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B O N N E V I L L E P O W E R A D M I N I S T R A T I O N

FIELD GUIDE: HISTORIC RESOURCES

This document was created in partnership with AECOM Portland for Bonneville Power Administration.

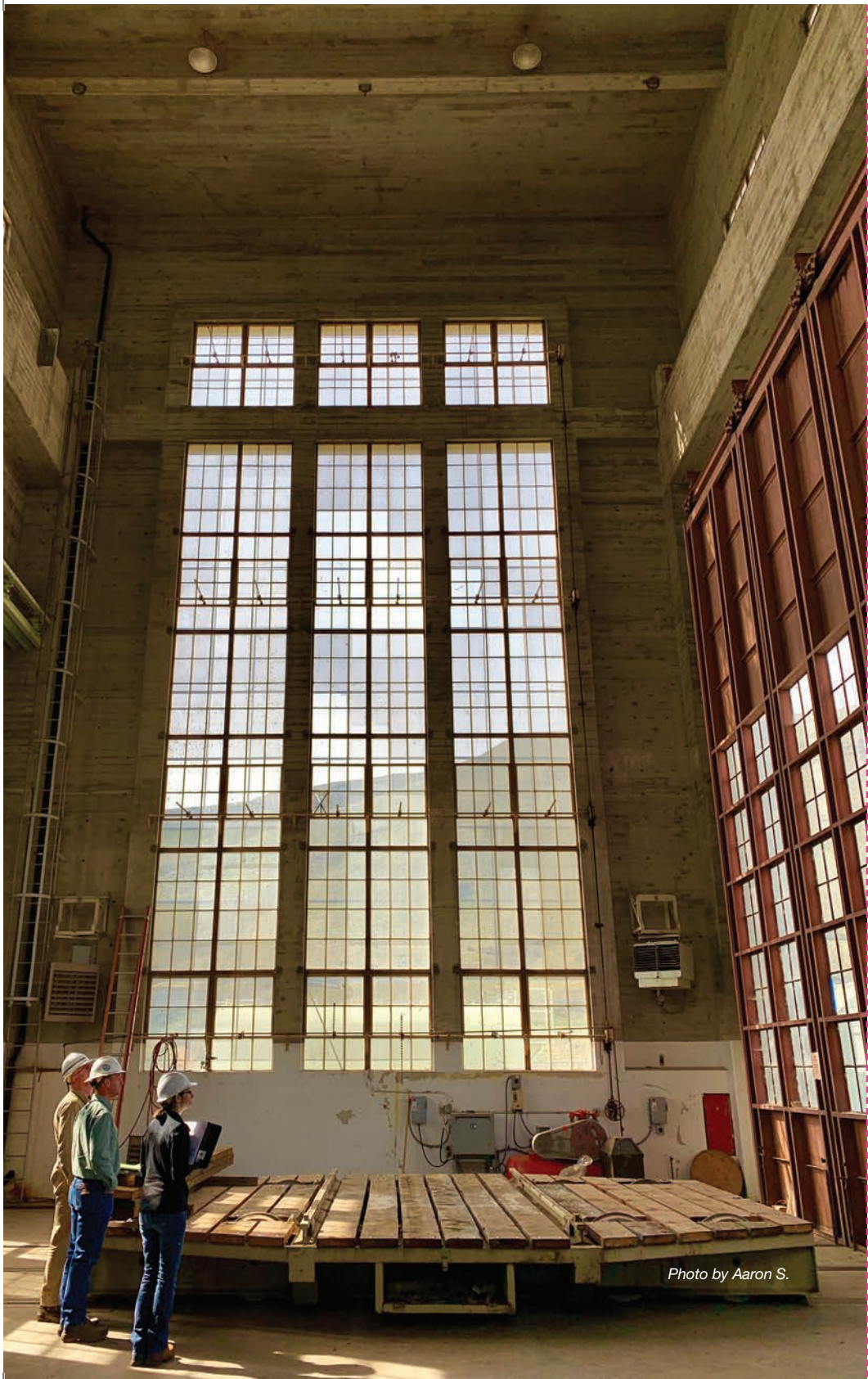


Photo by Aaron S.

LEGEND

TIER I HIGHEST PRESERVATION PRIORITY

- Individually Eligible and Contributing Architecturally and Historically Significant Resources
- Proposed alterations require screening and/or consultation conducted by BPA Historian.

TIER II PRESERVATION PRIORITY

- Eligible and Contributing Historically Significant Resources
- Proposed alterations require screening and/or consultation conducted by BPA Historian.

TIER III PRESERVATION CONSIDERATION

- Important or Rare Resources but Not Eligible/Non-Contributing
- Proposed alterations should be discussed with BPA Historian about preservation opportunities. External consultation likely not required.

X NO PRESERVATION CONSIDERATION

- Not Eligible/Non-Contributing Resources
- Alterations may occur without requiring Section 106. Coordinate with BPA Historian and Environmental Compliance to obtain CX.



SUBSTATION



MASTER GRID



DEFENSE INDUSTRY



INDUSTRIAL DEVELOPMENT



RURAL ELECTRIFICATION



INTERTIE



BACKBONE



UNTANKING TOWER



MAINTENANCE HEADQUARTERS



INITIAL MICROWAVE CIRCUIT /
MICROWAVE RADIO ORIGINAL



TESTING FACILITY



DAM DEVELOPMENT

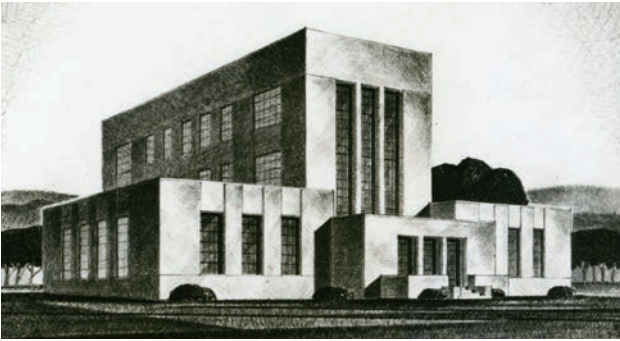
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1 INTRODUCTION

The Bonneville Power Administration's (BPA's) Historic Resources Field Guide functions as an integral part of the agency's Historic Resources Management Program, which promotes the preservation of the agency's significant resources dating from the construction of BPA's first facilities in 1938 to the end of BPA's historic period in 1974. The Field Guide informs BPA personnel about important agency resources that are eligible for historic designation and highlights architectural features that BPA personnel should work to preserve. BPA's primary historic resource types are substations and their buildings and microwave radio stations. BPA's other historic resource types are administrative buildings, test stations, converter stations, compensation stations, control centers, and transmission lines.



The substation is one of BPA's primary historic resource types. The Oregon Statesman [Salem, Oregon] published this architectural drawing of the Salem Substation Control House on the front page of its December 26, 1940, issue with the caption "Impressive Structure to House Substation."

BPA's historic resources tell the story of the agency's inception, expansion, and evolution. BPA's establishment in 1937 by the United States Congress was a defining moment for the region and the nation. At that time, the population and economy were still reeling from the Great Depression. Rural electrification was bringing electrical power to farms and ranches for the first time. Bonneville Dam, the first federal dam in the Columbia River, was constructed as part of President Franklin D. Roosevelt's New Deal. Transmission lines and substations then began transmitting Bonneville power to electrify the region and spur economic renewal.

When the United States entered World War II, the demand for power intensified to support the Pacific Northwest's expanding defense industries, particularly aluminum production. In the following decades, BPA continued to build, enlarge, and integrate its power grid to serve the region's residential, commercial, and industrial consumers. The construction of new sub-stations, microwave radio stations, and other facilities continued to upgrade and enhance grid operations. BPA's historic resources were key to the growth of power and transmission in the Pacific Northwest.



The Anaconda Substation (1953) was built to power the Anaconda Aluminum Company plant in Montana. The substation was part of BPA's expansion into Montana and contributed to midcentury development of the Pacific Northwest's aluminum industry. The control house is architecturally significant for its modern industrial design.

To highlight important BPA resources worthy of historic preservation, the Field Guide:

- Establishes resource types to provide a basis for comparison between resources with similar characteristics (Chapter 5).
- Enumerates the character-defining features of historic resources (Chapter 6).
- Implements a tiered ranking system, described in Chapter 2, to focus preservation efforts on resources with the highest levels of historical significance and integrity.

Historic transmission lines are identified as a resource type in Chapter 5 but are otherwise outside the scope of the Field Guide.



Bell Substation (1942) was built in Mead, Washington, to help meet the increasing power demands of war industries, particularly aluminum. Bell Substation's numerous changes render it "not eligible" for the National Register of Historic Places. However, the substation's tall untanking tower is still important as a rare BPA building type.



Wagner Lake Substation Control House (1974), in Wilbur, Washington, is one of the many control houses assembled at BPA substations in the 1960s and 1970s that consisted of prefabricated, aluminum-panel construction. The substation is historically significant for its association with BPA's rural electrification efforts



Grandview Substation Control House (1954), in Grandview, Washington, reflects the Minimal Traditional style, characterized by its lack of architectural ornament. BPA employed this style for certain control house from the 1940s to 1960s.

