TABLE OF CONTENTS

This page intentionally left blank.

4.5 Cultural Resources

This section describes the cultural and paleontological resources in the area of the Eldorado-Lugo-Mohave Series Capacitor Project (Proposed Project[1]). Potential impacts to cultural resources (i.e., archaeological and historical) are discussed first, followed by a discussion of paleontological resources. The alternatives are also discussed.

Cultural resources data presented in the following subsections were obtained primarily through a cultural resources literature review. A 1-mile-buffer records search has recently been conducted for the Area of Potential Effect (APE) for the Proposed Project. Following the records search, a Class III pedestrian survey was conducted for the APE, and the results are currently under review by the Bureau of Land Management (BLM). The results of the records search and survey would identify historical and archaeological resources in the Proposed Project area and determine their eligibility for the National Register of Historic Places (NRHP), California Register of Historic Resources (CRHR), and/or Nevada State Register of Historic Places (NSRHP). The results of the records search and survey would be considered during the final design of the Proposed Project to minimize impacts on cultural resources during construction.

A paleontological records search was conducted at the Natural History Museum of Los Angeles County and the Nevada State Museum**,** which included a review of mapped resources known to exist in the area, and an analysis of Proposed Project maps, engineering drawings, and technical data. In addition to the records search, geologic units underlying the Proposed Project area were identified and assigned paleontological sensitivity ratings according to the criteria of the BLM's Potential Fossil Yield Classification (PFYC) System, which is a predictive resource management tool that was originally developed and refined by federal agencies.

4.5.1 Environmental Setting

The Proposed Project is located in California and Nevada, within the Mojave Basin and Range (Mojave). Federal lands constitute a majority of the land area in the Mojave, including lands under the jurisdiction of the BLM, National Park Service (NPS), Bureau of Reclamation (BOR), and Department of Defense (DoD). The Proposed Project would modify three existing transmission lines that extend northeast from Lugo Substation (located in San Bernardino County, California) to Eldorado Substation (located in the City of Boulder City, Nevada) and Mohave Substation (located in Clark County, Nevada), and from Mohave Substation northwest to Eldorado Substation. Portions of the Proposed Project would also cross the City of Hesperia, California, the unincorporated community of Lucerne Valley in California, as well as the unincorporated communities of Searchlight and Laughlin in Nevada.

4.5.1.1 Geological and Natural Setting

The Proposed Project is located within the central portion of the Mojave Desert and the Transverse Ranges geomorphic provinces. The topography within this region consists of

[1] The term "Proposed Project" is inclusive of all components of the Eldorado-Lugo-Mohave Series Capacitor Project. Where the discussion in this section focuses on a particular component, that component is called out by its individual work area (e.g., "Ludlow Series Capacitor").

prominent northwest-southeast-trending faults and secondary east-west-trending faults—the latter of which are in alignment with the east-west trend of the Transverse Ranges geomorphic province. The Garlock fault separates the northern boundary of the Mojave Desert geomorphic province from the southern boundary of the Mojave Desert geomorphic province and the Sierra Nevada geomorphic province.

The Transverse Ranges geomorphic province consists of an east-west-trending series of steep mountain ranges that extends offshore to include the San Miguel, Santa Rosa, and Santa Cruz Islands. This geomorphic province is characterized by thickly folded and faulted Cenozoic, petroleum-rich sedimentary rocks. The California Geological Survey (CGS) notes that intense north-south compression is squeezing the Transverse Ranges, making this one of the most rapidly rising regions on earth.

The Mojave Desert typically receives trace levels of precipitation and is characterized by low humidity, wide diurnal temperature ranges (i.e., greater than 25 degrees Celsius), high average temperatures, and strong seasonal winds. The annual precipitation cycle shows distinctive cool and warm seasonal patterning. Cool season precipitation is the most important and extensive source of rain in the desert region. Rainfall is widespread and of relatively long duration during the cool season. Warm season precipitation results largely from convection precipitation in the form of thunderstorms. Cool season precipitation (October through April) averages 4 inches per year, while warm season precipitation (July through October) averages about 1.3 inches per year, with violent convectional downpours causing flash floods and deep landform incisions.

The flora of the Mojave Desert is fairly homogeneous, with variation in species abundance and presence reflecting topography, annual precipitation, and the presence or absence of surface water. There are four primary plant associations: Mojave creosote scrub, desert saltbush scrub, Mojave wash scrub, and blackbrush scrub. These generalized floristic groups include complexes of shrubs, grasses, herbs, succulents, and semi-succulents that supplied aboriginal populations with a range of food, raw materials, medicinal plants, and ritual products. The most characteristic plant is creosote bush (*Larrea tridentata*), which is a hardy, long-lived shrub that thrives in coarse, well-drained, non-saline soils on basin floors, alluvial fans, and upland slopes at elevations up to 1,200 meters in some interior areas. Species diversity within this community increases with topographic variability, as conditioned by community age, ground surface stability, soil density and rock content, and annual precipitation and temperature. Elsewhere, halophyic perennials like saltbush (*Atriplex* spp.) and bursage (*Ambrosia dumosa*) favor highly salty or alkaline soils on playas, in sinks, or near seeps, while xerophytes occupy drier soils and exhibit lower salt tolerances. Blackbrush scrub thrives at intermediate elevation (approximately 1,200 to 1,800 meters) and precipitation thresholds and has few floral associates relative to creosote scrub and the sagebrush (*Artemisia* spp.) shrub-steppe of the Great Basin.

Mojave Desert fauna are diverse and include many animals that were likely exploited by prehistoric populations. The most prevalent are reptiles, rodents, small carnivores, and birds. Common species include reptiles like the desert tortoise (*Gopherus agassizii*), western banded gecko (*Coleonyx variegates*), common chuckwalla (*Sauromalus obesus*), desert iguana (*Diposaurus dorsalis*), coachwhip (*Masticophis flagellum*), Mojave rattlesnake (*Crotalus scutulatus*), and sidewinder (*C. cerastes*); lagomorphs such as the black–tailed jackrabbit (*Lepus californicus*), and desert cottontail (*Sylvilagus audubonii*); rodents such as the antelope ground

squirrel (*Ammospermophilus leucurus*), desert kangaroo rat (*Dipodomys deserti*), desert woodrat (*Neotoma lepida*); and carnivores like the coyote (*Canis latrans*) and kit fox (*Vulpes macrotis*). Migratory waterfowl (e.g., *Anas* spp.) are occasional visitors to episodic playa lakes as well.

4.5.1.2 Prehistoric Background

The Proposed Project area is located within five temporal periods based on diagnostic projectile points and associated radiocarbon dates. The five periods identified by Warren and Crabtree within the southwestern Great Basin and northeastern Mojave Desert include the Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean periods (Warren and Crabtree 1986). These five periods exemplify significant spatial and temporal variations in the cultural remains representative of each period. The conflicting chronologies between these five periods can be attributed to the diversity of lifeways within the Great Basin and northeastern Mojave Desert, the lack of reliable radiocarbon dated sites, and the scarcity of stratified sites in the desert. However, these periods were established by Warren and Crabtree over 30 years ago and serve as the best overall regional sequence for the analysis of cultural resources in the Proposed Project area. The Lake Mojave, Pinto, Gypsum, Sarasota Springs, and Shoshonean periods are described in the following subsections.

Lake Mojave Period (Paleo-Indian and Early Archaic; between 12000 and 7000 Before Present)

The Lake Mojave complex represents the earliest human occupation in the Mojave Desert region, which began in approximately 12000 Before Present (B.P.) (Grayson 1993; Wallace 1962). Considered a Paleo-Indian assemblage, it is thought to be ancestral to the Early Archaic cultures of the subsequent Pinto period (Warren and Crabtree 1986). The Lake Mojave period was a time of extreme environmental change as the relatively cool and moist conditions of the terminal Wisconsin glacial age were gradually replaced by the warmer and drier conditions of the Holocene era (Spaulding 1990). Desertification continued throughout this period, which resulted in the appearance of mesquite species in the region in approximately 8000 B.P. (DuBarton et al. 1991).

Cultural materials characteristic of the Lake Mohave period include Lake Mohave, Parman, Silver Lake, and rare fluted Clovis projectile points. Other artifacts typically found in these assemblages include lunate and eccentric crescents, small flake engravers, technical scrapers, leaf-shaped knives, drills, and heavy choppers or hammer stones. Milling stones are not generally observed to originate from the Lake Mojave period (Campbell et al. 1937; Warren and Crabtree 1986). The assemblages of the Lake Mojave period represent early man in the Mojave Desert, and exhibit similarities to sites in the western Great Basin and to the San Dieguito complex of the Southern California culture area (Warren and Crabtree 1986).

Few sites dating to the early portion of the Lake Mojave period have been excavated, and little direct evidence of subsistence practices has been reported. When sites do contain datable materials, artifacts are generally found on the surface with no stratigraphic separation. Unlike sites in the southwest, no early Great Basin projectile point types have been found in undisputed association with the large mega-fauna known to have existed during that time (Warren and Crabtree 1986). Characterization of this period of prehistory in California is extremely complex due to the large number of competing models.

Pinto Period (Middle Archaic; between 7000 and 4000 Before Present)

The transition from pluvial to arid conditions at the end of the early Holocene era appears to have been the most extreme environmental change in the southern Great Basin during post-Pleistocene times. Increasingly arid conditions prevailed throughout the region between approximately 7500 and 5000 B.P. (Hall 1985; Spaulding 1991). Woodland environments reached their approximate modern elevations and the modern desert scrub communities appeared with the migration of plant species (e.g., creosote bush) into the area.

Similar to the Lake Mojave period, Pinto period sites are usually found in open, well-watered settings that represented isolated oases of high productivity. Artifacts dating to the Pinto period include Pinto series projectile points, leaf-shaped points and knives, domed and elongated keeled scrapers, and occasional Lake Mojave and Silver Lake points. Simple, flat milling stones, occasional shallow-basined milling stones, and hand stones also occur in Pinto period sites (Warren and Crabtree 1986). The appearance of hand stones during this period can be attributed to exploitation of hard seeds. Big-game hunting likely continued as an important focus during the Pinto period, but the economic return of this activity likely decreased as artiodactyl populations declined due to increased aridity in the region (Warren and Crabtree 1986).

The appearance of Pinto projectile points in the archaeological record exemplify the Pinto period in the Mojave Desert. However, the definition and dating of Pinto projectile points is a controversial topic among experts (Lyneis 1982; Schroth 1994; Warren 1984). Some argue the desert was abandoned between 7000 and 5000 B.P. (Donnan 1964; Kowta 1969; Wallace 1962), while others argue that no evidence of an occupational hiatus of such magnitude exists in the archaeological record (Susia 1964; Tuohy 1974; Warren 1980).

Gypsum Period (Late Archaic; between 4000 to 1500 Before Present)

The Gypsum period is characterized by population increases and broadening economic activities as technological adaptation to the desert environment evolved. Hunting continued to be an important subsistence activity, but the increase in the occurrence and diversity of ground stone artifacts indicate that plant foods were becoming a more important subsistence item. The observed reduction in the size of projectile points in approximately 1350 B.P. indicated the appearance of the bow and arrow (Bettinger and Eerkins 1999) in Gypsum period cultures.

Gypsum period artifact assemblages are characterized by medium- to large-stemmed and notched projectile points (i.e., Elko series, Humboldt Concave Base, and Gypsum types). The assemblages also include rectangular-based knives, flake scrapers, infrequently large scraper planes, choppers, and hammer stones. Milling equipment became more common, and the mortar and pestle appeared for the first time during the Gypsum period. Gypsum period sites exhibit an increase in rock shelters and base camps with extensive midden developments. Additional artifacts originating from the Gypsum period may include split-twig figurines, ritual bows, arrows, and pictographs (Davis and Smith 1981). The Gypsum period appears to have been a time when human populations adapted to the desert environments through technological innovations, ritual activities, and increased socioeconomic ties.

Saratoga Springs Period (between 1500 to 750 B.P.)

After 2000 B.P., Eastgate and Rose Spring projectile points began to dominate assemblages in parts of the Mojave Desert and southern Great Basin. Rose Spring projectile points were rare, and Ancestral Puebloan pottery existed primarily in the northern Mojave Desert and the southwestern desert region. The Ancestral Puebloan influence in the Mojave Desert is limited to the occurrence of pottery and is poorly understood. However, the northeastern Mojave exhibits a strong Ancestral Puebloan influence where horticultural people resided in communities along the Muddy and lower Virgin rivers in southeastern Nevada and adjacent portions of Utah and Arizona (Fowler and Madsen 1986; Lyneis 1982, 1995; Lyneis et al. 1978; Warren and Crabtree 1986; Winslow 2003a, 2003b).

Saratoga Springs period sites in the remainder of the Mojave Desert region exhibit a general continuity with the Gypsum period sites. One of the most conspicuous changes from the Gypsum period is the reduction in size of projectile points. With the exception of their smaller size, Rose Spring and Cottonwood series points are morphologically similar to Gypsum period points and dominate assemblages of the Saratoga Springs period (Warren and Crabtree 1986).

Protohistoric Period (750 B.P. to Contact with Euro-American People)

The Protohistoric period, a transitional period between the prehistoric and the historic, dates from approximately 750 B.P. and continues until first contact with Euro-American people (Warren 1980; Warren and Crabtree 1986). Diagnostic artifacts that characterize the Protohistoric period include Desert Side-notched points, various poorly defined types of brown ware pottery, and modified cultural developments from the Sarasota Springs period.

During the Protohistoric period, the Hakataya influence continued south of the Mojave River and by approximately Anno Domini (A.D.) 600, Hakatayan groups occupied a wide area in western Arizona, southeastern California, and southern Nevada (Schroeder 1979). The Hakataya were centered primarily on the lower Colorado River and their assemblages are characterized by brown, buff, and red on buff pottery, Desert Side-notched points, and Cottonwood Triangular points. These artifacts can be found along the length of the Mojave River to the Mojave Sinks (Drover 1979; Rogers 1929; Smith 1963). Archaeological evidence of Hakatayan occupation during the Protohistoric period includes buff-colored pottery; floodplain farming along the Colorado River; and a variety of features of stone construction, such as rock alignments, stone-lined roasting pits, and walled structures built with rocks or boulders (Schroeder 1979).

North of the Mojave River, the Saratoga Springs artifact assemblage continues, with the addition of Desert Side-notched points, Cottonwood Triangular points, and Great Basin Brown Ware pottery. Also present in these assemblages are steatite beads, large triangular knives, unshaped manos and milling stones, mortars and pestles, incised stones, slate pendants, and shell beads (Warren and Crabtree 1986).

4.5.1.3 Ethnographic Background

The Ethnohistoric period in the Proposed Project area dates from post-contact with Euro-Americans until the middle of the 19th century. The European explorers first entering the southwestern Great Basin encountered small, scattered groups of hunters and gatherers who

spoke different dialects of closely related Uto-Aztecan languages (Davis 1965; Steward 1933, 1938; Stewart 1941; Wheat 1967). The Proposed Project area is located within an extensive territory occupied by several subsets of the Numic/Shoshonean groups. The Shoshoneans occupied the eastern portion of California and are considered a Great Basin culture. While most of the territory occupied by Shoshoneans is located in the Great Basin of Nevada, Idaho, and Utah, at least 20 divisions were known ethnographically in California based on dialect. Shoshonean groups that occupied portions of California include the Southern Paiute, Chemehuevi, and Kawaiisu (Kroeber 1976).

The Proposed Project area was likely utilized by several different Native American groups during protohistoric times. While the Proposed Project is near the western edge of Southern Paiute territory, the area is closely bordered by the traditional territories of the Kawaiisu, Panamint Shoshone, Mojave, Chemehuevi, and Serrano/Vanyume tribes (Drover 1979). Groups that occupied the Proposed Project area likely relied on the exploitation of different environmental zones, as different areas offered varied resources on different seasonal cycles, which would directly influence subsistence cycles.

Historic accounts also report Chemehuevi and Serrano/Vanyume occupation in the Proposed Project area. The Clark Mountains, Ivanpah Valley, and Shadow Valley area within Chemehuevi territory and Vanyume territory is located primarily within the Mojave Sinks. The Chemehuevi are an offshoot of the Las Vegas band of Southern Paiute (Kelly 1934). In 1776, Father Francisco Garcés turned west from the Colorado River to avoid hostilities between the Mojave and the Halchidoma Indians, and encountered 40 Chemehuevi people who described their territory as extending along the Colorado River between the Vanyume and the Yuta nations to the north. On his return trip, Garcés reported a Chemehuevi rancheria between Soda Lake and the Providence Mountains (Coues 1900).

In 1844, John C. Fremont encountered a group of six Mojave Indians on the Mojave River who told him that some of their people had lived on the Mojave River and grew melons. Although this is the only European account of a Mojave Desert occupation, it is supported by Mojave and Chemehuevi oral tradition and research by Rogers (1929) and Drover (1979). The Mojave Indians reportedly visited the Mojave Sinks area near the Halloran Springs turquoise mines (Drover 1979). Rogers (1939) concludes that a distinctive Desert Mohave (Yuman) presence existed based on archaeological evidence of ceramics and cremations apparently affiliated with the material culture of the Colorado River. Drover (1979) agrees with Rogers' assessment of a Yuman occupancy in portions of the Mojave Desert, noting that the late-period ceramics, mortuary practices, and trade items in the Cronise Basin are characteristic of upland Arizona, while typical Shoshonean archaeological evidence, such as described for Death Valley, are absent.

Kroeber (1959, 1976) also came to accept the idea of the Mohave tribe's occupation in the desert apart from the Colorado River. He suggests that the Mohave colonized the desert for a short period of time between A.D. 1780 to 1800 or A.D. 1790 to 1810, moving into the void created when the Serrano/Vanyume were missionized. The Mohave dominated east-west trade, and Kroeber notes that they believed the trails across the desert were theirs to use whenever they wanted. The use of these trails resulted in a transitory occupation of the desert.

Southern Paiute/Chemehuevi

The Proposed Project area is within the traditional territory of the Southern Paiute belonging to the Plateau Shoshonean linguistic division, which also includes the Kawaiisu and Ute (Kroeber 1976). The Southern Paiute occupied a broad strip of territory extending across southeastern California, southern Nevada, southern Utah, and portions of northern Arizona. Of the 16 subgroups identified by Kelly (1934), the Las Vegas subgroup inhabited a relatively large area extending into the Mojave Desert, including the Spring Mountain Range and roughly bounded on the west by the Black Mountains and on the northerly extent by the Avawatz Mountains. Ethnographic research among the Southern Paiute was pioneered by John Wesley Powell and G.W. Ingalls in the 1870s.

According to Powell (Fowler and Fowler 1971), the southern boundary of Shoshone territory was marked by the Colorado River. The Chemehuevi branch of the Las Vegas band occupied both banks of the Colorado between the Mohave on the north and the Quechan on the south. Powell also asserted that Shoshonean tribes had expanded across Southern California, occupying a wide band of country to the Pacific Ocean as far north as Tulare Lake. Extensive research was conducted by Kelly in the early 1930s (Kelly 1964), much of which remains unpublished. The following discussion is focused on the Las Vegas subgroup and based on syntheses of Southern Paiute ethnography and ethnohistory compiled by Kelly and Fowler (1986) and Euler (1966).

The Southern Paiute organization consisted of small, economically self-sufficient groups that shared a relatively uniform culture (Euler 1966; Kelly and Fowler 1986). Political organization between and within groups was informal. Clusters of families formed loosely knit bands, usually with a headman who took on advisory responsibilities. Geographic boundaries between groups were fluid and allowed for the utilization of resources “belonging” to neighboring groups. Marriage and trade took place between Southern Paiute groups, and conflicts were rare (Kelly and Fowler 1986). While Paiute bands shared a common culture, they were economically self-sufficient (Euler 1966; Kelly and Fowler 1986), employing a mobile settlement system dependent on the seasonal availability of a variety of plant and animal resources. In the summer months, the Southern Paiute/Chemehuevi migrated to areas rich in grass seeds, roots, and barks. Seeds were gathered in baskets, hulled, ground, and mixed with water to form a mush that constituted a staple of the Southern Paiute diet (Kelly 1964). Mesquite was harvested in the late summer and processed in a similar fashion (Stuart 1945). When packed in baskets and dried, the resulting meal could be stored in underground caches to be retrieved during the winter. Pinyon nuts were also gathered later in the season and processed for storage (Fowler and Fowler 1971). Pinyon nuts were collected at higher elevations and were considered a staple. Agave (*Agave utahensis*) was also an important part of the diet. It grew extensively throughout the territory and could be harvested year round (Kelly and Fowler 1986).

During winter, small family groups traveled to hunting grounds where deer were either hunted by individual men or by small groups of men led by a hunt leader (Kelly 1964). Small game was hunted all year and included birds, rats, squirrels, and other small rodents. Rabbits were especially important and were hunted with a variety of methods, such as nets, traps, and throwing sticks. Other sources of animal protein included reptiles and a variety of insects. In the late winter and early spring, as stored food supplies ran low, a move was made to locations where mescal could be gathered. Women processed mescal, roasting it in deep pits and then grinding it

into flour that could then be combined with mesquite bean meal (Stuart 1945). This pattern of food procurement utilized by the Southern Paiute/Chemehuevi can be used as a model for hunter-gatherer subsistence strategy in the Proposed Project area.

Simple horticulture was adopted by some Southern Paiute groups prior to Euro-American occupation although the cultivation of crops appears to have played a minor role in the subsistence system relative to the hunting and gathering of wild foods. The cultivation of crops supplemented the Southern Paiute diet, but hunting and gathering of wild foods remained the primary subsistence strategy (Steward 1938). Ethnographic accounts of Southern Paiute material culture document the use of the bow and arrow with stone or hardened wood tips, flaked stone knives, milling stones, stone pipes, digging sticks, basketry, and ceramics (Euler 1972). Basket weaving was an important technological skill and a variety of different basketry forms were produced. Common forms were fan-shaped winnowing trays and conical carrying baskets. Infant carriers and basketry cradles were also common items, and typically contained a woven shade or visor. Most baskets were manufactured using a twining method, but depending on intended use, a coiling method was also employed. Several products, such as water jugs, were coated with pinyon pitch to make them watertight (Kelly and Fowler 1986).

Ceramic technology was practiced by most of the Southern Paiute groups and was generally a women's craft. Clays often contained no temper, but others contained cactus juice or dried roots as a tempering agent. In addition, the Las Vegas tribes employed stone tempering, displaying a Mohave influence. The Panaca and the Moapa tribes began their pots with a spiral and worked upward into conical shapes using concentric circles of rolled clay. The Las Vegas tribes differ from these groups again in their use of the paddle-and-anvil technique and the decorative painting of their vessels (Kelly and Fowler 1986).

The Southern Paiute did not exhibit any overall political organization between groups, nor was there any central control within the groups themselves. Each group contained a number of economic units, comprised of clusters of families, much like bands in other tribal organizations. These bands usually had a headman who took on advisory responsibilities. The headman of a band was typically a brother, grandson, or uncle of the previous headman, but was rarely, if ever, the headman's son. Boundaries between groups were not precise and allowed for the utilization of resources "belonging" to neighboring groups. Springs, however, were private property and were inherited (Kelly and Fowler 1986).

In general, relationships between Southern Paiute ethnographic groups were peaceable. Marriage and trade took place between groups, and conflicts were not common. Relationships with non-Paiute groups, however, were more varied. A congenial relationship existed between the Southern Paiute and several neighboring groups. The Southern Paiute, for example, were friendly with the Western Shoshone to the northwest, with some Las Vegas tribes even speaking the Shoshone language. However, other neighboring groups (e.g., the Navajo) occasionally stole horses, children, and women and invoked fear among the Paiutes (Kelly and Fowler 1986). Kroeber (1959) notes the Southern Paiute were sometimes met with hostility from lower Colorado River groups, and specifically the Mohave.

Early Spanish incursions into the southwest, beginning in approximately 1540, appear to have had little direct impact on Southern Paiute groups for as much as 250 years, although indirect

impacts were likely felt. By the early 19th century, however, Spanish impacts were both direct and devastating. The Spanish colonies of northern New Mexico and Southern California had institutionalized slavery by this time, and archival evidence suggests that Southern Paiutes may have been held as slaves in Santa Fe and surrounding communities as early as the late 1700s. Their presence by 1810 is well documented. The Southern Paiute were located between Ute raiders on the north and east and Navajos on the south. Their territory straddled the Old Spanish Trail, which opened for commerce in the 1830s and became a route for slaving activities.

Southern Paiute captives were often sold as slaves in Santa Fe or carried off to Southern California, transported there by Ute captors or sold to traffickers along the Old Spanish Trail. Euler (1966) cites historic documentation, noting the absence of Southern Paiute from ecologically favorable but heavily traveled areas within their territory in the 1830s and 1840s, suggesting that this may reflect a fear of slavers. He also notes reports of open aggression and hostility among some Paiutes in the 1840s, perhaps demonstrating retaliation against slave traffickers. This is in marked contrast to the non-warlike temperament reported for the Southern Paiute in the pre-contact period (Kelly and Fowler 1986). Slave raiding against the Southern Paiute came to an end soon after the Mormons arrived into Utah in 1847. The Mormon presence, however, also produced negative effects on the native populations. Mormon farms and settlements spread throughout the region by 1855, displacing Southern Paiutes from their best gathering and horticultural lands. Traditional food supplies were further depleted by livestock, timbering, and other activities. The Southern Paiute retaliated by raiding settlements and travelers during the late 1850s and the 1860s. Within the next two decades, several reservations were established, including the following:

- The Moapa Reservation on the Muddy River near Moapa, Nevada in 1872
- The Colorado River Reservation in Arizona in 1874
- The Shivwits Reservation near Saint George, Utah in 1891
- The Las Vegas Colony in Las Vegas, Nevada in 1911

The Las Vegas group traveled widely and had friendly contact with numerous California tribes, including the Kawaiisu, Serrano/Vanyume, Cahuilla, and Diegueno (Kelly and Fowler 1986).

Serrano/Vanyume

The Vanyume are believed to be a Serrano subgroup, though little information regarding their culture and language is available (Bean and Smith 1978) and they were extinct well before 1900 (Bean and Smith 1978; Beattie and Beattie 1939). Kroeber (1925) states that the Vanyume are the Serrano of the Mojave River, and it is the opinion of some researchers (Bright 1975; Kroeber 1907) that they spoke a dialect of Serrano. Both the Serrano and Vanyume are California Uto-Aztecan Takic speakers along with the more distantly related Gabrielino-Fernandeño, Luiseño-Juaneno, Cahuilla, Cupeño, and Kitanemuk (Ergle 1999).

As with Numic Shoshonean groups, establishing fixed boundaries for the Serrano and Vanyume has proven to be difficult. Ethnographically, Serrano clans controlled the Upper Mojave River region as far as Victorville, and areas south of Ord Mountain in Lucerne Valley may have been occupied by either the Serrano or the Vanyume. The lower Mojave River and areas north of Ord Mountain were Vanyume territory (Smith et al. 1978). According to Kroeber (1925), the

Vanyume occupied the Mojave River north of Barstow and Daggett. Bean and Smith (1978) attribute the problems of identifying boundaries between the Vanyume and Serrano to a lack of reliable data, although this may be a function of failed attempts to impose European notions of territory on Native American groups.

Boundaries of nomadic peoples are necessarily fluid, and the exact boundaries of the Serrano/Vanyume and Kawaiisu are not known (Kroeber 1925). While the Vanyume were related linguistically to the Serrano, they differed in having friendly relations with the Mohave and Chemehuevi. Vanyume subsistence relied heavily on mesquite, cactus fruits, yucca, and tubers available in the Mojave River drainage. In the early literature, there are only occasional references to the study area and the Native Americans who once lived there (Beattie and Beattie 1951; Brown and Boyd 1922; Pierson 1970; Smith et al. 1978), though contact with Europeans may have occurred as early as 1771. By 1806, the Serrano and Vanyume were recruited into the mission systems, and most of them were removed from their homelands to the missions (Beattie and Beattie 1939). Missionization led to the loss of their native lifeways, but Serrano culture survived northeast of the San Gorgonio Pass. Vanyume populations dwindled rapidly and the last person to record Vanyume settlements was Jedediah Smith in 1827.

By 1975, most Serrano lived on two Southern California reservations—Morongo and San Manuel—where they participated in ceremonial and political affairs with other native Californians on a pan-reservation. According to Bean and Smith (1978), approximately 100 people claim Serrano descent today, which is less than the pre-contact estimates between 1,500 (Kroeber 1925:617) and 2,500 (Bean 1962-1972).

Mohave[2]

The Mohave, the most northern of the Yuman tribes, were originally called Aha Macav or "people who live along the river," and are thought to have occupied their territory since as early as A.D. 900 (Schroeder 1952). The known territory of the Mohave centered in the Mojave Valley and along the Colorado River; however, their area extended into the Mojave Desert and reports of Mohave activities extend north to the Great Basin, west to the Pacific Ocean, south to Yuma, Arizona, and southeast to Gila Bend (Kroeber 1951). The tribe was made up of three groups: the northern Matha lyathum, the central Hutto-pah, and the southern Kavi lyathum (Fort Mojave Indian Tribe 2012). There is some evidence that substantial Mohave occupation of the central Mojave Desert may have occurred while maintaining the main habitation areas along the Colorado River. Oral tradition from the Chemehuevi and Mohave suggests Mohave were living in the Mojave Sinks at some point; Chemehuevi tradition suggests that that Mohave were exterminated from the central Mojave Desert through warfare (Drover 1979; King and Casebier 1976). Archaeological remains from the Cronise Basin indicate influence from the Colorado River area (Drover 1979).

[2] The term "Mohave" generally refers to the native people that lived in the valley of the Colorado River. Although originally referring to the native people on the Arizona side of the Colorado River—"Mojave" historically referred to the people on the California side of the river—"Mohave" is now used generally to refer to the people, whereas "Mojave" usually refers to the desert area.

The Mohave were organized into patrilineal exogamous clans, but not all clan members lived in the same locality (Kroeber 1925; Stewart 1970-1971) and only women used the clan names (Bean and Vane 2002). The Mohave moved freely between groups and saw themselves as one people with a well-defined territory (Stewart 1970-1971) and were governed by a hereditary chief and leaders from the northern Matha lyathum, central Hutto-pah, and Kavi lyathum groups. Dreams and visions feature as a central concept in their culture as the Mohave received their knowledge and power from dreams, and all special talents or skills and success during life were dependent on proper dreaming (Bean and Vane 2002). The Mohave cremated their dead and all material possessions were burned with that person (Kroeber 1925).

Subsistence emphasized dry farming, which relied on the regular overflow of the Colorado River to irrigate crops along the banks and wild plant gathering (Forde 1931; Stewart 1947, 1965, 1983). Crops were planted with a digging stick after annual flooding events (Castetter and Bell 1951) and farming was both productive and reliable, though occasional crop failures occurred during years with late inundations or years with no flooding (Castetter and Bell 1951; Forde 1931; Fort Mojave Indian Tribe 2012). Wild plants, fruits, and roots (especially the mesquite bean) were harvested in the summer months. Mesquite trees were considered property, and permission was required before harvesting (Castetter and Bell 1951; Forde 1931; Kroeber 1925). Fish was the primary meat source, and traps and nets were the most common techniques used. Though apparently minimal, bow and arrow hunting of mountain sheep and deer occurred during the summer, and smaller game (e.g., rabbits) was hunted using throwing sticks, traps, and organized drives during the winter months (Stewart 1947). Material possessions were often unadorned, and clothing was minimal due to the warm climate. Pottery was made from sedimentary clay and crushed sandstone, coiled and patted with a paddle, dried, painted with ochre, and fired in open pits or rudimentary kilns (Bean and Vane 2002; Kroeber 1925). Pots, bowls, and ladles were decorated with geometric patterns. Women constructed unique pottery dolls for children, including dressing and human hair (Fort Mojave Indian Tribe 2012). The Mohave tended to trade for baskets; their own were often irregularly constructed (Bean and Vane 2002). Face tattooing with lines and dots was a common practice, it was believed that the spirit of a Mojave who died without face tattoos would go into a rat hole and remain (Bean and Vane 2002; Fort Mojave Indian Tribe 2012).

In 1604, New Mexico governor Don Juan Onate traveled through Mohave territory on an expedition searching for “the southern sea.” The Mohave provided directions and food, and accompanied the expedition through Mohave territory (Bolton 1916; Fort Mojave Indian Tribe 2012). Although no additional recorded contact occurred until the late 18th century, the Mohave were aware of continuing Spanish impact through their neighbors, and they acquired Spanish wheat and horses through the Quechans (Sherer 1994; Stewart 1983). Other early contact included Fray Francisco Garces in 1775 to 1776, who traveled west along a Mohave trade route (Coues 1900; Fort Mojave Indian Tribe 2012). He was impressed by the Mohave who he reported as being enthusiastic about baptism and noted the number of young people and children in contrast to other groups living along the river (Galvin 1967). No attempt was made by the Spanish to establish a mission. Franciscan missions along California’s coast were baptizing farther inland. Many of the baptized rebelled at the control exerted by the missions, fled into the San Jacinto and San Bernardino Mountains, and reached Mohave settlements on the Colorado

River. Because of the resentment toward the missions, the Mohave participated in and may have led an attack on Mission San Gabriel in 1810.

Beginning in 1826, the Mohave met with multiple fur trappers with varying success, partially due to the Mohave's reverence for beaver. Between 1826 and 1831, Mohave territory was visited by no fewer than seven hunting parties (Sherer 1994). The first expedition led by Jedediah Smith in 1826 was met by the Mohave with hospitality, including guides and foods. The next expedition led by James Ohio Pattie was met with hostility, and later violence, when the expedition marched through Mohave territory with beaver pelts they refused to trade. Some subsequent expeditions and trappers experienced hostile encounters, though others were welcomed and assisted (Bean and Vane 2002; Sherer 1994).

By 1850, the United States (U.S.) had acquired the southwest from Mexico, and the U.S. Army Corps of Engineers sent Captain Lorenzo Sitgreaves and an expedition to map and explore the area. Initially met with food and openness, the Mohave later attacked the expedition (Sherer 1994). In 1854, a scientific party, the Whipple Expedition, led by Lieutenant Amiel Weeks Whipple, met the Mohave with greater success. The goal was to find "a practical route for a railroad along the 35th parallel from the Mississippi River to the Pacific Ocean" (Sherer 1994). The Mohave traded and exchanged information with the expedition, and they were a valuable source of information to the scientists studying plants, animals, and minerals, as well as to the surveyors in finding a proposed route that would allow them to trade (Fort Mojave Indian Tribe 2012; Sherer 1994).

In 1857, the Beale Expedition—led by Edward Fitzgerald Beale, the superintendent of Indian Affairs in California—left wagon tracks and campsites for later use while surveying with camels through Mohave territory. Originally, the Mohave attempted to trade with the expedition but were met with hostility; the expedition was later attacked in 1858 as they attempted to cross the river. Two wagon trains were also attacked by the Mohave as they camped at the river; there appears to have been misunderstandings as the wagon trains inadvertently destroyed valuable tree stands and crops (Bean and Vane 2002). As a result, by 1859, a detachment of cavalry, headed by Colonel William H. Hoffman, was to establish a fort for the protection of wagon trains in the area (Bean and Smith 1978). In 1859, a supply group from Beale and a mail party from the Central Overland Mail Company were also attacked (Kroeber and Kroeber 1973). On April 23, 1859, the fort at Beale's Crossing was established. The Mohave accepted terms of surrender after 700 soldiers stood ready at the crossing. The terms included harassment-free travel through the territory, no opposition to the establishment of roads and posts, and nine hostages (Fort Mojave Indian Tribe 2012; Sherer 1994). Fort Mojave was closed in 1861 during the Civil War and the Mohave were asked to guard the buildings (Casebier 1975). The Mojave Road remained in use by miners and supplies (Bean and Vane 2002).

The Colorado River Indian Reservation (CRIR) was established in 1865 and some Mohave moved south to live with the Yavapai, Walapai, and Chemehuevi. Conditions were poor and approximately 500 Mohave remained on the reservation by the end of 1870, surviving on rations (Bean and Vane 2002). In 1890, the approximately 3,000 Mohave living around the fort were called Fort Mojave; the building and acreage were transferred to the Interior Department. Land set aside by the government to pay for railroads in the area, including the Atlantic and Pacific Railroad, were sold to settlers, and the Mohave lost rights to use their traditional lands. In 1904,

an allotment plan gave each tribal member 5 acres of irrigable land; the rest of the land was opened to non-Indian settlers who treated the Mohave poorly (Fontana 1958).

The fort became an industrial boarding school for the Mohave and other non-reservation Indians (Fort Mojave Indian Tribe 2012). From 1890 to 1931, all Mohave children were forced to live at the school and a persistent effort was made to replace their cultural traditions with American ones (Bean and Vane 2002). The Mohave were pressured to move to the CRIR as the railroad had taken so much land that traditional farming was no longer feasible. Proposed damming of the Colorado River would take even more (Bean and Vane 2002). With the Mohave's refusal to move, the approximately 14,000 acres belonging to Fort Mojave military post and an additional 17,328 acres were set aside as the Fort Mojave Indian Reservation in 1910-1911 (Bean and Vane 2002).

4.5.1.4 Historic Background

Although the earliest historical explorations of California are traced to 1542 with the arrival of the first Europeans, particularly the exploration of San Miguel Bay by Juan Rodriguez Cabrillo, the widely accepted start of the historical period is 1769 with the joint founding of the Mission San Diego de Alcalá and the Royal Presidio. The Hispanic period in California's history includes the Spanish Colonial (1769-1820) and Mexican Republic (1820-1846) periods. These periods are characterized by the transition from a religious and military-dominated society to civilian populations residing on large ranchos or pueblos (Chapman 1921).

The most significant influx of Euro-American populations into the Mojave Desert occurred during what is referred to as the American Period in California history, which began in 1848 with the American conquest of California and the California Gold Rush. In their headlong rush to the Pacific Coast, early California Euro-American emigrants passed over much of the Mojave Desert, which was envisioned as a vast expanse of hostile desert to be avoided or traversed as quickly as possible. Given the rich and diverse history of the Proposed Project area, the following subsections describe specific historical themes that are relevant to the Proposed Project area, which include transportation and electrical power for Southern California.

Transportation

The Proposed Project area encompasses several transportation corridors that have been used to traverse the Mojave Desert from prehistoric times to present. These trails, roads, highways, and railroads connected Nevada, Utah, Arizona, and New Mexico with the California coast. Major trails, roads, and railroads are discussed in the following subsections.

Old Spanish Trail

The Proposed Project area includes the historic Old Spanish Trail, which consisted of a number of different routes that extended from New Mexico to California. Between 1776 and 1849, Mexican traders utilized this trail in an effort to establish commercial relations with California. In 1829, New Mexican governor Francisco Xavier Chávez dispatched Antonio Armijo to establish a trade route between Santa Fe and California. With a group of 60 men, Armijo began his journey from Abiquiu, New Mexico on November 8, 1829, and traveled the Old Spanish Trail until arriving at Mission San Gabriel Arcángel in California on February 3, 1831. By the

1830s, emigrants and raiders were utilizing the Old Spanish Trail, which was the first commercial route through the American southwest. However, trading activities dwindled after the Treaty of Guadalupe Hidalgo was signed in 1848, ceding large portions of Mexican land to the U.S. (Crawford et al. 1999; Warren 1974, 2011). By 1869, portions of the trail had evolved into wagon roads for local travel, and the days of cross-country mule caravans on the Old Spanish Trail declined.

Mormon Road/Salt Lake Route/Santa Fe Trail

In 1843 and 1844, John C. Fremont launched two expeditions into the western frontier that eventually established the Mormon Road/Salt Lake Route/Santa Fe Trail. Fremont's explorations established routes that connected Santa Fe, New Mexico, and San Gabriel, California. Fremont's 1844 expedition developed a trail between Utah and California by way of southern Nevada. A description of Fremont's route was published in 1844, and the trail became quite popular with people traveling to the western states, particularly after the discovery of gold in California. Mormons often used the routes established by Fremont to carry supplies and establish missions between Utah and California. As a result, the Old Spanish Trail was re-named the Mormon Road (Warren 1974).

