DOCKETED

Docket Number:	07-AFC-06C
Project Title:	Carlsbad Energy Center - Compliance
TN #:	202699
Document Title:	Supplemental Information Regarding Historical Cultural Resources
Description:	N/A
Filer:	Dee Hutchinson
Organization:	Locke Lord LLP
Submitter Role:	Applicant Representative
Submission Date:	7/14/2014 4:25:14 PM
Docketed Date:	7/14/2014

Locke Lord LLP
Attorneys & Counselors

500 Capitol Mall, Suite 1800
Sacramento, CA 95814
Telephone: 916-930-2500
Fax: 916-930-2501
www.lockelord.com

John A. McKinsey
Direct Telephone: 916-930-2527
Direct Fax: 916-720-0443
jmckinsey@lockelord.com

July 14, 2014

VIA E-FILING

Carlsbad Energy Center Project Petition to Amend (07-AFC-06C)
Mike Monasmith, Staff Project Manager
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814-5512

Re: Petition to Amend the Carlsbad Energy Center Project (07-AFC-06C)
Supplemental Information Regarding Historical Cultural Resources

Dear Mr. Monasmith:

Carlsbad Energy Center LLC ("**Project Owner**") hereby files the enclosed Historical Resources Inventory and Evaluation Update Report prepared by JRP Historical Consulting, LLC in March 2014. Sections 5.3.2 and 5.3.4 of Project Owner's Petition to Amend ("**PTA**") the Carlsbad Energy Center Project (07-AFC-06C) ("**CECP**") reference the conclusions made in this report. Project Owner submits this report to supplement the information contained in the PTA. Please contact me or my colleague Allison Harris if there are questions about the attachment.

Locke Lord LLP

By: ______________________________
John A. McKinsey
Attorneys for Carlsbad Energy Center LLC

JAM: awph

Enclosure

HISTORICAL RESOURCES INVENTORY AND EVALUATION UPDATE REPORT

for the

Carlsbad Energy Center Project, Encina Power Plant
Carlsbad Energy Center Project Petition to Amend (07-AFC-6)
Carlsbad, California

Prepared for:
CH2M HILL
402 W. Broadway, Suite 1450
San Diego, CA 92101

Prepared by:
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, California 95618

March 2014

SUMMARY OF FINDINGS

CH2M HILL contracted with JRP Historical Consulting LLC (JRP) to prepare this Historical Resources Inventory and Evaluation Update Report to inventory and evaluate historic buildings, structures, and objects located within the study area for the Carlsbad Energy Center Project on the Encina Power Plant property in Carlsbad, San Diego County, California as depicted on the attached study area map.

JRP previously prepared a historic resources evaluation for a portion of this property in 2007 entitled "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center."[1] This investigation, however, only included resources on that part of the property east of the railroad tracks and included Tanks 5, 6 and 7, Cannon Substation, and a segment of the former Atchison, Topeka and Santa Fe Railway (currently the Surfline railroad owned by North San Diego County Transit District). These four resources on the Encina Power Plant property were built between 1971 and 1977. As such, JRP evaluated the properties under National Register of Historic Places (NRHP) Criterion Consideration G, which allows for evaluation of properties less than fifty years old for "exceptional importance" and found that they did not meet this high standard of significance. The present study is an update of the 2007 JRP report and includes buildings and structures on the remainder of the property lying west of the railroad tracks with the exception of the Poseidon Resources parcel, which is currently being developed as a desalination plant. Please refer to the attached study area map in Appendix A for the architectural resources survey boundaries.

The purpose of this document is to comply with the California Environmental Quality Act (CEQA), as it pertains to historical resources, and to assess whether the architectural resources located within the project study area should be considered historical resources for the purposes of CEQA; that is, whether they are listed in, determined eligible for, or appear eligible for listing in the California Register of Historic Resources (CRHR). JRP has also included an analysis of their eligibility under NRHP criteria. This study was conducted in accordance with 36 CFR 800 relating to implementation of Section 106 of the National Historic Preservation Act and Section 15064.5(a)(2)-(3) of the CEQA Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code. This report concludes that the Encina Power Plant does not meet the criteria for listing in the NRHP or the CRHR and thus does not qualify as a historical resource for the purposes of CEQA.

Appendix A includes a project vicinity map, location map, study area map and site plan. The DPR 523 form is in **Appendix B** and the 2007 JRP report is in **Appendix C.**

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[1] JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007.

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ATTACHMENTS

1. NEED FOR REPORT

This report is being prepared to assist the property owner, NRG Energy, fulfill its environmental compliance obligations related to the Carlsbad Energy Center Project (CECP) Petition to Amend (07-AFC-6). The Carlsbad Energy Center Project (CECP) has already been licensed by the California Energy Commission (CEC), however, NRG Energy is now seeking a Petition to Amend to expand the license to include demolition of the existing plant, which was not part of the original project. The expansion of the project necessitates this update to JRP's 2007 technical report to cover the additional project area.

2. RESEARCH AND FIELD METHODS

JRP conducted fieldwork at the Encina Power Plant on February 5, 2014. JRP staff historian/architectural historian Steven J. Melvin was escorted during the site visit by Michael Pearson of NRG Energy. The fieldwork consisted of an intensive survey of the property in which all of the buildings and structures 50 years old or older were viewed, photographed, and recorded. In conducting background research for this project, JRP reviewed the 2007 report and evaluation. JRP also conducted in-house research relevant to the history of this property and reviewed other reports and evaluations of power plants similar to the Encina Power Plant.

The historic themes are discussed in Section 3. The description and historical evaluation of the property is summarized in Sections 4 and 5. Refer to Section 6 for JRP staff professional qualifications, and to the references listed in Section 7 for a complete listing of materials consulted.

3. HISTORICAL OVERVIEW[2]

The Encina Power Plant is located along the Pacific Ocean in Carlsbad, California adjacent to the Agua Hedionda Lagoon. It was built as a natural gas/oil fired electricity generating station by San Diego Gas & Electric (SDG&E) and the five generating units were built in stages from 1954 to 1978. This section presents a historical background to provide a basis for evaluating the historical significance of the facility within the context of the history of SDG&E and natural gas/oil fired power generation in California. This section also includes a brief summary of the history of the Encina Power Plant.

3.1. Early California Electrical Generation

Early electrical generation in California faced two major problems, securing inexpensive motive force for the generators and transmitting the power to often distant users. California's first electric light glowed in September 1879, when the California Electric Light Company of San Francisco installed a Brush arc light system powered by a steam engine for street lighting. It was costly to run because fuel for its steam engine was expensive. Another source of motive force, hydropower, was available in the Sierra Nevada and had been developed by miners. In fact in 1879, the same year the California Electric Light Company of San Francisco began operations, the Excelsior Water and Mining Company installed its own Brush lighting system. The water driven wheels were inexpensive to operate, but the plant was located far from population centers, and a method for transmitting electric power over long distances had not yet been developed. As a result, the company only produced electricity for its own use.

Even with the twin problems of motive force and transmission, southern California soon began experimenting with electric lighting. George Chaffey was the first to generate electricity in southern California in December of 1882. Chaffey, along with his brother, founded the Etiwanda Colony and utilized colony's irrigation system to also produce hydroelectric power. Chaffey first used to the power to light a small lamp outside of his ranch house.[3] At about the same time, commercial generation began in Southern California. The Los Angeles Electric Company installed Brush street lamps in Los Angeles. Using steam power they could light the city, but again it was expensive because coal and hardwood for the boilers had to be transported long distances to the plant.

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[2] This text draws from several JRP reports related to electrical generating facilities, including: JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007; "Historic Evaluation of the El Segundo Generating Station, El Segundo, Los Angeles County, California," October 2000; "Historic Resources Inventory and Evaluation Report for the Proposed Etiwanda Expansion Project." 2007; Highgrove Generating Station DPR 523 Form, 2006; South Bay Power Plant DPR 523 Form, 2006.

[3] Donald L. Clucas, *Light Over the Mountain: A History of the Rancho Cucamonga Area* (Upland, California: California Family House Publishers, 1979) 214.

Several smaller communities followed after and faced the same problems. Visalia and Santa Barbara installed steam powered systems, but these also proved expensive. Visalia's first plant was forced to close when customers objected to the high prices and unsuitable light. The little hydroelectric plant at Highgrove, on the other hand, was located close enough to provide street lighting to Riverside. It used a low head hydropower site that was able to power 15 arc lamps. Hydropower plants located near users were rare.

The transmission problem was a result of the nature of direct current. Resistance in the wires diminished the amount of electricity received at the user's end and reduced the distance electricity could be transmitted. Higher voltages reduced the resistance, but were not useful to customers. Alternating current systems, developed by Nicola Tesla and William Stanley and sold by Westinghouse, simultaneously solved the transmission and generation problems. Alternating current systems could be "stepped up" to higher voltages for transmission and back down to useable voltages for distribution by transformers, making it possible to transmit electricity over longer distances. With longer transmission distances, companies could begin to build hydropower plants at a distance from the markets they served.

At first, companies simply used alternating current to enlarge their market area and to provide new services. In the 1890s four early systems, Santa Barbara, Highgrove, Visalia and Pasadena, changed from direct current to alternating current without changing their generation sources. The first model for future generation was the San Antonio Light and Power Company. In 1891 Dr. Cyrus Grandison Baldwin had located an excellent hydropower site 14 miles from Pomona at the San Antonio Canyon. Baldwin hired Almarian William Decker to engineer the hydroelectric plant, and formed San Antonio Light and Power Company to develop the site. Decker successfully designed a single-phase alternating current system that began operations in 1892. It was able to provide 120 kW of power, compared to Highgrove's 75 kW.[4] Decker immediately began work on another power plant at Mill Creek which introduced the three phase alternating current to California. This plant produced even more power, 250 kW.[5] These hydroelectric projects proved that power could be transmitted longer distances and increased available power. They also proved to be the most economical means of generation at the time.

3.2. Twentieth Century Power Generation in California

Throughout the early twentieth century hydro-generated power prevailed over steam as companies built larger hydroelectric plants on the many suitable sites throughout the state. By 1920, hydroelectric power accounted for 69 percent of all electrical power generated in California. In

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[4] William A. Meyers, *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company* (Glendale, California: Trans-Anglo Books, 1983) 25.
[5] Meyers, *Iron Men and Copper Wires,* 27.

1930, that figure had risen to 76 percent, and to 89 percent in 1940.[6] These statistics, however, tend to obscure the attempts by both Pacific Gas & Electric Company (PG&E) and Southern California Edison (SCE), California's largest electrical utility providers, to build large-scale steam generation plants as early as the 1920s. James Williams, a historian of energy policies and practices in California, noted that the decision by PG&E and SCE to build steam plants may be attributed to several converging trends in the mid- to late-1920s. First, a persistent drought in California caused the major utilities to begin to question the reliability of systems relying so heavily upon hydroelectricity. This drought began in 1924 and continued, on and off, for a decade. At about the same time, new power plants on the East Coast (where steam had always played a more important role than in California) achieved far greater efficiencies than had previously been possible. Between 1900 and 1930, for example, the fuel efficiency of steam plants, measured in kilowatts per barrel of oil, increased more than nine-fold. In addition, new natural gas lines were completed which could bring new supplies to both Northern and Southern California in the late 1920s, tapping large reserves in the San Joaquin Valley. The availability of natural gas made it a viable option for steam generating plants.[7]

The confluence of these various factors – a drought, improved technologies, and new supplies of natural gas – induced PG&E, SCE, and other utilities to begin construction of large steam plants during the late 1920s and early 1930s. In 1929, the Great Western Power Company (which would be absorbed by PG&E in 1930) built a large steam plant on San Francisco Bay, near the Hunters Point shipyard, fitted with two 55 MW generators. PG&E built a steam plant in Oakland in 1928, called Station C. SCE had an even longer history of steam generation, having operated its large facility at Long Beach on Terminal Island throughout most of the 20th century. By World War II, the Long Beach plant was massive, with eleven units on line that were constructed in stages beginning in 1911. In Southern California, the Los Angeles Department of Water and Power (LADWP) constructed a steam station at Seal Beach consisting of two units installed in 1925 and 1928. These steam plants proved to be both profitable and reliable for the various utilities. In 1930, a PG&E vice-president for engineering wrote: "Under the circumstances which now prevail, it is natural to question the future of hydro in California." [8] This forecast proved prescient as steam generating plants accounted for most of the new power capacity in the state after 1941. Technology and improvements for steam turbine power plants continued to advance, leading power companies to retire or replace many of the older steam-electric plant generating units with more efficient units in the 1950s and 1960s.[9]

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[6] James C. Williams, *Energy and the Making of Modern California* (Akron, Ohio: University of Akron Press, 1997), 374.

[7] Williams, *Energy and the Making of Modern California*, 278.

[8] "1928 Steam Plants Account for 45 Percent of New Generating Capacity," *Electrical West* (February 2, 1929): 80-81; R.W. Spencer, "Cooling Water For Steam Electric Stations in Tidewater," *Transactions of the American Society of Civil Engineers* 126 (1961): 294, 300; Williams, *Energy and the Making of Modern California*, 279.

[9] Heinz Termuehlen, *100 Years of Power Plant Development: Focus on Steam and Gas Turbines as Prime Movers.* New York: ASME Press, 2001, 21-28; Williams, *Energy and the Making of Modern California*, 374.

Coinciding with the advancements in power generating technology was an increase in demand for electricity in Southern California. After World War II the population swelled and industry, particularly the defense industry, expanded throughout the region, contributing to an increased demand from residential and commercial customers. The need to generate power was imperative and PG&E, SCE, Los Angeles Department of Water and Power (LADWP), and San Diego Gas & Electric (SDG&E) expanded their systems along with the rest of California's energy industry. Since most of the more favorable hydroelectric sites in California had already been developed, and the cost of steam generating facilities had been reduced by technological developments in design and abundant natural gas resources, steam plants became the more favorable option. Steam turbine power plants were cheaper and quicker to build than hydroelectric plants, and utilities companies moved away from hydroelectricity, establishing steam turbines as the generator of choice. The efficiency of steam plants also kept costs down for the consumer. California energy historian James Williams observed, "the momentum for steam had been established by war, by drought, and by a positive history of increased thermal power plant development."[10]

Dozens of new steam generation plants were built throughout California, chiefly by PG&E and SCE, although LADWP and SDG&E built a few as well. The plants relied upon proven technologies and were assembled quickly and inexpensively, relative to earlier plants. In a detailed article in 1950 in *Civil Engineering*, PG&E Chief Engineer I. C. Steele summarized the design criteria that went into construction of four major steam plants the company had under construction at that time, at Moss Landing, Contra Costa, Kern, and Hunters Point in San Francisco. These plants had much in common with each other, he argued, and with other steam plants under construction in the state. The criteria were the same in all cases: to build the facility close to load centers to reduce transmission costs; to be close to fuel supplies; to be near a water supply; and to be on a site where land was cheap and could support a good foundation. In another article in *Transactions of the ASCE,* Walter Dickey, an engineer from Bechtel, detailed the economics of steam plant design from this era. Virtually all of these plants were designed to be expanded if market conditions warranted and most of them were. These plants, he argued, could be built economically by minimizing the structural material, including not enclosing the turbo-generator units in a building. Many plants in Southern California are of this "outdoor" variety, but some, such as the Encina Power Plant, were enclosed in curtain walls.[11]

The decades between 1950 and 1970 were the years of peak expansion of steam generating capacity for both the SCE and the PG&E, as well as for smaller utility companies. During this period, SCE built a series of very similar steam plants in the Los Angeles Basin and in San

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[10] Myers, *Iron Men and Copper Wires*, 200; Williams, *Energy and the Making of Modern California*, 277-78, 282-83.
[11] I. C. Steele, "Steam Power Gains on Hydro in California," *Civil Engineering* (January 1950): 17-21; Edgar J. Garbarini, "Design Saves Construction Dollars on Contra Costa Power Plant," *Civil Engineering* (May 1953): 31-33; Walter L. Dickey, "The Design of Two Steam Electric Plants," *ASCE Transactions* (1956): 253-273.

Bernardino County. In 1952, the company began work on Redondo No. 2, which was adjacent to an earlier plant at Redondo Beach. In 1953, the Etiwanda plant went online, followed in 1955 by El Segundo, Alamitos in 1956, and Huntington Beach and Mandalay in 1958. By 1960, all SCE plants either had multiple units or had additional units in the planning stages. In 1950 PG&E operated 15 steam electric plants in California, and during the following decade added several new plants and expanded older ones. Chief among these were the Kern plant (1948-50), Contra Costa (1951-53), Moss Landing (1950-52), Morro Bay (1955), Hunters Point (addition 1958), Humboldt Bay (1956-58), and Pittsburg (1959-60). The Pittsburg plant was at the time of its construction the largest steam station in the west, with a capacity of over 1,300,000 kW in 1960. The LADWP system was much smaller than those of SCE and PG&E, consisting of five steam plants by 1962. In addition to its Seal Beach Plant (1925-28) and Harbor Plant on Los Angeles Harbor (1943), these included the Valley Plant (San Fernando Valley, 1954), Scattergood (1958), and Haynes (1961). SDG&E had three steam-electric power plants, Silver Gate (1943), Encina (1954), and South Bay (1960). By the late 1970s, there were more than 20 fossil fuel thermal plants in California, clustered around San Francisco Bay, Santa Monica Bay, and in San Diego County, along with a few interior plants in San Bernardino County and Riverside and Imperial Counties, as well as a few plants on the Central Coast. [12]

Most of the oil- or gas-fired steam plants currently in use in California were built in the period from about 1950 through 1970 and all of these used virtually the same technology and design.[13] After 1970, the major utilities began to look for alternative energy sources, ranging from nuclear power to wind, geothermal, and other "green" energy sources, other than hydroelectric. Despite these efforts, however, fossil fuel steam generation remains the backbone of electrical generating capacity in California. Information from the California Energy Commission (CEC) states that there are currently 34 steam turbine power plants in California of a variety of ages and locations.[14]

3.3. History of the San Diego Gas & Electric Company

The history of the SDG&E Company mirrors the general history of steam-electric power plant development outlined previously with most of the company's growth occurring during the 1940s, 1950s and 1960s. A group from San Diego founded the company on April 18, 1881 as the San

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[12] Spencer, "Cooling Water For Steam Electric Stations in Tidewater," 280-302; Steele, "Steam Power Gains on Hydro in California," 17-19; Dickey, "The Design of Two Steam Electric Plants," 253-255; "Haynes Steam Plant Will Grow With Demand," *Southwest Builder and Contractor* (October 12, 1962): 24-27; Williams, *Energy and the Making of Modern California*, 257; Annual Reports of the Southern California Edison Company, various years.
[13] Termuehlen, *100 Years of Power Plant Development*, 21-28.
[14] The California Energy Commission retains figures on the fuel type for all electricity used in the state, even if the power is generated out of state. In 1999, natural gas-fired generators were responsible for 31% of all electricity used in the state, compared with 20% for hydroelectricity. Coal-fired steam plants, all of them out of state, accounted for 20% of the total. "Green" sources accounted for 12%. The percentage of in-state natural gas-fired steam electricity is much larger than 31%, since all of the coal and much of the hydroelectric power is generated out of state. See http://energyalmanac.ca.gov/electricity/index.html.

Diego Gas Company to serve the small city of about 3,000 people. With 89 charter subscribers located along its three miles of gas mains, the company began manufacturing gas from crude oil at its plant on June 2, 1881, and started service two days later. The plant had a capacity of 25,000 cubic feet of gas per day, an amount considered sufficient to supply a population of 20,000.[15]

The completion of the California Southern Railroad from San Diego to Barstow in 1885 to connect with the Atchison Topeka and Santa Fe's line caused a land boom in San Diego as the population climbed to approximately 35,000. In 1887, the San Diego Gas Company consolidated with the Coronado Gas and Electric Company into the San Diego Gas and Electric Light Company. The new company enlarged its gas plant and built its first electric generating plant (later named Station A) on the adjacent property. The capacity of the gas plant had been increased to 400,000 cubic feet per day, sufficient for a population of 100,000, and the new steam electric generating plant supplied 770 kW of power through four steam driven generators. During the 1890s, however, population growth slowed and the company's customer base grew modestly, but steadily.

In April 1905 the company was sold to H.M. Byllesby & Company of Chicago and reincorporated as the San Diego Consolidated Gas & Electric Company (SDCG&E). At this point, the company was serving 2,168 gas and 1,258 electric customers. The new owners began replacing the old equipment at Station A in 1906, when its first steam turbine generator with a capacity of 500 kW was installed. Other improvements followed, including the addition of a 2,000 kW turbogenerator in 1909, followed by 4,000 kW turbogenerators in 1912 and 1914. The company also made improvements at its gas plant, including switching from coal back to oil in 1906, following advances in oil production that made it more economically viable. By 1920, six new gas generators were online and the plant had a capacity of approximately 6,250,000 cubic feet per day. Construction during this period also included extending the gas and electric distribution systems beyond the San Diego city limits to the surrounding communities, including National City, La Jolla, Chula Vista, La Mesa, Imperial Beach, and San Ysidro.

In 1918, the company further extended its system with the construction of its first high voltage transmission line, a 66 kV line extending 75 miles north from San Diego to Del Mar, Oceanside, and San Juan Capistrano where it tied into the transmission system of SCE. This interconnection gave the smaller SDCG&E access to the SCE hydroelectric generated power to supplement the capacity of its own steam generating plant in times of need. However, the first transfer between the two companies occurred the following year when severe drought resulted in SDCG&E sending its surplus power north into the SCE system. Today, the SCE-SDG&E interconnection provides

[15] Except where otherwise noted, the following history of the San Diego Gas & Electric Company was taken from the following sources: San Diego Gas & Electric Company, *San Diego Gas & Electric Company: A Review of its Origin, Growth and Corporate History From 1881 to 1962* (San Diego: San Diego Gas & Electric Company, 1962); and Iris Engstrand and Kathleen Crawford, *Reflections: A History of the San Diego Gas & Electric Company 1881-1991* (San Diego: San Diego Historical Society and the San Diego Gas & Electric Company, 1991).

for the exchange of 100,000 kW and functions as the company's main tie with other members of the statewide energy pool.

By 1920, the company was serving 115,000 electric customers and its energy needs had outgrown Station A. SDCG&E purchased the 8,200 kW San Diego Electric Railroad power plant in 1921 and renamed it Station B. Further improvements at Station B consisted of installing a 15,000 kW generator, which surpassed the entire generating capacity of Station A, followed by a second 15,000 kW generator in 1927, and a 28,000 kW generator in 1928. These additions increased the capacity of the system from 46,000 kV to 74,000 kV. The company also began upgrading its transmission lines from 11 kV to 66 kV. By 1930, SDCG&E served over 70,000 customers.

SDCG&E continued to thrive in the 1930s with further improvements to its system and customer growth. In 1932, SDCG&E changed over from manufactured gas to natural gas, which increased the capacity of its gas system to 22 million cubic feet per day. While natural gas was found to be 50 percent more efficient than manufactured gas, gas sales increased by 110 percent during the 1930s. The San Diego area received renewed economic stimulus in 1938-39, with pre-World War II defense expansion leading to a revival in employment at aircraft manufacturing plants and increased activity at the area's naval installations. In 1939, the company installed a new 35,000 kW generator at Station B, increasing its total capacity to 99,000 kV, and took Station A offline. Station B carried the entire load of the company's service area until 1943 when another interconnection was made so that the SDCG&E could purchase surplus power from other systems, and the company brought a new power plant online.[16]

The World War II years were a period of tremendous growth for the San Diego metropolitan area and for SDCG&E. Between 1940 and 1945 the population of the area increased 90 percent to 550,000, and SDCG&E added over 17,000 gas and 21,000 electric customers. Peak loads exceeded the company's generating capacity, forcing it to rely heavily on purchased power. In 1941 the Standard Gas & Electric Company, which had a few years earlier succeeded H.M. Byllesby & Company as owner of SDCG&E, decided to divest itself of SDCG&E stock. SDCG&E then became an independent organization, renamed the San Diego Gas & Electric Company (SDG&E). SDG&E constructed a new power plant at Silver Gate on San Diego Bay in 1941, with the first 35,000 kW generator online by 1943. Despite this additional plant, the company still had to purchase outside power to meet its peak load demands.

