3 AFFECTED ENVIRONMENT

This chapter describes the baseline condition of the projects area for the purpose of identifying resources, ecosystems, and human communities that potentially could be affected by implementation of the alternatives described in Chapter 2. Information presented here includes geology, soils, and seismicity; water resources; climate and air quality; biological resources; cultural resources; land use; transportation; visual resources; socioeconomics; and minority and low-income populations. Information on the baseline environment for noise and human health is included in the corresponding sections in Chapter 4. The baseline condition serves as a reference point for the evaluation of impacts of the alternatives presented in Chapter 4.

3.1 GEOLOGY, PHYSIOGRAPHY, SOILS, AND SEISMICITY

3.1.1 Geology

The proposed transmission line routes and the two alternative routes would be located in the Imperial Valley, part of the Salton Trough, a structural and topographic depression that lies within the Basin and Range physiographic province. The Salton Trough is an extension of the East Pacific Rise as it emerges from the 1,000-mi (1,609-km) long trough occupied by the Gulf of California and continues northward to Palm Springs. The East Pacific Rise is a crustal spreading center characterized by a series of northwest-trending transform faults, the northernmost being the San Andreas. The tectonic activity of the East Pacific Rise has downwarped, downfaulted, extended, and laterally translated the sediments within the Salton Trough. Its underlying geologic complexity is masked by the relatively featureless surface of the basin, filled by thousands of feet of marine and nonmarine sediments (Morton 1977; Hunt 1974).

The sub-sea-level basin of the Salton Trough has received a continuous influx of sand, silt, and clay derived from the Colorado River, which created ephemeral lakes in the basin until about 300 years ago. Underlying this alluvial cover is a succession of Tertiary and Quaternary sedimentary rocks at least 20,000 ft (6,096 m) thick. These rocks are composed mainly of marine and nonmarine sandstones and clays and lake deposits. The depth to basement rock ranges from 11,000 to 15,400 ft (3,353 to 4,694 m), though metamorphism of sedimentary deposits is known to occur at depths as shallow as 4,000 ft (1,219 m) because of the high heat flows associated with crustal spreading. High heat flows also give rise to geothermal steam; several “known geothermal resources areas” have been delineated by the U.S. Geological Survey (USGS) in the Imperial Valley (Morton 1977).

The major geologic resources in Imperial County are sand and gravel. Of the 45 active mines reported by the California Department of Conservation Division of Mines and Geology (now the California Geological Survey) for 1997 through 1998, 36 (80%) were sand and gravel. Other mines in the county include gold (four), clay (two), limestone (one), fill (one), and gypsum (one) (Larose et al. 1999). While there is evidence of past small-scale mining (for sand and

gravel) near the existing 230-kV IV-La Rosita transmission line (hereafter in this chapter referred to as the existing line), there is currently no active mining in this area.

3.1.2 Physiography

The Imperial Valley is a flat, alluvium-filled basin following the same northwest trend as the Salton Trough. Located in the south-central part of Imperial County, the valley has an area of about 989,450 acres (400,418 ha) in the United States and is bounded to the north by the Salton Sea and extends south into Mexico. To the east are the Algodones Dunes and Sand Hills; to the west (from north to south) are the Fish Creek Mountains, Superstition Hills, Superstition Mountain, and the Coyote Mountains (Figure 3.1-1). The Yuha Desert lies to the southwest. The Imperial Valley is separated from the Gulf of California by the ridge of the Colorado River delta, which has an elevation of about 30 ft (9 m) above mean sea level (MSL) at its lowest point (Morton 1977; Zimmerman 1981).

As recently as 300 years ago, a lake, called Lake Cahuilla, filled the Imperial Valley basin to the elevation of the Colorado River delta. The shoreline of this ancient lake has an elevation of about 35 ft (11 m) above MSL and is visible today. Between the east side of the ancient lake bed and the Algodones Sand Hills is a desert plain, called the Imperial East Mesa, a terrace of the Colorado River delta. The proposed transmission line routes are located near the Imperial West Mesa, a desert plain to the west of the ancient lake bed (Figure 3.1-1).

3.1.3 Soils

The soils within the Imperial Valley study area are formed predominantly on silty to sandy sediments within and adjacent to ancient Lake Cahuilla, with interspersions of gravels and clays transported by the Colorado River (Zimmerman 1981). For the most part, the lake deposits are deep, poorly consolidated, and subject to both water and wind erosion. Gradual deflation of these deposits has resulted in the formation of desert pavement and protopavement over large areas. Stable lake deposits appear to be especially susceptible to this process. Most of the surface formations within the project area consist of, or are overlain by, thin wind deposits derived from lake sands and silts. The softer underlying silt and clay formations are dissected by intricate drainage systems trending northward toward the Salton Sea. Ancient beach deposits can often be observed in the banks of these channels.

