APPENDIX 8.3C

Architectural Report

TECHNICAL MEMORANDUM

ARCHITECTURAL DOCUMENTATION AND EVALUATION OF THE SOUTH BAY POWER PLANT, CHULA VISTA, CALOFORNIA

February 24, 2006

To: Clint Helton
CH2M Hill
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

From: Rand Herbert and Andrew Walters
JRP Historical Consulting
1490 Drew Avenue, Suite 110
Davis, California 95616

Subject: California Energy Commission (CEC) Cultural Resources Compliance for Demolition of the South Bay Power Plant, Chula Vista, San Diego County, California

As part of the California Energy Commission's efforts to comply with Section 106 of the National Historic Preservation Act (codified in 36 CFR Part 800) regarding the demolition of the South Bay Power Plant in Chula Vista, San Diego County, California, JRP Historical Consulting Services conducted a study of the property that included documentation of its physical setting, recordation of its history, and evaluation of its historic significance for the National Register of Historic Places and for the purposes of the California Environmental Quality Act ((Section 15064.5 (a)(2)-(3)), (CEQA). JRP conducted field reconnaissance of the South Bay Power Plant property on February 14, 2006.

JRP evaluated the building's historic significance of the South Bay Power Plant and recorded the property on the attached DPR523 form using considerations outlined in 36 CFR Part 800.4 (c)-(d). JRP found that the South Bay Power Plant property, consisting of the four-unit power plant and over 25 support structures located at 990 Bay Boulevard in Chula Vista, does not appear to meet the criteria for listing in the National Register of Historic Places, and is therefore also not a historic resource for the purposes of the California Environmental Quality Act ((Section 15064.5 (a)(2)-(3)), (CEQA).[1]

[1] The NRHP and CEQA both require that historic properties be identified and evaluated by following standardized guidelines and applying significance criteria. Because CEQA guidelines are based on those of the NRHP, the two

The first unit of the South Bay Power Plant was completed in 1960, and additional units were added incrementally thereafter. The property, therefore, is less than 50 years old, and only one of the plant's four units is 45 years old. In order to be eligible the property would need to qualify under the exacting standards for evaluation as an exceptionally significant property (Criteria Consideration G). This evaluation finds that the South Bay Power Plant does not appear to represent an exceptionally significant property, whether considered within the context of the history of San Diego Gas & Electric Company, the history of steam electrical generation, or the more limited context of steam plants built during the post-war era. Its dominant characteristic is its typicality rather than its exceptionality.

Research for the preparation of this report was conducted at the California State Library, Sacramento, University of California, San Diego, and San Diego Public Library. General information about the plant was provided by Jim Nylander, South Bay Power Plant plant manager, and historic photographs and building plans for the plant were provided by Joseph Otahal, Electric Modernization Manager. Following are the detailed results of this study, which are provided in greater detail on the attached DRP 523 form, which includes historic and contemporary photographs, maps, and other data.

<u>General History of Steam Plants in California</u>

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.[2]

are nearly identical. For the sake of clarity, this report outlines the NRHP evaluation process; nevertheless, both NRHP and CEQA guidelines were applied in the preparation of this report.

[2] 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.

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.[3]

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. 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.[4]

These statistics, however, mask an 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.[5]

---

[3] Termuehlen, *100 Years of Power Plant Development*, 21-28.
[4] James C. Williams, *Energy and the Making of Modern California* (Akron, Ohio: University of Akron Press, 1997), 374.
[5] Williams, *Energy and the Making of Modern California*, 278.

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.[6] 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 various utilities. In 1930, the PG&E vice-president for engineering wrote: "Under the circumstances which now prevail, it is natural to question the future of hydro in California." [7]

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 San Diego Gas & Electric Company (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 historian James Williams, "by a positive history of increased thermal power plant development."[8]

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

[6] 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.

[7] "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.

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

detailed article in 1950 in *Civil Engineering*, I. C. Steele, Chief Engineer for PG&E, 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 warranted; most of them were. [9]

The decades between 1950 and 1970 were the 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. [10]

[9] 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.

[10] 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

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.[11]

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.[12]

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

---

Demand," *Southwest Builder and Contractor* (October 12, 1962): 24-27; Williams, *Energy and the Making of Modern California*, 257.

[11] 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 www.energy.ca.gov/electricity/system_power.

[12] 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).

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 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.[13] 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.

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

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

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.[14]

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 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. [15] Nothing remains of the desalinization plant; tank and building foundations are all that remain of the LNG facility, which is outside of the study area of this project.

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

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

[15] *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.

hold. Addition power to 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. [16]

History of South Bay Power Plant

As discussed above, construction of the SBPP was part of SDG&E's plans to accommodate post war growth in its service area by bringing new steam-electric generating units online in two-year increments beginning in 1950. Physical planning for the development of the SBPP, to be sited on the eastern shore of San Diego Bay in Chula Vista, began in 1957 with construction of Unit 1 beginning in 1958. The site was laid out so that addition units could be added as needed. The plant's four units went online in 1960, 1962, 1964, and 1971. The plant's major facilities were constructed during this period. SDG&E owned and operated the plant until 1996, when it was sold to the Port of San Diego, and subsequently leased to Duke Energy, which continues to supply power to the San Diego metropolitan area.[17]

The site selection and construction of the plant was consistent with general engineering practices of the day, and the plant had much in common with other steam-electric power plants constructed during the post war period. As outlined above, the general design criteria for power plants included building the facility close to load centers to reduce transmission costs, in proximity to fuel and water supplies for ease of operation, and locating the plant on a site where land was cheap and could support a good foundation. The plant was also constructed to be a semi-outdoor type, in order to reduce construction cost and provide for ease of expansion. SDG&E had the SBPP designed and constructed without any enclosures over the equipment, creating a more cost-effective plant in terms of maintenance, cleaning, and ventilation. SDG&E was able to build the plant in this fashion because of the usually mild temperatures and dry weather conditions in Southern California. SDG&E built the SBPP near the tidewaters of San

[16] *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.
[17] San Diego Gas & Electric Company, South Bay Power Plant construction photographs; Pioneer Service and Engineering, "San Diego Gas & Electric Company, South Bay Power Plant Unit No. 1, San Diego, California, Plot Plan," May 31, 1957, revised through August 9, 1971; San Diego Gas & Electric Company construction photographs of the South Bay Power Plant (retained by Duke Energy).

Diego Bay to obtain water for feeding the boilers and turbines, and to provide for cooling in the large condenser units.[18]

SDG&E began construction for the SBPP in 1958 and had Unit 1 in full operation by July 1, 1960. Initial construction included the power plant structure, including a 142,000 kW turbo generator unit, boiler, and associated equipment, as well as many of the associated buildings and structures that would comprise the plant. These additional buildings included a construction office, warehouse, stores and shops building, fuel oil storage tanks, control structures, wastewater treatment facility, and other buildings located throughout the 149-acre site. The estimated cost of construction for Unit 1 plant and site, which included infrastructure for Unit 2, was $22,500,000. Pioneer Service & Engineering Company of Chicago, the firm that designed the company's Encina plant, designed the SBPP. Principal subcontractors on the project included General American Transportation Corporation for erecting the fuel oil storage tanks, Midwest Piping Company, Inc. for installing the piping, C.C. Moore & Company for erection of the boiler, Franks Dredging Company for dredging, and Bethlehem Pacific Coast Steel Company supplied the structural steel for the plant. General Electric Company manufactured the turbine and generator, and Babcock & Wilcox manufactured the boiler. Most of the construction, however, was accomplished by the company's own forces, under the supervision of H.A. Noble, vice- president of operations for SDG&E, and by Walter Zitlau, mechanical engineer.[19]

Because of its location in a low, flat marshy area once occupied by saltwater evaporation ponds, the plant site required extensive planning and the use of alternative construction methods for its foundation, detailed in a 1961 *Civil Engineering* article by Vernon A. Smoots and Phillip H. Benton. Whereas major power plants and other large structures normally required sturdy foundations founded on rock or piles, the authors contend, the SBPP was one of several plants constructed on earth fill, representing the expanding use of soil compaction techniques for heavy structures. Typically, steam power plants were located near bodies of water where soft soils are prevalent, and firm soil or bedrock is often 100 feet or more below ground. Because power plants are extremely heavy and settlement of the foundation must remain small, such an environment creates the problem of foundation support. Costly piles or caissons were generally used in order to reach suitable foundation materials. After considering several methods of pile foundation construction and other alternative methods, SDG&E chose the compacted-fill method for the SBPP as a matter of cost and expediency. This method involved excavating a 380' x 310'

[18] I. C. Steele, "Steam Power Gains on Hydro in California," 17-21; R.W. Spencer, "Cooling Water For Steam Electric Stations in Tidewater," 280-305; Walter L. Dickey, "The Design of Two Steam Electric Plants," 253-273; *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply" *Southwest Builder and Contractor* (July 10, 1959): 26-32, 37.