The State of California has established two Historic Landmarks associated with the Mormon Road/Salt Lake Route/Santa Fe Trail. The first is Historic Landmark Number 576, the Santa Fe and Salt Lake Trail Monument. The monument was erected in 1917 in honor of the pioneers of California who traveled the Santa Fe Trail and Salt Lake Route in 1849. The marker is located at the south end of Wagon Train Road, near the southeast corner of Interstate (I-) 15 and State Route (SR-) 138. The second landmark associated with the Mormon Road/Salt Lake Route/Santa Fe Trail is Historic Landmark Number 577, which is the Mormon Trail Monument. The Mormon Trail Monument is located in west Cajon Canyon along SR-138, approximately 3.6 miles west of I-15. This monument was erected in honor of the 500 Mormon pioneers that traveled to the San Bernardino Valley and established a prosperous community in 1851.

Mojave Trail/Mojave Road

The Proposed Project area also encompasses the Mojave Trail/Mojave Road (Mojave Road). The Mojave Trail was used by early explorers and surveyors to find railroad and wagon routes to California. The road was used briefly by the Central Overland Mail Company, but hostility with the Mohave made the route unsuccessful and directly contributed to the establishment of Fort Mojave (Casebier 1975). By 1864, the Mojave Road was a vital supply line, both military and civilian, to Arizona from California and carried mail, emigrants, politicians, provisions, and soldiers (Casebier 1975). Between 1870 and 1883, the road was used for renewed mining activities, ranching activities, and military functions. However, the use of Mojave Road declined after the completion of the railroad system in 1883.

Railroads

Desert geography and competition between railroad companies dictated placement of the first railroad south of the cross-desert Mojave Road. Between 1882 and 1883, Southern Pacific constructed a railroad from Mojave to Needles in California to forestall competition from the Atlantic & Pacific Railroad (A&P), which was controlled by the Atchison, Topeka, and Santa Fe

Railway (AT&SF). The A&P reached the eastern bank of the Colorado River in May 1883 and was connected to the AT&SF three months later. However, Southern Pacific's control of the track through the Mojave Desert precluded its usefulness to the AT&SF. In 1884, after the AT&SF threatened to build a line parallel to the Southern Pacific's route in order to allow traffic to pass, the AT&SF sold its desert track to the A&P.

In addition to the trans-desert route of the AT&SF Railway, entrepreneurs constructed shorter railroads to directly service settlements in the eastern Mojave. In 1893, the Nevada Southern Railway was constructed north from Goffs to Manvel (later known as Barnwell) to tap into the mining districts of southeastern California and southern Nevada. It promptly went bankrupt and was reorganized in 1895 as the California Eastern Railway. Six years later, the line was extended into the Ivanpah Valley, and in 1902, it was taken over by the AT&SF. Four years later, the Barnwell and Searchlight Railway was built from Barnwell to the mines at Searchlight, Nevada. After 1918, the AT&SF abandoned part of its line in the Ivanpah Valley and only ran trains past Barnwell as demand warranted. In 1923, AT&SF abandoned all of its lines north of Goffs due to unprofitable lines and substantial washouts.

The Tonopah & Tidewater Railroad (T&T) was constructed by Francis Marion "Borax" Smith between 1906 and 1907 to connect his borax mines near Death Valley to silver and gold mines in central Nevada. The history of the T&T is a story of success in overcoming formidable obstacles in the desert regions of California and Nevada. These obstacles included steep mountains, dry lakes, washes subject to flooding, and long expanses of uninhabited land devoid of trees and reliable sources of water. The great geologic forces that formed high-grade mineral deposits also created adverse conditions, which impeded the economic development of those resources.

A second transcontinental railroad crossed the eastern Mojave shortly after the beginning of the 20th century and runs through the middle of the Mojave National Preserve today. In 1905, Senator William A. Clark of Montana, a mining magnate, built the San Pedro, Los Angeles & Salt Lake Railroad (SP, LA & SL) south from Salt Lake City, across Utah, through southern Nevada, and across the Mojave Desert to its Pacific Ocean terminus outside of Los Angeles. In 1921, Union Pacific (UP) took full control of the SP, LA & SL, and built the Kelso Depot in 1924. Although the UP is not as busy as the BNSF railroad, the UP remains a major transcontinental railroad in the Mojave Desert.

United States Route 66

The historic U.S. Route 66 began as an interregional highway route linking Chicago to Los Angeles, and has transformed over time into a national historic treasure. The intention of U.S. Route 66 was to provide a national thoroughfare to the main streets of rural and urban communities along the route. Prior to the development of U.S. Route 66, the majority of the small towns in the along the route had no prior access to a major national thoroughfare. While legislation for public highways first appeared in 1916, with revisions in 1921, it was not until 1925 that the government executed its plan for national highway construction. Officially, the numerical designation "66" was assigned to the Chicago-to-Los Angeles route in the summer of 1926. With the designation, U.S. Route 66 became one of the nation's principal east-west arteries. U.S. Route 66 is now an approximately 2,400-mile road that travels from Jackson Boulevard and Michigan Avenue in Chicago, Illinois to Los Angeles, California.

Mining

The first confirmed gold discovery in San Bernardino County occurred at Salt Spring along the Mormon Trail in 1849. One of the primary historic mining locations in the Proposed Project area was the Vulcan Mine within the Providence Mountains. In 1863, silver was first discovered in the Providence Mountains in the Macedonia Canyon area. The Bonanza King Silver Mine in the Providence Mountains was established 1880 and within months, the Trojan Mining District was organized (Vredenburgh 2005; Shumway et al. 1980). Bullion was first shipped out of this mine in 1883 upon completion of the Southern Pacific.

Gold mining in the Providence Mountains did not flourish until 1893 after the price of silver decreased. Gold mines in the Providence Mountains included the Queen, Relief, Red Cloud, and Mexican Mines. Profitable mines in the Proposed Project area included the Hidden Hill and Mable Mines, which were discovered in 1894 and produced a large amount of money in a short amount of time until their closure in June 1914 (Shumway et al. 1980).

Historic-Era Electrical Power in the Mojave Desert

Southern California lacked sufficient electrical power to accommodate uncontrolled population growth and urban expansion at the beginning of the 20th century. After exploiting hydrological sources in California, power companies soon explored options in other states for power production. Attention soon turned to the Colorado River, where it was agreed that the river needed to be harnessed with a dam for the purposes of irrigation, drinking water, and power generation (Blair et al. 2004). To achieve this goal, a survey party comprised of men from Southern California Edison Company (SCE) and the U.S. Geological Survey embarked on a long journey to explore and study the Colorado River from Green River, Utah, to Needles, California (Myers 1984). The federal government was also interested in building a dam on the Colorado River. To provide the power necessary to construct the dam, Southern Sierras Power Company was contracted to construct a 132,000 volt power line from San Bernardino, California, to the Nevada rim of the canyon overlooking the dam construction site (Wilbur and Ely 1933). Once the dam was completed, the focus turned to the power plant, which began producing electricity in October 1936.

SCE traces its origins back to 1886, with its formal incorporation in 1909, and its last major acquisition in 1964. In 1891, the San Bernardino Light & Power Company constructed a 5 kilovolt (kV) transmission line that spanned approximately 28 miles from its powerhouse at Pomona, California to San Bernardino, California. The earliest identified lattice steel towers employed within the existing SCE system were installed for the Kern River-Los Angeles Transmission Line in 1907. The towers were designed by engineer James A. Lighthipe, and were modeled on modified windmills.

In the late 1960s, the first 500 kV high-voltage lines were constructed in the U.S. under the Pacific Intertie project. During this time, the Pacific Northwest had an excess of power during the summer months when the California power supply was low. The Bonneville Power Administration, Portland General Electric, Pacific Gas & Electric Company (PG&E), and SCE built two 500 kV interconnecting long-distance transmission lines to form the Pacific Northwest-Southwest Intertie. SCE's initial portion of the 500 kV line consisted of an approximately 114-mile transmission line between PG&E's Midway substation (approximately 30 miles west of

Bakersfield) and SCE's Vincent substation (approximately 30 miles north of Los Angeles). SCE shortly thereafter built additional 500 kV transmission lines and 500 kV substations, expanding across the desert to Eldorado and Mohave Substations and the Four Corners area. SCE no longer operates and maintains the 500 kV line to Four Corners within Arizona.

SCE's 66 kV, 220 kV, and 500 kV systems were developed by 1930, 1941, and 1971, respectively. These dates help to establish the period of significance for high- and extra high-voltage technology up to 500 kV and help determine NRHP and CRHR eligibility. The period of significance by voltage for SCE transmission lines is considered to be 1907 through 1930 for 66 kV transmission lines, 1912 through 1941 for 67 kV to 230 kV transmission lines, and 1965 to 1970 for 500 kV transmission lines. SCE substations constructed prior to 1950 that retain a historic building are considered potentially eligible for inclusion in the NRHP or CRHR and require individual evaluation.

4.5.2 Cultural Resources Records Search and Survey Results

4.5.2.1 Formal Records Searches

As previously described, a 1-mile-buffer records was conducted for the APE for the Proposed Project. A Class III pedestrian was also conducted for the APE, and the results are currently being reviewed by the BLM. The results of the records search and survey would identify historical and archaeological resources in the Proposed Project area and determine their NRHP, CRHR, and/or NSRHP eligibility. The results of the records search and survey would be considered during the final design of the Proposed Project to minimize impacts on cultural resources during construction. The following resources would be utilized to identify site records and cultural resources in the Proposed Project area:

- South Central Coastal Information Center
- California Historical Resources Information System
- NRHP
- CRHR
- Sacred Lands File held by the Native American Heritage Commission (NAHC)

4.5.2.2 Published and Unpublished Literature Review Results

Cultural resources were identified following a review of cultural resources literature, peer-reviewed scientific journals, publicly available Nevada State Register of Historic Places (NVSRHP) listings, and publicly available NRHP listings for the State of Nevada.

As previously discussed, the historic U.S. Route 66 and the Old Spanish Trail are located in the Proposed Project area. U.S. Route 66 is crossed by the existing Eldorado-Lugo and Lugo-Mohave 500 kV Transmission Lines. U.S. Route 66 was designated by the California Legislature as historic in 1991.

Within California, the previously described Old Spanish Trail is crossed by the existing Eldorado-Lugo 500 kV Transmission Line. This trail is a historic trade route connecting Los Angeles with Santa Fe, New Mexico, and was designated as a National Historic Trail by Congress in 2002. In Nevada, the Old Spanish Trail is crossed by the Eldorado-Mohave 500 kV Transmission Line.

Based on the presence and migration of Native American tribes in the Mojave Desert from 12000 B.P. to present, sensitive cultural resources are likely present in the Proposed Project area. As previously described, archaeological resources in the Proposed Project area may include projectile points, engravers, knives, scrapers, milling stones, hammer stones, figurines, ritual bows, arrows, and shell beads.

4.5.2.3 Nevada State Register of Historic Places and the National Register of Historic Places in the State of Nevada

Publicly available NVSRHP and NRHP listings provided on the Nevada State Historic Preservation Office (SHPO) website were reviewed to identify cultural resources in the vicinity of the Proposed Project. Based on a review of the information available, no historical resources were listed within 1 mile of the Proposed Project.

4.5.3 Cultural Resources Regulatory Setting

Federal, State, and local regulations were reviewed for applicability to the Proposed Project.

4.5.3.1 Federal

In addition to the federal regulations described in the following subsections, federal authorizations would also be required because a majority of the land within the Proposed Project area is under the jurisdiction of the BLM, NPS, BOR, and DoD.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consult with the Advisory Council on Historic Preservation to take into account the effects of their undertakings on historic properties, and the procedures in Title 36, Part 800 of the Code of Federal Regulations (CFR) define how federal agencies meet these responsibilities. Title 36, Section 800.5(a) of the CFR describes procedures for evaluating a project's adverse effects on cultural resources. An adverse effect is found when a federal undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Examples of adverse effects are provided in Title 36, Section 800(a)(2) of the CFR and include, but are not limited to:

- Physical destruction of or damage to all or part of the property
- Alteration of a property—including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access—that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines
- Removal of the property from its historic location
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance

- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance

National Register of Historic Places Eligibility Criteria

The NPS regulation provided in Title 36, Part 60 of the CFR is the primary reference for determining the historical significance of a cultural resource. The regulation defines the criteria by which a property is determined to be eligible for listing in the NRHP as follows:

> "The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction; or (d) that have yielded or may be likely to yield information important in history or prehistory."

Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) of 1979 provides for the protection of archaeological resources that are more than 100 years old and that occur on federally owned or controlled lands. The statute makes it unlawful to excavate and remove items of archaeological interest from federal lands without a permit, and it defines the process for obtaining such a permit from the responsible federal agency. This process includes a 30-day notification to interested persons, including Indian tribes, by the agency to receive comments regarding the intended issuing of a permit. The law establishes a process for prosecuting persons who illegally remove archaeological materials from lands subject to ARPA. The law also provides for curation of archaeological artifacts, ecofacts, notes, records, photographs, and other items associated with collections made on federal lands. Standards for curation are provided in Title 36, Part 79 of the CFR.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1970 requires the federal government to carry out its plans and programs in such a way as to "preserve important historic, cultural, and natural aspects of our national heritage" (42 U.S. Code [U.S.C.] § 4331[b][4]). The intent of the statute is to require that agencies obtain sufficient information regarding historic and cultural properties (including consulting, for example, appropriate members of the public; local, State and other federal government agencies; and Indian tribes, organizations, and individuals) to

make a determination of the historical and cultural significance of affected historic or cultural properties and to take into account whether irreversible adverse impacts to such resources can or should be avoided, minimized, or mitigated.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 provides a process for museums and federal agencies to return certain Native American "cultural items" (i.e., human remains, funerary objects, sacred objects, and objects of cultural patrimony) to lineal descendants, culturally affiliated Indian tribes (i.e., tribes recognized by the Secretary of the Interior), and Native Hawaiian organizations, if the legitimate cultural affiliation of the cultural items can be determined according to the law. Museums, as defined under the statute, are required to inventory cultural items in their possession and determine which items can be repatriated to the appropriate party. Cultural items intentionally or unintentionally excavated and removed from federal lands may be subject to NAGPRA.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 directs federal agencies to consult with Native Americans to determine appropriate procedures to protect the inherent rights of Native Americans to believe, express, and exercise their traditional religions. These rights include, but are not limited to, access to sites, use and possession of sacred objects, and freedom to worship through ceremonials and traditional rites.

Executive Order 13007

Executive Order (EO) 13007 directs that, in managing federal lands, each executive branch agency with statutory or administrative responsibility for the management of federal lands will, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, do the following:

- Accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners
- Avoid adversely affecting the physical integrity of such sacred sites

Where appropriate, agencies will maintain the confidentiality of sacred sites. The EO requires that affected agencies establish a process for implementing the EO.

Executive Order 13175

EO 13175 was issued to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the U.S. government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes. "Indian tribe" means an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. 479a). Relevant federal agencies are directed to establish policies and procedures for implementing consultation with federally recognized tribes on a government-to government basis.

Executive Order 13287

EO 13287 establishes that, among other things, it is the policy of the federal government to provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of the historic properties owned by the federal government, and by promoting intergovernmental cooperation and partnerships for the preservation and use of historic properties. The federal government will recognize and manage the historic properties in its ownership as assets that can support department and agency missions while contributing to the vitality and economic well-being of the nation's communities and fostering a broader appreciation for the development of the U.S. and its underlying values.

4.5.3.2 State

California

State regulations affecting cultural resources include Public Resources Code (PRC) Sections 21083.2 and 21084.1, and California Environmental Quality Act (CEQA) Guidelines Section 15064.5 and Appendix G.

Cultural resources, as defined in CEQA, include prehistoric- and historic-era archaeological sites, districts, and objects; historic buildings, structures, objects and districts; and traditional/cultural sites or the locations of important historic events. CEQA Guidelines Section 15064.5 states that a project may have a significant environmental effect if it causes a substantial adverse change in the significance of a historic resource. Additionally, the Lead Agency must consider properties that are eligible for listing on the CRHR, defined as a unique archaeological resource in PRC Section 21083.2, or defined as a tribal cultural resource in PRC Section 21074.

California Public Utilities Commission General Order 131-D

Pursuant to California Public Utilities Commission (CPUC) General Order (G.O.) 131-D, the CPUC has sole and exclusive jurisdiction over the siting and design of electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities in the State of California. Under CEQA, the CPUC is the Lead Agency with respect to such Proposed Project elements within the State of California. SCE is required to comply with G.O. 131-D and is seeking a Permit to Construct from the CPUC for the Proposed Project.

California Register of Historical Resources

Cultural resources include archaeological and historic objects, sites and districts, historic buildings and structures, and sites and resources of concern to local Native Americans and other ethnic groups. Cultural resources that meet the criteria of eligibility for the CRHR are termed "historic resources." Archaeological resources that do not meet CRHR criteria also may be evaluated as "unique," and impacts to such resources could be considered significant.

A site meets the criteria for inclusion on the CRHR if:

- It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage
- It is associated with the life or lives of a person or people important to California's past

- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

- It has yielded, or may be likely to yield, information that is important to prehistory or history

A resource eligible for the CRHR must meet one of the criteria of significance described previously and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the NRHP, but it may still be eligible for listing in the CRHR.

The CRHR automatically includes the following:

- California properties listed on the NRHP and those formally determined eligible for the NRHP

- California Registered Historical Landmarks from No. 770 onward

- Those California Points of Historical Interest that have been evaluated by the Office of Historic Preservation (OHP) and that have been recommended to the State Historical Resources Commission for inclusion on the CRHR

Other resources that may be nominated to the CRHR include the following:

- Historical resources with a significance rating of Category 3 through 5
- Individual historical resources
- Historical resources contributing to historic districts
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as a historic preservation overlay zone

Impacts to "unique archaeological resources" also are considered under CEQA, as described under PRC Section 21083.2. A unique archaeological resource is an archaeological artifact, object, or site that clearly demonstrates that—without merely adding to the current body of knowledge—there is a high probability that it meets one of the following criteria:

- It contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information
- It has a special and particular quality, such as being the oldest of its type or the best available example of its type
- It is directly associated with a scientifically recognized, important prehistoric or historic event or person
- A non-unique resource is one that does not fit the above criteria

Impacts to tribal cultural resources are also considered under CEQA, as described in PRC Section 21084.2. PRC Section 21074(a) defines a tribal cultural resource as a site, feature, place,

cultural landscape, sacred place, or object with cultural value to a California Native American tribe that is either of the following:

- Included or determined to be eligible for inclusion in the CRHR
- Included in a local register of historical resources, as defined in PRC Section 5020.1(k)

The Lead Agency, in its discretion and supported by substantial evidence, would determine whether a tribal cultural resource is significant pursuant to criteria in Section 5024.1(c). In applying these criteria, the Lead Agency would consider the significance of the resource to a California Native American tribe.

Nevada

Nevada Revised Statutes Section 704.865

Nevada Revised Statutes (NRS) Section 704.865 provides that "A person, other than a local government, shall not commence to construct a utility facility in the State without first having obtained a permit therefor from the Commission. The replacement of an existing facility with a like facility, as determined by the Commission, does not constitute construction of a utility facility." The Public Utilities Commission of Nevada is the Lead Agency for compliance with the Nevada Utility Environmental Protection Act.

Nevada State Register of Historic Places

According to NRS Section 383.21 and Section 101 (C)(1)(c) of the NHPA, the Nevada SHPO must maintain an inventory of the State of Nevada's cultural resources to assist federal, State, and local agencies planning projects to avoid impacts to important cultural resources. The NVSRHP is an official list maintained by the Nevada SHPO to identify and preserve historical, architectural, archaeological, and cultural resources that are important to Nevadans. The NVSRHP recognizes cultural resources that may have local, State, or national significance and that possess physical integrity that is representative of the period during which the resource was important. Eligible resources may include a building, structure, site, object, landscape, or collection of resources known as a historic district.

Nevada Revised Statutes Section 383.170: Procedure upon Discovery of Indian Burial Site; Permissible Excavation

In the event that a previously unknown Native American burial site or grave is inadvertently discovered during construction, mining, logging, farming, or other activities, NRS Section 383.170 requires that the discovery must be immediately reported to the Nevada SHPO. The Nevada SHPO would then consult with the Nevada Indian Commission and notify the appropriate Native American tribe. With the permission of the landowner, the Native American tribe may inspect the site and recommend an appropriate means for the treatment and disposition of the site and all artifacts and human remains associated with the site.

If the site is located on private land and the Native American tribe fails to make a recommendation within 48 hours, or if the landowner rejects the recommendation, the landowner must reinter with appropriate dignity all artifacts and human remains in a location not subject to future disturbance. If the burial site is located on public lands and action is necessary to protect

the site from immediate destruction, the Nevada SHPO may require that a professional archaeologist excavate the site and remove all artifacts and human remains. Excavation activities would be conducted under the supervision of the appropriate Native American tribe.

4.5.3.3 Local

The CPUC has sole and exclusive jurisdiction over the siting and design of the Proposed Project components located in the State of California. Pursuant to CPUC G.O. 131-D, Section XIV.B, "Local jurisdictions acting pursuant to local authority are preempted from regulating electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities subject to the CPUC's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters." Consequently, public utilities are directed to consider local regulations and consult with local agencies, but the county and cities' regulations are not applicable as the county and cities do not have jurisdiction over the Proposed Project. Accordingly, the following discussion of local regulations is provided for informational purposes only. The Proposed Project is subject to local regulations in the State of Nevada.

General plans and municipal codes were reviewed for relevant local policies pertaining to cultural resources in the vicinity of the Proposed Project components located in California and Nevada. General plans reviewed for the State of California included the County of San Bernardino 2007 General Plan and the City of Hesperia General Plan 2010. To identify local policies in the State of Nevada, the Clark County Comprehensive Plan, South Clark County Land Use Plan, Laughlin Land Use Plan, and Boulder City Master Plan were reviewed. Relevant goals, policies, and objectives are discussed in the following subsections.

California

The CPUC has sole and exclusive jurisdiction over the siting and design of the Proposed Project components located in the State of California. Pursuant to CPUC G.O. 131-D, Section XIV.B, "Local jurisdictions acting pursuant to local authority are preempted from regulating electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities subject to the CPUC's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters." Consequently, public utilities are directed to consider local regulations and consult with local agencies, but the county and cities' regulations are not applicable as the county and cities do not have jurisdiction over the Proposed Project. Accordingly, the following discussion of local regulations is provided for informational purposes only.

County of San Bernardino

County of San Bernardino 2007 General Plan

The Conservation Element of the County of San Bernardino 2007 General Plan contains the following policies that are relevant to the Proposed Project:

- Policy CO 3.1: Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity.

- Policy CO 3.2: Identify and protect important archaeological and historic cultural resources in all lands that involves disturbance of previously undisturbed ground.

- Policy CO 3.5: Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.

City of Hesperia

City of Hesperia General Plan 2010

The Conservation Element of the City of Hesperia General Plan 2010 contains the following policies that are relevant to the Proposed Project:

- Policy CN-5.1: Encourage the preservation of historical, paleontological, and cultural resources.

- Policy CN-5.2: In those areas where surveys and records indicate historical, cultural or paleontological resources may be found, appropriate surveys and record searches shall be undertaken to determine the presence of such resources, if any.

Nevada

The Proposed Project is subject to local regulations in the State of Nevada, which are described in the following subsections.

Clark County

Clark County Comprehensive Plan

The Conservation Element of the Clark County Comprehensive Plan contains the following policies that are relevant to the Proposed Project:

- Historic Preservation Policy 1: Clark County encourages programs designed to preserve and maintain historical, cultural, and archaeological resources that will help to enhance intellectual and social experiences within Clark County.

- Environmentally Sensitive Lands (ESLs) Policy 2: The recommendations and implementation measures should be considered in the context of the communities, urban and outlying, where the ESLs are located.

South Clark County Land Use Plan

The South Clark County Land Use Plan does not contain any specific cultural resource goals or policies that are relevant to the Proposed Project.

Laughlin Land Use Plan

The Laughlin Land Use Plan does not contain any specific cultural resource goals or policies that are relevant to the Proposed Project.

City of Boulder City

Boulder City Master Plan

The Boulder City Master Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

4.5.4 Cultural Resources Significance Criteria

The significance criteria for assessing the impacts to cultural resources are derived from the CEQA Environmental Checklist.[3] According to the CEQA Checklist, a project causes a potentially significant impact if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5
- Disturb any human remains, including those interred outside of formal cemeteries
- Cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074

State regulations affecting cultural resources include PRC Sections 21083.2 and 21084.1, and CEQA Guidelines Section 15064.5 and Appendix G. CEQA requires the Lead Agency to carefully consider the effects a project may have if it causes a substantial adverse change in the significance of a historic or archaeological resource.

Cultural resources as defined in CEQA include prehistoric- and historic-era archaeological sites, districts, and objects; historic buildings, structures, objects, and districts; and traditional/cultural sites or the locations of important historic events. CEQA Guidelines Section 15064.5 states that a project may have a significant environmental effect if it causes a substantial adverse change in the significance of a historic resource. Additionally, the Lead Agency must consider properties eligible for listing on the CRHR or that are defined as a unique archaeological resource in PRC Section 21083.2.

4.5.5 Cultural Resources Impact Analysis

4.5.5.1 Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Construction

Less-Than-Significant Impact. The majority of the construction activities associated with the Proposed Project would occur within existing or to-be-acquired franchise areas and rights-of-way (ROWs) and within existing substations. However, construction activities requiring ground disturbance could potentially disturb buried cultural deposits or archaeological sites in the

[3] CEQA is a statute that requires State of California and local agencies in California to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. There is no CEQA equivalent for the State of Nevada. Therefore, in the absence of such regulations, the Proposed Project (including components in Nevada) has been evaluated against the CEQA significance criteria. Where specific Nevada environmental regulations exist, a discussion has been included in the impact analysis for the Proposed Project.

Proposed Project area. Ground-disturbing activities would include construction of the proposed Newberry Springs and Ludlow Series Capacitors; installation of the proposed Barstow, Kelbaker, and Lanfair Fiber Optic Repeaters; installation of interset towers; installation of distribution facilities; installation of underground and overhead fiber optic cable; grading for new and existing access roads; and relocation of existing towers and grading required to address 16 potential overhead clearance discrepancies.[4]

Construction activities would also include the removal of the existing overhead ground wire (OHGW), modification of existing towers to support optical ground wire (OPGW), and installation of OPGW and underground fiber optic cable on approximately 235 miles of SCE's existing Eldorado-Mohave and Lugo-Mohave 500 kV Transmission Lines. As previously discussed, the historic U.S. Route 66 and the Old Spanish Trail are crossed by these existing transmission lines. However, construction activities associated with these Proposed Project components would include the use of existing access and spur roads. As a result, no impacts to cultural resources would occur.

Modifications within the existing Eldorado, Lugo, and Mohave Substations include upgrading existing series capacitor banks at Eldorado and Lugo Substations, replacement of the existing capacitor bank at Mohave Substation, installation of new terminal equipment, and removal of two existing tubular steel poles (TSPs) and installation of two new TSPs at Lugo Substation. All work at the substations would be within the existing substation walls and/or fences. The Eldorado, Lugo, and Mohave Substations were constructed in 1970, 1968, and 1969, respectively. Although not formally evaluated, these substations were built within the past 50 years and are likely not eligible for listing under the NRHP. As a result, no impacts to cultural resources would occur.

All potentially NRHP-eligible or archaeologically and historically sensitive sites identified during records searches and field surveys would be evaluated to determine eligibility for listing under the NRHP, CRHR, and/or the NSRHP. All potentially NRHP-eligible or archaeologically and historically sensitive sites identified within the APE would be considered Environmentally Sensitive Areas (ESAs) and avoided per Applicant-Proposed Measure (APM-) CUL-01. Per APM-CUL-02, SCE would perform cultural resource surveys prior to construction for any Proposed Project areas that were not previously surveyed, which may include new or modified staging areas, pull sites, or other work areas. Cultural resources discovered during these surveys would be subject to the mitigation measures and requirements specified in the Cultural Resource Management Plan (CRMP). Prior to construction, SCE would implement APM-CUL-03, which includes the preparation of a CRMP. The primary objectives of the CRMP would be the management, avoidance, and/or minimization of potential adverse effects on cultural resources. The CRMP would require the demarcation of all ESAs with proper signage prior to construction.

[4] SCE has defined "discrepancies" as potential clearance problems between an energized conductor and its surroundings, such as the structure, another energized conductor on the same structure, a different line, or the ground. SCE has identified approximately 16 discrepancies along the Eldorado-Lugo, Eldorado-Mohave, and Lugo-Mohave 500 kV Transmission Lines where minor grading, or relocation, replacement, or modification of transmission, subtransmission, or distribution facilities are needed to address CPUC G.O. 95 and National Electrical Safety Code overhead clearance requirements.

Signage would include protective fencing, flagging, or other markers to protect ESAs from inadvertent trespass during construction within 50 feet of ground-disturbing activities.

The CRMP would also specify monitoring requirements for the identification of cultural resources during construction and would outline procedures for the inadvertent discovery of cultural resources during construction. The CRMP would also specify roles and responsibilities of jurisdictional agencies for the long-term management of identified cultural resources in the APE.

As described in Section 3.9.2, Worker Environmental Awareness Training in Chapter 3, Project Description, SCE would implement the Worker Environmental Awareness Program (WEAP) as a best management practice (BMP) to train workers and establish procedures for treating previously unidentified resources. The WEAP would provide construction personnel with instruction on compliance with APMs and mitigation measures developed after pre-construction surveys. Additional objectives of the WEAP include instruction on the roles of cultural resource monitors and the appropriate treatment of areas designated as ESAs.

Based on the consideration of historical resources in the Proposed Project area during the final design of the Proposed Project and the implementation of APMs and SCE's WEAP, no substantial adverse changes related to a historical resource are anticipated. Therefore, impacts would be less than significant.

Operation

No Impact. Operation and Maintenance (O&M) activities associated with the Proposed Project would be similar to those currently performed by SCE for existing facilities, and generally include repairing conductors, washing or replacing insulators, repairing or replacing other hardware components, repairing or replacing poles and towers, tree trimming, brush and weed control, and access road maintenance, among other things. O&M practices would also include routine inspections and emergency repair within substations and ROWs, which would require the use of vehicles and equipment. SCE also inspects the transmission and subtransmission overhead facilities in a manner consistent with CPUC G.O. 165, which requires observation a minimum of once per year, but inspection typically occurs more frequently to ensure system reliability. Following construction of the mid-line series capacitors,[5] additional O&M activities would consist of monthly and annual inspections, as well as equipment testing and maintenance of emergency generators, ranging from once a year to once every five years. Additional testing, inspections, and maintenance of the building, site, generator, and fuel tank would also be required at the new fiber optic repeater facilities every six months to once a year.

O&M of the mid-line series capacitors and fiber optic repeater sites would involve minimal ground disturbance (if any) within previously disturbed areas. Therefore, O&M activities would not cause a substantial adverse change in the significance of a historical resource, and no impact would occur.

[5] The Proposed Project includes construction of two new 500 kV mid-line series capacitors—the proposed Newberry Springs Series Capacitor and Ludlow Series Capacitor.

4.5.5.2 Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Construction

Less-Than-Significant Impact. As previously described, the majority of the construction activities associated with the Proposed Project would occur within existing or to-be-acquired franchise areas and ROWs and within existing substations. However, construction activities requiring ground disturbance could potentially affect buried cultural deposits or archaeological sites in the Proposed Project area. As previously discussed, all potentially NRHP-eligible or archaeologically and historically sensitive sites identified during records searches and field surveys would be evaluated to determine eligibility for listing under the NRHP, CRHR, and/or the NSRHP. All potentially NRHP-eligible or archaeologically and historically sensitive sites identified within the APE would be considered ESAs. Prior to construction, SCE would implement APM-CUL-03, which includes the preparation of a CRMP. The primary objectives of the CRMP would be the management, avoidance, and/or minimization of potential adverse effects on cultural resources. The CRMP would require the demarcation of all ESAs with proper signage prior to construction. Signage would include protective fencing, flagging, or other markers to protect ESAs from inadvertent trespass during construction within 50 feet of ground-disturbing activities.

The CRMP would specify monitoring requirements for the identification of cultural resources during construction, and would outline procedures to implement during the inadvertent discovery of cultural resources. The CRMP would also specify roles and responsibilities of jurisdictional agencies for the long-term management of identified cultural resources in the APE.

As described in Section 3.9.2, Worker Environmental Awareness Training in Chapter 3, Project Description, SCE would implement the WEAP as a BMP to train workers and establish procedures for treating previously unidentified resources. The WEAP would provide construction personnel with instruction on compliance with APMs and mitigation measures developed after pre-construction surveys. Additional objectives of the WEAP include instruction on the roles of cultural resource monitors and the appropriate treatment of ESAs.

Based on the consideration of archaeological resources in the Proposed Project area during the final design of the Proposed Project and the implementation of APMs and SCE's WEAP, no substantial adverse changes related to an archaeological resource are anticipated. Therefore, impacts would be less than significant.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the mid-line series capacitors and fiber optic repeater sites would involve minimal ground disturbance (if any) within previously disturbed areas. Therefore, O&M activities would not cause a substantial adverse change in the significance of an archaeological resource, and no impact would occur.

4.5.5.3 Would the project disturb any human remains, including those interred outside of formal cemeteries?

Construction

Less-Than-Significant Impact. As previously described, the majority of the construction activities associated with the Proposed Project would occur within existing or to-be-acquired franchise areas and ROWs and within existing substations. Although known burial features and potential locations of human remains would be avoided, cultural resources, including Native American human remains, could potentially be encountered during ground-disturbing construction activities. It is not always possible to predict where Native American human remains might occur outside of formal cemeteries. Ground-disturbing activities could disturb human remains, including those interred outside of formal cemeteries. However, implementation of the WEAP would help workers identify potential human remains and establish procedures for stopping work and notifying SCE's cultural resource staff and construction supervisors in the event that human remains are detected.

If human remains are inadvertently discovered during construction activities in the State of California, all work in the vicinity of the find would cease within a 100-foot radius of the remains, and the area would be secured and protected to ensure that no additional disturbance occurs. The county coroner would then be contacted in accordance with California Health and Safety Code (HSC) Section 7050.5. The coroner would have two working days to examine the remains after being notified. If the coroner determines that the remains are Native American (i.e., not subject to the coroner's authority) and located on private or State land, the coroner has 24 hours to notify the NAHC of the determination. The NAHC is required under PRC Section 5097.98 to identify a Most Likely Descendant (MLD), notify that person, and request that they inspect the remains and make recommendations for treatment and/or disposition. The MLD would have 48 hours to inspect the find and make recommendations for treatment of the human remains. Work would be suspended in the area of the find until the MLD and landowner confer on the mitigation and treatment of the human remains. However, the human remains and associated burial items would be reburied, with appropriate dignity, on the property in a location not subject to further subsurface disturbance if one of the following occurs:

- The NAHC is unable to identify an MLD
- The MLD identified fails to make a recommendation
- The recommendation of the MLD is rejected and the mediation provided in PRC Section 5097.94(k) fails to provide measures acceptable to the landowner

This procedure would ensure that the remains are treated in accordance with Section 15064.5(d) and (e) of the CEQA Guidelines, California HSC Section 7050.5, and PRC Sections 5097.98 and 5097.99.

SCE would comply with the applicable regulations set forth in the State of California and Nevada to ensure the protection of human remains and burial sites during construction. Based on implementation of the WEAP and APMs, and the consideration of sites that may contain human remains during the final design of the Proposed Project, impacts to human remains during construction would be reduced to a less-than-significant level.

Within the State of Nevada, if a previously unknown Native American burial site or grave is inadvertently discovered during construction, NRS Section 383.170 requires that the discovery must be immediately reported to the Nevada SHPO. The Nevada SHPO would then consult with the Nevada Indian Commission and notify the appropriate Native American tribe. With the permission of the landowner, the Native American tribe may inspect the site and recommend an appropriate means for the treatment and disposition of the site, all artifacts, and all human remains associated with the site.

If the site is located on private land and the Native American tribe fails to make a recommendation within 48 hours, or the landowner rejects the recommendation, the landowner must reinter with appropriate dignity all artifacts and human remains in a location not subject to future disturbance. The relocation of human remains and artifacts would be conducted at the landowner's expense.

If the burial site is located on public lands and action is necessary to protect the site from immediate destruction, the Nevada SHPO may require that a professional archaeologist excavate the site and remove all artifacts and human remains. Excavation activities would be conducted under the supervision of the appropriate Native American tribe. Any other excavation of Native American burial sites in Nevada must be conducted by a professional archaeologist. In addition, written notification must be provided to the Administrator of the Nevada SHPO, and written consent is required from the appropriate Native American tribe prior to initiating excavation activities. If the appropriate Native American tribe fails to respond to the request for excavation within 60 days after the request is sent by certified mail, the excavation would be considered approved.

As described in Section 4.5.3, Cultural Resources Regulatory Setting, cultural resources intentionally or unintentionally excavated and removed from federal lands may be subject to NAGPRA if the resources are confirmed to be of Native American origin. In the event that Native American items are inadvertently discovered on federal lands, NAGPRA requires that the responsible federal agency must be immediately notified by telephone and in writing. Following the receipt of the written notification, the federal agency must certify the receipt of it within three days. The activity that resulted in the discovery must be stopped immediately after discovery and may not resume until 30 days after the applicable federal agency certifies the receipt of the notification. The federal agency would also be responsible for taking immediate steps, if necessary, to further secure and protect the remains and/or items that were discovered. During this process, the federal agency would notify any MLDs or applicable Native American tribes of the discovery, obtain written confirmation of the notification, and initiate consultation, if necessary. Following consultation, the federal agency would prepare, approve, and sign a written plan of action, which would specify the treatment, care, and handling of the discovered remains and cultural resources.

SCE would comply with the applicable federal and State regulations to ensure the protection of human remains and burial sites during construction. Based on implementation of the WEAP and APMs, and the consideration of sites that may contain human remains during the final design of the Proposed Project, impacts to human remains during construction would be reduced to less-than-significant levels.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the mid-line series capacitors and fiber optic repeater sites would involve minimal ground disturbance (if any) within previously disturbed areas. Therefore, impacts to human remains from O&M activities are not anticipated.

4.5.5.4 Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code section 21074?

Construction

Significance Determination Pending Completion of Tribal Consultation. As previously described, the majority of the construction activities associated with the Proposed Project would occur within existing or to-be-acquired franchise areas and ROWs and within existing substations.

Although SCE is not the CEQA Lead Agency responsible for tribal consultations per PRC Section 21080.3.1, SCE would submit a request to the NAHC for a search of its Sacred Lands File and a list of Native American individuals and organizations that might have knowledge of cultural resources in the Proposed Project area. Upon receipt of this information, SCE would contact the individuals and organizations listed by the NAHC.

As previously discussed, SCE would also prepare a CRMP per APM-CUL-03 and implement its WEAP to ensure the avoidance and minimization of potential adverse effects on tribal cultural resources. Tribal consultation is still in progress and tribal resources may be identified as a result of the consultation process. Therefore, the impacts associated with tribal cultural resources have not been determined.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the mid-line series capacitors and fiber optic repeater sites would involve minimal ground disturbance (if any) within previously disturbed areas. Therefore, impacts to tribal cultural resources from O&M activities are not anticipated.

