OMB Control No. 1024-0018
expiration date 03/31/2026

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Cordelia Substation DRAFT
Other names/site number: _____
Name of related multiple property listing:
Pacific Gas and Electric Company Historic-Era Electrical Infrastructure
(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: 2412 Cordelia Road
City or town: Fairfield State: California County: Solano
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ___ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ___ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___national ___statewide ___local

Applicable National Register Criteria:

___A ___B ___C ___D

Signature of certifying official/Title: **Date**

State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official: **Date**

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

_____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	[X]
Public – Local	[ ]
Public – State	[ ]
Public – Federal	[ ]

Category of Property

(Check only **one** box.)

Building(s)	[X]
District	[ ]
Site	[ ]
Structure	[ ]
Object	[ ]

Cordelia Substation | Solano County, CA
Name of Property | County and State

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
1		buildings
		sites
		structures
		objects
		Total

Number of contributing resources previously listed in the National Register _____

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6. Function or Use
Historic Functions
(Enter categories from instructions.)
GOVERNMENT/public works

Current Functions
(Enter categories from instructions.)
GOVERNMENT/public works

7. Description

Architectural Classification
(Enter categories from instructions.)
LATE 19TH AND 20TH CENTURY REVIVALS/Beaux Arts

Materials: (enter categories from instructions.)
Principal exterior materials of the property: CONCRETE

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

Cordelia Substation is situated southwest of Fairfield in Solano County, California, between Fairfield city limits and the unincorporated community of Cordelia, east of Cordelia Road and south of Interstate 80. The substation is built on a terraced hill, enclosed by chain link fencing, within which the control building and transmission/distribution switchyard occupy separate fenced areas. The substation comprises a control building and switchyard originally used for power management, but now partially inactive.

The control building is designed in the Beaux Arts style. It is constructed on a concrete slab foundation with reinforced concrete walls, and a flat roof with a raised parapet featuring a terra-cotta tile pent roof. The large volume, rectangular, mass control building measures approximately 182 feet long and 86 feet wide. Decorative features include Doric columns and ornamental features around a monumental entrance. The building has suffered extensive deterioration, vandalism, and structural damage, with missing equipment and non-extant auxiliary structures.

Narrative Description

The subject property of this nomination is the Cordelia Substation control building and switchyard located southwest of Fairfield in Solano County, California, between the city limits of Fairfield and the unincorporated community of Cordelia. The property is located east of Cordelia Road and south of Interstate 80. In addition to the building, the Cordelia Substation has an outdoor transmission and distribution switchyard.[1] The substation is constructed on a leveled hill, with terraced sections separating the control building from the transmission equipment. The control building is no longer used to accept or distribute power. The switchyard accepts power via transmission lines originating from Sacramento and the Sierra Nevada mountain range. The equipment within the switchyard is not historic-aged and is not part of this nomination. The substation provides power to locales around the East Bay via a series of distribution lines. A chain-link fence encloses the entire substation facility; the control building is in a separate fenced area from the active outdoor switchyard.

The Cordelia Substation control building is a Beaux Arts-style building with a rectangular plan constructed on a concrete slab foundation. It sits on a terrace supported by concrete and stone retaining walls and is accessible from stone steps cut into the terrace. The outdoor switchyard is on a higher terrace west of the control building, and the two sections of the property are separated by chain-link fencing. The control building is approximately 182 feet long and 86 feet wide. The control building has reinforced concrete walls and a flat, board-form concrete roof with a raised parapet and pent roof clad in terra cotta tiles. The roof features two rows of 10 skylights along its western side.

The façade is on the east side of the building and is asymmetrical, with a monumental entrance at its northern end flanked by a full side wing and another side wing one-third the width. The flanking wing volumes are one story. The entrance is a two-story mass projecting above the roofline and outward from the façade. The entrance is composed of a tripartite opening under a classically inspired entablature. It features three recessed, segmental-arch niches framed by four concrete Doric engaged columns under an entablature with a denticulated cornice. The verticality of the pilasters continues past the entablature, with light fixtures. The glass globes are missing from the lights. The glazed double entryway, with plate-glass sidelights and a transom, is located in the center niche. Above the transom, incised lettering reads “Cordelia Substation.” Above the lettering, a wood sash fan light echoes the arched shape of the entrance arch. Decorative elements within the recessed arches include paired string courses of plaster dentil molding and a cartouche in the center entrance arch. Above the entrance arch is incised lettering spelling “Pacific Gas and Electric Company.” On the base of the column directly north of the main

[1] Transmission and distribution infrastructure carry electricity from the generating source to the consumer. Transmission carries electricity from the generating source at high voltages, acting as the bulk electricity supplier. The transmitted electricity is then stepped down at step-down substations and disseminated to end users via lower voltage distribution lines and distribution substations. Further details about this process can be found in Chapter 3 of the Pacific Gas and Electric Company Historic-Era Electrical Infrastructure Multiple Property Documentation Form Report.

entryway is incised lettering spelling "A – D 1913." The bases of the columns are spalling, with chunks of concrete missing. The glass on the doors and side lights is broken and covered by wood board. The entire arch holding the entryway to the control building is covered by protective metal screening and a metal screen security door.

Fenestration across the façade is divided light, 7 feet by 7 feet square windows in a clerestory band separated by square, Doric engaged pilasters supporting the overhang of the hipped pent roof with terra-cotta tiles. The clerestory band is set above a projecting horizontal course. The lower third of the elevation is unadorned, smooth concrete.

The 7-foot-by-7-foot clerestory window course continues across the façade and returns three windows deep along the north and south side elevations of the top half story of the entrance volume. At the south side elevation, the clerestory window course continues in a smaller, 3-foot-by-3-foot size. On the north and east elevations, small portions of the windows are covered with steel and sheet-metal awnings. All the windows are covered with wood boards, and some original windows with wood sash and muntins are still present, but most are missing or broken. The west elevation features a clerestory band of 3-foot-by-3-foot windows.

The north and south elevations have large, segmental arch openings with Kinnear doors (steel rolling doors). The Kinnear doors and the single entryways on the north and south elevations are barricaded by square steel plates, obscuring the arches. The decorative pent roof does not continue above the large entrance along the north elevation. The west elevation has no entryway.