2 USING THE FIELD GUIDE

This chapter describes the tiered ranking system used to focus preservation efforts on resources with the highest levels of significance and integrity.

TIER I: ARCHITECTURAL AND HISTORICAL SIGNIFICANCE — HIGHEST PRESERVATION PRIORITY

Tier I resources have architectural and historical significance, retain integrity, and are eligible for historic designation, such as inclusion in the National Register of Historic Places. Most resources that qualify as Tier I are substation buildings such as control houses and untanking towers. Tier I resources have the highest preservation priority, meaning BPA personnel should preserve their architectural design, materials, and overall character. Proposed alterations to Tier I resources require screening and/or consultation conducted by qualified BPA cultural resources staff.



Tier I: Midway Substation (1941), on the Hanford Reservation in Washington, with transfer track leading to untanking tower. The substation is significant in the area of Industry for its role in the national defense, and the control house and untanking tower are architecturally significant.



Tier I: Midway Substation. Historic photo.



Tier I: Murray Substation Control House (1972) in Arlington, Washington is an example of the Contemporary architectural style and Beauty design concepts deployed by BPA during the System Expansion Period.



Tier I: Murray Substation Control House under construction in 1971. Historic photo.



Tier I: Gardiner Substation Control House (1963) in Gardiner, Oregon, retains excellent architectural integrity as an example of BPA's Standard Aluminum Control House Type 193 design and is historically significant in the area of Government for its association with rural electrification.



Tier I: Gardiner Substation Control House in 1964. Historic photo.

TIER II: HISTORICAL SIGNIFICANCE — PRESERVATION PRIORITY

Tier II resources have historical significance, retain integrity, and are eligible for historic designation, such as inclusion in the National Register of Historic Places. Although Tier II resources may convey important historic themes, they are not architecturally significant. Most resources that qualify as Tier II are substation buildings and microwave radio station sites. Tier II resources are preservation priorities, and proposed alterations to these resources require screening and/or consultation conducted by qualified BPA cultural resources staff.



Tier II: Oregon City Substation (1941) in Oregon is historically significant in the areas of Commerce and Industry and supplied power to defense-related industries in Portland and the Willamette Valley during World War II.



Tier II: Oregon City Substation. Historic photo.



Tier II: Troy Substation (1953) in Troy, Montana, is historically significant in the areas of Commerce and Industry and represents BPA's expansion into western Montana during a period of tremendous growth.



Tier II: Troy Substation in 1963. Historic Photo.



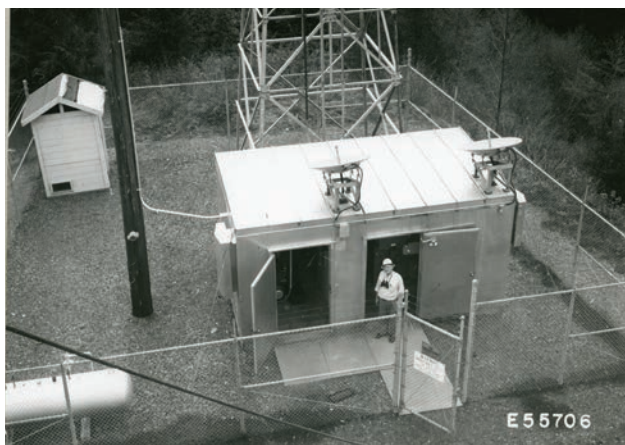
Tier II: Chief Joseph Substation (1956) in Bridgeport, Washington, is historically significant in the area of Government as representing the design, construction, operation, and expansion of BPA's transmission system during the System Expansion Period.



Tier II: Chief Joseph Substation, oil house and tanks in 1971. Historic photo.



Tier II: Goodwin Peak Microwave Radio Station (1953) near Mapleton, Oregon, is significant in the area of Communications as a key component of BPA's early microwave communications network. It is also significant in the area of Industry for supporting regional industrial development. All National Register of Historic Places-eligible microwave radio stations are Tier II resources.



Tier II: Goodwin Peak Radio Station in 1961. Historic photo.

TIER III: IMPORTANT OR RARE — PRESERVATION CONSIDERATION

Tier III resources are important or rare but do not meet the thresholds for architectural or historical significance, or they have significance but lack integrity. Tier III resources may include untanking towers, oil houses, transfer tracks and carts, distinctively designed control houses, maintenance buildings, boxlike switchyard superstructures, or fountains. Proposed alterations to Tier III resources should involve discussion with qualified BPA cultural resources staff about preservation opportunities. External consultation is likely not required for alterations to Tier III resources.



Tier III: Harrisburg Substation (1946), near Harrisburg, Oregon, is important for its association with rural electrification.



Tier III: Harrisburg Substation in 1963. Historic photo.



Tier III: Redmond Substation and Maintenance Headquarters heliport (1969) near Redmond, Oregon, is a rare example of a heliport within the BPA system. The substation is not eligible for the National Register of Historic Places due to major alterations to key buildings.



Tier III: Lookingglass Substation Control House (1951) near Roseburg, Oregon, is a rare example of a virtually unaltered 1950s System Expansion Control House (BPA Type 190). The substation is not eligible for the National Register of Historic Places due to the replacement of nearly all the switchyard's historic characteristics.



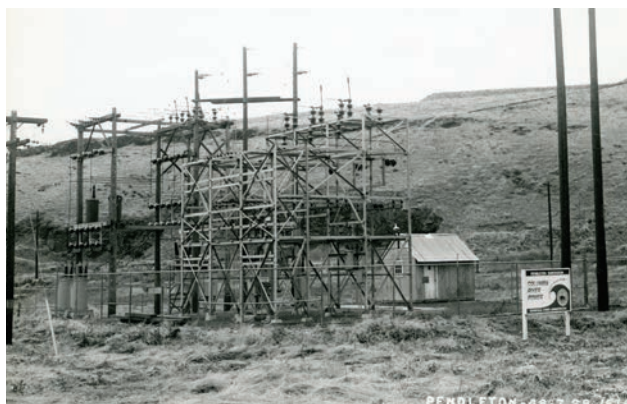
Tier III: Lookingglass Substation Control House. Historic photo.



Tier III: Redmond heliport. Historic photo.

TIER X: NO ARCHITECTURAL OR HISTORICAL SIGNIFICANCE, NOT IMPORTANT OR RARE — NO PRESERVATION CONSIDERATION

Tier X resources do not meet the thresholds for architectural or historical significance, are not eligible for historic designation, and do not constitute important or rare resources. Alterations to Tier X resources may occur without involving qualified BPA cultural resources staff.



Tier X: Pendleton Substation (1941), in Pendleton, Oregon, contains a modest control house and switchyard, which stand in stark contrast to the much larger historic resources at Salem Substation. Upon completion, Pendleton Substation helped power a nearby army base and serve a large Rural Electrification Administration project in the Pendleton–Hermiston area. Overall, the substation lacks integrity and is a Tier X resource. Historic photo.



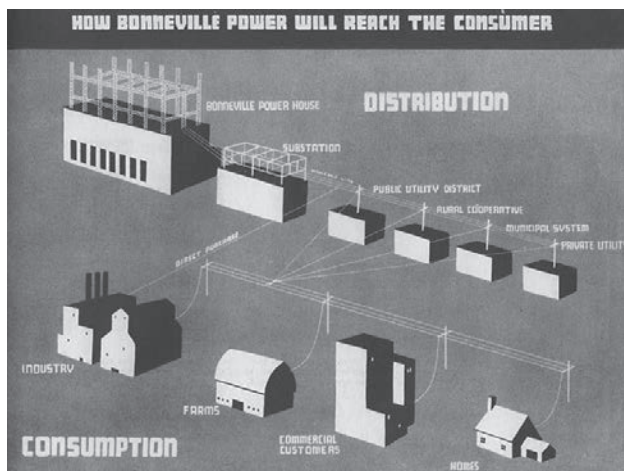
Tier X: Malin Substation (1967) has undergone substantial changes to the control house and the maintenance building that have rendered the substation not eligible for the National Register of Historic Places.



Tier X: Buck Butte Microwave Radio Station (1968) retains the original Armadillo Manufacturing Company control building; however, its function has been replaced by the new control building. The tower has also been replaced, and the site is not eligible for the National Register of Historic Places.

3 A BRIEF HISTORY OF BPA

Many of the BPA resources constructed between 1938 and 1974 represent important historic events and themes. Congress created BPA in 1937 as part of President Franklin D. Roosevelt's New Deal to market power from Bonneville Dam, the Columbia River's first federal dam. Now part of the U.S. Department of Energy, BPA markets wholesale electricity throughout the Pacific Northwest, providing nearly one-third of the region's electrical power. BPA operates primarily in Oregon, Washington, Idaho, and western Montana, as well as in parts of California, Nevada, Utah, and Wyoming. BPA also interconnects with systems in California and British Columbia, Canada.



Following its creation in 1937, BPA began supplying wholesale power for distribution to industrial, commercial, and residential customers.