[19] Pioneer Service and Engineering, "San Diego Gas & Electric Company, South Bay Power Plant Unit No. 1, San Diego, California, Plot Plan," May 31, 1957, revised through August 9, 1971; *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply" *Southwest Builder and Contractor*, 26-29.

x 20' deep area to remove unsuitable soil and replace it with a more suitable backfill. This fill consisted of a layer of crushed rock, followed by a layer of pea gravel and fine to coarse sand. Fine beach sand imported from the Silver Strand was then laid in one-foot layers that were then compacted under close supervision of engineers. The foundation sub-grade for the first two units of the plant was laid at the same time, at a cost of $94,000 per unit. Before the second unit was constructed beginning in 1960, the fill for future units 3 and 4 was placed as a slightly lower cost. The SCE Huntington Beach plant, the City of Burbank's Burbank plant, and California Electric Company's Daggett plant were among earlier plants also constructed on compacted fill foundations.[20]

The building pad and turbogenerator deck for Units 1 and 2 was 110' x 250'. The pad had a minimum thickness of four and one half feet and was reinforced by a double mat of #11 rebar on one foot centers. Concrete for the site was prepared in a batch plant located onsite, with aggregate supplied by H.G. Fenton Material Company of San Diego. Following the construction of the pad and turbine generator deck, 1,475 tons of structural steel was required for the frame of Unit 1. Similar amounts were needed for the subsequent units. The steel members arrived partially assembled from Bethlehem Pacific Steel, and were erected onsite with high tensile strength bolts. As part of the preparation for the construction of the facility, a railroad spur was extended approximately 2,500 feet from the main north-south San Diego & Arizona Eastern Railway tracks that skirt the eastern boundary of the SBPP property to the east side of the power plant building site in order to facilitate construction. This spur was used to bring in the mammoth boilers, turbines and generators units and other large components of the facility.[21]

Another major portion of the construction of the plant involved excavating channels from the power plant out into San Diego Bay for cooling water intake and discharge. The design of the plant included a concrete screening and pumping structure constructed on the south side of the power plant, from which a fifteen-foot deep intake channel was dredged a distance of 6,000 feet into the bay for cooling water. A similar channel for the discharge of warm water was constructed adjacent the intake channel, separated by a 1,000 foot long earth and rock dike. Two 48-inch concrete pipes conducted water from the intake structure to the plant, and a single 72-inch pipe returned the water after use to the discharge channel. The first screen house / intake structure was constructed for Units 1 and 2, and two additional smaller structures were constructed in association with Units 3 and 4, when the channels were also extended. Small pre-stressed concrete bridges were constructed across the channels to conduct fuel oil piping and conduits for control cables to the plant. The pre-stressed concrete beams for the bridges were

[20] Vernon A. Smoots and Phillip H. Benton, "Compacted Earth Fill For a Power-Plant Foundation" *Civil Engineering* (August 1961): 54-57; *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply," 27.
[21] *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply," 27-29.

cast by Southwest Structural Consolidated Concrete Company and delivered to the site by barge and floated into position on piers.[22]

Immediately after Unit 1 (142,000 kW) went online in July 1960, SDG&E began construction of Unit 2 (142,000 kW), manufactured by Westinghouse, which was completed and online by mid 1962. These units were later upgraded to 147,000 kW and 150,000 kW, respectively. As noted above, the structure for Unit 2 including turbine generator deck and cooling water system was constructed as part of the Unit 1 construction. In the years that followed, the company added two more units: Unit 3 (General Electric, 171,000 kW) in 1964, and Unit 4 (Westinghouse, 222,000 kW) in 1971. In 1966 SDG&E installed a small 2,300 kW peak load or emergency generator near its switchyard located on the north side of the power plant. This unit, comprised of a 72' x 29' x 26' high turbojet generator was manufactured by Pratt & Whitney and resembled an aircraft turbojet powerplant. The turbine, generator, transformer, and control room for the peaker plant was enclosed in a weatherproof, soundproof enclosure. A JP5 fuel tank to for the jet engine turbine was located nearby. The peaker plant was designed to reach full load capacity in three minutes to assist with peak load emergencies. In all, the SBPP was capable of generating 706 mW of electricity.[23]

As mentioned above, during the mid-1960s the SBPP became the site of two additional ventures subsidiary to power generation: the site of a liquefied natural gas (LNG) plant, and a seawater conversion installation. In 1965 SDG&E completed its LNG plant at SBPP, located in the southern portion of the power plant site. Based on cryogenic technology, this project was the first of its kind in the west, and one of only five worldwide. The purpose of the plant was to convert natural gas to liquid form so that it could be stored for peak season use, thus avoiding paying "demand charges" for gas during the peak winter months from its gas supplier, Southern Counties Gas Company. At an approximate cost of $2.8 million, the plant was projected to enable the company to save $10 million over ten years. The plant could handle 25 million cubic feet of "feed gas" daily, which it would clean up, liquefy, store, and re-gasify as needed. The primary facility was a 127 foot tall, 117 foot diameter "thermos jug" (storage tank) that could store 175,000 barrels of gas. In 1965, the US Department of the Interior built the west coast module of a nationwide seawater conversion program at the SBPP. This project was an extension of research and experimental projects between SDG&E and General Atomic Division of General

[22] *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply," 29-32.
[23] Vernon A. Smoots and Phillip H. Benton, "Compacted Earth Fill For a Power-Plant Foundation," 54; *San Diego Union*, July 20, 1966, October 5, 1966; California Energy Commission, Power Plant Data Base, July 1, 2004; Pioneer Service and Engineering, "San Diego Gas & Electric Company, South Bay Power Plant Unit No. 1, San Diego, California, Plot Plan," May 31, 1957, revised through August 9, 1971.

Dynamics Corporation to obtain economical seawater conversion. Both the LNG plant and the saltwater conversion facility were removed from the SBPP site during the mid-1970s.[24]

In addition to the power plant structure and cooling water channels and associated features, most of the buildings and structures at the SBPP site were part of the original construction. These included the Administrative building, originally a smaller change room and office building that was later expanded, the Stores and Shops building located on the southwest corner of the power plant, the Waste Water Operations Building, two 131,500 barrel capacity fuel oil storage tanks, the Tank Farm Control Buildings, Office Building, Warehouse, and the Wire Storage Building. The location of these buildings is depicted on a map included in the attached DPR 523 form. Alterations to the plant include the construction of a waste water tank farm on the south side of the Waste Water Operations Building on the former site of the seawater conversion facility, the construction and subsequent removal of several oil storage tanks and wastewater ponds.

Evaluation

The South Bay four-unit steam generating power plant does not appear to meet the criteria for listing in the National Register of Historic Places (NRHP) and is not a historic resource for the purposes of the California Environmental Quality Act ((Section 15064.5 (a)(2)-(3)), (CEQA).[25] Furthermore, the property is less than 50 years old, and only one of the plant's four units is over 45 years old. Therefore, in order to be eligible it would need to qualify under the exacting standards for evaluation as an exceptionally significant property. This evaluation finds that The South Bay Power Plant is neither exceptionally significant in the context of the development of SDG&E, nor as an example of a steam power plant from the post-war era.[26] Lacking such significance, the property does not appear to meet the criteria for listing in the National Register and is not an important historic property under CEQA.

The SBPP is not importantly associated with an event significant within the broad patterns of our history (Criterion A). While this property is a component of a larger power generating and delivery system operated throughout most of its lifetime (1960-1996) by SDG&E, it does not appear to represent a particularly significant property within the context of the development of power generation capacity of SDG&E or within the broader context of post-war power

[24] *San Diego Union*, January 24, 1965, February 18, 1967, May 30, 1968; Iris Engstrand and Kathleen Crawford, *Reflections: A History of the San Diego Gas & Electric Company 1881-1991*, 186; Personal Communication with Jim Nylander, South Bay Power Plant Manager, February 14, 2006.

[25] The NRHP and CEQA both require that historic properties be identified and evaluated by following standardized guidelines and applying significance criteria. Because CEQA guidelines are based on those of the NRHP, the two are nearly identical. For the sake of clarity, this report outlines the NRHP evaluation process; nevertheless, both NRHP and CEQA guidelines were applied in the preparation of this report.

[26] 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).

development in southern California. Rather, it was one of several such similar plants built in the region after World War II.

As discussed above, SDG&E built new steam plants between the 1950s to about 1971, the time period in which the four SBPP units went on line. These included units at the Encina Power Plant, located in north of the City of San Diego near Fallbrook. The regular addition of steam plant units helped the company survive through a period of great economic and demographic growth. The plants also helped sustain the local economy and population. In this sense all power plants have an important place in local history, which without understanding the over-all context of the system might lead to an over-broad conclusion that all such plants are significant. Within its context, however, this plant did not make an exceptionally important contribution to the history of SDG&E, or within the context of post war power development in southern California. The SBPP currently generates a base load of 706 mw, and was but one of several steam plants that helped the company accommodate the great growth of electrical demand in the San Diego region during the post-war era. Other plants in the SDG&E system included Station A (approximately 15 mw, offline since 1939), Station B (approximately 99 mw, offline since the 1980s), and Encina (909 mw). Since both Station A and Station B have been taken offline, SBPP is the smallest and last of the steam-electric plants in this group. It was, in fact, a typical power plant constructed during the period: it was built in the 1960s; was built sequentially, with the company adding the units in phases; had a substantial power generating capacity; and was sited to be near the major power load centers as well as near water sources that could be used for cooling.