4.5.6 Paleontological Resources Environmental Setting

The majority of the Proposed Project is located within the Mojave Desert geomorphic province. Several segments of the Lugo-Mohave 500 kV Transmission Line east of Lugo Substation are located within the Transverse Ranges geomorphic province. The Mojave Desert geomorphic province is a “broad interior region of isolated mountain ranges separated by expanses of desert plains” (CGS 2002) that is effectively wedged to the west between the Sierra Nevada (by the Garlock fault) and the Transverse Ranges (by the San Andreas fault). The western Mojave Desert acts as a sediment catch from the Mojave, Sierra Nevada, and Transverse Ranges. By the early Miocene or late Oligocene, an erosional surface rising eastward from the Garlock-San

Andreas convergence (at the western end of the Mojave Desert) had developed, and depression of the region began. Depression resulted in the Mojave Desert geomorphic province becoming an internal drainage area, with deposits of Miocene, Pliocene and Pleistocene sediments accumulating in local basins (Norris and Webb 1990). Miocene sedimentary units deposited during this time contain basalt, volcanic mud flows, and air-fall tuff. Repeated glacial advance and retreat during the Pleistocene created numerous lakes, which provided conditions for the preservation of fossils. The Proposed Project area is comprised of a thick cover of Holocene- to Pleistocene-aged alluvium and lacustrine deposits, composed of materials eroded off the surrounding mountains and accumulated during these periods of glacial advance and retreat. Older Miocene and Pliocene sediments are less likely to be exposed in the Proposed Project area, but generally underlie surface sediments at unknown depths.

4.5.7 Paleontological Resources Regulatory Setting

4.5.7.1 Federal

The management and preservation of paleontological resources on public lands is prescribed under various laws, regulations, and guidelines. For the past several decades, the BLM has used the Federal Land Policy and Management Act (FLPMA) of 1976 as the legislative foundation for its paleontological resource management policies. The BLM has also developed general procedural guidelines (Manual H-8720-1; Instructional Memorandum [IM] 2008-009; IM 2009-011) for the management of paleontological resources (BLM 2007, 2008). Paleontological resource management objectives include the evaluation, management, protection, and location of fossils on BLM-managed lands. Management policy also includes measures to ensure that proposed land use projects do not inadvertently damage or destroy scientifically significant paleontological resources.

The National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.)

NEPA recognizes the continuing responsibility of the federal government to “preserve important historic, cultural, and natural aspects of our national heritage” (42 U.S.C. § 4321).

Federal Land Policy and Management Act of 1976, as amended (43 U.S.C. 1701 et seq.)

The FLPMA defines significant fossils as unique, rare, or particularly well-preserved; an unusual assemblage of common fossils; being of high scientific interest; or providing important new data concerning (1) evolutionary trends, (2) development of biological communities, (3) interaction between or among organisms, (4) unusual or spectacular circumstances in the history of life, (5) or anatomical structure.

Omnibus Public Land Management Act of 2009

The Omnibus Public Land Management Act (OPLMA) directs the Secretaries (Interior and Agriculture) to act jointly in order to manage and protect paleontological resources on federal land using “scientific principles and expertise.” The OPLMA incorporates most of the recommendations of the report of the Secretary of the Interior entitled Assessment of Fossil Management on Federal and Indian Lands (2000) in order to formulate a consistent paleontological resources management framework. In passing the OPLMA, Congress officially recognized the scientific importance of paleontological resources on some federal lands by

declaring that fossils from these lands are federal property that must be preserved and protected. The OPLMA codifies existing policies of the BLM, NPS, U.S. Forest Service (USFS), BOR, and U.S. Fish and Wildlife Service, and provides the following:

- Uniform criminal and civil penalties for illegal sale and transport, and theft and vandalism of fossils from federal lands
- Uniform minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants)
- Uniform definitions for "paleontological resources" and "casual collecting"
- Uniform requirements for curation of federal fossils in approved repositories

Federal legislative protections for scientifically significant fossils apply to projects that take place on federal lands (with certain exceptions, such as the DoD), involve federal funding, require a federal permit, or involve crossing state lines. Because a portion of the Proposed Project area occurs on BLM-managed lands, federal protections for paleontological resources for those areas apply under NEPA, FLPMA, and OPLMA-Paleontological Resources Preservation. All paleontological work on BLM- and NPS-administered lands must be approved and coordinated by the BLM. SCE would acquire the necessary permits, as required. All fossils collected from federal agency lands must be housed in a federally approved paleontological repository. The paleontological repository would be determined following Lead Agency coordination and the issuance of applicable permits for the Proposed Project.

4.5.7.2 State

California

Public Resources Code Section 5097.5

Section 5097.5 of the PRC Section states the following:

> "A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands."

As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the State, or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, the California Department of Transportation and local project proponents are required to comply with PRC Section 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

Nevada

The NRS are the current codified laws of the State of Nevada. Nevada addresses paleontological resource protections under the two chapters within Title 33 of the NRS, which are described in the following subsections.

Nevada Revised Statutes, Title 33, Chapter 381: State Museums

NRS Section 381.195 defines a "prehistoric site" as "any archeological or paleontological site, ruin, deposit, fossilized footprints and other impressions, petroglyphs and pictographs, habitation caves, rock shelters, natural caves, burial ground or sites of religious or cultural importance to an Indian tribe."

NRS Section 381.197 permits are required to investigate, explore, or excavate historic or prehistoric sites, and penalties apply. Exceptions include actions taken under an agreement with the OHP pursuant to NRS Section 383.430. The regulations stipulate that a historic or prehistoric site on federal or State lands cannot be investigated, explored, or excavated—and objects cannot be removed from these sites—without a valid and current permit issued pursuant to NRS Sections 381.195 to 381.227.

Nevada Revised Statutes, Title 33, Chapter 383: Historic Preservation and Archeology

NRS Section 383.011 defines "cultural resources" as "any objects, sites or information of historic, prehistoric, archeological, architectural, or paleontological significance." This was added to the Statutes of Nevada in 2015 under Senate Bill 20, Chapter 18 by the Committee on Natural Resources.

4.5.7.3 Local

California

County of San Bernardino

County of San Bernardino 2007 General Plan

The Conservation Element of the County of San Bernardino 2007 General Plan contains the following goal and policy that are relevant to the Proposed Project:

- Goal D/CO6: Protect cultural and paleontological resources within the Desert Region
- Policy CO 3.4, Program 4: In areas of potential but unknown sensitivity, field surveys prior to grading will be required to establish the need for paleontologic monitoring

City of Hesperia

City of Hesperia General Plan 2010

The Conservation Element of the City of Hesperia General Plan 2010 contains the following policies that are relevant to the Proposed Project:

- Policy CN-5.1: Encourage the preservation of historical, paleontological, and cultural resources

- Policy CN-5.2: In those areas where surveys and records indicate historical, cultural or paleontological resources may be found, appropriate surveys and record searches shall be undertaken to determine the presence of such resources, if any

Nevada

Clark County

Clark County Comprehensive Plan

The Conservation Element of the Clark County Comprehensive Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

South Clark County Land Use Plan

The South Clark County Land Use Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

Laughlin Land Use Plan

The Laughlin Land Use Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

4.5.8 Paleontological Resources Records Search and Survey Results

4.5.8.1 Paleontological Resources Locality Searches

Paleontological resources locality searches were conducted at the Natural History Museum of Los Angeles County and the Nevada State Museum, which included a review of mapped resources known to exist in the area and an analysis of Proposed Project maps, engineering drawings, and technical data. The potential for paleontological resources to occur within the Proposed Project was determined on the basis of a paleontological review of the Proposed Project vicinity and mapped geological units that underlie the Proposed Project area. As part of the analysis, the geologic units in the Proposed Project vicinity were primarily classified according to the PFYC System, a predictive resource management tool that was originally developed and refined by the USFS and BLM. In light of this information, potential impacts to paleontological resources from the Proposed Project were assessed.

4.5.8.2 Paleontological Resources Locality Search Results

Locality searches conducted at the Natural History Museum of Los Angeles County and the Nevada State Museum revealed no vertebrate fossil localities within the boundaries of the Proposed Project. However, fossil localities were identified outside of the Proposed Project area within similar sedimentary deposits that underlie the Proposed Project. The closest vertebrate fossil locality was identified in the City of Victorville, west of Spring Valley Lake, and it consisted of a fossilized camel. Based on the absence of recorded fossil localities in the Proposed Project area, paleontological resources were further evaluated based on a review of geologic units in the Proposed Project area. The paleontological sensitivity of each geologic unit in the Proposed Project area was then determined using the BLM's PFYC System.

4.5.8.3 Paleontological Sensitivity Analysis

A total of 36 geologic units that occur within the Proposed Project area were identified and assigned paleontological sensitivity ratings according to the criteria of the BLM's PFYC System. The Crowder Formation is the geologic unit with the greatest potential for fossil recovery within the Proposed Project area. This formation is considered to have a very high PFYC sensitivity

ranking (PFYC 5) and is known to be especially fossiliferous. The Crowder Formation is located in several locations east of Lugo Substation, across Summit Valley Road. These locations consist primarily of fossil-bearing paleosols that contain a diverse assemblage of invertebrates (slugs and snails), reptiles (lizards and snakes), insectivores, rodents, peccaries (pig relative), antelopes, camels, horses, rhinoceroses, deer, rabbits, and pikas (rabbit relative) (Lindsay and Reynolds 2008; Reynolds 1983, 1984, 1992; Woodburne 1991).

A total of 14 units in the Proposed Project area are considered to have a high (PFYC 4) sensitivity rating. Geologic units with this rating exhibit a high occurrence of significant fossils or significant invertebrate or plant fossils, though the occurrence and predictability of these fossils may vary. The high PFYC ranking is largely due to the fact that these deposits are Pleistocene in age or may contain early Holocene or Pleistocene alluvial sediments. As described in Section 4.6, Geology and Soils, the majority of the Proposed Project area is primarily located on Pliocene- to Holocene-age and Quaternary-age alluvium and marine deposits. However, almost no information is available in the literature (both primary and unpublished reports) regarding the thickness of Holocene sediments mapped at the surface across the Mojave Desert. This lack of information makes it impossible to determine with any certainty at what depth the potential to encounter scientifically significant fossils increases from low to high. In rare cases, such as a locality in the community of Rosamond (which is approximately 60 miles northwest of the City of Hesperia in California), Holocene sediments mapped at the surface yielded Pleistocene-age mammoth fossils at depths of less than 3 feet (Wilkerson et al. 2011). Although the age of mapped Holocene units in the Proposed Project area cannot be determined based on available data, and because the depths of early Holocene and Pleistocene sediments are variable, mapped Holocene units are generally considered to have low sensitivity at depths above 5 feet.

An additional 21 geologic units in the Proposed Project area are considered to have PFYC rankings of low or very low. These units typically include volcanic, plutonic, or metamorphic rocks that have extremely limited to no fossil preservation potential. While volcanic and metamorphic rocks have been known to produce fossils in very rare and isolated circumstances, the Mojave Desert region is not known to contain these geologic units.

4.5.8.4 Field Survey

Fieldwork authorization requests to establish the APE and conduct field surveys were submitted to the BLM offices on November 18, 2016. Surveys for paleontological resources were conducted, and once compiled, the results will be reviewed and released by the BLM.

4.5.9 Paleontological Resources Significant Criteria

The significance criteria for assessing the impacts to paleontological resources come from the CEQA Environmental Checklist. According to the CEQA Checklist, a project causes a potentially significant impact if it would:

- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

Appendix G (part V) of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, which states, “a project will normally result in a significant impact

on the environment if it will …disrupt or adversely affect a paleontological resource or site or unique geologic feature, except as part of a scientific study." PRC Section 5097.5 specifies that any unauthorized removal of paleontological remains is a misdemeanor.

4.5.10 Paleontological Resources Impact Analysis

4.5.10.1 Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

Construction

Less-Than-Significant Impact. As previously described, the majority of the construction activities associated with the Proposed Project would occur within existing or to-be-acquired franchise areas and ROWs and within existing substations. However, construction activities requiring ground disturbance could potentially disturb or destroy significant paleontological resources. Ground-disturbing activities would include construction of the proposed Newberry Springs and Ludlow Series Capacitors; installation of the proposed Barstow, Kelbaker, and Lanfair Fiber Optic Repeaters; installation of interest towers; installation of distribution facilities; installation of underground and overhead fiber optic cable; grading for new and existing access roads; and relocation of existing towers and grading required to address 16 potential overhead clearance discrepancies.

Construction activities would also include the removal of the existing OHGW, modification of existing towers to support OPGW, and installation of OPGW and underground fiber optic cable on approximately 235 miles of SCE's existing Eldorado-Mohave and Lugo-Mohave 500 kV Transmission Lines. These activities would include the use of existing access and spur roads. As a result, no impacts to paleontological resources would occur as a result of these activities.

Modifications within the existing Eldorado, Lugo, and Mohave Substations would include upgrading the existing series capacitor banks at Eldorado and Lugo Substations, replacement of the existing capacitor bank at Mohave Substation, installation of new terminal equipment, the removal of two existing TSPs, and the installation of two new TSPs at Lugo Substation. This work would take place within the existing wall and/or fence of the established substation. As a result, no impacts to paleontological resources would occur.

As previously described, no fossil localities were identified within the boundaries of the Proposed Project area. However, several geologic units designated with a high paleontological sensitivity underlie the Proposed Project area. Therefore, SCE would implement APM-CUL-04 prior to construction of the Proposed Project, which includes the preparation of a Paleontological Resource Mitigation and Monitoring Plan (PRMMP). The PRMMP would outline procedures for monitoring in areas that contain sensitive paleontological resources, as well as recovery and treatment protocols to implement upon the discovery of sensitive paleontological resources during ground-disturbing construction activities. Implementation of the mitigation protocols outlined in the PRMMP would reduce impacts to a less-than-significant level.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M

activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the mid-line series capacitors and fiber optic repeater sites would involve minimal ground disturbance (if any) within previously disturbed areas. Therefore, O&M activities would not directly or indirectly destroy paleontological resources, and no impact would occur.

4.5.11 Applicant-Proposed Measures

The following APM(s) would be implemented to reduce cultural and paleontological resources impacts associated with the Proposed Project:

- **APM-CUL-01: Environmentally Sensitive Areas.** Where operationally feasible, all NRHP- and CRHR-eligible resources would be protected from direct impacts by Proposed Project redesign (i.e., relocation of the line, ancillary facilities, or temporary facilities or work areas). Avoidance mechanisms would include fencing off areas such as ESAs for the duration of the Proposed Project or as outlined in the CRMP. If avoidance of NRHP- or CRHR-eligible resources is not feasible, SCE would prepare and submit a Historic Properties Treatment Plan (HPTP) to outline the treatment of cultural resources that cannot be avoided. The HPTP would be submitted to the appropriate agencies for review and approval. All treatment measures outlined in the HPTP would be implemented at least 30 days before the start of construction.

- **APM-CUL-02: Cultural Resources Survey**. SCE would perform surveys prior to construction for any Proposed Project areas not yet surveyed (e.g., new or modified staging areas, pull sites, or other work areas). Resources discovered during the surveys would be subject to APM-CUL-03.

- **APM-CUL-03: CRMP.** SCE would prepare and submit for approval a CRMP to guide all cultural resource management activities during Proposed Project construction. Management of cultural resources would follow the standards and guidelines established by the NPS for implementing Section 106 of the NHPA ("Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines," 48 Federal Register 190 [29 September 1983], pp. 44716-44742). The CRMP would be submitted to the BLM for review and approval at least 30 days before the start of construction.

  The CRMP would define and map all known or assumed eligible NRHP and CRHR properties in or within 100 feet of the Proposed Project APE and would identify the cultural values that contribute to their NRHP and CRHR eligibility. A cultural resources protection plan would be included that details how NRHP- and CRHR-eligible properties would be avoided and protected during construction. Measures would include, at a minimum, designation and marking of ESAs, archaeological monitoring, personnel training, and effectiveness reporting. The plan would detail the measures to be used; how, when, and where they would be implemented; and how protective measures and enforcement would be coordinated with construction personnel.

  The CRMP would also define any additional areas that are considered to be of high sensitivity for the discovery of buried NRHP- and CRHR- eligible cultural resources,

including burials, cremations, or sacred features. The CRMP would detail provisions for monitoring construction in these high-sensitivity areas. It would also detail procedures for halting construction, making appropriate notifications to agencies, officials, and Native Americans, and assessing NRHP and CRHR eligibility in the event that unknown cultural resources are discovered during construction. For all unanticipated cultural resource discoveries, the CRMP would detail the methods, the consultation procedures, and the timelines for assessing NRHP and CRHR eligibility, formulating a mitigation plan, and implementing treatment. Mitigation and treatment plans for unanticipated discoveries would be reviewed by the appropriate Native Americans and approved by the BLM, and the OHP prior to implementation.

The CRMP would include provisions for analysis of data in a regional context, reporting of results within one year of the completion of field studies, curation of artifacts (except from private land) and data (e.g., maps, field notes, archival materials, recordings, reports, photographs, and analysts' data) at a facility that is approved by the BLM, and dissemination of reports to local and State repositories, libraries, and interested professionals. The BLM would retain ownership of artifacts collected from BLM-managed lands. SCE would attempt to gain permission for artifacts from privately held land to be curated with the other project collections. The CRMP would specify that archaeologists and other discipline specialists conducting the studies must meet the Professional Qualifications Standards mandated by the OHP.

- **APM-CUL-04: Paleontological Resource Mitigation and Monitoring Plan.** SCE would prepare and submit to the BLM for review and approval a PRMMP that is consistent with the following requirements:

  - The PRMMP would be prepared by a qualified paleontologist, would be based on Society of Vertebrate Paleontology guidelines, and would meet all regulatory requirements. The qualified paleontologist would have a master's degree or a Doctor of Philosophy in paleontology, would have knowledge of the local paleontology, and would be familiar with paleontological procedures and techniques.

  - The PRMMP would include a site-specific investigation to identify construction impact areas of moderate (PFYC 3a) to very high (PFYC 5) sensitivity for encountering significant resources and the approximate depths where those resources are likely to be encountered for each Proposed Project component.

  - The PRMMP would require the qualified paleontological monitor to monitor all construction-related ground disturbance in sediments determined to have a moderate (PFYC 3a) to very high (PFYC 5) sensitivity.

  - The PRMMP would define monitoring procedures and methodology, and would specify that sediments of undetermined sensitivity must be monitored on a part-time basis (as determined by the qualified paleontologist). Sediments with very low or low sensitivity would not require paleontological monitoring. The qualified paleontological monitor would have at least a Bachelor of Science in geology or

paleontology, as well as demonstrated field experience in the collection and identification of fossil material.

- The PRMMP would state which resources would be avoided and which would be recovered for their data potential. Where possible, recovery is preferred over avoidance in order to mitigate the potential for looting of paleontological resources. The PRMMP would also detail methods of recovery, preparation and analysis of specimens, final curation of specimens at a federally accredited repository, data analysis, and reporting.

- The PRMMP would specify that all paleontological work undertaken by SCE on public lands managed by the BLM would be carried out by qualified, permitted paleontologists with the appropriate current paleontological resources use permit.

4.5.12 Mid-Line Series Capacitor Site Alternatives

Consistent with Section 15126.6(d) of the CEQA Guidelines, this Proponent's Environmental Assessment analyzes alternatives to the Proposed Project. Section 5.2, Description of Project Alternatives and Impact Analysis identifies and compares the construction and O&M of SCE's Proposed Project with its alternatives, including alternatives that did not meet key Proposed Project objectives and were not carried forward. The alternatives retained for a full evaluation—alternative Newberry Springs Series Capacitor and Ludlow Series Capacitor sites—are analyzed in relation to cultural and paleontological resources in the following discussion.

The alternative Newberry Springs Series Capacitor site is approximately 3.1 acres and is located approximately 930 feet to the northeast of its proposed location along the Eldorado-Lugo 500 kV Transmission Line. The alternative Ludlow Series Capacitor site is approximately 3.1 acres and is located approximately 970 feet to the southwest of its proposed location along the Lugo-Mohave 500 kV Transmission Line.

Based on the proximity of the proposed and alternative Newberry Springs Series Capacitor sites, the potential to encounter historic, archaeological, and paleontological resources would be the same at both sites. The standard practices and procedures implemented as part of the CRMP would be similar at the alternative Newberry Springs Series Capacitor site and the proposed mid-line series capacitor site. In addition, both sites are underlain by Quaternary alluvium, which is designated with a high paleontological sensitivity. Therefore, potential impacts to cultural and paleontological resources during construction and O&M of the alternative Newberry Springs Series Capacitor site would be similar to impacts resulting from construction and O&M of the proposed mid-line series capacitor site. In addition, APMs discussed in Section 4.5.11, Applicant-Proposed Measures would be applied to construction of the alternative Newberry Springs Series Capacitor to avoid or minimize potential impacts to cultural and paleontological resources.

Potentially eligible cultural resource sites are located in the vicinity of the alternative site for the Ludlow Series Capacitor, which would result in greater impacts to cultural resources. Both the proposed and alternative Ludlow Series Capacitor sites are underlain by Quaternary alluvium, which is designated with a high paleontological sensitivity. Therefore, potential impacts to

cultural and paleontological resources during construction and O&M of the alternative Ludlow Series Capacitor site would be similar to impacts resulting from construction and O&M of the proposed mid-line series capacitor site. In addition, APMs discussed in Section 4.5.11, Applicant-Proposed Measures would be applied to construction of the alternative Ludlow Series Capacitor to avoid or minimize potential impacts to cultural and paleontological resources.

4.5.13 References

Bean, Lowell J. (1962-1972). *Serrano Fieldnotes*. Manuscript in Bean's Possession.

Bean, Lowell J., and Charles R. Smith. (1978). Serrano. In *California*, edited by Robert F. Heizer, pp. 570-574. Handbook of North American Indians, Vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Bean, Lowell J., Sylvia Brakke Vane. (2002). *The Native American Ethnography and Ethnohistory of Joshua Tree National Park*. Report submitted to the National Park Service by Cultural Systems Research, Inc. Menlo Park, California.

Beattie, George W., and Helen P. Beattie. (1939). *Heritage of the Valley: San Bernardino's First Century*. San Pasqual Press, Pasadena, California.

Beattie, George W., and Helen P. Beattie. (1951). *Heritage of the Valley: San Bernardino's First Century*. Biobooks, Oakland, California.

Bettinger, Robert L., and Jelmer Eerkens. (1999). Point Typologies, Cultural Transmission, and the Spread of Bow-and-Arrow Technologies in the Prehistoric Great Basin. *American Antiquity* 64(2):231-242.

Bischoff, Matt C. (2009a). *Desert Training Center/California-Arizona Maneuver Area, 1942-1944: Historic and Archaeological Contexts, Volume I: California*. University of Arizona Press, Tucson.

Bischoff, Matt C. (2009b). *Desert Training Center/California-Arizona Maneuver Area, 1942-1944: Historic and Archaeological Contexts, Volume II*: Arizona. University of Arizona Press, Tucson.

Bischoff, Matt C., R. Scott Baxter, and Rebecca Allen. (2010). *Documenting the Desert Training Center and California-Arizona Maneuver Area Cultural Landscape* (Draft). Prepared for California Energy Commission. Past Forward, Inc.

Blair, L.M., Wedding, J.R., Rose, S.F., Riddle, J.E., and Annette J. Smith. (2004). *Kern River 2003 Expansion Project, California - Volume II: Cultural Resource Data Recovery Report*. With contributions by C. N. Warren, H. T. Ore, J. T. Watson, and D. C. Smee. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas. Prepared for Kern River Gas Transmission.

BLM and NPS. (2013). *Old Spanish Trail Official Map and Guide*. Retrieved July 17, 2013, from http://www.nps.gov/olsp/planyourvisit/brochures/html.

BLM. (1986). *Desert Training Center California-Arizona Maneuver Area Interpretive Plan*. U.S. BLM, California Desert District Office, Riverside, California.

BLM. (2007). *Instruction Memorandum No. 2008-009*. Retrieved September 24, 2014, from http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/20080/im_2008-009.print.html.

BLM. (2008). *Instruction Memorandum No. 2009-011*. Retrieved September 24, 2014, from http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2009/IM_2009-011.html.

BLM. (2009). PFYC System.

BLM. (2011). World War II Desert Training Center, California-Arizona Maneuver Area. Retrieved June 9, 2011, from www.blm.gov/ca/st/en/fo/needles/patton.html.

Bolton, Herbert E. (1916). *Spanish Exploration in the Southwest, 1542-1706*. Charles Scribner's Sons, New York.

Bright, William. (1975). Two Notes on Takic Classification. Paper presented at the Third Annual Friends of Uto-Aztecan Conference, Flagstaff, Arizona. June 19-20, 1975. Copy Manuscript No. 76-77 in National Anthropological Archives, Smithsonian Institution, Washington, D.C.

Brow, J. and J. Boyd. (1922). *History of San Bernardino and Riverside Counties*. Lewis Publishing Company, Chicago.

Campbell, E.W., Crozier, Campbell, W.H., Antevz, E., Amsden, C., Barbieri, J.A., and Francis D. Bode. (1937). *The Archaeology of Pleistocene Lake Mohave: A Symposium*. Southwest Museum Papers No. 11. Los Angeles, California.

Casebier, Dennis G. (1975). *The Mojave Road.* California Tales of the Mojave Road Publishing Company, Norco, California.

Casstetter, E. F., and W. H. Bell. (1951). *Yuman Indian Agriculture. Primitive Subsistence on the Lower Colorado and Gila Rivers.* University of New Mexico Press, Albuquerque.

Chapman, Charles E. (1921). *A History of California: The Spanish Period.* New York: Macmillian.

CGS. (2002). California Geomorphic Provinces. Note 36.

Coues, Elliot (translator). (1900). *On the Trail of a Spanish Pioneer, the Diary and Itinerary of Francisco Garcés (Missionary Priest) in his Travels through Sonora, Arizona and California 1775-1776*. Two volumes. Francis Harper, New York.

Crawford, Mark, Heidler, D.S., and Heidler, J.T., Consulting Editors. (1999) *Building Hoover Dam: An Oral History of the Great Depression*. Maxwell Macmillian. Canada; New York.

Davis, C. Alan, and Gerald A. Smith. (1981). Newberry Cave. San Bernardino County Museum Association, Redlands, California.

Davis, Emma Lou. (1965). An Ethnography of the Kuzedika Paiute of Mono Lake, California. *University of Utah Anthropological Papers* 75:1-56. Salt Lake City, Utah.

Donnan, C. B. (1964). A Suggested Cultural Sequence for the Providence Mountains, Eastern Mojave Desert. *Annual Reports of the University of California Archaeological Survey* 1963-1964:1-23.

Drover, C. E. (1979). The Late Prehistoric Human Ecology of the Northern Mohave Sink, San Bernardino County, California. Ph.D. dissertation. Department of Anthropology, University of California, Riverside.

DuBarton, A. E., Spaulding, W.G., Kelly, M.S., and J. H. Cleland. (1991). *City of Las Vegas Land Transfer, Final Report on Archaeological and Paleontological Testing of Three Sites along the Eglington Escarpment*. Prepared for the BLM, Las Vegas, Nevada.

Ergle, Robert G. (1999). *Native California Guide: Weaving the Past and Present.* Trees Company Press, San Francisco, California.

Euler, Robert C. (1966). *Southern Paiute Ethnohistory*. Glen Canyon Series 28. University of Utah Anthropological Papers No. 78. Salt Lake City, Utah.

Euler, Robert C. (1972). *The Paiute People*. Indian Tribal Series, edited by John I. Griffin. Series Scientific Editors, Henry F. Dobyns and Robert Euler. Indian Tribal Series, Phoenix.

Fontana, Bernard L. (1958). History of the Colorado River Reservation. A report prepared for the Bureau of Indian Affair by the Bureau of Ethnic Research, Department of Anthropology, University of Arizona. Tucson: University of Arizona.

Forbes, J.D. (1963). *Warriors of the Colorado: The Yumans of the Quechan Nation and Their Neighbors.* Norman, University of Oklahoma Press.

Forde, C. Daryll. (1931). Ethnography of the Yuma Indians. *University of California Publications in American Archaeology and Ethnology* 28(4):83-278.

Fort Mojave Indian Tribe. (2012). Mojave Tribe. Retrieved September 14, 2012, from http://www.nps.gov/moja/historyculture/mojave-tribe.htm.

Fowler, Don D., and Catherine S. Fowler. (1971). *Anthropology of the Numa: John Wesley Powell's Manuscript on the Numic Peoples of Western North American 1868-1880*. Smithsonian Institution Press, Washington, D.C.

Fowler, Don D., and David B. Madsen. (1986). Prehistory of the Southeastern Area. In *Great Basin*, edited by W. L. d'Azevedo, pp. 173-182. Handbook of North American Indians, Vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Galvin, John. (1967). *A Record of Travels in Arizona and California, 1775-1776, by Francisco Garcés*. John Howell-Books, San Francisco.

Grayson, Donald K. (1993). The *Desert's Past: A Natural Prehistory of the Great Basin*. Smithsonian Institution Press, Washington, D.C.

Hall, S. A. (1985). Quaternary Pollen Analysis and Vegetational History of the Southwest. In *Pollen Records of Late Quaternary North American Sediments*, edited by V. Bryant, Jr., and R. Holloway, pp. 95-124. American Association of Stratigraphic Palynologists Foundation, Dallas, Texas.

Kelly, Isabel. (1934). Southern Paiute Bands. *American Anthropologist*, New Series 36(4):548-560. Washington, D.C.

Kelly, Isabel. (1964). *Southern Paiute Ethnography*. University of Utah Anthropological Papers No. 69. Salt Lake City, Utah.

Kelly, Isabel T., and Catherine S. Fowler. (1986). Southern Paiute. In *Great Basin*, edited by W. L. d'Azevedo, pp. 368-397. Handbook of North American Indians, Vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

King, Chester, and Dennis Casbier. (1976). *Background to Historic and Prehistoric Resources of the East Mojave Desert Region.* Prepared for U.S. Department of the Interior, BLM, California Desert Planning Program, Riverside, California. Archaeological Research Unit, University of California, Riverside (reprinted in 1981). NADB No. 1060290.

Kowta, Makoto. (1969). *The Sayles Complex: A Late Milling Stone Assemblage from Cajon Pass and the Ecological Implications of its Scraper Planes*. University of California Publications in Anthropology No. 6. Berkeley.

Kroeber, Alfred. (1907). *The Religion of the Indians of California*. University of California Publications in American Archaeology and Ethnology 4(6). University Press, Berkeley, California.

Kroeber, Alfred. (1925). *Handbook of the Indians of California*. Dover Publications Inc., New York.

Kroeber, Alfred. (1951). A Mohave Historical Epic. *Anthropological Records* 11(2):71-176. Berkeley: University of California Press.

Kroeber, Alfred. (1959). *Ethnographic Interpretations 1-6*. University of California Publications in American Archaeology and Ethnology, Vol. XLVII, 1956-1959. University of California Press.

Kroeber, Alfred. (1976). *Handbook of California Indians*. Second Edition. California Book Company, Ltd., Berkeley, California.

Kroeber, A.L., and Clifton Kroeber. (1973). *A Mohave War Reminiscence, 1854-1880*. University of California Publications in Anthropology 10. Berkeley: University of California Press.

Lindsay, E.H. and R.E. Reynolds. (2008). Heteromyid rodents from the Miocene faunas of the Mojave Desert, Southern California. *Natural History Museum of Los Angeles County, Science Series*, 41:213-235

Lyneis, Margaret M. (1982). Prehistory in the Southern Great Basin. In *Man and Environment in the Great Basin*, edited by David B. Madsen and James F. O'Connell, pp. 172-185. Society for American Archaeology Papers No. 2. Washington, D.C.

Lyneis, Margaret M. (1995). The Virgin Anasazi, Far Western Puebloans. *Journal of World Prehistory* 9(2):199-241.

Lyneis, Margaret M., Clark, J., McCarty, R., and Tara Shepperson. (1978). *ArchaeologicaElement: Historic Preservation Assessment and Planning Process, City of Las Vegas*. Department of Anthropology, University of Nevada-Las Vegas. Cultural Resource Report 4-1-4.

Meller, Sidney L., Sgt. (1946). *The Desert Training Center and C-AMA* Study No. 15. War Department Special Staff Historical Division – Army Ground Forces.

Myers, William. (1984). *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*. Trans-Anglo Books, Glendale, California.

Nevada SHPO. (2010). State and National Registers. Retrieved September 20, 2016, from http://shpo.nv.gov/state-and-national-registers.

Norris, Robert M. and Robert Wallace Webb. (1990). *Geology of California.* John Wiley & Sons, Hoboken, New Jersey.

NPS. (2016). Guidance for NPS Compliance with NAGPRA. Retrieved January 4, 2017, from https://www.nps.gov/archeology/sites/print/AppendixR_020806.doc.

NPS. (2010). Historic American Engineering Record No. NV-45: Boulder Dam-San Bernardino (115 kV) Transmission Line.

NPS. (2016). National Historic Trails & Routes. Retrieved September 20, 2016, from https://www.nps.gov/nagpra/MANDATES/INDEX.HTM.

NPS. (2016). National NAGPRA. Retrieved January 4, 2017, from http://imgis.nps.gov/html/?viewer=nht.

Parsons. (2010). *Site Inspection Report Camp Young Riverside County, California* (Draft Final). Prepared for U.S. Army Corps of Engineers Southwest IMA Region.

Pierson, E. (1970). *The Mojave River and Its Valley.* Arthur H. Clarke Co., Glendale.

Reynolds, R.E. (1983). Paleontologic salvage, Highway 138 Borrow Cut, Cajon Pass, San Bernardino County, California. Report for State of California, Department of Transportation, District VIII, San Bernardino, 205 pp.

Reynolds, R.E. (1984). Miocene faunas of the lower Crowder Formation, California: a preliminary discussion. In San Andreas Fault-Cajon Pass to Wrightwood, R.L. Hester and D.E. Hallinger (eds.), pp. 17-22. American Association of Petroleum Geologists, Pacific Section, AAPG Spring Picnic, Los Angeles, California, 120 pp.

Reynolds, R.E. (1990). Paleontologic Mitigation Program, Cajon Pass Truck Escape Ramp, Cajon Summit, San Bernardino County, California. Caltrans, District 8, San Bernardino

Reynolds, R.E. (1992). Paleontologic mitigation program, Highway 138 Widening, Phase I, Cajon Pass, San Bernardino County, California. Report for State of California Department of Transportation, District VII, San Bernardino, 135 pp.

Reynolds, R.E., R.L. Reynolds, and A.F. Pajak III. (1991). *Blancan, Irvingtonian, and Rancholabrean(?) land mammal age faunas from western Riverside County, California*. In Inland southern California: the last 70 million years. M.O. Woodburne, R.E. Reynolds, and D.P. Whistler (eds.) *San Bernardino County Museum Association Quarterly*, 38(3-4):37-40.

Reynolds, R.E., R.L. Reynolds, and E.H. Lindsay. (2008). Biostratigraphy of the Miocene Crowder Formation, Cajon Pass, southwestern Mojave Desert, California. *Natural History Museum of Los Angeles County, Science Series*, 41:237-53.

Rogers, Malcolm J. (1929). *Report of an Archaeological Reconnaissance in the Mohave Sink Region*. San Diego Museum of Man Papers No. 1.

Rogers, Malcolm J. (1939). *Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Areas.* San Diego Museum of Man Papers No. 3.

SCE. (2015). Historic-Era Electrical Infrastructures Management Program.

Schroeder, Albert H. (1952). *A Brief Survey of the Lower Colorado River from Davis Dam to the International Border*. Report on file, National Park Service.

Schroeder, Albert H. (1979). Prehistory: Hakataya. In *Southwest*, edited by Alfronso Ortiz, pp. 100-107. Handbook of North American Indians, Vol. 9, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Schroth, Adella Beverly. (1994). The Pinto Point Controversy in the Western United States. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

Sherer, Lorraine. (1994). *Bitterness Road, The Mojave: 1604 to 1860, With Comments by Frances Stillman, a Mojave Elder*. Ballena Press, Menlo Park, California.

Shumway, G.L., Vredenburgh, L.M., and Hartill, R.D. (1980). *Desert Fever: An Overview of Mining in the California Desert Conservation Area*. U.S. Department of the Interior BLM.

Smith, Gerald A., Reynolds, R.E., Leonard III, N. (1978). *Archaeological-Historical Resources Assessment Zone 4 Mojave River (Parcel 190) Located Within Portions of Sections 11 and 12, Township 9*. Unpublished report on file at the San Bernardino County Museum, Redlands, California.

Smith, Gerald A. (1963). *Archaeological Survey of the Mojave River Area and Adjacent Regions.* San Bernardino County Museum Association. Unpublished report on file at the San Bernardino County Museum, Redlands, California.

Spaulding, W.G. (1990). Vegetation and Climatic Development of the Mojave Desert: The Last Glacial Maximum to the Present. In *Packrat Middens: The Last 40,000 Years of Biotic Change*, edited by J. L. Betancourt, P. S. Martin and T. R Van Devender. University of Arizona Press, Tucson.

Spaulding, W.G. (1991). A Middle Holocene Vegetation Record from the Mojave Desert and its Paleoclimatic Significance. *Quaternary Research* 35:427-437.

Springer, K., E. Scott, J.C. Sagebiel, and L.K. Murray. (2009). The Diamond Valley Lake local fauna: Late Pleistocene vertebrates from inland southern California. In Albright, L. B. III (ed.), Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in Honor of Michael O. Woodburne. *Museum of Northern Arizona Bulletin* 65:217-36.

State of Nevada Legislature. (2016). NRS: Chapter 383 – Historic Preservation and Archaeology. Retrieved September 12, 2016, from https://www.leg.state.nv.us/nrs/NRS-383.html.

Steward, Julian. (1933). Ethnography of the Owens Valley Paiute. *University of California Publications in American Archaeology and Ethnology* 33(3):233-350.

Steward, Julian. (1938). *Basin-Plateau Aboriginal Sociopolitical Groups*. Smithsonian Institution Bureau of American Ethnology Bulletin No. 120. United States Government Printing Office, Washington, D. C.

Stewart, Kenneth M. (1947). Mohave Hunting. *The Masterkey* 21(3):80-84. Southwest Museum, Los Angeles.

Stewart, Kenneth M. (1965). Mohave Indian Gathering of Wild Plants. *Kiva* 31(1):46-53.

Stewart, Kenneth M. (1970-1971). Mojave Field Notes. Manuscript in Stewart's possession.

Stewart, Kenneth M. (1983). *Mohave.* In *Southwest*, edited by Alfonso Ortiz. Handbook of North American Indians, Vol. 10, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C

Stewart, Omer C. (1941). *Culture Element Distributions: XIV*, Northern Paiute. Anthropological Records 4(3):361-446.

Stuart, Bradley R. (1945). *Tule Springs Archaeological Surface Survey*. Nevada State Museum Anthropological Papers No. 12. Carson City.

Susia, Margaret L. (1964). *Tule Springs Archaeological Surface Survey*. Nevada State Museum Anthropological Papers No. 12. Carson City.

Tuohy, Donald R. (1974). A Comparative Study of the Late Paleoindian Manifestations in the Western Great Basin. In *A Collection of Papers on Great Basin Archaeology*, edited by R. Elston and L. Savini, pp. 91-116. Nevada Archaeological Survey Research Paper No. 5.

U.S. Department of the Interior. (2000). Assessment of Fossil Management on Federal and Indian Lands. Retrieved October 25, 2016, from http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/coop_agencies/paleontology_library/paleon_legis.Par.15714.File.dat/fossil.pdf.

Vredenburgh, Larry M. (2005). An Overview of Mining in the California Desert. In *Old Ores, Mining History in the Eastern Mojave Desert*, edited by Robert E. Reynolds, pp. 22-27. California State University.

Wallace, William J. (1962). Prehistoric Cultural Developments in the Southern California Deserts. *American Antiquity* 28(2):172-180.

Warren, Claude N. (1980). The Archaeology and Archaeological Resources of the Amargosa-Mohave Basin Planning Units. In *A Cultural Resources Overview for the Amargosa-Mohave Basin Planning Units*, edited by C. N. Warren, M. Knack, and E. Warren, pp. 2-134. Unpublished report submitted to the BLM, Desert Planning Staff, Riverside, California.