Illustration by Lloyd Hoff from 1940 booklet "Columbia River Power and the Northwest"

BPA's initial service area formed through construction of resources, mainly substations and transmission lines, in Oregon and Washington. In 1938, BPA's first administrator, James Delmage (J.D.) Ross, proposed a Master Grid transmission network to connect Bonneville Dam and the newer Grand Coulee Dam with the Portland, Oregon, and Puget Sound, Washington, areas. BPA's Master Grid construction lasted from 1938, when Congress provided initial appropriations, to 1945, the year World War II ended. BPA's Master Grid interconnected with existing electrical distribution systems, supplying inexpensive Columbia River power to rural communities and attracting major industries to the region.



J.D. Ross (1872–1939) was BPA's first administrator. BPA's Ross Complex in Vancouver, Washington, was named in his honor.

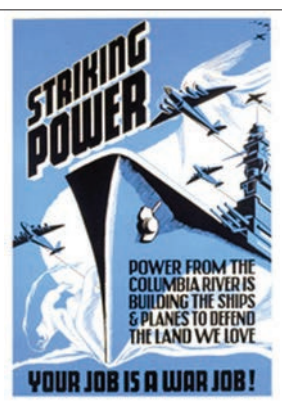
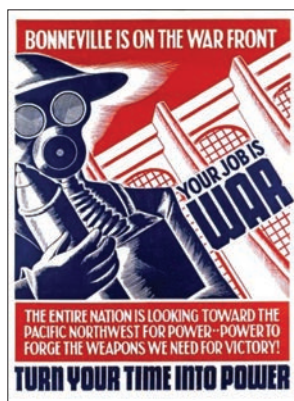
The Master Grid Period was followed by the System Expansion Period, which lasted from 1946 until 1974 and represents three decades of consequential BPA system development throughout the Pacific Northwest. During that period, BPA pioneered advanced microwave-based technologies for upgrading its communications system and participated in constructing the Pacific Northwest–Southwest Intertie to share power with the southwest United States. As BPA expanded over the years, it continually adapted to evolving regional and national priorities by incorporating new electric distribution and management technologies and by optimizing the appearance and functionality of its built resources.



BPA's Microwave Radio Communication System in 1957.

MASTER GRID PERIOD (1938–1945)

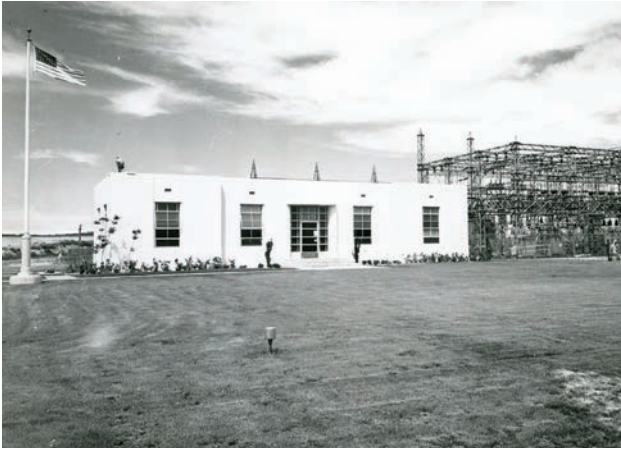
During the Master Grid Period, BPA built 3,000 circuit miles of transmission lines and interconnected with existing public, private, and municipal distribution systems. The Master Grid advanced the region's significant World War II industries by supplying power to shipyards and to aluminum manufacturing sites for aircraft and ship construction. BPA also powered the Hanford site in Washington, where the United States produced plutonium used in the atomic bomb dropped on Nagasaki, Japan in 1945. After the war, and during the defense industry's decline, BPA power helped grow regional agriculture and industry.



In 1942, in an effort to retain employees, BPA's personnel departemnt created posters that emphasized the agency's role in the manufacture of ships and planes. They are now known as "The War Posters."

Art work by BPA illustrator Lloyd Hoff





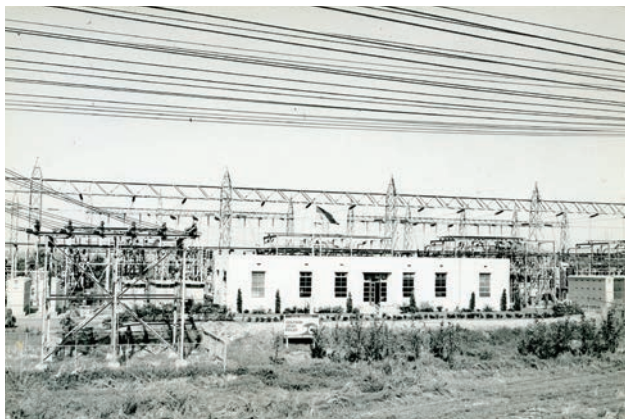
Walla Walla Substation (1941) in Washington was built during BPA's Master Grid Period (1938–1945) to supply power for defense industries and serve the Columbia County Rural Electrification Administration. The substation contains a control house, pump house, maintenance building, and switchyard. These historic resources all contribute to the Walla Walla Substation historic district. Historic photo.



The North Bonneville Substation (1941) in Washington was built during BPA's Master Grid Period (1938–1945). The substation's oil house is a small, semi-subterranean building that reflects features of the Streamline Moderne architectural style.

The Aluminum Industry

The aluminum industry, which required intensive energy consumption, was the first direct consumer of BPA's Columbia River power. When Bonneville Dam began operations in 1938, the Pacific Northwest became the ideal location for operating aluminum reduction plants. In addition to the availability of BPA's inexpensive energy, the region offered oceanic transport and port facilities, established rail lines, and abundant wood for fuel and facility construction. By late 1940, BPA had already constructed a 115-kilovolt (kV) transmission line from Bonneville Dam to Alcoa Substation, and the Aluminum Company of America (Alcoa) aluminum plant was near completion. The construction of BPA transmission facilities to support production at more plants soon followed.



Alcoa Substation (1940), near Vancouver, Washington, powered the Alcoa plant. Aluminum was vital to the World War II-era defense industry, and Alcoa Substation received priority for completion. Alcoa Substation was the first of six BPA facilities constructed to power aluminum plants. Historic photo.

SYSTEM EXPANSION PERIOD (1946–1974)

Energy from Columbia River dams built during BPA's System Expansion Period promoted postwar development in the region. In 1966, the Columbia River Treaty between the U.S. and Canada and construction of the Pacific Northwest–Southwest Intertie (Intertie) to California enabled BPA to further expand its network and market excess power throughout the West. Two important events in 1974 marked the end of BPA's System Expansion. First, the new Dittmer Control Center in Vancouver, Washington, was dedicated, unifying BPA system controls. Second, the Federal Columbia River Transmission Act enabled BPA to use its revenue for system operations, maintenance, and future construction projects instead of relying on congressional appropriations.



Alvey Substation and Maintenance Headquarters (1952) near Eugene, Oregon, is part of BPA's System Expansion Period. The Tier I control house was built in the International style of architecture and is the only example of its type (BPA Type 180) in the BPA system.



Alvey Automotive Shop (1953) is one of the substation's historic buildings. Formerly called Goshen Substation, Alvey Substation's other historic buildings include the maintenance, Engine Generator, Automotive Storage, and Customer Service Engineering buildings, all of which contribute to the historic district. Historic photo.

Communications

In 1950, BPA introduced the Pacific Northwest's first large-scale microwave communication system which substantially enhanced the power grid's efficiency and reliability while reducing operating costs. This microwave-based system replaced BPA's outdated radio frequency communication system. The new system consisted of radio stations built at high-ground sites, such as ridges and mountain peaks; associated equipment installed at end locations, such as control centers and power substations; and equipped mobile field units.



BPA pioneered midcentury microwave technology. Microwave radio station site locations were selected to enable associated stations and equipment to maintain their "line of sight," a key element of microwave communication technology. BPA's microwave radio station sites that retain and use their original station buildings and antenna towers, such as Squak Mountain Microwave Radio Station (1950), are historically significant. Historic photo.

The Pacific Northwest–Southwest Intertie and the 500 kV “Backbone” System

The Intertie, a monumental engineering achievement, connected the West Coast’s three main power grids: BPA, Los Angeles Department of Water and Power, and California Power Pool. As the largest transmission project in the nation’s history, the Intertie was built to “balance power needs in the West” by enabling the Northwest and Southwest to share surplus electrical power and distribute power to 11 western states.



The high-voltage direct-current Pacific Northwest–Southwest Intertie was an unprecedented engineering feat that enabled power-sharing between utilities throughout the West (Image courtesy of the Northwest Power Planning Council).

Intertie construction lasted from 1965 to 1970 and established two 500 kV alternating current (AC) transmission lines (1967 and 1968) extending approximately 940 miles from the John Day Dam on the Columbia River southward through the Central Valley of California and terminating at the Lugo Substation near Los Angeles. A third transmission line, an 800 kV direct current (DC) line (1970), extended from the Celilo Converter Station near The Dalles Dam on the Columbia River south through Central Oregon and Nevada and terminating at the Sylmar Converter Station near Los Angeles, California.



John Day Substation (1966), near Rufus, Oregon, is associated with the Pacific Northwest–Southwest Intertie and part of the first 500 kV transmission subsystem to serve the Portland area.