Interior

The interior of the control building has three levels. The primary entrance on the east façade opens onto the second-floor operations room. The operations room is on the east side of the control floor, with cabinets and steel stairs leading up to the third level on the west side. There are also ladders along the walls of the control floor to access the switch cells from above. The first and second levels of the south half of the building are dedicated to concrete switch cells with metal rolling doors. Most of the switch cells are empty, but some have desks and cabinets stacked in them. The north half of the building also has a few switch cells and larger open areas with shelving and cabinets. The lowest level of the building is bisected by a rail line that previously served to move equipment in and out of the substation.

Landscape

The outdoor switchyard is directly west of the control building. The enclosed yard contains modern transmission equipment. Previously, there was a concrete cooling pond and a small concrete pump house with a side-gable roof clad in clay tiles, downslope and east of the control building terrace, but both are no longer extant. There were also at least two small cottages that served as permanent quarters for the substation operators, but they are also no longer extant.

Functionality

As initially designed, the Drum-Cordelia transmission line entered the control building through the 7-foot square windows on the east elevation, immediately under the cornice.[2] On the west elevation, seven high-voltage lines exited the building through 3-foot square windows. West of the control building were pole switches that created the original outdoor switchyard and carried the lines out of the substation and onto other distribution stations throughout the Bay Area.[3]

The Cordelia Substation control building interior was dedicated to space for the switchboard, transformers, and bus structures. The main switchboard and apparatus were on the second level, in the center of the building. Portions of the switchboard mechanisms were in a small room in the center of the building. Half of the Cordelia Substation control building interior was dedicated to 60,000-volt oil switch cells, and the other half was dedicated to 100,000-volt switch cells. There were 10 cells for 60,000-volt switches on the west side of the building and 13 cells for 100,000-volt switches on the east side of the building. Each cell had a sliding metal door, and there were passageways down the center of all the cells, as well as multiple passageways into the center of the building. Through the center of the building ran a rail line, which was used to bring equipment in or out, or to fix equipment in place, utilizing an overhead gantry crane for maintenance. The 100,000-volt apparatus was the first one installed in PG&E's system, and both the 60,000- and 100,000-volt switches were designed by PG&E engineers and fabricated at the company's shop facility in Sacramento. The Cordelia Substation used auto-transformers, which were high-efficiency transformers as well as compact and easy to operate.[4]

Alterations

Exterior: On the building, the original fenestration pattern remains despite the removal of some glazing and doors and use of plywood in the openings. Some ornamental features on the exterior have been removed, specifically the electric lights along the entablature at the entrance. The switchyard contains modern equipment installed outside the period of significance.

Interior: All equipment related to the control building's function (bus units, switches, transformers, and conductors) has been removed. The building's interior was vandalized for several years, and most of the walls are covered with graffiti. Birds have also taken up residence in the building, and there is bird debris, including feathers, guano, and dead birds throughout the building. The ceiling and some walls inside the control building exhibit substantial concrete spalling. Various debris is scattered throughout the building, from old operator logs and steel pipes to empty spray paint cans and wood boards.

[2] Ivan C. Frickstad, "Cordelia Substation From an Architectural Standpoint," *Pacific Service Magazine* 5, no. 11 (April 1914): 364.
[3] Frickstad, "Cordelia Substation From an Architectural Standpoint," 364.
[4] J.P. Pollyman, "The Electrical Equipment of Cordelia Substation," *Pacific Service Magazine* 5, no. 11 (April 1914): 368–370.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for the National Register listing.)

- [X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B. Property is associated with the lives of persons significant in our past.
- [X] C. Property embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
Architecture
Engineering

Period of Significance
1913-1930

Significant Dates

Significant Person
(Complete only if Criterion B is marked above.)

Cultural Affiliation

Architect/Builder
Ivan C. Frickstad/Pacific Gas & Electric

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Cordelia Substation reflects the importance of the Drum-Spaulding Hydroelectric Project, an engineering achievement in electricity production that enabled widespread growth in northern and central California. The Cordelia Substation has statewide significance under National Register Criterion A for its association with the Drum-Spaulding Hydroelectric Project. The property is also locally significant under Criterion C for its distinctive Beaux Arts architectural design. The Cordelia Substation is nominated individually under the *Multiple Property Documentation Form for Pacific Gas and Electric Company Historic-Era Electrical Infrastructure*, under the themes "Transformative System Expansion, 1906–1930" and subtheme

"Drum-Spaulding Hydroelectric Project," as well as the "Architectural Styles" theme and subtheme "Pacific Service Period, 1911–1930." Under both themes, the property type is "Substations."

The property reflects the significance of monumental electrical infrastructure building projects and the application of City Beautiful principles to the design of substations associated with these projects. The property's period of significance is 1913–1930, spanning the property's year of construction to the end of the Transformative System Expansion period (1911–1930) of PG&E's electrical infrastructure.

Cordelia Substation maintains integrity to convey its significance. The property is in its original location. Sufficient original materials and design features of the property remain intact. These architectural features include wall cladding, windows, fenestration pattern, and a decorative, monumental entrance. Some windows and doors are obscured with metal or wood boards. The property retains functional features (e.g., orientation and physical connection to named transmission lines and switchyard), thereby representing its association with PG&E's history during the Pacific Service period. The resource retains sufficient integrity of workmanship to exhibit original construction techniques. Although no longer in active use as a substation, the property maintains an integrity of feeling and association with the Pacific Service period (1911–1930). The property retains its original setting, with an intact switchyard immediately adjacent to the building. Beyond this immediate setting, the property retains its broader setting in undeveloped shallow hills, north of Suisun Bay and adjacent to saltwater marshes.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

Transformative System Expansion, 1906–1930[5]

PG&E's operational and financial foundations stabilized and strengthened by 1910, as the immediate devastation of San Francisco in 1906 yielded to a prolonged campaign of rebuilding and regional growth throughout Northern California. Industrial, residential, and commercial construction in the Bay Area created strong utility demand, as did corresponding growth in Northern California, as agricultural and regional development transformed the Sacramento and Northern San Joaquin Valleys into increasingly settled population areas. From 1900–1910, California's population jumped by 60 percent, with much of this growth in PG&E's service territory. Thus, even as company officials scrambled to secure sufficient

[5] ICF, *Historic-Era Electrical Infrastructure Multiple Property Documentation Form Report Draft* (Sacramento, CA: Prepared for Pacific Gas & Electric Company, 2025).

funding for system rehabilitation and improvement, they also plotted continued growth, with several incremental expansions occurring during the period.[6]