Warren, Claude N. (1984). The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, pp. 338-430. Academic Press, New York.

Warren, Claude N., and Robert Crabtree. (1986). Prehistory of the Southwestern Area. In *Great Basin*, edited by W. L. d'Azevedo, pp. 183-193. Handbook of North American Indians, Vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Warren, Elizabeth von Till. (1974). Armijo's Trace Revisited: A New Interpretation of the Impact of the Antonio Armijo Route of 1829-1830 on the Development of the Old Spanish Trail. Unpublished Master's thesis, Department of Anthropology, University of Nevada-Las Vegas.

Warren, Elizabeth von Till. (2011). Old Spanish National Historic Trail. Retrieved August 8, 2016, from http://www.oldspanishtrail.org/learn/trail_history.php.

Wheat, Margaret M. (1967). *Survival Arts of the Primitive Paiutes*. University of Nevada Press, Reno.

Wilbur, Ray and Northcutt Ely. (1933). *The Hoover Dam Power and Water Contracts and Related Data*. United States Government Printing Office. Washington.

Wilkerson, G., T. Elam, and R. Turner. (2011). Lake Thompson Pleistocene mammalian fossil assemblage, Rosamond. In Reynolds, R.E. (ed.) The Incredible Shrinking Pliocene: The 2011 Desert Symposium Field Guide and Proceedings. California State University Desert Studies Consortium, pp. 88-90.

Winslow, Diane L. (2003a). *Mitigation Black Dog Mesa Archaeological Complex (26CK5686/BLM 53-7216) Volume 1 – History and Project Overview*. Harry Reid Center for Environmental Studies, Division of Cultural Resources, University of Nevada, Las Vegas. Prepared for the BLM and Nevada Power Company. BLM Report No. 5-2430(1), HRC Report No. 5-4-26(1).

Winslow, Diane L. (2003b). *Mitigation Black Dog Mesa Archaeological Complex (26CK5686/BLM 53-7216) Volume II – Black Dog Cave*. Harry Reid Center for Environmental Studies, Division of Cultural Resources, University of Nevada, Las Vegas. Prepared for the BLM and Nevada Power Company. BLM Report No. 5-2430(2), HRC Report No. 5-4-26(2).

Woodburne, M.O. (1991). The Mojave Desert Province. In Inland Southern California: the last 70 million years. A self-guiding tour of major paleontologic localities from Temecula to Red Rock Canyon: fossils, structure, and geologic history. M.O. Woodburne, R.E. Reynolds, and D.P. Whistler (eds.). San Bernardino County Museum Association Quarterly 38(3-4):60-77.

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

This page intentionally left blank.

4.6 Geology and Soils

This section describes the geology and soils in the area of the Eldorado-Lugo-Mohave Series Capacitor Project (Proposed Project[1]). The potential impacts and alternatives are also discussed.

This analysis reviews State and local resources characterizing geologic units and soils in the Proposed Project area, including databases maintained by the following agencies:

- United States (U.S.) Geological Survey (USGS)
- U.S. Department of Agriculture (USDA)
- USDA's National Resources Conservation Service (NRCS)
- California Geological Survey (CGS)
- State of Nevada Division of Water Resources
- General plans and geologic hazard maps from the Cities of Hesperia and Boulder City, as well as the County of San Bernardino and Clark County

Geologic and seismic hazards were identified and analyzed in the vicinity of the Proposed Project to determine areas where people or structures could be exposed to substantial adverse effects resulting from strong seismic ground shaking, fault rupture, liquefaction, unstable soils, landslides, expansive soil, substantial soil erosion, or the loss of topsoil. Soil characteristics (e.g., drainage, erosion potential, slope, and permeability) were examined to determine potential impacts resulting from the construction of the Proposed Project. These soil characteristics were reviewed in conjunction with available seismic data to identify areas where the installation of new Proposed Project components would expose people or structures to substantial adverse effects.

4.6.1 Environmental Setting

The Proposed Project is located in California and Nevada, within the Mojave Basin and Range (Mojave). Federal lands constitute a majority of the land area in the Mojave, including lands under the jurisdiction of the Bureau of Land Management (BLM), National Park Service (NPS), Bureau of Reclamation (BOR), and Department of Defense (DoD). The Proposed Project would modify three existing transmission lines that extend northeast from Lugo Substation (located in San Bernardino County, California) to Eldorado Substation (located in the City of Boulder City, Nevada) and Mohave Substation (located in Clark County, Nevada), and from Mohave Substation northwest to Eldorado Substation. Portions of the Proposed Project would also cross the City of Hesperia, California, the unincorporated community of Lucerne Valley in California, as well as the unincorporated communities of Searchlight and Laughlin in Nevada.

4.6.1.1 Geologic Setting

The majority of the existing transmission facilities associated with the Proposed Project is located within the central portion of the Mojave Desert Geomorphic Province. In addition,

[1] The term "Proposed Project" is inclusive of all components of the Eldorado-Lugo-Mohave Series Capacitor Project. Where the discussion in this section focuses on a particular component, that component is called out by its individual work area (e.g., "Ludlow Series Capacitor").

several segments of the existing Lugo-Mohave 500 kilovolt (kV) Transmission Line east of Lugo Substation are located within the Transverse Ranges Geomorphic Province.

The Mojave Desert Geomorphic Province encompasses a broad interior region of isolated mountain ranges separated by expanses of desert plains. The topography within this region consists of prominent northwest-southeast-trending faults and secondary east-west-trending faults, the latter of which are in alignment with the east-west trend of the Transverse Ranges Geomorphic Province. The Garlock fault separates the northern boundary of the Mojave Desert Geomorphic Province from the southern boundary of both the Basin and Range and the Sierra Nevada Geomorphic Provinces.

The Transverse Ranges Geomorphic Province consists of an east-west-trending series of steep mountain ranges that extends offshore to include the San Miguel, Santa Rosa, and Santa Cruz Islands. This Geomorphic Province is characterized by thickly folded and faulted Cenozoic, petroleum-rich sedimentary rocks. The CGS notes that intense north-south compression is squeezing the Transverse Ranges, making this one of the most rapidly rising regions on earth.

The majority of the existing transmission facilities associated with the Proposed Project are underlain by Pliocene- to Holocene-age and Quaternary-age alluvium and marine deposits. These formations consist primarily of unconsolidated and semi-unconsolidated lake, playa, and terrace deposits. Prominent geologic units within the Proposed Project area also include Quaternary alluvium, Permian to Tertiary granodiorite, Early Miocene to Middle Miocene alkali-granite, and Late Miocene to Middle Miocene andesite. Geologic formations in the vicinity of the existing Eldorado, Lugo, Mohave, and Pisgah Substations consist primarily of Pliocene to Holocene and/or Quaternary alluvial deposits. The northeastern portion of the Proposed Project is underlain primarily by Quaternary alluvial deposits and Early Miocene to Middle Miocene alkali-granite (alaskite). Geologic formations in the Proposed Project area are depicted in Figure 4.6-1: Geologic Formations in the Proposed Project Area.

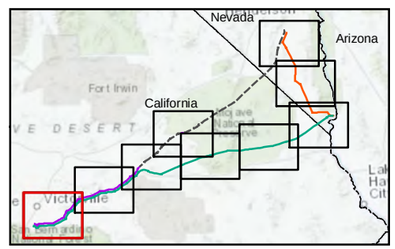
Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 1 of 9

Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Proposed Fiber Optic Repeater Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 5-Mile Project Buffer
- City Boundary
- State Boundary

Geological Unit Categories

- C: marble (Late Proterozoic to Pennsylvanian)
- Mzv: felsic volcanic rock (Triassic to Cretaceous)
- PZ: limestone (Late Proterozoic to Jurassic)
- Q: alluvium (Pliocene to Holocene)
- QPc: sandstone (Miocene to Pleistocene)
- gb: gabbro (Triassic to Cretaceous)
- gr-m: plutonic rock (phaneritic) (Early Proterozoic to Late Cretaceous)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)
- m: schist (Early Proterozoic to Cretaceous)
- pC: gneiss (Early Proterozoic to Miocene)
- pCc: gneiss (Early Proterozoic to Miocene)



1:150,000

0 2 4 Miles

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\Geo.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 2 of 9

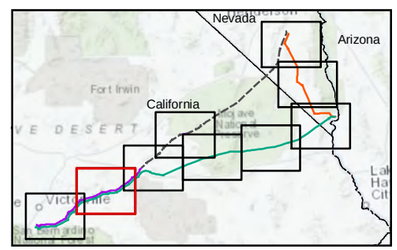
Eldorado-Lugo-Mohave Series Capacitor Project

- Proposed Fiber Optic Repeater Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 5-Mile Project Buffer
- State Boundary

Geological Unit Categories

- Mc: sandstone (Oligocene to Pleistocene)
- Mzv: felsic volcanic rock (Triassic to Cretaceous)
- PZ: limestone (Late Proterozoic to Jurassic)
- Q: alluvium (Pliocene to Holocene)
- QPc: sandstone (Miocene to Pleistocene)
- Qrv: tephrite (basanite) (Holocene)
- Qv: basalt (Quaternary)
- Ti: rhyolite (Tertiary)
- Tv: rhyolite (Tertiary)
- Tvp: rhyolite (Tertiary)
- gb: gabbro (Triassic to Cretaceous)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)
- m: schist (Early Proterozoic to Cretaceous)
- pC: gneiss (Early Proterozoic to Miocene)

Barstow Repeater



1:150,000

0 2 4 Miles

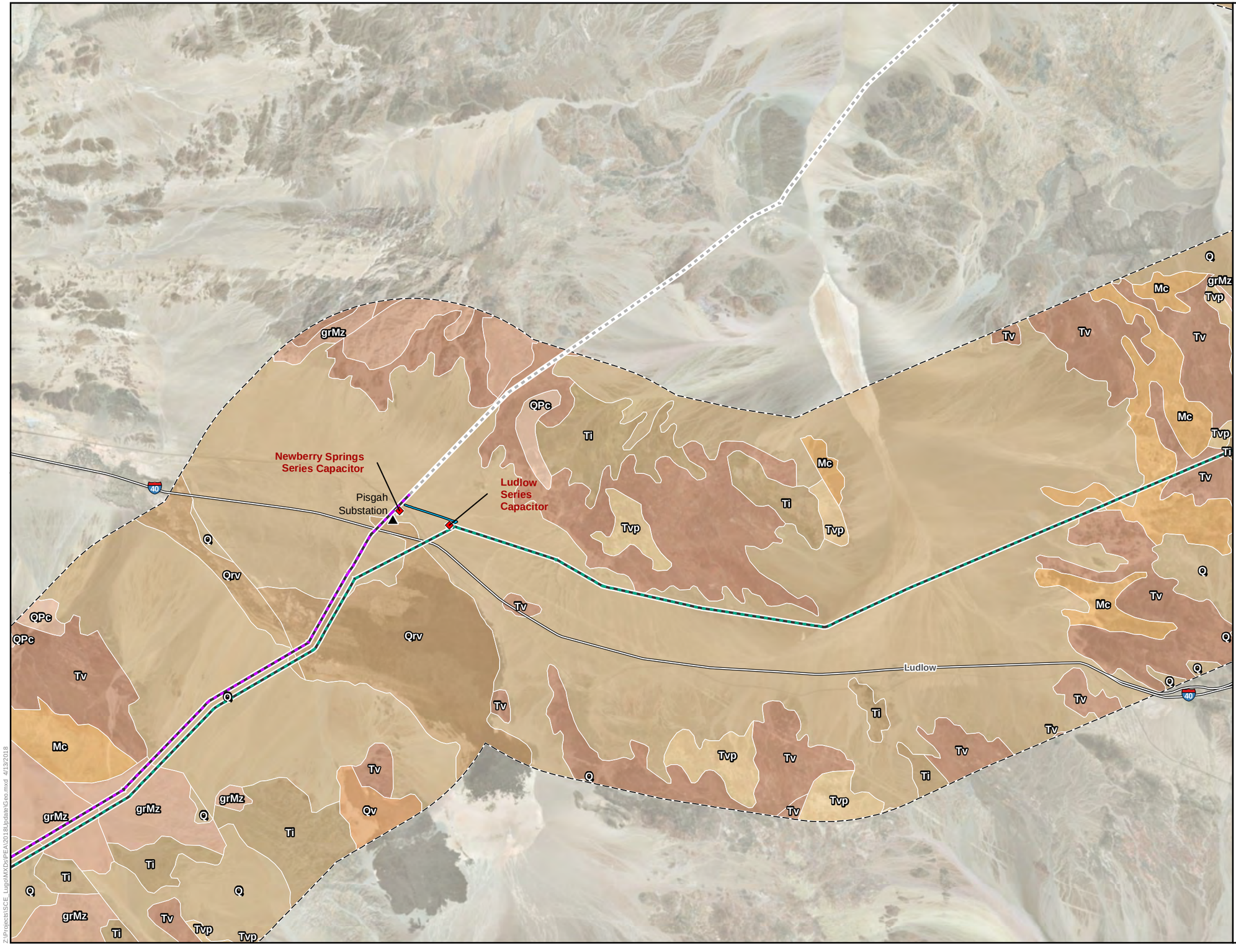
Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\SCee.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 3 of 9

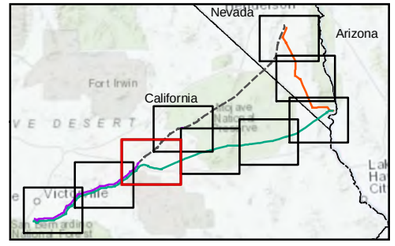
Eldorado-Lugo-Mohave Series Capacitor Project



- Existing Substation
- Proposed Mid-Line Capacitor Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- Telecommunication Line
- 5-Mile Project Buffer
- State Boundary

Geological Unit Categories

- Mc: sandstone (Oligocene to Pleistocene)
- Q: alluvium (Pliocene to Holocene)
- QPc: sandstone (Miocene to Pleistocene)
- Qrv: tephrite (basanite) (Holocene)
- Qs: dune sand (Quaternary)
- Qv: basalt (Quaternary)
- Ti: rhyolite (Tertiary)
- Tv: rhyolite (Tertiary)
- Tvp: rhyolite (Tertiary)
- gr-m: plutonic rock (phaneritic) (Early Proterozoic to Late Cretaceous)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)



1:150,000

0 2 4 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

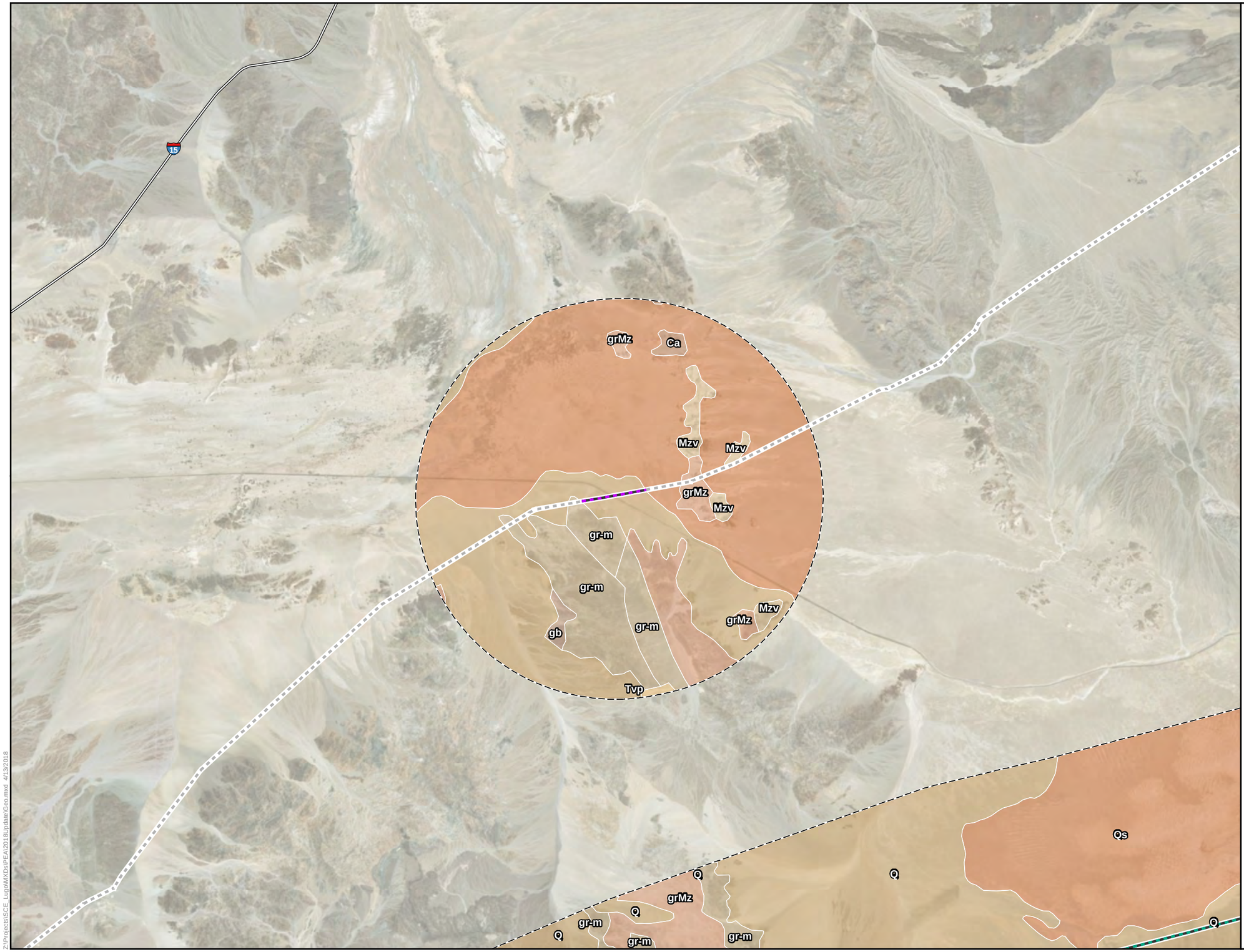
Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_LugoMXDs\PEA2018Update\Geo.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 4 of 9

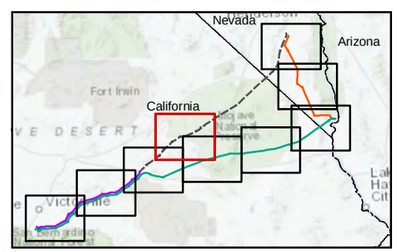
Eldorado-Lugo-Mohave Series Capacitor Project



- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 5-Mile Project Buffer
- State Boundary

Geological Unit Categories

- Ca: sandstone (Late Proterozoic to Middle Devonian)
- Mc: sandstone (Oligocene to Pleistocene)
- Mzv: felsic volcanic rock (Triassic to Cretaceous)
- Q: alluvium (Pliocene to Holocene)
- Qs: dune sand (Quaternary)
- Tvp: rhyolite (Tertiary)
- gb: gabbro (Triassic to Cretaceous)
- gr-m: plutonic rock (phaneritic) (Early Proterozoic to Late Cretaceous)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)
- m: schist (Early Proterozoic to Cretaceous)



1:150,000

0 2 4 Miles

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\Geo.mxd 4/13/2018

This page intentionally left blank.

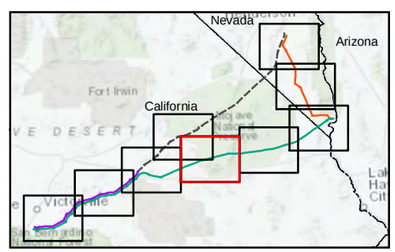
Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 5 of 9

Eldorado-Lugo-Mohave Series Capacitor Project

- Proposed Fiber Optic Repeater Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 5-Mile Project Buffer
- State Boundary

Geological Unit Categories

- C: limestone (Mississippian to Early Permian)
- Ca: sandstone (Late Proterozoic to Middle Devonian)
- D: limestone (Middle to Late Devonian)
- Mc: sandstone (Oligocene to Pleistocene)
- Mzv: felsic volcanic rock (Triassic to Cretaceous)
- P: limestone (Pennsylvanian to Triassic)
- Q: alluvium (Pliocene to Holocene)
- Qs: dune sand (Quaternary)
- Qv: basalt (Quaternary)
- Ti: rhyolite (Tertiary)
- Tv: rhyolite (Tertiary)
- Tvp: rhyolite (Tertiary)
- gb: gabbro (Triassic to Cretaceous)
- gr-m: plutonic rock (phaneritic) (Early Proterozoic to Late Cretaceous)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)
- grpC: granite (Early Proterozoic to Miocene)
- m: schist (Early Proterozoic to Cretaceous)
- pCc: gneiss (Early Proterozoic to Miocene)



1:150,000

0 2 4 Miles

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXD\s\PEA\2018Update\Geo.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 6 of 9

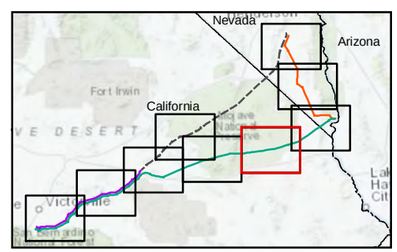
Eldorado-Lugo-Mohave Series Capacitor Project

Proposed Fiber Optic Repeater Location
Lugo - Mohave 500 kV Transmission Line
5-Mile Project Buffer
State Boundary

Geological Unit Categories

- Q: alluvium (Pliocene to Holocene)
- QPc: sandstone (Miocene to Pleistocene)
- Tc: conglomerate (Paleocene to Pliocene)
- Tv: rhyolite (Tertiary)
- Tvp: rhyolite (Tertiary)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)
- grpC: granite (Early Proterozoic to Miocene)
- pC: gneiss (Early Proterozoic to Miocene)

Lanfair Repeater



1:150,000
0 2 4 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_LugoMXDs\PEA2018Update\Geo.mxd 4/13/2018

This page intentionally left blank.

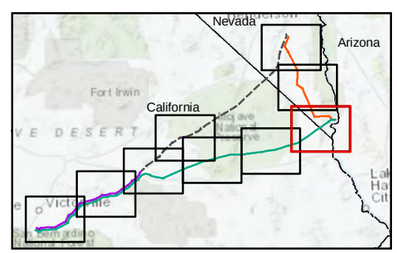
Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 7 of 9

Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Eldorado - Mohave 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 5-Mile Project Buffer
- City Boundary
- State Boundary
- State Highway/US Highway

Geological Unit Categories

- Q: alluvium (Pliocene to Holocene)
- Qa: alluvium (Quaternary)
- Ta3: andesite (Late Miocene to Middle Miocene)
- Tc: conglomerate (Paleocene to Pliocene)
- Ti: alkali-granite (alaskite) (Early Miocene to Middle Miocene)
- Tv: rhyolite (Tertiary)
- Tvp: rhyolite (Tertiary)
- Xm: gneiss (Early Proterozoic)
- Ygr: granite (Middle Proterozoic)
- grMz: granodiorite (Permian to Tertiary; most Mesozoic)
- grpC: granite (Early Proterozoic to Miocene)
- pC: gneiss (Early Proterozoic to Miocene)
- water: water (Holocene)



1:150,000

0 2 4 Miles

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXD\SPEA\2018\Update\CGeo.mxd 4/13/2018

This page intentionally left blank.

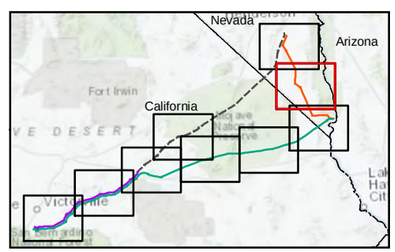
Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 8 of 9

Eldorado-Lugo-Mohave Series Capacitor Project

- Eldorado - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 5-Mile Project Buffer
- State Boundary
- State Highway/US Highway

Geological Unit Categories

- Q: alluvium (Pliocene to Holocene)
- QToa: alluvium (Miocene to Quaternary)
- Qa: alluvium (Quaternary)
- Ta3: andesite (Late Miocene to Middle Miocene)
- Tba: basalt (Early Miocene to Early Pliocene)
- Ti: alkali-granite (alaskite) (Early Miocene to Middle Miocene)
- Tt3: rhyolite (Middle Miocene to Late Miocene)
- Xm: gneiss (Early Proterozoic)
- Ygr: granite (Middle Proterozoic)
- water: water (Holocene)



1:150,000

0 2 4 Miles

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_LugoMXDs\PEA2018Update\Geo.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-1: Geologic Formations in the Proposed Project Area Map 9 of 9

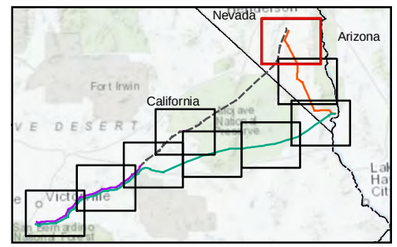
Eldorado-Lugo-Mohave Series Capacitor Project

Tba
Tba
Tba
Tba
Tba
Qp
95
Boulder City
Eldorado Substation
Tt3
Ta3
Ta3
Xm
Qa
Tba
Tba
Tba
Tba
Qa
Tba
Xm
Ta3
Ti
Xm
Ta3
Xm
Xm
Xm
Tt3
Ta3
QToa
Tt3
Ta3
Ta3
Xm
Tt3
QToa
QToa
Tt3
Tt3
Tt3
Tt3
Ta3
Ta3
Tt3
Ta3
Tt3
Tt3
Tt3
Tt3
Ta3
QToa
QToa
Tt3
Ta3
Ta3
Ta3
Ta3
Ta3
Xm
Ygr
Ti
Ygr

- Existing Substation
- Eldorado - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 5-Mile Project Buffer
- City Boundary
- State Boundary
- Interstate
- State Highway/US Highway

Geological Unit Categories

- QToa: alluvium (Miocene to Quaternary)
- Qa: alluvium (Quaternary)
- Qp: playa (Quaternary)
- Ta3: andesite (Late Miocene to Middle Miocene)
- Tba: basalt (Early Miocene to Early Pliocene)
- Ti: alkali-granite (alaskite) (Early Miocene to Middle Miocene)
- Tt3: rhyolite (Middle Miocene to Late Miocene)
- Xm: gneiss (Early Proterozoic)
- Ygr: granite (Middle Proterozoic)



1:150,000
0 2 4 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: Insignia, 2018; SCE; 2018;
U.S. Geological Survey, California Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\Geo.mxd 4/13/2018

This page intentionally left blank.

4.6.1.2 Soils

The mapped soil units directly underlying existing transmission facilities in the Proposed Project area consist primarily of Arizo series soils, Cajon series soils, Tewell series soils, Arrastre series soils, the Gullied Land-Haploxeralfs association, and Cushenbury-Crafton-rock outcrop complex soils. The NRCS has either not mapped several areas along the existing Eldorado-Lugo 500 kV Transmission Line between Mile 34 and Mile 150 and the existing Lugo-Mohave 500 kV Transmission Line between Mile 34 and Mile 165, and/or the data are not publicly available. Proposed Project areas without NRCS data also include the mid-line series capacitor[2] sites, the Kelbaker Fiber Optic Repeater site, and the Lanfair Fiber Optic Repeater site. However, based on available data, the topography and surface characterizations in the unmapped portions of the Proposed Project appear to be similar to areas for which NRCS data are available.

Existing transmission facilities associated with the Proposed Project, including Mohave Substation, are also located within areas mapped as pits, riverwash, rock outcrop, and urban land soils. Riverwash consists of barren alluvial areas, and rock outcrops consist of exposures of bare bedrock other than lava flows and rock-lined pits. Urban land is considered to be land that is mostly covered by streets, parking lots, buildings, and other structures.

Soils underlying the existing Eldorado-Mohave 500 kV Transmission Line consist primarily of sand, silt, and other alluvial remnants from the surrounding mountains. These soils were deposited by flowing water and eventually formed alluvial fans. Soil map units underlying existing transmission facilities associated with Proposed Project components in Nevada consist primarily of urban land, the Goldroad-rock outcrop association, Tenwell series, the Riverbend series, Carrwash series, and Crosgrain series soils. Information regarding the primary soil types that underlie the Proposed Project area is provided in Figure 4.6-2: Soils in the Proposed Project Area[3] and Table 4.6-1: Soils in the Proposed Project Area.

[2] The Proposed Project includes construction of two new 500 kV mid-line series capacitors—the proposed Newberry Springs Series Capacitor and Ludlow Series Capacitor.

[3] Figure 4.6-2: Soils in the Proposed Project Area only shows Proposed Project areas for which NRCS soil data were available.

Table 4.6-1: Soils in the Proposed Project Area

Soil Type	Slope	Permeability	Drainage	Erosion Potential	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Cajon sand and gravelly sand, Cajon-Wasco, Cool complex	0 to 15	Rapid	Somewhat excessively drained	Moderate	10.2
Tenwell series	2 to 8	Moderately slow	Well-drained	Slight to moderate	9.6
Lanip-Kidwell association	2 to 8	Moderately slow	Well-drained	Moderate	9.0
Arizo series	0 to 15	--	Excessively drained	Moderate to slight	8.8
Kidwell-Tenwell association	2 to 8	Moderately slow	Well-drained	Slight	5.8
Seanna-Goldroad-rock outcrop association	8 to 50	Moderately rapid	Well-drained	Severe	5.3
Gullied Land-Haploxeralfs association	--	--	Excessively drained	Severe	4.9
Cushenbury-Crafton-rock outcrop association	15 to 50	Moderately rapid	Well-drained	--	4.7
Goldroad-rock outcrop association	15 to 75	Rapid	Somewhat excessively drained	Severe	4.6
Hypoint gravelly sandy loam and Hypoint-Gravesumit association	0 to 8	Rapid	Somewhat excessively drained	Slight	4.3
Arrastre-rock outcrop complex	30 to 50	Moderately rapid	Well-drained	--	3.5

Soil Type	Slope	Permeability	Drainage	Erosion Potential	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Haleburu series	2 to 75	Rapid	Well-drained	Moderate to severe	3.5
Filaree-Seanna association	1 to 15	Moderately rapid	Somewhat excessively drained	Moderate	3.0
Riverbend-Carrwash association	2 to 15	Rapid	Excessively drained	Slight	2.8
Newera association and Newera-rock outcrop association	4 to 75	Moderately slow	Well-drained to somewhat excessively drained	Moderate to severe	2.7
Crosgrain extremely gravelly loam, very stony loam, and Crosgrain-Tenwell association	2 to 50	Moderately rapid	Well-drained	Slight to moderate	2.6
Wasco sandy loam	0 to 5	Moderately rapid	Well-drained	--	2.6
Carrwash series	2 to 75	Rapid	Excessively drained	Moderate	2.5
Tonopah-Arizo association	0 to 15	Moderately rapid	Excessively drained	Slight	2.3
Dalvord-rock outcrop association	15 to 75	--	Somewhat excessively drained	--	2.2
Burntshack-Hypoint association	2 to 4	--	Well-drained	--	2.1
Helendale loamy sand	0 to 5	--	Well-drained	--	1.6
Kimberlina loamy fine sand and gravelly sandy loam	0 to 2	Moderately slow	Well-drained	--	1.4

Soil Type	Slope	Permeability	Drainage	Erosion Potential	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Peskah-Crosgrain association	2 to 8	Moderately slow	Well-drained	Severe	1.4
Bryman series	0 to 15	Moderately slow	Well-drained	Moderate	1.1
Nolena-rock outcrop association	4 to 75	Moderately rapid	Well-drained	Severe	1.0
Avawatz-Oak Glen association	2 to 9	Rapid	Excessively drained	Moderate	0.8
Hesperia loamy fine sand	2 to 5	Moderately rapid	Well-drained	Moderate	0.6
Carrizo association	0 to 15	--	Excessively drained	Moderate	0.4
Pahrump-Wodavar-Vegastorm association	0 to 15	Moderately slow	Well-drained	Severe	0.4
Lavic loamy fine sand	0 to 5	Moderate	Moderately drained	--	0.3
Haplargids-Caliorthids complex	15 to 50	--	--	--	0.2
Lovelace loamy sand	5 to 9	Moderate	Well-drained	--	0.1
Nipton-Highland-rock outcrop association	4 to 75	Moderately rapid	Well-drained	Severe	0.1

Sources: USDA (n.d.), USDA (2015c)
Note: "--" = information not available

Figure 4.6-2: Soils in the Proposed Project Area Map 1 of 13

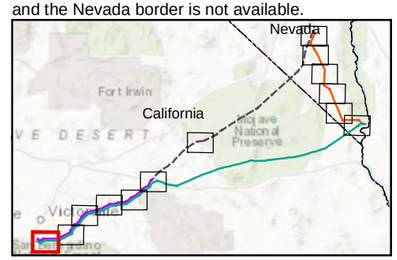
Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- City Boundary
- State Boundary

Soil Categories

- Arrastre
- Avawatz
- Bryman
- Bull Trail
- Cajon
- Crafton
- Cushenbury
- Haplargids
- Haploxeralfs
- Helendale
- Hesperia
- Lithic Xerorthents
- Lucerne
- Riverwash
- Wapi family
- Wasco
- Wrightwood

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_LugoMXOps\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 2 of 13

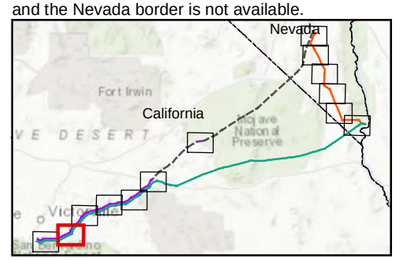
Eldorado-Lugo-Mohave Series Capacitor Project

- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- City Boundary
- State Boundary

Soil Categories

- Arrastre
- Avawatz
- Bousic
- Bryman
- Cajon
- Cushenbury
- Dune land
- Helendale
- Kimberlina
- Lavic
- Lithic Xerorthents
- Playas
- Rock outcrop
- Rosamond
- Wapi family
- Wasco

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_LugoMXDs\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 3 of 13

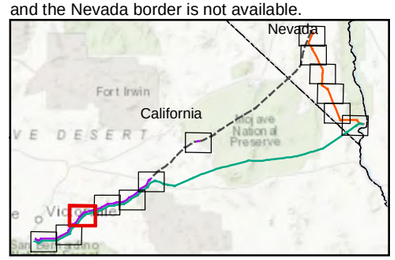
Eldorado-Lugo-Mohave Series Capacitor Project

- Proposed Fiber Optic Repeater Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- State Boundary

Soil Categories

- Arizo
- Bousic
- Cajon
- Cave
- Dune land
- Helendale
- Joshua
- Kimberlina
- Lavic
- Lovelace
- Pits
- Playas
- Rock outcrop
- Rosamond
- Wasco
- Soil Mapping Not Available

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_LugoMXDs\PEA\2018\UpdateSoils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 4 of 13

Eldorado-Lugo-Mohave Series Capacitor Project

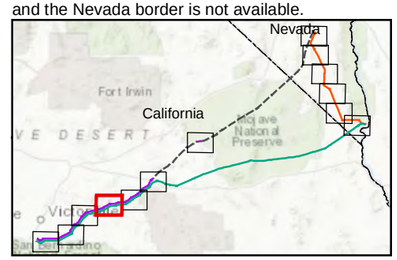
Eldorado - Lugo 500 kV Transmission Line
Lugo - Mohave 500 kV Transmission Line
1-Mile Project Buffer
State Boundary

Soil Categories

- Arizo
- Burntshack
- Cajon
- Dalvord
- Helendale
- Hypoint
- Ironped
- Joshua
- Soil Mapping Not Available

Dalvord
Hypoint
Dalvord

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000
0 1 2 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_LugoMXDs\PEA\2018\Updates\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 5 of 13

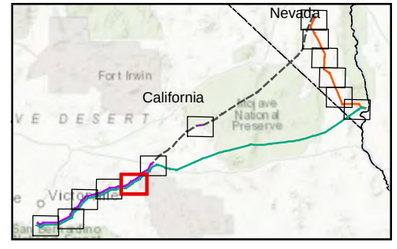
Eldorado-Lugo-Mohave Series Capacitor Project

- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- State Boundary

Soil Categories

- Arizo
- Dalvord
- Haleburu
- Hypoint
- Ironped
- Lavabed
- Oldwoman
- Soil Mapping Not Available

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 6 of 13

Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Proposed Mid-Line Capacitor Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- Telecommunication Line
- 1-Mile Project Buffer
- State Boundary

Soil Categories

- Arizo
- Sunrock
- Soil Mapping Not Available

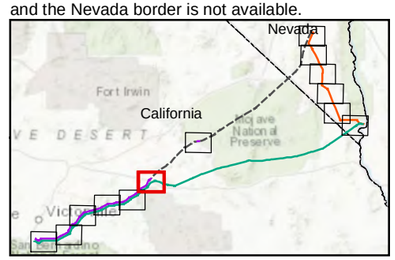
Pisgah Substation

Newberry Springs Series Capacitor

Ludlow Series Capacitor

40

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXD\s\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 7 of 13

Eldorado-Lugo-Mohave Series Capacitor Project

Eldorado - Lugo 500 kV Transmission Line

Transmission Line not part of Project

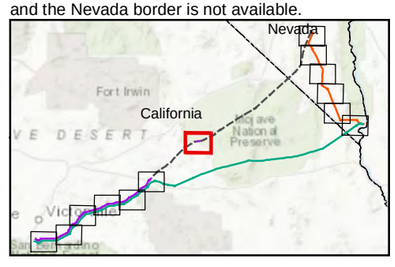
1-Mile Project Buffer

State Boundary

Soil Categories

Soil Mapping Not Available

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 8 of 13

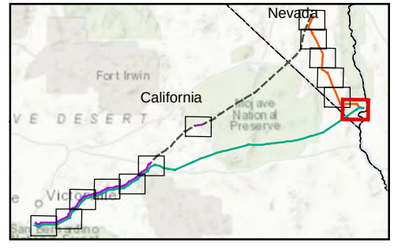
Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Eldorado - Mohave 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- City Boundary
- State Boundary
- State Highway/US Highway

Soil Categories

- Carrizo
- Carrwash
- Filaree
- Goldroad
- Huevi
- Kidwell
- Newera
- Nolena
- Pahrump
- Riverbend
- Rositas
- Seanna
- Tenwell
- Varwash
- Soil Mapping Not Available

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 9 of 13

Eldorado-Lugo-Mohave Series Capacitor Project

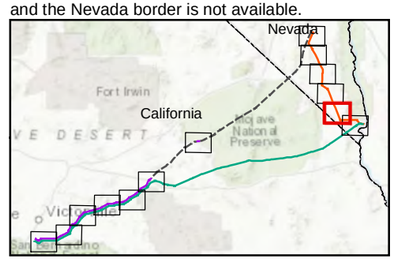
- Eldorado - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- City Boundary
- State Boundary
- State Highway/US Highway

Soil Categories

- Bluepoint
- Filaree
- Goldroad
- Kidwell
- Lanip
- Newera
- Nolena
- Pahrump
- Seanna
- Tenwell

Nevada
California
95
163
95
Pahrump
Seanna
Pahrump
Seanna
Filaree

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000
0 1 2 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_LugoMXDs\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 10 of 13

Eldorado-Lugo-Mohave Series Capacitor Project

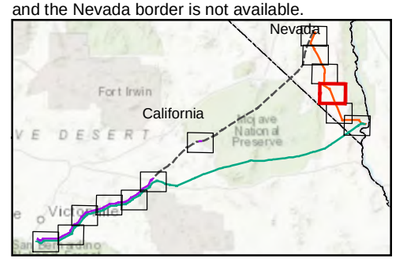
Eldorado - Mohave 500 kV Transmission Line
1-Mile Project Buffer
State Boundary
State Highway/US Highway

Soil Categories

Bluepoint
Crosgrain
Haleburu
Kidwell
Lanip
Newera
Tenwell

Haleburu
Cal-Nev-Ari
Bluepoint
95

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000
0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 11 of 13

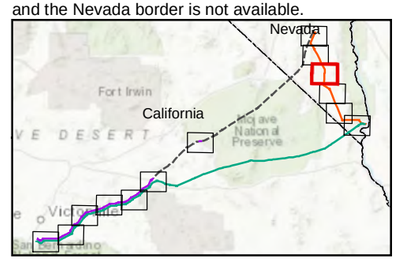
Eldorado-Lugo-Mohave Series Capacitor Project

- Eldorado - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- State Boundary
- State Highway/US Highway

Soil Categories

Arizo	Newera
Crosgrain	Nippeno
Haleburu	Nipton
Hoppswell	Peskah
Lanip	Tenwell

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXD\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 12 of 13

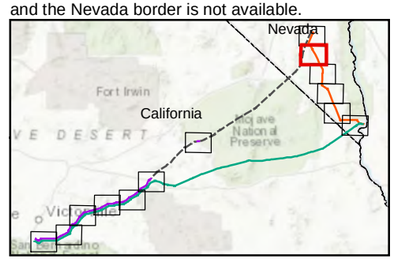
Eldorado-Lugo-Mohave Series Capacitor Project

- Eldorado - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 1-Mile Project Buffer
- City Boundary
- State Boundary
- State Highway/US Highway

Soil Categories

Arizo	Nipton
Crosgrain	Peskah
Haleburu	Rock outcrop
Hoppswell	Tenwell
Nippeno	Tonopah

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_Lugo\MXDs\PEA\2018\Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Figure 4.6-2: Soils in the Proposed Project Area Map 13 of 13

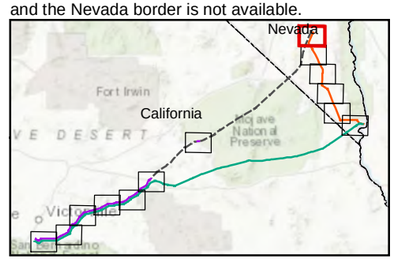
Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Eldorado - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 1-Mile Project Buffer
- City Boundary
- State Boundary
- State Highway/US Highway

Soil Categories

- Arizo
- Haleburu
- Hypoint
- Rock outcrop
- Tonopah

Note: Soil data between Pisgah and the Nevada border is not available.