Growth continued at an extremely rapid rate after World War II and SDG&E continued to add generating capacity. Silver Gate Unit 2 came online in 1948, adding 50,000 kW to the system, but the company was still unable to meet customer demand having added over 37,000 new electric and 21,000 new gas customers by 1950. Growth continued to be dramatic, with 8,350 new

[16] The subsequent history of Station B is not detailed in the historic record. It was taken offline at an unknown date.

customers in the first three months of 1951. During this decade, San Diego's population passed the one million mark, and the company invested over $190 million in construction of new power plants. SDG&E planned to build a new steam-electric generating unit every two years to meet continually increasing demand and started with Silver Gate Unit 3 in 1950, followed by Silver Gate Unit 4 in 1952, both 66,000 kW units. Following construction of the fourth unit, the Silver Gate site was at capacity and SDG&E looked north to Carlsbad for its next project, the Encina Power Plant. The first 106,000 kW unit at Encina went on line in 1954, followed by two more in 1956 and 1958, respectively (see below section for a history of the Encina Power Plant). Though the company tripled its generating capacity during the 1950s to 672,000 kW, demand had doubled to just over 600,000 kW. In order to keep ahead of demand, SDG&E continued its expansion program by breaking ground at its South Bay Power Plant (South Bay) in Chula Vista in 1958. South Bay Unit 1 went online in 1960 and Unit 2 in 1962, each adding 142,000 kW to the system. A third South Bay unit came online in 1964, pushing the total capacity of the SDG&E system to 1,166,000 kW. Several years then passed until South Bay Unit 4 was added in 1971.[17]

During the 1960s, the decade of the company's most explosive growth, SDG&E initiated a four-part long-term plan designed to meet ever-increasing energy demands. In 1961, the company entered into agreement with SCE to finance and operate a nuclear-fueled steam-electric generating plant at San Onofre. The San Onofre Nuclear Generating Station was completed in 1965. Designed by Bechtel Corporation and Westinghouse, the plant was larger than other such plants constructed by the federal government and private utilities during the previous decade. In another innovative turn, the company also completed the first liquefied natural gas (LNG) plant at South Bay for converting natural gas to liquid in 1964-65. This project was the first of its kind in the west, and one of only five worldwide. The company's plan also included becoming a member of the California Power Pool and participating in the Pacific Northwest Intertie, a combination of public and private transmission lines that linked surplus hydro resources of the Pacific Northwest with the power systems in Oregon, California, Arizona, and Nevada. Also in 1965, the federal Department of the Interior built the west coast module of a nationwide seawater conversion program at South Bay. It was the extension of research and experimental projects between SDG&E and General Atomic Division of General Dynamics Corporation to obtain an economical seawater conversion platform. The seawater conversion plant, along with the LNG facility, was removed from South Bay during the mid-1970s.[18]

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[17] *San Diego Union*, 6 June 1948, 1; *San Diego Union*, 16 February 1958, 24; *San Diego Union*, 18 October 1958, 13; *San Diego Union,* 11 October 1959; *San Diego Union,* 15 November 1959; *San Diego Union*, 1 May 1960; *San Diego Union*, 22 June 1962; "New Generator Ordered for Carlsbad Plant," *Los Angeles Times*, 26 April 1951, 23.

[18] "Deep Hole Being Dug For Atomic Plant" *Southwest Builder and Contractor* (August 14, 1964): 14-16; *San Diego Union,* 17 September 1964; *San Diego Union,* 24 January 1965; *San Diego Union,* 28 September 1966; *San Diego Union*, 18 February 1967; *San Diego Union*, 30 May 1968; *San Diego Union*, 30 July 1970; *San Diego Union*, 9 May 1971; Personal Communication with Jim Nylander, South Bay Power Plant Manager, February 14, 2006.

The 1970s were a period of slow growth and lower investment in improvements for SDG&E. During the decade, declining demand led SDG&E to delay plans for expansion, including putting plans for three more units at South Bay on hold. The company served 500,000 electric customers in 1972, and its facilities produced enough electricity to meet demand. Later in the 1970s, SDG&E developed geothermal sites in the Imperial Valley and built additions to the San Onofre nuclear plant, where the company owned a 20 percent interest in three generating units. SDG&E also expended large sums on environmental control programs to reduce nitrogen and sulfur emissions from its plants, and on converting much of its overhead electrical distribution system to an underground system. By the end of the decade, SDG&E served approximately 2.5 million customers in a service area that encompassed over 4,000 square miles of San Diego County and the western section of Orange County, with power supplied primarily from plants at Encina, South Bay, and San Onofre. In 1988 SDG&E merged with Southern California Edison, and is now a part of Sempra Energy.[19]

3.4. The Encina Power Plant

SDG&E announced plans to build the Encina Power Plant in April 1951 on a 110-acre site near the mouth of Agua Hedionda Lagoon, west of the Atchison, Topeka and Santa Fe Railroad and east of what was then Highway 101 (currently Carlsbad Boulevard; **Illustration 1**). The company built the plant in stages with the first 106,000 kW unit coming on line in October 1954, with power from the plant primarily serving northern San Diego County. Similar to other plants built at this time in California, it used a combination gas/oil powered generator and seawater to cool the condensers. The plant construction department of SDG&E served as general contractor for the plant. The first unit required 2,500 tons of structural steel and 1,000 cubic yards of concrete for the turbine and generator foundation (**Illustration 2** and **Illustration 3**). After completion of the framework, the first unit was equipped with a generator by General Electric, a boiler by Babcock and Wilcox, and other standard equipment. As the first unit began operation, ground had already been broken for the second unit, completed in 1956, followed by a third in 1958. The first unit was estimated to cost about $20 million and the entire project about $60 million. In addition to the power generators, other major elements of the complex built during the 1950s construction phase included Tanks 1, 2 and 3; Fuel Oil Pump Room Building; Warehouse/Maintenance Shop; Water Intake; and Substation 1. During the 1970s, SDG&E undertook another major construction phase that included Units 4 and 5; Tanks 4, 5, 6, and 7; Substation 2; and several storage buildings (See Table 1 in Section 4, and Site Plan in Appendix A).[20]

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[19] *San Diego Union*, 15 May 1970; *San Diego Union,* 11 January 1972; *San Diego Union*, 15 February 1972; *San Diego Union*, 9 January 1973; *San Diego Union*, 16 March 1974; *San Diego Union*, 3 January 1975; *San Diego Union* 17 October 1975; *San Diego Union* 4 April 1988; *San Diego Union*, 2 December 1988; *San Diego Union*, 21 April 1989.

[20] "New Generator Ordered for Carlsbad Plant," *Los Angeles Times*, 26 April 1951, 23; "Dedication Set Tomorrow for Power Plant," *Los Angeles Times*¸ 18 October 1954, A7; "Generating Plant Work Under Way," *Los Angeles Times,* 20 January 1952, 33; "Unusual Cooling Water Supply Problems at San Diego Steam Electric Plant," *Southwest Builder and Contractor* (September 11, 1953), 12, 13, 16.

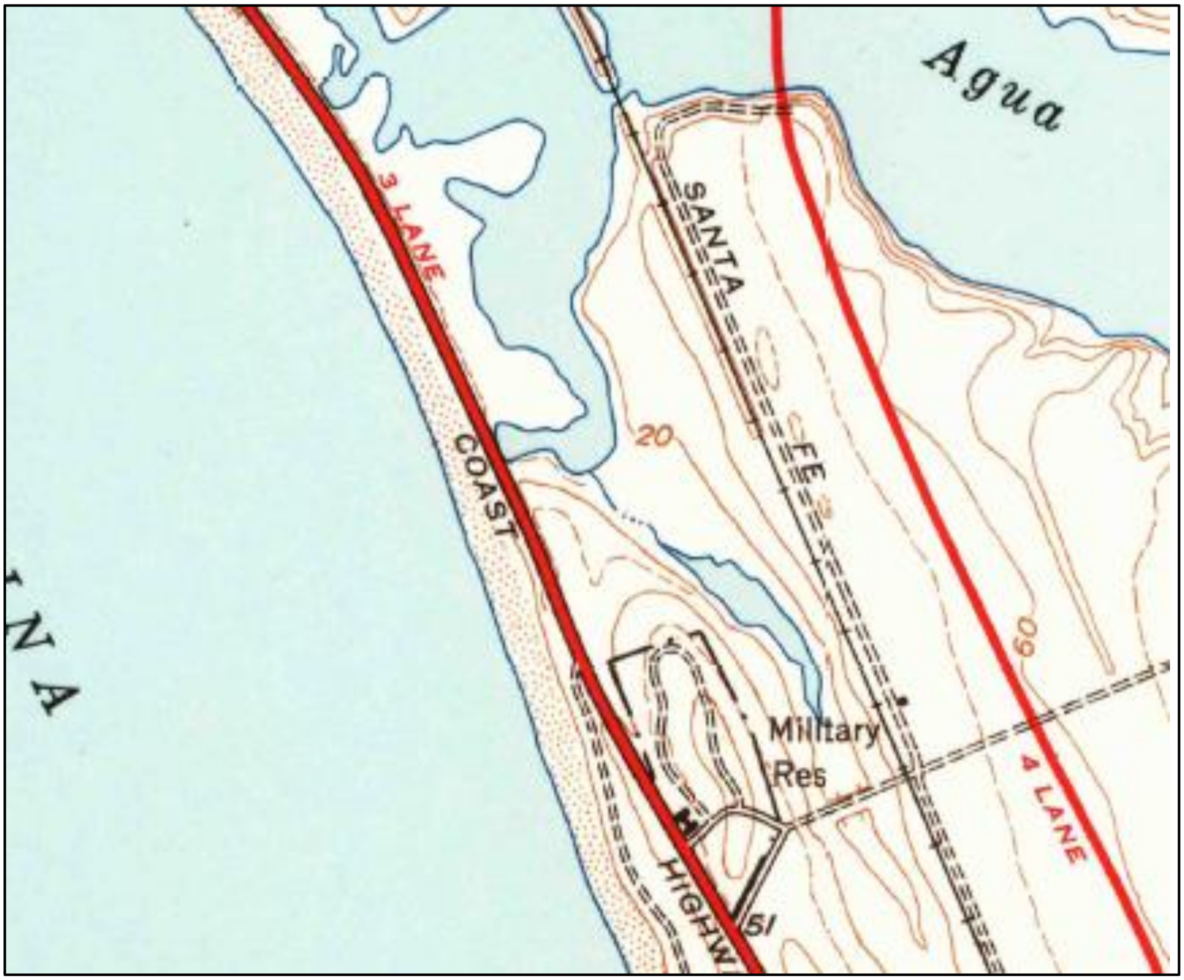

Illustration 1. USGS topographic map from 1948. The site of Encina Power Plant is just north of the area marked "Military Res".

Illustration 2. Construction underway on Unit 1 in May 1953. The buildings to the left of the structure were previously existing and demolished in 1954. (Courtesy of NRG Energy.)

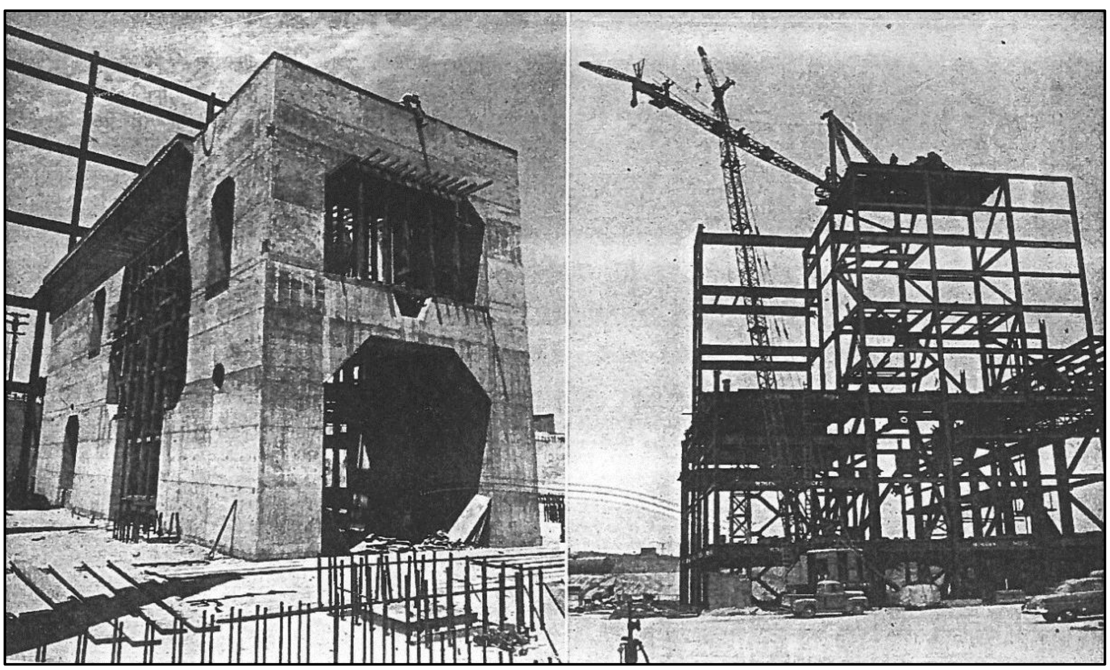

Illustration 3. Unit 1 under construction in September 1953. (*Southwest Builder and Contractor*, September 11, 1953.)

SDG&E chose this site in part because of its proximity to Agua Hedionda Lagoon. Drawing water directly from the ocean was difficult in this area because of heavy storms and shifting sands. The secluded inland lagoon solved this problem, but in its natural state it was small, shallow and only opened to the ocean periodically when high flows in Agua Hedionda Creek pushed through the sand bar at the shore. To make the lagoon a functional intake water reservoir, SDG&E undertook a massive dredging project which required removing 4 million cubic yards of material over an area of 240 acres to a depth of eight feet below sea level. Intake tunnels drew water in from the lagoon at the north end of the plant and a discharge tunnel carried water out to a cooling pond and then under Highway 101 (Carlsbad Boulevard) to the ocean.[21]

SDG&E sold Encina Power Plant in the spring of 1999 to NRG Energy. Today, the plant has five steam turbines and one peaking combustion turbine. It generates 965 megawatts (MW) of electricity, supplying power to about 775,000 residences and businesses in San Diego. NRG is currently developing the Carlsbad Energy Center, the first phase in replacing the existing plant with a cleaner and more efficient generating facility to be located on the 95-acre site. The current project will replace three older generating units with modern, high-efficiency natural gas units that will increase the net output of the facility by 200 MW, enough additional power to supply over 160,000 customers.[22]

[21] "Unusual Cooling Water Supply Problems at San Diego Steam Electric Plant," 12; Spencer, "Cooling Water For Steam Electric Stations in Tidewater," 299.
[22] NRG Energy, "Encina Power Plant," available at http://maps.nrgenergy.com/. Accessed January 2014.

4. DESCRIPTION OF RESOURCES

The Encina Power Station is on a 95-acre parcel with Carlsbad Boulevard and the Pacific Ocean on the west and Agua Hedionda Lagoon on the north and east. The facility consists of a natural gas fired generating plant and associated buildings and structures. The resources on the site generally consist of industrial utilitarian buildings and structures, the oldest of which date to 1954, when the plant was originally built. **Table 1** lists existing buildings and structures on the property with dates of construction and Map Reference (MR) Numbers (See **Site Map** in **Appendix A**). Below is a description of the power plant building, which houses the five generating units at the plant. Please see the DPR 523 form attached in Appendix B for descriptions of all of the buildings and structures at the facility and additional photographs.

Table 1
Currently Existing Buildings and Structures at the Encina Power Plant

Building/Structure	Map Reference (MR) Number*	Date of Construction
Unit 1	11	1954
Equipment Bay	12	1954-1978
Fuel Oil Pump Room Building	10	1954
Warehouse/Maintenance Shop	9	1954/1985
Water Intake	4	1954
Outflow Pond	1	1954
Tank 1	22	1954
Control Room 1	14	1954
Substation 1	16	1954
Security Building	5	1954
Dredge Dock	2	ca. 1954
Tank 2	23	1956
Unit 2	11	1956
Control Room 2	15	ca. 1958
Unit 3	11	1958
Gas Turbine Generator	8	ca. 1970
Fabrication Building	21	ca. 1970
Air Compressor Storage Bldg	20	ca. 1970
Storage Building	3	ca. 1970
Tank 4	24	1972
Tank 5	25	1972
Unit 4	11	1974
Substation 2	17	ca. 1975
Tank 6	26	ca. 1975
Tank 7	27	ca. 1977
Unit 5	11	1978
Exhaust Stack	13	1978
Administration Building	6	1985
Waste Water Tanks	7	ca. 1985
Hazardous Waste Building	19	ca. 1985
Paint Storage Building	18	ca. 1985

*See **Site Map** in Appendix A.

The Power Plant Building houses the five generator units built in phases from 1954 to 1978 (**Photograph 1**). It is a massive building about 140 feet high and 750 feet long with a two-tiered flat roof. Construction of the building started on the north end and proceeded south as additional units were built. The exterior of Units 1, 2 and 3 is poured concrete, while Units 5 and 6 are clad in transite panels – a cement/fiber composite material. On the east side of the building are rows of vents high on the wall and a 400-foot tall poured concrete exhaust stack that towers above the building. In front is a deep, below-grade equipment bay with an overhead traveling crane that houses pumps and other equipment.

Photograph 1. Power Plant Building (MR#11), camera facing northeast, February 5, 2014.

5. FINDINGS AND CONCLUSIONS

5.1. Evaluation Criteria

JRP used the criteria of the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP) to evaluate the historic significance of the Encina Power Plant. The State of California references cultural resources in the California Environmental Quality Act (CEQA—Public Resources Code [PRC] Division 13, Sections 21000-21178); historical resources are specifically treated under Section 21084.1. California PRC 5020.1 through 5024.6 (effective 1992) creates the CRHR and sets forth requirements for protection of historic cultural resources. The criteria for listing properties in the CRHR are in Section 15064.5(a)(2)-(4) of the CEQA Guidelines, which provide the criteria from Section 5024.1 of the California PRC. The CRHR is in the California Code of Regulations Title 14, Chapter 11.5. The CRHR criteria closely parallel those of the NRHP. The eligibility criteria for listing properties in the NRHP are codified in Code of Federal Regulations 36 Part 60 and explained in guidelines published by the Keeper of the National Register.

Eligibility for listing in either the NRHP or CRHR rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm historical significance a property may possess and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it is also ineligible.

Historic significance is judged by applying the NRHP and CRHR criteria. The NRHP criteria are identified as Criteria A through D, the CRHR as Criteria 1 through 4. The NRHP guidelines explain that a historic resource's "quality of significance in American history, architecture, archeology, engineering, and culture" is determined by meeting at least one of the four main criteria. Properties may be significant at the local, state, or national level:

- NRHP Criterion A (CRHR Criterion 1): association with events or trends significant in the broad patterns of our history;
- NRHP Criterion B (CRHR Criterion 2): association with the lives of significant individuals;
- NRHP Criterion C (CRHR Criterion 3): a property that embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or that possesses high artistic values;
- NRHP Criterion D (CRHR Criterion 4): has yielded, or is likely to yield information important to history or prehistory.

In general, NRHP Criterion D (CRHR Criterion 4) is used to evaluate historic sites and archaeological resources. Although buildings and structures can occasionally be recognized for the important information they might yield regarding historic construction or technologies, the properties within the study area for this project are building types that are well documented. Thus, these properties are not principal sources of important information in this regard.

Certain property types are usually excluded from consideration for listing in the NRHP, but can be considered if they meet special requirements in addition to meeting the regular criteria. The following are the seven Criteria Considerations that address properties usually excluded from listing in the NRHP:[23]

- Consideration A: Religious Properties
- Consideration B: Moved Properties
- Consideration C: Birthplaces and Graves
- Consideration D: Cemeteries
- Consideration E: Reconstructed Properties
- Consideration F: Commemorative Properties
- Consideration G: Properties that have Achieved Significance within the Past Fifty Years

Integrity is determined under NRHP guidelines through applying seven factors to the historic resource. Those factors are location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

The CRHR definition of integrity and its special considerations for certain properties are slightly different than those for the NRHP. Integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance." The CRHR further states that eligible resources must "retain enough of their historic character or appearance to be recognizable as historical resources and to

[23] USDI, National Park Service, "How to Apply the National Register Criteria for Evaluation," *National Register Bulletin 15*, 25, 41-43; USDI, National Park Service, "Guidelines for Evaluating and Nominating Properties that have Achieved Significance within the Last Fifty Years," *National Register Bulletin No. 22* (Washington, D.C.: Government Printing Office, 1979, revised 1990 and 1996).

convey the reasons for their significance" and it lists the same seven aspects of integrity used for evaluating properties under the NRHP criteria. The CRHR's special considerations for certain properties types are limited to: 1) moved buildings, structures, or objects; 2) historical resources achieving significance within the past fifty years; and 3) reconstructed buildings.

Under CEQA Guidelines, Section 15064.5 (a), a "historical resource" includes:

- A resource listed in or eligible for the CRHR;
- A resource listed in a local register of historical resources, as defined in section 5020.1(k) of the PRC or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the PRC;
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant, provided the determination is supported by substantial evidence in light of the whole record;
- A resource so determined by a lead agency as defined in PRC sections 5020.1(j) or 5024.1.
- Historical resources listed in, or determined eligible for, the NRHP are automatically listed in the CRHR, Section 5024 (d)(1)(2) of the PRC.

5.2. Previous Evaluation

In 2007, JRP recorded and evaluated the Cannon Substation and Tanks 5, 6, and 7 – built between 1971 and 1977 – on the Encina Power Plant property as well as the former Atchison, Topeka and Santa Fe Railway (built in 1882). At the time, the structures on the power plant property were less than fifty years old and were not recorded on a DPR 523 form. JRP did consider them under NRHP Criteria Consideration G, which allows for properties less than fifty years old to be found eligible for listing in the NRHP if they have "exceptional importance."[24] JRP's 2007 report reached the following conclusion:

> The Cannon Substation and Tanks 5, 6 and 7 are associated with the Encina Power Station. The station was constructed to meet the growing post World War II demand for electricity. All of the major California power companies were building plants at this time. The plants, including Encina, were constructed within a short period of time with standardized plans. None of the plants and their associated tanks and substations can be singled out as significant within the electrical system. As a result, Encina Power Station does not appear significant and the association of the tanks and substation with the station is not sufficient to grant them exceptional significance required for properties under 50 years old.[25]

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[24] NPS, "Guidelines for Evaluating and Nominating Properties that Have Achieved Significance Within the Past Fifty Years," *National Register Bulletin No. 22* (Washington, D.C.: GPO, revised 1996), 41-43; JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007.

[25] JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007, 25.

In addition to the 2007 JRP report on the Encina Power Plant, several other steam power plants in California of similar size and design and built around the same time as Encina have been evaluated under regular NRHP/CRHR Criteria and found to be not eligible. These include El Segundo, Etiwanda (Rancho Cucamonga), Highgrove (Grand Terrace), and South Bay (San Diego). The PG&E Humboldt Bay power plant complex was found eligible for the NRHP, but this finding was driven primarily because of the plant's Unit 3, the nation's first commercial nuclear unit. The Humboldt Bay study did not evaluate the property as a whole or Units 1 and 2 (the two gas/oil-fired units at the facility) individually for significance.[26]

5.3. Evaluation

The current survey and evaluation of the Encina Power Plant finds that it does not meet the criteria for listing in the NRHP or the CRHR, and is not an historical resource for the purposes of CEQA. All buildings or structures in the study area 50 years old and older received evaluation under NRHP and CRHR Criteria. Also, all of the buildings and structures on the facility less than 50 years old received evaluation under NRHP Criteria Consideration G, which allows for properties less than fifty years old to be found eligible if they are determined to have "exceptional importance." Generating Units No. 1, 2, and 3 and their associated buildings and structures were built in 1954, 1956 and 1958, respectively. Generating Units No. 4 and 5 and their associated buildings and structures were added in the 1970s. In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, this facility also has diminished integrity. Therefore, none of the buildings and structures in the project area are significant historic properties under Section 106, nor are they historical resources for the purposes of CEQA.