Intertie construction necessitated new power transmission technologies and prompted a major evolution in BPA's transmission system. As part of Intertie development, BPA established the High Voltage-Direct Current Test Center adjacent to BPA's Big Eddy Substation in 1963. The Big Eddy Test Center enabled engineers to examine new technologies and use their newfound knowledge to design converter stations at Celilo and Sylmar. The converter stations served as termini for the Intertie and converted the frequency of current from AC to DC, or the reverse. Compensation stations associated with the Intertie provided additional regulator functions for electricity transmission. At the time of the Intertie's completion, it was the nation's first, and the world's longest, DC transmission power line. The Big Eddy Test Center enabled BPA to implement 500 kV AC as the backbone of its primary transmission system, to operate in conjunction with its 230 kV Master Grid system.



HVDC Test Center at Big Eddy. The Test Center was used until 1996 and was removed in 2018.

SYSTEM DESIGN AND APPEARANCE

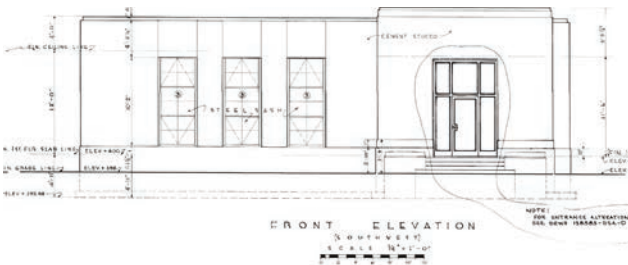
During the Master Grid and System Expansion Periods, BPA continued to upgrade the functions and technology of its transmission system and thus altered the use and appearance of contributing features. The current appearance of BPA's historic resources embodies their architectural and historical significance.

Master Grid Period

During the Master Grid Period (1938–1945), BPA developed its basic substation building requirements to fulfill operational needs. The substation's primary unit was a control house that could be combined with other units, such as a switchyard, untanking tower, and oil house, to enhance functionality. Master Grid substations also reflected the era's architectural trends in building materials and styles. Streamline Modern, a more “aerodynamic” version of the Art Deco style, emerged during the 1930s and emphasized curving forms and horizontal lines. This confluence of form and function set the defining architectural styles of the Master Grid Period at BPA.



Eugene Substation (1940) in Eugene, Oregon, was built during BPA's Master Grid Period as the terminus for the Vancouver-Eugene transmission line. The 115 kV line served the City of Eugene and its vicinity. The Eugene Substation Control House, built in the Streamline Moderne architectural style, is the only remaining example of its type (BPA Type 100) in the BPA system.



Eugene Substation Control House, front elevation drawing dated March 13, 1939. Many of the larger control houses were designed by BPA architects or regional architecture firms.

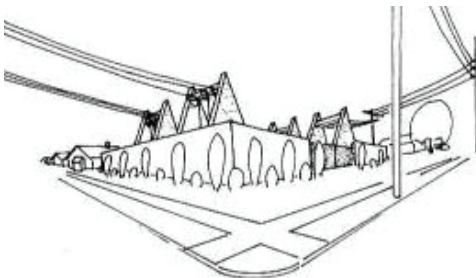


The Eugene Substation Control House's character-defining features are its single-story, concrete construction; flat roof with parapet; curved walls at main entrance; curved metal railing; and original brass signage above and adjacent to the main entrance. Historic photo.

System Expansion Period

During the early part of the System Expansion Period (1946–1974), many control houses were constructed in the styles of the 1940s and 1950s, including Brutalism, the International Style, and Utilitarianism. Many smaller facilities were also built in the Minimal Traditional style, a common postwar style typified by simply designed one-story buildings. The attention to current design sensibilities promoted “beautility,” the belief that utility structures can be both attractive and functional. BPA’s “Appearance Program Practices” guide, prepared by the Portland-based architectural firm of Stanton, Boles, Maguire, and Church, formalized BPA’s beautility principles:

- Site selection to satisfy engineering and aesthetic concerns.
- Transition zones to blend the station into the landscape.
- Yard structures with lower profiles.
- Color system to unify substation composition.
- Incorporation of general and accent lighting.
- Line approaches to improve the appearance of elements visible to the public.
- Use of architect-designed buildings.



In 1966, the architectural firm of Stanton, Boles, Maguire, and Church developed A Report on Appearance Planning for BPA transmission resources, such as substations and transmission lines. The design principles for substations built upon the basic layout, which depended upon electrical and safety concerns, and sought to “make the transmission lines and substations more suitable to their environment,” as shown in the firm’s “Substation concealment” drawing.

To achieve these principles, BPA hired regional architecture firms for new substation and building designs. In some cases, BPA architects modified these designs or generated their own designs for new standard building types.



Lane Substation Control House (1967) in Eugene, Oregon, was designed by BPA architect C. Tetherow with features of the International S style of architecture. The substation was a terminus of the Marion–Lane transmission line, a 72-mile, 500 kv line that served customers in Eugene.



Lane Substation Control House during construction.

4 IMPORTANT HISTORICAL THEMES

Throughout much of the twentieth century, BPA's transmission system played an important role in shaping the growth of the Pacific Northwest. BPA enabled the region's communities and economies to flourish, supported the war effort, applied new technologies to system operations, helped bring electrical power many rural areas, and pioneered designs for industrial architecture.

BPA's built resources embody the era's important historical themes and convey BPA's profound impact on the region. These resources derive their cultural importance from seven primary themes (historical significance), including Architecture, Commerce, Communications, Community Planning and Development, Engineering, Industry, and/or Politics/Government. A resource or resource grouping may also be significant due to its architecture style or building materials or techniques (architecture significance).

Architecture

Architecture is the practical art of designing and constructing buildings and structures to serve human needs. The designs of BPA's substations and other facilities reflect the incorporation of the architectural styles during the Master Grid Period (1938–1945) and System Expansion Period (1946–1974).

Architectural design during the Master Grid Period reflects the initial development of BPA's transmission grid and the implementation of BPA's standardized designs. Resources constructed during the Master Grid Period include Streamline Moderne style control houses, brick buildings, untanking towers, and oil houses, as well as other buildings/structures such as maintenance and storage buildings, pump houses, switchyards, rails, and transfer carts.

During the System Expansion Period, BPA introduced Modernism, modularity, rapid expansion, and increasingly standardized plans and repeated designs into substation development. BPA also formalized and integrated beauty design principles beginning in the 1960s. The System Expansion Period is characterized by the influence of Modernism and the Minimal Traditional, Modern, and International architectural styles. During this period, BPA intensified its use of concrete in building construction and minimized its application of architectural details.

The construction of smaller aluminum utilitarian control houses and associated buildings marked BPA's rapid expansion during this period. The aluminum buildings convey BPA's repeated application of standardized control house designs for swift construction throughout BPA's transmission system.



Alcoa Substation Control House (1940) is individually significant for exemplifying the Stream-line Moderne architectural style of the Master Grid Period.



Alcoa Substation Control House. Historic photo.



Walton Substation Control House (1949) is significant for reflecting BPA's use of standardized designs in substation development and for exemplifying BPA's Standard Aluminum Control House Type 190 model.



Walton Substation in 1951. Historic photo.



Sickler Substation (1969) was built in East Wenatchee, Washington, during BPA's System Expansion Period (1946–1974) and is part of BPA's 500 kV transmission subsystem. The substation's control house is significant in the area of Architecture for its International design and adherence to BPA's beauty principles.



Sickler Substation in 1970. Historic photo.

Commerce

Commerce is the business of trading goods, services, and commodities. Beginning with the Master Grid Period (1938–1945) and later during the early part of the System Expansion Period (1946–1974), BPA enabled the rapid growth of commerce in the region by connecting rural agriculture (rural electrification) with port facilities and industrial operations in urban areas (grid connection to municipal and public power).



Anaconda Substation (1953) in Montana is significant in the area of Commerce for its role in powering the Anaconda Mining Company operations. Many BPA resources have multiple areas of significance, including Anaconda Substation, which is also significant in the areas of Industry and Politics/Government.

Communications

Communications is the technology and process of transmitting information. Beginning in 1949, BPA began constructing a microwave radio communication system that incorporated newly developed microwave-based technologies. This led to a network of high-elevation microwave radio stations throughout BPA's service area, which enhanced data delivery and system operations.



Mary's Peak Microwave Radio Station (1961) west of Corvallis, Oregon, is significant in the area of Communications as a key component of BPA's early microwave communications network, which facilitated grid operations. The radio station is also significant in the area of Industry for supporting commercial and industrial development throughout the region, particularly the Corvallis area.

Community Planning and Development

Community Planning and Development is the design or development of the physical structure of communities. BPA supported Community Planning and Development throughout the region by building new substations, compensation facilities, and transmission lines in new and expanding communities throughout the Pacific Northwest.



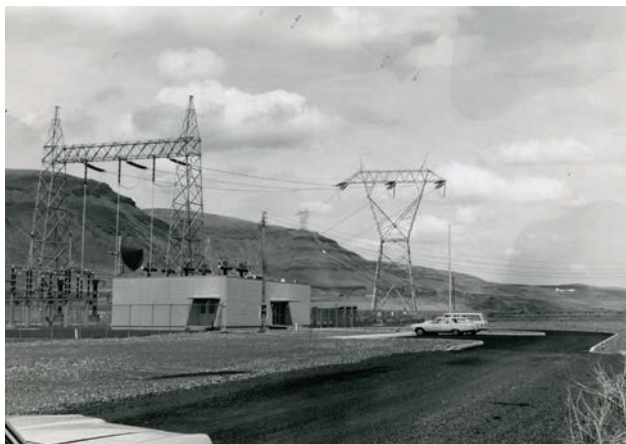
Driscoll Substation (1966) in Clatskanie, Oregon, is significant in the area of Community Planning and Development for its role in the growth of southwestern Washington's rural communities.