PG&E continued to expand its corporate holdings, steadily acquiring several key rivals. In addition to this steady organizational expansion, PG&E initiated improvements to existing components of the system, rehabilitating existing electric plants and gas works, adding new substations, and rebuilding and expanding transmission and distribution lines. Across the service territory, PG&E added new "permanent" substations to increase distribution capacity from the existing high-voltage corridors and replace rudimentary and functionally obsolete facilities. Within this context of substation improvement through permanent construction, PG&E began to develop a characteristic classical architectural tone that characterized much of the company's development before World War II.[7] To accompany the improved generating and substation facilities, PG&E initiated a campaign of distribution improvement during the period, developing new lines across the service territory to serve new areas and replace outdated networks. By 1911, the company served 204 towns with electricity and 54 with gas service. Approximately two-thirds of California's population was within the PG&E service territory.[8]

Drum-Spaulding Hydroelectric Project

In 1912, PG&E embarked on the company's first major new development: construction of the Drum-Spaulding Hydroelectric Project, an ambitious phased hydroelectric project situated on the west slope of the Sierra Nevada along the South Yuba River, Bear River, North Fork of the North Fork American River, and tributaries of the Sacramento River watershed in Nevada and Placer Counties, California. The project used the abundant waters previously held by South Yuba Water Company and other water companies serving mining needs in the vicinity. The project had been under consideration for some years, but it did not come to fruition until the transformative system expansion of the 1910s.

The resulting Drum-Spaulding Hydroelectric Project is a power generation and water supply system consisting of numerous components, including powerhouses, on-stream dams with reservoirs, off-stream impoundments, diversion dams, associated canals, tunnels, ditches, penstocks, an overhead transmission line, and other features. The Drum-Spaulding Hydroelectric Project reflects a design conceived, surveyed, and engineered by PG&E in the 1910s and enhanced in the 1920s, 1940s, 1960s, and 1980s. Initial facility development included the 24,000 kilowatt (kW) Drum Powerhouse; Lake Spaulding Dam and Reservoir, a

[6] United States Census Records, *California Census Data, 1900 and 1910*, accessed at California Department of Finance.
[7] "Building New Substations," *Pacific Gas and Electric Magazine* 2, no. 5 (October 1910): 171–173; "Fireproof Substations," *Pacific Gas and Electric Magazine* 2, no. 8 (January 1911).
[8] "Industries Supplied from Hydroelectric Plants," *Pacific Gas and Electric Magazine* 1, no. 4 (September 1909): 152; "The Pacific Gas and Electric Company Supplies Heat, Light, and Power To," *Pacific Gas and Electric Magazine* 3, no. 5: back cover.

massive concrete dam and storage reservoir; associated water conveyance tunnels and canals; and a 110-mile, 110 kV transmission line (referred to as the Drum Cordelia line) to a new electrical load center for the Bay Area, Cordelia Substation, completed in 1913. The transmission line was the highest voltage line of the PG&E system. Assistant General Manager and PG&E Chief Engineer James H. Wise, who had begun his career with work on the 1903 de Sabla Powerhouse, oversaw engineering and design. Electrical engineer Frank G. Baum replaced Wise as chief engineer following Wise's death in 1912. As chief engineer of PG&E through the 1910s and 1920s, Baum led the vanguard of electrical engineering research and hydroelectric design and development.[9]

When the Drum-Spaulding Hydroelectric Project was launched into service on November 26, 1913, the Cordelia Substation became the nucleus and load center of the Pacific Service area for PG&E.[10] The Cordelia Substation site was selected for its central location within the PG&E service area and its strategic position between two rapidly growing areas, the Sacramento Valley and the Bay Area. The Cordelia Substation was located near other PG&E substations and existing transmission lines, so PG&E did not have to alter much of its existing system to bring Cordelia online.[11]

Since its initial phase was completed in 1913, PG&E has updated and modified the Drum-Spaulding Project's powerhouses, dams, and other water control and conveyance features as economic and technological considerations have allowed. The Drum-Spaulding Hydroelectric Project is a phased system of 10 developments. In the 10 developments, there are 29 reservoirs with a combined capacity of 154,388 acre-feet, six major water conduits, 12 powerhouses with associated switchyards totaling 192.5 megawatts (MW), transmission lines, and associated facilities and structures, including recreational facilities. The project reflects an achievement for PG&E's engineers and, equally importantly, a triumph for the primacy of hydroelectricity.[12] The establishment of the Drum-Spaulding Hydroelectric Project was of significant importance to both PG&E's institutional ascendancy and the development of Northern California as a whole, providing electrical power to the cities, industries, and agricultural centers in the northern half of the state during most of the twentieth century.[13] This access to electricity enabled unprecedented growth across the region during the twentieth century.

[9] PAR Environmental Service, Inc., *National Register of Historic Places Evaluation, PG&E's Drum-Spaulding Hydroelectric Project, FERC No. 2310, Nevada and Placer Counties, CA*, prepared for Pacific Gas and Electric Company, 2011.
[10] F.G. Mudgett, "Breaking a World's Record in Our Lake Spaulding Dam Construction," *Pacific Service Magazine* 5, no. 4 (September 1913): 125.
[11] Cardno, Inc., and Evans & De Shazo. *Drum-Cordelia Transmission Line DPR 523 Form*. Prepared by Matt Walker and Brian Matuk. Prepared for Pacific Gas and Electric Company, September 2018.
[12] "$10,000,000 Power Plants to Improve Service Here," *Pacific Gas and Electric Magazine* (August 1912): 92.
[13] "Starting the Drum Plant [etc.]," *Pacific Service Magazine* (December 1913): 219–228.

