducted along the route, and a total of 109 cultural resource sites have been recorded along the alignment. Of the 109 sites recorded along the alignment, a total of 18 are either in the corridor or within ¼ mile of the corridor, while the remainder (91) are outside of the corridor or farther than ¼ mile of it. Of these 91 resources outside the corridor, 29 resources fall within the Solar 1 survey area. Previous cultural resource studies are summarized in table 1, and previously recorded cultural resource sites are summarized in table 2 below.

The records search conducted at the SBAIC included specific information about previous studies as well as information about previously recorded sites in the area described above. The 71 previous studies conducted within and near the corridor are summarized in Table 1, provided as attachment TRANS-1, located behind this response. A figure showing the areas along the proposed upgrade alignment which have been previously surveyed is filed under confidential cover. Approximately 17 percent of the alignment has been previously surveyed. Results of the previous surveys are contained within this response and in the figures filed under confidential cover.

The 109 cultural resource sites that have been previously recorded along the alignment are summarized in Table 2, provided as attachment TRANS-2, located behind this response. A figure showing the previously recorded sites is filed under confidential cover.

Table 1 - Previous Surveys within Project Area and within 1/4-Mile Radius of Project

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1060046	Mohave Desert Pipeline Survey	Gordon Grosscup and Jack Smith	Southern California Gas Company	August 1960	Yes
1060078	Life and Adventure Along the Mojave River Trail	Clifford Walker	San Bernardino County Museum	Fall 1967	Yes
1060108	An Archaeological Survey of the Proposed Right-of-Way of the Morongo-Yucca-Upper Coachella Valley Pipeline	Thomas F. King	U.S. Department of the Interior, National Park Service	September 1971	Yes
1060124	Preliminary Report on Archaeological Impact Study Southern California Edison Company Fry Mountain Project	Thomas F. King	Southern California Edison Company	June 1, 1972	Yes
1060191	Archaeological, Historical, and Paleontological Site Survey for County Service Area No. 70, Improvement Zone J	Robert Reynolds	County Service Area No. 70	December 26, 1973	Yes
1060213	Archaeological Analysis Summit Valley Road from State Highway #138 to Ranchero Street	Robert Reynolds	San Bernardino County Road Department, Public Works Agency	February 1974	Yes
1060240	Archaeological Impact Evaluation Southern California Edison Proposed Generating Station in Upper Johnson Valley and Associated Transmission, Gas and Fuel Routes	Carol A. Mortland	Southern California Edison Company	December 31, 1974	Yes
1060314	Archaeological Survey and Excavation Report of the proposed Southern California Edison 500 kV Tower Locations	Jack Preston Marshall	Southern California Edison Company	March 1976	Yes
1060466	Archaeological Historical Resources Assessment of proposed Arrowhead Lake Road HO4221, Hesperia area	Joseph E. Hearn	San Bernardino County Transportation Department	January 26, 1977	Yes
1060701	Archaeological Reconnaissance Report Checkers Motorcycle Race	Gary Stumpf	American Motorcycle Association	1978	Yes
1060772	Cultural Resources of Smith-Grube Subdivision, Tentative Tract No. 10717, Hesperia	Joseph E. Hearn	Inland Engineering Corporation	April 2, 1979	Yes
1060879	Cultural Resources Assessment Section 36, Township 8 North, Range 5 East, San Bernardino Base Meridian, San Bernardino County, California	Joseph E. Hearn	Duval Corporation	December 12, 1979	Yes
1060900	Prehistoric Cultural Resource Investigations Southern California Edison Lucerne Valley Project Summary Report	Edward B. Weil	Applied Conservation Technology, Inc.	October 29, 1979	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1060901	Prehistoric Cultural Resource Investigations for the Lucerne Valley Project, San Bernardino County, California	Edward B. Weil and Jamie Lytle-Webb	Southern California Edison Company	January 24, 1980	Yes
1060964	Cultural Resource Survey for a Portion of the Earp to Johnson Valley, California Enduro Racecourse Route	Richard H. Norwood	Bureau of Land Management	June 11, 1980	Yes
1060965	A Cultural Resource Inventory: Johnson Valley to Parker Motorcycle Race – the Public Comment Alternative	Ruth A. Musser	Bureau of Land Management	September 15, 1980	Yes
1061025	Archaeological, Historical, and Paleontological Site Survey for County Service Area No. 70	Ruth Harris	County Service Area No. 70	December 26, 1973	Yes
1061026	Archaeological, Historical, and Paleontological Site Survey for County Service Area No. 70, Improvement Zone J Addendum	Ruth Harris	County Service Area No. 70	February 7, 1974	Yes
1061027	Cultural Resources Assessment Baldy Mesa Water Lines County Service Area 70, Improvement Zone J	Robert E. Reynolds	County Service Area No. 70	September 1980	Yes