The proposed transmission line routes and the two alternative routes would cross two soil associations as mapped by the U.S. Department of Agriculture (USDA) Soil Conservation Service (Zimmerman 1981), now called the Natural Resources Conservation Service. These soils represent the two general kinds of landscapes in the southwestern portion of the Imperial Valley: the lake basin formerly occupied by ancient Lake Cahuilla and the mesas to the east and west of the lake basin (the western alternative route would cross soils of the Imperial West Mesa). The soils within the utility corridor already provide adequate structural support for the existing line immediately adjacent to the location of the proposed transmission line routes.

The USDA soil survey did not cover the area south of State Route 98 and west of the proposed transmission line routes; however, the soil types in these areas can be assumed to be similar. Brief summaries of the soil associations are provided below.

3.1.3.1 Meloland-Vint-Indio Association

This soil association consists of nearly level, well-drained fine sand to silt loam formed predominantly in the lake basin, floodplains, and on the low alluvial fans of the Imperial West Mesa. Natural drainage of these soils has been altered by extensive irrigation in the area and seepage of water from irrigation canals. During periods of heavy irrigation, a perched water table may be found at depths less than 60 in. (152 cm). These soils are deep (to at least 60 in., or 152 cm), low to moderately permeable, with a high to very high water capacity. The soil erosion hazard is generally slight, but soils in this unit are susceptible to blowing and to erosion during infrequent periods of intense rainfall. At higher elevations, floodwaters have created a drainage network of rills and arroyos. These soils are mainly used for farmlands but are also well suited for home sites, urban areas, and desert recreation.

3.1.3.2 Rositas Association

This soil association consists of nearly level to moderately steep (with slopes up to 30%), excessively well-drained sand to silt loam formed in the transitional area between the ancient beachline of the Lake Cahuilla basin to the middle and upper levels of alluvial fans from the Imperial West Mesa. These soils are deep (to at least 60 in. [152 cm]), highly permeable, and have a low water capacity. The soil erosion hazard is generally slight, but soils in this unit are susceptible to blowing and erosion during infrequent periods of intense rainfall. These soils are mainly used for desert recreation and wildlife habitat, but they have the potential for irrigated farming. They are also well suited for home sites and urban areas. Locally, these soils are a source of sand.

3.1.3.3 Prime Farmland

The Natural Resources Conservation Service has designated certain soil types in the Imperial Valley as “prime farmland” (if irrigated) subject to protection under the Farmland Protection Policy Act (FPPA; Public Law [P.L.] 97-98, 7 USC 4201). Among these are several soil types found in the Lake Cahuilla basin as part of the Meloland-Vint-Indio soil association: Meloland very fine sandy loam, wet; Meloland and Holtville loams, wet; Indio loam; Indio loam, wet; Indio-Vint complex; Vint loamy very fine sand, wet; Vint fine sandy loam; and Vint and Indio very fine sandy loams, wet. The Rositas silt loam (0 to 2% slopes) soil type found in the Rositas soil association in floodplains, basins, and terraces of the Imperial West Mesa also qualifies as prime farmland (California Department of Conservation 1995). Construction activities on privately owned property or within an existing ROW, such as the one through which the existing line runs, are not subject to the FPPA; however, the FPPA may apply to any route on public land outside of the existing utility corridor.

3.1.4 Seismicity

The zone of northwest-trending strike-slip faults in the Salton Trough defines the transform boundary between the Pacific and North American plates (Figure 3.1-2). As part of this system, the Imperial Valley is a seismically active region. In the past 100 years, 5 earthquakes with a magnitude equal to or greater than 6.5 have occurred: December 30–31, 1914 (2 earthquakes with magnitudes of 6.5 and 7.1), just below the U.S.-Mexico border; May 18, 1940 (magnitude 6.7), along the Imperial Fault; October 15, 1979 (magnitude 6.6), also along the Imperial Fault; and most recently, November 24, 1987 (magnitude 6.6), along the Superstition Hills Fault. Interim seismic activity is characterized by smaller magnitude earthquake swarms (Real et al. 1979; SCEDC 2004).