In considering the impact of this power plant on the local economy, it is necessary to appreciate the property in the context of similar resources. It is in the nature of public utilities, as with public works projects, that the benefits of these improvements are widely distributed. Every power generating facility delivers a useful product to a broad market or serves a useful public purpose, as does every highway, airport, sewer system, hospital, school, and other utility and public works undertakings. Analyzed at face value, every improvement made by a utility or public works agency may be seen as having made an important contribution to the community it serves. These types of properties, however, must be appreciated in the context of like properties, to avoid trivializing the elements of what constitutes significance for the property type. The question is not whether the SBPP made a useful contribution to the local economy; it obviously did. The question rather is whether the station made a contribution that is significant within the context of other properties of its type.

In the universe of steam turbine powerplants in California, many are older than SBPP. Duke Energy, the current operator of SBPP, is currently listed as owning two other steam turbine power plants in California, Morro Bay (1955) and Moss Landing (1950), both of which are older than SBPP. Older steam turbine facilities also include Burbank's Magnolia Plant (1943), Glendale's Grayson Plant (1953), PG&E's Contra Costa (1951-53) and Pittsburg (1958) plants, LADWP's Harbor (1943) and Valley plants (1954), and SCE's Redondo Beach (1948), Etiwanda (1953) and El Segundo plants (1955). The CEC also lists a steam turbine co-generating facility in Watsonville with a construction date of 1901. The first unit of the SBPP plant at Chula Vista was built in 1960 and contains a single steam turbine-driven generator. This facility contains the technology from the 1950s that made power plants more efficient.[27]

In this context, the SBPP is by any reasonable measure a typical example of its type. According to the records of the California Energy Commission, the plant has a capacity of 706 mw. In this regard, it is a large but not an exceptional part of the power generating capacity of SDG&E and is a typical but not exceptional steam plant from this period. The steam plants built by SCE, for example, between 1945 and 1965 range in their capacity from about 1,000 mw to about 2,100 mw. The Alamitos station in Long Beach is by far the largest of these, with a capacity of 2,120 mw. Other plants from this era include Redondo Beach, with a capacity of 1,310 mw, Etiwanda at 1,049 mw, and Ormond Beach at 1,500 mw. It appears that the SBPP is actually one of the smaller of the various plants built during this era. The facility's capacity, however, is less important than the general similarities among the various elements of the SDG&E steam generating system. The SBPP was one of several plants the company brought on line during this period and is typical of these plants, albeit having a different capacity than the others. In terms of its role in the history of the company, this plant does not appear to have made an exceptionally significant contribution.

In addition, it does not appear that the plant is exceptionally significant within the context of steam generation plants in California, whether seen in the long history of the area, or in the more limited context of steam plants during the immediate post-war era. As noted above, steam generation of electricity dates to the late 19th century. Among the earliest power plants of SDG&E were small steam plants, Station A, constructed in 1887, and Station B, constructed in 1921, both of which are currently inactive. Steam generation, however, fell out of favor during the period from about 1900 through the 1940s, as many California utilities built numerous low-cost hydroelectric facilities to take advantage of the high-head capabilities in the mountainous regions of the state.

The resurgence of steam power generation in California after 1945 reflects a simple fact: all of the best hydroelectric power generation sites had already been taken, either by other power

[27] California Energy Commission, Power Plant Data Base, July 1, 2004; 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.

companies, or the various state, federal and local water development agencies, who were in the midst of a massive program of dam development throughout the 1940s, 1950s, and 1960s. These public projects brought a great deal of new hydroelectric power online that supplemented the SDG&E system somewhat through transfers between utilities. Between 1945 and 1970, the amount of hydroelectric power generated in the state more than tripled, from eleven million kilowatt hours to nearly 38 million kilowatt hours.[28] Most of this new hydroelectric capacity, however, was associated with the power plants of the huge dams that were completed during this era, by local, state, and federal water development agencies. The investor-owned utilities were denied access to these dam sites and most of the economical upstream sites had already been developed. There were a few privately built hydroelectric facilities constructed during the post-World War II era, but these were relatively unimportant compared to other types of power stations.

SDG&E, LADWP, PG&E and SCE built dozens of steam plants during the first two decades after the conclusion of World War II. Primary and secondary literature suggests that these plants were quite similar to each other. Many — South Bay, Contra Costa, Pittsburg, Kern, Moss Landing, Hunters Point, Magnolia, Etiwanda, El Segundo and Long Beach, for example — were built in the outdoor and semi-outdoor design. This design is so characteristic that such plants, whatever the company that built them, appear to be closely identical, even though they often include different sizes of boilers and generators. Most of these plants were located in proximity to water and fuel supplies, and all were built sequentially as the need for expansion arose. In a previously cited article in *Civil Engineering*, PG&E engineer Steele noted the similarities of four major steam plants — Kern, Hunters Point, Moss Landing, and Contra Costa — that the company had under construction in 1950, just a few years before work at the SBPP started. His article emphasized economical measures that were taken to hold down costs on these enormously expensive projects and hinted at cooperation between the PG&E and SCE, both of which were faced with the same types of problems. For example, the saltwater intake at the PG&E Moss Landing power plant was patterned after an intake already under construction by SCE at its Redondo Beach facility.[29] The extent to which SDG&E's plans were influenced by the experience of other companies was not revealed in the research for this project; however, the similarity of SDG&E's plants to others of a similar age around the state is strong.

The SBPP, like other similar aged and designed plants, utilized equipment that was essentially "off-the-shelf." As discussed earlier, it was a substantial project, but was by no means the largest steam station constructed in the San Diego or Southern California region during the post-war era. It does not appear that the station represented a new departure in the technology of steam generation of electrical power. Neither does it appear that the plant represented an

[28] Williams, *Energy and the Making of Modern California*, 374.
[29] I.C. Steele, "Steam Power Gains on Hydro in California," 21.

important departure in the areas of plant siting, foundation work, or any other aspect of power plant construction techniques. While the foundation work for the plant as discussed above involved a less tried-and-true method of foundation support, it was not revolutionary in terms of construction technology, technique, or accomplishment. The station, therefore, does not appear to meet Criterion C, because it does not embody the distinctive characteristics of a type, period, or method of construction.

Neither does the power plant appear to be associated with the life of a historically significant person (Criterion B), nor is it significant under Criterion D, which addresses "information potential" of a property. In rare instances, buildings and structures can serve as sources of important information about historic construction materials or technologies under Criterion D; however, this property is otherwise well-documented and does not appear to be a principal source of important information in this regard.

If a property meets any of the significance criteria, it is then evaluated for its degree of historical integrity. In this case, the station does not appear to meet any of the significance criteria, rendering the status of its physical integrity irrelevant. Despite the fact that the plant appears to largely retain integrity to its original design, the station lacks overall historic significance.

In summary, the South Bay Power Plant does not appear to represent an exceptionally significant property, whether considered within the context of the history of SDG&E, the history of steam electrical generation, or the more limited context of steam plants built during the post-war era. Its dominant characteristic is its typicality rather than its exceptionality.

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 #** South Bay Power Plant

P1. Other Identifier: South Bay Power Plant

***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** Imperial Beach **Date** 1967 (1975) **T** 18S; **R** 2W; SW ¼ **of Sec** 9 and NW ¼ **of Sec** 16; SD **B.M.**

c. Address 990 Bay Boulevard City Chula Vista Zip 91911

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)

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

The South Bay Power Plant is a natural gas-fired steam generating power plant located on the eastern shoreline of San Diego Bay, west of Interstate 5, in Chula Vista, San Diego County. This large industrial complex occupies a site of approximately 149 acres, containing a four-unit power plant and many appurtenant support structures, including a fuel oil tank farm, cooling water intake and discharge structures, water treatment facilities, and miscellaneous equipment. The complex also contains many additional support buildings, including an administration building, engineering and shop buildings, a warehouse, and other storage and control buildings. Consistent with National Register guidelines and standard professional cultural resource management practices, this integrated industrial facility is treated as a single resource for the purpose of evaluating its potential historic significance. The generating units, their appurtenant structures and equipment, and ancillary buildings are individually described below. The location of this facility is shown on the attached **Sketch Map**, and its general layout is shown on the attached **Site Plan**. (See Continuation Sheet)

***P3b. Resource Attributes:** (HP9) Public Utility Building

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

P5a. Photo of Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) South Bay Power Plant, 14 February 2006, camera facing south

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
Unit 1 1960; others later, (see B.10 Significance)

***P7. Owner and Address:**
Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

***P8. Recorded by:** (Name, affiliation, address)
Rand Herbert / Andrew Walters
JRP Historical Consulting,
1490 Drew Ave, Suite 110,
Davis, CA 95616

***P9. Date Recorded:** 14 February 2006

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

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") None

***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) ______

Primary #
HRI #

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z
***Resource Name or #** (Assigned by recorder) South Bay Power Plant

B1. Historic Name: South Bay Power Plant
B2. Common Name: South Bay Power Plant
B3. Original Use: Power Plant B4. Present Use: Power Plant
***B5. Architectural Style:** Industrial
***B6. Construction History:** (Construction date, alteration, and date of alterations) Original construction 1960, additions 1961-1971 (See B.10 Significance)

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** ______ **Original Location:** ______
***B8. Related Features:** Subsidiary buildings and structures including administration building, engineering and water treatment facilities, and tank farm (See B10. Significance)

B9. Architect: Pioneer Service and Engineering Company b. Builder: San Diego Gas & Electric Company
***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 South Bay four-unit steam generating power plant does not appear to meet the criteria for listing in the National Register of Historic Places (NRHP) and is not a historic resource for the purposes of the California Environmental Quality Act ((Section 15064.5 (a)(2)-(3)), (CEQA). Initially constructed in 1960, the plant does not appear to represent an exceptionally significant property, whether considered within the context of the history of SDG&E, the history of steam electrical generation, or the more limited context of steam plants built during the post-war era. (see Continuation Sheet)

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

***B12. References:** *San Diego Union*, various years; San Diego Gas & Electric Company construction photographs of the South Bay Power Plant (retained by Duke Energy); Pioneer Service and Engineering Company, "San Diego Gas & Electric Company, South Bay Power Plant Plot Plan," 1957, updated through 1971; *Southwest Builder and Contractor,* "South Bay Generating Plant Will Augment San Diego's Power Supply" (July 10, 1959):26-30; Iris Engstrand and Kathleen Crawford, *Reflections: A History of the San Diego Gas & Electric Company 1881-1991* (San Diego Historical Society and San Diego Gas & Electric Company, 1991); 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). (see B10. Significance)

(Sketch Map with north arrow required.)