1:60,000

0 1 2 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: Insignia, 2018; SCE, 2018; SSURGO Soils Database, 2015

Z:\Projects\SCE_LugoMXDs\PEA\2018Update\Soils.mxd 4/13/2018

This page intentionally left blank.

Faults, Seismicity, and Related Hazards

The State of California considers a fault to be active if the fault is well-defined and if there is evidence of surface displacement along the fault during the Holocene epoch (i.e., within the past 11,000 years).[4] In addition, potentially active faults are those that have demonstrated activity within the Quaternary period (i.e., approximately the past 1.6 million years).

Proposed Project components involving the installation of new structures—including the mid-line series capacitors, fiber optic repeaters, and the replacement of equipment within the existing Eldorado, Lugo, and Mohave Substations—are not located on any active faults in the Proposed Project area. The closest active fault to a Proposed Project component involving the installation of new structures is mapped within the Lavic Lake fault zone, which is located approximately 1.7 miles west of the Newberry Springs Series Capacitor site. In addition, the Proposed Project is located within 10 miles of active faults within the San Andreas and San Jacinto fault zones, which are considered to be two of the most active fault zones in California. Faults located within 25 miles of new Proposed Project structures and their approximate distance from the nearest new Proposed Project structure are listed in Table 4.6-2: Active and Potentially Active Faults in the Vicinity of New Proposed Project Structures. Active and potentially active faults in the Proposed Project area are depicted in Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area.

[4] The USGS considers a fault to be active if it has moved one or more times in the past 10,000 years.

Table 4.6-2: Active and Potentially Active Faults in the Vicinity of New Proposed Project Structures

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
California					
Lavic Lake fault zone	Active	1.7 miles west	Newberry Springs Series Capacitor	33.4	--
Cleghorn fault zone (Southern Cleghorn Section)	Active	3.7 miles southwest	Lugo Substation	29.9	--
Pisgah-Bullion fault zone (Pisgah Section)	Active	4.3 miles southwest	Ludlow Series Capacitor	24.3	--
Cleghorn fault zone (Northern Cleghorn Section)	Potentially Active	4.8 miles southeast	Lugo Substation[5]	15.2	--
Helendale-South Lockhart fault zone (Helendale Section)	Active	5.0 miles southwest	Barstow Fiber Optic Repeater	50.9	--
Cady fault	Potentially Active	7.1 miles north	Newberry Springs Series Capacitor	9.4	--
North Frontal thrust system (Western Section)	Active	7.1 miles east	Lugo Substation	53.3	--

[5] Though the substations already exist, equipment within the substations would be replaced.

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
San Andreas fault zone (San Bernardino Mountains)	Active	7.5 miles southwest	Lugo Substation	156.5	7.5
Lenwood-Lockhart fault zone (Lenwood Section)	Active	8.2 miles east	Barstow Fiber Optic Repeater	60.6	--
Rodman fault	Potentially Active	8.5 miles southwest	Newberry Springs Series Capacitor	11.3	--
Ludlow fault	Potentially Active	9.0 miles east	Ludlow Series Capacitor	40.9	--
San Andreas fault zone (Mojave Section)	Potentially Active	9.1 miles southwest	Lugo Substation	26.1	7.4
San Jacinto fault zone (San Bernardino Section)	Active	9.4 miles southwest	Lugo Substation	98.0	6.7
Waterman Canyon fault	Potentially Active	9.9 miles south	Lugo Substation	13.8	--
Tunnel Ridge fault	Potentially Active	10.1 miles southeast	Lugo Substation	11.2	--
Calico-Hidalgo fault zone (Calico Section)	Active	10.6 miles southwest	Ludlow Series Capacitor	63.5	--
Icehouse Canyon fault	Potentially Active	11.1 miles southwest	Lugo Substation	16.5	--
Stoddard Canyon fault	Potentially Active	11.6 miles southwest	Lugo Substation	13.5	--

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
Arrastre Canyon Narrows fault	Potentially Active	11.9 miles east	Lugo Substation	13.2	--
Bowen Ranch fault	Potentially Active	11.9 miles east	Lugo Substation	4.3	--
Pisgah-Bullion fault zone (Bullion Section)	Active	11.9 miles southwest	Ludlow Series Capacitor	16.3	--
Calico-Hidalgo fault zone (West Calico Section)	Active	12.0 miles southwest	Newberry Springs Series Capacitor	40.8	--
San Gabriel fault zone	Potentially Active	12.9 miles southwest	Lugo Substation	38.0	7.2
North Frontal thrust system (Eastern Section)	Active	13.3 miles southeast	Barstow Fiber Optic Repeater	34.3	--
Sierra Madre fault zone (Cucamonga Section)	Active	13.4 miles southwest	Lugo Substation	33.6	--
Silver Reef fault	Active	13.4 miles southeast	Barstow Fiber Optic Repeater	5.5	--
Arrowhead fault	Potentially Active	13.5 miles southeast	Lugo Substation	9.9	--
Johnson Valley fault zone (Northern Johnson Valley Section)	Active	13.8 miles east	Barstow Fiber Optic Repeater	51.3	--

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
Old Woman Springs fault	Active	14.2 miles southeast	Barstow Fiber Optic Repeater	8.8	--
Manix fault	Active	14.8 miles northwest	Newberry Springs Series Capacitor	25.2	--
Helendale-South Lockhart fault zone (Northern San Bernardino Mountains Section)	Potentially Active	15.1 miles southeast	Barstow Fiber Optic Repeater	19.1	--
Camp Rock-Emerson-Copper Mountain fault zone (Camp Rock Section)	Active	15.4 miles northeast	Barstow Fiber Optic Repeater	24.1	--
Santa Ana fault	Potentially Active	15.8 miles southeast	Lugo Substation	31.9	--
Red Hill-Etiwanda Avenue fault	Active	16.5 miles southwest	Lugo Substation	8.6	--
Camp Rock-Emerson-Copper Mountain fault zone (Emerson Section)	Active	16.6 miles east	Barstow Fiber Optic Repeater	76.4	--
San Antonio fault	Potentially Active	17.2 miles southwest	Lugo Substation	13.3	--
South Bristol Mountains fault	Potentially Active	17.2 miles southwest	Kelbaker Fiber Optic Repeater	17.3	--

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
Bullion Mountains fault zone	Active	17.3 miles southeast	Ludlow Series Capacitor	27.7	--
Homestead Valley fault zone	Active	20.4 miles southwest	Ludlow Series Capacitor	55.8	--
Mirage Valley fault zone	Potentially Active	21.1 miles northwest	Lugo Substation	23.7	--
Calico-Hidalgo fault zone (Hidalgo Section)	Active	21.3 miles southeast	Ludlow Series Capacitor	8.0	--
Pipes Canyon fault	Potentially Active	21.8 miles southeast	Barstow Fiber Optic Repeater	7.7	--
Harper fault zone	Potentially Active	22.4 miles northwest	Barstow Fiber Optic Repeater	3.4	--
Broadwell Lake fault	Potentially Active	22.5 miles southwest	Kelbaker Fiber Optic Repeater	7.5	--
Pisgah-Bullion fault zone (East Bullion Section)	Active	22.5 miles southeast	Ludlow Series Capacitor	20.4	--
Pisgah-Bullion fault zone (West Bullion Section)	Active	22.6 miles southeast	Ludlow Series Capacitor	9.2	--
Mount General fault	Potentially Active	22.9 miles northwest	Barstow Fiber Optic Repeater	3.2	--
Sierra Madre fault zone (Sierra Madre E Section)	Potentially Active	23.9 miles southwest	Lugo Substation	5.5	--

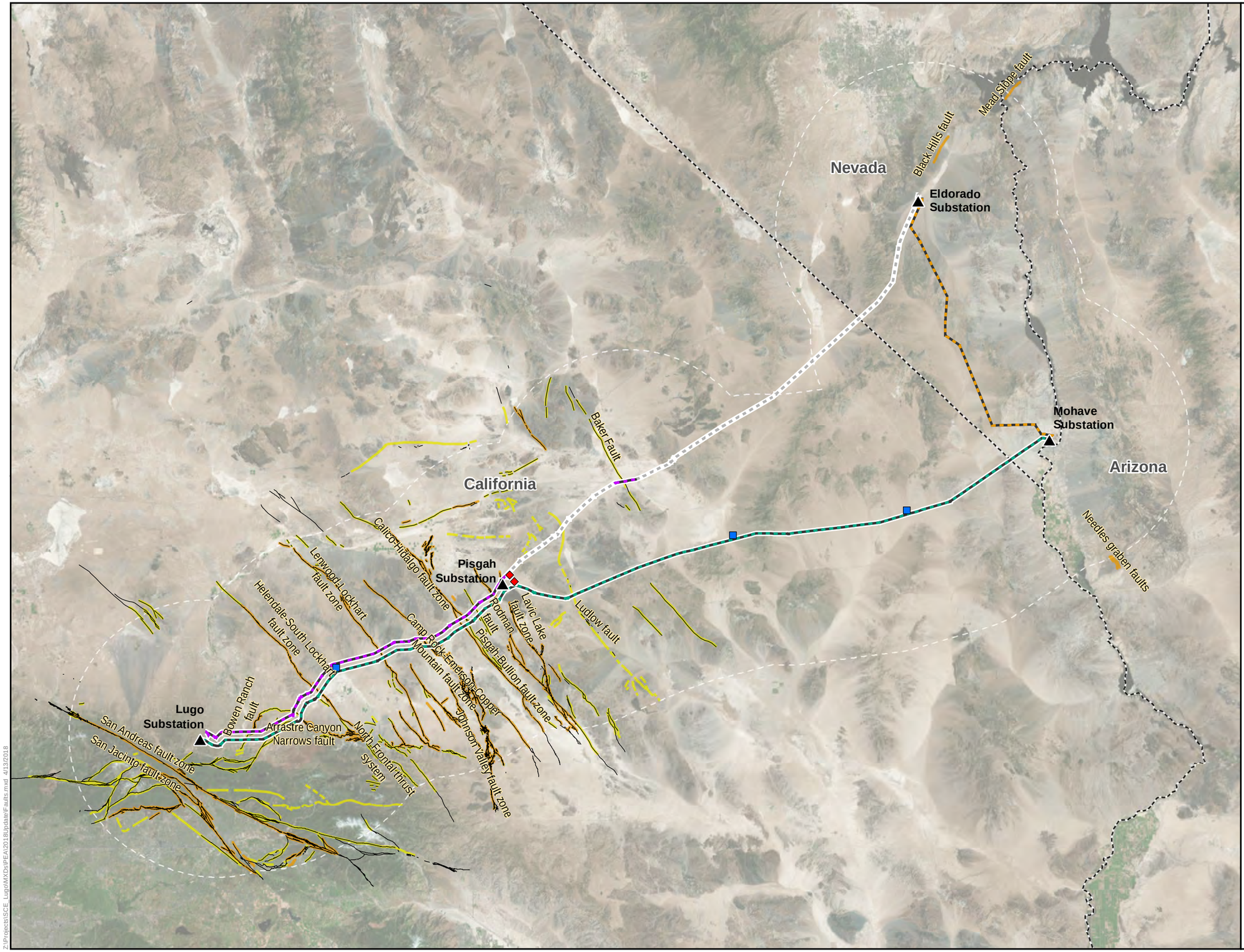
Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
Crafton Hills fault zone	Potentially Active	24.0 miles southeast	Lugo Substation	29.9	--
Red Pass fault	Active	24.1 miles northwest	Newberry Springs Series Capacitor	10.4	--
Llano fault	Active	24.8 miles northwest	Lugo Substation	2.1	--
Coyote Lake fault	Potentially Active	25.5 miles northwest	Newberry Fiber Optic Repeater	24.7	--
Mesquite Lake fault	Active	26.0 miles southeast	Ludlow Series Capacitor	2.2	--
San Gorgonio Mountain fault	Potentially Active	28.6 miles southeast	Barstow Fiber Optic Repeater	2.4	--
Johnson Valley fault zone (Southern Johnson Valley Section)	Active	29.1 miles southwest	Ludlow Series Capacitor	29.4	--
Nevada					
Black Hills fault	Active	6.8 miles northwest	Eldorado Substation	5.5	6.8
Las Vegas Valley faults (Class B)	Potentially Active	16.7 miles northwest	Eldorado Substation	--	--
Frenchman Mountain fault	Potentially Active	21.2 miles north	Eldorado Substation	8.9	6.8
Mead Slope fault	Active	23.8 miles northeast	Eldorado Substation	--	--

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude
Stateline fault	Potentially Active	24.7 miles southwest	Eldorado Substation	--	--
Arizona					
Needles graben faults	Potentially Active	24.6 miles southeast	Mohave Substation	2.1	--

Sources: CGS (2015a), CGS (2015b), USGS (2015d), USGS (2015g)

Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area

Eldorado-Lugo-Mohave Series Capacitor Project



- Existing Substation
- Proposed Mid-Line Capacitor Location
- Proposed Fiber Optic Repeater Location
- Eldorado - Lugo 500 kV Transmission Line
- Eldorado - Mohave 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- Transmission Line not part of Proposed Project
- Alquist-Priolo Fault Zones
- Active Fault Zones
- Potentially Active Faults
- 25-mile Project Buffer
- State Boundary

1:1,110,000

0 15 30 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: CGS, 2013; Insignia, 2018; SCE, 2018; USGS 2012

Z:\Projects\SCE_Lugo\MXD\SPEA\2018\Update\Faults.mxd 4/13/2018

This page intentionally left blank.

Fault Rupture

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 regulates construction and development of buildings intended for human occupancy to avoid rupture hazards from surface faults. This act does not specifically regulate substations and power lines, but it does aid in defining areas where fault rupture is most likely to occur. Proposed Project components involving the installation of new structures—including the mid-line series capacitors, fiber optic repeaters, and the replacement of equipment within the existing Eldorado, Lugo, and Mohave Substations—are located within the following two mapped Alquist-Priolo earthquake fault zones:

- Hector Quadrangle, where active portions of the Pisgah-Bullion and Lavic Lake fault zones have been identified
- Sleeping Beauty Quadrangle, where active portions of an unnamed fault have been identified

The mid-line series capacitor sites are not crossed by any active faults within these earthquake fault zones. As previously described, the Lavic Lake fault zone is the closest active fault zone to the mid-line series capacitor sites, and it is located approximately 1.7 miles west of the Newberry Springs Series Capacitor site. As depicted in Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area, additional active faults within 5 miles of Proposed Project components requiring the installation of new structures include the Cleghorn fault zone, Pisgah-Bullion fault zone, and Helendale-South Lockhart fault zone. The proposed fiber optic repeaters and the existing Eldorado, Lugo, and Mohave Substations are not located within Alquist-Priolo earthquake fault zones, nor are they crossed by any active or potentially active faults.

Strong Ground Motion

Several factors influence how ground motion interacts with structures, making the impact hazard of ground shaking difficult to predict. Seismic waves propagating through the earth's crust are responsible for the ground vibrations normally felt during an earthquake. Seismic waves can vibrate in any direction and at different frequencies, depending on the frequency content of the earthquake, its rupture mechanism, the distance from the seismic epicenter, and the path and material through which the waves are propagating. Ground shaking due to nearby and distant earthquakes should be anticipated during the life of the structure. Active and potentially active faults in the vicinity of new Proposed Project structures are listed in Table 4.6-2: Active and Potentially Active Faults in the Vicinity of New Proposed Project Structures.

An earthquake is commonly described by the amount of energy released, which has traditionally been quantified using the Richter scale. However, seismologists have recently begun using a Moment Magnitude scale because it provides a more accurate measurement of a major earthquake's size. Specifically, the Moment Magnitude is based on the measurement of maximum motion recorded by a seismograph. The Moment Magnitude and Richter scales are almost identical for earthquakes of less than magnitude 7.0. Moment Magnitude scale readings are slightly greater than a corresponding Richter scale reading for earthquakes with magnitudes greater than 7.0.

The intensity of ground motions induced by earthquakes can be described using peak site accelerations, represented as a fraction of the acceleration of gravity (g). CGS Probabilistic Seismic

Hazard Assessment (PSHA) maps were used to estimate peak ground accelerations within the vicinity of the Proposed Project area. PSHA maps indicate that there is an approximately 10-percent probability of exceeding a peak site acceleration of 0.305g and 0.544g in a 50-year period at the Pisgah and Lugo Substations, respectively. Peak ground accelerations along the existing Eldorado-Lugo and Lugo-Mohave 500 kV Transmission Lines range from 0.075g to 0.544g. Based on the same criteria, peak ground accelerations in the vicinity of Mohave Substation and the Eldorado-Mohave 500 kV Transmission Line range from 0.03g to 0.1g.

The Modified Mercalli Intensity Scale is another common measure of earthquake intensity, which is a subjective measure of earthquake strength at a particular place and is determined by its effects on people, structures, and earth materials. Table 4.6-3: Earthquake Intensity Scale presents the Modified Mercalli Intensity Scale, including a range of approximate average peak accelerations associated with each intensity value. Based on the previously described approximate peak accelerations, the majority of the Proposed Project is estimated to fall within Intensity Value VIII.

Table 4.6-3: Earthquake Intensity Scale

Intensity Value	Intensity Description	Average Peak Acceleration Range (g)
I	Not felt except by very few people under especially favorable circumstances.	<0.0017
II	Felt only by a few people at rest, especially on upper floors of buildings. Delicately suspended objects may swing.	0.0017-0.014
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly; vibration similar to a passing truck.	
IV	During the day, felt indoors by many, and outdoors by few. At night, some awakened. Dishes, windows, and doors disturbed; walls make a cracking sound. The sensation is like a heavy truck striking a building. Standing motor cars rock noticeably.	0.014-0.039
V	Felt by nearly everyone, and many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees and poles may be noticed. Pendulum clocks may stop.	0.039-0.092
VI	Felt by all; many frightened and run outdoors. Some heavy furniture moves and plaster falls or chimneys are damaged. Damage slight.	0.092-0.18
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; damage slight to moderate in well-built, ordinary structures; damage considerable in poorly built or badly designed structures. Some chimneys broken. Noticed by people driving motor cars.	0.18-0.34
VIII	Damage slight in specially designed structures; damage considerable in ordinary substantial buildings, with partial collapse; damage great in poorly built structures. Panel walls thrown out of frame structures. Chimneys, factory stacks, columns, monuments, and walls fall. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. People driving motor cars disturbed.	0.34-0.65

Intensity Value	Intensity Description	Average Peak Acceleration Range (g)
IX	Damage considerable in specially designed structures. Well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65-1.24
X	Some well-built wooden structures destroyed. Most masonry and frame structures destroyed with foundations. Ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	>1.24
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	>1.24
XII	Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	

Source: Bolt (1988)

4.6.1.3 Liquefaction

Liquefaction is the process in which the soil below the water table becomes converted to a fluid state and loses its strength when sufficiently shaken or vibrated during a seismic event. The soil types considered most susceptible to liquefaction are granular, low-plasticity, fine-grained soils that are saturated and have a density that ranges from loose to medium. In addition, the presence of shallow groundwater increases the potential for liquefaction. Adverse effects of liquefaction include loss of bearing strength, lateral spreading, sand boils, ground oscillation, and settlement when liquefied ground reconsolidates following the seismic event.

According to the USGS, liquefaction-prone areas are defined by historical occurrences of liquefaction and local geological, geotechnical, and groundwater conditions that indicate a potential for permanent ground displacement. Liquefaction-prone areas have not been evaluated or identified by the CGS for the majority of the Proposed Project area. Therefore, liquefaction-prone characteristics, such as shallow groundwater, were evaluated to determine the potential for liquefaction in the Proposed Project area.

Static groundwater levels were obtained from wells identified on the USGS National Water Information System Mapper as well as the Water Resources Map provided by the State of Nevada Division of Water Resources. Static groundwater levels in the vicinity of Proposed Project components lacking CGS data are provided in Table 4.6-4: Depth to Groundwater in the Proposed Project Area. As presented in Table 4.6-4: Depth to Groundwater in the Proposed Project Area, shallow groundwater is not present in the vicinity of the Proposed Project components located in Nevada. Additional detail on soil characteristics is provided in Section 4.6.1.2, Soils.

Table 4.6-4: Depth to Groundwater in the Proposed Project Area

Proposed Project Component	Approximate Depth to Groundwater in Nearby Wells
Lugo-Mohave 500 kV Transmission Line from Pisgah Substation to Mohave Substation	37 to 73 feet bgs
Mohave Substation	190 to 240 feet bgs
Eldorado-Mohave 500 kV Transmission Line between Mile 12 and Mile 25	180 to 425 feet bgs
Eldorado-Mohave 500 kV Transmission Line between Mile 33 and Mile 36	180 to 365 feet bgs
Eldorado Substation	310 to 350 feet bgs

Source: USGS (2015f)

4.6.1.4 Slope Instability

Strong ground motion can result in rock fall hazards and/or slope instability. The slopes most susceptible to earthquake-induced failure include those with highly weathered and unconsolidated materials on moderately steep slopes, especially in areas of previously existing landslides.

Landslides occur when masses of rock, earth, or debris move down a slope, and include rock falls, deep failure of slopes, and shallow debris flows. The actuators of landslides can be both natural events (e.g., earthquakes, rainfall, and erosion) and human activities. Those induced by humans are most commonly related to large grading activities that can potentially cause new slides or reactivate old ones when compacted fill is placed on potentially unstable slopes. Excavation operations can also contribute to landslides when lateral support is removed near the base of unstable hillside areas. Conditions to be considered in regard to slope instability include slope inclination, characteristics of the soil materials, the presence of groundwater, and the degree of soil saturation. Slopes in the vicinity of existing transmission facilities associated with the Proposed Project area range from less than one percent to 75 percent.

Soil map units with slopes ranging from 15 to 75 percent are located between Mile 9 and Mile 18 on the existing Eldorado-Lugo and Lugo-Mohave 500 kV Transmission Lines. These soils consist primarily of the Cushenbury-Crafton-rock outcrop association complex and the Arrastre-rock outcrop complex. Additional rock outcrop and Dalvord series soils with steep slopes ranging from 15 to 75 percent are mapped in the vicinity of the following areas on the existing Lugo-Mohave 500 kV Transmission Line:

- Mile 23 and Mile 24
- Mile 28 and Mile 30
- Mile 44 and Mile 47
- Mile 56 and Mile 59

Several work areas along the existing Eldorado-Mohave 500 kV Transmission Line have underlying soil types with steep slopes ranging from 15 to 75 percent. Soil types within these work areas include the Seanna-Goldroad-rock outcrop association, Crosgrain-Tenwell association, and Crosgrain series soils. Additional soils with steep slopes underlying the existing Eldorado-Mohave and Lugo-Mohave 500 kV Transmission Lines include the Haleburu series, Newera series, the Nipton-Highland-rock outcrop association, and the Nolena-rock outcrop association.

CGS-designated landslide areas are defined by previous occurrences of landslides or where local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacement. However, CGS-designated landslide areas have not been evaluated or identified by the CGS for the majority of the Proposed Project area. Therefore, soil characteristics and associated slopes were utilized to assess landslide hazards in the Proposed Project area.

With the exception of the previously described portions of the existing transmission facilities, the majority of the Proposed Project is underlain by relatively flat terrain. Proposed Project

components requiring the installation of new structures—including the mid-line series capacitors, fiber optic repeaters, and the replacement of equipment within the existing Eldorado, Lugo, and Mohave Substations—are located primarily within flat areas with slopes ranging from zero to 15 percent.

4.6.1.5 Differential Settlement

If the soil beneath a structure settles non-uniformly, the structure can be damaged. The reasons for differential settlement are usually traced to differences in the bearing characteristics of the soils. Alternatively, a portion of the soil beneath a structure may lose strength during an earthquake due to liquefaction. If liquefaction occurs non-uniformly, differential compaction would occur. As previously described in Section 4.6.1.3, Liquefaction, shallow groundwater, which is a liquefaction-prone hydrologic characteristic, is not present within the majority of the Proposed Project area.

4.6.1.6 Subsidence

Subsidence occurs most often when fluids are withdrawn from the ground, removing partial support for previously saturated soils. More rarely, subsidence occurs due to tectonic down-warping during earthquakes. The two types of subsidence that have historically occurred within San Bernardino County are tectonic subsidence and subsidence caused by groundwater withdrawal. According to the County of San Bernardino 2007 General Plan, subsidence from 0.8 to 5.8 feet is reportedly possible within the entire alluvial valley area in the La Verne, Chino-Riverside, and Bunker Hill-Yucaipa areas. However, the Proposed Project is not located within these areas. Based on available NRCS data, the majority of the soil types mapped within the Proposed Project area are moderately well-drained, well-drained, somewhat excessively drained, or excessively drained. Therefore, soils the Proposed Project area have a low potential to hold water and a subsequent low potential for subsidence.

4.6.1.7 Expansive or Collapsible Soils

Expansive soils are characterized by the ability to undergo significant volume change (i.e., shrink and swell) as a result of specific clay types and variations in soil moisture content. Soil moisture content can change due to many factors, including perched groundwater, landscape irrigation, rainfall, and utility leakage. Expansive soils are typically characterized by clays with a high swelling potential. Section 1808 of the International Building Code (IBC) and Chapter 18 of the California Building Code (CBC) provide design standards for structures constructed on expansive soils. According to Section 1803.5.3 of the IBC, Table 18-1-B of the 1994 Uniform Building Code (UBC), and Section 1803.5.3 of the CBC, soils with an expansion index of 20 or greater require additional foundation design considerations.

The majority of the soil types underlying the Proposed Project area contain little to no clays with swelling potential or have insufficient data to indicate the clay content and/or swelling potential of underlying soils. Section 4.6.1.2, Soils provides a discussion on the soil characteristics anticipated to be encountered in the Proposed Project area.

4.6.2 Regulatory Setting

Federal, State, and local regulations were reviewed for applicability to the Proposed Project. The following subsections describe regulations regarding geology and soils that are relevant to the Proposed Project.

4.6.2.1 Federal

In addition to the federal regulations described in the following subsections, federal authorizations would also be required because a majority of the land within the Proposed Project area is under the jurisdiction of the BLM, NPS, BOR, and DoD.

International Building Code

Published by the International Code Council, the purpose of the IBC is to establish minimum structural requirements to provide a reasonable level of safety, public health and general welfare through structural strength, and safety to life and property from fire and other hazards attributed to the built environment. The provisions of the IBC apply to the construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of buildings or structures, as well as any appurtenances connected to applicable buildings or structures. The IBC also incorporates the requirements and regulations set forth in several other ICC codes including the International Energy Conservation Code, the International Existing Building Code, the International Fire Code, and the International Fuel Gas Code. The IBC is in use or adopted in all 50 states of the U.S. and is updated every three years to ensure that new construction methods and technologies are incorporated into existing codes.

Uniform Building Code

Published by the International Conference of Building Officials, the UBC provides complete regulations covering all major aspects of building design and construction relating to fire and personnel safety and structural safety. This is the code that has been adopted by most western states. The provisions of Volume 1 of the UBC contain the administrative, fire and personnel safety, and field inspection provisions, including all non-structural provisions and those structural provisions necessary for field inspections. Volume 2 contains provisions for structural engineering design, including those design provisions formerly in the UBC Standards. Volume 3 contains the remaining material, testing, and installation standards previously published in the UBC Standards.

Clean Water Act

The Clean Water Act (CWA) (33 U.S. Code §1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of waters of the U.S. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point-source and certain non-point-source discharges to surface water. Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point-source discharges of pollutants into waters of the U.S. Discharges or construction activities that disturb 1 or more acres—including the Proposed Project—are regulated under the NPDES storm water program and are required to obtain coverage under a NPDES Construction General Permit. The Construction General Permit establishes limits and other requirements, such as the

implementation of a Storm Water Pollution Prevention Plan (SWPPP), which would further specify best management practices (BMPs) and other measures designed to avoid or eliminate pollution discharges in waters of the U.S.

4.6.2.2 State

California

California Public Utilities Commission General Order 95

California Public Utilities Commission (CPUC) General Order (G.O.) 95 Rules for Overhead Line Construction provides general standards for the design and construction of overhead electric transmission lines.

California Public Utilities Commission General Order 128

CPUC G.O. 128 (Rules for Construction of Underground Electric Supply and Communication Systems) provides general standards for the construction of underground electric systems.

California Public Utilities Commission General Order 131-D

Pursuant to CPUC G.O. 131-D, the CPUC has sole and exclusive jurisdiction over the siting and design of electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities in the State of California. Under the California Environmental Quality Act (CEQA), the CPUC is the Lead Agency with respect to such Proposed Project elements within the State of California. Southern California Edison Company (SCE) is required to comply with G.O. 131-D and is seeking a Permit to Construct from the CPUC for the Proposed Project.

California Building Code

The Proposed Project is subject to the applicable sections of Title 24, Part 2 of the CBC, which is administered by the California Building Standards Commission. Under State law, all building standards must be centralized in Title 24 to be enforceable. The CBC contains necessary California amendments, which are based on American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) Standard. The ASCE/SEI Standard provides requirements for general structural design and includes means for determining earthquake loads, as well as other loads for inclusion into building codes. The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, which are used to determine a seismic design category (SDC) for a project. Once a project is categorized according to an SDC, design specifications can be determined. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure—or any appurtenances connected or attached to such buildings or structures—throughout California.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was enacted by the State of California in 1972 to mitigate the hazards of surface faulting on structures planned for human occupancy and other critical structures. The State of California has established regulatory zones, known as earthquake fault zones, around the surface traces of active faults. Earthquake fault zone maps have been

issued for use by government agencies to plan and review new construction projects. In addition to residential projects, structures planned for human occupancy that are associated with industrial and commercial projects are also a concern near the Alquist-Priolo earthquake fault zones.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (California Public Resources Code, Chapter 7.8, §2690-2699.6) directs the CGS to identify and map areas prone to liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of this program is to minimize the loss of life and property through the identification, evaluation, and mitigation of seismic hazards. Seismic Hazard Zone Maps that identify Zones of Required Investigation have been generated as a result of the program. Counties and cities are then required to use the Seismic Hazard Zone Maps in their land use planning and building permit processes. The Proposed Project is in an area that has not yet been mapped as part of the Seismic Hazards Mapping Act.

Nevada

Nevada Revised Statutes Section 704.865

Nevada Revised Statutes Section 704.865 provides that "A person, other than a local government, shall not commence to construct a utility facility in the State without first having obtained a permit therefor from the Commission. The replacement of an existing facility with a like facility, as determined by the Commission, does not constitute construction of a utility facility." The Public Utilities Commission of Nevada is the Lead Agency for compliance with the Nevada Utility Environmental Protection Act.

Nevada Bureau of Mines and Geology

The Nevada Bureau of Mines and Geology (NBMG) is a research and public service unit of the University of Nevada and is the State geological survey. The NBMG publishes reports on mineral resources, engineering geology, environmental geology, hydrogeology, and geologic mapping. The NBMG is responsible for publishing geological maps from the USGS's Quaternary Fault and Fold Database for the U.S.

4.6.2.3 Local

The CPUC has sole and exclusive jurisdiction over the siting and design of Proposed Project components located in the State of California. Pursuant to CPUC G.O. 131-D, Section XIV.B, "Local jurisdictions acting pursuant to local authority are preempted from regulating electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities subject to the CPUC's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters." Consequently, public utilities are directed to consider local regulations and consult with local agencies, but the county and cities' regulations are not applicable as the county and cities do not have jurisdiction over the Proposed Project. Accordingly, the following discussion of local regulations is provided for informational purposes only. The Proposed project is subject to local regulations in the State of Nevada.

California

County of San Bernardino

County of San Bernardino 2007 General Plan

The Safety Element of the County of San Bernardino 2007 General Plan contains the following goals to address geologic and seismic hazards:

- Goal S 1: The County will minimize the potential risks resulting from exposure of County residents to natural and man-made hazards in the following priority: loss of life or injury, damage to property, litigation, excessive maintenance and other social and economic costs
- Goal S 6: The County will protect residents from natural and manmade hazards
- Goal S 7: The County will minimize exposure to hazards and structural damage from geologic and seismic conditions

City of Hesperia

City of Hesperia General Plan 2010

The Safety Element of the City of Hesperia General Plan 2010 contains the following goals to address geologic and seismic hazards:

- Goal SF-1: Minimize injury, loss of life, property damage and economic and social disruption caused by seismic shaking and other earthquake-induced hazards, and by geologic hazards such as slope instability, compressible and collapsible soils, and subsidence
- Goal SF-5: Plan for emergency response and recovery from natural disasters, especially from flooding, fire, and earthquakes, and from civil unrest that may occur following a natural disaster

City of Hesperia Building Code

The City of Hesperia has adopted Title 24 of the most current California Code of Regulations (CCR), which is based substantially on the IBC. Local governments are permitted to make local amendments to the CCR that address unique local climatic, geologic, and/or topographical conditions in their respective communities. The City of Hesperia Building Code does not contain any specific regulations that are relevant to the Proposed Project.

Nevada

Clark County

Clark County Comprehensive Plan

The Safety Element of the Clark County Comprehensive Plan contains the following policies to address geologic and seismic hazards:

- Natural and Man-made Hazards Policy 1: Minimize public exposure to natural and man-made hazards
- Natural and Man-made Hazards Policy 2: Ensure that land use plans and development regulations consider natural and man-made hazards and mitigation programs
- Natural and Man-made Hazards Policy 3: Provide public facilities and services to protect against natural and man-made hazards
- Natural and Man-made Hazards Policy 4: Support educational programs to inform the community about natural and man-made hazards
- Natural and Man-made Hazards Policy 5: Coordinate with local, regional, state and federal governments and the private sector to provide protection against natural and man-made hazards

Clark County Building Code

The 2012 IBC has been adopted by Clark County. The Clark County Building Code does not contain any specific regulations that are relevant to the Proposed Project.

South County Land Use Plan

The South County Land Use Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

Laughlin Land Use Plan

The Laughlin Land Use Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

City of Boulder City

Boulder City Master Plan

The Boulder City Master Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

City of Boulder City Building Code

The 2012 IBC has been adopted by the City of Boulder City. The City of Boulder City Building Code does not contain any specific regulations that are relevant to the Proposed Project.

4.6.3 Significance Criteria

The significance criteria for assessing the impacts to geology and soils come from the CEQA Environmental Checklist.[6] According to the CEQA Checklist, a project causes a potentially significant impact if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, or injury, or death involving: rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Refer to Division of Mines and Geology Special Publication 42.); strong seismic ground shaking; seismic-related ground failure, including liquefaction; and landslides
- Result in substantial soil erosion or the loss of topsoil
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse
- Be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water

4.6.4 Impact Analysis

4.6.4.1 Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault strong seismic ground shaking; seismic-related ground failure, including liquefaction; and landslides?

Construction

Less-Than-Significant Impact. As previously discussed, Proposed Project components involving the installation of new structures—including the mid-line series capacitors, fiber optic repeaters, and the existing Eldorado, Lugo, and Mohave Substations—are not crossed by any active faults in the Proposed Project area. As depicted on Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area, the most active faults are crossed by portions of the existing Eldorado-Lugo and Lugo-Mohave 500 kV Transmission Lines located west of Pisgah Substation. Geotechnical investigations would be conducted for the mid-line series capacitor sites and fiber optic repeater sites to ensure that new facilities installed during construction of the

[6] CEQA is a statute that requires State of California and local agencies in California to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. There is no CEQA equivalent for the State of Nevada. Therefore, in the absence of such regulations, the Proposed Project (including components in Nevada) has been evaluated against the CEQA significance criteria. Where specific Nevada environmental regulations exist, a discussion has been included in the impact analysis for the Proposed Project.

Proposed Project would be able to withstand seismic shaking and seismic-induced hazards. In addition, modifications to existing transmission, subtransmission, distribution, and telecommunications facilities would be designed in accordance with the standards provided in CPUC G.O. 95 and G.O. 128, and would be consistent with any relevant IBC standards. As a result, the Proposed Project would be able to withstand reasonably foreseeable seismic events. Incorporation of these standard engineering practices would ensure that people or structures would not be exposed to hazards associated with strong seismic ground shaking. As a result, potential impacts are anticipated to be less than significant.

Several active faults—many of which are estimated to be capable of producing earthquakes with a maximum magnitude of 6.7 or greater—are located within 25 miles of the previously discussed Proposed Project components requiring new structures, as shown in Table 4.6-2: Active and Potentially Active Faults in the Vicinity of New Proposed Project Structures and Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area. Strong earthquakes, particularly near active faults, can result in liquefaction and collapse of soils if certain conditions are present. However, no new Proposed Project structures would be installed where active faults cross existing transmission facilities. As previously discussed, geologic and hydrologic characteristics that are prone to liquefaction and landslides are not present in the majority of the Proposed Project area. Geologic hazards associated with liquefaction are discussed further in the response to Question 4.6.4.3.

The proposed mid-line series capacitors, fiber optic repeaters, and modifications to existing substations are not located within mapped CGS-designated liquefaction or landslide areas. SCE would ensure that the final Proposed Project design would address site-specific soil conditions and implement recommendations from the previously described geotechnical investigations for Proposed Project components requiring the installation of new facilities, which include the proposed mid-line series capacitors and the fiber optic repeaters. Therefore, the Proposed Project would not subject construction personnel or proposed structures to geologic hazards, and impacts resulting from seismic-related ground failure would be less than significant.