Engineering

Engineering is the practical application of scientific principles to design, construct, and operate equipment, machinery, and structures to serve human needs. BPA engineers and contractors applied advanced technologies to the construction of BPA's microwave radio communication network and Intertie substations, converter stations, and compensation stations. BPA's test facilities, such as test centers and transmission test lines, are also associated with the theme of Engineering and led to implementation of BPA's 500 kV backbone transmission system.



Little Goose Substation (1970) near Riparia, Washington, is significant in the area of Engineering for its association with the Pacific Northwest–Southwest Intertie.



Little Goose Substation in 1971. Historic photo.

Industry

Industry is the technology and process of managing materials, labor, and equipment to produce goods and services. BPA power has promoted industrial development and expansion throughout the region. During World War II, BPA delivered reliable electricity to the region's aluminum industry, which supplied the aluminum to build airplanes for the war effort. BPA also powered the steel industry, which enabled the construction of Liberty Ships, mass-produced cargo ships that were also used for emergency troop transport.



Columbia Substation (1945) in Rock Island, Washington, is significant in the area of Industry for supporting regional industrial development. The substation is also significant in the area of Commerce for delivering hydropower to Portland General Electric's commercial customers.

Politics/Government

Politics/Government is the enactment and administration of laws by which a nation, state, or other political jurisdiction is governed and the activities related to this political process. By providing reliable power to public utility districts, as well as municipal utilities, that formed after enactment of the Rural Electrification Act of 1936, BPA is significantly associated with the theme of Politics/Government.



Republic Substation (1953) in Washington is significant in the area of Politics/Government for providing reliable power to the local Ferry County public utility district for distribution to rural communities in eastern Washington.

5 HISTORIC RESOURCE TYPES

A variety of BPA resource types embody and convey architectural and historical significance. This chapter establishes resource types to provide a basis for comparison between BPA resources with similar characteristics. BPA's primary resource types are substations and microwave radio stations, which are the focus of this Field Guide. Substations may contain a variety of buildings, structures, and objects: control houses, untanking towers, oil houses, maintenance and storage buildings, pump houses, engine generator buildings, relay houses, and switchyards. Microwave radio stations are sites that typically contain a station building and antenna tower. Other BPA resource types are administrative buildings, test stations, converter stations, compensation stations, control centers, and transmission lines.

Substation

Substations consist of a control house and switchyard and may contain other buildings, structures, and objects that function as untanking towers, oil houses, maintenance and storage buildings, pump houses, engine generator buildings, relay houses, storage sheds, and rails/carts. Substations may transform voltage from high to low, or the reverse, and play an important role in transmitting and distributing power in the BPA system.



St. Johns Substation (1940) was built during the Master Grid Period with an oil house, storage building, and control house as well as rails and a cart.



Dworshak Substation (1972) was built near the end of the System Expansion Period. The substation contains a historic control house, maintenance building, engine generator building, and switchyard, all of which contribute to the Dworshak Substation historic district.

Control House The substation's primary unit is the control house, which contains the substation controls, panels, batteries, meters, and relays. Larger control houses also contain office space and other worker facilities.



Anaconda Substation Control House (1950). Historic photo.

Untanking Tower

An untanking tower is an industrial structure that facilitates on-site maintenance and repair of switchyard equipment. Untanking towers typically contain the mechanical equipment to clean and service power transformers, circuit breakers, and other oil-immersed heavy equipment. Untanking towers are tall structures with full-height interior spaces, massive overhead doors, multi-pane steel window banks, cranes and rigging equipment operated from a crow's nest near the ceiling, and rails that extend from transformer pads in the switchyards. Untanking towers are either connected to the control house or within a separate building.



Salem Substation (1942) under construction. The untanking tower, which forms the control house's central block, is flanked by two one-story wings. Historic photo.



Untanking tower crane at Chehalis Substation (1941).

Oil House

An oil house contains pumps used to empty and replace oil from equipment such as circuit breakers or transformers. Oil houses are typically found at Master Grid Period substations and some early System Expansion Period substations.



*North Bonneville
Substation Oil House
(built 1940).*

Maintenance and Storage Building

Maintenance and storage buildings are common in System Expansion Period substations and maintenance headquarter facilities. These buildings range in year of construction, size, and materials.



*Maintenance building
(built 1950) at
Port Angeles Substation
and Maintenance
Headquarters.*



*Maintenance building
(built 1952) at Alvey
Substation and
Maintenance Headquarters.*



Automotive Shop (built 1953) at Alvey Substation and Maintenance Headquarters.



Maintenance building at Custer Substation (1967) in Ferndale, Washington. Overall the Custer Substation is not eligible for the National Register of Historic Places, due to alterations to the control house; although the maintenance building retains integrity.

Pump House

A pump house is a structure that holds pumps used to empty and replace oil from equipment, such as circuit breakers and transformers, during standard filtering and maintenance operations. Pump houses were built at BPA's Master Grid and System Expansion substations, but all were constructed during the System Expansion Period.



Oregon City Substation (1943) with 1953 pump house.

Engine Generator Building

An engine generator building is commonly a metal vault-like structure that houses backup power equipment for the substation.



*Engine generator building
at Dworshak Substation.*

Relay House

A relay house contains protective relays and related equipment for the switchyard. While the local manual controls are maintained in the control house, a separate relay house is usually installed when the control house lacks enough space and cannot feasibly undergo expansion.



*Chief Joseph
Substation Relay House
No. 1 (1956).*

Switchyard

Within a substation, the switchyard features a complex arrangement of individual elements that function collectively as the substation's connection to the overall grid and the start and end points of named transmission lines. Switchyards built in the Master Grid and System Expansion Periods were "designed to control power flow and transform voltages for distribution," and then supply low-voltage distribution and/or high-voltage transmission lines.

Switchyards are characterized by vertical superstructure of steel, typically latticework; dead-end towers; conductors; circuit breakers; insulators; transmission towers; other electrical equipment connecting transmission lines to a series of grade-mounted transformers, circuit breakers, and switches; small portable prefabricated aluminum storage sheds to hold oil absorbents and other materials. From 1938 through the early 1950s, switchyards contained rectangular box-like steel superstructure, oil circuit breakers, and oil storage tanks. System Expansion switchyards generally have the same function and equipment as Master Grid switchyards except they use larger transmission towers for increased voltages and the circuit breakers use gas instead of oil.

The cable tunnel is a common switchyard feature. These concrete-lined tunnels house sections of cables running underground from the control house to the switchyard. Smaller cable runs are also used to install cable between the control house basement and the switchyard. Cable tunnels are found at some Master Grid control houses but are more common at System Expansion substations. Interior basement doors provide access to the cable tunnels. The tunnels exit via a stairway into the switchyard. Cable tunnels are characterized by an underground, concrete structure that extends between control house basement and switchyard.



Switchyard at Chehalis Substation (1941).



Switchyard with oil (left) and gas (right) circuit breakers at Midway Substation (1941).



Cable tunnel access from switchyard at Boundary Substation (1967).



Cable tunnel access from control house basement at Boundary Substation (1967).

Rail/Transfer Track and Transfer Cart

The railroad spurs and transfer tracks at some early Master Grid switchyards are ground-level steel rails that connect power transformer sites to switchyard maintenance areas or untanking towers. Transfer tracks were installed as part of substation development to transport power transformers and other heavy equipment on transfer carts for routine maintenance and installation. Steel transfer carts carried transformers and other heavy loads on fixed transfer tracks from the switchyard into substation maintenance areas and/or untanking towers. Several System Expansion substations associated with specific industries, such as Anaconda and Columbia Falls, had railroad spur and transfer tracks that diverted from a main railroad line to the substation.

Transfer Tracks are characterized by standard gauge tracks (4 feet 8 ½ inches) that connect to railroad spurs; distinctive broad-gauge tracks (9 feet 7 ⅝ inches) within BPA substations; wood ties set in crushed rock ballast and covered with asphalt; exposed rails; exposed cribs (open space around rail); and exposed trench drains.

Transfer carts have flat open steel decks and wheel rail conveyors.



The transfer track at Salem Substation (1942) is mostly obscured by switchyard gravel.



Transfer track at Salem Substation.



Transfer cart at St. Johns Substation.

Microwave Radio Station

Microwave radio stations (1949–1974) are System Expansion sites that contain a station building and microwave antenna, often attached to self-supporting structures or towers. These stations are usually located in remote areas at high elevations to maintain line-of-sight for microwave transmissions to adjacent microwave radio stations and other radio-equipped BPA facilities. They enable system voice and data communication within the BPA system, as well as among Northwest Power Pool members. Microwave radio stations may operate in conjunction with passive repeaters that help maintain line-of-sight transmission.