See continuation sheet.

B13. Remarks:

***B14. Evaluator:** Rand Herbert / Andrew Walters

***Date of Evaluation:** 22 February 2006

P3a. Description (continued):

South Bay Power Plant

The central feature of the complex is the South Bay Power Plant structure (hereafter SBPP, identified as Building A on the attached **Site Map**) containing the generating units and their associated boilers. This massive structure consists of four generating units designed as an integrated "semi-outdoor" facility, i.e. much of the equipment is not sheltered within a building. The power plant has a footprint of approximately 365' x 240' and consists of two primary elements: a 30 foot high semi-enclosed turbine generator deck surmounted by a traveling crane on the north end, and an open steel I-beam framework that houses the boilers and associated equipment that towers over the turbine generator deck, located immediately to the south. A "unit" comprises the boiler and boiler stacks located in the towering steel framework, as well as the turbine and generator located on the generator deck below. Each unit also has associated fuel lines, condensers, cooling equipment, and other functional elements enclosed in the lower portion of the structure. **Photograph 2** is an overview of the power plant structure with the complex's Administration Building in the foreground.

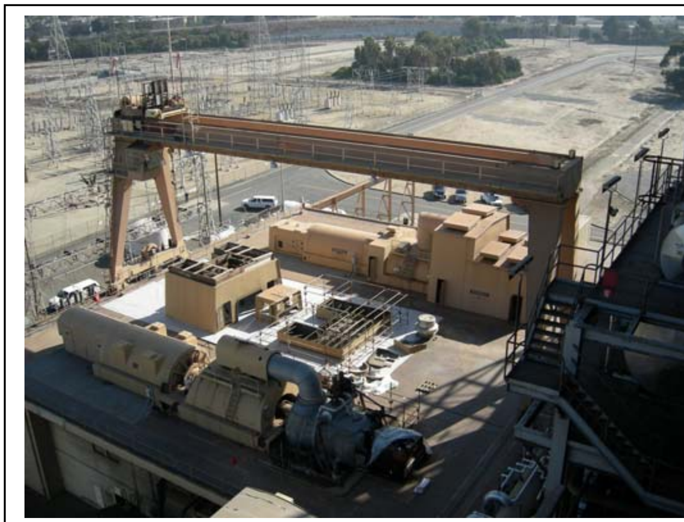
Photograph 2. South Bay Power Plant, camera facing southeast

Photograph 3 (facing northwest)

Photograph 4 (facing north)

As shown in **Photographs 3** and **4**, the basic structure of the plant is visually dominated by the boiler stacks, as well as the open steel framework that supports the boiler units themselves. This portion of the plant ranges in height from approximately 150 feet at the top of the boiler framework to the 200-foot tall boiler stacks. Unit 1, located at the west end of the structure (**Photograph 4**, left), was completed in 1960, followed by Unit 2 in 1962, Unit 3 in 1964, and finally Unit 4 in 1971 (**Photograph 4**, right). Each boiler differs slightly in appearance and characteristics, but all are generally identical in terms of technology and use.

Photograph 5 (facing north)



Photograph 6 (facing northeast)

Each unit has a generator and turbine located on the turbine generator deck immediately north of its associated boiler. The turbine generator deck is a U-shaped reinforced concrete structure 30 feet in height and 365 feet long, with Units 1 and 2 located on the west end and Units 3 and 4 located on the east end. The deck is surmounted by a gantry crane on steel tracks that extend out approximately 30 feet on the east and west sides of the structure. The Unit 1 and Unit 3 turbines were manufactured by Westinghouse, while Unit 2 and Unit 4 were manufactured by General Electric. Units 1 and 2 are shown in **Photograph 5** and Units 3 and 4 are shown in **Photograph 6**. Like the boilers and boiler stacks located in the structure above, the turbines are all slightly different in appearance, characteristics, and generating capacity. The generating capacity of each unit is identified in the **Table 1** below. Despite being a largely outdoor design, the lower areas of the plant are enclosed, giving it its "semi-outdoor" designation. Circuit breakers and other electrical equipment and machinery located on the ground floor are enclosed beneath the turbine generator deck and the boiler superstructure. Elevators provide access to the catwalks and decks above surrounding the boilers and turbine generator deck.

Table 1. Generating Capacity of Individual Units[1]

UNIT	GENERATING CAPACITY
1	147,000 kW
2	150,000 kW
3	171,000 kW
4	222,000 kW

Photograph 7 (facing south)

Photograph 8 (facing north)

The design of the SBPP includes intake and discharge channels and underground piping for circulating cooling water through the plant. Shown in **Photograph 7**, these channels consist of dredged indentations into the shoreline approximately 40 feet wide and 300-500 feet long. An earth and rock dike that extends approximately 1,000 feet out into San Diego Bay separates the two channels. The intake channel that draws cold sea water into the plant is located in the north side, and the channel that discharges warm water back into the bay is located to the south. Three concrete intake portals or "screen houses" are located on the north embankment of the intake channel from which pre-cast concrete pipes approximately 48 to 72 inches in diameter connect to the power plant (see **Photographs 39** and **40** below). The westernmost and largest of the intake portals was part of the original plant construction in 1959-60, and was designed for Units 1 and 2. Separate intake portals were later constructed in association with Units 3 and 4, which are visible in **Photograph 8**. Based on construction

[1] California Energy Commission, Power Plant Data Base, July 1, 2004.

photographs of the intake channel and its appurtenant features, the Units 1 and 2 screen house is a large poured concrete structure approximately 30 feet high and 40-50 feet long with four separate portals. Both the intake and discharge channels have fuel line bridges constructed of concrete supported by concrete piers that support fuel line piping from the fuel oil tank farm located to the south and east of the intake and discharge channels.

Support Buildings and Structures

The SBPP has numerous support structures located throughout the 149 acre complex. These buildings and structures are described below generally in a counter-clockWise fashion beginning at the northwest corner of the main power plant structure (A) described above. Photograph 9 is a view of the largest congregation of buildings located southeast of the main power plant structure. All buildings and structures are identified on the attached Site Plan as Buildings B through V.

Peaker Plant (B): In 1966 San Diego Gas Electric installed a small 2,300 kW peak load or emergency generator. This unit, comprised of a 72' x 29' x 26' high turbojet generator, transformer, and control room is enclosed in a weatherproof, soundproof enclosure. A JP5 fuel tank to for the jet engine turbine is located nearby. The peaker plant and its associated fuel tank are shown in Photograph 10.

Photograph 9 (facing southeast)

Photograph 10 (facing north)

Administration Building (C): Shown in Photographs 11 and 12, the complex's administration building is located at near the northwest corner of the power plant. This building consists of an original square change room and office building with additions on both the north and south sides constructed in a sympathetic manner to the original building. The building is basically rectangular in plan, is constructed of concrete clad in stucco, and has a flat roof. The original core of the building was square in plan with glazed metal personnel doors and small sets of four light fixed frame windows, visible in Photograph 12. The additions on the north and south side of the building have sets of six light fixed sash and a protruding frieze / ridge above the window line. The building's main entrance is located at the junction of the northern addition and the original building element, and consists of an aluminum frame glass door with large sidelights.

Stores and Shop Building (D): This building, shown in Photograph 13, is located on the west side of the power plant, adjacent Unit 1. This building is constructed entirely of concrete and has a fat roof. Fenestration consists of multi-light casement windows, and entries consist of metal personnel doors and a metal roll up door.

Photograph 11 (facing east)

Photograph 12 (facing northwest)

Engineering Building (E): The engineering building, shown in **Photograph 14**, is located south of the Stores and Shops Building, adjacent the intake channel. This pre-manufactured raised seam metal building has a gable roof and is square in plan. It replaced an earlier turbine overhaul shop at this location likely during the 1970s or 1980s. The building has square, fixed-frame windows on the south and west sides, and varied arrangements of louvered vents over metal personnel doors and metal roll up doors.

Photograph 13 (facing southeast)

Photograph 14 (facing west)

Motor Control Buildings / Electrical Equipment Buildings (F): These three small rectangular buildings, shown in **Photograph 15**, are located along the north side of the intake channel. Two are constructed of cinder blocks with a flat roof and no fenestration. The third and westernmost building is constructed of raised seam metal and has a gable roof. All three buildings are approximately 10' x 20' in size.