Operation

Less-Than-Significant Impact. Operation and Maintenance (O&M) activities associated with the Proposed Project would be similar to those currently performed by SCE for existing facilities, and generally include repairing conductors, washing or replacing insulators, repairing or replacing other hardware components, repairing or replacing poles and towers, tree trimming, brush and weed control, and access road maintenance, among other things. O&M practices would also include routine inspections and emergency repair within substations and rights-of-way (ROWs), which would require the use of vehicles and equipment. SCE also inspects the transmission and subtransmission overhead facilities in a manner consistent with CPUC G.O. 165, which requires observation a minimum of once per year, but inspection typically occurs more frequently to ensure system reliability. Following construction of the mid-line series capacitors, additional O&M activities would consist of monthly and annual inspections, as well as equipment testing and maintenance of emergency generators, ranging from once a year to once every five years. Additional testing, inspections, and maintenance of the building, site, generator, and fuel tank would also be required at the new fiber optic repeater facilities every six months to once a year. As previously discussed, SCE would design proposed aboveground and

underground infrastructure in accordance with CPUC G.O. 95, G.O. 128, and consistent with relevant IBC standards, which would allow structures to withstand reasonably foreseeable seismic events. Therefore, O&M of the Proposed Project is not expected to expose people or structures to hazards associated with strong seismic ground shaking. As a result, impacts would be less than significant.

4.6.4.2 Would the project result in substantial soil erosion or the loss of topsoil?

Construction

Less-Than-Significant Impact. Ground-disturbing activities would expose soil to erosion by removing the vegetative cover and potentially compromising the soil structure. Rain and wind may potentially further detach soil particles and transport them off site. Because the Proposed Project would disturb more than 1 acre, a Proposed Project-specific SWPPP would be prepared that identifies BMPs to be implemented during construction. Information based on the soil type, slope, and other on-site characteristics would be used to develop appropriate BMPs to ensure that erosion and sedimentation would be controlled during construction of the Proposed Project. As described in Section 4.9, Hydrology and Water Quality, the Proposed Project's NPDES permits would be under the jurisdiction of the Lahontan and Colorado River Basin Regional Water Quality Control Boards. Therefore, SCE would obtain coverage under both the Construction General Permit (Order No. 2009-0009-DWQ) from the State Water Resources Control Board, as well as the Construction Stormwater General Permit (NVR100000) from the Nevada Department of Environmental Protection Bureau of Water Pollution Control.

In addition, a Worker Environmental Awareness Program would be provided for all on-site personnel to ensure that proper procedures are taken to implement BMPs during construction. With implementation of the SWPPP, which would include BMPs to control erosion and prevent off-site sedimentation, substantial soil erosion is not anticipated to occur, and impacts would be less than significant.

The existing Eldorado-Mohave and Lugo-Mohave 500 kV Transmission Lines are primarily located on flat and rolling terrain with a slight to moderate erosion potential. However, as previously described in Section 4.6.1.4, Slope Instability, several portions of the Proposed Project are located in the vicinity of mountainous terrain underlain by soil types with slopes ranging 15 to 75 percent. Minor grading near steep slopes may occur within one discrepancy work area[7] between Mile 29 and Mile 30 along the Lugo-Mohave 500 kV Transmission Line. However, erosion at these sites would occur primarily through wind, water, tracking from vehicles and equipment, and excavation activities. The erosion potential would be considered when developing BMPs for inclusion in the SWPPP. In addition, erosion resulting from

[7] SCE has defined "discrepancies" as potential clearance problems between an energized conductor and its surroundings, such as the structure, another energized conductor on the same structure, a different line, or the ground. SCE has identified approximately 16 discrepancies along the Eldorado-Lugo, Eldorado-Mohave, and Lugo-Mohave 500 kV Transmission Lines, where minor grading, or relocation, replacement, or modification of transmission, subtransmission, or distribution facilities are needed to address CPUC G.O. 95 and National Electrical Safety Code overhead clearance requirements.

construction activities would be temporary and would be sufficiently stabilized following the completion of construction. As a result, impacts would be less than significant.

The majority of the Proposed Project components involving ground disturbance are located within existing or to-be-acquired franchise areas and ROWs where soil has been previously disturbed due to past and current construction and O&M activities. Construction of the mid-line series capacitors, fiber optic repeaters, and grading at discrepancy areas would permanently impact a total of approximately 8.8 acres. However, as previously discussed, BMPs developed for the SWPPP would be implemented to prevent erosion and the loss of topsoil during construction. Therefore, the loss of topsoil would be considered less than significant.

Operation

Less-Than-Significant Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. In addition, O&M associated with the Proposed Project would not typically involve ground-disturbing activities or grading, and loss of topsoil is not anticipated. If ground-disturbing activities are required, SCE would implement BMPs to minimize erosion and control sedimentation within the work areas. Therefore, impacts to soil erosion or topsoil would be less than significant.

4.6.4.3 Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Construction

Less-Than-Significant Impact. Landslides typically occur on moderate-to-steep slopes when masses of rock or earth move down a slope. Landslides can be caused by natural events (e.g., rainfall, earthquakes, and soil erosion) or human activities (e.g., grading) that can result in unstable fill slopes or excessive cuts. Important factors that affect the slope stability include the steepness of the slope and the strength of rock or soil materials. As previously described, steeper slopes ranging from 15 to 75 percent are present in the vicinity of the existing Eldorado-Lugo, Eldorado-Mohave, and Lugo-Mohave 500 kV Transmissions Lines.

As previously described, construction of the Proposed Project would primarily occur within existing or to-be-acquired franchise areas and ROWs along existing transmission facilities where soil has been previously disturbed and/or engineered due to past and current construction and O&M activities. With the exception of certain portions of the existing 500 kV transmission lines, the majority of the Proposed Project is underlain by relatively flat terrain. Proposed Project components requiring the installation of new structures are located primarily within flat areas with slopes ranging from zero to 15 percent. Furthermore, geotechnical investigations would be conducted primarily for the mid-line series capacitor sites and fiber optic repeater sites to ensure that new structures installed during construction of the Proposed Project would be able to withstand seismic-induced hazards and potential geologic instability. New access roads adjacent to the mid-line series capacitors would also be assessed during geotechnical investigations. Based on the relatively minor slopes underlying the majority of the Proposed Project, as well as

the Proposed Project components requiring the installation of new structures, the potential for landslides or other forms of slope failure during construction would be low. As a result, impacts from unstable geologic units would be considered less than significant.

As previously described, no CGS-designated liquefaction or landslide areas are mapped in the vicinity of Proposed Project components located in California. Based on the absence of CGS-designated liquefaction or landslide areas in the vicinity of Proposed Project components in Nevada, soil and groundwater conditions prone to liquefaction were examined in the Proposed Project area in Nevada. The majority of the soil types underlying Proposed Project components in Nevada are moderately well-drained, well-drained, somewhat excessively drained, or excessively drained. Shallow groundwater, which increases the potential for liquefaction, has not been reported in the vicinity of the Proposed Project components located in Nevada. In addition, the geologic setting underlying Proposed Project components in Nevada consists primarily of Quaternary alluvium and is similar to several areas in California with no mapped liquefaction areas. Based on the absence of shallow groundwater and the drainage characteristics of soil types underlying the Proposed Project, geologic characteristics prone to landslides, lateral spreading, subsidence, liquefaction, or collapse do not likely exist in the vicinity of Proposed Project components located in Nevada. Therefore, impacts resulting from unstable geologic units would be less than significant.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. In addition, O&M activities are not expected to result in the increase or relocation of soils that would increase the probability of slope movement, lateral spreading, subsidence, or collapse as the O&M activities are generally limited to work in existing developed areas. As a result, there would be no impact.

4.6.4.4 Would the project be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property?

Construction

Less-Than-Significant Impact. As described in Section 4.6.1.2, Soils, most soil types underlying the Proposed Project contain little to no clays with swelling potential. In addition, geotechnical investigations would be conducted for work areas where new facilities are proposed to be installed. According to Section 1803.5.3 of the IBC, Table 18-1-B of the UBC, and Section 1803.5.3 of the CBC, soils with an expansion index of 20 or greater require additional foundation design considerations. Data acquired during geotechnical investigations would be used to design the final grading plans to ensure that the soil composition, compaction, and grade mitigates the risk of damage from potentially expansive soils. Based on the implementation of recommendations provided as a result of the geotechnical investigations, impacts resulting from expansive soils would be less than significant.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M activities associated with the Proposed Project would continue in the same manner as they do for the existing facilities. O&M activities are not anticipated to result in new expansive soil conditions, and new soils imported for O&M activities would meet the requirements of Table 18-1-B of the UBC. Therefore, O&M of the Proposed Project is not expected to result in substantial risks to life or property due to soil expansion or shrinkage. As a result, there would be no impact.

4.6.4.5 Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

Construction

No Impact. Soil permeability is a consideration for projects that require septic system installation. Because the Proposed Project would not involve the installation of a septic tank or alternative wastewater disposal system, no impact would occur.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the Proposed Project would not involve the use of a septic tank or alternative wastewater disposal system, as O&M of the Proposed Project is not anticipated to generate wastewater. As a result, no impact would occur.

4.6.5 Applicant-Proposed Measures

Because no impacts to geology and soils would occur as a result of the Proposed Project, no avoidance or minimization measures are proposed.

4.6.6 Mid-Line Series Capacitor Site Alternatives

Consistent with Section 15126.6(d) of the CEQA Guidelines, this Proponent's Environmental Assessment analyzes alternatives to the Proposed Project. Section 5.2, Description of Project Alternatives and Impact Analysis identifies and compares the construction and operation of SCE's Proposed Project with its alternatives, including alternatives that did not meet key Proposed Project objectives and were not carried forward. The alternatives retained for a full evaluation—alternative sites for the proposed Newberry Springs Series Capacitor and the proposed Ludlow Series Capacitor—are analyzed in relation to geology and soils in the following discussion.

The alternative Newberry Springs Series Capacitor site is an approximately 3.1-acre site located approximately 930 feet to the northeast of its proposed location along the Eldorado-Lugo 500 kV Transmission Line. The alternative Ludlow Series Capacitor site is an approximately 3.1-acre

site located approximately 970 feet to the southwest of its proposed location along the Lugo-Mohave 500 kV Transmission Line.

The geologic characteristics and seismic hazards in the vicinity of the alternative Newberry Springs Series Capacitor site are generally the same as the proposed mid-line series capacitor site. No NRCS data were available for the mid-line series capacitor sites. However, based on preliminary site reconnaissance activities and a review of available USGS topographical data, the proposed and alternative Newberry Springs Series Capacitor sites are underlain by relatively flat terrain. Based on the similar topography associated with the proposed and alternative Newberry Springs Series Capacitor sites, construction and O&M at these sites would result in similar impacts related to geology and soils.

The geologic characteristics and seismic hazards in the vicinity of the alternative Ludlow Series Capacitor site are generally the same as the proposed mid-line series capacitor site. No NRCS data were available for the mid-line series capacitor sites. However, preliminary site reconnaissance activities and available USGS topographical data revealed that the proposed and alternative Ludlow Series Capacitor sites are underlain by relatively flat terrain. Therefore, impacts related to geology and soils during construction and O&M of the alternative Ludlow Series Capacitor site would be similar to impacts resulting from construction and O&M of the proposed mid-line series capacitor site.

4.6.7 References

ASCE. (2016). *Minimum Design Loads for Buildings and other Structures (ASCE/Structural Engineering Institute 7-10).* Retrieved May 23, 2016, from http://ascelibrary.org/doi/book/10.1061/9780784412916

Bolt, B.A. (1988). *Earthquakes.* New York City, NY: W.H. Freeman and Company.

CBC. (2016). *California Building Code – Chapter 18: Soils and Foundations*. Retrieved January 12, 2017, from http://codes.iccsafe.org/app/book/content/2016%20California%20Codes/Building%20Volume%202/Chapter%2018%20Soils%20and%20Foundations.pdf

CGS. (2002). *California Geomorphic Provinces*. Retrieved December 31, 2015, from http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/note_36.pdf.

CGS. (2008). *Ground Motion Interpolator*. Retrieved December 31, 2015, from http://www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html.

CGS. (2015a). *Alquist-Priolo Earthquake Fault Zone Maps*. Retrieved December 28, 2015, from http://www.consrv.ca.gov/cgs/rghm/ap/Pages/Index.aspx.

CGS. (2015b). *Regional Geologic Hazards and Mapping Program*. Retrieved December 28, 2015, from http://maps.conservation.ca.gov/cgs/informationwarehouse/.

City of Boulder City. (2009). *Boulder City Master Plan.* Retrieved December 23, 2015, from http://www.bcnv.org/176/Planning-Publications.

City of Hesperia. (2010). *City of Hesperia General Plan 2010.* Retrieved December 23, 2015, from http://www.cityofhesperia.us/DocumentCenter/View/3459.

Clark County. (2007). *Laughlin Land Use Plan.* Retrieved March 31, 2016, from http://www.clarkcountynv.gov/comprehensive-planning/land-use/Documents/LaughlinAmendedPlan0907.pdf.

Clark County. (2013). *South Clark County Land Use Plan.* Retrieved March 30, 2016, from http://www.clarkcountynv.gov/comprehensive-planning/land-use/Documents/SouthCounty_LandUsePlan.pdf.

Clark County. (2014). *Clark County Comprehensive Plan.* Retrieved December 23, 2015, from http://www.clarkcountynv.gov/comprehensive-planning/advanced-planning/Pages/ComprehensivePlan.aspx.

County of San Bernardino. (2007). *County of San Bernardino 2007 General Plan*. Retrieved December 23, 2015, from http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FINALGP.pdf.

International Code Council. (2015). *2015 International Building Code*. Retrieved February 24, 2016, from http://codes.iccsafe.org/app/book/content/2015-I-Codes/2015%20IBC%20HTML/EFFECTIVE%20USE%20OF%20THE%20INTERNATIONAL%20BUILDING%20CODE.html

NBMG. (1998). *Guidelines for Evaluating Potential Surface Fault Rupture/Land Subsidence Hazards in Nevada*. Retrieved May 23, 2016, from http://www.nbmg.unr.edu/nesc/NESC_Seismic_Building_Guidelines/Guidelines_Surface_Fault_Rupture.pdf

NBMG. (2016a). *Guidelines for Evaluating Liquefaction Hazards in Nevada*. Retrieved December 31, 2015, from http://www.nbmg.unr.edu/nesc/NESC_Seismic_Building_Guidelines/Guidelines_liquefaction.pdf.

NBMG. (2016b). *Maps and Data*. Retrieved December 31, 2015, from http://www.nbmg.unr.edu/Maps&Data/index.html.

Nevada Seismological Lab. (2009). *Living with Earthquakes in Nevada: A Nevadan's Guide to preparing for, surviving, and recovering from an earthquake*. Retrieved December 28, 2015, from http://crack.seismo.unr.edu/ep/nvguide/sbg3.html.

Norris, R.M., and Webb, R.W. (1976). *Geology of California*. Hoboken, CA: John Wiley and Sons, Inc.

State of Nevada Division of Water Resources. (2015). *Water Resources Map*. Retrieved December 31, 2015, from http://webgis.water.nv.gov/

USDA. (2015a). *Soil Survey Manual – Chapter Two*. Retrieved December 30, 2015, from http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054252.

USDA. (2015b). *Soil Survey Manual – Chapter Three*. Retrieved December 30, 2015, from http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054253.

USDA. (2015c). *Web Soil Survey and Soil Survey Geographic Database*. Retrieved December 30, 2015, from http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

USDA. (n.d.) *Soil Series Descriptions*. Retrieved December 22, 2015, from https://soilseries.sc.egov.usda.gov/osdname.asp.

USGS. (2015a). *Appendix A: California Fault Parameters for the National Seismic Hazard Maps and Working Group on California Earthquake Probabilities 2007*. Retrieved January 13, 2016, from http://pubs.usgs.gov/of/2007/1437/a/.

USGS. (2015b). *California geologic map data for California*. Retrieved December 21, 2015, from http://mrdata.usgs.gov/geology/state/state.php?state=CA

USGS. (2015c). *California geologic map data for Nevada*. Retrieved December 22, 2015, from https://mrdata.usgs.gov/geology/state/state.php?state=NV.

USGS. (2015d). *Lower 48 Maps and Data*. Retrieved December 28, 2015, from http://earthquake.usgs.gov/hazards/products/conterminous/.

USGS. (2015e). *National Geologic Map Database: Swelling clays map of the conterminous United States*. Retrieved December 28, 2015, from http://ngmdb.usgs.gov/Prodesc/proddesc_10014.htm.

USGS. (2015f). *National Water Information System: Mapper*. Retrieved December 31, 2015, http://maps.waterdata.usgs.gov/mapper/index.html.

USGS. (2015g). *Quaternary Faults in Google Earth*. Retrieved December 21, 2015, from http://earthquake.usgs.gov/hazards/qfaults/google.php.

TABLE OF CONTENTS

LIST OF TABLES

This page intentionally left blank.

4.7 Greenhouse Gas Emissions

This section describes the greenhouse gas (GHG) regulations that are applicable to electrical transmission projects and evaluates the potential impacts from construction and operation of the Eldorado-Lugo-Mohave Series Capacitor Project (Proposed Project[1]). The potential impacts from the Proposed Project alternatives are also assessed.

Federal, State, regional, and local regulations and policies were consulted to determine the Proposed Project's level of compliance with—and potential impacts to—applicable climate action plans and/or GHG standards. Information for this section was obtained from Internet searches of federal, State, regional, and local websites. The simulated GHG emissions presented in this section were developed using emission factors from the California Air Resources Board's (CARB's) OFFROAD 2007 model, the California Emissions Estimator Model 2013.2.2, and the United States (U.S.) Environmental Protection Agency's (EPA's) Compilation of Air Pollutant Emission Factors (AP-42). This analysis of GHG emissions evaluates the Proposed Project's potential to generate GHG emissions for the construction and operation phases of the Proposed Project. GHG emissions were calculated with the intent of identifying the Proposed Project's biggest contributors of GHGs.

4.7.1 Environmental Setting

The Proposed Project is located in California and Nevada, within the Mojave Basin and Range (Mojave). Federal lands constitute a majority of the land area in the Mojave, including lands under the jurisdiction of the Bureau of Land Management (BLM), National Park Service (NPS), Bureau of Reclamation (BOR), and Department of Defense (DoD). The Proposed Project would modify three existing transmission lines that extend northeast from Lugo Substation (located in San Bernardino County, California) to Eldorado Substation (located in the City of Boulder City, Nevada) and Mohave Substation (located in Clark County, Nevada), and from Mohave Substation northwest to Eldorado Substation. Portions of the Proposed Project would also cross the City of Hesperia, California, the unincorporated community of Lucerne Valley in California, as well as the unincorporated communities of Searchlight and Laughlin in Nevada.

4.7.2 Climatic Environmental Setting

GHGs refer to gases that trap heat in the atmosphere, causing a greenhouse effect. GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). Atmospheric concentrations of the two most important directly emitted, long-lived GHGs, CO_2 and CH_4, are currently well above the range of atmospheric concentrations that occurred over the last 650,000 years (Center for Climate and Energy Solutions, 2011). According to the Intergovernmental Panel on Climate Change (IPCC), increased atmospheric levels of CO_2 are correlated with rising temperatures; concentrations of CO_2 have increased by approximately 31 percent above pre-

[1] The term "Proposed Project" is inclusive of all components of the Eldorado-Lugo-Mohave Series Capacitor Project. Where the discussion in this section focuses on a particular component, that component is called out by its individual work area (e.g., "Ludlow Series Capacitor").

industrial levels since the year 1750. Climate models show that temperatures will probably increase by 1.4 degrees Celsius (°C) to 5.8°C by the year 2100 (IPCC, 2007).

Global warming potential (GWP) estimates how much a given mass of a GHG contributes to climate change. The term enables comparison of the warming effects of different gases. GWP uses a relative scale that compares the warming effect of the gas in question with that of the same mass of CO_2. The CO_2 equivalent (CO_2e) is a measure used to compare the effect of emissions of various GHGs based on their GWP, when projected over a specified time period (generally 100 years). CO_2e is commonly expressed as tons per year (tpy) of CO_2 equivalents (CO_2e). The CO_2e for a gas is obtained by multiplying the mass of the gas (in tons) by its GWP.

4.7.3 Regulatory Setting

Federal, State, and local regulations were reviewed for applicability to the Proposed Project.

4.7.3.1 Federal

In addition to the federal regulation described in the following subsection, federal authorizations would also be required because a majority of the land within the Proposed Project area is under the jurisdiction of the BLM, NPS, BOR, and DoD.

Mandatory Reporting of Greenhouse Gases (Title 40, Part 98 of the Code of Federal Regulations)

The U.S. EPA promulgated this rule in 2009 to require mandatory reporting of GHGs from large GHG emissions sources in 31 source categories in the U.S. In general, the threshold for reporting is 25,000 metric tons (MT) of CO_2e or more. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHGs, along with vehicle and engine manufacturers, report at the corporate level. Facilities and suppliers began collecting data on January 1, 2010. The first emissions report was due on March 31, 2011, for emissions during 2010. Manufacturers of vehicles and engines outside of the light-duty sector began reporting CO_2 for model year 2011 and other GHGs in subsequent model years as part of existing EPA certification programs.

Since 2012, EPA regulations also require the reporting of SF_6 emissions from certain electrical facilities. See Title 40, Part 98, Subpart DD of the Code of Federal Regulations. Southern California Edison Company (SCE) complies with these requirements. Furthermore, SCE has developed and would implement SF_6 gas management guidelines as described in SCE's document entitled "An Asset Management Approach for EPA/CARB SF_6 Regulations," dated April 2012. This document includes an overview of the tools and methods that SCE utilizes to comply with both the EPA's Voluntary SF_6 Emission Reduction Partnership program and the CARB's SF_6 Regulations. Following the guidelines in this document would ensure compliance with these regulations. This guideline document identifies storage methods, disposal method alternatives, and record-keeping requirements. Inventories are documented and annually reported to the U.S. EPA and CARB.

4.7.3.2 State

California

California Public Utilities Commission General Order 131-D

Pursuant to California Public Utilities Commission (CPUC) General Order (G.O.) 131-D, the CPUC has sole and exclusive jurisdiction over the siting and design of electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities in the State of California. Under the California Environmental Quality Act (CEQA), the CPUC is the Lead Agency with respect to such Proposed Project elements within the State of California. SCE is required to comply with G.O. 131-D and is seeking a Permit to Construct from the CPUC for the Proposed Project.

Global Warming Solutions Act of 2006 (Assembly Bill 32)

The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) charges the CARB with the responsibility of monitoring and regulating sources of GHG emissions in order to reduce those emissions. The CARB established a scoping plan in December 2008 for achieving reductions in GHG emissions and has established and implemented regulations for reducing those emissions by the year 2020.

Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (Title 17, Sections 95350-95359 of the California Code of Regulations)

The CARB adopted this rule in 2011 to reduce SF_6 emissions from gas insulated switchgear (GIS) and circuit breakers that use SF_6 as an electrical insulating medium. The rule specifies maximum annual SF_6 emission rates for each GIS owner's active GIS equipment. These emission rates decrease with time. The rule also specifies record-keeping and reporting requirements. SCE complies with this regulation.

Mandatory Greenhouse Gas Reporting Regulation (Title 17, Sections 95100-95133 of the California Code of Regulations)

Pursuant to AB 32, the CARB adopted the Mandatory GHG Reporting Regulation. The facilities required to annually report their GHG emissions include electricity-generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 $MTCO_2e$ per year from stationary source combustion. In particular, retail providers of electricity are required to report fugitive emissions of SF_6 related to transmission and distribution systems, substations, and circuit breakers located in California that the retail provider or marketer is responsible for maintaining in proper working order. SCE complies with these requirements.

Senate Bills 1078 and 107 and Executive Order S-14-08

Senate Bill (SB) 1078 requires retail sellers of electricity to generate at least 20 percent of their supply from renewable sources by 2017 and establishes the California Renewables Portfolio Standard Program. SB 107 then subsequently accelerated this goal by requiring utilities to obtain 20 percent of their power from renewable sources by 2010. In November 2008, then-Governor Arnold Schwarzenegger signed Executive Order (EO) S-14-08, which expanded the Renewables Energy Standard to 33 percent by 2020. In April 2011, the California Legislature enacted SB 2,

which mandates that the Renewables Portfolio Standard must reach 33 percent by 2020 for investor-owned and publicly owned utilities.

Senate Bill 350

SB 350 establishes California's 2030 GHG reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 sets 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing GHG emissions. SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown signed EO B-30-15. The EO established a new, interim, statewide target to reduce GHG emissions to 40 percent below 1990 levels by 2030 to ensure that California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050.

Nevada

Nevada Revised Statutes Section 704.865

Nevada Revised Statutes (NRS) Section 704.865 provides that "A person, other than a local government, shall not commence to construct a utility facility in the State without first having obtained a permit therefor from the Commission. The replacement of an existing facility with a like facility, as determined by the Commission, does not constitute construction of a utility facility." The Public Utilities Commission of Nevada is the Lead Agency for compliance with the Nevada Utility Environmental Protection Act.

Nevada Revised Statutes Section 445B.380

NRS Section 445B.380 requires that a statewide GHG inventory must be prepared and issued at least every four years beginning in 2008. The GHG inventory report includes the origin, types, and amount of GHGs emitted throughout Nevada, and all supporting analyses and documentation.

Nevada Climate Change Advisory Committee Final Report

In 2007, Governor Jim Gibbons signed an EO establishing a committee to recommend climate actions Nevada could pursue to reduce its GHG emissions. In 2008, the final report was issued. The report provides recommendations from the Nevada Climate Change Advisory Committee for addressing GHG emissions in the following six sectors:

- Electricity Consumption
- Residential/Commercial/Industrial
- Transportation
- Waste
- Agriculture
- Other

4.7.3.3 Local

The CPUC has sole and exclusive state jurisdiction over the siting and design of the Proposed Project components located in the State of California. Pursuant to CPUC G.O. 131-D, Section XIV.B, "Local jurisdictions acting pursuant to local authority are preempted from regulating electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities subject to the CPUC's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters." Consequently, public utilities are directed to consider local regulations and consult with local agencies, but the county and cities' regulations are not applicable as the county and cities do not have jurisdiction over the Proposed Project. Accordingly, the following discussion of local regulations is provided for informational purposes only. The Proposed Project is subject to local regulations in the State of Nevada.

California

Mojave Desert Air Quality Management District

California Environmental Quality Act Guidelines Policy Document

The air districts are primarily responsible for regulating stationary emission sources at industrial and commercial facilities within their respective geographic areas and for preparing the air quality plans that are required under the federal Clean Air Act and the California Clean Air Act. The Mojave Desert Air Quality Management District (MDAQMD) stipulates rules and regulations with which all projects must comply. In addition, the MDAQMD provides methodologies for analyzing a project's impacts under CEQA. The MDAQMD adopted significance thresholds for GHGs in 2016, which are set forth in the latest version of the MDAQMD CEQA and Federal Conformity Guidelines. The guidelines state that any project with GHG emissions exceeding 100,000 tpy of CO_2e or 548,000 pounds of CO_2e per day will be considered significant. The document also states the following:

> "A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased project (such as project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value."

San Bernardino Associated Governments

San Bernardino County Regional Greenhouse Gas Reduction Plan

San Bernardino Associated Governments (SANBAG) has adopted a Regional GHG Reduction Plan, which is intended to present goals identified by participating cities for reducing GHG emissions to levels they have individually selected. The plan includes an inventory of current GHG emissions, forecasts of 2020 emissions, initiatives to reduce emissions, and baseline information for the development of city climate action plans.

County of San Bernardino

County of San Bernardino 2007 General Plan

The Conservation Element of the County of San Bernardino 2007 General Plan contains the following policy that is relevant to the Proposed Project:

- Policy CO 4.13: Reduce GHG emissions within the County boundaries.

This policy requires the county to prepare GHG emission inventories for the operational activities, services, and facilities that the county has direct responsibility and control over. In addition, an inventory of emissions is also required from private industry and development located within the county's discretionary land use authority.

This policy also calls for the preparation and adoption of a GHG Emissions Reduction Plan that outlines measures to reduce GHG emissions. The county adopted a final GHG Reduction Plan in September 2011, which included Statewide, San Bernardino County, and local community measures. These measures target all sectors, but are primarily targeted at the building energy and transportation sectors.

City of Hesperia

City of Hesperia General Plan 2010

The Conservation Element of the City of Hesperia General Plan 2010 contains the following goal that is relevant to the Proposed Project:

- Goal CN-7: Develop, promote and implement policies to reduce and limit GHG Emissions.

This goal requires the city, in conjunction with regional councils of government, to prepare and implement a climate action plan. The goal also promotes the utilization of alternative energy resources (e.g., solar and wind), environmentally sensitive building materials, and the conservation of energy though building design and site layouts.

Nevada

Southern Nevada Regional Planning Coalition

Regional Emissions Inventory

The Southern Nevada Regional Planning Coalition (SNRPC) brought together all public jurisdictions, which included the CARB, California Climate Action Registry, International Council of Local Environmental Initiatives-Local Governments for Sustainability USA, and the Climate Registry to develop a consistent protocol for reporting GHG emissions. In partnership with these public jurisdictions, the SNRPC developed the first GHG emission inventory for the Las Vegas Valley, including unincorporated areas of Clark County and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City. The first inventory provided a comparison of emissions by sector from 2005 to 2009. The Regional GHG Emissions Inventory was last updated in 2014.

Clark County

Clark County Department of Air Quality

The Department of Air Quality (DAQ) is the air pollution control agency for all of Clark County, Nevada. Certain facilities in Clark County may be subject to both federal and State GHG regulations. The Nevada Division of Environmental Protection (NDEP) and the U.S. EPA each currently require the submission of GHG emission inventories for facilities that exceed applicable threshold emission levels. The EPA has also published a proposed rule that may require certain industrial facilities to acquire federal permits.

Clark County Comprehensive Plan

The Conservation Element of the Clark County Comprehensive Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

City of Boulder City

City of Boulder City Master Plan

The City of Boulder City Master Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

4.7.4 Significance Criteria

The significance criteria for assessing the impacts from GHG emissions are derived from the CEQA Environmental Checklist.[2] According to the CEQA Checklist, a project causes a potentially significant impact if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions

4.7.4.1 Thresholds for Greenhouse Gas Emissions

Mojave Desert Air Quality Management District

As described in Section 4.7.3.3, Local, the MDAQMD has published thresholds of 548,000 pounds of CO_2e per day or 100,000 tons of CO_2e per year. Because the construction and Operation and Maintenance (O&M) phases of the Proposed Project have a duration of more than one year, a CO_2e threshold of 100,000 tons per year would be applied.

[2] CEQA is a statute that requires State of California and local agencies in California to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. There is no CEQA equivalent for the State of Nevada. Therefore, in the absence of such regulations, the Proposed Project (including components in Nevada) has been evaluated against the CEQA significance criteria. Where specific Nevada environmental regulations exist, a discussion has been included in the impact analysis for the Proposed Project.

Clark County Department of Air Quality

The Clark County DAQ has not developed thresholds for determining the significance of GHG emissions.

4.7.5 Impact Analysis

4.7.5.1 Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction and Operation

Less-Than-Significant Impact. The main source of GHG emissions associated with the Proposed Project would be fossil fuel combustion in vehicles and equipment used during construction. GHG emissions for construction were calculated using the same approach as criteria air emissions for construction, as described in Section 4.3, Air Quality and as summarized in Table 4.7-1: Greenhouse Gas Construction Emissions.

Table 4.7-1: Greenhouse Gas Construction Emissions

Category	GHG Emissions (Tons per Year)		
	CO_2	CH_4	CO_2e
GWP	1	21	N/A
Annual Construction Emissions			
2019	8,186.3	1.1	8,210.2
2020	3,542.2	0.5	3,552.1

Note: "N/A" = Not Applicable

O&M activities associated with the Proposed Project would be similar to those currently performed by SCE for existing facilities, and generally include repairing conductors, washing or replacing insulators, repairing or replacing other hardware components, repairing or replacing poles and towers, tree trimming, brush and weed control, and access road maintenance, among other things. O&M practices would also include routine inspections and emergency repair within substations and rights-of-way, which would require the use of vehicles and equipment. SCE also inspects the transmission and subtransmission overhead facilities in a manner consistent with CPUC G.O. 165, which requires observation a minimum of once per year, but inspection typically occurs more frequently to ensure system reliability. Following construction of the mid-line series capacitors,[3] additional O&M activities would consist of monthly and annual inspections, as well as equipment testing and maintenance of emergency generators, ranging from once a year to once every five years. Additional testing, inspections and maintenance of the building, site, generator, and fuel tank would also be required at the new fiber optic repeater facilities every six months to once a year. Activities

[3] The Proposed Project includes construction of two new 500 kilovolt (kV) mid-line series capacitors—the proposed Newberry Springs Series Capacitor and Ludlow Series Capacitor.

would include replacing defective circuit boards, damaged radio antennas, or feedlines. Telecommunications equipment would also be subject to routine inspection and preventative maintenance, such as filter change-outs or software and hardware upgrades.

New circuit breakers upgraded at the Lugo Substation, Mohave Substation, and Eldorado Substation would be insulated with SF_6. Leakage of SF_6 from the circuit breakers during operation of the Proposed Project would generate GHG emissions. GHG emissions from SF_6 leakage were calculated by multiplying the amount of SF_6 contained in new circuit breakers and gas switches by the estimated annual leakage rate. As shown in Table 4.7-2: Annual Fugitive SF_6 Emissions, the estimated annual GHG emissions from SF_6 would be approximately 744.90 tons.

Table 4.7-2: Annual Fugitive SF_6 Emissions

Equipment Type	Net Change in Equipment Capacity (Pounds of SF_6 Per Circuit Breaker)	Total Annual Fugitive SF_6 Emissions (Pounds)	Annual CO_2e Fugitive Emissions (Tons)
Switch for Lugo Series Capacitor at Eldorado Substation	162	0.81	9.68
Switch for Newberry Springs Series Capacitor along the Eldorado-Lugo 500 kV Transmission Line	162	0.81	9.68
Switch for Eldorado Series Capacitor at Lugo Substation	162	0.81	9.68
Switch for Lugo Series Capacitor at Mohave Substation	162	0.81	9.68
Switch for Ludlow Series Capacitor along the Lugo-Mohave 500 kV Transmission Line	162	0.81	9.68
Switch for Mohave Series Capacitor at Lugo Substation	162	0.81	9.68
Reactor Device for Lugo-Mohave 500 kV Transmission Line at Eldorado Substation	1,295	6.48	77.37
500 kV Circuit Breakers at Eldorado Substation	180	0.90	10.76
500 kV Circuit Breakers at Lugo Substation	4,240	21.20	253.34
500 kV Circuit Breakers at Mohave Substation	5,780	28.90	345.35
Total	**12,467**	**62.34**	**744.90**

Fossil fuel combustion during periodic maintenance and repair activities and on-road vehicle travel associated with employee travel to and from the site would be an additional source of GHG emissions during O&M. Periodic maintenance and repair activities would continue to be conducted at a similar frequency and intensity as they are for the existing facilities. It is anticipated that a slight increase in O&M activities would be required for the mid-line series capacitors and fiber optic repeater sites. These activities would be generally limited to regular, monthly, and annual inspections and occasional repairs. It is also anticipated that there would be no increase in the number of employees that would perform O&M activities. Table 4.7-3: Total Annual Greenhouse Gas Emissions shows the Proposed Project's total annual GHG emissions, including emissions from both construction and O&M activities.

Table 4.7-3: Total Annual Greenhouse Gas Emissions

Source	GHG Emissions (Tons of CO_2e per Year)
2019 Construction and Fugitive SF_6 Emissions	8,955.1
2020 Construction and Fugitive SF_6 Emissions	4,297.0
Threshold	**100,000**

As shown in Table 4.7-3: Total Annual Greenhouse Gas Emissions, the annual construction emissions combined with the total fugitive SF_6 emissions would result in less than 10,000 tons of CO_2e per year. Because these emissions would be well below the annual threshold of 100,000 tons of CO_2e, impacts would be less than significant.

4.7.5.2 Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Construction and Operation

No Impact. CARB staff, in collaboration with interested stakeholders, developed a control measure to address SF_6 emissions from electrical transmission facilities. The regulation for reducing SF_6 emissions from GIS is an additional early-action measure (as part of the U.S. EPA's rule titled Mandatory Reporting of Greenhouse Gases) to achieve overall GHG reductions by specifically lowering SF_6 emissions from GIS. GIS owners must not exceed the maximum annual SF_6 emission rate for active GIS equipment, establish and adhere to written procedures to track all gas containers as they are leaving and entering storage, calibrate and weigh all gas containers on a scale, establish and maintain a complete record of GIS equipment inventory, and submit annual reports to the CARB Executive Officer for emissions that occurred during the previous calendar year.

The Climate Action Team, which consists of representatives from various State boards and departments, including the CPUC, has issued various reports outlining strategies to reduce climate change-related emissions in California. The reports serve as the primary State guidance to date. No other plans, policies, or regulations with the purpose of reducing GHG emissions have been adopted that would be applicable to the Proposed Project. The Proposed Project is

therefore analyzed in light of whether it is consistent with the applicable GHG-reduction measures recommended by the Climate Action Team's reports.

SCE's SF_6 gas management guidelines require proper documentation and control of SF_6 inventories, whether in equipment or in cylinders.[4] Inventories are documented on both a quarterly and yearly basis. SCE assumes that any SF_6 that is purchased and not used to fill new equipment is needed to replace SF_6 that has inadvertently leaked from equipment already in service. This assumption forms the basis for SCE's tracking and management of SF_6 emissions. Currently, SCE reports these emissions to the EPA and CARB on an annual basis.

SCE has taken proactive steps in the effort to minimize GHG emissions since 1997. In 1997, SCE established an SF_6 Gas Resource Team to address issues pertaining to the environmental impacts of SF_6. The team developed the SF_6 gas management guidelines that allow for rapid location and repair of equipment leaking SF_6. In addition, SCE's parent organization, Edison International, joined the EPA's voluntary SF_6 gas management program in 2001, committing SCE to join the national effort to minimize emissions of this GHG. Importantly, SCE's SF_6 emissions in 2006 were 41 percent less than in 1999, while the inventory of equipment containing SF_6 actually increased by 27 percent during the same time period.

SCE has made a significant investment in not only improving its SF_6 management practices, but also in purchasing state-of-the-art, gas-handling equipment that minimizes SF_6 leakage. The new equipment has improved sealing designs that virtually eliminate possible sources of leakage. SCE has also addressed SF_6 leakage on older equipment by performing repairs and replacing antiquated equipment through its infrastructure replacement program.

It is expected that the Proposed Project would have a minimal amount (approximately 744.90 tons of CO_2e per year) of SF_6 leakage as a result of the installation of state-of-the-art equipment and SCE's SF_6 gas management practices. Pursuant to its existing practices, SCE would reduce potential GHG impacts resulting from the Proposed Project to the greatest extent practicable.

SCE also incorporates a significant number of clean diesel, electric, and hybrid-electric service vehicles into its fleet. In addition to meeting the CARB's emission standards for air quality criteria pollutants, SCE is aggressively lowering GHG emissions from SCE fleet operations.

Because SCE complies with all Climate Action Team guidance, the Proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs. As a result, there would be no impact.

As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the Proposed Project would be consistent with the policies, plans, and regulations for reducing GHG emissions. As a result there would be no impact.

[4] Until the CARB finalizes its proposed SF_6 emission-reduction rules, SCE will continue to follow its internal policy.

4.7.6 Applicant-Proposed Measures

Because no impacts to GHG emissions would occur as a result of the Proposed Project, no avoidance or minimization measures are proposed.

4.7.7 Mid-Line Series Capacitor Site Alternatives

Consistent with Section 15126.6(d) of the CEQA Guidelines, this Proponent's Environmental Assessment analyzes alternatives to the Proposed Project. Section 5.2, Description of Project Alternatives and Impact Analysis, identifies and compares the construction and operation of SCE's Proposed Project with its alternatives, including alternatives that did not meet key Proposed Project objectives and were not carried forward. The alternatives retained for a full evaluation—alternative sites for the Newberry Springs Series Capacitor and the Ludlow Series Capacitor—are analyzed in relation to greenhouse gas emissions in the following discussion.