1061120	Cultural Resources Assessment of Tentative Tract No. 11842, Hesperia, California	Michael K. Lerch	Cubit Engineering	May 1981	Yes
1061219	An Archaeological Survey of the Proposed Southern California Edison Ivanpah Generating Plant Site and Related Rail, Coal Slurry, Water, and Transmission Line Corridors	Matthew Hall, Philip Wilke, Doran Cart, James Swenson, Stephan Bouscaren, and Kendall Kroesen	Southern California Edison Company	December 1981	Yes
1061220	The Ivanpah Generating Station Project Ethnographic (Native American) –Resources	Cultural Systems Research, Inc (Lowell Bean, Sylvia Vane, Jackson Young	Southern California Edison Company	March 10, 1982	Yes
1061256	Plan of Operations from Duval Company	Mark Q. Sutton	Bureau of Land Management	March 26, 1982	Yes
1061466	Cultural Resources Assessment of the Arrowhead Lake Road Improvement Project	San Bernardino County Museum Association	Environmental Public Works Agency County of San Bernardino	November 1984	Yes
1061499	Class I Cultural Resource Investigation for the Pacific Texas Pipeline Project State of California	John M. Foster and Roberta S. Greenwood	Engineering-Science	July 1985	Yes
1061712	Minor Subdivision 7/17/87/01V	Russell Kaldenberg	County of San Bernardino	August 31, 1987	Yes
1061787	Archaeological Field Visit 5-19-87-01V (Thomas Hassey)	Russell Kaldenberg	County of San Bernardino	August 6, 1997	Yes
1061800	A Cultural Resource Assessment of 10 Acres of Land in the Vicinity of Hesperia, San Bernardino County, California	Victor C. deMunck	Cubit Engineering	May 10, 1988	Yes
1061801	A Cultural Resource Assessment of 30 Acres of Land Designated as DN 87-0398 in the Vicinity of Hesperia, San Bernardino County, California	Victor C. deMunck	Cubit Engineering	May 21, 1988	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1061802	A Cultural Resource Assessment of 60 Acres of Land Designated as DN 87-0599 in the Vicinity of Hesperia, San Bernardino County, California	Victor C. deMunck	Cubit Engineering	May 25, 1988	Yes
1061856	A Reevaluation of and a Proposed Mitigation Plan for Archaeological Site CA-SBR-4597, Located on Tentative Tract No. 14073 in Hesperia, San Bernardino County, California	Joan S. Schneider	Carriage Homes	February 1989	Yes
1061891	Las Flores Ranch Archaeological Project Phase 1 Summary and Phase 2 Workplan	Claude Warren, Kevin Pete, Craig Woodman, Brenda Bowser	County of San Bernardino	December 3, 1987	Yes
1061895	Cultural Resources Inventory of the Proposed Rancho Las Flores Planned Unit Development San Bernardino California	Kevin Peter, Craig Woodman, Claude Warren, Robert Weaver	County of San Bernardino	July 20, 1989	Yes
1061915	Archaeological Survey of the Mojave River and Adjacent Regions	Gerald A. Smith	San Bernardino County Museum Association	1963	Yes
1061944	The Deep Creek Site (CA-SBR-176): A Late Prehistoric Base Camp in the Mojave River Forks Region, San Bernardino County, California	Jeffrey Altschul, William Johnson, and Matthew Sterner	Statistical Research Incorporated	1989	Yes
1061979	Cultural Resources Report for the All American Pipeline Project: Santa Barbara to McCamey, Texas	New Mexico State University	All American Pipeline Company	1989	Yes
1062158	Archaeological Impact Evaluation Southern California Edison Proposed Generating Station in Upper Johnson Valley and Associated Transmission, Gas, and Fuel Lines	Carol A. Mortland	Southern California Edison Company	June 30, 1974	Yes
1062220	Archaeological Sites of the California Desert Area (Owlshead, Amargosa Mojave Basin Planning Unit, Phase I-III: Sample Unit Records	Author Unknown	Bureau of Land Management	1978	Yes
1062388	A Cultural Resources Inventory and Limited Evaluation of the Proposed Mojave Pipeline Corridor in California and Arizona	Kelly R. McGuire	Woodward Clyde Consultants	July 9, 1990	Yes
1062396	Cultural Resources Assessment of Sumit Valley Management Company Planning Area 5 Near Hesperia, San Bernardino County, California	Kathleen C. Del Chario, Carol R. Demcak	Summit Valley Management Company	March 1991	Yes
1062399	A Cultural Resources Inventory of a Proposed Natural Gas Pipeline Corridor from Adelanto to Ward Valley, San Bernardino County, California	Kelly R. McGuire and Leslie Glover	Southern California Gas Company	March 1991	Yes
1062496	An Archaeological Assessment of Tentative Tract #14995, Apple Valley, San Bernardino County, California	Robert E. Parr	California Desert Studies Consortium	January 1992	Yes
1062515	Class III Cultural Resources Inventory of the Morongo Basin Pipeline Project, Hesperia to Landers, San Bernardino County, California	Michael K. Lerch & Associates	Tom Dodson & Associates	February 1992	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1062564	Cultural Resources Management Plan Rancho Las Flores Project, Hesperia, San Bernardino County, California	Chambers Group, Inc.	ARC Las Flores Limited Partnership	December 1990	Yes