The Drum-Spaulding Hydroelectric Project expanded beyond its initial infrastructure. In 1920, PG&E added Spaulding No. 2 Powerhouse, and in 1928, added Spaulding No. 3 Powerhouse. Spaulding No. 3 Powerhouse was the first partially automatically operated powerhouse in the PG&E system. Dutch Flat and Drum No. 2 Powerhouses followed in the 1940s and 1960s, with Wise No. 2 Powerhouse added to the system in the 1980s.[14]

After the success of the Drum-Spaulding Hydroelectric System, PG&E began to plan for rapid hydroelectric expansion in Northern California. The company determined that hydroelectric power was the ideal form of stable power and the most efficient way to generate electricity. They launched a construction campaign along rivers throughout Central and Northern California.[15] They also continued expanding the reach of the Drum-Spaulding Hydroelectric System by constructing the Cordelia-San Rafael 60 kV line (also called the Bay Line) in 1913.[16] Underwater lines across San Francisco Bay carried power from the Drum-Spaulding Hydroelectric System into San Francisco by October 1916.[17]

Starting in the early 1950s, PG&E began constructing 230 kV transmission lines in conjunction with their large steam power plants. To ensure reliable service across the PG&E system and in conjunction with other public and private agencies, PG&E upgraded its existing high voltage transmission systems from 110 and 220 kV to 115 and 230 kV, respectively. This change required the installation of new substation equipment to allow the existing lines to transmit at a higher capacity.[18]

Cordelia Substation was built with a small outdoor switchyard to handle the distribution of the power leaving the substation and going to other substations around the Bay Area. Throughout the 1950s, 1960s, and 1970s, the switchyard was added to and enlarged, and the equipment inside the control building slowly became obsolete. In 1977, PG&E began the process of officially retiring the control building and installed a grounding system for the switchyard and all transmission lines entering Cordelia Substation. After the installation of the grounding system, they removed the 115 kV oil circuit breaker, the pump house, the

[14] PAR Environmental Service, Inc., *Drum-Spaulding Hydroelectric Project*, 2011; "Starting the Drum Plant," *Pacific Service Magazine* (December 1913): 219; "The Robot in Hydroelectric Operation—Spaulding No. 3," *Pacific Service Magazine*, Volume XVII, No. 12 (April 1930): 383.
[15] F. G. Baum, "Starting the Drum Plant," *Pacific Service Magazine*, 5, No. 7 (December 1913): 221.
[16] E. H. Steele, "How Towers are Built and Lines Strung over Mountain, Marsh, Stream and Valley," *Pacific Service Magazine,* XVII, no. 5 (July 1928): 151.
[17] Pacific Gas and Electric Company, "Friday Photo Feature from the PG&E Photographic Archives: Bridging the Gate," *PG&E @Work*, In the News Archives, Employee Publications, April 4, 2003.
[18] Allan Mazur, *Energy and Electricity in Industrial Nations: The Sociology and Technology of Energy* (New York: Routledge, 2013); Transmission Agency of Northern California, "California-Oregon Transmission Project," http://www.tanc.us/cotp.html (accessed March 15, 2017); Transmission Agency of Northern California, "The Big Picture, The Western US Power System," http://www.tanc.us/chap2_picture.html (accessed March 15, 2017); Western Electricity Coordinating Council, "About Us," https://www.wecc.b iz/Pages/home.aspx (accessed March 15, 2015).

cooling pond, and all miscellaneous indoor equipment in the control building in 1979.[19] After the retirement of the Cordelia Substation control building in 1979, the building was fenced off from the active outdoor switchyard. In 1980, PG&E installed a new 115 kV transformer bank in the outdoor switchyard at Cordelia Substation, solidifying the retirement of the control building.

The Cordelia Substation reflects the importance of the Drum-Spaulding Hydroelectric Project, an engineering achievement in electricity production that enabled widespread growth in northern and central California.

Beaux Arts Architectural Style of the Pacific Service Period, 1911–1930

By the early 1910s, the form and style of properties within the PG&E portfolio began to convey monumentality through elaborate architectural forms. This new emphasis on style is attributed to Ivan C. Frickstad, who started his role as the "architectural assistant to the civil and hydraulic engineer of the Pacific Gas and Electric Company of San Francisco" in 1911 and retired in 1948.[20] The shift toward high-style buildings began with the Drum-Spaulding Hydroelectric Project in 1912. Frickstad saw a unified architectural style as a way of conveying the connection of the systems, explaining,

> It is fitting and proper that the buildings comprising a system made up of several plants which are dependent upon one another for the perfect fulfillment of their specific mechanical functions should be made to express this relationship by carrying a consistent architectural theme…While each has been given an individuality, they are architecturally related…in rendering "Pacific Service" to the customer.[21]

The Cordelia Substation was constructed simultaneously with Drum Powerhouse in 1912 and 1913 as part of the Drum-Spaulding Hydroelectric Project. Frickstad designed both in a similar interpretation of Beaux Arts classicism. Frickstad emphasized that, despite its individual design aspects, the substation's design clearly reflected the unified style of other powerhouses and substations within the PG&E system.[22] Writing in 1916, Frickstad described the architectural style of PG&E's buildings as "Pacific Service;" however, the buildings and structures display characteristics of the substyles typically classified as part of the City Beautiful movement.[23]

[19] Pacific Gas and Electric Company, "Grounding System Cordelia Substation," Department of Engineering, Drawing No. 308819, November 1, 1979, Box 654407222, Pacific Gas and Electric Company Archives.
[20] Ivan C. Frickstad, "Some Sub-Stations of the Pacific Gas & Electric Co.," *The Architect and Engineer* 42 (1915): 54–68; Ivan C. Frickstad, "The Development of 'Pacific Service' Architecture as Exemplified in its Modern Powerhouses and Substations," *Pacific Service Magazine* 8, no. 6 (1916): 204–216.
[21] Ivan C. Frickstad, "Cordelia Substation From an Architectural Standpoint," *Pacific Service Magazine* 5, no. 11 (April 1914): 364.
[22] Frickstad, "Cordelia Substation From an Architectural Standpoint," 364.
[23] Ibid.

The City Beautiful movement emerged from the Chicago World's Columbian Exposition of 1893. It focused on large-scale urban planning projects, promoting the idea that beauty inspires moral and civic virtue, which in turn could elevate society. Architects of the City Beautiful movement typically learned the architectural language of classicism at the École des Beaux-Arts in Paris, the French school of architecture. From broad Beaux Arts classicism, more nuanced variations emerged, including Neoclassical and Italian Renaissance Revival architectural styles. Architectural design within the City Beautiful movement also incorporated the general revival of older European architectural styles Gothic Revival, Mediterranean Revival, and Spanish Colonial Revival.

Little is known about Frickstad's formal architectural training. His designs reflect the City Beautiful movement with an emphasis on historicist styles that dominated civic and public works building campaigns across the United States. Frickstad recognized that architectural style was a form of branding and referencing historical forms conveyed the importance and monumentality of PG&E's buildings. The design of these systems was not dictated by setting. The buildings seem to be embracing the monumentality and design trends of the era more than their geographic contexts.