Photograph 15 (facing west)

Photograph 16 (facing southeast)

Water Treatment Facility (G): Located east of the power plant and intake and discharge channels is a complex of water control tanks, a water control facility, and associated piping. The Water Control Facility, shown in **Photograph 16**, is a ca. 1960s small two-story rectangular building of concrete construction clad in stucco. The building is accessed on the ground floor via an externally-mounted sliding track door, and on the second floor via a metal personnel door accessed by a staircase on the north side of the building. The building also has aluminum sliding windows. Waste water tanks of varying sizes are located southeast of the water treatment building.

Photograph 17 (facing west)

Photograph 18 (facing south)

Hazardous Materials Storage (H): West of the Water Treatment Facility is a modern storage facility consisting of a manufactured hazardous material storage building and a smaller semi-enclosed storage structure. The hazardous materials storage building has a centrally located externally-mounted track door on the west side and no fenestration. The adjacent semi-enclosed storage structure is a raised seam metal shed with three bays open on the north side. Both buildings are shown in **Photograph 17**.

Fuel Oil Storage Tanks (I): This tank farm originally included four large fuel oil storage tanks constructed during the 1960s, however only two tanks remain. Shown in **Photograph 18**, they are identical 140' diameter tanks that are 48' in height.

Photograph 19 (facing northwest)

Photograph 20 (facing west)

Tank Farm Control Buildings (J): Shown in **Photograph 19**, these two identical raised seam metal control buildings, identified as South Tank Farm East / West Control Houses, are located along the northern perimeter of the fuel oil storage tank farm. They are approximately 20' x 30' in size, have gable roofs and glazed metal personnel doors on the north side.

Assembly Room (K): The Assembly Room is located east of the water treatment facility. Shown in **Photograph 20**, this small modern, rectangular building consists of three joined modular wood frame units with fixed wood frame windows and metal personnel doors.

Office Building (L): Also known as the "White House," this building was constructed in 1958 as the original engineering offices for construction of the SBPP. Shown in **Photograph 21**, it was originally a rectangular wood frame building; it is clad in corrugated metal and has a gable roof clad in composition roofing. The building consists of an original core consisting of four offices with metal personnel doors flanked by sets of one over one wood frame windows. Additional hopper windows are located on the east side of the building. A small corrugated metal clad addition with aluminum frame windows was constructed on the west end of the south side of the building at an unknown date. There is a small shed roof enclosure with a single fixed frame window located on the south side of the building's roof.

Warehouse (M): A large warehouse approximately 150' x 60' in size is located south of the office building. Also constructed as part of the original plant's construction in 1958, this building has a metal frame clad in corrugated metal. The building, shown in **Photograph 22**, has a gable roof and is set atop a raised concrete foundation with a full length loading dock along its east side. The building is accessed via externally-mounted track doors, three on the east side, one on the south and one on the west side.

Photograph 21 (facing southwest)

Photograph 22 (facing northwest)

Wire Storage Building (N): This small storage building, shown in **Photograph 23**, is of metal frame construction clad in corrugated metal with a corrugated metal clad gable roof. It is approximately 15' x 30' in size, and has a personnel door on the south side and a six light fixed frame window on east side.

Tank Farm Control House (O): Shown in **Photograph 24**, this small building, the South Tank Farm Control House for Tank 7 (which has been removed), is located east of the warehouse. It is a small 10' x 10' raised seam metal building with a glazed metal personnel door on the north side.

Photograph 23 (facing northwest)

Photograph 24 (facing west)

***Resource Name or #** (Assigned by recorder) South Bay Power Plant

***Recorded by** Rand Herbert / Andrew Walters *Date 14 February 2006 ☒ Continuation ☐ Update

Photograph 25 (facing northeast)

Photograph 26 (facing northwest)

School House (P): Shown in **Photograph 25**, this 20' x 40' raised seam metal building has a gable roof, aluminum sliding windows and louvered vents beneath the gable ends. The building has no foundation, resting on metal rails laid directly on the asphalt driveway.

Storage Building (Q): Shown in **Photograph 26**, this L-shaped, semi-enclosed raised seam metal storage structure located west of the warehouse has a shed roof and is set on a concrete pad.

Photograph 27 (facing northwest)

Photograph 28 (facing northeast)

Gate House (R): Shown in **Photographs 27 and 28**, this small structure is situated along the north side of the main gate located at the southeast corner of the SBPP site. It has a flat overhanging roof sheltering walls composed almost entirely of full-length windows. Masonry walls and landscaped planter boxes are located on either side of the complex's access road.

Unidentified Building (S): Shown in **Photograph 29**, this building is located on the south side of the fuel oil tank farm at the south end of the power plant complex. It is a simple rectangular building constructed of cinder blocks with a flat roof and single and double metal personnel doors.

Photograph 29 (facing southwest)

Photograph 30 (facing northwest)

Railroad Spur (T): A railroad spur extends approximately 2,500 feet from the main north-south San Diego & Arizona Eastern Railway tracks that skirt the eastern boundary of the SBPP property to the east side of the power plant building, shown in **Photograph 30**. This spur line was constructed in 1958 as part of the original construction of the power plant, and was used primarily during its construction between 1958 and 1971. A second smaller spur line extends from the longer spur approximately 750 feet to the warehouse located at the southeastern corner of the complex.

Photograph 31 (facing northwest)

Photograph 32 (facing northwest)

Telegraph Creek Bridge (U): Shown in **Photograph 31**, Telegraph creek is a concrete lined channel that bisects the northern portion of the plant complex. An access road from the main power plant complex to the south connects to the site of a fuel oil tank farm and waste water ponds on the north side of the creek via a concrete slab bridge with concrete guardrails. The bridge is approximately 50 feet long. Both the bridge and channel lining below appear modern.

Control Building (V): This 15' x 30' raised seam metal building is located at the north end of the complex along a berm that formally delineated a fuel oil tank farm and waste water ponds. Shown in **Photograph 32**, the building has a gable roof and three sets of glazed metal personnel doors on the east side. There is a storage tank located immediately north of the building.

B10. Significance (continued):

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 amount of 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.[2]

In the beginning stages of development of steam turbine power plants, the materials needed to withstand the high temperatures of modern turbines were not yet available. 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.[3]

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. 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, hydro plants accounted for only 31% of all electricity generated in California.[4]

These statistics, however, mask an 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.[5]

---

[2] 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.
[3] Termuehlen, *100 Years of Power Plant Development*, 21-28.
[4] James C. Williams, *Energy and the Making of Modern California* (Akron, Ohio: University of Akron Press, 1997), 374.
[5] Williams, *Energy and the Making of Modern California*, 278.

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.[6] 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 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, the PG&E vice-president for engineering wrote: "Under the circumstances which now prevail, it is natural to question the future of hydro in California." [7]

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 San Diego Gas & Electric Company (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," wrote Williams, "by a positive history of increased thermal power plant development."[8]

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*, I. C. Steele, Chief Engineer for PG&E, 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 warranted; most of them were. [9]

The decades between 1950 and 1970 were the 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

---

[6] 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.
[7] "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.
[8] Myers, *Iron Men and Copper Wires*, 200; James C. Williams, *Energy and the Making of Modern California*, 277-78, 282-83.
[9] 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.

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.[10]

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.[11]

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.[12]

---

[10] 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.

[11] 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 www.energy.ca.gov/electricity/system_power.

[12] 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).

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 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 to 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 experience renewed economic growth in 1938-39 following defense related prewar 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.[13] 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.

[13] The subsequent history of Station B in unclear in the historic record. It was taken offline at an unknown date.

The war years were a period of tremendous growth for the San Diego metropolitan area and for SDG&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 new 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 unprecedented rate in the post war 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 kv 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.[14]

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. The San Onofre Nuclear Generating Station, located on the coast near the northwest corner of Camp Pendelton north of San Diego, was completed in 1965. Designed by Bechtel Corporation and Westinghouse, the plant was larger that other such plants constructed by the Federal government and private utilities during the previous decade. In 1964-65 the company also completed the first liquefied natural gas (LNG) plant at SBPP for converting natural gas to liquid. 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 US Department of the Interior built the west coast module of a nationwide seawater conversion program at the SBPP. 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.[15]

During the 1970s, declining demand led to expansion delays, but SDG&E had plans to add three more units to SBPP in the future. In 1972, the company served 500,000 electric customers, but 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

---

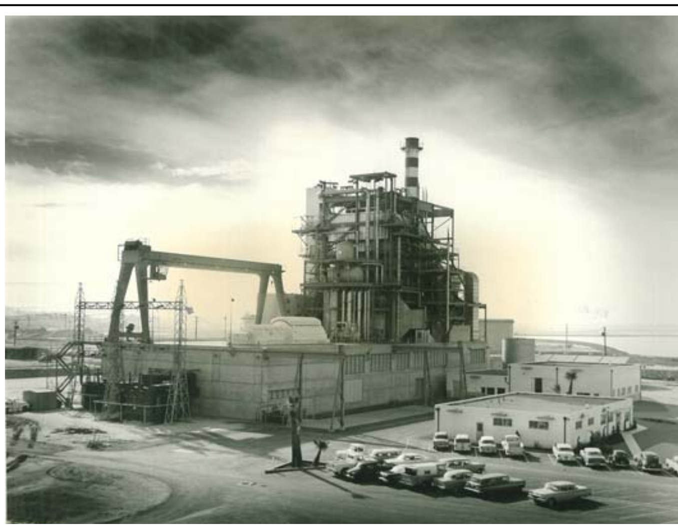
[14] *San Diego Union*, June 6, 1948, February 16, 1958, October 18, 1958, October 11, 1959, November 15, 1959, May 1, 1960, June 22, 1962;