Applying the NRHP/CRHR criteria, the Encina Power Plant is not significant within the context of the development of electric power generation, steam power plants, or the history of SDG&E (Criterion A/1). At the time of its construction, the plant was one of several being built of similar – often nearly identical – design by SDG&E after World War II to supply the growing post-war demand for electricity in southern California such as Silver Gate Unit 2 (1948), Unit 3 (1950), and Unit 4 (1952), and South Bay Unit 1 (1960), and Unit 2 (1962). In addition to SDG&E, other companies throughout California including PG&E, SCE, and California Electric were also building similar plants at this time to meet energy demands. Among those built by SCE were Redondo Beach (1952), Etiwanda (1953), El Segundo (1955), Alamitos (1956), Huntington Beach (1958) and Mandalay (1958). These plants and associated substations generated the power needed to answer the demands of its customers. While the Encina Power Plant was obviously important

[26] PAR Environmental Services, Inc., "Cultural Resources Study for the PG&E Humboldt Bay Power Plant, ISFSI Licensing Project," August 2003; Will Shapiro, Pacific Legacy, Inc., "Application for Certification for the Humboldt Bay Repowering Project, 2006," DPR 523 Form, PG&E Humboldt Bay Power Plant, April 10, 2006.

to the customers it served, it was one of many such power plants built during this era of tremendous growth that served essentially the same function, and this single plant does not stand out as particularly important within the SDG&E system or electrical generating development in the southern California region or the state as a whole.

Under Criterion C/3, the Encina Power Plant is not significant for its design, construction or architecture. This facility, including Units 1, 2, 3, 4 and 5 contained within the power plant building, was constructed as a combination gas/oil-fired steam generating power plant, a design that was standard and common for the period. In addition, all of the associated structures such as tanks, substations and equipment installed at the plant were also typical for this type of facility. Nothing about the design or construction of the Encina Power Plant was unique, or required groundbreaking or innovative features to surmount engineering or design challenges. Additionally, the buildings on the property are generally common, utilitarian types built of concrete or prefabricated metal. They exhibit priority of function over style and lack architectural distinction. The exception is the original security building, which has a few modest Modern style traits, but lacks sufficient characteristics of this style to be eligible under this criterion.

The Encina Power Plant does not appear to be importantly associated with the life of a historically significant person (Criterion B/2). Finally, this property, and others of its type, is well documented in engineering literature and in company records and construction documents and thus does not appear to be a potential source of information important to history (Criterion D/4).

In addition to lacking historical significance and not meeting the above criteria, the property has undergone alterations that have diminished its integrity of design, materials, workmanship, feeling and association. Originally, Units 1, 2 and 3 each had their own exhaust stacks, but these were removed around 1978 when the single exhaust stack was built. In 1985, the original administration building was demolished and the warehouse/maintenance shop remodeled and an addition built which doubled its size. Four waste water ponds located just west of the current waste water tanks were removed ca. 2000. Tank 3, a waste water treatment facility and diesel storage tanks have all recently been demolished in preparation for a very large desalinization plant under construction at the time of this survey.

This property has been evaluated in accordance with Section 106 of the NHPA and Section 15064.5(a) (2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California PRC, and does not qualify as a historical resource for the purposes of CEQA. A comprehensive evaluation of this property is located in the DPR 523 form in Appendix B.

6. PREPARERS' QUALIFICATIONS

JRP Principal Rand F. Herbert (MAT in History, University of California Davis, 1977), provided project direction and management for the preparation of the report, directed the field work, and edited the report and form. Mr. Herbert has more than 30 years professional experience working as a consulting historian and architectural historian on a wide variety of historical research and cultural resource management projects as a researcher, writer, and project manager. Mr. Herbert qualifies as a historian/architectural historian under United States Secretary of Interior's Professional Standards (as defined in 36 CFR Part 61).

JRP Staff Historian Steven J. Melvin (M.A., Public History, California State University, Sacramento) was the lead historian for this project. Mr. Melvin conducted fieldwork and drafted the updated report and DPR 523 form. Mr. Melvin has more than eight years of professional experience in conducting inventory and evaluation studies, and qualifies as an architectural historian and historian under the Secretary of the Interior's Professional Qualification Standards (as defined in 36 CFR Part 61).

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APPENDIX A

Maps

Figure 1. Project Vicinity

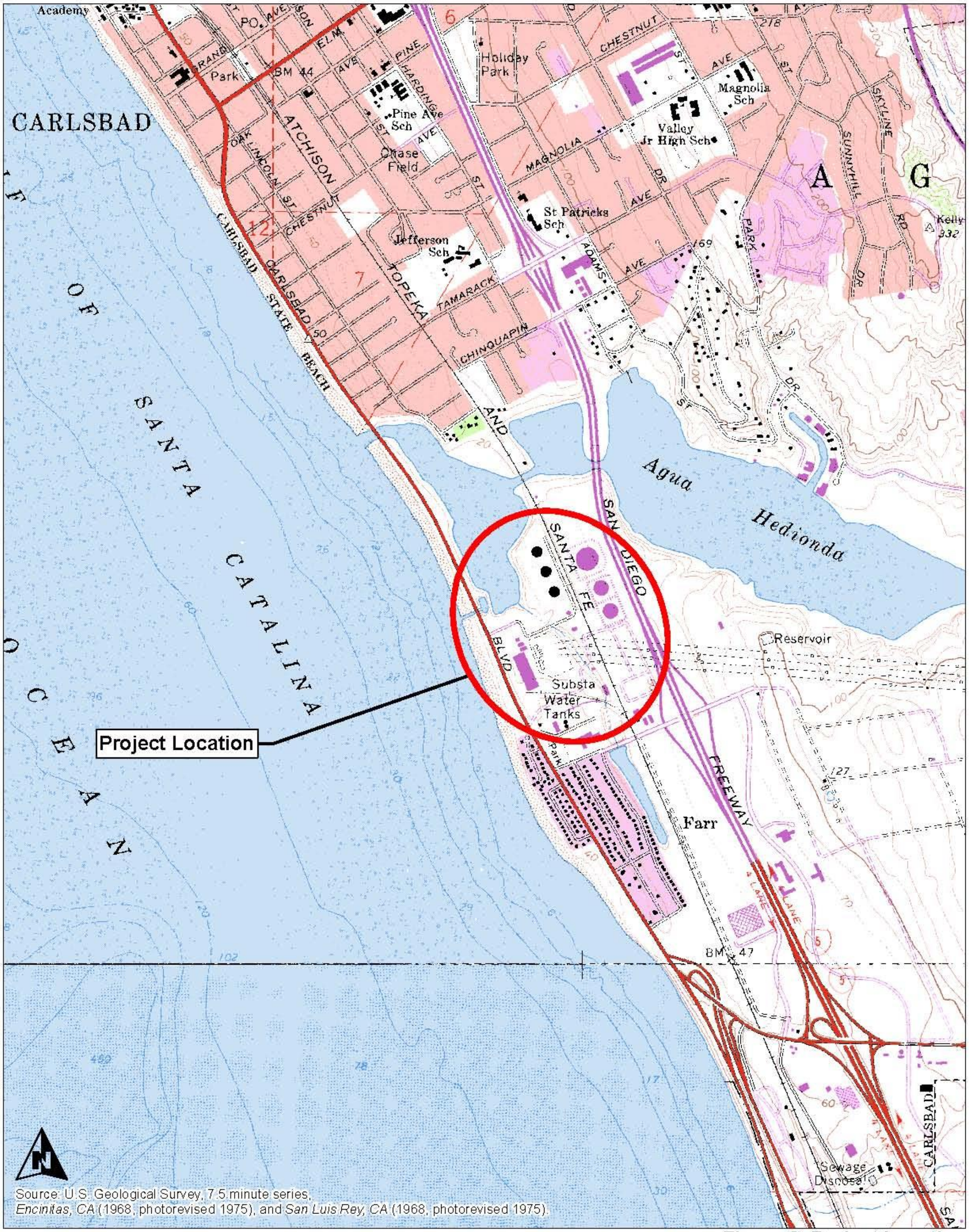


Figure 2. Project Location

Figure 3. Study Area

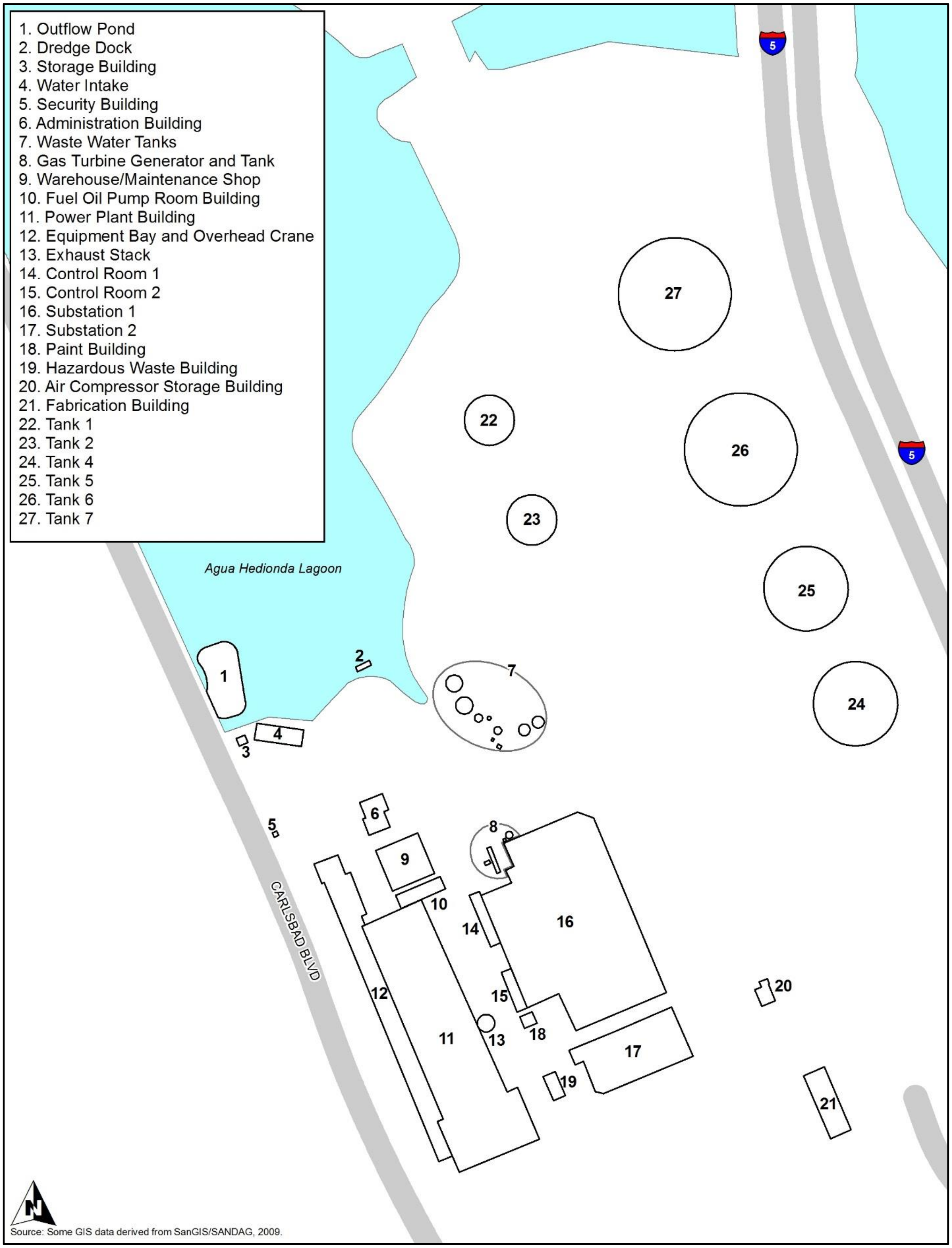


Figure 4. Site Map

APPENDIX B

DPR 523 Form

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code 6Z
Other Listings ______
Review Code ______ Reviewer ______ Date ______

 ***Resource Name or #** (Assigned by recorder): Encina Power Plant

P1. Other Identifier: Carlsbad Energy Center

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** San Diego
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** San Luis Rey **Date:** 1997 **T:**11S; **R:** 4W; **Sec:** _; S.B.B.M.
c. Address: 4600 Carlsbad Blvd City: Carlsbad Zip: 92008
d. UTM: (give more than one for large and/or linear resources) Zone: _____; ______mE/ ______mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
APN: 2100104600

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Encina Power Plant is on a 95-acre parcel on the Pacific Ocean roughly bounded Carlsbad Boulevard, Agua Hedionda Lagoon, and I-5. It is a natural gas fired generating station consisting of five boiler units contained within a single building built in phases from 1954 to 1978 (**Photograph 1**) and their associated buildings and structures. **Table 1** on Page 4 lists the buildings and structures with their dates of construction and Map Reference (MR) Numbers and a **Site Map** is located on Page 26. The Power Plant Building is a massive building about 140 feet high and 750 feet long with a two-tiered flat roof. Construction of the building started on the north end and proceeded south as additional units were built. The exterior of Units 1, 2 and 3 is poured concrete, while Units 5 and 6 are clad in transite panels – a cement/fiber composite material. On the east side of the building are rows of vents high on the wall and a 400-foot tall poured concrete exhaust stack that towers above the building (**Photograph 2**). (See Continuation Sheet.)

***P3b. Resource Attributes:** (List attributes and codes) HP9—Public Utility

***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession#) **Photograph 1.** Power Plant Building (MR#11), camera facing northeast, February 5, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1954 (*Los Angeles Times*)

***P7. Owner and Address:**
NRG Energy
5790 Fleet Street, #200
Carlsbad, CA
92008

***P8. Recorded by:** (Name, affiliation, address)
Steven J. Melvin
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded:** February 5, 2014

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** JRP Historical Consulting, LLC, "Historical Resources Inventory and Evaluation Update Report, Carlsbad Energy Center Project, Encina Power Plant, Petition to Amend (07-AFC-6), Carlsbad, CA," February 2014.

***Attachments:** ☐ None ☐ Location Map ☒ Site Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
BUILDING, STRUCTURE, AND OBJECT RECORD

Primary # ______
HRI # ______

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder): Encina Power Plant

B1. Historic Name: Carlsbad Energy Center
B2. Common Name: Encina Power Plant; Carlsbad Energy Center
B3. Original Use: electrical power generation B4. Present Use: electrical power generation
***B5. Architectural Style:** utilitarian
***B6. Construction History:** (Construction date, alteration, and date of alterations) See **Table 1** below for dates of construction; alterations include construction of new exhaust stack ca. 1978; original administration building was demolished and the warehouse/maintenance shop remodeled and an addition built 1985; four waste water ponds removed ca. 2000; Tank 3, wastewater treatment facility and diesel storage tanks demolished 2013

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** ______ **Original Location:** ______
***B8. Related Features:** ______
B9. Architect: SDG&E b. Builder: SDG&E
***B10. Significance: Theme:** n/a **Area:** n/a
Period of Significance: n/a **Property Type:** n/a **Applicable Criteria:** n/a
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Encina Power Plant does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), nor does it appear to be an historical resource for the purposes of CEQA. This property has been evaluated in accordance with Section 106 of the NHPA and Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code.

(See Continuation Sheet.)

B11. Additional Resource Attributes: (List attributes and codes) ______

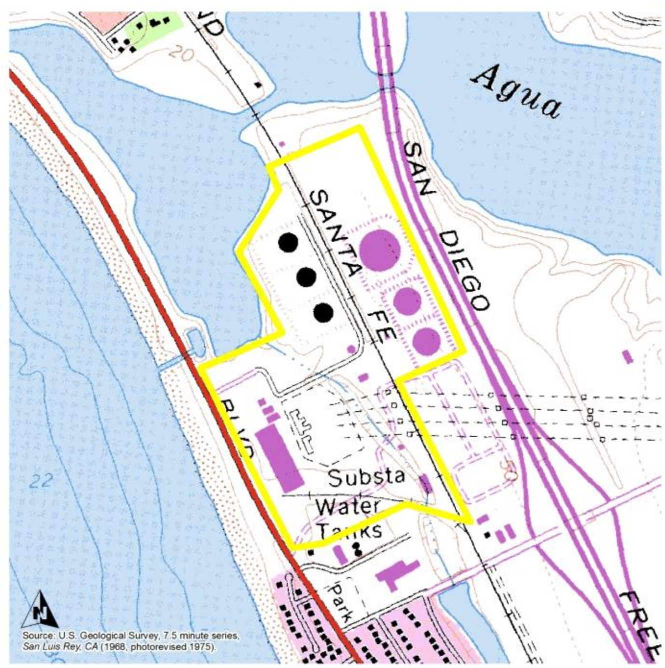
***B12. References:** Meyers, *Iron Men and Copper Wires*; Spencer, "Cooling Water For Steam Electric Stations in Tidewater"; Williams, *Energy and the Making of Modern California*; San Diego Gas & Electric Company, *San Diego Gas & Electric Company: A Review of its Origin, Growth and Corporate* History; See also footnotes.

B13. Remarks:

***B14. Evaluator:** Steven J. Melvin

***Date of Evaluation:** February 2014

(This space reserved for official comments.)



P3a. Description (continued):

In front is a deep, below-grade equipment bay with an overhead traveling crane that houses pumps and other equipment (**Photograph 3**). This below-grade bay extends around the south side and is crossed by two steel vehicle bridges leading to roll-up overhead doors accessing the building (**Photograph 4**). Throughout the building are numerous metal personnel doors and metal roll-up doors.

The Fuel Oil Pump Room Building is a single-story building with a two-story element in the center and a flat roof (**Photograph 4**). It is made of poured concrete and has metal pipe railing around the perimeter of the roof. The building has several metal personnel doors, and two metal roll-up doors. On the second story are several horizontal sliding sash windows and on the west side are two large, tall, steel equipment doors. The Warehouse/Maintenance Shop is just to the north. It is a single story building with a flat roof (**Photograph 6**). The exterior is clad in stucco and has two raised bands running below the roofline. Fenestration consists of metal personnel doors, metal roll-up doors and sets of fixed/horizontal sliding sash windows. To the north of this building, and similar in style, is the Administration Building (**Photograph 7**). It is also clad in stucco with two raised bands running just above the windows, which are horizontal sliding sash with sets of small fixed pane above. There are several metal personnel doors with single windows throughout the building.

Control Room 1 and Control Room 2 are identical single-story poured concrete buildings next to Substation 1 (**Photographs 8** and **9**). They each have several metal personnel doors and exhaust vents. Both of these buildings lack windows. Substation 1 and Substation 2 are large rectangular lots defined by chain link fence (**Photographs 10** and **11)**. They contain electrical transmission equipment such as transformers, switches and circuit breakers and metal support structures.

The Water Intake is on the bank of Agua Hedionda Lagoon. It is a concrete structure with four rectangular openings and wingwalls (**Photographs 12**). Above the intake is a large traveling crane used to lift and lower metal gates. Near the intake is the outflow pond. This small pond holds the plant's discharged water before it flows into the sea. The pond is lined with rip-rap and two rectangular concrete tunnels carry the water under Carlsbad Boulevard (**Photographs 13**).

Tanks 1, 2, 4, 5, 6, 7 are all nearly identical large, cylindrical metal tanks set in deep, excavated depressions (**Photographs 14** and **15**). Steel bands wrap around the walls of the structures to provide support. Running along the rims are metal catwalks supported by brackets and accessed by metal staircases attached to the exterior walls. The Waste Water Tanks are a set of five welded steel tanks of varying sizes (**Photographs 16**). They also have metal catwalks along the rims supported by metal brackets and metal staircases. The Dredge Dock has a wood and concrete deck supported by a combination of wood, steel and concrete piles (**Photographs 17**). A simple pipe railing runs around the edge of the deck.

The Security Building is a very small building at the main gate of the complex. It has a flat roof with a very wide overhang. The exterior is rough-hewn brick and a band of tall, fixed pane windows wraps around the front. On the side of the building is the single personnel door made of wood with a large fixed pane window (**Photograph 18**). The Gas Turbine Generator is a rectangular object roughly the size of a train engine (**Photograph 19**). It has metal sides, several vents on the sides, an exhaust duct, a catwalk on one side, and a single personnel door on the end.

At the southeast corner of the parcel are the Fabrication Building and the Air Compressor Storage Building (**Photographs 20** and **21**). These two buildings have metal frames clad in raised-ridge metal sheets with low-pitched gable roofs. Openings consist of top-hung sliding doors, roll-up doors and metal personnel doors. The Fabrication Building has a few horizontal sliding sash windows on the west side. It also appears that the south side of the Air Compressor Storage Building was originally open and has been covered with corrugated metal. On the north end of this building, an open-sided, corrugated metal shed roof supported by wood posts shelters a sliding door. Another small storage building is near the water intake. It has a gently sloping corrugated metal shed roof and is clad in vertical groove wood panels (**Photograph 22**). The façade has a top-hung sliding door and a metal personnel door with a half window. **Photograph 23** shows the Hazardous Waste Building. This building is open on two sides with concrete masonry unit walls on the two other sides. The gable roof is supported by steel posts and beams and covered by raised ridge metal sheets. Nearby is the Paint Storage Building (**Photograph 23**). It is a raised ridge metal building with a gable roof. The west side is partially open-sided and also has a set of metal double doors. Two more metal personnel doors on the east side are sheltered by a shed roof. The only windows are two horizontal sliding sash on the south side.

Table 1

Currently Existing Buildings and Structures at the Encina Power Plant

Building/Structure	Map Reference (MR) Number*	Date of Construction
Unit 1	11	1954
Equipment Bay	12	1954-1978
Fuel Oil Pump Room Building	10	1954
Warehouse/Maintenance Shop	9	1954/1985
Water Intake	4	1954
Outflow Pond	1	1954
Tank 1	22	1954
Control Room 1	14	1954
Substation 1	16	1954
Security Building	5	1954
Dredge Dock	2	ca. 1954
Tank 2	23	1956
Unit 2	11	1956
Control Room 2	15	ca. 1958
Unit 3	11	1958
Gas Turbine Generator	8	ca. 1970
Fabrication Building	21	ca. 1970
Air Compressor Storage Building	20	ca. 1970
Storage Building	3	ca. 1970
Tank 4	24	1972
Tank 5	25	1972
Unit 4	11	1974
Substation 2	17	ca. 1975
Tank 6	26	ca. 1975
Tank 7	27	ca. 1977
Unit 5	11	1978
Exhaust Stack	13	1978
Administration Building	6	1985
Waste Water Tanks	7	ca. 1985
Hazardous Waste Building	19	ca. 1985
Paint Storage Building	18	ca. 1985

*See **Site Map** on Page 26.

B10. Significance (continued):

Historic Context[1]

The Encina Power Plant is located along the Pacific Ocean in Carlsbad, California adjacent to Agua Hedionda Lagoon. It was built as a natural gas/oil fired electricity generating station by San Diego Gas & Electric (SDG&E) and the five generating units were built in stages from 1954 to 1978. This historic background provides the basis for evaluating the historic significance of the facility within the context of the history of SDG&E, and natural gas/oil fired power generation in California. The section also includes a brief summary of the history of the Encina Power Plant.