Frickstad's designs for the Drum-Spaulding projects exemplify the application of City Beautiful architectural styles to power infrastructure, and the Cordelia Substation is an excellent example of Beaux Arts classicism. The building features a triumphal-arch-inspired monumental tripartite entrance with arches framed by engaged columns, light-colored cladding material reminiscent of marble, engaged pilasters separating bands of fenestration, an elaborate cornice, and a distinctive height difference between the primary and secondary levels. The Cordelia Substation control building exhibits the following general design and materials elements that characterize Beaux Arts classicism: arched or linteled openings; cladding materials consisting of cast concrete and plaster; elaborate cornice or active roofline with roof-top sculpture or decorative elements; monumental entrance; and tripartite (base-shaft-capital) vertical arrangement. [24]

Property Type: Substations

Substations have been an integral part of power transmission and distribution since the late nineteenth century. Since that time, they have taken many forms, from utilitarian sheds to

[24] Marcus Whiffen, *American Architecture Since 1780: A Guide to the Styles* (Cambridge, MA: MIT Press, 1992); GPA Consulting, "Context: Architecture and Engineering, 1850–1980; Theme: Beaux Arts Classicism, Neoclassical, and Italian Renaissance Revival Architecture, 1895–1940," in *SurveyLA: Los Angeles Citywide Historic Context Statement*, prepared for City of Los Angeles Department of City Planning, Office of Historic Resources, 2018.

[24] Marcus Whiffen, *American Architecture Since 1780: A Guide to the Styles* (Cambridge, MA: MIT Press, 1992); GPA Consulting, "Context: Architecture and Engineering, 1850–1980; Theme: Beaux Arts Classicism, Neoclassical, and Italian Renaissance Revival Architecture, 1895–1940," in *SurveyLA: Los Angeles Citywide Historic Context Statement*, prepared for City of Los Angeles Department of City Planning, Office of Historic Resources, 2018.

monumental buildings to enclosed yards. Substations typically serve as the starting point and endpoint of named transmission lines. Functionally, the primary purpose of most substations is to modulate line voltage, stepping it up or down, depending upon the need. All substations include switching mechanisms or circuit breakers that allow line segments to be energized or switched off for maintenance or, automatically, as the result of a fault. A substation can increase or moderate distribution from high-voltage corridors, though sub-70 kV substations are the most common in the PG&E system.

Construction of substations has been an ongoing constant throughout PG&E's history. Even during periods of limited development for generation and transmission facilities, new substations were constructed to replace obsolete older substations. Subtypes of substations roughly correspond to four periods: pre-1910, 1910–1930, 1930–1945, and after 1945. The earliest substations were utilitarian and no known examples from the pre-1910 period are extant. By 1912, many early substations were obsolete and dangerous, leading to a campaign to replace rudimentary early stations with permanent, safe, enclosure buildings.

The Cordelia Substation control house exemplifies the substation type constructed during the Pacific Service period between 1910 and 1930, reflecting a distinct period of growth for PG&E. During this important period, large-scale systems with monumental architectural designs were constructed as PG&E established its commercial and institutional identity through a cohesive monumental built form. Substation control houses of this period used a City Beautiful-influenced architectural vocabulary. The power plants and Cordelia Substation control building of the Drum-Spaulding Hydroelectric Project System reflect this important architectural period. The design was of a heightened and unified architecture intended to convey the company's growing civic role in California life. The Beaux Arts architectural style of the Cordelia Substation conveys monumentality, employing the same architectural language as significant civic buildings of the 1910s.

Criterion A

The Cordelia Substation control house is significant under Criterion A for its association with the development of the Drum-Spaulding Project, which marked an achievement in the expansion of power distribution in the state of California. Cordelia Substation conveys a direct physical and operational association with the Drum-Spaulding Hydroelectric Project (FERC License No. 2310), a key project sponsored by PG&E that demonstrably shaped the territory and service breadth of PG&E from 1911–1930.

The Cordelia Substation was a component of this project, and as an engineering feat in power transmission, the Drum-Spaulding Hydroelectric Project and its major components reflect significance in power generation and distribution. The Cordelia Substation served as the terminus of the original and pioneering 110-mile-long 110 kV transmission system, allowing for the distribution of reliable electricity for the Bay Area's increasing electrical demands.

The Cordelia Substation was developed as part of the larger Drum-Spaulding Hydroelectric System, including the innovative Drum-Cordelia 110 kV transmission line, which was a notable innovation in electric transmission and distribution at the time it was placed into operation.

The arrival of a stable power supply and a substation that was designed to support high-voltage power transmission was key to the continued development of the Bay Area in the 1910s. It was initially spurred as a direct operational response to the San Francisco earthquake of 1906 and the need for stable power sources in the Bay Area. The Drum-Spaulding Hydroelectric System was PG&E's first major hydroelectric project, and its integral components, including the Cordelia Substation, have directly contributed to the state's history.

Criterion C

The Cordelia Substation is significant under Criterion C for its design, embodying the distinctive characteristics of the Pacific Service period's Beaux Arts classicism. The building reflects the significance of monumental electrical infrastructure building projects and the application of City Beautiful principles to the design of substations associated with these projects. It exhibits the cohesive monumental built form while relegating transmission and distribution infrastructure to a secondary switchyard.

The building's Beaux Arts style and monumental form reflect the corporate organization of PG&E during the Pacific Service period. The Cordelia Substation control house exemplifies the substation type constructed during the Pacific Service period between 1910 and 1930, reflecting a distinct period of growth for PG&E when large-scale systems with monumental architectural designs were constructed as PG&E established its commercial and institutional identity through cohesive architectural styles. As one of the first substations Ivan Frickstad designed for PG&E, which set a precedent for other monumental designs in PG&E's hydroelectric projects, the Cordelia Substation is representative of PG&E's distinctive style during the period.

The Cordelia Substation control house reflects significance under Criterion C within the theme Transformative System Expansion (1906–1930). As an engineering feat, the substation's lines and equipment transmitted hydroelectric power at unprecedented capacity. At the time of construction, the transmission line was the highest voltage line of the PG&E system. Cordelia Substation reflects the innovation in hydroelectric power generation that occurred in the early twentieth century and the significance of the Drum-Spaulding Project as the work of PG&E engineers James H. Wise and Frank G. Baum. The success of the Drum-Spaulding Project put PG&E at the vanguard of electrical engineering research and hydroelectric design and development, enabling widespread electricity in northern and central California.

Integrity

The Cordelia Substation retains the essential aspects of integrity to convey its significance.