Microwave radio stations have small, one- or two-story station buildings that may incorporate severe weather adaptations, such as snow roofs. The station buildings are constructed of metal, concrete block, or precast panel building materials. The microwave antennas are mounted on monopole or steel lattice antenna towers. The stations have on-site electrical and switching equipment.

Passive repeaters are reflective aluminum panels mounted on self-supporting steel or wooden structures, transmission or communication towers, or side of buildings. Passive repeaters lack independent power sources.



Blacktail Peak Microwave Radio Station (1968) contains a historic station building (shown in foreground) and microwave antenna towers.

Other Historic Resource Types

While this Field Guide emphasizes BPA's historic substations and microwave radio stations, the BPA system contains other historic resource types: administrative buildings, test stations, converter stations, compensation stations, and control centers.

Administrative Building (district/regional maintenance headquarters)

Certain historic substations serve as BPA district or regional maintenance headquarters. Substations housing headquarters generally contain additional office space and maintenance facilities.



Spokane District and East Regional Headquarters Building at Bell Substation (1942) in Mead, Washington. This building, and the Bell Substation overall, are not eligible for the National Register of Historic Places due to alterations.



Bell Headquarters Building in 1972. Historic photo.

Test Station

Test stations may occur independently or in conjunction with substations or control centers. Test stations investigate new equipment and technologies for transmitting electricity.



BPA's High Voltage Direct Current (HVDC) Test Center in 1964, the first facility of its kind in the United States, used emerging industry knowledge on conversion between AC and DC. This conversion technology enabled stable long-distance electricity transmission that moved as high-voltage DC before it was converted to lower-voltage AC when it reached the end-user home or business. Historic photo.



Control panel from HVDC Test Center, 1972. Tests conducted at the HVDC Test Center gave BPA the information it needed to design a system to transmit power from what would become BPA's Cello Converter Station, near The Dalles, Oregon, to the Sylmar Converter Station at Los Angeles Water and Power in California. This system, the Pacific Northwest–Southwest Intertie, used an 846-mile-long DC line that was heralded as the longest of its kind in the world.



The Ross Complex contains a grouping of test facilities that include the Medium Voltage Testing station, High Current Test Lab, Mangan High Voltage Lab, Fog Test Site, and Carey High Voltage Lab. BPA's test labs provided state-of-the-art facilities to analyze and experiment with new technologies and techniques for transmitting electricity.



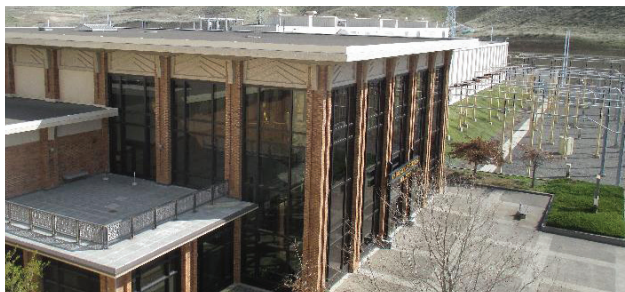
J.D. Ross Substation (Ross Complex) High Voltage Test Laboratory, c. 1946. Historic photo.

Converter Station

A converter station is a facility built for intertie operations. It contains equipment to convert the frequency of electrical current from AC to DC, or the reverse. BPA's only historic converter station at Celilo Falls is the intertie's northern terminus and contains buildings and structures like those at substations. (The intertie's southern terminus is the Sylmar Converter Station near Los Angeles, California.) The Celilo Converter Station is located on a 45-acre site a mile south of the Big Eddy Substation. The station contains a massive 800-by-120-foot converter station with a 20-acre switchyard that housed two DC terminals.



Celilo Converter Station (1970) near The Dalles, Oregon, is the northern terminus of the Pacific Northwest–Southwest Intertie. Historic photo.



Celilo Converter Station converts Columbia River power, which is generated as AC into DC to facilitate long-distance transmission to the Southwest. Once the energy reaches the Sylmar Converter Station near Los Angeles, California, the power is converted back to AC before distribution.

Compensation Station

A compensation station is an automated facility that provides additional regulator functions for intertie electricity transmission.



Sand Spring Compensation Station Control House (1969).

Control Center

The control center is BPA's operational and management hub, governing generation and transmission systems through computer-based and communication technologies. BPA's main grid power system control and dispatch is based at the William A. Dittmer (Dittmer) Control Center. Dedicated in 1974, Dittmer Control Center represents the transition from early power system control at the Portland headquarters to computer-based automatic system control at the Ross Complex in Vancouver, Washington. Dittmer Control Center is a large building that houses a central control and dispatch room with computerized equipment, visitor's gallery, training facilities, and hundreds of personnel. BPA established other secondary control centers after BPA's period of significance (1938–1974), such as the Eastern Control Center, which opened in 1976 and closed in 2015.



BPA's Portland, Oregon Headquarters (1954).



William A. Dittmer Control Center (1974) at Ross Substation in Vancouver, Washington.



Dittmer Control Center in 1979. Historic photo.

Transmission Line

A transmission line consists primarily of transmission poles or structures and associated equipment. These linear resources transmit and distribute electrical power throughout BPA's service area. BPA's historic transmission lines and test lines are not included in the Field Guide.



Holcomb-Naselle Transmission Line (1949) in southwestern Washington.

6 ARCHITECTURAL STYLES

BPA's resources have distinctive architectural styles and forms based on the eras' design trends and the resource's function and location. Variations are typical in both Master Grid (1939–1945) and System Expansion (1946–1974) periods. Common characteristics define each architectural style, though not all of BPA's resources display every element typically associated with a specific architectural style.

Streamline Moderne (1939–1953)

Streamline Moderne was a simplified version of the Art Deco architectural style prevalent in 1930s and early 1940s government buildings. BPA employed Streamline Moderne designs in substation buildings and structures such as control houses, untanking towers, oil houses, and early microwave radio station buildings. Most of BPA's buildings constructed during the Master Grid Period (1938–1945) are expressive of this style.

Style Elements:

- One story
- Reinforced concrete construction
- Symmetrical façade
- Stucco, brick, or aluminum siding
- Flat roof/occasional hipped roof
- Large multi-pane steel windows
- Minimal exterior architectural details: brass, cast stone, and glass block elements
- Interior architectural details: brass radiator grilles and light fixtures, marble wainscot and granite window sills, metal lath and plaster over structural tile walls, asphalt tile floors, skylights



*Streamline Moderne
control house at
St. Johns Substation in
Portland, Oregon.*



Streamline Moderne light fixtures at St. Johns Substation Control House.



Brass radiator grill in St. Johns Substation Control House.



Streamline Moderne control house at Valhalla Substation (1953) in Malaga, Washington.

Untanking towers, like many Master Grid control houses, were constructed in the Streamline Moderne style but were designed expressly to accommodate specialized equipment.



Tall, concrete untanking tower at Midway Substation (1941) built in the Streamline Moderne style.



Streamline Moderne Art Deco-inspired geometric railings on Midway Untanking Tower.

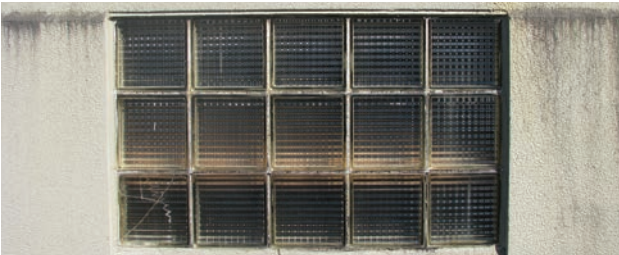
Oil houses were generally constructed in the Streamline Moderne architectural style but were typically small and semi-subterranean. During the System Expansion Period, BPA continued to implement the same Streamline Moderne semi-subterranean concrete design; however, utilitarian designs eventually became more prominent.

Style Elements:

- Small
- Semi-subterranean
- Poured concrete exterior
- Concrete, stucco-like texture
- Flat roof
- Multi-pane steel and/or glass block windows



*St. Johns Substation
Oil House (1940).*



*North Bonneville
Substation Oil House's
glass block window.*



*Oil house at Port Angeles
Substation (1950) in Port
Angeles, Washington.*

Brick (1943 and 1947)

Two Master Grid substations contain brick-clad buildings; Troutdale Substation (1943) contains a brick control house, while Tacoma Substation (1947) contains a brick control house and brick maintenance building. Notwithstanding the distinctive brick siding, these buildings convey Streamline Moderne architectural style features like those of concrete buildings from the same era.

Style Elements:

- One story
- Symmetrical façade
- Brick siding
- Flat roof
- Large multi-pane steel windows



Brick-clad control house at Troutdale Substation (1943) in Troutdale, Oregon.

Minimal Traditional (1953–1968)

Minimal Traditional buildings became a common control house design during the System Expansion Period.

Style Elements:

- One story
- Rectangular plan
- Concrete construction
- Gable or hipped roof
- Minimal architectural details



Minimal Traditional control house at Tahkenitch Substation (1963) near Gardiner, Oregon.

Early Modern (1953–1964)

During the early 1950s, modernism influenced BPA's building design. BPA's early iterations of modern style control houses and microwave radio station buildings incorporated modernism's innovative concrete construction technologies, functionalist principles, and minimization of architectural ornament.