Twentieth Century Power Generation in California

Throughout the early twentieth century hydro-generated power prevailed over steam as companies built larger hydroelectric plants on the many suitable sites throughout the state. By 1920, hydroelectric power accounted for 69 percent of all electrical power generated in California. In 1930, that figure had risen to 76 percent, and to 89 percent in 1940.[2] These statistics, however, tend to obscure the attempts by both Pacific Gas & Electric Company (PG&E) and Southern California Edison (SCE), California's largest electrical utility providers, to build large-scale steam generation plants as early as the 1920s. James Williams, a historian of energy policies and practices in California, noted that the decision by PG&E and SCE to build steam plants may be attributed to several converging trends in the mid- to late-1920s. First, a persistent drought in California caused the major utilities to begin to question the reliability of systems relying so heavily upon hydroelectricity. This drought began in 1924 and continued, on and off, for a decade. At about the same time, new power plants on the East Coast (where steam had always played a more important role than in California) achieved far greater efficiencies than had previously been possible. Between 1900 and 1930, for example, the fuel efficiency of steam plants, measured in kilowatts per barrel of oil, increased more than nine-fold. In addition, new natural gas lines were completed which could bring new supplies to both Northern and Southern California in the late 1920s, tapping large reserves in the San Joaquin Valley. The availability of natural gas made it a viable option for steam generating plants.[3]

The confluence of these various factors – a drought, improved technologies, and new supplies of natural gas – induced PG&E, SCE, and other utilities to begin construction of large steam plants during the late 1920s and early 1930s. In 1929, the Great Western Power Company (which would be absorbed by PG&E in 1930) built a large steam plant on San Francisco Bay, near the Hunters Point shipyard, fitted with two 55 MW generators. PG&E built a steam plant in Oakland in 1928, called Station C. SCE had an even longer history of steam generation, having operated its large facility at Long Beach on Terminal Island throughout most of the 20th century. By World War II, the Long Beach plant was massive, with eleven units on line that were constructed in stages beginning in 1911. In Southern California, the Los Angeles Department of Water and Power (LADWP) constructed a steam station at Seal Beach consisting of two units installed in 1925 and 1928. These steam plants proved to be both profitable and reliable for the various utilities. In 1930, a PG&E vice-president for engineering wrote: "Under the circumstances which now prevail, it is natural to question the future of hydro in California."[4] This forecast proved prescient as steam generating plants accounted for most of the new power capacity in the state after 1941. Technology and

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[1] This text draws from several JRP reports related to electrical generating facilities, including: JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007; "Historic Evaluation of the El Segundo Generating Station, El Segundo, Los Angeles County, California," October 2000; "Historic Resources Inventory and Evaluation Report for the Proposed Etiwanda Expansion Project." 2007; Highgrove Generating Station DPR 523 Form, 2006; South Bay Power Plant DPR 523 Form, 2006.

[2] James C. Williams, *Energy and the Making of Modern California* (Akron, Ohio: University of Akron Press, 1997), 374.

[3] Williams, *Energy and the Making of Modern California*, 278.

[4] "1928 Steam Plants Account for 45 Percent of New Generating Capacity," *Electrical West* (February 2, 1929): 80-81; R.W. Spencer, "Cooling Water For Steam Electric Stations in Tidewater," *Transactions of the American Society of Civil Engineers* 126 (1961): 294, 300; Williams, *Energy and the Making of Modern California*, 279.

improvements for steam turbine power plants continued to advance, leading power companies to retire or replace many of the older steam-electric plant generating units with more efficient units in the 1950s and 1960s.[5]

Coinciding with the advancements in power generating technology was an increase in demand for electricity in Southern California. After World War II the population swelled and industry, particularly the defense industry, expanded throughout the region, contributing to an increased demand from residential and commercial customers. The need to generate power was imperative and PG&E, SCE, LADWP, and SDG&E expanded their systems along with the rest of California's energy industry. Since most of the more favorable hydroelectric sites in California had already been developed, and the cost of steam generating facilities had been reduced by technological developments in design and abundant natural gas resources, steam plants became the more favorable option. Steam turbine power plants were cheaper and quicker to build than hydroelectric plants, and utilities companies moved away from hydroelectricity, establishing steam turbines as the generator of choice. The efficiency of steam plants also kept costs down for the consumer. California energy historian James Williams observed, "The momentum for steam had been established by war, by drought, and by a positive history of increased thermal power plant development."[6]

Dozens of new steam generation plants were built throughout California, chiefly by PG&E and SCE, although LADWP and SDG&E built a few as well. The plants relied upon proven technologies and were assembled quickly and inexpensively, relative to earlier plants. In a detailed article in 1950 in *Civil Engineering*, PG&E Chief Engineer I. C. Steele summarized the design criteria that went into construction of four major steam plants the company had under construction at that time, at Moss Landing, Contra Costa, Kern, and Hunters Point in San Francisco. These plants had much in common with each other, he argued, and with other steam plants under construction in the state. The criteria were the same in all cases: to build the facility close to load centers to reduce transmission costs; to be close to fuel supplies; to be near a water supply; and to be on a site where land was cheap and could support a good foundation. In another article in *Transactions of the ASCE,* Walter Dickey, an engineer from Bechtel, detailed the economics of steam plant design from this era. Virtually all of these plants were designed to be expanded if market conditions warranted and most of them were. These plants, he argued, could be built economically by minimizing the structural material, including not enclosing the turbo-generator units in a building. Many plants in Southern California are of this "outdoor" variety, but some, such as the Encina Power Plant, were enclosed in curtain walls.[7]

The decades between 1950 and 1970 were the years of peak expansion of steam generating capacity for both SCE and PG&E, as well as for smaller utility companies. During this period, SCE built a series of very similar steam plants in the Los Angeles Basin and in San Bernardino County. In 1952, the company began work on Redondo No. 2, which was adjacent to an earlier plant at Redondo Beach. In 1953, the Etiwanda plant went online, followed in 1955 by El Segundo, Alamitos in 1956, and Huntington Beach and Mandalay in 1958. By 1960, all SCE plants either had multiple units or had additional units in the planning stages. In 1950 PG&E operated 15 steam electric plants in California, and during the following decade added several new plants and expanded older ones. Chief among these were the Kern plant (1948-50), Contra Costa (1951-53), Moss Landing (1950-52), Morro Bay (1955), Hunters Point (addition 1958), Humboldt Bay (1956-58), and Pittsburg (1959-60). The Pittsburg plant was at the time of its construction the largest steam station in the west, with a capacity of over 1,300,000 kW in 1960. The LADWP system was much smaller than those of SCE and PG&E, consisting of five steam plants by 1962. In addition to its Seal Beach Plant (1925-28) and Harbor Plant on Los Angeles Harbor (1943), these included the Valley Plant (San Fernando Valley, 1954), Scattergood (1958), and Haynes (1961). SDG&E had three steam-electric power plants, Silver Gate (1943), Encina (1954), and South Bay (1960). By the late 1970s, there were more than 20 fossil fuel thermal plants in

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[5] Heinz Termuehlen, *100 Years of Power Plant Development: Focus on Steam and Gas Turbines as Prime Movers.* New York: ASME Press, 2001, 21-28; Williams, *Energy and the Making of Modern California*, 374.
[6] Myers, *Iron Men and Copper Wires*, 200; Williams, *Energy and the Making of Modern California*, 277-78, 282-83.
[7] I. C. Steele, "Steam Power Gains on Hydro in California," *Civil Engineering* (January 1950): 17-21; Edgar J. Garbarini, "Design Saves Construction Dollars on Contra Costa Power Plant," *Civil Engineering* (May 1953): 31-33; Walter L. Dickey, "The Design of Two Steam Electric Plants," *ASCE Transactions* (1956): 253-273.

California, clustered around San Francisco Bay, Santa Monica Bay, and in San Diego County, along with a few interior plants in San Bernardino County and Riverside and Imperial Counties, as well as a few plants on the Central Coast. [8]

Most of the oil- or gas-fired steam plants currently in use in California were built in the period from about 1950 through 1970 and all of these used virtually the same technology and design.[9] After 1970, the major utilities began to look for alternative energy sources, ranging from nuclear power to wind, geothermal, and other "green" energy sources, other than hydroelectric. Despite these efforts, however, fossil fuel steam generation remains the backbone of electrical generating capacity in California. Information from the California Energy Commission (CEC) states that there are currently 34 steam turbine power plants in California of a variety of ages and locations.[10]

History of the San Diego Gas & Electric Company

The history of the SDG&E Company mirrors the general history of steam-electric power plant development outlined previously, with most of the company's growth occurring during the 1940s, 1950s and 1960s. A group from San Diego founded the company on April 18, 1881 as the San Diego Gas Company to serve the small city of about 3,000 people. With 89 charter subscribers located along its three miles of gas mains, the company began manufacturing gas from crude oil at its plant on June 2, 1881, and started service two days later. The plant had a capacity of 25,000 cubic feet of gas per day, an amount considered sufficient to supply a population of 20,000.[11]

The completion of the California Southern Railroad from San Diego to Barstow in 1885 to connect with the Atchison Topeka and Santa Fe's line caused a land boom in San Diego as the population climbed to approximately 35,000. In 1887, the San Diego Gas Company consolidated with the Coronado Gas and Electric Company into the San Diego Gas and Electric Light Company. The new company enlarged its gas plant and built its first electric generating plant (later named Station A) on the adjacent property. The capacity of the gas plant had been increased to 400,000 cubic feet per day, sufficient for a population of 100,000, and the new steam electric generating plant supplied 770 kW of power through four steam driven generators. During the 1890s, however, population growth slowed and the company's customer base grew modestly, but steadily.

In April 1905 the company was sold to H.M. Byllesby & Company of Chicago and reincorporated as the San Diego Consolidated Gas & Electric Company (SDCG&E). At this point, the company was serving 2,168 gas and 1,258 electric customers. The new owners began replacing the old equipment at Station A in 1906, when its first steam turbine generator with a capacity of 500 kW was installed. Other improvements followed, including the addition of a 2,000 kW turbogenerator in 1909, followed by 4,000 kW turbogenerators in 1912 and 1914. The company also made improvements at its gas plant, including switching from coal back to oil in 1906, following advances in oil production that made it more economically viable. By 1920, six new gas generators were online and the plant had a capacity of approximately 6,250,000 cubic feet per day. Construction during this period also included extending the gas and electric distribution systems beyond the San Diego city

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[8] Spencer, "Cooling Water For Steam Electric Stations in Tidewater," 280-302; Steele, "Steam Power Gains on Hydro in California," 17-19; Dickey, "The Design of Two Steam Electric Plants," 253-255; "Haynes Steam Plant Will Grow With Demand," *Southwest Builder and Contractor* (October 12, 1962): 24-27; Williams, *Energy and the Making of Modern California*, 257; Annual Reports of the Southern California Edison Company, various years.

[9] Termuehlen, *100 Years of Power Plant Development*, 21-28.

[10] The California Energy Commission retains figures on the fuel type for all electricity used in the state, even if the power is generated out of state. In 1999, natural gas-fired generators were responsible for 31% of all electricity used in the state, compared with 20% for hydroelectricity. Coal-fired steam plants, all of them out of state, accounted for 20% of the total. "Green" sources accounted for 12%. The percentage of in-state natural gas-fired steam electricity is much larger than 31%, since all of the coal and much of the hydroelectric power is generated out of state. See http://energyalmanac.ca.gov/electricity/index.html.

[11] Except where otherwise noted, the following history of the San Diego Gas & electric Company was taken from the following sources: San Diego Gas & Electric Company, *San Diego Gas & Electric Company: A Review of its Origin, Growth and Corporate History From 1881 to 1962* (San Diego: San Diego Gas & Electric Company, 1962); and Iris Engstrand and Kathleen Crawford, *Reflections: A History of the San Diego Gas & Electric Company 1881-1991* (San Diego: San Diego Historical Society and the San Diego Gas & Electric Company, 1991).

limits to the surrounding communities, including National City, La Jolla, Chula Vista, La Mesa, Imperial Beach, and San Ysidro.

In 1918, the company further extended its system with the construction of its first high voltage transmission line, a 66 kV line extending 75 miles north from San Diego to Del Mar, Oceanside, and San Juan Capistrano where it tied into the transmission system of SCE. This interconnection gave the smaller SDCG&E access to the SCE hydroelectric generated power to supplement the capacity of its own steam generating plant in times of need. However, the first transfer between the two companies occurred the following year when severe drought resulted in SDCG&E sending its surplus power north into the SCE system. Today, the SCE-SDG&E interconnection provides for the exchange of 100,000 kW and functions as the company's main tie with other members of the statewide energy pool.

By 1920, the company was serving 115,000 electric customers and its energy needs had outgrown Station A. SDCG&E purchased the 8,200 kW San Diego Electric Railroad power plant in 1921 and renamed it Station B. Further improvements at Station B consisted of installing a 15,000 kW generator, which surpassed the entire generating capacity of Station A, followed by a second 15,000 kW generator in 1927, and a 28,000 kW generator in 1928. These additions increased the capacity of the system from 46,000 kV to 74,000 kV. The company also began upgrading its transmission lines from 11 kV to 66 kV. By 1930, SDCG&E served over 70,000 customers.

SDCG&E continued to thrive in the 1930s with further improvements to its system and customer growth. In 1932, SDCG&E changed over from manufactured gas to natural gas, which increased the capacity of its gas system to 22 million cubic feet per day. While natural gas was found to be 50 percent more efficient than manufactured gas, gas sales increased by 110 percent during the 1930s. The San Diego area received renewed economic stimulus in 1938-39, with pre-World War II defense expansion leading to a revival in employment at aircraft manufacturing plants and increased activity at the area's naval installations. In 1939, the company installed a new 35,000 kW generator at Station B, increasing its total capacity to 99,000 kV, and took Station A offline. Station B carried the entire load of the company's service area until 1943 when another interconnection was made so that the SDCG&E could purchase surplus power from other systems, and the company brought a new power plant online.[12]

The World War II years were a period of tremendous growth for the San Diego metropolitan area and for SDCG&E. Between 1940 and 1945 the population of the area increased 90 percent, to 550,000, and SDCG&E added over 17,000 gas and 21,000 electric customers. Peak loads exceeded the company's generating capacity, forcing it to rely heavily on purchased power. In 1941 the Standard Gas & Electric Company, which had a few years earlier succeeded H.M. Byllesby & Company as owner of SDCG&E, decided to divest itself of the company's stock and SDCG&E became an independent organization, renamed the San Diego Gas & Electric Company (SDG&E). SDG&E constructed a new power plant at Silver Gate on San Diego Bay in 1941, with the first 35,000 kW generator online by 1943. Despite this additional plant, the company still had to purchase outside power to meet its peak load demands.

Growth continued at an extremely rapid rate after World War II and SDG&E continued to add generating capacity. Silver Gate Unit 2 came online in 1948, adding 50,000 kW to the system, but the company was still unable to meet customer demand having added over 37,000 new electric and 21,000 new gas customers by 1950. Growth continued to be dramatic, with 8,350 new customers in the first three months of 1951. During this decade, San Diego's population passed the one million mark, and the company invested over $190 million in construction of new power plants. SDG&E planned to build a new steam-electric generating unit every two years to meet continually increasing demand and started with Silver Gate Unit 3 in 1950, followed by Silver Gate Unit 4 in 1952, both 66,000 kW units. Following construction of the fourth unit, the Silver Gate site was at capacity and the SDG&E looked north to Carlsbad for its next project, the Encina Power Plant. The first 106,000 kW unit at Encina went on line in 1954, followed by two more in 1956 and 1958, respectively (see below section for a history of the Encina Power Plant). Though the company tripled its generating capacity during the 1950s to 672,000 kW, demand had doubled to just over 600,000 kW. In order to keep ahead of demand, SDG&E continued its expansion program by breaking ground at its South Bay Power Plant (South Bay) in Chula Vista in 1958. South Bay Unit 1 went online in 1960 and Unit 2 in

[12] The subsequent history of Station B is not detailed in the historic record. It was taken offline at an unknown date.

1962, each adding 142,000 kW to the system. A third South Bay unit came online in 1964, pushing the total capacity of the SDG&E system to 1,166,000 kW. Several years then passed until South Bay Unit 4 was added in 1971.[13]

During the 1960s, the decade of the company's most explosive growth, SDG&E initiated a four-part long-term plan designed to meet ever-increasing energy demands. In 1961, the company entered into agreement with SCE to finance and operate a nuclear-fueled steam-electric generating plant at San Onofre. The San Onofre Nuclear Generating Station was completed in 1965. Designed by Bechtel Corporation and Westinghouse, the plant was larger than other such plants constructed by the federal government and private utilities during the previous decade. In another innovative turn, the company also completed the first liquefied natural gas (LNG) plant at South Bay for converting natural gas to liquid in 1964-65. This project was the first of its kind in the west, and one of only five worldwide. The company's plan also included becoming a member of the California Power Pool and participating in the Pacific Northwest Intertie, a combination of public and private transmission lines that linked surplus hydro resources of the Pacific Northwest with the power systems in Oregon, California, Arizona, and Nevada. Also in 1965, the federal Department of the Interior built the west coast module of a nationwide seawater conversion program at South Bay. It was the extension of research and experimental projects between SDG&E and General Atomic Division of General Dynamics Corporation to obtain an economical seawater conversion platform. The seawater conversion plant, along with the LNG facility, was removed from South Bay during the mid-1970s.[14]

The 1970s were a period of slow growth and reduced investment in improvements for SDG&E. During the decade, declining demand led SDG&E to delay plans for expansion, including putting plans for three more units at South Bay on hold. The company served 500,000 electric customers in 1972, and its facilities produced enough electricity to meet demand. Later in the 1970s, SDG&E developed geothermal sites in the Imperial Valley and built additions to the San Onofre nuclear plant, where the company owned a 20 percent interest in three generating units. SDG&E also expended large sums on environmental control programs to reduce nitrogen and sulfur emissions from its plants, and on converting much of its overhead electrical distribution system to an underground system. By the end of the decade, SDG&E served approximately 2.5 million customers in a service area that encompassed over 4,000 square miles of San Diego County and the western section of Orange County, with power supplied primarily from plants at Encina, South Bay, and San Onofre. In 1988 SDG&E merged with Southern California Edison, and is now a part of Sempra Energy.[15]

The Encina Power Plant

SDG&E announced plans to build the Encina Power Plant in April 1951 on a 110-acre site near the mouth of Agua Hedionda Lagoon, west of the Atchison, Topeka and Santa Fe Railroad and east of what was then Highway 101 (currently Carlsbad Boulevard; **Illustration 1**). The company built the plant in stages with the first 106,000 kW unit coming on line in October 1954, with power from the plant primarily serving northern San Diego County. Similar to other plants built at this time in California, it used a combination gas/oil powered generator and seawater to cool the condensers. The plant construction department of SDG&E served as general contractor for the plant. The first unit required 2,500 tons of structural steel and 1,000 cubic yards of concrete for the turbine and generator foundation (**Illustration 2** and **Illustration 3**). After completion of the framework, the first unit was equipped with a generator by General Electric, a boiler by Babcock and Wilcox, and other standard equipment. As the first unit began operation, ground had already been broken for the second unit, completed in 1956, followed by a third in 1958. The first unit was estimated to cost about $20 million and the entire project about $60 million. In addition to the power generators, other major elements of the complex built during the 1950s construction phase included

[13] *San Diego Union*, 6 June 1948, 1; *San Diego Union*, 16 February 1958, 24; *San Diego Union*, 18 October 1958, 13; *San Diego Union,* 11 October 1959; *San Diego Union,* 15 November 1959; *San Diego Union*, 1 May 1960; *San Diego Union*, 22 June 1962; "New Generator Ordered for Carlsbad Plant," *Los Angeles Times*, 26 April 1951, 23.
[14] "Deep Hole Being Dug For Atomic Plant" *Southwest Builder and Contractor* (August 14, 1964): 14-16; *San Diego Union,* 17 September 1964; *San Diego Union,* 24 January 1965; *San Diego Union,* 28 September 1966; *San Diego Union*, 18 February 1967; *San Diego Union*, 30 May 1968; *San Diego Union*, 30 July 1970; *San Diego Union*, 9 May 1971; Personal Communication with Jim Nylander, South Bay Power Plant Manager, February 14, 2006.
[15] *San Diego Union*, 15 May 1970; *San Diego Union,* 11 January 1972; *San Diego Union*, 15 February 1972; *San Diego Union*, 9 January 1973; *San Diego Union*, 16 March 1974; *San Diego Union*, 3 January 1975; *San Diego Union* 17 October 1975; *San Diego Union* 4 April 1988; *San Diego Union*, 2 December 1988; *San Diego Union*, 21 April 1989.

Tanks 1, 2 and 3; Fuel Oil Pump Room Building; Warehouse/Maintenance Shop; Water Intake; and Substation 1. During the 1970s, SDG&E undertook another major construction phase that included Units 4 and 5; Tanks 4, 5, 6, and 7; Substation 2, and several storage buildings (See Table 1 in Section 4, and Site Plan in Appendix A).[16]

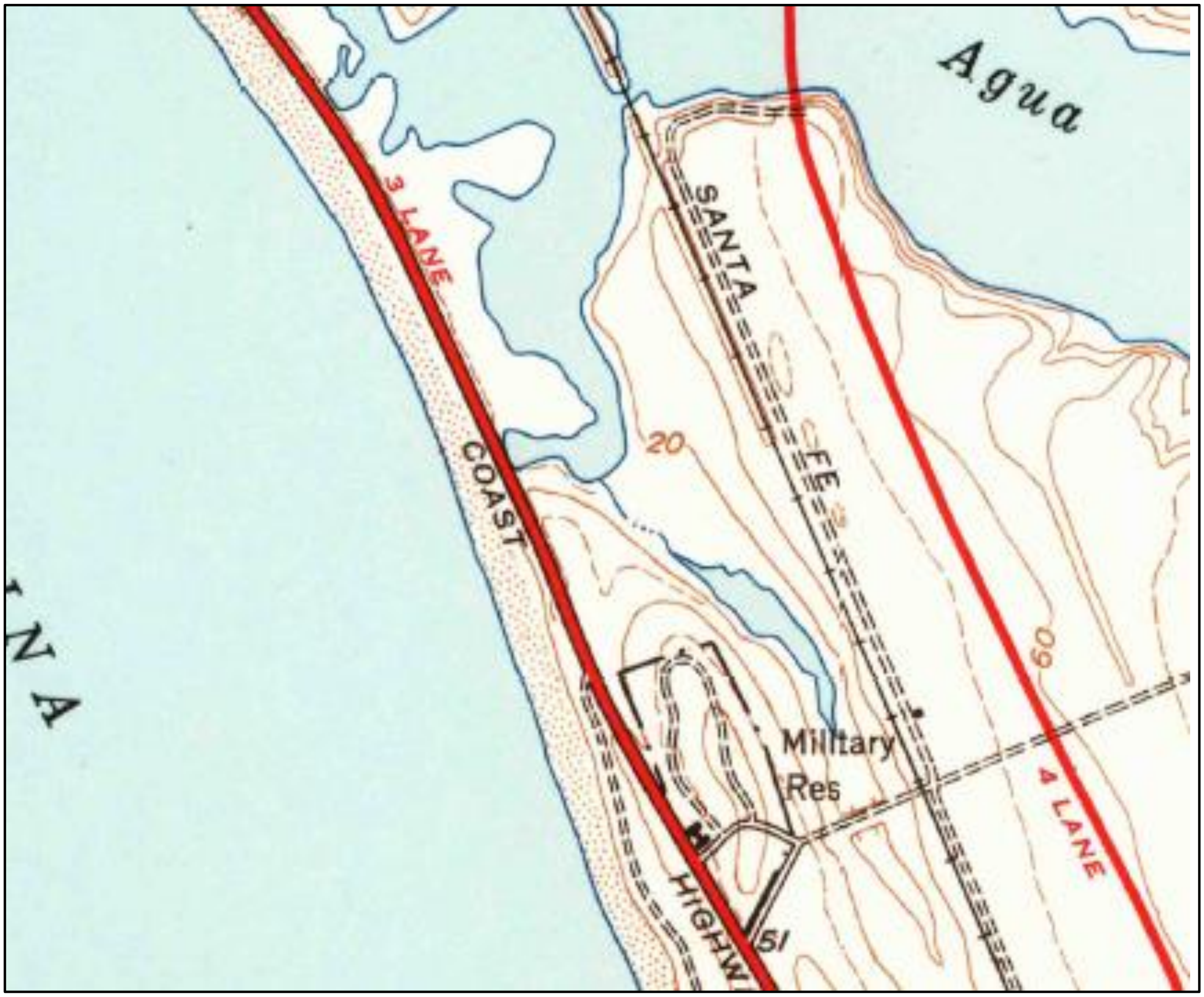

Illustration 1. USGS topographic map from 1948. The site of Encina Power Plant is just north of the area marked "Military Res".