[15] *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.

power needs SDG&E puts its expansion program on hold. Addition power to the SDG&E system would come from the development of geothermal sites in the Imperial Valley, and additions to the San Onofre nuclear plant, where the company owned 20 percent interest in three generating units. During this period, the company spent large sums of money 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 over a service area that encompassed over 4,000 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. [16]

History of South Bay Power Plant

As discussed above, construction of the SBPP was part of SDG&E's plans to accommodate post war growth in its service area by bringing new steam-electric generating units online in two-year increments beginning in 1950. Physical planning for the development of the SBPP, to be sited on the eastern shore of San Diego Bay in Chula Vista, began in 1957 with construction of unit 1 beginning in 1958. The site was laid out such that addition units could be added as needed. **Photograph 33** shows Unit 1, the Administration Building (Building C), and the Shops and Stores Building (Building D) shortly after completion in November 1960, and **Photograph 34** shows the plant under construction in November 1959. The plant's four units went online in 1960, 1962, 1964, and 1971. During this period, the plant's major facilities were constructed. SDG&E owned and operated the plant until 1996, when it was sold to the Port of San Diego, and subsequently leased to Duke Energy, which continues to supply power to the San Diego metropolitan area.[17]



Photograph 33

Photograph 34

[16] *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.
[17] San Diego Gas & Electric Company, South Bay Power Plant construction photographs; Pioneer Service and Engineering, "San Diego Gas & Electric Company, South Bay Power Plant Unit No. 1, San Diego, California, Plot Plan," May 31, 1957, revised through August 9, 1971; San Diego Gas & Electric Company construction photographs of the South Bay Power Plant (retained by Duke Energy).

The site selection and construction of the plant was consistent with general engineering practices of the day, and the plant had much in common with other steam-electric power plants constructed during the post war period. As outlined above, the general design criteria for power plants included building the facility close to load centers to reduce transmission costs, in proximity to fuel and water supplies for ease of operation, and locating the plant on a site where land was cheap and could support a good foundation. The plant was also constructed to be a semi-outdoor type, in order to reduce construction cost and provide for ease of expansion. SDG&E had the SBPP designed and constructed without any enclosures over the equipment, creating a more cost-effective plant in terms of maintenance, cleaning, and ventilation. SDG&E was able to build the plant in this fashion because of the usually mild temperatures and dry weather conditions in Southern California. SDG&E built the SBPP near the tidewaters of San Diego Bay to obtain water for feeding the boilers and turbines, and to provide for cooling in the large condenser units.[18]

SDG&E began construction for the SBPP in 1958 and had Unit 1 under full operation by July 1, 1960. Initial construction included the power plant structure, including a 142,000 kW turbo generator unit, boiler, and associated equipment, as well as many of the associated buildings and structures that would comprise the plant. These additional buildings included a construction office, warehouse, stores and shops building, fuel oil storage tanks, control structures, wastewater treatment facility, and other buildings located throughout the 149-acre site. The estimated cost of construction for Unit 1 plant and site, which included infrastructure for Unit 2, was $22,500,000. Pioneer Service & Engineering Company of Chicago, the firm that deigned the company's Encina plant, designed the SBPP. Principal subcontractors on the project included General American Transportation Corporation for erecting the fuel oil storage tanks, Midwest Piping Company, Inc. for installing the piping, C.C. Moore & Company for erection of the boiler, Franks Dredging Company for dredging, and Bethlehem Pacific Coast Steel Company supplied the structural steel for the plant. General Electric Company manufactured the turbine and generator, and Babcock & Wilcox manufactured the boiler. Most of the construction, however, was accomplished by the company's own forces, under the supervision of H.A. Noble, vice- president of operations for SDG&E, and by Walter Zitlau, mechanical engineer.[19]

Because of its location in a low, flat marshy area once occupied by saltwater evaporation ponds, the plant site required extensive planning and the use of alternative construction methods for its foundation, detailed in a 1961 *Civil Engineering* article by Vernon A. Smoots and Phillip H. Benton. Whereas major power plants and other large structures require sturdy foundations founded on rock or piles, the authors contend, the SBPP was one of several plants constructed on earth fill, representing the expanding use of soil compaction techniques for heavy structures. Typically, steam power plants were located near bodies of water where soft soils are prevalent, and firm soil or bedrock is often 100 feet or more below ground. Because power plants are extremely heavy and settlement of the foundation must remain small, such an environment creates the problem of foundation support. Costly piles or caissons were generally used in order to reach suitable foundation materials. After considering several methods of pile foundation construction and other alternative methods, SDG&E chose the compacted-fill method for the SBPP as a matter of cost and expediency. This method involved excavating a 380' x 310' x 20' deep area to remove unsuitable soil and replace it with a more suitable backfill. This fill consisted of a layer of crushed rock, followed by a layer of pea gravel and fine to coarse sand. Fine beach sand imported from the Silver Strand was then laid in one-foot layers that were then compacted under close supervision of engineers. The foundation subgrade for the first two units of the plant was laid at the same time, at a cost of $94,000 per unit. Before the second unit was constructed beginning in 1960, the fill for future units 3 and 4 was placed as a slightly lower cost. The SCE Huntington Beach plant, the City of Burbank's Burbank plant, and California Electric Company's Daggett plant were among earlier

[18] I. C. Steele, "Steam Power Gains on Hydro in California," 17-21; R.W. Spencer, "Cooling Water For Steam Electric Stations in Tidewater," 280-305; Walter L. Dickey, "The Design of Two Steam Electric Plants," 253-273; *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply" *Southwest Builder and Contractor* (July 10, 1959): 26-32, 37.
[19] Pioneer Service and Engineering, "San Diego Gas & Electric Company, South Bay Power Plant Unit No. 1, San Diego, California, Plot Plan," May 31, 1957, revised through August 9, 1971; *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply" *Southwest Builder and Contractor*, 26-29.

plants also constructed on compacted fill foundations. **Photographs 35** and **36** show the excavation work in progress in February and March 1958, respectively.[20]

Photograph 35

Photograph 36

Photograph 37

Photograph 38

The building pad and turbogenerator deck for units 1 and 2 was 110' x 250'. The pad had a minimum thickness of four and one half feet and was reinforced by a double mat of #11 rebar on one foot centers. **Photograph 37** shows the concrete and structural steel portions of the structure under construction in October 1958. Concrete for the site was prepared in a batch plant located onsite, with aggregate supplied by H.G. Fenton Material Company of San Diego. Following the construction of the pad and turbine generator deck, 1,475 tons of structural steel was required for the frame of Unit 1, likely with a similar

[20] Vernon A. Smoots and Phillip H. Benton, "Compacted Earth Fill For a Power-Plant Foundation" *Civil Engineering* (August 1961): 54-57; *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply," 27.

amount needed for the subsequent units. The steel members arrived partially assembled from Bethlehem Pacific Steel, and were erected onsite with high tensile strength bolts. As part of the preparation for the construction of the facility, a railroad spur was extended approximately 2,500 feet from the main north-south San Diego & Arizona Eastern Railway tracks that skirt the eastern boundary of the SBPP property to the east side of the power plant building site in order to facilitate construction. This spur, shown in **Photograph 38** (November 1958), brought in the mammoth boilers, turbines and generators units and other large components of the facility.[21]

Another major portion of the construction of the plant involved excavating channels from the power plant out into San Diego Bay for cooling water intake and discharge. The design of the plant included a concrete screening and pumping structure constructed on the south side of the power plant, from which a fifteen-foot deep intake channel was dredged a distance of 6,000 feet into the bay for cooling water. A similar channel for the discharge of warm water was constructed adjacent the intake channel, separated by a 1,000 foot long earth and rock dike. Two 48-inch concrete pipes conducted water from the intake structure to the plant, and a single 72-inch pipe returned the water after use to the discharge channel. The first screen house / intake structure was constructed for Units 1 and 2, and two additional smaller structures were constructed in association with Units 3 and 4, when the channels were also extended. Small pre-stressed concrete bridges were constructed across the channels to conduct fuel oil piping and conduits for control cables to the plant. The pre-stressed concrete beams for the bridges were cast by Southwest Structural Consolidated Concrete Company and delivered to the site by barge and floated into position on piers. The intake / screening structure and bridge piers are shown below under construction in **Photograph 39** (October 1958), and the intake piping is shown in **Photograph 40** (October 1958).[22]