- **Location**: The Cordelia Substation is in its original location.

- **Design, Materials, Workmanship**: Sufficient original materials and design features of the building remain intact. These architectural features include wall cladding, windows, fenestration pattern, and a decorative, monumental entrance. Some windows and doors are obscured with metal or wood boards. The building retains functional features (e.g., orientation and physical connection to named transmission lines), such that it represents its association with PG&E's history during the Pacific Service period. The resource retains sufficient integrity of workmanship to exhibit original construction techniques.

- **Feeling and Association**: Although the building is no longer in active use as a substation, the building and switchyard retains an integrity of feeling and association with the Pacific Service period's electricity transmission.

- **Setting**: The property retains its original setting, with an intact switchyard immediately adjacent to the building. Beyond this immediate setting, the property retains its original undeveloped shallow hills, north of Suisun Bay and adjacent to saltwater marshes.

Character-defining features that reflect function and use (Criterion A)

- Location at the end of a long-distance transmission system on the edge of the Bay Area.
- Spatial arrangement and layout of the control building in the standardized plan of Pacific Service substation facilities.
- Separation of control building and outdoor switchyard.
- Interior arrangement of separate operations room, concrete switch cells, and rail line receiving areas.
- Kinnear door openings on side elevations.

Character-defining features that reflect architectural style (Criterion C)

- Massing with monumental entrance and flanking wing.
- Tripartite monumental entrance under a classically inspired entablature.
- Applied ornamentation and classically-inspired design on monumental entrance, featuring:
    - Three recessed, segmental arch niches framed by four concrete Doric engaged columns under an entablature with a denticulated cornice.
    - Decorative elements within the recessed arches include paired string courses of plaster dentil molding and a cartouche in the center entrance arch.

- Glazed double entryway with plate glass sidelights and a transom in the center niche.
- Incised lettering signage in entablature.

- Reinforced concrete walls.
- A raised parapet and hipped pent roof clad in terra-cotta tiles.
- Fenestration with a clerestory band of windows separated by square, Doric engaged pilasters supporting the overhang of the hipped pent roof.
- Segmental arch openings with Kinnear doors (steel rolling doors) on side elevations.

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

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Previous documentation on file (NPS):

____ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
____previously determined eligible by the National Register
____designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #_____
____recorded by Historic American Engineering Record # _____
____ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

X____ State Historic Preservation Office
____ Other State agency
____ Federal agency
____ Local government
____ University
X____ Other
Name of repository: Pacific Gas and Electric Company Archive, 300 Lakeside Drive, Ste. 210, Oakland, CA 94612_____

Historic Resources Survey Number (if assigned): _____

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10. Geographical Data

Acreage of Property 0.35_____

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)

1. Latitude: 38.216361 Longitude:-122.111829

2. Latitude: 38.215902 Longitude:-122.111765

3. Latitude: 38.215898 Longitude:-122.112055

4. Latitude: 38.216349 Longitude:-122.112108

Or
UTM References
Datum (indicated on USGS map):

☐ NAD 1927 or ☐ NAD 1983

1. Zone:	Easting:	Northing:
2. Zone:	Easting:	Northing:
3. Zone:	Easting:	Northing:
4. Zone:	Easting :	Northing:

Verbal Boundary Description (Describe the boundaries of the property.)
The boundary runs along the walls of the control building and switchyard. To the north and east of the building are concrete, paved areas. To the west, there is the switchyard. To the south of the building is a railroad track.

Boundary Justification (Explain why the boundaries were selected.)
This nomination addresses the Cordelia Substation. The control building is situated across two irregularly shaped parcels, which include a switchyard, single-family houses, railroad tracks, and other built elements unrelated to the control building and its historic function during its period of significance.

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11. Form Prepared By

name/title: Allison Lyons Medina, Senior Architectural Historian (ICF), Rebecca Riggs, Architectural Historian (Stantec)
organization: ICF
street & number: 595 Market Street, Suite 950
city or town: San Francisco state: CA zip code: 94105
e-mail: allison.lyonsmedina@icf.com
telephone: (213) 312-1701
date: 1/23/2026

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location [included in final].
- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.
- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Location Map