[16] "New Generator Ordered for Carlsbad Plant," *Los Angeles Times*, 26 April 1951, 23; "Dedication Set Tomorrow for Power Plant," *Los Angeles Times*¸ 18 October 1954, A7; "Generating Plant Work Under Way," *Los Angeles Times,* 20 January 1952, 33; "Unusual Cooling Water Supply Problems at San Diego Steam Electric Plant," *Southwest Builder and Contractor* (September 11, 1953), 12, 13, 16.

Illustration 2. Construction underway on Unit 1 in May 1953. The buildings to the left of the structure were previously existing and demolished in 1954. (Courtesy of NRG Energy.)

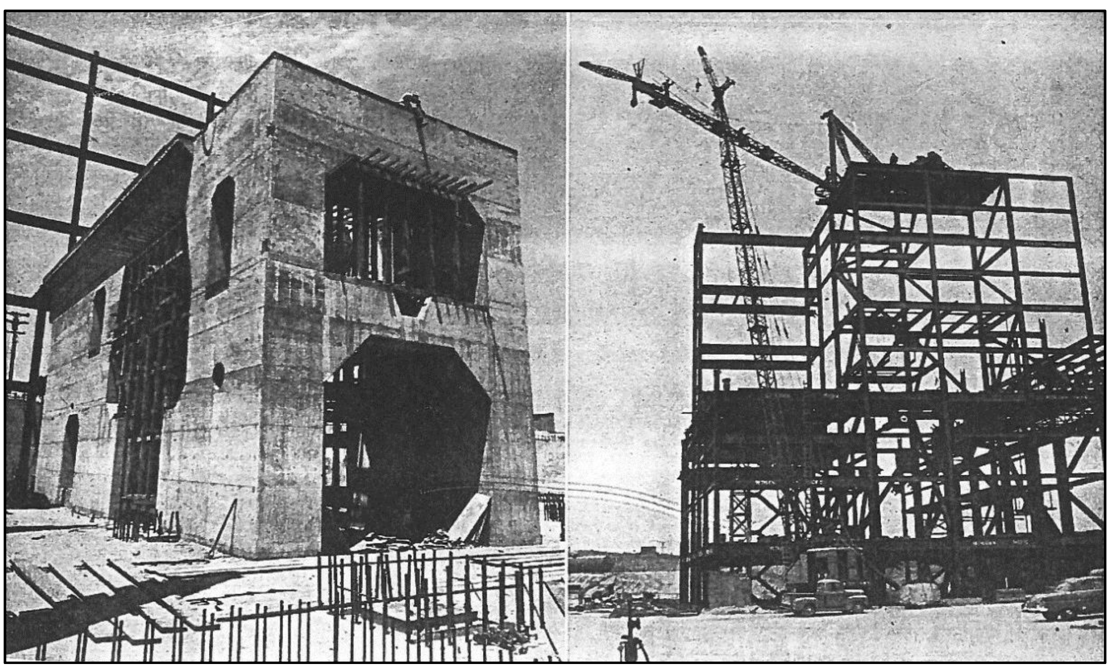

Illustration 3. Unit 1 under construction in September 1953. (*Southwest Builder and Contractor*, September 11, 1953.)

SDG&E chose this site in part because of its proximity to Agua Hedionda Lagoon. Drawing water directly from the ocean was difficult in this area because of heavy storms and shifting sands. The secluded inland lagoon solved this problem, but in its natural state it was small, shallow and only opened to the ocean periodically when high flows in Agua Hedionda Creek pushed through the sand bar at the shore. To make the lagoon a functional intake water reservoir, SDG&E undertook a massive dredging project which required removing 4 million cubic yards of material over an area of 240 acres to a depth of eight feet below sea level. Intake tunnels drew water in from the lagoon at the north end of the plant and a discharge tunnel carried water out to a cooling pond and then under Highway 101 (Carlsbad Boulevard) to the ocean.[17]

SDG&E sold Encina Power Plant in the spring of 1999 to NRG Energy. Today, the plant has five steam turbines and one peaking combustion turbine. It generates 965 megawatts (MW) of electricity, supplying power to about 775,000 residences and businesses in San Diego. NRG is currently developing the Carlsbad Energy Center, the first phase in replacing the existing plant with a cleaner and more efficient generating facility to be located on the 95-acre site. The current project will replace three older generating units with modern, high-efficiency natural gas units that will increase the net output of the facility by 200 MW, enough additional power to supply over 160,000 customers.[18]

Evaluation

JRP recorded and evaluated a portion of the Encina Power Plant property in 2007. This investigation covered that portion of the property east of the railroad tracks and included the following resources: Tanks 5, 6 and 7, the Cannon Substation and a segment of the former Atchison, Topeka and Santa Fe Railway. At the time of the JRP 2007 survey, these Encina Power Plant structures – built between 1971 and 1976 – were less than fifty years old and were not recorded on a DPR 523 form. JRP did consider them for historical significance under NRHP Criteria Consideration G, which allows for properties less than fifty years old to be found eligible for listing in the NRHP if they have "exceptional importance."[19] JRP's 2007 report reached the following conclusion regarding the structures:

> The Cannon Substation and Tanks 5, 6 and 7 are associated with the Encina Power Station. The station was constructed to meet the growing post World War II demand for electricity. All of the major California power companies were building plants at this time. The plants, including Encina, were constructed within a short period of time with standardized plans. None of the plants and their associated tanks and substations can be singled out as significant within the electrical system. As a result, Encina Power Station does not appear significant and the association of the tanks and substation with the station is not sufficient to grant them exceptional significance required for properties under 50 years old.[20]

In addition to JRP's 2007 Encina Power Plant evaluation, several other steam power plants in California of similar size and design and built around the same time have been evaluated under regular NRHP/CRHR Criteria and found to be not eligible. These include El Segundo, Etiwanda (Rancho Cucamonga), Highgrove (Grand Terrace), and South Bay (San Diego). The PG&E Humboldt Bay power plant was found eligible for the NRHP, but only the plant's Unit 3 — the nuclear unit — was determined eligible. The study did not evaluate the property as a whole or Units 1 and 2 (the two gas/oil-fired units at the facility) individually for significance.[21]

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[17] "Unusual Cooling Water Supply Problems at San Diego Steam Electric Plant," 12; Spencer, "Cooling Water For Steam Electric Stations in Tidewater," 299.
[18] NRG Energy, "Encina Power Plant," available at http://maps.nrgenergy.com/. Accessed January 2014.
[19] NPS, "Guidelines for Evaluating and Nominating Properties that Have Achieved Significance Within the Past Fifty Years," *National Register Bulletin No. 22* (Washington, D.C.: GPO, revised 1996), 41-43; JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007.
[20] JRP Historical Consulting, LLC, "Historic Resources Inventory and Evaluation Report, Carlsbad Energy Center," July 2007, 25.
[21] PAR Environmental Services, Inc., "Cultural Resources Study for the PG&E Humboldt Bay Power Plant, ISFSI Licensing Project," August 2003; Will Shapiro, Pacific Legacy, Inc., "Application for Certification for the Humboldt Bay Repowering Project, 2006," DPR 523 Form, PG&E Humboldt Bay Power Plant, April 10, 2006.

The current survey and evaluation of the Encina Power Plant finds that it does not meet the criteria for listing in the NRHP or the CRHR, and is not an historical resource for the purposes of CEQA. All buildings or structures in the study area 50 years old and older received evaluation under NRHP and CRHR Criteria. Also, all of the buildings and structures on the facility less than 50 years old received evaluation under NRHP Criteria Consideration G, which allows for properties less than fifty years old for to be found eligible if they are determined to have "exceptional importance." Generating Units No. 1, 2, and 3 and their associated buildings and structures were built in 1954, 1956 and 1958, respectively. Generating Units No. 4 and 5 and their associated buildings and structures were added in the 1970s. In addition to lacking historical significance and not meeting the criteria necessary for eligibility for listing in either the NRHP or CRHR, this facility also has diminished integrity. Therefore, none of the buildings and structures in the project area are significant historic properties under Section 106, nor are they historical resources for the purposes of CEQA.

Applying the NRHP/CRHR criteria, the Encina Power Plant is not significant within the context of the development of electric power generation, steam power plants, or the history of SDG&E (Criterion A/1). At the time of its construction, the plant was one of several being built of similar – often nearly identical – design by SDG&E after World War II to supply the growing post-war demand for electricity in southern California, including Silver Gate Unit 2 (1948), Unit 3 (1950), and Unit 4 (1952), and South Bay Unit 1 (1960), and Unit 2 (1962). In addition to SDG&E, other companies throughout California including PG&E, SCE, and California Electric were also building similar plants at this time to meet energy demands. Among those built by SCE were Redondo Beach (1952), Etiwanda (1953), El Segundo (1955), Alamitos (1956), Huntington Beach (1958) and Mandalay (1958). These plants and associated substations generated the power needed to answer the demands of its customers. While the Encina Power Plant was obviously important to the customers it served, it was one of many such power plants built during this era of tremendous growth that served essentially the same function, and this single plant does not stand out as particularly important within the SDG&E system or electrical generating development in the southern California region or the state as a whole.

This property is not significant for an association with the lives of persons important to history (Criterion B/2). It does not appear that any individual associated with this property has made demonstrably important contributions to history at the local, state, or national level.

Under Criterion C/3, the Encina Power Plant is not significant for its design, construction or architecture. This facility, including Units 1, 2, 3, 4 and 5 contained within the power plant building, was constructed as a combination gas/oil-fired steam generating power plant, a design that was standard and common for the period. In addition, all of the associated structures such as tanks, substations and equipment installed at the plant were also typical for this type of facility. Nothing about the design or construction of the Encina Power Plant was unique, or required groundbreaking or innovative features to surmount engineering or design challenges. Additionally, the buildings on the property are generally common, utilitarian types built of concrete or prefabricated metal. They exhibit the priority of function over style and lack architectural distinction. The exception is the original security building (MR#5), which has a few modest Modern style traits, but lacks sufficient characteristics of this style to be eligible under this criterion.

Finally, this property is well-documented in company records and construction documents and does not appear to be a likely source of important information about historic construction materials or technologies (Criterion D/4).

In addition to lacking historical significance and not meeting the above criteria, the property has undergone alterations that have diminished its integrity of design, materials, workmanship, feeling and association. Originally, Units 1, 2 and 3 each had their own exhaust stacks, but these were removed around 1978 and the single exhaust stack was built. This change coincided with the addition of Units 4 and 5 to the Power Plant Building. In 1985, the original administration building was demolished and the warehouse/maintenance shop remodeled and an addition built which doubled its size. Four waste water ponds located just west of the current waste water tanks were removed ca. 2000. Tank 3, a waste water treatment facility and diesel storage tanks have all recently been demolished in preparation for a very large desalinization plant under construction at the time of this survey.

Photographs (continued):

Photograph 2: Power Plant Building (MR#11) and Exhaust Stack (MR#13), camera facing northwest, February 5, 2014.

Photograph 3: Power Plant Building (MR#11) showing Equipment Bay (MR#12) and overhead crane, camera facing south, February 5, 2014.

Photographs (continued):

Photograph 4: Power Plant Building (MR#11), camera facing northeast, February 5, 2014.

Photograph 5: Fuel Oil Pump Room Building (MR#10), camera facing east, February 5, 2014.

Photographs (continued):

Photograph 6: Warehouse/Maintenance Shop (MR#9), camera facing northeast, February 5, 2014.

Photograph 7: Administration Building (MR#6), camera facing southeast, February 5, 2014.

Photographs (continued):

Photograph 8: Control Room 1 (MR#14), camera facing northeast, February 5, 2014.

Photograph 9: Control Room 2 (MR#15), camera facing northeast, February 5, 2014.

Photographs (continued):

Photograph 10: Substation 1 (MR#16), camera facing northwest, February 5, 2014.

Photograph 11: Substation 2 (MR#17), camera facing southwest, February 5, 2014.

Photographs (continued):

Photograph 12: Water Intake (MR#4), camera facing southwest, February 5, 2014.

Photograph 13: Outflow Pond (MR#1), camera facing west, February 5, 2014.

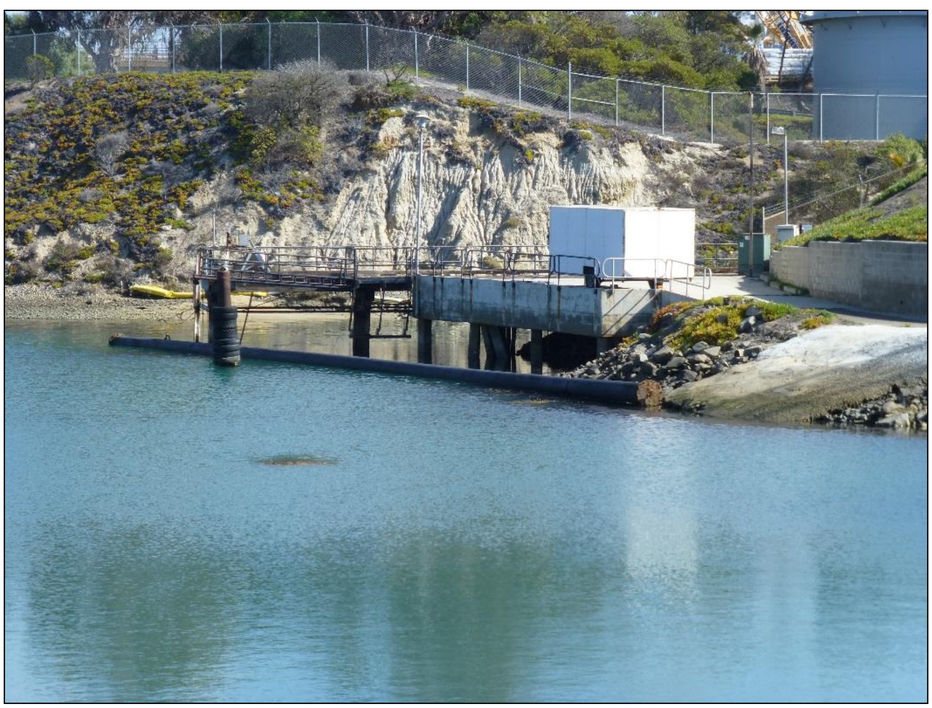
Photographs (continued):

Photograph 14: Tanks 1 and 2 (MR#22 and 23), camera facing northeast, February 5, 2014.

Photograph 15: Tank 5 (MR#25), camera facing northeast, February 5, 2014.

Photographs (continued):

Photograph 16: Waste Water Tanks (MR#7), camera facing northeast, February 5, 2014.



Photograph 17: Dredge Dock (MR#2), camera facing east, February 5, 2014.

***Resource Name or #** (Assigned by recorder): Encina Power Plant
***Recorded by:** S. J. Melvin ***Date:** February 5, 2014. ☒ Continuation ☐ Update

Photographs (continued):

Photograph 18: Security Building (MR#5), camera facing west, February 5, 2014.

Photograph 19: Gas Turbine Generator (MR#8), camera facing southwest, February 5, 2014.

Photographs (continued):

Photograph 20: Fabrication Building (MR#21), camera facing northwest, February 5, 2014.

Photograph 21: Air Compressor Storage Building (MR#20), camera facing southwest, February 5, 2014.

Photographs (continued):

Photograph 22: Storage Building (MR#3), camera facing southwest, February 5, 2014.

Photograph 23: Hazardous Waste Building (MR#19), camera facing southwest, February 5, 2014.

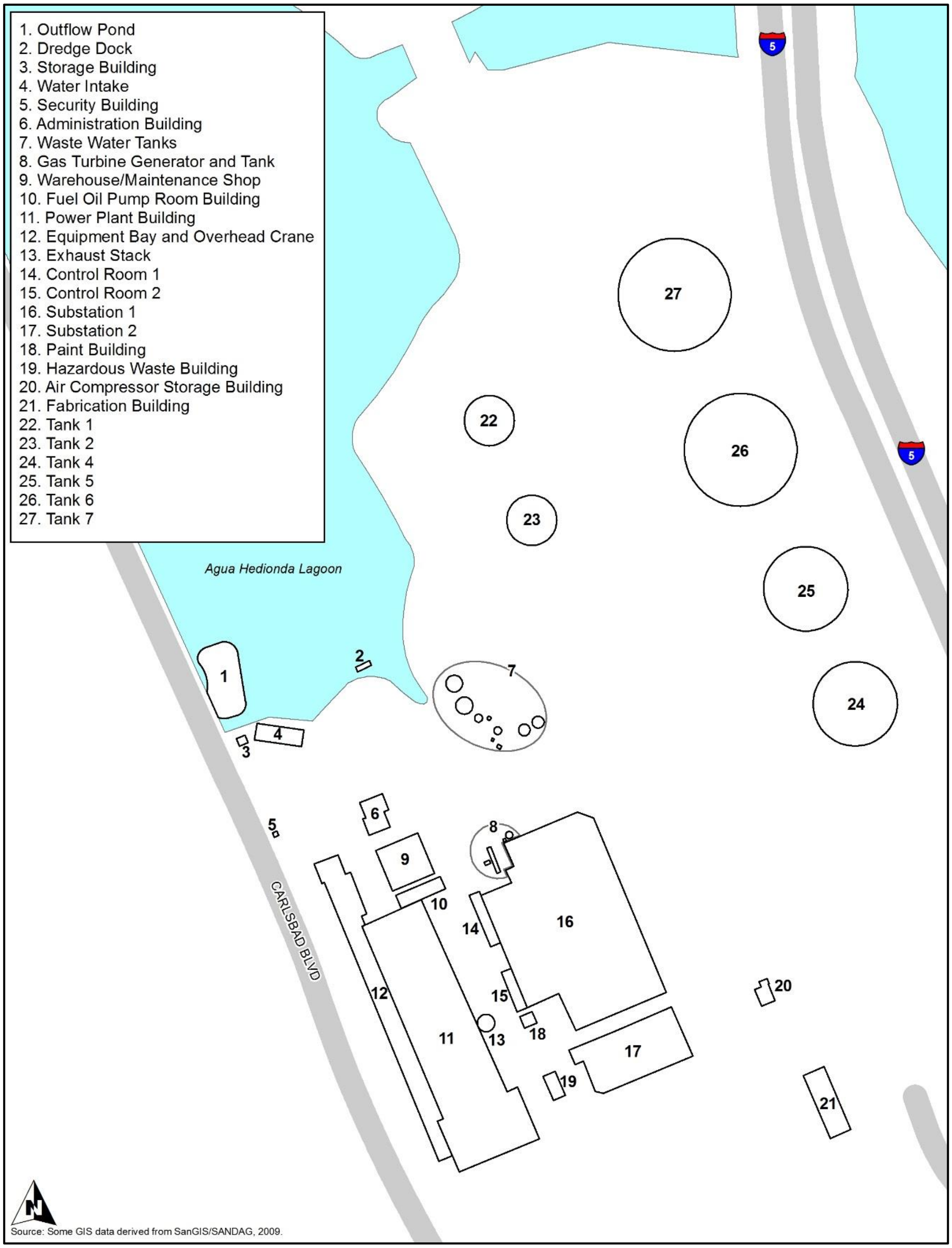
Photographs (continued):

Photograph 23: Paint Storage Building (MR#18), camera facing northwest, February 5, 2014.

***Resource Name or #** (Assigned by recorder): Encina Power Plant

***Recorded by:** S. J. Melvin ***Date:** February 5, 2014. ☒ Continuation ☐ Update

Site Map:



APPENDIX C

Previous Report

JRP HISTORICAL CONSULTING

HISTORIC RESOURCES INVENTORY AND EVALUATION REPORT

Carlsbad Energy Center

PREPARED FOR

CH2M Hill
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

July 2007

SUMMARY OF FINDINGS

CH2MHill contracted with JRP Historical Consulting, LLC (JRP) to prepare a Historical Resources Inventory and Evaluation Report for historic buildings, structures, and objects located within the architectural study area for this project. The architectural study area contains a parcel northeast of the Encina Power Plant containing tanks 5, 6 and 7, the Cannon substation and a segment of the former Atchison, Topeka and Santa Fe Railway's "Surfline," now owned by North San Diego County Transit District.

The purpose of this document is to comply with the California Environmental Quality Act (CEQA), as it pertains to historical resources, and to assess whether the architectural resources located within the project study area should be considered eligible for the National Register of Historic Places (NRHP) or historical resources for the purposes of CEQA; that is, whether they are listed in, determined eligible for, or appear eligible for listing in the California Register of Historic Resources (CRHR). This study was conducted in accordance with 36 CFR 800 relating to implementation of Section 106 of the National Historic Preservation Act and Section 15064.5(a)(2)-(3) of the CEQA Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code.

Before the power plant, the peninsula near Agua Hedionda lagoon was part of an important transportation route. The California Southern Railroad built the "Surfline" along the coast in 1888 connecting San Diego with Los Angeles. It was also used for agricultural purposes. San Diego Gas & Electric Company (SDG&E) began construction of the Encina Power Plant in 1952 and like many steam power plants of the era it was designed to be built in stages. The first three units went online at two year intervals, stating in 1954. The company built the power station west of the Atchison, Topeka and Santa Fe Railroad and east of what was then Highway 101, and the complex included three fuel storage tanks located west of the tracks and north of the power plant. SDG&E added Tanks 4, 5, 6, and 7 to supply the new units with oil between 1968 and 1976. The company built Encina Substation to distribute electricity generated by the power plant. The substation expanded as new units were brought online. Between 1968 and 1976 a secondary substation (Cannon Substation) was established south of Tanks 5, 6, and 7. Tanks 5, 6, and 7, and Cannon Substation are less than fifty years old and do not require evaluation; they are also of common design for tanks of this kind and are thus not considered exceptionally significant. Currently, the study area is primarily industrial, dominated by the Encina Power Plant. A modern hotel, restaurant, and gas station complex is located immediately to the south of the study area. Agricultural fields are located east of the freeway, and a modern residential area is located to the south of Cannon Road, outside the study area. This report concludes that the railroad segment, tanks and substation do not appear to meet the criteria for listing in the CRHR and thus do not qualify as historical resources for the purposes of CEQA.

Appendix A includes maps showing the project vicinity (**Map 1**), and study area (**Map 2**). Map 2 includes map reference numbers for the individual resources located within the study area. The DPR 523 form for the evaluated property, the North San Diego County Transit District's Surfline Railroad tracks, is in **Appendix B**.

TABLE OF CONTENTS

ATTACHMENTS

1. PROJECT DESCRIPTION
[to be Edited by client]

NRG is proposing to develop the Carlsbad Energy Center (CEC) Project to meet the needs of local load and contribute to the electricity reserves that will ensure a reliable energy supply in southern California.

CEC will be a 525.2-megawatt (MW) net (at 73.6 degrees Fahrenheit [°F] with steam power augmentation and evaporative cooling) 560 MW gross combined-cycle generating facility configured using two trains with one natural-gas-fired combustion turbine and one steam turbine per train (or unit). The CEC units will connect to the electrical transmission system via 138 kV and 230 kV lines that connect to the respective, nearby existing switchyards at the existing Encina plant. Natural gas for the facility will be delivered via Southern California Gas Company's (SoCalGas) existing 20-inch gas transmission line ("Rainbow line"). The project will include an onsite fuel gas compressor station.