Style Elements:

- Concrete construction
- Asymmetrical building plan
- Minimal architectural ornament
- Emphasis on clean lines, basic forms, and rectangular shapes



*Anaconda Substation
Control House (1950).*



*Potholes Substation
Control House (1958).*



*Rockdale Microwave Radio
Station (1955) with ladder
enabling entry at second
story during deep snowfall
events. Historic photo.*

Modern Beautyity-Inspired (1965–1974)

During the late System Expansion Period, modern and beautyity-inspired designs became more common for control houses and maintenance facilities. These designs featured simple boxy forms, unified color schemes, creative uses of materials, exposed aggregate panels, general and accent lighting, and other design elements intended to better incorporate the substation into the existing landscape. Architect-designed buildings also became more common. Following broader architectural trends, BPA's designed control houses express International, Modern/Brutalist, and Modern/Contemporary architectural styles.

International

The International architectural style became a prominent design for BPA control houses and maintenance facilities during the mid- to late 1960s and for the Celilo Converter Station control house, built in 1970.

Style Elements:

- Asymmetrical form
- Horizontal lines
- Flat roof
- Curtainwall construction
- Smooth unornamented surface
- Flush window openings.



International-style control house and maintenance building at John Day Substation (1968).



Modern style globe lights at John Day Control House entrance.



*Cello Converter Station
Control House (1970).*

Brutalist

The Brutalist architectural style was another modern design applied to BPA's buildings in 1970–1971.

Style Elements:

- Concrete construction
- Repeated modular narrow windows
- Limited architectural detail
- Simple form



*Control house at Alston
Substation (1969).*



*Dittmer Control Center
(1974).*

Modern/Contemporary

The Modern/Contemporary architectural style reflects BPA's emphasis on Beauty from the mid-1960s to early 1970s and is represented in a few control houses and maintenance buildings.

Style Elements:

- Asymmetrical form
- Exposed steel structural elements
- Low-pitched cross gable roof with wide airplane eave overhangs
- Glazed gables
- Glass and brick materials
- Recessed entrance
- Winding interior staircase



Modern/Contemporary Control House and maintenance building at C.W. Paul Substation (1971) in Centralia, Washington.



C.W. Paul Substation (1971). Historic photo.

UTILITARIAN (1948–1974)

BPA incorporated the Utilitarian style into a variety of resource types, such as control houses, maintenance and storage buildings, engine generator buildings, storage sheds, and microwave radio station buildings. These simply-designed buildings employed concrete or aluminum-panel construction. Beginning in the 1970s, BPA transitioned from the standardized design types for Utilitarian control houses to more architecturally varied designs. Although they shared key features of the standardized Utilitarian models, each of BPA's 1970s Utilitarian control houses had its own individual design. This shift marked a distinct contrast with the era's beauty-inspired buildings.

Style Elements:

- Small
- One story
- Emphasis on functionality
- Minimal architectural detail
- Inexpensive, durable materials
- Simple entrances and windows



*Utilitarian control house
at Mapleton Substation
(1948) in Oregon.*

Utilitarian oil and pump houses generally have steel-frame construction, vertical inverted-seam aluminum siding, front-gable roofs, and multi-pane steel windows.



Utilitarian control house at Maupin Substation (1974) in Oregon.



Although Utilitarian oil houses generally have steel-frame construction, some, such as the oil house at Santiam Substation (1954) near Stayton, Oregon, have concrete construction.



Oil house (presently storage) at Chief Joseph Substation (1958) in Bridgeport, Washington.



Pump house at Wendson Substation (1973) in Florence, Oregon.



Utilitarian engine generator buildings generally display flat roofs or nearly flat shed roofs.



Engine generator building constructed in 1963 at Chemawa Substation (1954) in Keizer, Oregon.



Utilitarian relay houses generally display concrete or aluminum panel walls.



Relay house No. 1 at Chief Joseph Substation (1956) in Bridgeport, Washington.



Utilitarian microwave radio station buildings lack architectural ornamentation.



*Noti Microwave Radio
Station building (1954).*



Grizzly Mountain Photo by Ean A.

7 HISTORIC SUBSTATIONS AND RADIO SITES

BPA's primary historic resource types are substations, their buildings, and microwave radio stations. This chapter lists historic substations and microwave radio stations by region and provides an overview of notable features, including tier classifications described in Chapter 2, structural components, historical characteristics, and a brief history of the construction. The significance of why the structures are an important part of BPA's and the region's history, and how they meet criteria under the National Register of Historic Places, is also noted.

TIER I – HIGHEST PRESERVATION PRIORITY

- Individually Eligible and Contributing Architecturally and Historically Significant Resources
- Proposed alterations require screening and/or consultation conducted by BPA Historian.

TIER II – PRESERVATION PRIORITY

- Eligible and Contributing Historically Significant Resources
- Proposed alterations require screening and/or consultation conducted by BPA Historian.

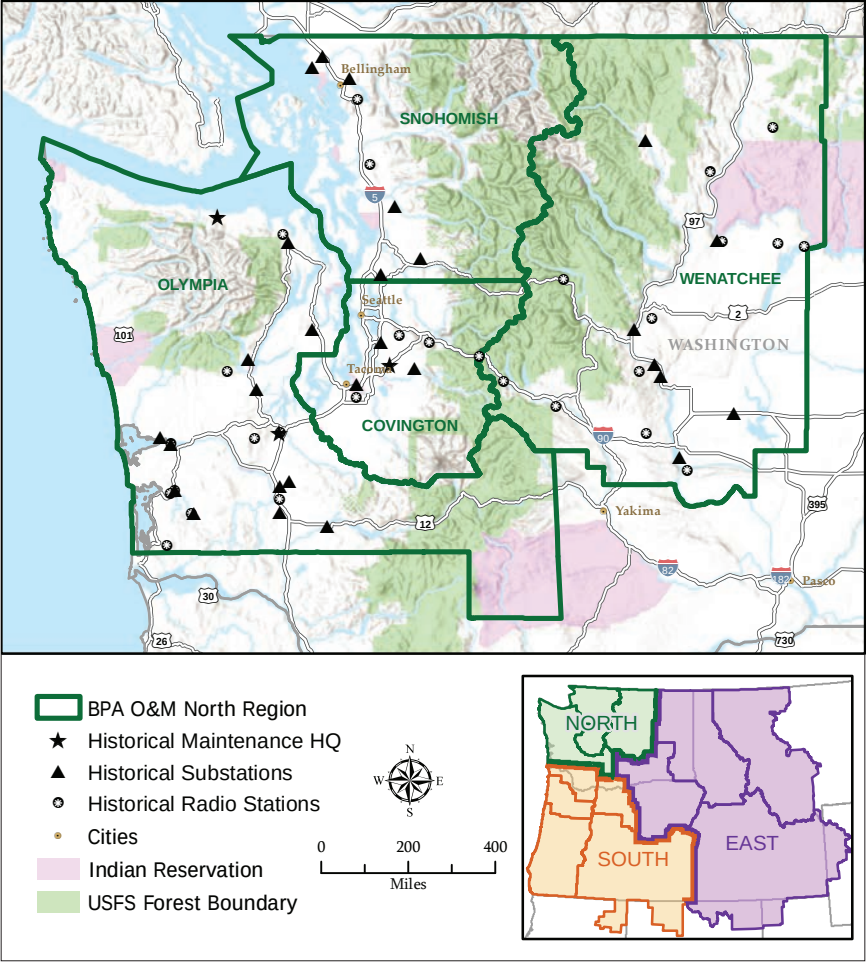
TIER III – PRESERVATION CONSIDERATION

- Important or Rare Resources but Not Eligible/Non-Contributing
- Proposed alterations should be discussed with BPA Historian about preservation opportunities. External consultation likely not required.

X – NO PRESERVATION CONSIDERATION

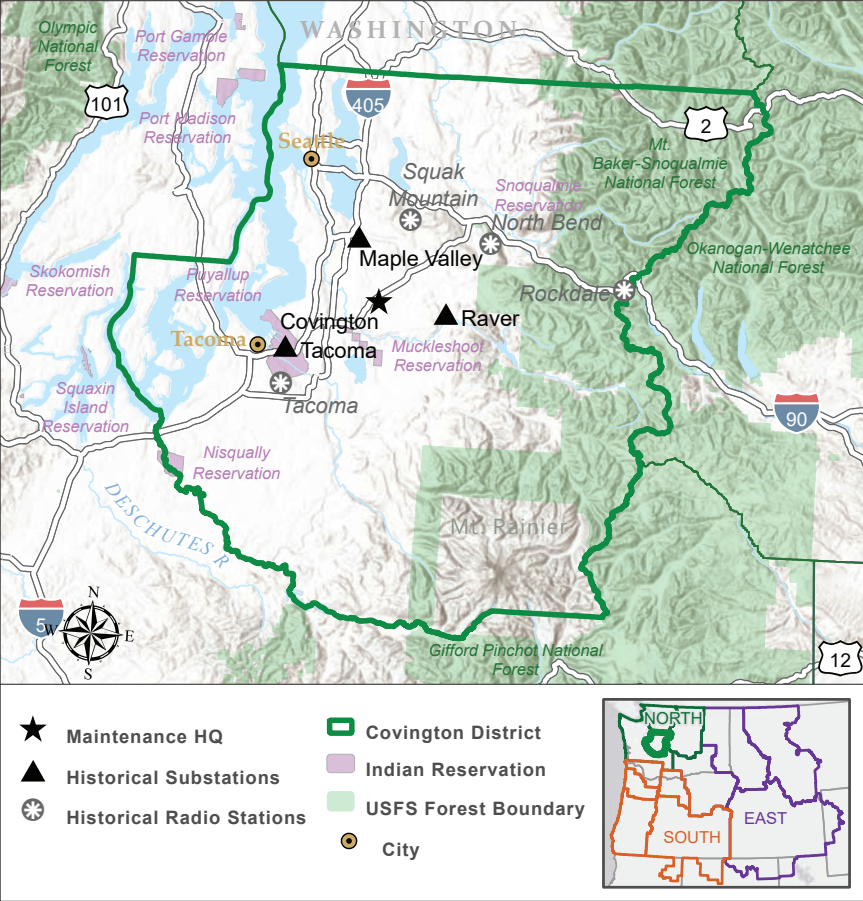
- Not Eligible/Non-Contributing Resources
- Alterations may occur without requiring Section 106. Coordinate with BPA Historian and Environmental Compliance to obtain CX.