The alternative site for the Newberry Springs Series Capacitor is an approximately 3.1-acre site located approximately 930 feet to the northeast of its proposed location along the Eldorado-Lugo 500 kV Transmission Line. The alternative site for the Ludlow Series Capacitor is an approximately 3.1-acre site located approximately 970 feet to the southwest of its proposed location along the Lugo-Mohave 500 kV Transmission Line.

Construction and O&M of the alternative Newberry Springs Series Capacitor site would be similar in scope to that of the proposed mid-line series capacitor; however, the alternative Newberry Springs Series Capacitor site would be located approximately 0.9 mile northeast of Interstate (I-) 40 and the proposed mid-line series capacitor would be approximately 0.6 mile northwest of I-40. The farther distance from I-40 would generate slightly increased GHG emissions associated with employee travel to and from the site. The resulting impacts would be slightly greater, but still less than significant than the proposed mid-line series capacitor's impacts. Because these emissions would be amortized over 30 years when compared to the applicable thresholds, the resulting impacts from the alternative site would be minimal and similar to the proposed mid-line series capacitor site.

Construction and O&M of the alternative Ludlow Series Capacitor site would be similar in scope to that of the proposed mid-line series capacitor; however, the alternative Ludlow Series Capacitor site would be approximately 0.4 mile northwest of I-40 and the proposed mid-line series capacitor would be approximately 0.5 mile northwest of I-40. The closer distance to I-40 would generate slightly less GHG emissions associated with employee travel to and from the site. The resulting impacts from the alternative site would be less than the impacts from the proposed mid-line series capacitor site.

4.7.8 References

Center for Climate and Energy Solutions. (2011). Climate Change 101: Science and Impacts. Retrieved October 28, 2016, from http://www.c2es.org/docUploads/climate101-science.pdf.

City of Boulder City. (2009). *Boulder City Master Plan*. Retrieved April 20, 2016, from http://www.bcnv.org/DocumentCenter/Home/View/129.

City of Hesperia. (2010). *Final Environmental Impact Report for the City of Hesperia General Plan Update*. Retrieved October 20, 2016, from http://www.cityofhesperia.us/DocumentCenter/Home/View/1589.

City of Hesperia. (2010). *City of Hesperia General Plan 2010*. City of Hesperia, California. Retrieved October 20, 2016, from http://www.cityofhesperia.us/DocumentCenter/View/3459.

County of San Bernardino. (2015). Greenhouse Gas Emissions Development Review Processes. Retrieved May 6, 2016, from http://www.sbcounty.gov/Uploads/lus/GreenhouseGas/FinalGHG.pdf.

County of San Bernardino. (2011). G*eneral Plan Amendment and Greenhouse Gas Reduction Plan*. Retrieved October 20, 2016, from http://www.sbcounty.gov/Uploads/lus/Countywide/GreenhouseGas/Full-Vol-1.pdf.

IPCC. (2007). Climate Change 2007: Impacts, Adaptation, and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Retrieved October 28, 2016, from https://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4_wg2_full_report.pdf.

MDAQMD. (2016). California Environmental Quality Act (CEQA) and Federal Conformity Guidelines. Retrieved November 20, 2017, from http://www.mdaqmd.ca.gov/home/showdocument?id=192.

Nevada Climate Change Advisory Committee. (2008). *Nevada Climate Change Advisory Committee Final Report*. Retrieve April 22, 2016, from http://conradcommunications.com/wp-content/uploads/2008/07/ClimateChangeReport.pdf.

NDEP. (2008). Nevada Statewide Greenhouse Gas Emissions Inventory and Projections, 1990-2020. Retrieved July 28, 2016, from http://ndep.nv.gov/baqp/technical/docs/nv_statewide_ghg_inventory2008.pdf.

Office of Governor Brown. (2015). Executive Order B-30-15. Retrieved May 13, 2016, from https://www.gov.ca.gov/news.php?id=18938.

SANBAG. (2014). *San Bernardino County Regional Greenhouse Gas Reduction Plan*. Retrieved April 21, 2016, from http://www.sanbag.ca.gov/planning2/greenhousegas/Final_SBCRegionalGHGReduction.pdf.

SNRPC. (2014). Clark County Regional Emissions Inventory. Retrieved October 20, 2016, from http://www.clarkcountynv.gov/comprehensive-planning/eco-county/Documents/RegionalGHG.pdf.

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

This page intentionally left blank.

4.8 Hazards and Hazardous Materials

This section describes the hazards and hazardous materials in the area of the Eldorado-Lugo-Mohave Series Capacitor Project (Proposed Project[1]), as well as the potential impacts and alternatives.

For the purposes of this assessment, hazards include air traffic related to nearby airports or airstrips, wildland fires, existing hazardous sites, and hazardous materials related to construction and operation of the Proposed Project. This analysis addresses hazards to public and worker health and safety, and physical hazards related to the construction and Operation and Maintenance (O&M) of the Proposed Project. Information for this analysis was obtained from the following sources:

- Database search reports produced by Environmental Data Resources, Inc. (EDR), which are included in Appendix I: Hazardous Materials Records Search Results
- State Water Resources Control Board (SWRCB) GeoTracker website
- Department of Toxic Substances Control (DTSC) EnviroStor website
- Aerial photographs and topographic maps
- California Department of Forestry and Fire Protection (CAL FIRE) website
- Nevada Division of Forestry website
- General plans, zoning maps, emergency evacuation and response plans, and Office of Emergency Services (OES) websites from the Cities of Hesperia and Boulder City, as well as the County of San Bernardino and Clark County

4.8.1 Environmental Setting

The Proposed Project is located in California and Nevada, within the Mojave Basin and Range (Mojave). Federal lands constitute a majority of the land area in the Mojave, including lands under the jurisdiction of the Bureau of Land Management (BLM), National Park Service (NPS), Bureau of Reclamation (BOR), and Department of Defense (DoD). The Proposed Project would modify three existing transmission lines that extend northeast from Lugo Substation (located in San Bernardino County, California) to Eldorado Substation (located in the City of Boulder City, Nevada) and Mohave Substation (located in Clark County, Nevada), and from Mohave Substation northwest to Eldorado Substation. Portions of the Proposed Project would also cross the City of Hesperia, California, the unincorporated community of Lucerne Valley in California, as well as the unincorporated communities of Searchlight and Laughlin in Nevada.

[1] The term "Proposed Project" is inclusive of all components of the Eldorado-Lugo-Mohave Series Capacitor Project. Where the discussion in this section focuses on a particular component, that component is called out by its individual work area (e.g., "Ludlow Series Capacitor").

4.8.1.1 Records Review

EDR conducted custom database searches within at least 0.75 to 1 mile of all Proposed Project components[2] that require ground disturbance. These Proposed Project components include all work areas associated with the Proposed Project where hazardous materials could potentially be encountered during excavation activities. EDR generated database search reports for all capacitor and discrepancy[3] work areas, as well as Eldorado, Lugo, Pisgah, and Mohave Substations.

The EDR reports document findings of various federal, State, and local regulatory database searches regarding properties with known or suspected releases of hazardous materials or petroleum hydrocarbons. EDR obtained records from the following federal, State, and local databases, among others, to determine areas where contamination might be encountered during construction:

- Active Underground Storage Tank facilities (UST)
- California Department of Conservation Online Well Record database
- California Facility Inventory Database UST
- California Hazardous Material Incident Report System (CHMIRS)
- California HAZNET Facility and Manifest Data (CA HAZNET)
- California Office of Environmental Health Hazard Assessment Notify 65 Database
- Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS)
- CERCLIS No Further Response Actions Planned (CERLIS-NFRAP)
- DTSC Cortese List
- DTSC EnviroStor database
- Emergency Response Notification System (ERNS)
- Federal Emergency Response Notification System
- Federal Institutional Controls/Engineering Controls
- Federal Underground Storage Tank listings
- Land Disposal Site (LDS)
- Local Landfill/Solid Waste Disposal sites
- Local Brownfield sites
- National Pollutant Discharge Elimination System (NPDES) Permits Listing
- National Priorities List (NPL) (including delisted and proposed sites)
- Needing Further Evaluation sites

[2] EDR database searches were conducted prior to the inclusion of the Barstow, Lanfair, and Kelbaker Fiber Optic Repeaters in the Proposed Project design. Therefore, these Proposed Project components, which also require minor ground disturbance, were not initially considered when EDR reports were generated. The Barstow Fiber Optic repeater was captured within the database search radii of existing EDR reports, and no hazardous sites were identified within 1 mile of this Proposed Project component. A review of the GeoTracker and EnviroStor online databases revealed no hazardous sites within 1 mile of the Lanfair or Kelbaker Fiber Optic Repeaters.

[3] Southern California Edison Company (SCE) has defined "discrepancies" as potential clearance problems between an energized conductor and its surroundings, such as the structure, another energized conductor on the same structure, a different line, or the ground. SCE has identified approximately 16 discrepancies along the Eldorado-Lugo, Eldorado-Mohave, and Lugo-Mohave 500 kV Transmission Lines, where minor grading, or relocation, replacement, or modification of transmission, subtransmission, or distribution facilities are needed to address California Public Utilities Commission (CPUC) General Order (G.O.) 95 and National Electrical Safety Code overhead clearance requirements.

- Nevada Correction Action sites (NV State Hazardous Waste Sites [SHWS])
- Resource Conservation and Recovery Act (RCRA) Corrective Action Report (CORRACTS) facilities list
- RCRA Non-CORRACTS Treatment, Storage, and Disposal facilities list
- RCRA Large Quantity Generators (RCRA-LQG) list
- School Property Evaluation Program
- Solid Waste Disposal Facilities or Landfills (SWF/LF)
- State and Tribal Equivalent NPL/CERCLIS sites
- State and Tribal Registered Underground Storage Tanks
- State and Tribal Landfills and Solid Waste Disposal sites
- State and Tribal Leaking Underground Storage Tanks (LUSTs)
- State and Tribal Voluntary Cleanup sites
- State Response sites
- Statewide Environmental Evaluation and Planning System (SWEEPS) UST
- Statewide Spills, Leaks, Investigations, and Cleanups
- Toxic Alert for California Superfund sites
- Waste Discharge System (WDS)

A review of the search results identified hazardous materials and the use, generation, storage, treatment, or disposal of chemicals, as well as any release incidents of such materials that may be encountered during construction of the Proposed Project. The EDR reports, as well as the relevant databases searched by EDR, are included in Appendix I: Hazardous Materials Records Search Results. In addition, aerial photographs and historical documentation provided by the GeoTracker and EnviroStor databases were reviewed to supplement information provided by EDR.

4.8.1.2 Existing Conditions

The following subsections discuss the types and amounts of hazardous materials that are anticipated to be located within 1 mile of the Proposed Project. Schools located within 0.25 mile of the Proposed Project have been identified according to the California Environmental Quality Act (CEQA) requirement to assess potential impacts with regard to hazardous conditions.

Existing Hazardous Sites

Eleven hazardous sites within 1 mile of the Proposed Project were listed under the federal, State, and local databases searched by EDR, including the Eldorado and Lugo Substation sites. The results of EDR's database search are provided in Appendix I: Hazardous Materials Records Search Results. Potentially hazardous sites located in the vicinity of the Proposed Project are listed in Table 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project, depicted in Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project,[4] and discussed in the following subsections.

[4] Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project does not show Proposed Project areas where hazardous sites do not occur.

Table 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project

Site	Cleanup Status	Media Affected	Position of Site from Proposed Project Component	Approximate Distance from Proposed Project[5] (Miles)	Nearest Proposed Project Component
Lugo Substation	N/A	Minor release of polychlorinated biphenyls (PCBs) to soil. Following the initial cleanup, no additional corrective action measures or remedial activities were specified.	N/A	N/A	Lugo Substation
SCE/Unnamed Site	Closed landfill	No releases reported.	Upgradient	0.1 mile	Lugo-Mohave 500 kilovolt (kV) Transmission Line, Barstow Fiber Optic Repeater site
Ford Cady Borate	N/A	No releases reported.	Downgradient	1 mile	Lugo-Mohave 500 kV Transmission Line
BLM Communication Site	N/A	No releases reported. One permanently out-of-use UST on-site.	Upgradient	Adjacent	Eldorado-Mohave 500 kV Transmission Line
Laughlin High School	N/A	No releases reported. One active UST on site.	Upgradient	0.7 mile	Eldorado-Mohave 500 kV Transmission Line

[5] Distances were measured from each hazardous site to the closest Proposed Project component requiring ground disturbance.

Site	Cleanup Status	Media Affected	Position of Site from Proposed Project Component	Approximate Distance from Proposed Project[5] (Miles)	Nearest Proposed Project Component
Mobil Gas Station and Convenience Store	N/A	No releases reported. Two active USTs on site.	Downgradient	0.7 mile	Lugo-Mohave 500 kV Transmission Line
Wastewater Treatment Plant	Closed wastewater treatment plant	No releases reported. Two permanently out-of-use USTs were previously reported on site. The current status of each UST is unknown.	Downgradient	0.6 mile	Mohave Substation
Former Mohave Generating Station	Open – In remediation	Soil and groundwater contaminated with volatile organic compounds, petroleum hydrocarbons, metals, oils, and other unspecified contaminants.	Upgradient	Adjacent	Mohave Substation
Casino Drive Lift Station #24	Open	Soil and groundwater contaminated with diesel.	Upgradient	0.9 mile	Mohave Substation
Laughlin Landfill	N/A	No releases reported.	Downgradient	0.8 mile	Eldorado-Mohave 500 kV Transmission Line
Eldorado Substation	N/A	No releases reported.	N/A	Proposed Project component	Eldorado Substation

Sources: DTSC (2016), EDR (2015a through 2015l), SWRCB (2016)
Note: "N/A" = Not applicable.

Lugo Substation

The Lugo Substation site was listed in the ERNS, SWEEPS UST, CHMIRS, NPDES, RCRA-LQG, and CA HAZNET databases. Lugo Substation was listed on the ERNS for a release of PCBs in a 4-square-foot area in August 1994. The CHMIRS listing was a result of a fire that occurred at a transformer station on site. Lugo Substation was listed on the SWEEPS UST database in 1988 for a UST that contained regular unleaded gasoline; the SWEEPS UST database is no longer updated or maintained and the current status of the UST was not specified. The Lugo Substation site was listed on the CA HAZNET database due to the storage, bulking, and/or off-site transfer of materials and liquids containing PCBs, waste oil, organic solids, empty containers, and other unspecified waste materials. No additional releases or violations were reported for Lugo Substation, and no open hazardous materials sites were identified within 1 mile of Lugo Substation.

SCE/Unnamed Site

One hazardous site—formerly operated by SCE and located at 33261 Haynes Road—was reported within 0.1 mile of the Barstow Fiber Optic Repeater site and existing Lugo-Mohave 500 kV Transmission Line and was listed multiple times under the CA HAZNET, and CHMIRS databases. One CA HAZNET listing for this site was for a landfill or surface impoundment that was closed as a landfill, and a separate CA HAZNET listing was due to the presence of a former clandestine drug lab operation. No cleanup actions were required, and no additional releases or violations were reported for this site. However, subsurface materials associated with the former landfill may be located in the vicinity of the Proposed Project.

Ford Cady Borate

One LDS/WDS site—Ford Cady Borate—is located approximately 1 mile north of the existing Lugo-Mohave 500 kV Transmission Line. No releases or violations were reported for this site.

Underground Storage Tanks

A closed BLM Communication site and Laughlin High School were listed in the EDR reports based on the presence of one permanently out-of-use UST and one active UST, respectively. The BLM Communication site is located adjacent to the existing Eldorado-Mohave 500 kV Transmission Line, and Laughlin High School is located approximately 0.7 mile northeast of the existing Eldorado-Mohave 500 kV Transmission Line. However, no releases or violations were reported for the BLM Communication site or the Laughlin High School site.

In addition, the Mobil Gas Station and Convenience Store UST site is located approximately 0.7 mile south of the existing Lugo-Mohave 500 kV Transmission Line. No releases or violations were reported for this site.

One open UST site—Wastewater Treatment Plant—is located approximately 0.6 mile northwest of Mohave Substation. This site reported the presence of one permanently out-of-use diesel UST in 1984 and one permanently out-of-use gasoline UST in 1994. The current status of each UST was not specified. However, based on the distance from this site to Mohave Substation, a potential release originating from this site would not pose a risk to the Proposed Project.

Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project Map 1 of 4

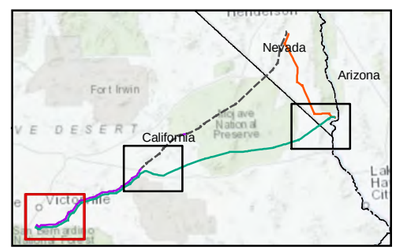
Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Proposed Fiber Optic Repeater Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- City Boundary
- State Boundary

Hazardous Sites

- Upgradient

Oro Grande
Victorville
Mountain View Acres
Apple Valley
Hesperia
Lucerne Valley
Southern California Edison Company (SCE)/Unnamed Site
Barstow Repeater
Lugo Substation
395
18
15
247
173
138



1:150,000
0 2 4 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: California Geological Survey, 2015; Insignia, 2018; SCE, 2018; U.S. Geological Survey, 2015

Z:\Projects\SCE_LugoMXDs\PEA\HazHaz_Sites.mxd 4/16/2018

This page intentionally left blank.

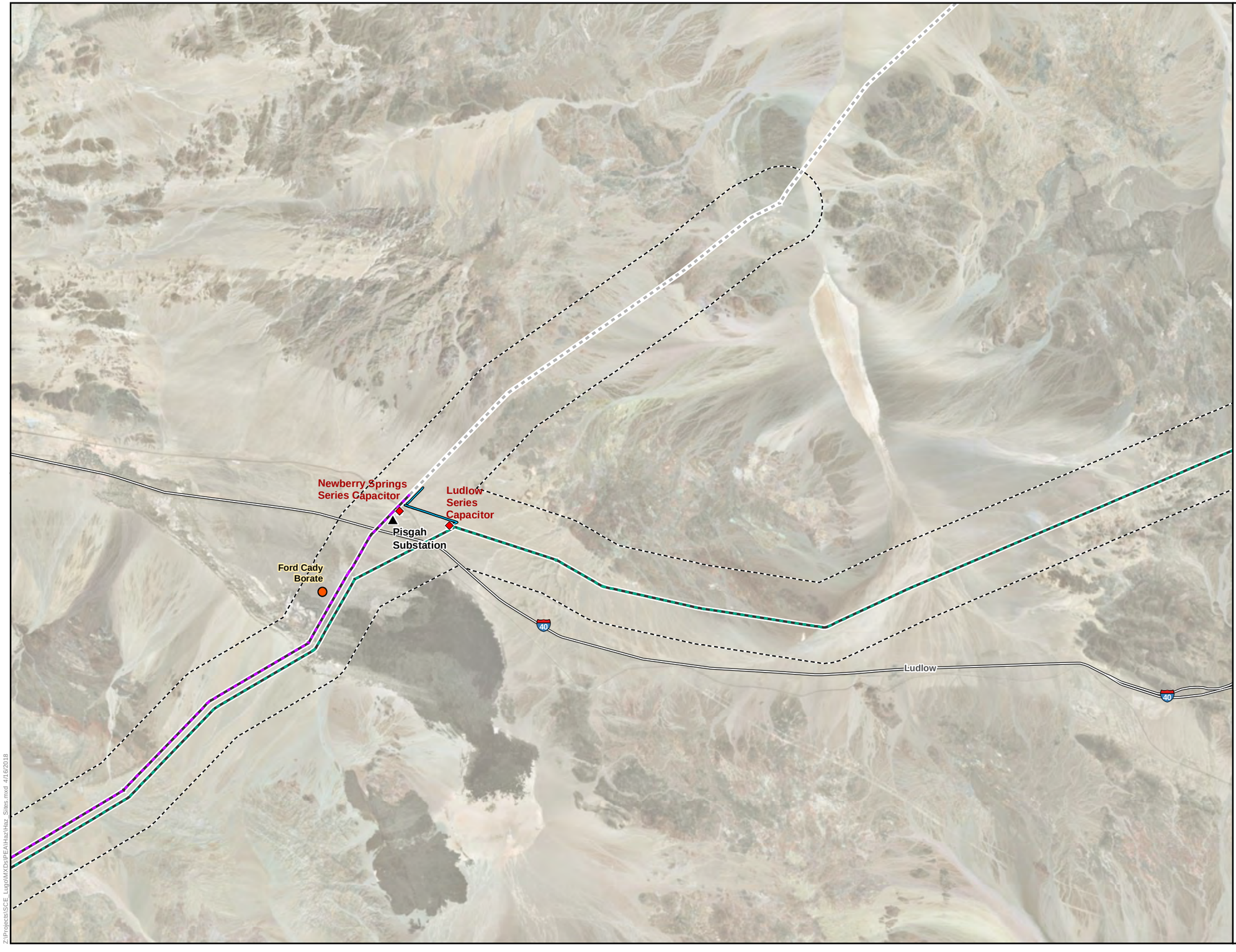


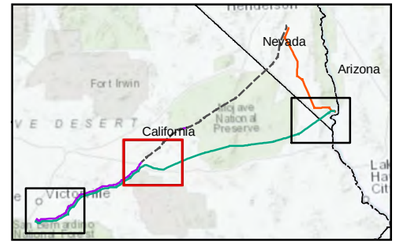
Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project Map 2 of 4

Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Proposed Mid-Line Capacitor Location
- Eldorado - Lugo 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- Telecommunication Line
- 1-Mile Project Buffer
- State Boundary

Hazardous Sites

- Downgradient



1:150,000

0 2 4 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: California Geological Survey, 2015; Insignia, 2018; SCE, 2018; U.S. Geological Survey, 2015

Z:\Projects\SCE_Lugo\MXD\PEA\Haz\Haz_Sites.mxd 4/16/2018

This page intentionally left blank.

Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project Map 3 of 4

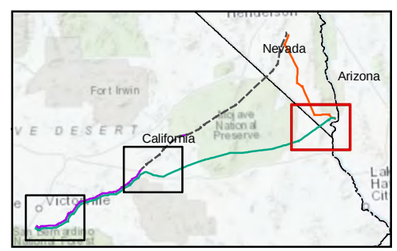
Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Eldorado - Mohave 500 kV Transmission Line
- Lugo - Mohave 500 kV Transmission Line
- 1-Mile Project Buffer
- City Boundary
- State Boundary
- State Highway/US Highway

Hazardous Sites

- Downgradient
- Upgradient

Laughlin Landfill
Laughlin High School
BLM Communication Site
Wastewater Treatment Plant
Mohave Substation
Casino Drive Lift Station #24
Mobil Gas Station and Convenience Store
Laughlin
Former Mohave Generating Station
Bullhead City
Nevada
California
Arizona
Mesquite Creek
Mojave Ranch Estates
Mohave Valley
Willow Valley
95
163
68



1:150,000

0 2 4 Miles

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

INSIGNIA ENVIRONMENTAL

Source: California Geological Survey, 2015; Insignia, 2018; SCE, 2018; U.S. Geological Survey, 2015

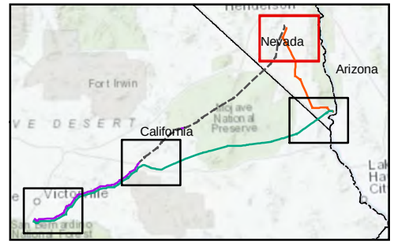
Z:\Projects\SCE_Lugo\MXDs\PEA\Haz\Haz_Sites.mxd 4/16/2018

This page intentionally left blank.

Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project Map 4 of 4

Eldorado-Lugo-Mohave Series Capacitor Project

- Existing Substation
- Eldorado - Mohave 500 kV Transmission Line
- Transmission Line not part of Project
- 1-Mile Project Buffer
- City Boundary
- State Boundary
- Interstate
- State Highway/US Highway



1:150,000

0 2 4 Miles

Source: California Geological Survey, 2015; Insignia, 2018; SCE, 2018; U.S. Geological Survey, 2015

Z:\Projects\SCE_LugoMXDs\PEA\Haz\Haz_Sites.mxd 4/16/2018

This page intentionally left blank.

Leaking Underground Storage Tanks

One LUST site—Casino Drive Lift Station #24—is located approximately 0.9 mile east of Mohave Substation. This site reported soil and groundwater impacts resulting from a release of diesel in 2005.

Former Mohave Generating Station

The Former Mohave Generating Station site is located adjacent to Mohave Substation. The approximately 2,500-acre site was shut down in 2005 and subsequently demolished between 2009 and 2013. Database listings for this site include the Nevada (NV) UST, NV LUST, and CERCLIS-NFRAP databases. Available regulatory documentation indicated that this site was in remediation due to the presence of several subsurface contaminants associated with the former operation, decommissioning, and demolition of the approximately 2,500-acre property. The extent of the subsurface contamination was not specified in available historical or regulatory documentation. Therefore, subsurface contaminants may be present in the vicinity of Mohave Substation.

Laughlin Landfill

One NV SHWS and SWF/LF site—Laughlin Landfill—was identified approximately 0.8 mile east of the existing Eldorado-Mohave 500 kV Transmission Line. No releases or violations were reported for the Laughlin Landfill.

Eldorado Substation

The Eldorado Substation site was listed in the CA HAZNET and RCRA-SQG databases. The Eldorado Substation site was listed on the CA HAZNET database due to the storage, bulking, and/or off-site transfer of asbestos containing waste, organic solids, and other unspecified waste materials. No additional releases or violations were reported for Eldorado Substation, and no open hazardous materials sites were identified within 1 mile of Eldorado Substation.

In addition, existing transformers and other oil-filled equipment are located on the Eldorado, Lugo, and Mohave Substations.

Contaminated Soil and Groundwater

Two open hazardous materials sites and one closed landfill were identified within 1 mile of Proposed Project components requiring ground disturbance. As previously discussed, the Former Mohave Generating Station Site is located adjacent to Mohave Substation and was reported to be in remediation. Because the extent of the contaminant plume and the existing contaminant levels are unknown, subsurface contaminants may exist in the vicinity of Mohave Substation. No other soil or groundwater contamination was identified in the vicinity of the Proposed Project components that require ground disturbance.

Fire Hazards

Within California, fire hazard severity zones are designated by CAL FIRE. Fire hazard severity zone levels range from moderate to very high. Fire hazard severity zones are administered by the

federal, State, or local government that is financially responsible for preventing and suppressing wildfires in a given area, and are categorized into the following three groups:

- Federal Responsibility Areas: The federal government is financially responsible for wildfire suppression
- State Responsibility Areas: The State is financially responsible for wildfire suppression
- Local Responsibility Areas: Cities or counties are financially responsible for wildfire suppression

The existing transmission lines and substations associated with the Proposed Project are located within all three responsibility areas. Within California, the majority of the existing facilities associated with the Proposed Project are located within the CAL FIRE moderate fire hazard severity zone. The remainder of these facilities are located within the CAL FIRE high fire hazard severity zone, as well as some areas designated as non-wildland/non-urban land.

For portions of the Proposed Project within Nevada, wildland fire risk is evaluated in the Clark County Fire Plan. According to this plan, the Proposed Project is not located in the vicinity of high or extreme hazard communities. Fire hazard designations are assigned to specific communities in Clark County based on community design, construction material, defensible space, availability and capability of fire suppression resources, and physical conditions such as fuel loading and topography. The communities of Laughlin, CalNevAri, and Boulder City are designated as low hazard communities with a low fire ignition risk. The community of Searchlight is designated as a moderate hazard community with a low fire ignition risk. No additional communities in the vicinity of the Proposed Project were evaluated in the Clark County Fire Plan.

Schools

No schools are located within 0.25 mile of the Proposed Project. Three schools were identified within 1 mile of the existing transmission lines associated with the Proposed Project. The Krystal School of Math, Science & Technology is located approximately 1 mile north of the Proposed Project between Mile 4 and Mile 6 of the existing Lugo-Mohave 500 kV Transmission Line. Two Clark County schools—William G. Bennet Elementary School and Laughlin Junior/Senior High School—are located approximately 0.5 mile south and 0.7 mile north of the existing Lugo-Mohave 500 kV Transmission Line, respectively. Schools identified in the Proposed Project vicinity are discussed further in Section 4.14, Public Services.

Airports

The nearest public airport is the Hesperia Airport, which is located approximately 0.9 mile northwest of the discrepancy work area between Mile 4 and Mile 5 of the Lugo-Mohave 500 kV Transmission Line. The Hesperia Airport runway is approximately 3,950 feet long, and the nearest Proposed Project component is within 10,000 feet of the Hesperia Airport. However, the Proposed Project is not located within any safety zones specified in the Comprehensive Land Use Plan for Hesperia Airport. Additional airport facilities within 2 miles of existing facilities associated with the Proposed Project include the Ludlow Airstrip, Laughlin/Bullhead International Airport, Kidwell Airport, and Searchlight Airport. With the exception of the Hesperia Airport, the Proposed Project is not located within available Airport Land Use

Compatibility Plans. No additional public or private airports or airstrips were identified within 2 miles of the Proposed Project. In addition, heliports are located on the northwest portion of Lugo Substation and on the southeast side of Eldorado Substation.

The Dick Taylor Airstrip and Rabbit Ranch Airstrip were identified within 0.2 and 0.6 mile of the Proposed Project, respectively. However, a review of available data and recent aerial photographs indicated that these facilities are no longer in operation.

Emergency Response and Evacuations Plans

California

County of San Bernardino

Emergency response plans include elements to maintain continuity of government, emergency functions of governmental agencies, mobilization and application of resources, mutual aid, and public information during times of emergency. Emergency response plans are maintained at the federal, State, and local levels for all types of disasters, including man-made and natural. It is the responsibility of the government to undertake an ongoing comprehensive approach to emergency management in order to avoid or minimize the effects of hazardous events. Local governments have the primary responsibility for preparedness and response activities.

The San Bernardino County Fire Department's OES maintains the San Bernardino County Emergency Operations Plan (EOP), which provides guidance for the county to respond to catastrophic natural, environmental, or conflict-related risks. The EOP implements the standards and principles of the National Incident Management System, the Standardized Emergency Management System, the National Response Framework, and the Incident Command System. The San Bernardino County OES serves a population of over 2 million people and over 20,100 square miles. In addition, San Bernardino County Fire Department participates in the Mountain Area Safety Taskforce (MAST), which is a coalition of federal, State, and local government agencies, private companies, and volunteer organizations tasked with preventing catastrophic wildfires. The MAST provides emergency planning strategies to the public and issues evacuation route maps for several areas in San Bernardino County. The existing Lugo-Mohave 500 kV Transmission Line spans State Route (SR-) 18, which is designated as an evacuation route by the MAST.

City of Hesperia

The City of Hesperia implements an Emergency Preparedness Program to provide residents and businesses with resources for emergency planning and response. Potential emergency shelters and evacuation routes are provided in the Safety Element of the City of Hesperia General Plan 2010.

Nevada

Clark County

The Clark County Office of Emergency Management (OEM) maintains the Clark County EOP, in which Clark County Public Works (CCPW) acts as the Lead Agency. CCPW provides support in response to emergency situations caused by earthquakes, floods, storms, severe heat, volcanic

ash fallout, avalanches, and fires. The Clark County OEM facilitates the coordination between agencies and resources to mitigate, prepare for, and respond to emergencies.

City of Boulder City

The City of Boulder City maintains an EOP and city representatives attend emergency management meetings to coordinate with Clark County and other entities in Southern Nevada. The Boulder City EOP is not available for public dissemination.

4.8.2 Regulatory Setting

Federal, State, and local regulations were reviewed for applicability to the Proposed Project. The following subsections describe regulations regarding hazards and hazardous materials that are relevant to the Proposed Project.

4.8.2.1 Federal

In addition to the federal regulations described in the following subsections, federal authorizations would also be required because a majority of the land within the Proposed Project area is under the jurisdiction of the BLM, NPS, BOR, and DoD.

Code of Federal Regulations Title 40

Title 40 of the Code of Federal Regulations (CFR) provides regulations related to the United States (U.S.) Environmental Protection Agency's (EPA's) operations. The EPA maintains a list of wastes considered to be hazardous to the environment or to human health. These wastes are identified in the following three categories:

- F-List: Wastes from the F-list are published under Title 40, Section 261.31 of the CFR. These wastes include non-specific source wastes common in manufacturing and industrial processes.
- K-List: K-list wastes are published under Title 40, Section 261.32 of the CFR. These wastes include source-specific wastes from specific industries, including pesticide manufacturing and petroleum refining.
- P-List and U-List: Wastes from the P-List and U-List are published under Title 40, Section 261.33 of the CFR. These wastes include discarded commercial chemical products in an unused form.
- Waste that has not been previously listed may still be considered hazardous if it exhibits one or more of the following characteristics: ignitibility, corrosivity, reactivity, or toxicity (40 CFR Part 261 Subpart C).

Code of Federal Regulations Title 14

All airports and navigable airspace not administered by the DoD are under the jurisdiction of the Federal Aviation Administration (FAA). Title 14, Part 77 of the CFR establishes the standards and required notification for objects affecting navigable airspace. In general, construction projects exceeding 200 feet in height—or those extending at a ratio greater than 100 to 1

(horizontal to vertical) from a public or military airport runway more than 3,200 feet long, out to a horizontal distance of 20,000 feet—are considered potential obstructions and require FAA notification. In addition, construction projects extending at a ratio greater than 50 to 1 (horizontal to vertical) from a public or military airport runway measuring 3,200 feet or less, out to a horizontal distance of 10,000 feet, are considered potential obstructions and require FAA notification. Title 14, Part 133 of the CFR also requires an operating plan to be developed in coordination with and approved by the local FAA Flight Standards District Office that has jurisdiction over when helicopter use would be required.

Resource Conservation and Recovery Act

Developed by the EPA, the RCRA regulates potential health and environmental problems associated with hazardous and non-hazardous waste. This law is implemented by the EPA through Subtitle C, Title 42, Section 6921 et seq. of the U.S. Code (U.S.C.) and its implementing regulations (40 CFR Part 260 et seq.). The generation, transportation, treatment, storage, and disposal of hazardous waste are regulated through Subtitle C of the RCRA, which addresses a "cradle-to-grave" approach to hazardous waste management. All states are subject to Subtitle C with regard to hazardous waste generation. The RCRA also provides the specific quantities of wastes that it regulates.

Under the authority of the RCRA, the DTSC regulates hazardous waste, cleans up existing contamination, and looks for ways to reduce hazardous waste production.

Comprehensive Environmental Response, Compensation, and Liability Act and Superfund Amendments and Reauthorization Act

Along with their implementing regulations, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA)—an amendment to CERCLA—govern the use, planning, reporting, cleanup, and notification of hazardous materials and hazardous material releases into the environment. These statutes are codified in Title 40, Parts 239 through 282 of the CFR, and the regulations are defined in Title 40, Parts 302 through 355 of the CFR.

Annual reporting requirements associated with hazardous materials released into the environment are provided by the EPA in Title 42, Section 11023 of the U.S.C. and Title 40, Section 372.30 of the CFR. Reporting of both routine discharges and spill releases is required. In addition, Title III of SARA (identified as the Emergency Planning and Community Right-To-Know Act of 1986) requires that all states develop and implement local chemical emergency preparedness programs and release information pertaining to hazardous materials that are used at facilities within local communities.

Uniform Building Code and Uniform Fire Code

The Uniform Building Code (UBC) and the Uniform Fire Code (UFC) provide codes for fire protection at the federal level. To minimize potential fire risk and damage to structures, the UBC provides requirements to which building construction, materials, and other elements or construction practices must adhere. In addition, the UFC provides design measures for the installation of fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion

hazards and safety measures, hazardous material storage and use, and other general and specialized requirements pertaining to fire safety and prevention.

Clean Water Act

The Clean Water Act (CWA) provides measures governing the accidental release of hazardous materials to surface waters. Requirements for Spill Prevention, Control, and Countermeasure (SPCC) Plans were developed as one of the regulations under the CWA. SPCC Plans are described in Title 40, Part 112 of the CFR (Oil Spill Prevention) and have specific requirements for electrical substations, and are also intended to reduce the threat of oil spills to "navigable waters" of the U.S. The site-specific plan must identify the design, control, training, and response requirements of a facility. An SPCC Plan is required for facilities that have an aggregate aboveground storage capacity of oil (e.g., gasoline, diesel, and transformer liquids) of more than 1,320 gallons, and only containers with a capacity of 55 gallons or greater are counted.

Clean Air Act

The Clean Air Act (CAA) provides measures aimed at preventing the accidental release of hazardous materials into the atmosphere. Regulations implementing the CAA and governing hazardous materials emissions are provided in Title 40, Part 68 of the CFR. Implementation of these regulations is intended to prevent the accidental release of hazardous materials into the environment.

Occupational Safety and Health Act

The hazardous material regulations of the Occupational Safety and Health Administration (OSHA) were created by the Occupational Safety and Health Act of 1970 and govern worker safety. Separate OSHA standards have been developed for construction and industrial workers, and Title 29, Part 1926 of the CFR generally governs construction worker safety. Title 29, Section 1926.55(a) of the CFR requires avoidance of employees' exposure to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists.

Hazardous Materials Transportation Act

U.S. Department of Transportation regulations govern the interstate transport of hazardous materials and wastes through the implementation of the Hazardous Materials Transportation Act (HMTA). The provisions of the HMTA contain requirements for hazardous material shipments and packaging, and guidelines for marking, manifesting, labeling, packaging, placarding, and spill reporting. Specific regulations dealing with hazardous materials are covered under Title 49, Part 173 et seq. of the CFR (Hazardous Material Regulations, Shippers – General Requirements for Shipping and Packaging) and Title 49, Part 397 of the CFR (Transportation of Hazardous Materials; Driving and Parking Rules).

National Pollutant Discharge Elimination System Permits

Within the State of California, the California SWRCB issues both general permits and individual permits under the NPDES permit program. The SWRCB delegates much of its NPDES authority

and administration to nine Regional Water Quality Control Boards (RWQCBs). The Proposed Project's NPDES permits in California would be under the jurisdiction of the Lahontan and Colorado River Basin RWQCBs. Specifically, SCE would obtain NPDES coverage under the California Construction General Permit (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ).

The State of Nevada requires that projects disturbing 1 or more acres must obtain a Construction Stormwater General Permit (NVR100000) from the Nevada Division of Environmental Protection (NDEP) Bureau of Water Pollution Control. This Construction Stormwater General Permit is also required for projects disturbing less than 1 acre that are part of a larger common plan for development or sale that would ultimately disturb 1 acre or more.

4.8.2.2 State

California

California Public Utilities Commission General Order 131-D

Pursuant to CPUC G.O. 131-D, the CPUC has sole and exclusive jurisdiction over the siting and design of electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities in the State of California. Under CEQA, the CPUC is the Lead Agency with respect to such Proposed Project elements within the State of California. SCE is required to comply with G.O. 131-D and is seeking a Permit to Construct from the CPUC for the Proposed Project.

California Occupational Safety and Health Act

The California Occupational Safety and Health Act of 1973 provides measures to address the safety of construction and industrial workers. Title 8 of the California Code of Regulations (CCR) implements the majority of these measures. The California Division of Occupational Safety and Health (Cal/OSHA) is responsible for enforcing the occupational and public safety laws adopted by OSHA. OSHA is responsible for the regulation of workplace hazards and hazardous materials at the federal level, while Cal/OSHA regulates hazards and hazardous materials at the State level.

Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.)

The Porter-Cologne Water Quality Control Act provides for the regulation of pollutants entering the State's surface waters and groundwaters. The Lahontan and Colorado River Basin RWQCBs are responsible for protecting the beneficial uses of surface water and groundwater resources in the Proposed Project area in California. The Lahontan RWQCB adopted a Water Quality Control Plan (Basin Plan) in March 1995 and the most recent Basin Pan includes fully approved sets of amendments adopted since 1995. The Colorado River Basin RWQCB adopted its Basin Plan in 1993. These Basin Plans set forth implementation policies, goals, and water management practices in accordance with the Porter-Cologne Water Quality Control Act. The Basin Plans establish both numerical and narrative standards and objectives for water quality aimed at protecting aquatic resources. Project discharges to surface waters are subject to the regulatory standards set forth in applicable regional basin plans, which prevent the discharge of hazardous materials into waters of the State.