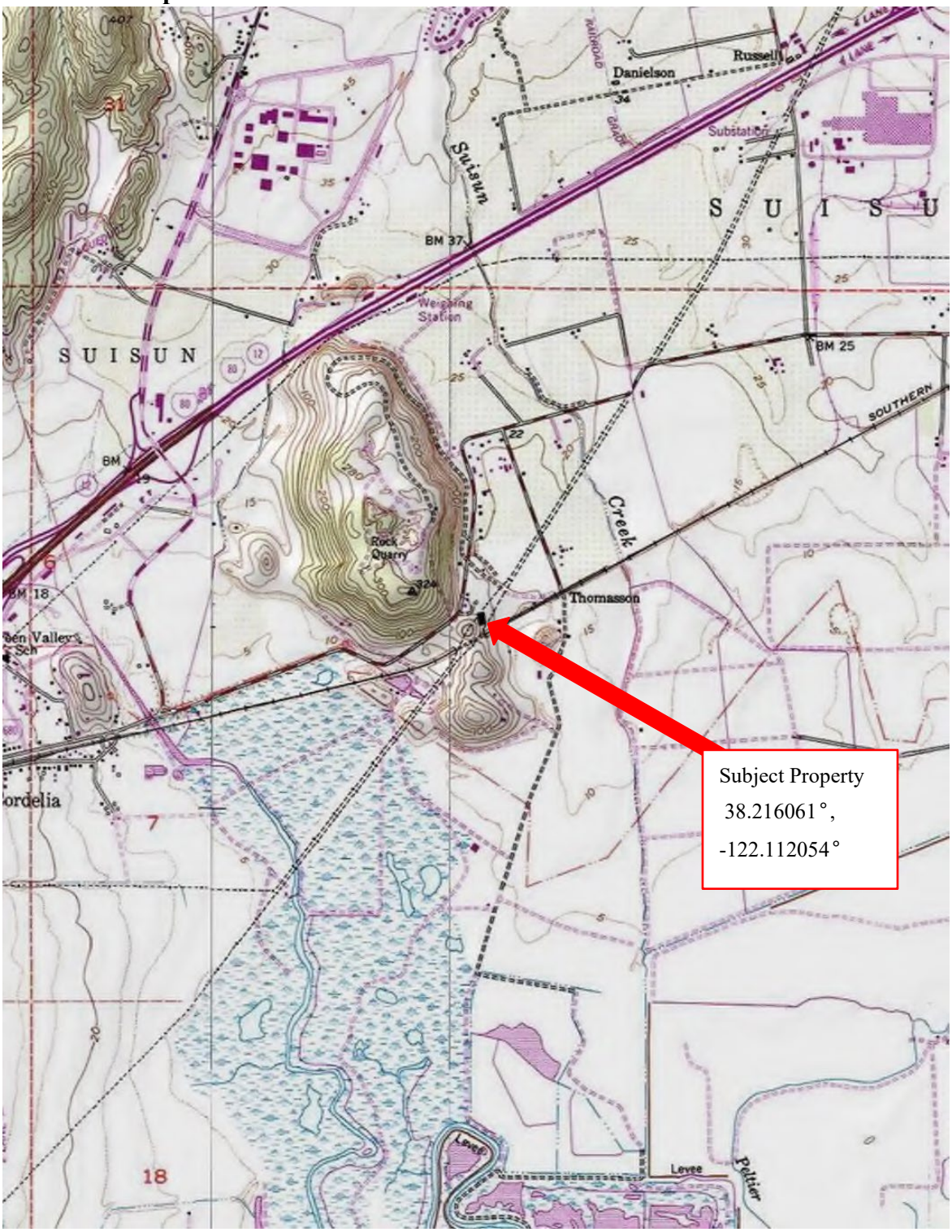

Figure 1: Cordelia Substation, 1914 (PG&E).

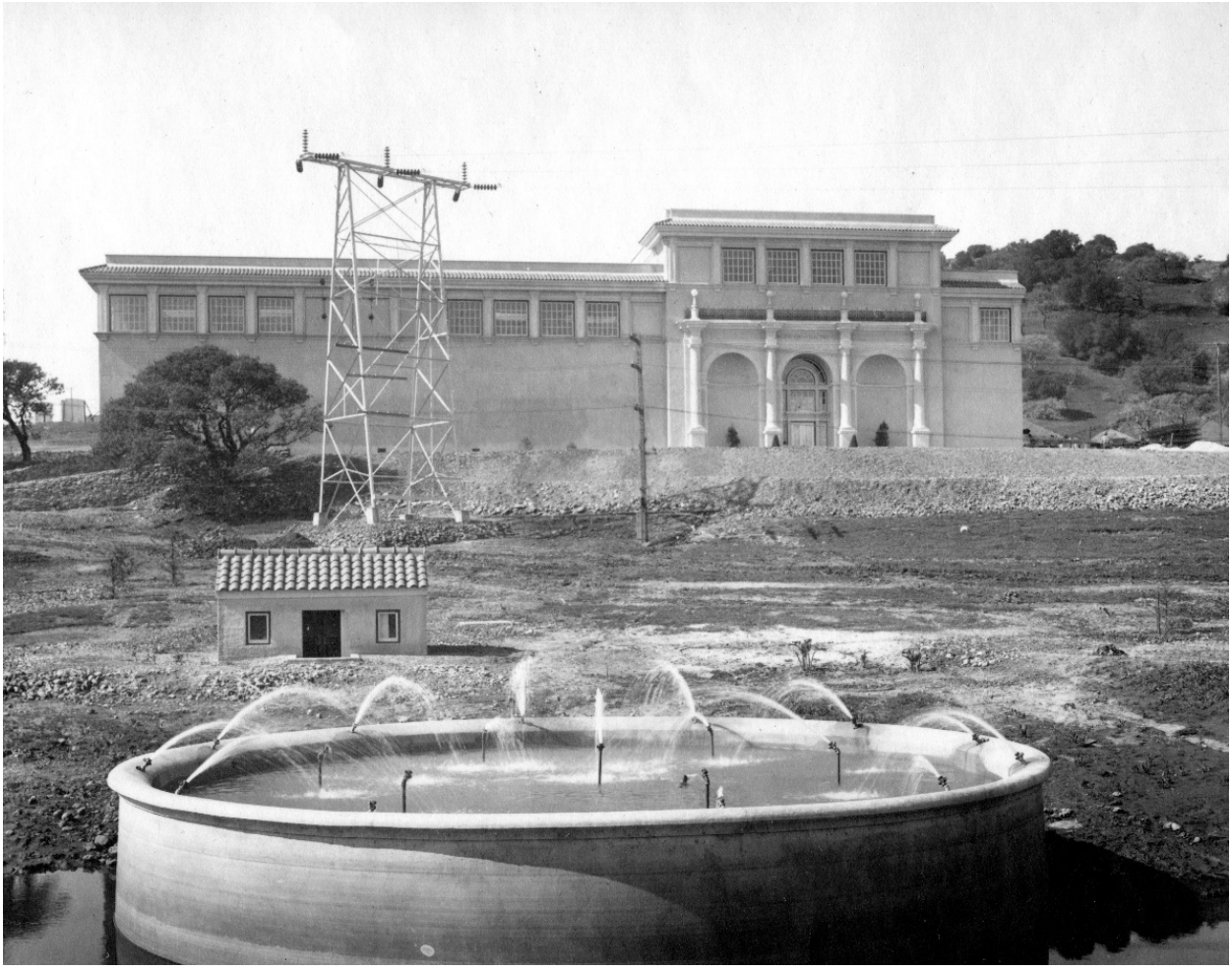

Figure 2: Cordelia Substation in 1913, showing pump house and cooling pond (PG&E).