1062688	Cultural Resources Assessment Parcel 13577 Located in the Apple Valley Area of San Bernardino County, California	Michael Hogan	David Tarango	October 23, 1992	Yes
1062689	Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California	Joan C. Brown	STA Consultants	October 1992	Yes
1062690	Addendum to: Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California	Joan C. Brown	STA Consultants	October 1992	Yes
1062807	Addendum to Cultural Resources Survey Report for the Fort Cady Boric Acid Mining and Processing Facility, Newbery Springs, California	Rebecca McCorkle Apple	Fort Cady Minerals Corporation	March 1993	Yes
1062830	Appendix A: Historic Resource Evaluation: Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California	Joan C. Brown	STA Consultants	October 1992	Yes
1062994	Prehistoric and Historic Land Use of he Pisgah Crater Lava Flows and Lavic Lake Area, Marine Corps Air Ground Combat Center, San Bernardino County, California	Meg McDonald and Daniel McCarthy	U.S. Army Corps of Engineers	December 1994	Yes
1063019	Results of a Cultural Resources Assessment, Crystal Creek Pumped Storage Hydroelectric Facility, Lucerne Valley, San Bernardino County, California	Jane Rosenthal	Creamer and Nobel Engineers	January 1993	Yes
1063020	Draft Adelante-Lugo Transmission Project Cultural Resources Assessment	Brad Sturm, Deborah McLean, Kenneth Becker, Jane Rosenthal	City of Anaheim	December 7, 1993	Yes
1063719	A Resurvey, Reevaluation & Revised Mitigation Plan for CA-SBR-4597	Roger Hatheway	Pleasant & Associates	2001	Yes
1063720	Negative Archaeological Survey Report Southern California Edison AT&T Cell Site Utility Connection Project	Compass Rose Archaeological, Inc.	Southern California Edison Company	March 2002	Yes
1063729	Cultural Resources Inventory of a Land Transfer of Solid Waste Landfill Facilities from the Bureau of Land Management to the County of San Bernardino	Michael K. Lerch & Associates	County of San Bernardino	June 1997	Yes
1063840	Cultural Resources Survey for the Cadiz Groundwater Storage and Dry-Year Supply Program, San Bernardino County, California	Applied Earthworks, Inc.	P&D Consultants	November 1999	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1064027	Cultural Resources Report Rancho Lucerne Development	Bruce Love and Bai Tang	Tom Dodson and Associates	February 5, 1998	Yes
1064028	Adaptive Use Report: The Oasis/Rabbit Springs Ranch Historic Buildings Rancho Lucerne Development, Lucerne Valley, San Bernardino County, California	Andrea Urbas	Tom Dodson and Associates	March 12, 1998	Yes
1064520	Cultural Resource Monitoring Program Mesa Estates (Tract No. 14073) City of Hesperia, San Bernardino County, California	Riordan Goodwin	KB Home	March 23, 2005	Yes
1064541	Skyhi and Hercules 12 kV Distribution Lines Lucerne Valley and Hesperia Areas, San Bernardino County	Compass Rose Archaeological, Inc.	Southern California Edison Company	October 18, 2004	Yes
1064562	Cultural Resources Inventory of the Big Bear Reinforcement Project, San Bernardino County, California	Daron G. Duke	Trigon, EPC	June 2005	Yes
1064698	Results of a Phase I Cultural Resources Investigation for the Deep Creek Assemblage Project Area, San Bernardino County, California	McKenna, et al.	United Engineering Group	April 14, 2006	Yes
1064741	Historical/Archaeological Resources Survey Report Tentative Parcel Map Number 16584 in the City of Hesperia, San Bernardino County, California	Bai Tang, Michael Hogan, Terri Jacquemain	Peterson Land and Development, Inc.	February 9, 2006	Yes
1064883	An Historical Resources Investigation within APN 0438-163-06, Kiowa Road, San Bernardino County, California	John Stephen Alexandrowicz	Westar Plaza, LLC	August 26, 2006	Yes
1064966	Phase I Cultural Resources Assessment Tentative Tract Map No. 17550, Hesperia, San Bernardino County, California	Richard S. Shepard	Bonterra Consulting	July 25, 2005	Yes
1065225	Cultural Resources Overview and Management Plan Rancho Las Flores Project, Hesperia, San Bernardino County, California	Professional Archaeological Services	Rancho Las Flores, LLC	October 2004	Yes
1065371	Phase I Cultural Resources Investigation of Approximately 101 Acres of Unimproved Land in the City of Hesperia, San Bernardino County, California	McKenna, et al.	AEI-CASC Engineering		Yes
1065893	Archaeological Survey of an 18-Acre Parcel south of Lugo Substation, Hesperia, San Bernardino County, California	Koral Ahmet	Southern California Edison Company	April 2008	Yes
1065903	Results of a Class III Archaeological Survey for the Proposed Expansion of the Hector Mine Operations SE of Newberry Springs and in the Mohave Desert of San Bernardino Co., California	McKenna, et al.	Lilburn Corporation	March 3, 2008	Yes
1065981	Archaeological Survey of Four Parcels Totaling 55 Acres Near Lugo Substation, Hesperia, San Bernardino County, California	Koral Ahmet	Southern California Edison Company	September 2008	Yes
1066333	Cultural Resources Survey for the Mohave Water Agency Water Banking Project	Applied Earthworks, Inc.	Mohave Water Agency	June 2005	Yes