For evaporative cooling make-up, demineralized water, and other uses, the CEC will use up to 1,570 acre feet per year (afy) of reclaimed water provided by the City of Carlsbad. The evaporative cooling and heat recovery steam generator (HRSG) blowdowns and normal plant liquid wastes will be recycled to raw water storage for reuse. Reverse Osmosis reject stream and emergency plant wastes will be sent to City of Carlsbad (Encina Wastewater Authority) system via sanitary sewer line. The reclaimed water will be delivered to CEC through a reclaimed water line adjacent to the existing rail line to the plant site from a connection to the City's system at Cannon Road and Avenida Encinas. This new 12-inch pipe will be approximately 3,200 feet long.

Potable water for drinking, eye protection, safety showers, fire protection and service water will be served from the City's potable water system. Sanitary wastewater disposal will be to City of Carlsbad (Encina Wastewater Authority's) sanitary sewer system. A new line connection will be added to connect to the Authority's system. [An ___-inch] sanitary sewer line would exit the plant site from the west side of the site and connect with the Authority's existing wastewater pipe which runs immediately adjacent to the plant site on the west side, parallel to the existing rail line. The total distance of the new line would be [_____? feet.]

The CEC will be located at the existing Encina power plant site. The two new units will be on the northeast area of the existing site, between the existing rail line and I-5 highway, and at the location of existing fuel oil tanks Nos. 5, 6, and 7. These three tanks would be demolished and removed to install the proposed two power generating units (designated Units 6 and 7). The new project site will consist of approximately [___] acres. [___] acres will be available during construction for parking and equipment laydown.

The site is located in an industrial area in the City of Carlsbad, in San Diego County. Map 1 in Appendix A shows the location of the generating facility, electric transmission lines, natural gas supply pipeline, reclaimed water supply pipeline, and potable water supply line.

2. RESEARCH AND FIELD METHODS

JRP examined standard sources of information that list and identify known and potential historical resources to determine whether any buildings, structures, objects, districts, or sites had been previously recorded or evaluated in or near the project study area. JRP reviewed the National Register of Historic Places (NRHP), CRHR, California Historical Landmarks, and California Points of Historical Interest to ascertain if listed resources were within the study area.[1] The Carlsbad Santa Fe Depot, listed on the National Register of Historic Places, is located within a mile of the project at 400 Elm Avenue, but is not within the study area. JRP also consulted the San Diego County Local Register of Historic Places and contacted the City of Carlsbad Planning Department.[2] Neither of these local agencies had previously recorded properties in the area. Neither the northeastern lot of the Encina Power Plant, the powerplant itself, nor the adjacent properties have been previously identified as potential historic resources, nor do they appear to have been previously evaluated for listing in the NRHP or CRHR.

JRP conducted fieldwork at the Carlsbad Energy Center site on July 26, 2007 and recorded the structures within the study area, and recorded the railroad on a DPR 523 form (Appendix B). JRP conducted research at a variety of libraries and repositories including the California State Library, Sacramento, and Shields Library, University of California, Davis; San Diego Historical Society; San Diego Public Library; Carlsbad Historical Society Collection and general collection at Cole Library, Carlsbad Public Library; as well as additional research at the California State Railroad Museum in Sacramento.

JRP prepared a historic context to address pertinent themes of Carlsbad, electrical transmission and railroad history and evaluated the structures under CRHR criteria on the DPR 523 form. The historic themes are discussed in Section 3. A description and historical evaluation of the property is summarized in Sections 4 and 5. Section 6 provides professional qualifications for

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[1] National Park Service, National Register Information System, online database: <http://www.nr.nps.gov/> (accessed January 2006); Office of Historic Preservation, *California Historical Landmarks*, (Sacramento: California State Parks, 1996); and Office of Historic Preservation, *California Points of Historical Interest*, (Sacramento: California State Parks, May 1992).

[2] The Carlsbad Planning department had no historic properties list on record when contacted on July 30, 2007; County of San Diego, Historic Sites Board, "San Diego County Historic Sites Listing," November 11, 2006, accessed online on Jul 27, 2007.

JRP staff, and to the references listed in Section 7 for a listing of materials consulted.

3. HISTORICAL OVERVIEW

3.1. Agua Hedionda and Carlsbad

The area surrounding the Encinas Energy Center was originally home to the Luiseño Indians, a Takic-speaking people. The Spanish explorer Don Gaspar de Portola first explored the area in 1769, and soldiers in the expedition named the Agua Hedionda lagoon, meaning "stinking waters." Agua Hedionda was part of the landholdings of the Spanish mission at San Luis Rey and became part of the *Agua Hedionda Rancho* granted to Juan Maria Marron, a sea captain who lived in San Diego, in 1842. This rancho covered 13,311 acres in what is now the northern half of the City of Carlsbad, plus portions of Oceanside and Vista, and included the area around the Agua Hedionda lagoon. Marron died in 1853, and Francis Hinton acquired the rancho by 1865. Robert Kelly worked for Hinton on the rancho. In 1870 Hinton died, leaving the property to Kelly. Marron, Hinton, and Kelly all used the ranch for cattle ranching and some dry farming.[3]

Additions to rail lines during the 1880s spurred population expansion in the greater San Diego area. The completion of the California Southern rail line from San Diego to Barstow in 1885 to connect with the Atchison Topeka and Santa Fe's Atlantic & Pacific Railroad, resulted in a land boom in San Diego as the population increased to approximately 35,000 inhabitants. The California Southern Railroad was the first to build a bridge across Agua Hedionda for its line from National City, south of San Diego, to Fallbrook, northeast of Oceanside, which opened in 1881.

In 1885, John Frazier discovered mineral and artesian waters on his land north of the lagoon, and the Aqua Hedionda Rancho, near the railroad track. Soon thereafter Frazier established a train stop and attracted railroad passengers to his putative medicinal water supply. This discovery led to Carlsbad's naming and initial town development, because the waters were believed to have similar properties to the springs in Karlsbad, Bohemia (now Karlovy Vary located in the Czech Republic). Carlsbad Land and Water Company (CLWC), formed in 1887, purchased 400 acres north of the Agua Hedionda Rancho, including Frazier's property. This became the town of Carlsbad. CLWC laid out the town's grid street pattern and endeavored to attract settlers and vacationers from Midwestern and Eastern states as well as from Europe. Lack of sustainable local water for crops, and the general economic depression of the 1890s, curtailed Carlsbad's

[3] Friends of the Library, *A History of Carlsbad*, (Carlsbad, CA: Friends of the Library, 1961?), 1-8; Susan Schnebelen Gutierrez, *Windows on the Past: An Illustrated History of Carlsbad, California*, (Virginia Beach, VA: Donning Company Publishers, 2002), 7-12; and Warren A. Beck and Ynez D. Hasse, *Historical Atlas of California*, (Norman: University of Oklahoma Press, 1974), 39.

first phase of development. Most of the city's originators moved elsewhere, and only a few new settlers stayed in this area south of Oceanside.[4]

Robert Kelly died in 1890 and left the Aqua Hedionda Rancho to his nephews and nieces. They surveyed and partitioned the rancho in the mid 1890s, retaining more than 1,700 acres along the shore that included most of the Aqua Hedionda lagoon as tenants in common. The more than two miles of shoreline kept by the family was considered more valuable than most of the rancho's inland areas, though the lagoon itself was a salt flat for much of the year and considered of little value. In Carlsbad town, CLWC sold its land to the South Coast Land Company between 1906 and 1914. The new landholders harnessed additional water supplies and attracted new settlers to Carlsbad. This second attempt at town development was more successful. The town's infrastructure and institutions grew in the 1910s and 1920s as the regional tourism industry matured. The Division of Highways encouraged inter-regional auto tourism with improvements to the Coast Highway along the San Diego coast and through Carlsbad during the 1920s, and the Santa Fe railroad provided regular passenger service through Carlsbad during this period.[5]

Carlsbad's agricultural economy grew with the avocado and flower industries that developed in the 1910s and 1920s. Tourists continued to come and stay in Carlsbad during the 1920s and 1930s, particularly during Prohibition, as it was a convenient overnight stop between Los Angeles and Tijuana for those traveling both by railroad and automobile. Northern San Diego County's economy changed during World War II after the Marine Corps' established Camp Pendleton north of Oceanside. As in so many other California communities hosting new wartime installations, there was a great influx of military personnel and their families, bringing with them the demand for more housing and services to Carlsbad. Following the war, the military retained its presence in the region. Military families settled permanently, causing another economic boom and a chronic housing shortage in Carlsbad. The post-war population increase put a strain on all types of municipal services in what had been unincorporated San Diego County. In response, SDG&E announced its plan in 1948 to construct a power plant along the south shore of Aqua Hedionda between the railroad line and Carlsbad Boulevard. The company completed the initial units of its Encina Power Plant in 1954, dredging Agua Hedionda to ensure good tidal flushing to provide water to cool its power plant generators. Carlsbad residents seeking incorporation argued that the power plant would provide a stable source of tax income for a new city and that services to Carlsbad could be improved in this way. The City of Carlsbad, incorporated in 1952, included the Aqua Hedionda Lagoon within its original

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[4] Friends of the Library, *A History of Carlsbad*, 5, 8, 10; *Plain Truth*, July 1909 (typed references, Carlsbad History Room, Cole Library, City of Carlsbad Library); and Gutierrez, *Windows on the Past*, 15-16.

[5] Allan O. Kelly, "Waters of Aqua Hedionda Lagoon Reflect the Coming of the Spaniards to Area," *Carlsbad Journal*, August 13, 1959, 4; Gutierrez, *Windows on the Past*, 21-25; and *California Highways and Public Works*, January 1925, May 1926, and October 1926.

boundaries. The City of Carlsbad made plans for development in Aqua Hedionda from the 1950s through the 1970s, including constructing a small-craft harbor, an idea that was eventually dropped. The city annexed much of the land that it now encompasses in the 1960s and 1970s. Santa Fe passenger rail service ended in 1960 and the Division of Highways completed freeway I-5 in the mid-1960s to the east of the rail line and downtown Carlsbad. I-5 replaced Highway 101, which was moved onto the freeway; for a while Caltrans retained Highway 101 signs on the freeway, but they were eventually removed.[6]

3.2. General History of Steam Plants in California

Steam plants comprised the first generation of electric generating facilities in California. British designer Sir Charles Parsons built the first steam turbine-generator in 1884, and almost immediately others began making improvements upon his original concept. The earliest steam generating plants were little more than steam engines converted to drive a generator rather than a locomotive. By the beginning of the twentieth century, power plants with steam turbines began to replace the original steam engine power plants. Aegidius Elling of Norway is credited with creating the first applied method of injecting steam into the combustion chambers of a gas turbine engine in 1903-04. Within a relatively short time, the technology of engines capable of supplying power and electricity grew by leaps and bounds. New and better methods and designs helped to spread electricity to a wide range of commercial buildings and residences.[7]

The materials needed to withstand the high temperatures of modern turbines were not yet available in the beginning stages of development of steam turbine power plants. Technology and improvements for steam turbine engines continued to advance throughout the 1920s and 1930s, leading to a generation of more efficient turbine power plants in the 1950s. By this time, utilities retired or replaced many of the older steam-electric plant generating units following the construction of more modern units. While the technology of turbine power plants peaked in the 1950s, it appears to have remained relatively unchanged until the 1980s, despite the availability of newer technology that would allow an increase of pressure and heat for the systems.[8]

Steam power generation has been an import part of California's power production throughout the twentieth century, although the importance of steam diminished considerably during the 1920-1940 era, when massive hydroelectric generating capabilities came on line throughout the state.

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[6] Gutierrez, *Windows on the Past*, 25-47, 63, and 70; City of Carlsbad, Agua Hedionda Land Use Plan, March 1982, 4; and City of Carlsbad, "The Evolution of a Small-Craft Harbor Development at Carlsbad, California 1953 to 1973," no date; http://www.efgh.com/bike/old101.htm, accessed July 31, 2007.

[7] Heinz Termuehlen, *100 Years of Power Plant Development: Focus on Steam and Gas Turbines as Prime Movers*, (New York: ASME Press, 2001), 11; Douglas Stephen Beck and David Gordon Wilson, *Gas Turbine Regenerators*, (New York: Chapman & Hall, 1996), 30; William A. Myers, *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*, (Glendale, CA: Trans-Anglo Books, 1984), 8.

[8] Termuehlen, *100 Years of Power Plant Development*, 21-28.

In 1920, hydroelectric power accounted for 69% of all electrical power generated in California. In 1930, that figure had risen to 76%; it rose again to 89% in 1940. Rapid construction of new thermal, or steam-electric generating units, however, accounted for most of the new power capacity in the state after 1941. By 1950, hydroelectricity accounted for only 59% of the total, a figure that fell to 27% in 1960. Some new hydroelectric plants were built during the 1960s, chiefly associated with federal and state water projects, but by 1970, hydroelectric plants accounted for only 31% of all electricity generated in California.[9]

These statistics, however, tend to obscure the attempt by both Pacific Gas & Electric Company (PG&E) and Southern California Edison (SCE), California's largest electrical utility providers, to build large-scale steam generation plants as early as the 1920s. James Williams, a historian of energy policies and practices in California, noted that the decision by PG&E and SCE to build steam plants may be attributed to several converging trends in the mid- to late-1920s. First, a persistent drought in California caused the major utilities to begin to question the reliability of systems relying so heavily upon hydroelectricity. This drought began in 1924 and continued, on and off, for a decade. At about the same time, new power plants on the East Coast (where steam had always played a more important role than in California) achieved far greater efficiencies than had previously been possible. Between 1900 and 1930, for example, the fuel efficiency of steam plants, measured in kilowatts per barrel of oil, increased more than nine-fold. In addition, new natural gas lines were completed which could bring new supplies to both Northern and Southern California in the late 1920s, tapping large reserves in the San Joaquin Valley. Natural gas has always played an important role in steam electric power generation in California.[10]

The confluence of these various factors – a drought, new steam generator technologies, and new supplies of natural gas – induced PG&E, SCE, and other utilities to begin construction of large steam plants during the late 1920s and early 1930s. In 1929, the Great Western Power Company (which would be absorbed by PG&E in 1930) built a large steam plant on San Francisco Bay, near the Hunters Point shipyard, fitted with two 55 MW generators.[11] PG&E built a steam plant in Oakland in 1928, called Station C. SCE had an even longer history of steam generation, having operated its large facility at Long Beach on Terminal Island throughout most of the 20th century. By World War II, the Long Beach plant was huge, with eleven units on line that were constructed in stages beginning in 1911. In Southern California, the Los Angeles Department of Water and Power (LADWP) constructed a steam station at Seal Beach consisting of two units installed in 1925 and 1928. These steam plants proved to be both profitable and reliable for the

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[9] James C. Williams, *Energy and the Making of Modern California* (Akron, Ohio: University of Akron Press, 1997), 374.

[10] Williams, *Energy and the Making of Modern California*, 278.

[11] This plant still exists, although it was fitted with new units in the early 1950s, at the same time that the Kern Power Plant was being constructed. Coleman, p. 298.

various utilities. In 1930, a PG&E vice-president for engineering wrote: "Under the circumstances which now prevail, it is natural to question the future of hydro in California." [12]

The post-World War II era was a time of rapid growth in Southern California. Housing and populations swelled along with the business and industrial concerns. Fueled by wartime defense industries, southern California grew rapidly, spreading out into suburbs and into areas outside the original city limits of the communities around Los Angeles and San Diego. The need to generate power was imperative and PG&E, SCE, Los Angeles Department of Water and Power (LADWP), and SDG&E expanded their systems along with the rest of California's energy industry. Since most of the more favorable hydro sites in California had already been developed, and the cost of steam generating facilities had been reduced by technological developments in design and abundant natural gas resources, steam plants became the more favorable option. Steam turbine power plants were cheaper and quicker to build than hydroelectric plants and utilities companies moved away from hydroelectricity, establishing steam turbine power as the generator of choice. Such plants conserved water and kept costs down for the business and the consumer. The "momentum for steam had been established by war, by drought, and," observed California energy historian James Williams, "by a positive history of increased thermal power plant development."[13]

Dozens of new steam generation plants were built throughout California, chiefly by PG&E and SCE, although LADWP and SDG&E built a few as well. The plants relied upon proven technologies but were assembled quickly and inexpensively, relative to earlier plants. In a detailed article in 1950 in *Civil Engineering*, PG&E Chief Engineer I. C. Steele, summarized the design criteria that went into construction of four major steam plants the company had under construction at that time, at Moss Landing, Contra Costa, Kern, and Hunters Point in San Francisco. These plants had much in common with each other, he argued, and with other steam plants under construction in the state. The design criteria were the same in all cases: to build the facility close to load centers to reduce transmission costs; to be close to fuel supplies; to be near a water supply; and to be on a site where land was cheap and could support a good foundation. In another article in *Transactions of the ASCE,* Walter Dickey, an engineer from Bechtel, detailed the economics of steam plant design from this era. These plants, he argued, could be built economically by minimizing the structural material, chiefly by creating "outdoors" turbo-generator units. Virtually all of these plants were designed to be expanded if market conditions

[12] "1928 Steam Plants Account for 45 Percent of New Generating Capacity," *Electrical West*, February 2, 1929, pp. 80-81; R.W. Spencer, "Cooling Water For Steam Electric Stations in Tidewater, " *Transactions of the American Society of Civil Engineers* 126 (1961): 294, 300; Williams, *Energy and the Making of Modern California*, 279.

[13] Myers, *Iron Men and Copper Wires*, 200; James C. Williams, *Energy and the Making of Modern California*, 277-78, 282-83.

warranted; most of them were.[14] Many plants in Southern California are of the outdoor variety; Encina is among the exceptions, as it is enclosed in curtain walls.

The decades between 1950 and 1970 were the years of peak expansion of steam generating capacity for both the SCE and the PG&E, as well as for smaller utility companies. During this period, SCE built a series of very similar steam plants in the Los Angeles Basin and in San Bernardino County. In 1952, the company began work on Redondo No. 2, which was adjacent to an earlier plant at Redondo Beach. In 1953, the Etiwanda plant went online, followed in 1955 by El Segundo, Alamitos in 1956, and Huntington Beach and Mandalay in 1958. By 1960, all SCE plants either had multiple units or had additional units in the planning stages. In 1950 PG&E operated 15 steam electric plants in California, and during the following decade added several new plants and expanded older ones. Chief among these were the Kern plant (1948-50), Contra Costa (1951-53), Moss Landing (1950-52), Morro Bay (1955), Hunters Point (addition 1958), Humboldt Bay (1956-58), and Pittsburg (1959-60). The Pittsburg plant was at the time of its construction the largest steam station in the west, with a capacity of over 1,300,000 kW in 1960. The LADWP system was much smaller than those of SCE and PG&E, consisting of five steam plants by 1962. In addition to its Seal Beach Plant (1925-28), and Harbor Plant on Los Angeles Harbor (1943) these included the Valley Plant (San Fernando Valley, 1954), Scattergood (1958), and Haynes (1961). SDG&E had three steam-electric power plants, Silver Gate (1943), Encina (1954), and South Bay (1960). By the late 1970s, there were more than 20 fossil fuel thermal plants in California, clustered around San Francisco Bay, Santa Monica Bay, and in San Diego County, along with a few interior plants in San Bernardino County and Riverside and Imperial Counties, as well as a few plants on the Central Coast.[15]

Most of the oil- or gas-fired steam plants currently in use in California were installed in the period from about 1950 through 1970. After 1970, the major utilities began to look for alternative energy sources, ranging from nuclear power to wind, geothermal, and other "green" energy sources, other than hydroelectric. Despite these efforts, however, fossil fuel steam generation remains the backbone of electrical generating capacity in California. Information from the California Energy Commission (CEC) states that there are currently 34 steam turbine power plants in California of a variety of ages and locations.[16]

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[14] I. C. Steele, "Steam Power Gains on Hydro in California," *Civil Engineering* (January 1950): 17-21; Edgar J. Garbarini, "Design Saves Construction Dollars on Contra Costa Power Plant," *Civil Engineering* (May 1953): 31-33; Walter L. Dickey, "The Design of Two Steam Electric Plants," *ASCE Transactions* (1956): 253-273.

[15] Annual Reports of the Southern California Edison Company, various years. R.W. Spencer, "Cooling Water For Steam Electric Stations in Tidewater," *Transactions of the American Society of Civil Engineers* 126 (1961): 280-302; I. C. Steele, "Steam Power Gains on Hydro in California," 17-19; Walter L. Dickey, "The Design of Two Steam Electric Plants," 253-255; *Southwest Builder and Contractor*, "Haynes Steam Plant Will Grow With Demand," *Southwest Builder and Contractor* (October 12, 1962): 24-27; Williams, *Energy and the Making of Modern California*, 257.

[16] The California Energy Commission retains figures on the fuel type for all electricity used in the state, even if the power is generated out of state. In 1999, natural gas-fired generators were responsible for 31% of all electricity used

3.3. History of San Diego Gas and Electric Company

The history of the San Diego Gas & Electric Company mirrors the general history of steam-electric power plant development outlined previously. The utility initially formed during the 1880s and over the next century slowly increased its service area, customer base, and generating capacity, with most of the company's development occurring during World War II and the decades immediately following. Throughout its existence SDG&E has relied on steam-electric generated power as its primary power supply.

On April 18, 1881 a group of San Diego citizens incorporated the San Diego Gas Company to serve a small city with a population of approximately 3,000. With 89 charter subscribers located along it three miles of gas mains, the small company began making gas at its gas plant on June 2, 1881, and began service two days later. The initial plant had a capacity of 25,000 cubic feet of gas per day, which was considered sufficient for a population of 20,000. The plant made oil gas from crude petroleum, but was modified for coal in 1883.[17]

The completion of the California Southern rail line from San Diego to Barstow in 1885 to connect with the Atchison Topeka and Santa Fe's Atlantic & Pacific Railroad, issued in a land boom in San Diego as the population climbed to approximately 35,000 inhabitants. In 1887 the San Diego Gas Company consolidated with the Coronado Gas and Electric Company into the San Diego Gas and Electric Light Company. The new company enlarged its gas plant and built its first electric generating plant (later named Station A) on the adjacent property. The capacity of the gas plant had been increased to 400,000 cubic feet per day, sufficient for a population of 100,000, and the new steam electric generating plant supplied 770 kW of power through four steam driven generators. During the 1890s, however, the population boom waned and the company's costumer base grew modestly, but steadily.

In April 1905 the company was sold to H.M. Byllesby & Company of Chicago reincorporated as the San Diego Consolidated Gas & Electric Company (SDCG&E). At this point, the company was serving 2,168 gas and 1,258 electric customers. The new owners began replacing the old equipment at Station A in 1906, when its first steam turbine generator with a capacity of 500 kW

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in the state, compared with 20% for hydroelectricity. Coal-fired steam plants, all of them out of state, accounted for 20% of the total. "Green" sources accounted for 12%. The percentage of in-state natural gas-fired steam electricity is much larger than 31%, since all of the coal and much of the hydroelectric power is generated out of state. See www.energy.ca.gov/electricity/system_power.

[17] Except where otherwise noted, the following history of the San Diego Gas & electric Company was taken from the following sources: San Diego Gas & Electric Company, *San Diego Gas & Electric Company: A Review of its Origin, Growth and Corporate History From 1881 to 1962* (San Diego: San Diego Gas & Electric Company, 1962); and Iris Engstrand and Kathleen Crawford, *Reflections: A History of the San Diego Gas & Electric Company 1881-1991* (San Diego: San Diego Historical Society and the San Diego Gas & Electric Company, 1991).

was installed. Other improvements followed, including the addition of a 2,000 kW turbogenerator in 1909, followed by 4,000 kW turbogenerators in 1912 and 1914. The company also made improvements at its gas plant, including switching from coal burning back to oil in 1906, following advances in oil production that made it economically feasible. By 1920 six new gas generators were online and the plant had a capacity of approximately 6,250,000 cubic feet per day. Construction during this period also included extending the gas and electric distribution systems beyond the San Diego city limits to the surrounding communities, including National City, La Jolla, Chula Vista, La Mesa, Imperial Beach, and San Ysidro.