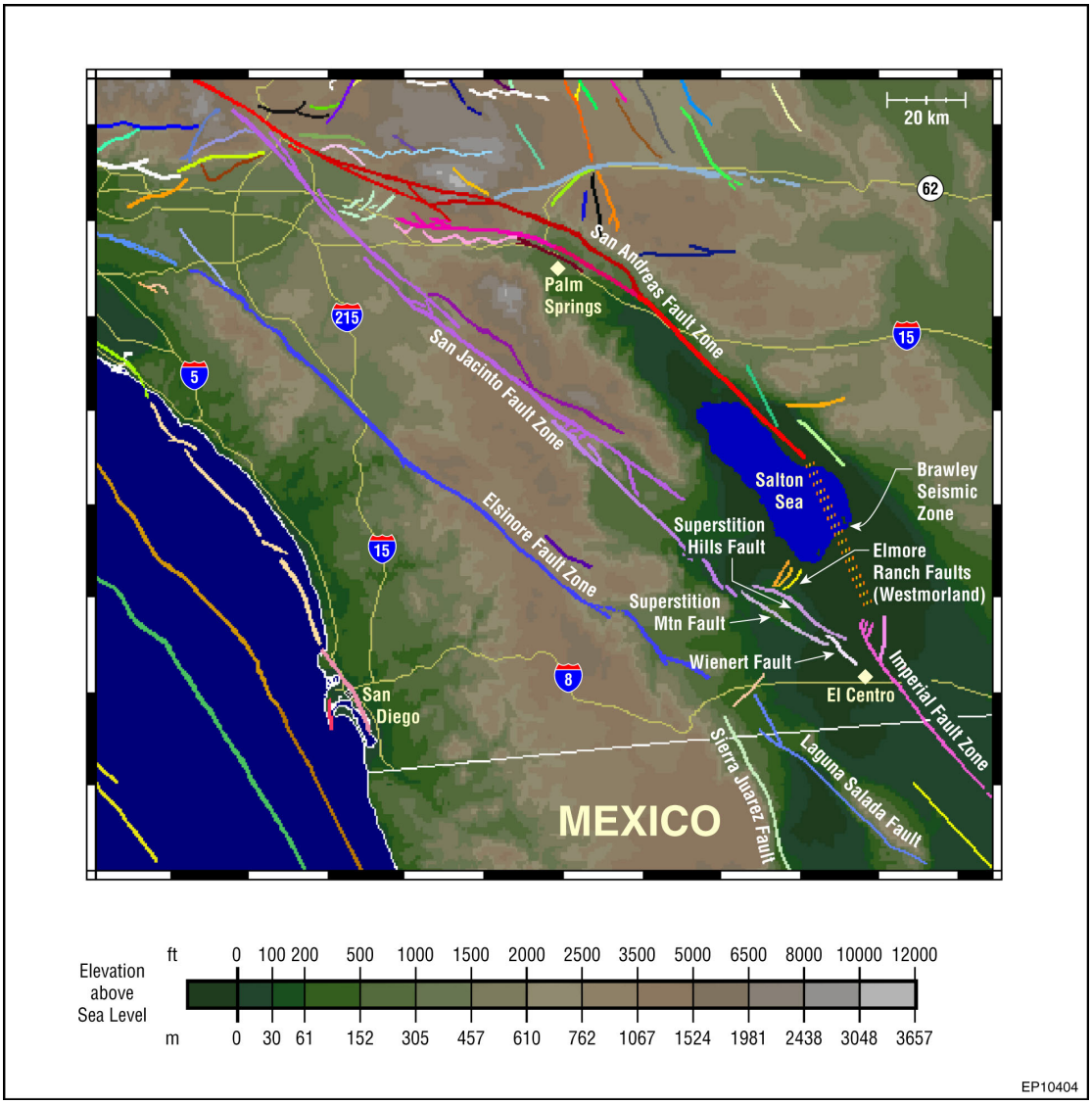

FIGURE 3.1-2 Major Fault Zones in the Salton Trough, Southern California (Source: SCEDC 2004)

The proposed transmission line routes and the two alternative routes would lie between the Laguna Salada Fault (about 9 mi [14 km] west), the Superstition Hills Fault (about 9 mi [14 km] northeast), and the Imperial Fault (about 14 mi [23 km] east) (Figure 3.1-2). In recent history, the Imperial Fault has had the most activity. Earthquakes along this fault have produced surface rupture (i.e., breakage of the ground) along the surface trace of the fault and offsets as great as 15 ft (4.5 m) (SCEDC 2004).

3.2 WATER RESOURCES

Water resources associated with the transmission line projects include surface water, wetlands, floodplains, and groundwater.

3.2.1 Surface Water Resources

The proposed routes and the two alternative routes for the projects lie within Imperial Valley, California, and the Colorado Desert. Very high summer temperatures, low precipitation, and high evaporation rates produce an extremely arid environment. Imperial Valley, California, has an average annual rainfall of about 3 in. (8 cm) (Setmire 2000). Under these conditions, surface water is scarce. The only surface water resource that would be directly affected by the projects is the New River. Indirect impacts would affect the Salton Sea and a pilot wetland project (at Brawley) along the New River. No natural wetlands occur along the New River (Barrett 2004).

The following sections present background information on the New River, the Zaragoza Oxidation Lagoons, Salton Sea, and the Brawley wetland. This information is used in Section 4.2 to evaluate the environmental impacts of the projects to surface water resources in the United States. The Zaragoza Oxidation Lagoons, a man-made feature, are part of the plants' operating systems (as described in Chapter 2). They are discussed in this section because they are also a source of water for the New River.

3.2.1.1 New River

3.2.1.1.1 Physical Conditions. The New River originates about 15 mi (24 km) south of Mexicali, Mexico, and flows 60 mi (97 km) northward through Imperial County, California, to the Salton Sea (EPA 2003b). The channel of the New River was formed between October 1905 and February 1907, when high waters following summer flooding in the Colorado River breached a temporary diversion that had been designed to bypass a silted-up section of the