Table 2
Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius

Primary No.	Site Description	Characterization of Artifacts	Within Project Area (Yes/No)?
36-000181	Sparse Lithic Scatter	Jasper and chalcedony flakes and points	No
36-001505	A large prehistoric lithic reduction site	Chipping stations, cobble test/quarry areas and lithic reduction loci of cryptocrystalline silicates and basalt.	Yes
36-001906	A prehistoric low density lithic scatter.	Several hundred flakes of cryptocrystalline silicates and some cores.	No
36-002073	Rock shelter site	Choppers, cores and burnt wood	No
36-002298	Prehistoric lithic reduction site	Containing low density quartzite flakes, shatter and a core.	No
36-002910	Refer to Solar One Technical Report April 2009.		Yes
36-003033	Historic Trail/ Road	The Mojave Trail/ Road. CHL-963	Yes
36-003132	Prehistoric lithic scatter.	Low density of quartzite flakes and a knife fragment	No
36-003516	Prehistoric lithic reduction site	Three cleared areas, cryptocrystalline silicate flakes, cores and test blocks.	No
36-003819	Prehistoric lithic scatter.	Quartzite scraper, hammerstone and flakes.	No
36-003849	Prehistoric food preparation site.	Fire affected rock, quartzite flakes and core, and a roasting pit.	Yes
36-003850	Prehistoric lithic scatter.	Quartzite flakes and cores.	No
36-003851	Prehistoric lithic scatter.	Flakes of various materials, and leaf shaped knife or point.	No
36-004132	Prehistoric occupation site.	Groundstone, core, flakes, scraper, fire affected rock and burnt bone.	No
36-004255	Historic telephone line.	The Hesperia Pole Line built in 1920-1921. Removed in 1950s.	No
36-004256	Historic road	The Hesperia Road.	Yes
36-004274	Historic road	Toll Road Hesperia-Road Bypass.	No
36-004276	Historic road	Coxey Road, built in 1861.	Yes
36-004307	Prehistoric lithic scatter.	Two basalt edge modified flakes and a single flake.	No
36-004308	Prehistoric lithic reduction site	Two lithic reduction loci and a sparse scatter.	No
36-004309	Prehistoric lithic scatter.	Flakes of jasper and possible basalt tools.	No
36-004597	Prehistoric lithic reduction site	Groundstone, milling features, and lithics	No
36-004598	Prehistoric occupation site.	Midden soil, fire affected rock, burnt bone and quartzite flakes.	No
36-004680	Prehistoric lithic reduction site	Sparse scatter of lithics and cores.	No
36-004740	Prehistoric lithic scatter.	Three quartzite flakes	No
36-005566	Prehistoric lithic scatter.	Two quartzite scrapers and flakes	No
36-005667			No
36-006512	Refer to Solar One Technical Report April 2009.		Yes
36-006513	Refer to Solar One Technical Report April 2009.		Yes
36-006693	Refer to Solar One Technical Report April 2009.		No
36-006793	Historic Railroad	A.T. & S.F. Railroad.	No