In 1918, the company further extended its system with the construction of its first high voltage transmission line, a 66 kV line extending 75 miles north from San Diego to Del Mar, Oceanside, and San Juan Capistrano where it tied into the transmission system of SCE. This interconnection gave the smaller SDCG&E access to a source of hydroelectric power to supplement the capacity of its own steam generating plant in times of need. However, the first transfer between the two companies occurred the following year when severe drought caused a shortfall in the SCE system, and SDCG&E sent its surplus power north. Today, the SCE-SDG&E interconnection provides for the exchange of 100,000 kW and functions as the company's main tie with other members of the statewide energy pool.

By 1920 the company was serving 115,000 electric customers and its energy needs had outgrown Station A. In 1921 the company purchased the 8,200 kW San Diego Electric Railroad power plant, renaming it Station B. In 1923 the company installed a 15,000 kW generator, which surpassed the entire generating capacity of Station A, followed by a second 15,000 kW generator in 1927, and a 28,000 kW generator in 1928. These improvements, known as Station B, increased the capacity of the system from 46,000 kV to 74,000 kV. In addition, the company began upgrading its transmission lines from 11 kV to 66 kV, beginning the development of today's expansive transmission system. By 1930, the company was serving over 70,000 customers.

However, during the decade of the 1930s customer gains dwindled as did company investment in its electrical system. In 1932 the company changed over from manufactured gas to natural gas, which increased the capacity of its gas system to 22 million cubic feet per day. While natural gas was found for be 50 percent more efficient than manufactured gas, gas sales increased by 110 percent during the 1930s. The San Diego area received renewed economic stimulus in 1938-39, with pre-World War II defense expansion leading to a revival in employment at aircraft manufacturing plants and increased activity at the area's naval installations. In 1939 the company installed a new 35,000 kW generator at Station B, increasing its total capacity to 99,000 kV, and took Station A offline.[18] Station B carried the entire load of the company's

[18] The subsequent history of Station B is not detailed in the historic record. It was taken offline at an unknown date.

service area until 1943 when another interconnection was made so that the SDCG&E could purchase surplus power from other systems, and the company brought a new power plant online.

The World War II years were a period of tremendous growth for the San Diego metropolitan area and for SDCG&E. Between 1940 and 1945 the population of the area increased 90 percent, to 550,000, and SDCG&E added over 17,000 gas and 21,000 electric customers. Peak loads exceeded the company's generating capacity, forcing the company to rely heavily on purchased power. In 1941 the Standard Gas & Electric Company, which had a few years earlier succeeded H.M. Byllesby & Company as owner of SDCG&E, decided to divest the company's stock and the company became an independent organization, renamed the San Diego Gas & Electric Company (SDG&E). In 1941 the reorganized company began construction of a new power plant at Silver Gate on San Diego Bay, with the first 35,000 kW generator online by 1943. However, the company's annual peak load was 169,000 kV in 1945, forcing a continued reliance of purchased power.

Growth continued at an extremely rapid rate in the post World War II years. By 1950 SDG&E had added over 37,000 new electric and 21,000 new gas customers, but because of shortage in materials and manpower the company was unable to keep up with growing demand. Silver Gate Unit 2 came online in 1948, adding 50,000 kW to the system, but the company still relied heavily on purchased power. During the 1950s, San Diego's population passed the one million mark, and the company invested over $190 million in construction of new power plants. The company planned to bring a new steam-electric generating unit online every two years to meet continually increasing demand beginning in 1950 with Silver Gate Unit 3, followed in 1952 by Silver Gate Unit 4, both 66,0000 kW units. With four units in operation, the capacity of the Silver Gate site was expended, and the company began construction of its Encina Plant, 34 miles north of San Diego near Carlsbad. Three 106,000 kW Encina units went on line in 1954, 1956 and 1958. Though the company tripled its generating capacity during the 1950s to 672,000 kW, demand had doubled to just over 600,000 kW. In order to keep ahead of demand, the company continued its expansion program with the construction on the South Bay Power Plant in Chula Vista. Construction began in 1958, and unit 1 went online in 1960, and Unit 2 in 1962, each adding 142,000 kW to the system. In 1964 Unit 3 came online, pushing the total capacity of the SDG&E system to 1,166,000 kW. South Bay Unit 4, however, would not come online until 1971.[19]

During the 1960s, the decade of the company's most explosive growth, SDG&E became involved in several new ventures, pieces of a four-part long-term plan designed to meet ever-increasing energy demands. In 1961, the company entered into agreement with SCE to finance and operate a nuclear-fueled steam-electric generating plant at San Onofre, along the ocean shore

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[19] *San Diego Union*, June 6, 1948, February 16, 1958, October 18, 1958, October 11, 1959, November 15, 1959, May 1, 1960, June 22, 1962;

at the northwest corner of San Diego County near the Orange County border. The San Onofre Nuclear Generating Station was completed in 1965. Designed by Bechtel Corporation and Westinghouse, the plant was larger than other such plants constructed by the federal government and private utilities during the previous decade. In another innovative turn, the company also completed the first liquefied natural gas (LNG) plant at SBPP for converting natural gas to liquid in 1964-65. This project was the first of its kind in the west, and one of only five worldwide. The company's plan also included becoming a member of the California Power Pool and participating in the Pacific Northwest Intertie, a combination of public and private transmission lines that linked surplus hydro resources of the Pacific Northwest with the power systems in Oregon, California, Arizona, and Nevada. The company also participated in the Kaiparowits Plateau project in Utah during this period. Also in 1965, the federal Department of the Interior built the west coast module of a nationwide seawater conversion program at the SBPP. It was the extension of research and experimental projects between SDG&E and General Atomic Division of General Dynamics Corporation to obtain an economical seawater conversion platform. The seawater conversion plant, along with the LNG facility were removed from SBPP during the mid-1970s. [20] Nothing remains of the desalinization plant; tank and building foundations are all that remain of the LNG facility.

During the 1970s, declining demand led to some delays in the company's plans for expansion, but SDG&E proceeded with its plans to add three more units to SBPP in future years. The company served 500,000 electric customers in 1972, and its existing facilities were adequate to handle the load. In 1975 the Public Utilities Commission granted the company permission to construct the units, but after re-assessing its power needs SDG&E puts its expansion program on hold. Additional power for the SDG&E system later came from the development of geothermal sites in the Imperial Valley and additions to the San Onofre nuclear plant, where the company owned a 20 percent interest in three generating units. During this period, the company spent large sums on environmental control programs to reduce nitrogen and sulfur emissions from its plants, and on converting much of its overhead electrical distribution system to an underground system. During the 1980s, the Silver Gate plant had been taken offline. By the end of the decade, SDG&E served approximately 2.5 million customers in a service area that encompassed over 4,000 square miles of San Diego County and the western section of Orange County, with power supplied primarily from plants at Encina, South Bay, and San Onofre. In 1988 SDG&E merged with Southern California Edison, and is now a part of Sempra Energy. [21]

[20] *Southwest Builder and Contractor,* "Deep Hole Being Dug For Atomic Plant" *Southwest Builder and Contractor* (August 14, 1964): 14-16; *San Diego Union,* September 17, 1964, January 24, 1965, September 28, 1966, February 18, 1967, May 30, 1968, July 30, 1970, May 9, 1971. Personal Communication with Jim Nylander, South Bay Power Plant Manager, February 14, 2006.

[21] *San Diego Union*, May 15, 1970, January 11, 1972, February 15, 1972, January 9, 1973, March 16, 1974, January 3, 1975, October 17, 1975, April 4, 1988, December 2, 1988, April 21, 1989.

3.4. History of Atchison, Topeka and Santa Fe Railway in San Diego

The Atchison, Topeka and Santa Fe Railway began as the Atchison & Topeka Railroad Company chartered by the Kansas legislature in 1859 and became the Atchison, Topeka and Santa Fe Railroad Company in 1863. The company expanded westward from Kansas through the Southwest generally along the old Santa Fe Trail, giving the railroad its common name the "Santa Fe." The railroad, and its subsidiary companies jointly held with others, created a system that stretched from Illinois to Texas to California by the end of the 1880s, getting its foothold in the latter state through its involvement with the construction of the railroad in San Diego.[22]

During the 1870s, San Diego residents and business leaders could not interest California's main railroad, the Southern Pacific (SP), to link their city to the railroad's state and transcontinental system. San Diego booster Frank Kimball, along with the San Diego Chamber of Commerce, instead attracted Thomas Nickerson and other board members of the Atchison, Topeka, and Santa Fe Railroad to build a line connecting San Diego with Santa Fe's projected Atlantic and Pacific (A&P) line intended to link Needles, near the Arizona border, to San Bernardino. This group, closely affiliated with Santa Fe, formed the California Southern Railroad in 1880 and completed construction of 211 miles of track in 1882 from National City north to Fallbrook Junction, just north of Oceanside. This line proceeded north from Fallbrook through Temecula Canyon to San Bernardino. The California Southern also surveyed the line north of Fallbrook Junction along the shoreline to Fullerton (now in Orange County) at the same time. Although California Southern successfully completed its initial line, there were early challenges that almost led to the railroad's immediate demise. The A&P was not built by Santa Fe west of Needles and in late 1884 and early 1885 flooding washed out large sections of California Southern's track and structures in Temecula Canyon. The railroad closed and SP threatened to take over the financially troubled California Southern. Santa Fe seized greater control of California Southern to prevent SP's take-over, and negotiated with SP to purchase one of its branch lines running from Needles to Mojave, through Barstow, in San Bernardino County. Santa Fe then built the connecting line between San Bernardino and Barstow completing the railroad's transcontinental line in 1885, although Santa Fe still had to lease track from SP to reach Los Angeles. After the 1885 flood, California Southern did not rebuild the entire line through Temecula Canyon to San Bernardino, but rather constructed a shoreline route north of Fallbrook Junction on the coast to Fullerton completing the new line in 1888. This became the main line between San Diego and Los Angeles.[23]

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[22] G. Holterhoff, Jr., "Historical Review of the Atchison, Topeka and Santa Fe Railway Company (with particularly reference to California lines)," as furnished to the Railroad Commission of the State of California, June 1914; and Donald Duke and Stan Kistler, *Santa Fe . . . Steel Rails Through California*, (San Marino, CA: Golden West Book, 1963), 10-29.

[23] Keith L. Bryant, Jr., *History of the Atchison, Topeka and Santa Fe Railway*, (New York: MacMillian Publishing Co, Inc., 1974), 96-102; Atchison, Topeka and Santa Fe Railway, "Coast Lines Los Angeles District, Fourth District, National City to Fullerton," timeline of construction, October 1918 (San Diego Historical Society Research

California Southern built the shoreline route north from Fallbrook Junction to Fullerton to improve service between the two cities and as part of the Santa Fe's larger strategic plan to secure its own lines into Los Angeles. The shore route became known as the "Surfline." The following year, in 1889, California Southern and several smaller branch lines were reconfigured into the Southern California Railway, helping stabilize the company during the region's heady period of economic growth in the 1880s generated in part by the vigorous competition with SP. Although the economy faltered in San Diego and Los Angeles along with the rest of the state following the Panic of 1893, the Southern California railway infrastructure laid in the 1880s and early 1890s established the ground work of even greater economic expansion in and around San Diego and Los Angeles during the first half of the twentieth century.[24]

The Atchison, Topeka and Santa Fe Railroad reorganized into the Atchison, Topeka and Santa Fe Railway (Santa Fe) in 1895, following a period in which the railroad fell into receivership. Although there were several so-called "short-line" railroad companies in the San Diego region, during the late 1890s and early twentieth century, the Santa Fe was one of only two major inter-regional railroads in San Diego. The other was John Spreckel's San Diego & Arizona Railroad. The Santa Fe purchased the Southern California outright in 1906 and continued improvements along the Surfline it had created in the mid-1890s. These improvements included straightening the line just south of its bridge at Agua Hedionda Lagoon (Figure 1). Consolidation of the smaller short-lines into the two main railroads in San Diego increased following the massive flood of 1916 that devastated many small lines and damaged portions of the Santa Fe system.[25]

Archives, Atchison, Topeka and Santa Fe Document File); R.P. Middlebrook, "The Fallbrook Branch," *Pacific Railway Journal*, Volume 2, Number 4, November 1957; Holterhoff, "Historical Review of the Atchison, Topeka and Santa Fe Railway Company," 1914; Duke and Kistler, *Santa Fe . . . Steel Rails Through California*, 27-46; and Douglas L. Lowell, "The California Southern Railroad and the Growth of San Diego," *Journal of San Diego History*, Fall 1985 (Part 1) and Winter 1986 (Part 2).

[24] Bryant, *History of the Atchison, Topeka and Santa Fe Railway*, 102-105.

[25] Holterhoff, "Historical Review of the Atchison, Topeka and Santa Fe Railway Company," 1914; Bryant, *History of the Atchison, Topeka and Santa Fe Railway*, 102-105; *San Diego Union and Bee*, February 7, 1897, 5; McGlashan and Ebert, *Southern California Floods of January, 1916*,"1918, 30-31; and *Plain Truth*, July 1909 (typed references, Carlsbad History Room, Cole Library, City of Carlsbad Library).

Figure 1. 1942 USGS Quadrangle 15-minute Oceanside map showing the main line and a sidetrack in the study area. The heavy black line was used in the records center search.

The Santa Fe used the Surfline for both freight and passenger service. The railroad's streamline "San Diegan" began service between San Diego and Los Angeles in 1938. The railroad continued to maintain and improve the line and its structures throughout the mid-twentieth century, replacing an earlier bridge at Agua Hedionda with a new structure around 1950. Eventually, the Santa Fe ran two small self-propelled trains, the diesel San Diegan, and several other local passenger service trains along the Surfline through the 1950s and 1960s. Santa Fe passenger service between San Diego and Los Angeles continued until 1971 when it was turned over to the National Railroad Passenger Corporation (Amtrak), though the Santa Fe continued to run the service until 1986. NCTD purchased the railroad route between the San Diego County / Orange County boundary line and the City of San Diego / City of Del Mar boundary line in 1992, granting Santa Fe track rights for continued freight service. The Santa Fe merged with Burlington Northern in 1995 to become the Burlington Northern and Santa Fe Railway (BNSF).[26] The old timber trestle bridge at Agua Hedionda has recently been replaced with a modern concrete box girder structure.

[26] James N. Price, "The Railroad Stations of San Diego County: Then and Now," *Journal of San Diego History*, Spring 1988, np; *San Diego Union*, May 21, 1952; Lee Gustafson and Phil Serpico, *Santa Fe Coast Line Depots: Los Angeles Division*, (Palmdale, CA: Omni Publications, 1992), 183; *San Diego Union*, May 2, 1971; Gustafson and Serpico, *Santa Fe Coast Line Depots: Los Angeles Division*, 183; *San Diego Daily Transcript*, June 19, 1992, np; BNSF, "Company Profile," BNSF website, 2004: www://bnsf.com/media/html/company_profile.html (accessed May 2004); A.T.&S.F Ry. System, "Br. A-231 4th Dist. Los Angeles District, Ballast Deck Timber Trestle with Steel Stringers and Caps," plans, Chicago, IL, April 1948; A.J. Smith in San Bernardino, letter to M.C. Blanchard, AT&SF Chief Engineer, Los Angeles, May 12, 1948; NSDCTDB Timber Trestle Bridge Inspection Record File, Bridge 230.6, February 7, 1994; Carlsbad Historical Society photos collection of Encinas Power Plant, 1950s; and

4. STRUCTURES IN THE STUDY AREA

The Encina Power Station complex sits on the peninsula formed by the southern shore of the Agua Hedionda Lagoon and the Pacific Ocean. The study area encompasses three fuel storage tanks and a substation on the east portion of the power station property, and a segment of the North San Diego County Transit District tracks running north-south that divides the power station complex. The study area is in an industrial area. Agua Hedionda Lagoon separates it from residential development to the north. To the west of the railroad is the main portion of the Encina Power Station complex and the Pacific Ocean. East of the study area is Interstate 5, which separates the study area from agricultural land immediately to the east. The residential area of Farr is southwest of the study area and was constructed after the development of the power station. Within the past five years, a hotel and gas station have been built directly south of the study area on Cannon Road between I-5 and the railroad tracks.

Fuel Tanks

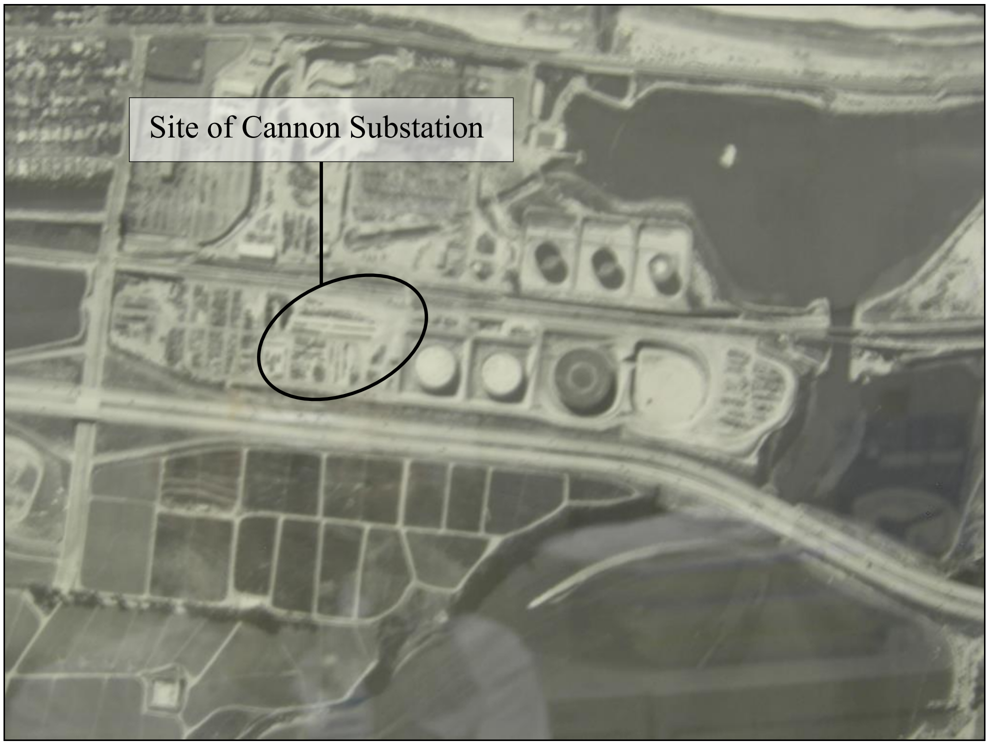
The three tanks within the study area, Tanks 5, 6, and 7, were constructed in the late 1960s and early 1970s to hold fuel for the Encina Power Station. They are sited in deep containment pits with sloped concrete walls. The three metal tanks are formed by corrugated metal walls (Photograph 1). Rising approximately 35 feet, the tanks sit primarily on asphalt with some loose gravel. The two tanks to the north are larger than the southernmost tank. Metal pipes extend from the tanks into the surrounding walls and continue underground to the power station. A staging area for power station materials is in line with the tanks to the northwest and has no permanent structures on it.

Susan Gutierrez, Carlsbad Historical Society Historian, personal communications with Elsbeth Trask Cosart, September 2004.

Photograph 1. Fuel storage tanks 5, 6, and 7, facing north, July 26, 2007.

Cannon Substation

The Cannon Substation, located southeast of tanks 4, 5, 6, and 7, was built between 1976 and 1984. Prior to this period, this portion of the power station was used as a staging area for the construction of the tanks (Photograph 2). It is positioned at approximately a 45 degree angle in relation to the power station. This substation makes a connection between the Encina Power Station and local customers. The substation consists of a metal framework grouped together with substation equipment. Large A-frame metal structures sit to the west and east of the metal framework. Electrical cables extend from each of these A-frames. This property contains three small manufactured sheds.

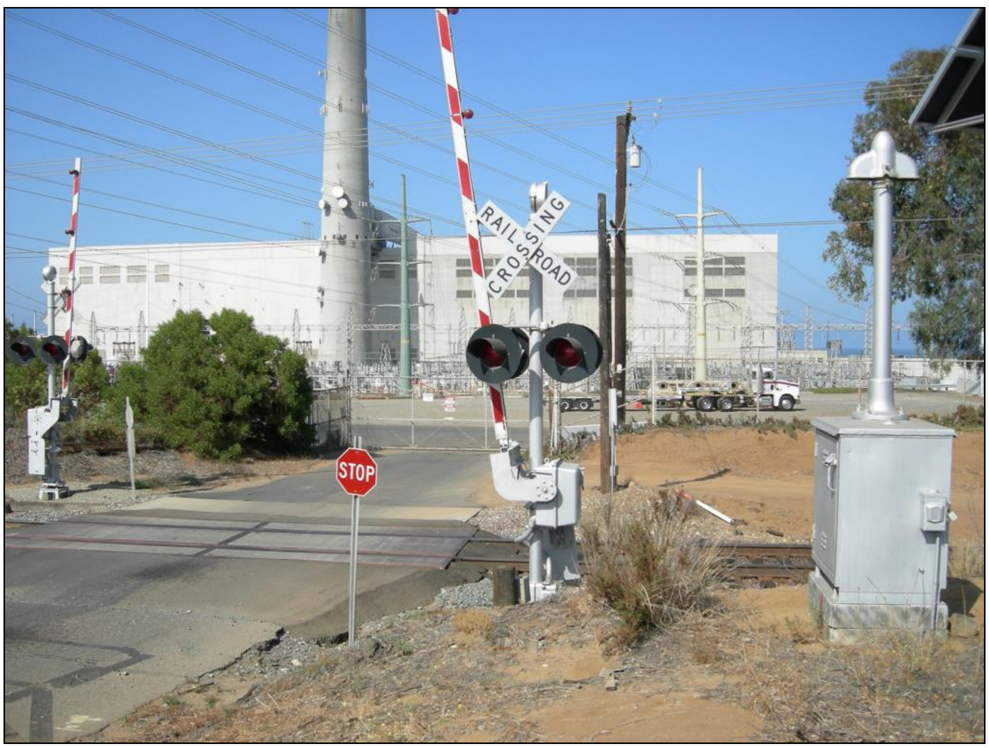


Photograph 2. Aerial photograph of tank construction, 1976; Tank 7 not yet installed.

Photograph 3. Cannon Substation, facing north, July 26, 2007.

The Surfline Tracks

The North San Diego County Transit District tracks run through the Encina Power Station. The rail line was built in the 1882 and re-aligned in 1906. The railroad connects San Diego to Los Angeles and northern California, and thus has been updated numerous times. Presently it is used as a commuter and freight line. San Diego Gas and Electric built the original portion of the power station on the property to the west of the railroad. The portion of the track that lies within the study area contains one grade-crossing for power station use (Photograph 4). To the south, the study area ends at the grade crossing for Cannon Road (Photograph 5). The welded metal rails sit on concrete ties and rock ballast. The rails were most recently replaced in 1989 and the ties in 1990. Gates and flashing lights protect both crossings. The Encina Power Station crossing also has metal wire sliding gates controlling access to the grade.



Photograph 4. Atchison, Topeka and Santa Fe Railroad grade crossing for Encina Power Station, facing southwest, July 26, 2007.

Photograph 5. Atchison, Topeka and Santa Fe Railroad at Cannon Road, facing north, July 26, 2007.

Photograph 6. Aerial of the Encina Power Station, 1984; Tanks 5, 6, 7 are at the upper right; the Surfline runs through the middle of the image.

5. FINDINGS AND CONCLUSIONS

5.1. Evaluation Criteria

JRP used the criteria of the California Register of Historical Resources (CRHR) to evaluate the historic significance of the properties within the study area.