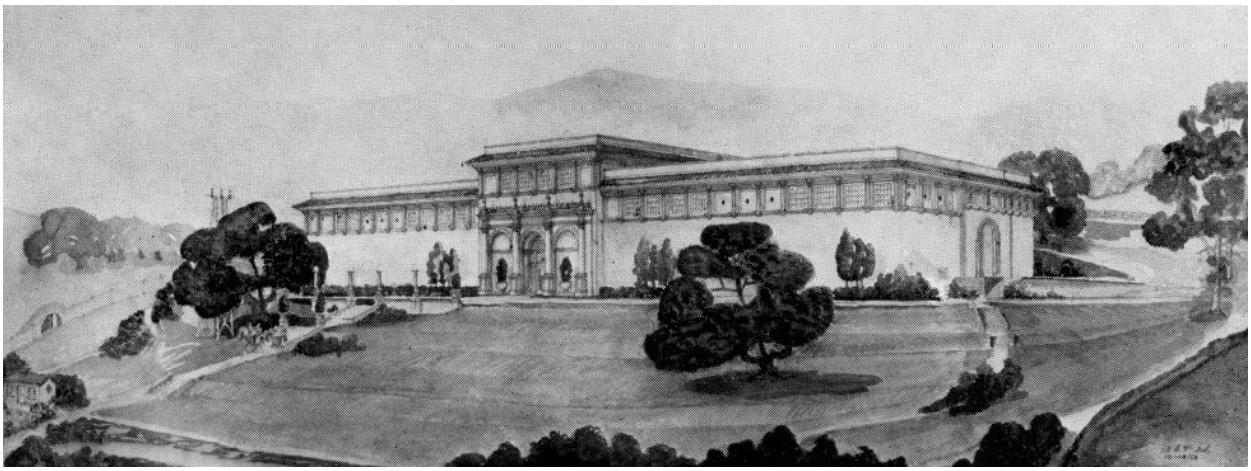

Figure 3: Rendering of the Cordelia Substation as originally designed with symmetrical composition of two wings branching off the larger mass center and a fully landscaped terrace, 1914 (Frickstad, "Cordelia Substation From an Architectural Standpoint," page 367).

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Cordelia Substation

City or Vicinity: Fairfield

County: Solano State: CA

Photographer: Rebecca Riggs, Stantec

Date Photographed: April 29, 2021

Description of Photograph(s) and number, include description of view indicating direction of camera:

1 of 16 (CA_Fairfield_CordeliaSubstation_0001)
The Cordelia Substation, camera facing west. April 29, 2021.

2 of 16 (CA_Fairfield_CordeliaSubstation_0002)
North elevation of the Cordelia Substation showing terraces and separation of control building and active switchyard, camera facing south. April 29, 2021.

3 of 16 (CA_Fairfield_CordeliaSubstation_0003)
Kinnear door covered by steel plate on the south elevation, camera facing north. April 29, 2021.

4 of 16 (CA_Fairfield_CordeliaSubstation_0004)
Kinnear door covered by steel plate on the north elevation, camera facing southeast. April 29, 2021.

5 of 16 (CA_Fairfield_CordeliaSubstation_0005)
East elevation of the Cordelia Substation, camera facing southwest. April 29, 2021.

6 of 16 (CA_Fairfield_CordeliaSubstation_0006)
Arches, Doric columns, and other ornamental features on the east elevation, camera facing west. April 29, 2021.

7 of 16 (CA_Fairfield_CordeliaSubstation_0007)
Cracking and spalling of concrete columns, camera facing southwest. April 29, 2021.

8 of 16 (CA_Fairfield_CordeliaSubstation_0008)
Glazed doors with broken glass, camera facing southwest. April 29, 2021.

9 of 16 (CA_Fairfield_CordeliaSubstation_0009)
Cornice above glazed entryway on the east elevation, camera facing south. April 29, 2021.

10 of 16 (CA_Fairfield_CordeliaSubstation_0010)
Concrete cartouche on the entryway cornice, camera facing southwest. April 29, 2021.

11 of 16 (CA_Fairfield_CordeliaSubstation_0011)
Windows on the east elevation, camera facing southwest. April 29, 2021.

12 of 16 (CA_Fairfield_CordeliaSubstation_0012)
Visible spalling of concrete cornice and pilasters on the south elevation, camera facing north. April 29, 2021.

13 of 16 (CA_Fairfield_CordeliaSubstation_0013)
Graffiti inside the entryway to the control building, camera facing east. April 29, 2021.

14 of 16 (CA_Fairfield_CordeliaSubstation_0014)
Hallway leading to bus cells, camera facing south. April 29, 2021.

15 of 16 (CA_Fairfield_CordeliaSubstation_0015)
Main control floor with rail line through the center, camera facing southwest. April 29, 2021.

16 of 16 (CA_Fairfield_CordeliaSubstation_0016)
Ceiling spalling inside the control building, camera facing southeast. April 29, 2021.

Sketch Map and Photo Key

Photograph 1: The Cordelia Substation, camera facing west. April 29, 2021.

Photograph 2: North elevation of the Cordelia Substation showing terraces and separation of control building and active switchyard, camera facing south. April 29, 2021.

Photograph 3: Kinnear door covered by steel plate on the south elevation, camera facing north. April 29, 2021.

Photograph 4: Kinnear door covered by steel plate on the north elevation, camera facing southeast. April 29, 2021.

Photograph 5: East elevation of the Cordelia Substation, camera facing southwest. April 29, 2021.

Photograph 6: Arches, Doric columns, and other ornamental features on the east elevation, camera facing west. April 29, 2021.

Photograph 7: Cracking and spalling of concrete columns, camera facing southwest. April 29, 2021.

Photograph 8: Glazed doors with broken glass, camera facing southwest. April 29, 2021.

Photograph 9: Cornice above the glazed entryway on the east elevation, camera facing south. April 29, 2021.

Photograph 10: Concrete cartouche on the entryway cornice, camera facing southwest. April 29, 2021.

Photograph 11: Windows on the east elevation, camera facing southwest. April 29, 2021.

Photograph 12: Visible spalling of concrete cornice and pilasters on the south elevation, camera facing north. April 29, 2021.

Photograph 13: Graffiti inside the entryway to the control building, camera facing east. April 29, 2021.

Photograph 14: Hallway leading to bus cells, camera facing south. April 29, 2021.

Photograph 15: Main control floor with rail line through the center, camera facing southwest. April 29, 2021.

Photograph 16: Ceiling spalling inside the control building, camera facing southeast. April 29, 2021.

Cordelia Substation
Name of Property

Solano County, CA
County and State

Paperwork **Reduction Act Statement:** This information is being collected for nominations to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.). We may not conduct or sponsor and you are not required to respond to a collection of information unless it displays a currently valid OMB control number.
Estimated Burden Statement: Public reporting burden for each response using this form is estimated to be between the Tier 1 and Tier 4 levels with the estimate of the time for each tier as follows:

Tier 1 – 60-100 hours
Tier 2 – 120 hours
Tier 3 – 230 hours
Tier 4 – 280 hours

The above estimates include time for reviewing instructions, gathering and maintaining data, and preparing and transmitting nominations. Send comments regarding these estimates or any other aspect of the requirement(s) to the Service Information Collection Clearance Officer, National Park Service, 1201 Oakridge Drive Fort Collins, CO 80525.