Table 2
Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius

Primary No.	Site Description	Characterization of Artifacts	Within Project Area (Yes/No)?
36-006844	Prehistoric lithic reduction site	Quartzite flakes, cores, hammerstones, scrapers, core tools and chopper.	Yes
36-006845	Prehistoric lithic scatter.	Quartzite, scrapers, two flakes and hammerstone.	No
36-006846	Prehistoric lithic reduction site	Manos, core tool, and flakes.	No
36-007069	Prehistoric lithic scatter.	Four quartzite flakes	No
36-007100	Prehistoric lithic reduction site	Two chipping stations, core and lithic debitage.	No
36-007102	Prehistoric lithic reduction site	Two chipping stations, core and lithic debitage.	No
36-007103	Prehistoric lithic scatter.	12 cryptocrystalline silicate flakes	No
36-007105	Historic trash scatter	Milled wood and can scatter.	No
36-007106	Prehistoric lithic scatter.	Basalt flakes	No
36-007107	Prehistoric lithic reduction site	Four chipping stations, with basalt and rhyolite cores and flakes.	No
36-007108	Prehistoric lithic reduction site	One chipping station, with lithic debitage from various materials.	No
36-007966	Prehistoric lithic reduction site	Jasper flakes and bifaces.	No
36-007968	Prehistoric lithic reduction site	Chalcedony flakes, biface, core, brownware sherd, and flakes from various materials.	No
36-007969	Prehistoric lithic reduction site	Chalcedony and jasper flakes, two biface..	No
36-007974	Historic Road	Goat Trail Road; Las Flores Road	Yes
36-010316	Historic Transmission Line	Arrowhead-Mohave Siphon-Devil Canyon-Shandin 115kV Live; AE-Shapiro-2H; South Sierras Power Company Transmission Line	No
36-012999	Historic Trash scatter	Sparse can scatter	No
36-013000	Prehistoric lithic scatter.	Quartzite flakes, scrapers, fire affected rock and mano fragment.	No
36-013001	Prehistoric lithic scatter.	Quartzite flakes, and scrapers	No
36-013007	Prehistoric isolate	Basalt core	No
36-013008	Historic isolate	Two amethyst glass fragments	No
36-013009	Prehistoric isolate	Quartzite flake	No
36-013010	Prehistoric isolate	Quartzite flake	No
36-013015	Historic isolate	One vent hole can	No
36-013017	Historic isolate	One church key Coors beer can	No
36-013018	Prehistoric isolate	Two basalt tested cobbles	No
36-013762	Prehistoric lithic reduction site	Fire hearths and lithic debitage	No
36-013767	Historic can scatter	150 – 200 cans	No
36-013768	Historic or prehistoric rock feature	A partial rock ring	No
36-013769	Prehistoric lithic scatter.	Eight quartzite flakes	No
36-013770	Prehistoric lithic scatter.	Quartzite flakes and cores	Yes
36-013771	Prehistoric lithic scatter.	Quartzite flakes and cores	Yes
36-014067	Prehistoric lithic scatter.	A flake, core and hearth feature	No