The State of California references cultural resources in the California Environmental Quality Act (CEQA—Public Resources Code (PRC) Division 13, Sections 21000-21178); archaeological and historical resources are specifically treated under Sections 21083.2 and 21084.1, respectively. California PRC 5020.1 through 5024.6 (effective 1992) creates the California Register of Historical Resources (CRHR) and sets forth requirements for protection of historic cultural resources. The criteria for listing properties in the CRHR are in Section 15064.5(a)(2)-(4) of the CEQA Guidelines, which provide the criteria from Section 5024.1 of the California Public Resources Code. The CRHR is in the California Code of Regulations Title 14, Chapter 11.5. The CRHR criteria closely parallel those of the NRHP. The eligibility criteria for listing properties in the NHRP are codified in Code of Federal Regulations 36 Part 60 and explained in guidelines published by the Keeper of the National Register.

Eligibility for listing in CRHR rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm historical significance a property may possess and render it ineligible. Likewise, a property can have complete integrity, but if it lacks significance, it must also be considered ineligible.

Historic significance is judged by applying the CRHR criteria. The CRHR criteria are identified as Criteria 1 through 4. The CRHR guidelines explain that a historic resource's significance is determined by meeting at least one of the four main criteria. Properties may be significant at the local, state, or national level:

- CRHR Criterion 1: association with events or trends significant in the broad patterns of our history;
- CRHR Criterion 2: association with the lives of significant individuals;
- CRHR Criterion 3: a property that embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or that possesses high artistic values;
- CRHR Criterion 4: has yielded, or is likely to yield information important to history or prehistory.

In general, CRHR Criterion 4 is used to evaluate historic sites and archaeological resources. Although buildings and structures can occasionally be recognized for the important information they might yield regarding historic construction or technologies, the properties within the study area for this project are building types that are well documented. Thus, these properties are not principal sources of important information in this regard.

The CRHR definition of integrity and its special considerations for certain properties are slightly different than those for the NRHP. Integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance." The CRHR further states that eligible resources must "retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance" and it lists the same seven aspects of integrity used for evaluating properties under the NRHP criteria. The CRHR's special considerations for certain properties types are limited to: 1) moved buildings, structures, or objects; 2) historical resources achieving significance within the past fifty years; and 3) reconstructed buildings.

Under CEQA Guidelines, Section 15064.5 (a), a "historical resource" includes:

- A resource listed in or eligible for the California Register of Historical Resources;
- A resource listed in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code;
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant, provided the determination is supported by substantial evidence in light of the whole record;
- A resource so determined by a lead agency as defined in Public Resources Code sections 50203.1(j) or 5024.1.
- Historical resources listed in, or determined eligible for, the NRHP are automatically listed in the CRHR, Section 5024 (d)(1)(2) of the Public Resources Code.

5.2. Evaluation

None of the buildings or structures in the study area of the Carlsbad Energy Center appear to meet the criteria for listing in the CRHR. The sole structure in the study area around the Carlsbad Energy Center over 50 years old received evaluation: the tracks of the North San Diego County Transportation District. This structure does not have integrity to its potential period of significance. Tanks 5, 6 and 7, and the Cannon Substation, have been constructed within the past 50 years and do not appear to meet the exacting standards of exceptional significance.

Therefore, none of the buildings in the study area appear to be historical resources for the purposes of CEQA.

The Cannon substation and tanks 5, 6 and 7 are associated with the Encina Power Station. The station was constructed to meet the growing post World War II demand for electricity. All of the major California power companies were building plants at this time. The plants, including Encina, were constructed within a short period of time with standardized plans. None of the plants and their associated tanks and substations can be singled out as significant within the electrical system. As a result, Encina Power Station does not appear significant and the association of the tanks and substation with the station is not sufficient to grant them exceptional significance required for properties under 50 years old.

The segment of the North San Diego County Transportation District tracks crossing the study area does not appear to be eligible primarily because of the loss of integrity of design setting, materials, workmanship, feeling and association. If the line were determined to have integrity it would appear to meet the criteria for listing in the CRHR under Criterion 1, for is association with the development of San Diego. The period of significance would be 1882 when it became the first railroad in San Diego until the resultant land boom ended with the 1893 economic recession. However, field survey and research indicates that this segment lacks integrity. The alignment was altered in 1906, and maintenance and technological improvements have further altered the design, materials and workmanship of the line. Ties, ballast and rails have been replaced and additional crossings and safety features have been added with the most recent rail replacement occurring in 1989. The development of San Diego and the outlying communities has altered the setting, feeling and association. The original line traversed former ranchos with the small settlement of Carlsbad established after the railroad was built. Carlsbad did not become firmly established until the economy revived in the early 1900s. The Encina Power Station now surrounds the railroad along with the residential development south of the power station. The lack of six of the seven aspects of integrity prevents the railroad from conveying its significance and restrains its eligibility for the CRHR.

Infrastructure such as railroads are rarely eligible under Criteria 2, the association with historically significant people, unless the individual was a significant engineer or designer, in which case the property is more appropriately covered under Criterion 3. This track segment does not have and significant engineering or design characteristics that would render it eligible under these criteria and does not appear eligible under Criteria 2 or 3. Under Criterion 4 the segment has not yielded, nor will likely yield, important historical information that is otherwise unavailable in the documentary record.

This property has been evaluated in accordance with Section 15064.5(a) (2)-(3) of the CEQA Guidelines, using the criteria outlines in Section 5024.1 of the California Public Resources Code, and does not appear to be a historical resource for the purposes of CEQA. In addition the properties were also evaluated for inclusion in the San Diego County Register of Historical Resources as outlined in Ordinance 9493; San Diego Administrative Code Section397.7.

A full evaluation of the railroad property is located in Appendix B.

6. PREPARERS' QUALIFICATIONS

JRP Principal Rand F. Herbert (MAT in History, University of California Davis, 1977), provided project direction and management for the research and preparation of the report, directed the field work, and edited the report and forms. Mr. Herbert has more than 28 years professional experience working as a consulting historian and architectural historian on a wide variety of historical research and cultural resource management projects as a researcher, writer, and project manager. Architectural historian Cheryl Brookshear (MS Historic Preservation, University of Pennsylvania, 2000) performed portions of the research and prepared portions of the contextual statement, DPR 523 forms, and evaluations for this report. Mr. Herbert edited the report and evaluations. Research Assistant Joseph Freeman (MA, History, University of California, Riverside, 2007) assisted with research and fieldwork and prepared portions of the DPR 523 forms.

Mr. Herbert qualifies as a historian/architectural historian under the Secretary of Interior's Professional Standards (as defined in 36 CFR Part 61). Ms. Brookshear has a Master of Science degree in historic preservation from the University of Pennsylvania and qualifies as a historian/architectural historian under the Secretary of Interior's Professional Standards (as defined in 36 CFR Part 61). Mr. Freeman has a Master of Arts degree in History from the University of California, Riverside, and qualifies as a historian under the Secretary of Interior's Professional Standards (as defined in 36 CFR Part 61).

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APPENDIX A:

Figures

Map 1. Vicinity Map.

Map 2. Study Area outlined in black.

APPENDIX B:

DPR 523 Forms

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____
HRI # ____
Trinomial ____
NRHP Status Code 6

Other Listings ____
Review Code ____ Reviewer ____ Date ____

***Resource Name or #** (Assigned by recorder) NCTD Tracks

P1. Other Identifier: "Surfline" Railroad

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** San Diego
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** San Luis Rey **Date** 1997 **T** ___; **R** ___; __ ¼ **of Sec** ___; ___ **B.M.**

c. Address ____ City Carlsbad Zip 92008

d. UTM: (give more than one for large and/or linear resources) Zone ___; ____mE/ ____mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Segment from Agua Hedionda Bridge, railroad milepost 230.6, south approximately 4,000 feet to Cannon Road railroad milepost 231.4.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The segment is a portion of the former Atchison, Topeka, and Santa Fe Surfline which ran along the Pacific coast between San Diego and Los Angeles. The section within the study area runs through the Encina Power Station complex. The rails have a standard gauge width of four feet, eight and half inches. The length of the rail line within the study area is approximately 4,000 feet. The welded metal rails sit on concrete ties and rock ballast. One controlled grade crossing sits approximately half way along the rail line. This crossing is used by the power station. The road at the crossing is asphalt and the gates are automatic with lights, and powered by a solar panel. Cannon Road marks the southern edge of the study area. Between Cannon Road and the grade crossing is a decommissioned spur, connecting the Encina Power Station with the railroad.

***P3b. Resource Attributes:** (List attributes and codes) HP9 Public Utility - Railroad

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Railroad at Cannon Road, camera facing north, July 26, 2007

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1882, *History of the Atchison, Topeka and Santa Fe Railway*

***P7. Owner and Address:**
North County Transit District
810 Mission Avenue
Oceanside, California 92054

***P8. Recorded by:** (Name, affiliation, address)
Rand Herbert and Joseph Freeman
JRP Historical Consulting, LLC
1490 Drew Ave, Suite 110,
Davis, CA 95618

***P9. Date Recorded:** July 26, 2007

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, "Historical Resource Inventory and Evaluation Report, Carlsbad Energy Center, Carlsbad, San Diego County, California," July, 2007.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

BUILDING, STRUCTURE, AND OBJECT RECORD

Primary # ____________________
HRI # ____________________

***NRHP Status Code** 6

***Resource Name or #** (Assigned by recorder) NCTD Tracks

B1. Historic Name: California Southern Railroad, California Southern Railway, Atchison, Topeka & Santa Fe Railway, Burlington Northern Santa Fe.

B2. Common Name: "Surfline"

B3. Original Use: Railroad B4. Present Use: Railroad

***B5. Architectural Style:** Utilitarian

***B6. Construction History:** (Construction date, alteration, and date of alterations) Constructed 1888, Improvements 1906, additional modern maintenance and alterations unknown

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown Date:** ________ **Original Location:** ________

***B8. Related Features:** Agua Hedionda Bridge

B9. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The railroad segment does not appear to meet the criteria for listing in the National Register of Historic Places (NRHP),the California Register of Historical Resources (CRHR) or the San Diego County Register of Historical Resources, primarily because it lacks integrity of design, setting, materials, workmanship, feeling, and association for the potential period of significance of 1882, when it became the first rail line connecting San Diego creating a land boom that lasted until the Panic of 1893. Continued use and growth of the communities along the route have impacted the integrity of the line. At this time little remains of the 1882 track except the location. This property has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code, and does not appear to be a historical resource for the purposes of CEQA. This property has also been evaluated under Ordinance No. 9493; San Diego County Administrative Code Section 396.7 for possible inclusion in the San Diego County Register of Historical Resources. (See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) ________

***B12. References:** See Footnotes.

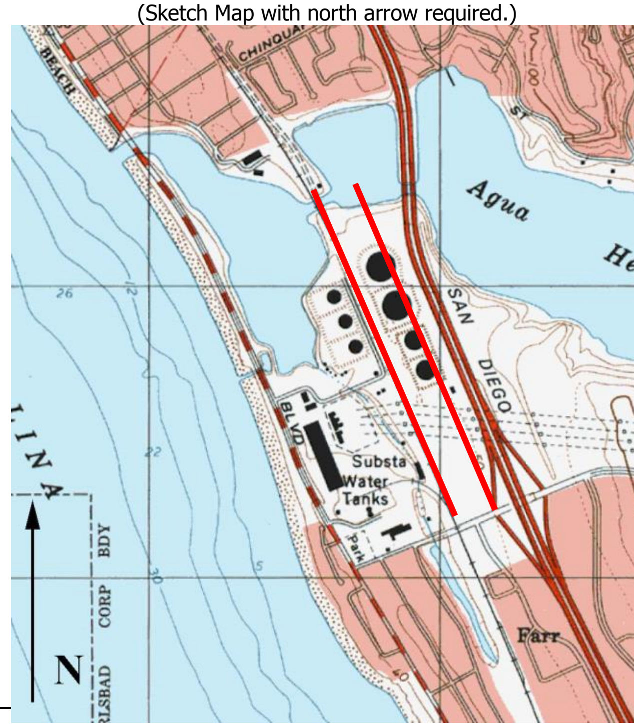
B13. Remarks:

***B14. Evaluator:** Cheryl Brookshear

***Date of Evaluation:** July 2007

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # ____________
HRI # ____________
Trinomial ____________

***Resource Name or #** (Assigned by recorder) NCTD Tracks

L1. Historic and/or Common Name: "Surfline," California Southern, Atchison, Topeka, and Santa Fe, Burlington Northern Santa Fe

L2a. Portion Described: ☐ Entire Resource Segment ☒ Point Observation **Designation:** Encina Power Station Crossing

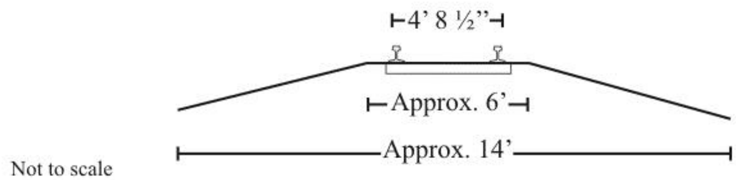
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)
Grounds of the Encina Power Station crossing located south of oil storage tanks. Railroad milepost 231.0

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

See Primary Record Description. This thoroughly modernized line runs through the Encina Power Station complex, for most of its length, in a cut with vertical banks from 3 to 20 feet in height.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)
- **a. Top Width** 4 feet, 8 1/2 inches
- **b. Bottom Width** 14 feet
- **c. Height or Depth** 1 foot
- **d. Length of Segment** 4,000 feet

L4e. Sketch of Cross-Section (include scale) **Facing:** North



L5. Associated Resources:
Agua Hedionda bridge

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
This segment is level crossing through the center of the Encina Power Station which was built around the railroad tracks. Across the Agua Hedionda lagoon the railroad enters a residential urban area. Residences have grown up around the siding to the south as well.

L7. Integrity Considerations: This portion of the tracks was re-aligned in 1906 to straighten the tracks, continued maintenance and improvements have altered the workmanship, design and materials of the line. Urban development has engulfed the tracks further altering the setting, feeling and association.

L8b. Description of Photo, Map, or Drawing: Encina Power Station crossing, camera facing southwest, July 26, 2007.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Cheryl Brookshear/Joseph Freeman, JRP Historical Consulting Services, LLC
1490 Drew Ave, Suite 110,
Davis, CA 95616

L11. Date: July 26, 2007

B10. Significance (continued):

Historic Context
The Atchison, Topeka and Santa Fe Railway began as the Atchison & Topeka Railroad Company chartered by the Kansas legislature in 1859 and became the Atchison, Topeka and Santa Fe Railroad Company in 1863. The company expanded westward from Kansas through the Southwest generally along the old Santa Fe Trail, giving the railroad its common name the "Santa Fe." The railroad, and its subsidiary companies jointly held with others, created a system that stretched from Illinois to Texas to California by the end of the 1880s, getting its foothold in the latter state through its involvement with the construction of the railroad in San Diego.[1]

During the 1870s, San Diego residents and business leaders could not interest California's main railroad, the Southern Pacific (SP), to link their city up to the railroad's state and transcontinental system. San Diego booster Frank Kimball, along with the San Diego Chamber of Commerce, instead attracted Thomas Nickerson and other board members of the Atchison, Topeka, and Santa Fe Railroad to build a line connecting San Diego with Santa Fe's projected Atlantic and Pacific (A&P) at San Bernardino. Nickerson's group, closely affiliated with Santa Fe, formed the California Southern Railroad in 1880 and completed construction of 211 miles of track in 1882 from National City north to Fallbrook Junction, just north of Oceanside including the segment south of Agua Hedionda. This line proceeded north from Fallbrook through Temecula Canyon to San Bernardino. The California Southern also surveyed the line north of Fallbrook Junction along the shoreline to Fullerton (now in Orange County) at the same time. Although California Southern successfully completed its initial line, there were early challenges that almost led to the railroad's immediate demise. The A&P was not built by Santa Fe west of Needles and in late 1884 and early 1885 flooding washed out large sections of California Southern's track and structures in Temecula Canyon. The railroad closed and SP threatened to take over the financially troubled California Southern. Santa Fe seized greater control of California Southern to prevent SP's take over and negotiated with SP to purchase one of its branch lines running from Needles to Mojave, through Barstow, in San Bernardino County. Santa Fe then built the connecting line between San Bernardino and Barstow completing the railroad's transcontinental line in 1885, although Santa Fe still had to lease track from SP to reach Los Angeles. After the 1885 flood, California Southern did not rebuild the entire line through Temecula Canyon to San Bernardino, but rather constructed a shoreline route north of Fallbrook Junction on the coast to Fullerton completing the new line in 1888. This became the main line between San Diego and Los Angeles.[2]

California Southern built the shoreline route north from Fallbrook Junction to Fullerton to improve service between the two cities and as part of the Santa Fe's larger strategic plan to secure its own lines into Los Angeles. The shore route became known as the "Surfline." The following year, in 1889, California Southern and several smaller branch lines were reconfigured into the Southern California Railway helping stabilize the company during the region's heady period of economic growth in the 1880s generated in part by the healthy competition with SP. Although the San Diego and Los Angeles economy faltered along with the rest of the state following the Panic of 1893, the Southern California Railway

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[1] G. Holterhoff, Jr., "Historical Review of the Atchison, Topeka and Santa Fe Railway Company (with particularly reference to California lines)," as furnished to the Railroad Commission of the State of California, June 1914; and Donald Duke and Stan Kistler, *Santa Fe . . . Steel Rails Through California*, (San Marino, CA: Golden West Book, 1963), 10-29.

[2] Keith L. Bryant, Jr., *History of the Atchison, Topeka and Santa Fe Railway*, (New York: MacMillian Publishing Co, Inc., 1974), 96-102; Atchison, Topeka and Santa Fe Railway, "Coast Lines Los Angeles District, Fourth District, National City to Fullerton," timeline of construction, October 1918 (San Diego Historical Society Research Archives, Atchison, Topeka and Santa Fe Document File); R.P. Middlebrook, "The Fallbrook Branch," *Pacific Railway Journal*, Volume 2, Number 4, November 1957; Holterhoff, "Historical Review of the Atchison, Topeka and Santa Fe Railway Company," 1914; Duke and Kistler, *Santa Fe . . . Steel Rails Through California*, 27-46; and Douglas L. Lowell, "The California Southern Railroad and the Growth of San Diego," *Journal of San Diego History*, Fall 1985 (Part 1) and Winter 1986 (Part 2).

infrastructure laid in the 1880s and early 1890s established the ground work of even greater economic expansion in and around San Diego and Los Angeles during the first half of the twentieth century.[3]

The construction of the railroad connecting San Diego to a transcontinental line produced a land boom in San Diego. The competition between the two railroads, SP and California Southern, resulted in a fare war and increased marketing of land in southern California. San Diego's population grew to 35,000 during this period of competition. The railroad increased competition between the ports at San Diego and Los Angeles. Los Angeles' port and greater access to rail service tempered growth in San Diego.

The Atchison, Topeka and Santa Fe Railroad reorganized into the Atchison, Topeka and Santa Fe Railway in 1895, following a period in which the railroad fell into receivership. Although there were several so-called "short-line" railroad companies in the San Diego region, during the late 1890s and early twentieth century, the Santa Fe was one of only two major inter-regional railroads in San Diego. The other was John Spreckel's San Diego & Arizona Railroad. The Santa Fe purchased the Southern California outright in 1906 and continued improvements along the Surfline it had created in the mid-1890s. These improvements included straightening the line just south of its bridge at Agua Hedionda lagoon. Consolidation of the smaller short-lines into the two main railroads in San Diego increased following the massive flood of 1916 that devastated many small lines and damaged portions of the Santa Fe system.[4]

The Santa Fe used the Surfline for both freight and passenger service. The railroad's streamline "San Diegan" began service between San Diego and Los Angeles in 1938. The railroad continued to maintain and improve the line and its structures throughout the mid-twentieth century, replacing an earlier bridge at Agua Hedionda with the current structure around 1950. Eventually, the Santa Fe ran two small self-propelled trains, the diesel San Diegan, and several other local passenger service trains along the Surfline through the 1950s and 1960s. Santa Fe passenger service between San Diego and Los Angeles continued until 1971 when it was turned over to the National Railroad Passenger Corporation (Amtrak), though the Santa Fe continued to run the service until 1986. NCTD purchased the railroad route between the San Diego County / Orange County boundary line and the City of San Diego / City of Del Mar boundary line in 1992, granting Santa Fe track rights for continued freight service. The Santa Fe merged with Burlington Northern in 1995 to become the Burlington Northern and Santa Fe Railway (BNSF).[5]

This segment received new rails in 1989 and was resurfaced in 1991.

Evaluation

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[3] Bryant, *History of the Atchison, Topeka and Santa Fe Railway*, 102-105.

[4] Holterhoff, "Historical Review of the Atchison, Topeka and Santa Fe Railway Company," 1914; Bryant, *History of the Atchison, Topeka and Santa Fe Railway*, 102-105; *San Diego Union and Bee*, February 7, 1897, 5; McGlashan and Ebert, *Southern California Floods of January, 1916*,"1918, 30-31; and *Plain Truth*, July 1909 (typed references, Carlsbad History Room, Cole Library, City of Carlsbad Library).

[5] James N. Price, "The Railroad Stations of San Diego County: Then and Now," *Journal of San Diego History*, Spring 1988, np; *San Diego Union*, May 21, 1952; Lee Gustafson and Phil Serpico, *Santa Fe Coast Line Depots: Los Angeles Division*, (Palmdale, CA: Omni Publications, 1992), 183; *San Diego Union*, May 2, 1971; Gustafson and Serpico, *Santa Fe Coast Line Depots: Los Angeles Division*, 183; *San Diego Daily Transcript*, June 19, 1992, np; BNSF, "Company Profile," BNSF website, 2004: www://bnsf.com/media/html/company_profile.html (accessed May 2004); A.T.&S.F Ry. System, "Br. A-231 4th Dist. Los Angeles District, Ballast Deck Timber Trestle with Steel Stringers and Caps," plans, Chicago, IL, April 1948; A.J. Smith in San Bernardino, letter to M.C. Blanchard, AT&SF Chief Engineer, Los Angeles, May 12, 1948; NSDCTDB Timber Trestle Bridge Inspection Record File, Bridge 230.6, February 7, 1994; Carlsbad Historical Society photos collection of Encinas Power Plant, 1950s; and Susan Gutierrez, Carlsbad Historical Society Historian, personal communications with Elsbeth Trask Cosart, September 2004. Ms. Cosart's family owned property near the Agua Hedionda bridge from the 1920s to the 1970s, and she remembers track work in the 1940s. The railroad bridge in photos of the completed Encina Power Plant in the 1950s was replaced by the current concrete box girder structure in 2006.

***Resource Name or #** (Assigned by recorder) NCTD

***Recorded by** Rand Herbert and Joseph Freeman *Date July 26, 2007 ☒ Continuation ☐ Update

This segment of the North San Diego County Transportation District tracks does not appear to be eligible for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR) primarily because of the loss of integrity of design setting, materials, workmanship, feeling and association. If the line were determined to have integrity it would be potentially eligible under Criterion A, for is association with the development of transportation routes to San Diego. The period of significance would be 1882 when it became the first railroad in San Diego until the resultant land boom ended with the 1893 economic recession.

Field survey and research indicates that this segment lacks integrity. The alignment was altered in 1906, and maintenance and technological improvements have further altered the design, materials and workmanship of the line. Ties, ballast and rails have been replaced and additional crossings and safety features have been added. The development of San Diego and the outlying communities has altered the setting, feeling and association. The original line traversed former ranchos with the small settlement of Carlsbad established after the railroad was built. Carlsbad did not become firmly established until the economy revived in the early 1900s. The Encina Power Station now surrounds the railroad along with the residential development south of the power station. The lack of six of the seven aspects of integrity prevents the railroad from conveying its significance and restrains its eligibility for the National Register of Historic Places or the California Register.

Infrastructure such as railroads are rarely eligible under Criteria B or 2, the association with historically significant people, unless the individual was a significant engineer or designer, in which case the property is more appropriately covered under Criterion C or 3. This track segment does not have and significant engineering or design characteristics that would render it eligible under these criteria and does not appear eligible under Criteria B (2) or C (3). Under Criterion D or 4 the segment has not yielded, nor will likely yield, important historical information.