California Health and Safety Code

Within the State of California, the storage, handling, use, and/or disposal of hazardous materials are regulated through various sections of the Health and Safety Code (HSC). In addition, Section 33437 of the HSC requires lessees or purchasers of property in a redevelopment project to comply with all covenants, conditions, and restrictions imposed by the agency for the reasonable protection of lenders. Individual states are required by the RCRA to develop their own programs for the regulation of hazardous waste discharges; however, such plans are required to meet or exceed RCRA requirements.

The California Hazardous Waste Control Law (HWCL) addresses the control of hazardous wastes in California. The HWCL regulates generators of universal waste (e.g., batteries, mercury control devices, dental amalgams, aerosol cans, and lamps/cathode ray tubes) under Section 25100 et seq. of the HSC, as well as hydrocarbon waste (e.g., oils, lubricants, and greases) that is not classified as hazardous waste under the federal RCRA regulations. The DTSC is responsible for the administration and enforcement of the HWCL. HSC Section 25249.5 et seq. of the Safe Drinking Water and Toxics Enforcement Act (i.e., Proposition 65) is administered through the California Office of Environmental Health Hazard Assessment and regulates cancer-causing and reproduction-impairing chemicals. Under Proposition 65, users of such regulated chemicals are required to issue a public warning before potential exposure to chemicals above a threshold quantity (TQ) occurs (HSC §25249.6). In addition, the Safe Drinking Water and Toxics Enforcement Act is aimed at preventing discharges or releases of specified hazardous materials into a "source of drinking water." The Safe Drinking Water and Toxics Enforcement Act provides a list of chemicals of concern (HSC §25249.5), which is periodically updated.

Section 25404 et seq. of the California HSC includes the California Unified Hazardous Waste and Hazardous Material Management Regulatory Program Act, which establishes specific requirements for handling hazardous waste locally by establishing the Certified Unified Program Agency (CUPA). The responsibility for management of local hazardous wastes is delegated by the California Environmental Protection Agency to the local agency through a Memorandum of Understanding. The primary CUPA relative to the Proposed Project area is the Health Hazardous Materials Division of the Los Angeles County Fire Department.

Hazardous Materials Release Response Plans and Inventory Act

The Hazardous Materials Release Response Plans and Inventory Act (HSC §25500 et seq.) and regulations provided in Title 19, Part 2620 et seq. of the CCR require that local governments are responsible for the regulation of facilities that store, handle, or use hazardous materials above TQs. The TQs for identified hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at a standard temperature and pressure. Facilities that store such hazardous materials in excess of their TQs are required to prepare a Hazardous Materials Business Plan (HMBP) to provide information on the storage of hazardous materials and identify the facility's internal response requirements to accidental spills. The HMBP would include safety information regarding the transport, use, and disposal of hazardous materials. In addition, the HMBP may identify emergency contacts, hazardous material inventory and quantities, control methods, emergency response measures, and employee training methods. The HMBP is required to be submitted to the local administering agency, which is typically the local fire department or public health agency. In the event of a spill from such a facility, both the

local administrative agency and the California Governor's Office of Emergency Services must be notified.

California Code of Regulations Title 24, Part 9, Chapter 50 – Hazardous Materials

Title 24, Part 9, Chapter 50 – Hazardous Materials of the CCR describes the requirements for the implementation of a Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) during the permit application process. An HMMP is required for construction and typically includes a facility site plan, along with the storage location(s) of hazardous materials, UST and aboveground storage tank locations, hazards classes in each storage area, emergency equipment locations, and facility evacuation meeting point locations. An HMIS contains information specific to each hazardous material, such as the product name, Chemical Abstract Service number, container size, hazard classification, and the amount of the chemical stored. The CAL FIRE Office of the State Fire Marshal manages the implementation of the California Fire Code HMMP and HMIS within the CUPA. The requirements of the HMMP/HMIS and HMBP are similar and have subsequently been merged to facilitate coordination and prevent the duplication of efforts by regulatory agencies.

California Aboveground Petroleum Storage Act

Chapter 6.67, Sections 25270 through 25270.13 of the HSC grant CUPAs the authority to administer the Aboveground Petroleum Storage Act (APSA) program in their jurisdictions. The California APSA applies to facilities that are subject to the oil pollution prevention regulations specified in Title 40, Part 112 of the CFR, or that have a storage capacity of at least 1,320 gallons of petroleum. The California APSA only regulates tank facilities that store petroleum, whereas the federal SPCC requirement includes other oils. The California APSA requires preparation of an SPCC Plan in accordance with Title 40, Part 112 of the CFR.

California Code of Regulations Title 13

Title 13, Division 2, Articles 1 through 6 of the CCR outline applicable procedures for the safe transport of hazardous materials and designates required routes, stops, and inspection procedures when transporting these materials. General hazardous materials regulations are also provided and describe the proper storage procedures, hazard classification and labeling methods, inspection fees, registration requirements, training protocols, and safety measures. In addition, Title 13 contains specific regulations associated with the transport of explosives, inhalation hazards, and radioactive materials, which illustrate acceptable travel routes.

California Building Code

The California Building Code (CBC) provides design and construction measures for structures and other facilities with regard to fire protection and prevention. The CBC supplements the UBC by providing measures that are specific to potential conditions in the State of California. Measures provided in the CBC are integrated and enforced through city and county review of development projects, the CAL FIRE Office of the State Fire Marshal, and by local city or county fire chiefs or marshals.

California Public Resources Code

The California Public Resources Code (PRC) provides regulations to enhance safety with regard to the operation and management of electrical transmission lines. These include, but are not limited to, the following:

- PRC Section 4292: This section requires the clearing of flammable vegetation around specific structures that support certain connectors or types of electrical apparatus. An approximately 10-foot radius around such structures must remain clear of vegetation for the entirety of the fire season.

- PRC Section 4293: This section requires specific clearance between conductors and vegetation. As the line voltage increases, the clearance radius also increases. In addition, some trees must be removed if they pose the potential to fall on an electrical transmission line and cause damage.

California Public Utilities Commission General Order 95

G.O. 95—originally adopted by the CPUC on December 23, 1941 and amended through 2014—contains requirements and specifications for overhead electrical line construction. These requirements are intended to ensure safety to workers engaged in the construction, O&M, and use of electrical facilities. The regulations are also intended to ensure the general reliability of the State's utility infrastructure and services.

Rule 35 of G.O. 95 establishes minimum clearances between line conductors and nearby vegetation for fire prevention purposes. These minimum clearances must be maintained through tree trimming prior to construction and throughout O&M of utility facilities.

Nevada

Nevada Revised Statutes Section 704.865

Nevada Revised Statutes Section 704.865 provides that "A person, other than a local government, shall not commence to construct a utility facility in the State without first having obtained a permit therefor from the Commission. The replacement of an existing facility with a like facility, as determined by the Commission, does not constitute construction of a utility facility." The Public Utilities Commission of Nevada is the Lead Agency for compliance with the Nevada Utility Environmental Protection Act.

Nevada Administrative Code

Chapter 459 – Hazardous Materials of the Nevada Administrative Code (NAC) provides regulations for the handling, transportation, disposal, and storage of hazardous materials. Chapter 459 also includes regulations that pertain to storage tanks, explosives, voluntary cleanup of hazardous substances, enforcement actions, spill response, and funding for Brownfields projects.

The Nevada Bureau of Corrective Actions operates under the regulations provided in Chapter 445A – Water Controls of the NAC, and manages the cleanup of regulated substances following a release. The Bureau of Corrective Actions administers Superfund and Brownfields programs, environmental response programs, and the UST program for the State. The Bureau also specifies

spill reporting requirements and provides current information on a number of active hazardous sites and remediation projects located in the State of Nevada.

4.8.2.3 Local

The CPUC has sole and exclusive jurisdiction over the siting and design of Proposed Project components located in the State of California. Pursuant to CPUC G.O. 131-D, Section XIV.B, "Local jurisdictions acting pursuant to local authority are preempted from regulating electric power line projects, distribution lines, substations, or electric facilities constructed by public utilities subject to the CPUC's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters." Consequently, public utilities are directed to consider local regulations and consult with local agencies, but the county and cities' regulations are not applicable as the county and cities do not have jurisdiction over the Proposed Project. Accordingly, the following discussion of local regulations is provided for informational purposes only. The Proposed Project is subject to local regulations in the State of Nevada.

California

County of San Bernardino

County of San Bernardino 2007 General Plan

The Safety Element of the County San Bernardino 2007 General Plan contains the following goals to address hazards and hazardous materials:

- Goal S 2: The County will minimize the generation of hazardous waste in the County and reduce the risk posed by storage, handling, transportation, and disposal of hazardous wastes
- Goal S 3: The County will protect its residents and visitors from injury and loss of life and protect property from fires
- Goal S 7: The County will minimize exposure and potential of damage posed by aviation activity
- Goal S 9: The County's emergency evacuation routes will quickly and efficiently evacuate all residents in the event of wildland fires and other natural disasters, and will ensure adequate access of emergency vehicles to all communities

City of Hesperia

City of Hesperia General Plan 2010

The Safety Element of the City of Hesperia General Plan 2010 contains the following goal to address hazards and hazardous materials:

- Goal SF-4: Reduce the potential for hazardous materials contamination in Hesperia

Nevada

Clark County

Clark County Comprehensive Plan

The Safety Element of the Clark County Comprehensive Plan contains the following policies to address hazards and hazardous materials:

- Minimize public exposure to natural and man-made hazards
- Ensure that land use plans and development regulations consider natural and man-made hazards and mitigation programs
- Provide public facilities and services to protect against natural and man-made hazards
- Support educational programs to inform the community about natural and man-made hazards
- Coordinate with local, regional, State and federal governments and the private sector to provide protection against natural and man-made hazards

South Clark County Land Use Plan

The South Clark County Land Use Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

Laughlin Land Use Plan

The Laughlin Land Use Plan does not contain any specific goals or policies that are relevant to the Proposed Project.

City of Boulder City

Boulder City Master Plan

The Public Safety Element of the Boulder City Master Plan was reviewed for hazards and hazardous materials policies that are relevant to the Proposed Project. However, the Public Safety Element does not contain any specific goals or policies that are relevant to electric utility projects.

4.8.3 Significance Criteria

The significance criteria for assessing the impacts to hazards and hazardous materials come from the CEQA Environmental Checklist.[6] According to the CEQA Checklist, a project causes a potentially significant impact if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials

[6] CEQA is a statute that requires State of California and local agencies in California to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. There is no CEQA equivalent for the State of Nevada. Therefore, in the absence of such regulations, the Proposed Project (including components in Nevada) has been evaluated against the CEQA significance criteria. Where specific Nevada environmental regulations exist, a discussion has been included in the impact analysis for the Proposed Project.

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school
- Be located on a site that is included on a list of hazardous material sites, compiled pursuant to California Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, the project would result in a safety hazard for people residing or working in the project area
- For a project within the vicinity of a private airstrip, the project would result in a safety hazard for people residing or working in the project area
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands

4.8.4 Impact Analysis

4.8.4.1 Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Construction

Less-Than-Significant Impact. The routine transport, use, and disposal of hazardous materials (e.g., fuels, lubricating oil, and hydraulic fluid) during construction could result in an inadvertent release or spill. A general list of the products anticipated to be used during construction is provided in Table 4.8-2: Hazardous Materials Typically Used for Construction. A potential release of hazardous materials would most likely result from accidental spills, equipment failure, or other release during vegetation clearing; grading; removal of overhead ground wire and installation of optical ground wire; capacitor installation; modifications to transmission, subtransmission, and distribution facilities; and other Proposed Project construction activities. Other potential impacts originating from the use of hazardous materials could occur during the transportation of materials or workers to work sites; refueling or servicing of equipment; and the handling of hazardous materials at work areas, staging areas, laydown areas, or landing zones.

Table 4.8-2: Hazardous Materials Typically Used for Construction

Hazardous Materials	
ABC fire extinguisher	Insulating oil (inhibited, non-PCB)
Acetylene gas	Jet A-1 fuel
Air tool oil	Lubricating grease
Ammonium hydroxide	Mastic coating
Battery acid (in vehicles and in the meter house of the substations)	Methyl alcohol
Bottled oxygen	Mineral oil
Brake fluid	Motor oils
Canned spray paint	Paint thinner
Chain lubricant (contains methylene chloride)	Propane
Connector grease (penotox)	Puncture seal tire inflator
Contact cleaner 2000	Safety fuses
Diesel fuel	Starter fluid
Diesel fuel additive	Sulfur hexafluoride (within the line breakers in the substations)
Eye glass cleaner (contains methylene chloride)	Two-cycle oil (contains distillates and hydro-treated heavy paraffinic)
Gasoline	WD-40
Gasoline treatment	ZEP (safety solvent)
Hot stick cleaner (cloth treated with polydimethylsiloxane)	ZIP (1,1,1-trichloroethane)
Hydraulic fluid	--

Vehicles and equipment used for construction may contain or require temporary, short-term use of potentially hazardous substances, such as fuel, lubricating oils, or hydraulic fluid.

A Proposed Project-specific HMMP would be prepared and implemented throughout construction of the Proposed Project. The HMMP would include safety information regarding the transport, use, and disposal of hazardous materials in compliance with applicable laws, rules, and regulations. In addition, SCE would provide Proposed Project-specific best management practices (BMPs) in Storm Water Pollution and Preventions Plans (SWPPPs) to ensure that the transport, use, and disposal of hazardous materials are conducted in accordance with applicable regulations. Project specific SWPPPs would be prepared for the State of California and the State of Nevada in accordance with the Construction General Permit requirements described in Section 4.8.2, Regulatory Setting. Therefore, implementation of the HMMP, as well as SCE's BMPs provided in the SWPPPs, would reduce the likelihood of inadvertent spills originating from hazardous substances during construction.

Construction of the Proposed Project would result in the generation of various waste materials that would require recycling and/or disposal. Waste items and materials would be collected by construction crews and stored in roll-off boxes or other similar containers at the staging areas. All waste materials that are not recycled would be characterized by SCE to ensure the proper disposal of waste materials. As described in Section 4.17, Utilities and Service Systems, non-hazardous waste would be transported to SCE-approved, licensed, local waste management facilities. Hazardous materials encountered during construction would be disposed of at SCE-approved facilities that accept hazardous waste materials, in accordance with all applicable laws and regulations. The closest landfills to the Proposed Project are the Barstow Landfill, Landers Landfill, Mid-Valley Landfill, San Timoteo Landfill, Victorville Landfill, Boulder City Landfill, Apex Regional Landfill and Transfer Station, and Laughlin Landfill. Therefore, with the implementation of the HMMP and BMPs, impacts from routine transport, use, or disposal of hazardous materials would be less than significant.

Operation

Less-Than-Significant Impact. O&M activities associated with the Proposed Project would be similar to those currently performed by SCE for existing facilities, and generally include repairing conductors, washing or replacing insulators, repairing or replacing other hardware components, repairing or replacing poles and towers, tree trimming, brush and weed control, and access road maintenance, among other things. O&M practices would also include routine inspections and emergency repair within substations and ROWs, which would require the use of vehicles and equipment. SCE also inspects the transmission and subtransmission overhead facilities in a manner consistent with CPUC G.O. 165, which requires observation a minimum of once per year, but inspection typically occurs more frequently to ensure system reliability. Following construction of the mid-line series capacitors,[7] additional O&M activities would consist of monthly and annual inspections, as well as equipment testing and maintenance of emergency generators, ranging from once a year to once every five years. Additional testing,

[7] The Proposed Project includes construction of two new 500 kV mid-line series capacitors—the proposed Newberry Springs Series Capacitor and Ludlow Series Capacitor.

inspections, and maintenance of the building, site, generator, and fuel tank would also be required at the new fiber optic repeater facilities every six months to once a year.

The majority of the chemicals used for O&M activities are similar to those used in the construction phase and are listed in Table 4.8-2: Hazardous Materials Typically Used for Construction. In addition, the removal of wood poles treated with hazardous substances (e.g., pentachlorophenol, creosote, or arsenicals) may be necessary during O&M activities. The existing wood poles removed for the Proposed Project would be returned to a staging yard and either reused by SCE, returned to the manufacturer, disposed of in a Class I hazardous waste landfill, and/or disposed of in the lined portion of an RWQCB-certified municipal landfill.

Hazardous materials are typically transported to and removed from the site by maintenance personnel, rather than being stored on-site for extended periods of time. In addition, should a discharge occur, O&M personnel are trained and equipped to respond appropriately. Therefore, the Proposed Project would not create a significant hazard to the public or the environment, and impacts would be less than significant.

4.8.4.2 Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Construction

Less-Than-Significant Impact. Construction of the Proposed Project would require the limited use of hazardous materials, such as fuels, lubricants, and cleaning solvents. As previously described, a Proposed Project-specific HMMP would be prepared and implemented throughout construction of the Proposed Project, pursuant to Title 24, Part 9 of the CCR. The HMMP would include safety information regarding the transport, use, and disposal of hazardous materials. Additionally, all hazardous materials would be stored, handled, and used in accordance with applicable regulations, and Safety Data Sheets would be available upon request for all crew members and contractors.

Minor spills or releases of hazardous materials that result from construction activities would be cleaned up immediately, in accordance with the Proposed Project's SWPPPs, thereby minimizing impacts. The SWPPPs would provide the locations for the storage of hazardous materials during construction, as well as protective measures, notifications, and cleanup requirements for any incidental spills or other potential releases of hazardous materials. Construction activities associated with Eldorado, Lugo, and Mohave Substations and the mid-line series capacitor sites would involve the highest volumes of on-site hazardous materials. With implementation of the SWPPPs, impacts due to accidental spills or releases would be less than significant.

SCE would also develop a Worker Environmental Awareness Plan (WEAP) as part of the Worker Environmental Awareness Training, which would provide site personnel with instruction regarding the SWPPPs and Proposed Project-specific BMPs, as described in Section 3.9.2, Worker Environmental Awareness Training in Chapter 3, Project Description. The WEAP would also provide notification procedures in the event of a hazardous materials release, an equipment leak, or the discovery of contaminated soils during excavation activities.

Although construction of the majority of the Proposed Project would occur within existing or to-be-acquired franchise areas and ROWs, subsurface gas, water, or power utilities could be encountered during excavation activities, which could result in a release of hazardous substances. However, subsurface utilities and structures would be avoided by screening for such structures prior to any trenching or excavation activities. Screening activities would include the use of Underground Service Alert, visual observations, and buried line-locating equipment. Therefore, the Proposed Project would not create a significant hazard to the public or the environment, and any potential impacts would be less than significant.

Operation

Less-Than-Significant Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M of the Proposed Project would involve the limited usage of hazardous materials primarily within vehicles and equipment. Hazardous materials impacts could occur in the event of a spill or release of hazardous materials utilized during O&M activities. However, Proposed Project personnel are trained to prevent and address accidental releases of hazardous materials during O&M activities. As such, potential impacts resulting from O&M of the Proposed Project would be less than significant.

4.8.4.3 Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Construction

No Impact. As previously stated and as described in Section 4.14, Public Services, no schools are located within 0.25 mile of the Proposed Project and only three schools were identified within 1 mile of the Proposed Project. Construction of the Proposed Project would require the use of hazardous materials, such as fuels, lubricants, and cleaning solvents. Based on the distance and location of the three schools identified within 1 mile of the Proposed Project, it is not anticipated that vehicles transporting hazardous materials would utilize roads adjacent to these schools. If the transport of hazardous materials is required in the vicinity of schools, SCE would avoid the usage roads adjacent to schools in the Proposed Project area. In addition, if hazardous materials are released and/or emitted during construction or the transport of hazardous materials, the impacted media would be contained and managed through implementation of the BMPs provided in the SWPPPs. Based on the absence of schools within 0.25 mile of the Proposed Project, hazardous emissions or handling hazardous substances would result in no impact to schools.

Operation

Less-Than-Significant Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. In addition, O&M personnel are trained and equipped to respond to a release of hazardous materials. As such, potential impacts resulting from O&M of the Proposed Project would be less than significant.

4.8.4.4 Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Construction

Less-Than-Significant Impact. As presented in Table 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project and Figure 4.8-1: Hazardous Sites Within 1 Mile of the Proposed Project, 11 contaminated sites are located within 1 mile of the Proposed Project. However, based on the relative distance of these sites to the Proposed Project, available topographic data, and a review of applicable historical documentation, it is unlikely that contaminated media associated with these sites would be encountered during construction of the Proposed Project.

Eldorado and Lugo Substations were listed on the CA HAZNET database for the storage, bulking, and/or off-site transfer of various organic and inorganic wastes. However, the EDR reports generated for the Proposed Project reported no releases, violations, subsurface contaminants, or remedial actions in connection with Eldorado Substation or Lugo Substation. Therefore, these sites do not represent a hazard to the public or the environment, and impacts would be less than significant.

The Casino Drive Lift Station # 24 is located approximately 0.9 mile east of Mohave Substation and reported a release of diesel to soil and groundwater in 2005. However, based on the distance from this site to the Proposed Project, the Casino Drive Lift Station #24 site does not represent a hazard to the public or the environment in the Proposed Project area. Therefore, impacts would be less than significant.

Three open sites were identified within 1 mile of Proposed Project activities requiring ground disturbance. Hazardous sites were considered open if existing releases were identified or corrective action measures were reported to be in progress due to an existing or former release. Sites with limited information were also considered open if subsurface contaminants could potentially be encountered due to the current or former operation of a hazardous site.

One open hazardous site—reportedly operated by SCE—is located within 0.1 mile of the Barstow Fiber Optic Repeater site and existing Lugo-Mohave 500 kV Transmission Line at 33261 Haynes Road. Although no releases or cleanup actions were reported, this site was listed under the CA HAZNET database for a landfill or surface impoundment that was closed as a landfill. Therefore, subsurface contaminants associated with the former landfill may be present in the vicinity of proposed excavation activities, and could be encountered during construction of the Proposed Project. In the event that contaminated media are encountered during construction requiring excavation activities, SCE would stop work, contact SCE's Safety and Environmental Specialist (SES), request a site assessment, and notify the proper authorities. The potentially contaminated soil would first be segregated into lined stockpiles, dump trucks, or roll-off containers. Samples would then be collected and analyzed to determine the appropriate handling, treatment, and disposal options. If the analytical results indicate that the soils are hazardous, the impacted soils would be properly managed on location and transported to a Class I Landfill or other appropriate soil treatment or recycling facility using a Uniform Hazardous Waste Manifest. All hazardous materials would be transported, used, and disposed of in accordance with applicable rules, regulations, and SCE protocols designed to protect the environment, workers,

and the public. Work would continue at that location only when given clearance by the SES. Therefore, with the implementation of SCE's standard practices, the potential for exposing hazardous materials to Proposed Project personnel or the environment during construction is unlikely. SWPPPs containing BMPs and an HMMP would also be implemented during construction. Therefore, impacts resulting from the discovery of contaminated materials during excavation activities would be less than significant.

The former Mohave Generating Station is located adjacent to Mohave Substation and was listed under several databases as an open hazardous site. The former plant is currently in remediation due to the presence of subsurface contaminants associated with the former operation, decommission, and demolition of the plant. The current status of on-site remediation efforts was not specified in available documentation. Based on a review of available U.S. Geological Survey (USGS) data, groundwater levels in the vicinity of Mohave Substation are greater than 200 feet below surface. Therefore, groundwater contaminants are not anticipated to be encountered during potential excavation activities near Mohave Substation. However, the extent of subsurface impacts is unknown and soil contaminants could potentially be encountered during excavation activities. As previously discussed, contaminated media protocol would be implemented throughout construction of the Proposed Project to address subsurface contaminants encountered during excavation activities. As a result, impacts would be less than significant.

Operation

Less-Than-Significant Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M activities would primarily occur on aboveground structures, and excavation activities are not typically required. In the event that contaminated media are encountered during O&M requiring excavation activities, SCE would stop work, contact SCE's Safety and Environmental Specialist (SES), request a site assessment, and notify the proper authorities. The potentially contaminated soil would first be segregated into lined stockpiles, dump trucks, or roll-off containers. Samples would then be collected and analyzed to determine the appropriate handling, treatment, and disposal options. If the analytical results indicate that the soils are hazardous, the impacted soils would be properly managed on location and transported to a Class I Landfill or other appropriate soil treatment or recycling facility using a Uniform Hazardous Waste Manifest. All hazardous materials would be transported, used, and disposed of in accordance with applicable rules, regulations, and SCE protocols designed to protect the environment, workers, and the public. Work would continue at that location only when given clearance by the SES. Therefore, with the implementation of SCE's standard practices, the potential for exposing hazardous materials to Proposed Project personnel or the environment during O&M is unlikely. As a result, impacts would be less than significant.

4.8.4.5 For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Construction

Less-Than-Significant Impact. The Proposed Project area is located within 2 miles of five public or private airports. The nearest public airport to the Proposed Project—the Hesperia Airport—is located approximately 0.9 mile northwest of the Proposed Project. As previously discussed, the Proposed Project is not located within any safety zones specified in the Comprehensive Land Use Plan for the Hesperia Airport. However, as described in Section 3.5.2, Poles/Towers of Chapter 3, Project Description, modifications to existing towers and facilities would result in a maximum height of approximately 192 feet.

SCE would file FAA notifications for Proposed Project structures, as required. With respect to Proposed Project structures, the FAA would conduct its own analysis and may recommend no changes to the design of the proposed structures; or may request redesigning the proposed structures near the airports to reduce the height of such structures; or marking the structures, including the addition of aviation lighting; or placement of marker balls on wire spans. SCE would evaluate the FAA recommendations for reasonableness and feasibility, and in accordance with Title 14 Part 77, SCE may petition the FAA for a discretionary review of its determination to address any issues with the FAA determination. FAA agency determinations for permanent structures typically are valid for 18 months, and therefore such notifications would be filed upon completion of final engineering and before construction commences. The majority of the Proposed Project area would be built within existing or to-be-acquired franchise areas and ROWs, and all construction activities would be performed at a distance from airport activity sufficient to minimize safety concerns to construction personnel. A very low probability of a safety hazard would exist for nearby residents or personnel. Therefore, the impact would be less than significant.

Operation

Less-Than-Significant Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. Helicopters are periodically used to inspect existing SCE utility facilities and would continue to be used during O&M to perform aerial inspections of the Proposed Project. Helicopter flight paths would continue to follow existing flight paths, which are generally limited to SCE owned or to-be-acquired ROWs associated with the Eldorado-Mohave and Lugo-Mohave 500 kV Transmission Lines. O&M activities requiring the use of a helicopter would be coordinated with the FAA and local air traffic control prior to commencement in the same or a similar manner as is done currently. In addition, helicopter use would be infrequent and in accordance with applicable federal, State, and local aviation rules and regulations. Because the height of proposed structures would be similar to existing structures, the Proposed Project would not result in a change to current flight patterns, and no additional safety hazards would occur for people residing or working in the Proposed Project area. As a result, any potential impacts would be less than significant.

4.8.4.6 For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Construction and Operation

Less-Than-Significant Impact. The Ludlow Airstrip, which is designated as a private-use only airstrip, is located approximately 1.6 miles south of the Lugo-Mohave 500 kV Transmission Line. However, as previously discussed, SCE would file FAA notifications for Proposed Project structures, as required. In addition, the entirety of the Proposed Project area would be built within SCE-owned and/or to-be-acquired ROWs, and all construction activities would be performed at a distance from airport activity sufficient to minimize safety concerns to construction personnel. Therefore, the impact would be less than significant.

4.8.4.7 Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Construction

No Impact. Several work areas associated with the Proposed Project are located near Interstate 40 and various state routes that could potentially be utilized as evacuation routes. In addition, a review of the San Bernardino County EOP and MAST-designated evacuation routes indicated that existing facilities associated with the Proposed Project span SR-18, which is designated as an evacuation route by MAST. As described in Section 3.93, Traffic Control of Chapter 3, Project Description, temporary road or lane closures may be necessary during some construction activities to provide safe conditions for the public and workers within public areas and roadways. In addition, some roads may be temporarily limited to one-way traffic at times, and one-way traffic controls would be implemented as required. Therefore, road closures and encroachment into public roadways in the vicinity of evacuation routes could potentially impair coordinated response efforts described in the EOP or increase roadway hazards. However, SCE would obtain the required encroachment permits from local jurisdictions and implement traffic control measures accordingly. In addition, SCE would coordinate with local authorities—including emergency responders implementing the EOP—regarding appropriate procedures to maintain MAST-designated evacuation routes. In the event of an evacuation, Proposed Project construction would cease and obstructed roads would be opened to traffic. Therefore, emergency access would not be impaired during construction and there would be no impact.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. O&M would generally not occur in roadways; however, O&M associated with the Proposed Project may infrequently require temporary lane closures to facilitate access to the Proposed Project. If O&M activities require lane closures, SCE personnel would coordinate emergency and evacuation routes with local responders implementing the EOP to ensure that emergency evacuation routes specified in the plan are available, should an evacuation be necessary. Therefore, O&M activities would result in no impact to emergency evacuation and response plans.

4.8.4.8 Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Construction

Less-Than-Significant Impact. As previously discussed, the majority of the Proposed Project components within California are located within the CAL FIRE moderate fire hazard severity zone. Portions of the Proposed Project are also located within the high and very high fire hazard severity zone, as well as some areas designated as non-wildland/non-urban land. However, Proposed Project components within Nevada are not located in the vicinity of communities designated with a moderate, high, or extreme risk of wildland fire ignition.

High heat or sparks from vehicles or equipment have the potential to ignite dry vegetation and cause fires. However, Proposed Project activities would generally be located within existing SCE owned and/or to-be-acquired ROWs where vegetation has been previously cleared. Vehicles and equipment would primarily use existing roads, and would also use a drive and crush method for temporary construction areas containing vegetation. In addition, SCE would implement standard fire prevention protocols during construction activities and comply with applicable laws and regulations. Prior to construction, contractors would be required to submit a fire prevention plan to SCE construction management for review and approval. In the event that the National Weather Service issues a Red Flag Warning during construction of the Proposed Project, additional measures would be implemented to address smoking and fire rules, storage and parking areas, the use of gasoline-powered tools, the use of spark arresters on construction equipment, road closures, the use of a fire guard, fire suppression tools, fire suppression equipment, and training requirements. The portions of the Proposed Project area located within moderate to very high fire hazard severity zones would be grubbed of vegetation and graded before the staging of equipment, thereby minimizing the potential for vehicles or equipment to start a fire. As a result of these measures, construction of the Proposed Project would have a less-than-significant impact to the risk of loss, injury, or death involving wildland fires.

Lastly, within California, SCE participates with CAL FIRE, the California Governor's OES, the U.S. Forest Service (USFS), and various city and county fire agencies in the Red Flag Fire Prevention Program, and complies with California PRC Sections 4292 and 4293 related to vegetation management in transmission line corridors. The portions of the Proposed Project located within moderate or high fire hazard severity zones would generally be cleared of vegetation and graded prior to the staging of equipment, minimizing the risk of construction vehicles starting a fire. Based on SCE's participation in the Red Flag Fire Prevention Program and compliance with applicable State and federal laws and regulations during construction, impacts resulting from wildland fire would be less than significant.

Operation

No Impact. As previously described, O&M activities associated with the Proposed Project would be similar to those currently performed for the existing facilities, with additional O&M activities associated with the proposed mid-line series capacitors and fiber optic repeater facilities. Consistent with CPUC G.O. 95 and other applicable federal and State laws, SCE would conduct regular vegetation clearing during O&M and maintain an area of cleared brush around

equipment to minimize the potential for fire. As previously discussed, SCE participates with CAL FIRE, the California Governor's OES, the USFS, and various city and county fire agencies in the Red Flag Fire Prevention Program and complies with California PRC Sections 4292 and 4293 related to vegetation management in transmission line corridors. As a result, O&M associated with the Proposed Project would result in no impact to the risk of loss, injury, or death involving wildland fires.

4.8.5 Applicant-Proposed Measures

Because no potentially significant impacts associated with hazards or hazardous materials would occur as a result of the Proposed Project, no avoidance or minimization measures are proposed.

4.8.6 Mid-Line Series Capacitor Site Alternatives

Consistent with Section 15126.6(d) of the CEQA Guidelines, this Proponent's Environmental Assessment analyzes alternatives to the Proposed Project. Section 5.2, Description of Project Alternatives and Impact Analysis, identifies and compares the construction and operation of SCE's Proposed Project with its alternatives, including alternatives that did not meet key Proposed Project objectives and were not carried forward. The alternatives retained for a full evaluation—alternative sites for the Newberry Springs Series Capacitor and the Ludlow Series Capacitor—are analyzed in relation to hazards and hazardous materials in the following discussion.

This section analyzes the alternative siting locations for the mid-line series capacitors. The alternative Newberry Springs Series Capacitor site is an approximately 3.1-acre site located approximately 930 feet to the northeast of its proposed location along the Eldorado-Lugo 500 kV Transmission Line. The alternative Ludlow Series Capacitor site is an approximately 3.1-acre site located approximately 970 feet to the southwest of its proposed location along the Lugo-Mohave 500 kV Transmission Line.

No hazardous sites, schools, public airports, or private airstrips were identified in the vicinity of the alternative Newberry Springs Series Capacitor site. Both the proposed and alternative Newberry Springs Series Capacitor sites are located within the CAL FIRE moderate fire hazard severity zone. In addition, no evacuation routes would be obstructed during construction or O&M of the alternative Newberry Springs Series Capacitor site. However, a high-pressure gas line was identified less than 300 feet south of the alternative Newberry Springs Series Capacitor site. The presence of a high-pressure gas line would introduce potential engineering and constructability issues during construction at the alternative Newberry Springs Series Capacitor site. Based on the presence of this gas line in the vicinity of the alternative Newberry Springs Series Capacitor site, construction at the proposed mid-line series capacitor site would result in fewer potential hazards than construction at the alternative Newberry Springs Series Capacitor site.

No hazardous sites, schools, public airports, or private airstrips were identified in the vicinity of the alternative Ludlow Series Capacitor site. Both the proposed and alternative Ludlow Series Capacitor sites are located within the CAL FIRE moderate fire hazard severity zone. In addition, no evacuation routes would be obstructed during construction or O&M of the alternative Ludlow Series Capacitor site. Therefore, impacts related to hazards and hazardous materials during

construction and O&M of the alternative Ludlow Series Capacitor site would be similar to impacts resulting from construction and O&M of the proposed mid-line series capacitor site.

4.8.7 References

Airport-Data.com. 2016. Ludlow Airport (5CA4) Information. Retrieved February 2, 2016, from http://www.airport-data.com/airport/5CA4/.

Beyond Pesticides. (2003). Fact Sheet on Chemically Treated Wood Poles. Retrieved February 23, 2016, from http://www.beyondpesticides.org/programs/wood-preservatives/resources.

California EPA. (2014a). Colorado River Region Basin Plan. Retrieved April 21, 2016, from http://www.waterboards.ca.gov/coloradoriver/water_issues/programs/basin_planning/.

California EPA. (2014b). Colorado River Region Basin Plan. Retrieved April 21, 2016, from http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

CAL FIRE. (2012). Fire Hazard Severity Zones Maps. Retrieved February 8, 2016, from http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones.

City of Boulder City. (2009). *Boulder City Master Plan.* Retrieved December 23, 2015, from http://www.bcnv.org/176/Planning-Publications.

City of Hesperia. (2010). *City of Hesperia General Plan 2010.* Retrieved December 29, 2015, from http://www.cityofhesperia.us/DocumentCenter/View/3459.

Clark County. (2014a). *Clark County Comprehensive Plan.* Retrieved December 23, 2015, from http://www.clarkcountynv.gov/comprehensive-planning/advanced-planning/Pages/ComprehensivePlan.aspx.

Clark County. (2014b). *Clark County Emergency Management Plan – Basic Plan.* Retrieved December 23, 2015, from http://www.clarkcountynv.gov/fire/oem/Pages/EmergencyPlans.aspx.

Clark County. (2007). *Laughlin Land Use Plan.* Retrieved March 31, 2016, from http://www.clarkcountynv.gov/comprehensive-planning/land-use/Documents/LaughlinAmendedPlan0907.pdf.

Clark County. (2013). *South Clark County Land Use Plan.* Retrieved March 30, 2016, from http://www.clarkcountynv.gov/comprehensive-planning/land-use/Documents/SouthCounty_LandUsePlan.pdf.

County of San Bernardino. (2007a). *County of San Bernardino 2007 General Plan*. Retrieved December 23, 2015, from http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FINALGP.pdf.

County of San Bernardino. (2007b). Wildland Hazard & Building Codes. Retrieved February 8, 2016, from http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones.

DTSC. (2016). EnviroStor. Retrieved January 6, 2016, from http://www.envirostor.dtsc.ca.gov/public/.

EDR. (2015a). *EDR Radius Map Report for Lugo Substation and Locations 1 and 2*.

EDR. (2015b). *EDR Radius Map Report for Locations 3 and 4*.

EDR. (2015c). *EDR Radius Map Report for Locations 5 and 7*.

EDR. (2015d). *EDR Radius Map Report for Locations 7 through 12*.

EDR. (2015e). *EDR Radius Map Report for Locations 13 through 15*.

EDR. (2015f). *EDR Radius Map Report for Location 16*.

EDR. (2015g). *EDR Radius Map Report for Locations 17 and 18*.

EDR. (2015h). *EDR Radius Map Report for Pisgah Substation and Location 19*.

EDR. (2015i). *EDR Radius Map Report for Location 20*.

EDR. (2015j). *EDR Radius Map Report for Location 21*.

EDR. (2015k). *EDR Radius Map Report for Mohave Substation and Locations 22 through 24*.

EDR. (2015l). *EDR Radius Map Report for Eldorado Substation*.

Google. 2016. Google Earth Pro Version 7.1.2.2041 Software. Program used January 2016.

NDEP. (2015). *Construction Stormwater Permit*. Retrieved on May 11, 2016, from http://ndep.nv.gov/bwpc/storm_cont03.htm.

Nevada Division of Forestry. (2005). Nevada Community Wildfire Risk/Hazard Assessment Project: Clark County. Retrieved on May 12, 2016, from http://www.rci-nv.com/reports/clark/.

Official California Legislative Information. (2016). Public Resources Code Sections 4291-4299. Retrieved February 17, 2016, from http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=04001-05000&file=4291-4299.

San Bernardino County Fire. (2013). *San Bernardino County Emergency Operations Plan*. Retrieved February 17, 2016, from http://www.sbcfire.org/oes/emg_planning_docs.aspx.

San Bernardino County Fire. (2013). Emergency Planning Documents. Retrieved February 17, 2016, from http://www.sbcfire.org/oes/emg_planning_docs.aspx.

San Bernardino County Land Use Services. (1991). Airport Land Use Compatibility Plans – Hesperia Airport. Retrieved January 6, 2016, from http://cms.sbcounty.gov/lus/Planning/AirportLandUse.aspx.

SCE. (2015). Mohave Generating Station Land Sale. Retrieved December 30, 2015, from https://www.sce.com/wps/portal/home/about-us/reliability/upgrading-transmission/mgs/!ut/p/b0/04_Sj9CPykssy0xPLMnMz0vMAfGjzOK9PF0cDd1NjDwNHE1MDRw9DHzMvE3MDQ08DfULsh0VAabJB4M!/.

SWRCB. (2016a). GeoTracker. Retrieved January 6, 2016, from http://geotracker.waterboards.ca.gov/.

SWRCB. (2016b). Storm Water Program. Retrieved May 11, 2016, from http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

USGS. (2016). National Water Information System: Mapper. Retrieved January 6, 2016, from http://maps.waterdata.usgs.gov/mapper/index.html.

This page intentionally left blank.