Photograph 39

Photograph 40

Immediately after Unit 1 (142,000 kW) went online in July 1960, SDG&E began construction of Unit 2 (142,000 kW), manufactured by Westinghouse, which was completed and online by mid 1962. These units were later upgraded to 147,000 kW and 150,000 kW, respectively. As noted above, the structure for Unit 2 including turbine generator deck and cooling water system was constructed as part of the Unit 1 construction. In the years that followed, the company added two more units: Unit 3 (General Electric, 171,000 kW) in 1964, and Unit 4 (Westinghouse, 222,000 kW) in 1971. In 1966 SDG&E installed a small 2,300 kW peak load or emergency generator near its switchyard located on the north side of the power plant. This unit, comprised of a 72' x 29' x 26' high turbojet generator was manufactured by Pratt & Whitney and resembled

[21] *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply," 27-29.
[22] *Southwest Builder and Contractor*, "South Bay Generating Plant Will Augment San Diego Power Supply," 29-32.

an aircraft turbojet powerplant. The turbine, generator, transformer, and control room for the peaker plant was enclosed in a weatherproof, soundproof enclosure. A JP5 fuel tank to for the jet engine turbine was located nearby. The peaker plant was designed to reach full load capacity in three minutes to assist with peak load emergencies. In all, the SBPP was capable of generating 706 mw of electricity.[23]

Photograph 41

Photograph 42

As mentioned above, during the mid-1960s the SBPP became the site of two additional ventures subsidiary to power generation: the site of a liquefied natural gas (LNG) plant, and a seawater conversion installation. In 1965 SDG&E completed its LNG plant at SBPP, located in the southern portion of the power plant site. Based on cryogenic technology, this project was the first of its kind in the west, and one of only five worldwide. The purpose of the plant was to convert natural gas to liquid form so that it could be stored for peak season use, thus avoiding paying "demand charges" for gas during the peak winter months from its gas supplier, Southern Counties Gas Company. At an approximate cost of $2.8 million, the plant was projected to enable the company to save $10 million over ten years. The plant could handle 25 million cubic feet of "feed gas" daily, which it would clean up, liquefy, store, and re-gasify as needed. The primary facility was a 127 foot tall, 117 foot diameter "thermos jug" (storage tank) that could store 175,000 barrels of gas. In 1965, the US Department of the Interior built the west coast module of a nationwide seawater conversion program at the SBPP. This project was an extension of research and experimental projects between SDG&E and General Atomic Division of General Dynamics Corporation to obtain economical seawater conversion. This facility is shown in **Photograph 41** (undated), along with completed Units 1 (left), 2, and 3 (right). Both the LNG plant and the saltwater conversion facility were removed from the SBPP site during the mid-1970s.[24] Nothing remains of the saltwater conversion plant; tank and building foundations can be seen in the LNG site, which is not part of this study area.

[23] Vernon A. Smoots and Phillip H. Benton, "Compacted Earth Fill For a Power-Plant Foundation," 54; *San Diego Union*, July 20, 1966, October 5, 1966; California Energy Commission, Power Plant Data Base, July 1, 2004; Pioneer Service and Engineering, "San Diego Gas & Electric Company, South Bay Power Plant Unit No. 1, San Diego, California, Plot Plan," May 31, 1957, revised through August 9, 1971.
[24] *San Diego Union,* January 24, 1965, February 18, 1967, May 30, 1968; Iris Engstrand and Kathleen Crawford, *Reflections: A History of the San Diego Gas & Electric Company 1881-1991*, 186; Personal Communication with Jim Nylander, South Bay Power Plant Manager, February 14, 2006.

In addition to the power plant structure and cooling water channels and associated features, most of the buildings and structures at the SBPP site were part of the original construction. These included the Administrative building (**Photograph 33**), originally a smaller change room and office building that was later expanded (Building C in the attached **Site Map**), the Stores and Shops building located on the southwest corner of the power plant (Building D), the Waste Water Operations Building (Building G), two 131,500 barrel capacity fuel oil storage tanks (Building I), the Tank Farm Control Buildings (Building J), Office Building (Building L), Warehouse (Building M), and the Wire Storage Building (Building N). Alterations to the plant include the construction of a waste water tank farm on the south side of the Waste Water Operations Building on the former site of the seawater conversion facility, the construction and subsequent removal of several oil storage tanks and wastewater ponds. **Photograph 42** (May 1959) depicts the Office Building (Building L), Warehouse (Building M), and the foundation for one of the complex's fuel oil storage tanks.

Evaluation

The South Bay four-unit steam generating power plant does not appear to meet the criteria for listing in the National Register of Historic Places (NRHP) and is not a historic resource for the purposes of the California Environmental Quality Act ((Section 15064.5 (a)(2)-(3)), (CEQA).[25] Furthermore, the property is less than 50 years old, and only one of the plant's four units is over 45 years old. Therefore, in order to be eligible it would need to qualify under the exacting standards for evaluation as an exceptionally significant property. This evaluation finds that the South Bay Power Plant is not exceptionally significant in the context of the development of SDG&E, nor as an example of a steam power plant from the post-war era.[26] Lacking such significance, the property does not appear to meet the criteria for listing in the National Register and is not an important historic property under CEQA.

The SBPP is not associated with an event important within the broad patterns of our history (Criterion A). While this property is a component of a larger power generating and delivery system operated throughout most of its lifetime (1960-1996) by SDG&E, it does not appear to represent a particularly significant property within the context of the development of power generation capacity of SDG&E or within the broader context of post-war power development in southern California.

As discussed above, SDG&E built new steam plants between the 1950s to about 1971, the time period in which the four SBPP units went on line. These included units at the Encina Power Plant, located in north of the City of San Diego near Fallbrook. The regular addition of steam plant units helped the company survive through a period of great economic and demographic growth. The plants also helped sustain the local economy and population. In this sense all power plants have an important place in local history, which without understanding the over-all context of the system might lead to an over-broad conclusion that all are significant. Within its context, however, this plant did not make an exceptionally important contribution to the history of SDG&E, or within the context of post war power development in southern California. The SBPP currently generates a base load of 706 mw, and was but one of several steam plants that helped the company accommodate the great growth of electrical demand in the San Diego region during the post-war era. Other plants in the SDG&E system included Station A (approximately 15 mw, offline since 1939), Station B (approximately 99 mw, offline since the 1980s), and Encina (909 mw). Since both Station A and Station B have been taken offline, SBPP is the smallest and last of the steam-electric plants in this group. It was, in fact, a typical power plant constructed during the period: it was built in the 1960s; was built sequentially, adding the units in phases; had a substantial power generating capacity; and was sited to be near the major power load centers as well as near water sources that could be used for cooling.

---

[25] The NRHP and CEQA both require that historic properties be identified and evaluated by following standardized guidelines and applying significance criteria. Because CEQA guidelines are based on those of the NRHP, the two are nearly identical. For the sake of clarity, this report outlines the NRHP evaluation process; nevertheless, both NRHP and CEQA guidelines were applied in the preparation of this report.

[26] 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).

In considering the impact of this power plant on the local economy, it is necessary to appreciate the property in the context of similar resources. It is in the nature of public utilities, as with public works projects, that the benefits of these improvements are widely distributed. Every power generating facility delivers a useful product to a broad market, as does every highway, airport, sewer system, and other utility and public works undertakings. Analyzed at face value, every improvement made by a utility or public works agency may be seen as having made an important contribution to the community it serves. These types of properties, however, must be appreciated in the context of like properties, to avoid trivializing the elements of what constitutes significance for the property type. The question is not whether the SBPP made a useful contribution to the local economy; it obviously did. The question rather is whether the station made a contribution that is significant within the context of other properties of its type.

In the universe of steam turbine powerplants in California, many are older than SBPP. Duke Energy, the current operator of SBPP, is currently listed as owning two other steam turbine power plants in California, Morro Bay (1955) and Moss Landing (1950), both of which are older than SBPP. Older steam turbine facilities also include Burbank's Magnolia Plant (1943), Glendale's Grayson Plant (1953), PG&E's Contra Costa (1951-53) and Pittsburg (1958) plants, LADWP's Harbor (1943) and Valley plants (1954), and SCE's Redondo Beach (1948), Etiwanda (1953) and El Segundo plants (1955). The CEC also lists a steam turbine co-generating facility in Watsonville with a construction date of 1901. The first unit of the SBPP plant at Chula Vista was built in 1960 and contains a single steam turbine-driven generator. This facility contains the technology from the 1950s that made power plants more efficient.[27]

In this context, the SBPP is by any reasonable measure a typical example of its type. According to the records of the California Energy Commission, the plant has a capacity of 706 mw. In this regard, it is a large but not an exceptional part of the power generating capacity of SDG&E and is a typical but not exceptional steam plant from this period. The steam plants built by SCE, for example, between 1945 and 1965 range in their capacity from about 1000 MW to about 2100 mw. The Alamitos station in Long Beach is by far the largest of these, with a capacity of 2120 mw. Other plants from this era include Redondo Beach, with a capacity of 1310 mw, Etiwanda at 1049 mw, and Ormond Beach at 1500 mw. It appears that the SBPP is actually one of the smaller of the various plants built during this era. The facility's capacity, however, is less important than the general similarities among the various elements of the SDG&E steam generating system. The SBPP was one of several plants the company brought on line during this period and is typical of these plants, albeit having a different capacity than the others. In terms of its role in the history of the company, this plant does not appear to have made an exceptionally significant contribution.