Table 2 Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius			
Primary No.	**Site Description**	**Characterization of Artifacts**	**Within Project Area (Yes/No)?**
36-014412	Prehistoric lithic scatter.	Two Pinto points and two flakes.	No
36-014622	Refer to Solar One Technical Report April 2009.		No
36-014623	Refer to Solar One Technical Report April 2009.		No
36-014626	Prehistoric lithic scatter.	13 jasper flakes	No
36-014804	Refer to Solar One Technical Report April 2009.		No
36-014805	Refer to Solar One Technical Report April 2009.		Yes
36-014825	Refer to Solar One Technical Report April 2009.		No
36-014826	Refer to Solar One Technical Report April 2009.		No
36-014827	Refer to Solar One Technical Report April 2009.		Yes
36-014828	Refer to Solar One Technical Report April 2009.		No
36-014829	Refer to Solar One Technical Report April 2009.		No
36-014830	Refer to Solar One Technical Report April 2009.		No
36-014831	Refer to Solar One Technical Report April 2009.		No
36-014855	Refer to Solar One Technical Report April 2009.		No
36-014856	Refer to Solar One Technical Report April 2009.		No
36-014875	Refer to Solar One Technical Report April 2009.		No
36-014876	Refer to Solar One Technical Report April 2009.		No
36-014877	Refer to Solar One Technical Report April 2009.		No
36-014878	Refer to Solar One Technical Report April 2009.		Yes
36-014880	Refer to Solar One Technical Report April 2009.		No
36-015508	Historic Landmark	Chimney Rock, CHL 737	No
36-020872	Refer to Solar One Technical Report April 2009.		No
36-060660	Prehistoric isolate	Jasper flake	No
36-060781	Prehistoric isolate	Quartz flake	No
36-060871	Prehistoric isolate	Quartzite flake	No
36-060874	Prehistoric isolate	Jasper knife	No
36-060888	Prehistoric isolate	Two basalt flakes	No
36-060889	Prehistoric isolate	Quartzite flake	No
36-061431	Refer to Solar One Technical Report April 2009.		No
36-061432	Refer to Solar One Technical Report April 2009.		No
36-061433	Refer to Solar One Technical Report April 2009.		No
36-061434	Refer to Solar One Technical Report April 2009.		No
36-061435	Refer to Solar One Technical Report April 2009.		No
36-061436	Refer to Solar One Technical Report April 2009.		No
36-061438	Prehistoric isolate	Cryptocrystalline silicate flake	No
36-061439	Prehistoric isolate	Four cryptocrystalline silicate flakes	No
36-061441	Prehistoric isolate	Five red cryptocrystalline silicate flakes	No
36-061445	Prehistoric isolate	One cryptocrystalline silicate core, two core fragments and one flake	No
PSBR-15	Prehistoric village site	Three locations with lithics, core tools, bifacial tools, groundstone, and pottery.	Yes
P1321-3	Prehistoric features	Wind carved rock shelter	No

Table 2 Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius			
Primary No.	**Site Description**	**Characterization of Artifacts**	**Within Project Area (Yes/No)?**
P1321-4	Prehistoric lithic reduction site	Flakes, cores, hammerstones	Yes
P1321-5	Prehistoric lithic scatter.	Sparse concentration of lithics	No
P1321-6	Prehistoric feature	Rock Shelter	No
P1334-7	Prehistoric lithic scatter	Three manos, five flakes and one core	Yes
P1334-9	Prehistoric lithic scatter	Hammerstones, flakes, chopper, cobble tool, and shell.	No

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION
For the SES SOLAR ONE PROJECT

Docket No. 08-AFC-13

PROOF OF SERVICE

(Revised 12/2/09)

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DECLARATION OF SERVICE

I Corinne Lytle , declare that on January 29, 2009, I served and filed copies of the attached Applicant's Response to the CEC Transmission Line Upgrades Memo--Cultural Resources Responses. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

[www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(***Check all that Apply***)

FOR SERVICE TO ALL OTHER PARTIES:

_____ sent electronically to all email addresses on the Proof of Service list;

_____ by personal delivery or by depositing in the United States mail at _____________ with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

_____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

~~***OR***~~

depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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

Original signed by

Corinne Lytle

*indicates change