In addition, it does not appear that the plant is exceptionally significant within the context of steam generation plants in California, whether seen in the long history of the area, or in the more limited context of steam plants during the immediate post-war era. As noted above, steam generation of electricity dates to the late 19th century. Among the earliest power plants of SDG&E were small steam plants, Station A, constructed in 1887, and Station B, constructed in 1921, both of which are currently inactive. Steam generation, however, fell out of favor during the period from about 1900 through the 1940s, as many California utilities built numerous low-cost hydroelectric facilities to take advantage of the high-head capabilities in the mountainous regions of the state.

The resurgence of steam power generation in California after 1945 reflects a simple fact: all of the best hydroelectric power generation sites had already been taken, either by other power companies, or the various state, federal and local water development agencies, who were in the midst of a massive program of dam development throughout the 1940s, 1950s, and 1960s. These public projects would bring a great deal of new hydroelectric power on line that would supplement the

---

[27] California Energy Commission, Power Plant Data Base, July 1, 2004; 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.

SDG&E system somewhat through transfers between utilities. Between 1945 and 1970, the amount of hydroelectric power generated in the state more than tripled, from eleven million kilowatt hours to nearly 38 million kilowatt hours.[28] Most of this new hydroelectric capacity, however, was associated with the power plants of the huge dams that were completed during this era, by local, state, and federal water development agencies. The investor-owned utilities were denied access to these dam sites and most of the economical upstream sites had already been developed by these utilities. There were a few privately built hydroelectric facilities constructed during the post-war era, but these were relatively unimportant compared to other types of power stations.

SDG&E, LADWP, PG&E and SCE, built dozens of steam plants during the first two decades after the conclusion of World War II. Primary and secondary literature suggests that these plants were quite similar to each other. Many — South Bay, Contra Costa, Pittsburg, Kern, Moss Landing, Hunters Point, Magnolia, Etiwanda, El Segundo and Long Beach, for example — were built in the semi-outdoor design. This design is so characteristic that such plants, whatever the company that built them, appear to be closely identical, even though they often include different sizes of boilers and generators. Most of these plants were located in proximity to water and fuel supplies, and all were built sequentially as the need for expansion arose. In a previously cited article in *Civil Engineering*, PG&E engineer Steele noted the similarities of four major steam plants — Kern, Hunters Point, Moss Landing, and Contra Costa — that the company had under construction in 1950, just a few years before work at the SBPP started. His article emphasized economical measures that were taken to hold down costs on these enormously expensive projects and hinted at cooperation between the PG&E and SCE, both of which were faced with the same types of problems. For example, the saltwater intake at the PG&E Moss Landing plant was patterned after an intake already under construction by SCE at its Redondo Beach plant.[29] The extent to which SDG&E's plans were influenced by the experience of other companies was not revealed in the research for this project; however, the similarity of SDG&E's plants to others of a similar age around the state is strong.

The SBPP, like other similar aged and designed plants, utilized equipment that was essentially "off-the-shelf." As discussed earlier, it was a substantial project, but was by no means the largest steam station constructed in the San Diego or Southern California region during the post-war era. It does not appear that the station represented a new departure in the technology of steam generation of electrical power. Neither does it appear that the plant represented any type of departure in the areas of plant siting, foundation work, or any other aspect of power plant construction techniques. While the foundation work for the plant as discussed above involved a less tried-and-true method of foundation support, it was not revolutionary in terms of construction technology, technique, or accomplishment. The station, therefore, does not appear to meet Criterion C, because it does not embody the distinctive characteristics of a type, period, or method of construction.

Neither does the power plant appear to be associated with the life of a historically significant person (Criterion B), nor is it significant under Criterion D, which addresses "information potential" of a property. In rare instances, buildings and structures can serve as sources of important information about historic construction materials or technologies under Criterion D; however, this property is otherwise well-documented and does not appear to be a principal source of important information in this regard.

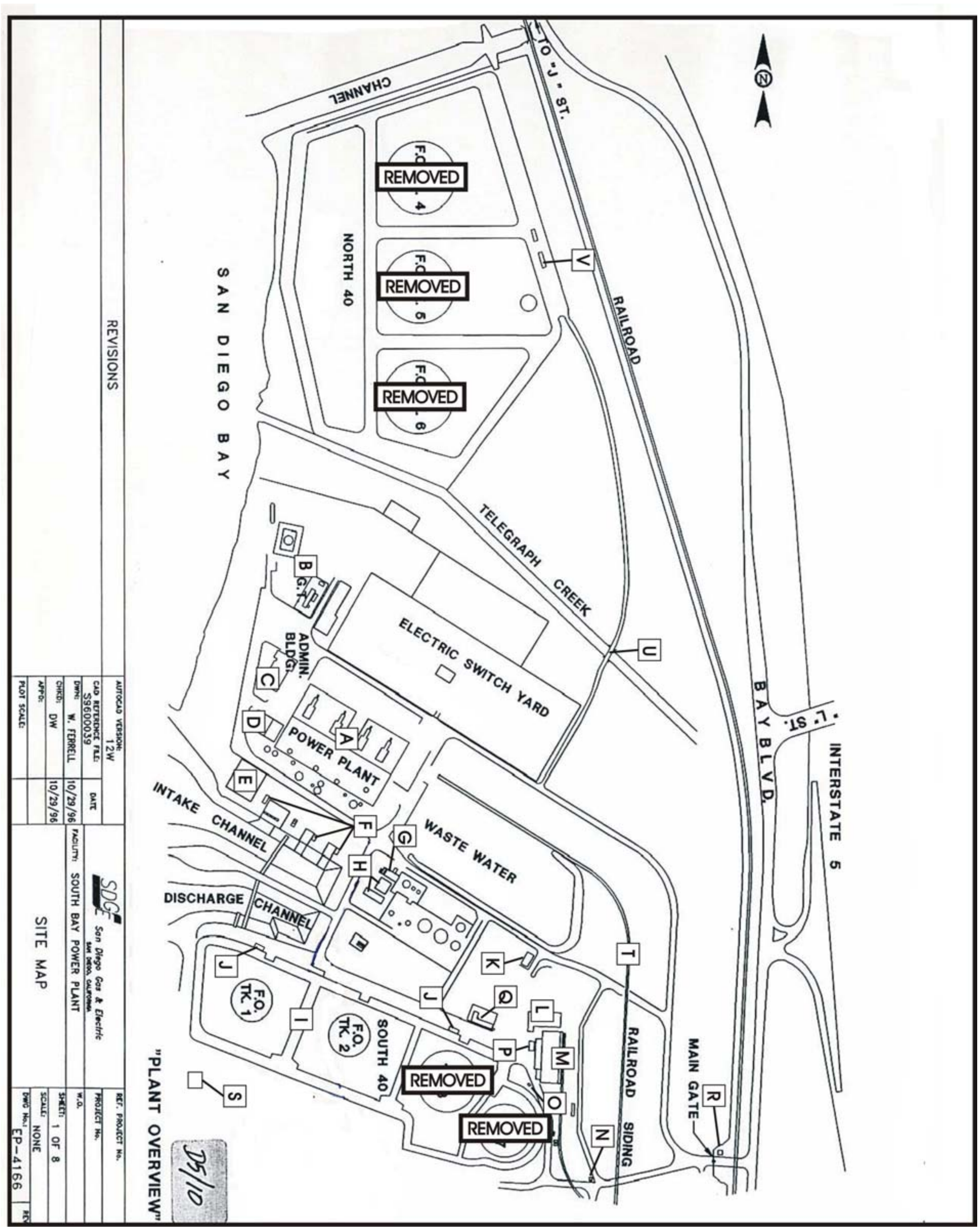
If a property meets any of the significance criteria, it is then evaluated for its degree of historical integrity. In this case, the station does not appear to meet any of the significance criteria, rendering the status of its physical integrity irrelevant. Despite the fact that the plant appears to largely retain integrity to its original design, the station lacks overall historic significance.

In summary, the South Bay Power Plant does not appear to represent an exceptionally significant property, whether considered within the context of the history of SDG&E, the history of steam electrical generation, or the more limited

[28] Williams, *Energy and the Making of Modern California*, 374.
[29] Steele, "Steam Power Gains on Hydro in California," 21.

context of steam plants built during the post-war era. Its dominant characteristic is its typicality rather than its exceptionality.

SITE PLAN


CHANNEL
TO "J" ST.
REMOVED
REMOVED
REMOVED
NORTH 40
SAN DIEGO BAY
RAILROAD
TELEGRAPH CREEK
ELECTRIC SWITCH YARD
ADMIN. BLDG.
POWER PLANT
BAY BLVD.
"L" ST.
INTERSTATE 5
INTAKE CHANNEL
WASTE WATER
DISCHARGE CHANNEL
F.O. TK. 1
F.O. TK. 2
SOUTH 40
REMOVED
REMOVED
RAILROAD SIDING
MAIN GATE
"PLANT OVERVIEW"
REVISIONS
SDG&E San Diego Gas & Electric
SOUTH BAY POWER PLANT
SITE MAP
AUTOCAD VERSION: 12W
S9600039
W. FERRELL 10/29/96
DW 10/29/96
SHEET: 1 OF 8
SCALE: NONE
EP-4166

***Resource Name or #** (Assigned by recorder) South Bay Power Plant

***Recorded by** Rand Herbert / Andrew Walters *Date 14 February 2006 ☒ Continuation ☐ Update

SKETCH MAP