NORTH REGION



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WENATCHEE.....	112

COVINGTON DISTRICT*



*Covington Substation Historic District is listed in the National Register of Historic Places.

LOCATION	HISTORICAL SIGNIFICANCE
Covington Substation and Maintenance Headquarters	TIER II
Maple Valley Substation	X
North Bend Microwave Radio Station	TIER II
Raver Substation	X
Rockdale Microwave Radio Station	TIER II
Squak Mountain Microwave Radio Station	TIER II
Tacoma Substation.....	TIER I
Tacoma Microwave Radio Station.....	X

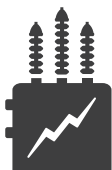
TIER II

MASTER GRID



- ★ Covington Substation & Maintenance HQ
- City
- Covington District

1942



COVINGTON SUBSTATION AND MAINTENANCE HEADQUARTERS



NORTH
REGION

COVINGTON
DISTRICT

COVI / 28401 Covington Way SE, Covington, WA / King County

HISTORIC PAINT: 1950 SCHEME

History

Covington Substation was constructed in Covington, King County, Washington, to supply power to the Puget Sound area. In June 1940, BPA began work on clearing the Substation site, a former mill site, and building a small warehouse. After a cessation of work, likely due to lack of funding, BPA resumed construction on the Substation in May 1941. This included relocating Jenkins Creek, which flowed through the property, and constructing a new railroad and roadway bridges over the new channel. C. F. Davidson Company of Tacoma, Washington, built the Control House and Untanking Tower. The \$2.2 million Substation was energized in March 1942. That month, the 230 kV Covington–Seattle and 115 kV Covington–Tacoma transmission lines were energized to help power the area's defense industries, such

as aluminum and shipbuilding. Later that year, BPA completed three Grand Coulee–Covington lines extending about 185 miles. With additional lines to Covington energized throughout the 1950s, Covington Substation became a major hub in the BPA system. The Substation continued expanding to better fulfill its role as a transmission hub with construction of a new vehicle repair shop, communications building, automotive storage building, larger warehouse, and other on-site facilities.

Significance

Covington Substation is significant under NRHP Criterion A in the areas of Industry and Government. Developed as BPA's primary facility in the Puget Sound region, the Substation provided reliable low-cost power to the area's existing public utility districts and promoted regional growth and industries. The Substation also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-964 CONTROL HOUSE	1942	Tier II - Historic/Contributing
Z-965 UNTANKING TOWER	1942	Tier II - Historic/Contributing
Z-1079 AUTOMOTIVE STORAGE	1945	X - Historic/Non-contributing
Z-966 HMEM SHOP	1953	Tier II - Historic/Contributing
Z-778 COMMUNICATION BUILDING	1958	Tier II - Historic/Contributing
Z-770 AUTOMOTIVE STORAGE	1959	Tier II - Historic/Contributing
Z-766 MAINTENANCE WAREHOUSE	1960	Tier II - Historic/Contributing
Z-409 STORAGE	1967	Tier II - Historic/Contributing
Z-517 ENGINE GENERATOR BUILDING	1942	Tier II - Historic/Contributing
SWITCHYARD	1974	Tier II - Historic/Contributing
Z-7888 STORAGE - SUB MAINT HAZMAT RR	1980	Out of Period/Non-contributing
Z-9023 STORAGE	1980	Out of Period/Non-contributing
Z-9030 STORAGE	1980	Out of Period/Non-contributing
Z-9092 STORAGE CONTAINER	1990	Out of Period/Non-contributing
Z-9093 STORAGE CONTAINER	1990	Out of Period/Non-contributing
Z-1298 PSC & SPC OFFICE	1996	Out of Period/Non-contributing
Z-9032 STORAGE	1999	Out of Period/Non-contributing
Z-45 SPC MAINTENANCE SHOP	2004	Out of Period/Non-contributing
Z-1448 DISTRICT OFFICE	2009	Out of Period/Non-contributing
Z-7380 FUELING STATION	2011	Out of Period/Non-contributing

TIER II Z-964 CONTROL HOUSE 1942

Building style: Streamline Moderne, BPA Standard Type 110

Characteristics: one story, reinforced concrete construction, concrete canopy at entrance, curved walls at entrance, curved metal railings



TIER II Z-965 UNTANKING TOWER 1942

Building style: Streamline Moderne, Untanking Tower

Exterior characteristics: tall central tower, concrete construction, flat roof with parapet, stucco finish, porthole windows, steel multi-pane windows, projecting concrete canopies, metal pipe handrailing

Interior characteristics: gear-driven window operators, imbedded rail spur in Assembling Room, finishes, door hardware, window hardware



TIER II Z-966 HMEM SHOP 1953

Building style: Utilitarian

Characteristics: tall one story, concrete construction, flat roof, seven vehicle bays

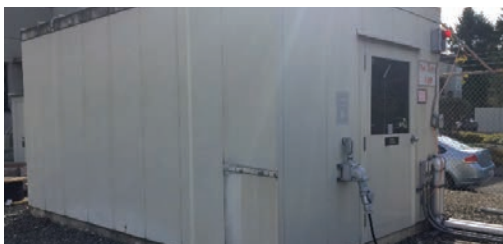


TIER II Z-778 COMMUNICATION BUILDING 1958

Building style: Utilitarian

Characteristics: tall one story, concrete masonry unit construction, multi-pane metal window, wood roll up garage door



TIER II Z-770 AUTOMOTIVE STORAGE 1959**Building style:** Utilitarian**Characteristics:** large one story, steel frame, flat primary roof section, multiple open bays**TIER II Z-766 MAINTENANCE WAREHOUSE 1960****Building style:** Utilitarian**Characteristics:** large one story, steel frame construction, flat roof, aluminum siding, roll up garage door**TIER II Z-409 STORAGE 1967****Building style:** Utilitarian**Characteristics:** small, one story, prefabricated metal panel construction, flat roof, metal double door**TIER II Z-517 ENGINE GENERATOR BUILDING 1974****Building style:** Utilitarian**Characteristics:** small, one story, prefabricated metal panel construction, flat roof**TIER II SWITCHYARD****Characteristics:** Flat, gravel yard, chain link fence, concrete paths, aluminum storage sheds, transfer track rails and transfer cart. 230-kV and 500-kV equipment includes multi-part dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, capacitor banks, and buswork.

TIER II
SYSTEM
EXPANSION



- ☼ North Bend Microwave Radio Station
- City
- Covington District

1954



NORTH BEND
MICROWAVE
RADIO STATION



NORTH
REGION

COVINGTON
DISTRICT

NBNW / King County, Washington

History

The North Bend Microwave Radio Station was constructed in 1954 as part of the Snohomish–Beverly circuit in Washington, the third link in BPA's microwave radio communication system. This circuit extended from the Snohomish Microwave Radio Station to the Beverly Microwave Radio Station and connected with Ross–Spokane, BPA's second microwave circuit. The Snohomish–Beverly circuit provided direct routing for protective relay channels associated with transmission lines crossing the northern Cascade mountain range. Through its connection with the Ross–Spokane circuit via the Beverly Microwave Radio Station, the Snohomish–Beverly circuit completed a loop that allowed alternate routing of transmissions to numerous microwave radio stations in case of equipment failure along the loop.

BPA internal records indicate that in August 1953, Weyerhaeuser Company agreed to lease the North Bend Station site to BPA for \$250 per year. BPA historic photographs indicate BPA began surveys for the site by September 1953. Construction had begun by October and was near completion by May 1954. By that time, the Pacific Telephone & Telegraph Company had constructed a concrete building and 275-foot steel-lattice antenna tower adjacent to the BPA site.

Significance

The North Bend Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the North Bend, Washington, area. The period of significance for the Station is 1954, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-857 RADIO 1954

Building style: Modern,
BPA Standard Type 1612

Characteristics: Two-story concrete-block control building used at high elevations to allow second-floor entry in heavy snow; concrete block covered in smooth finish scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two asymmetrical entrances with separate access to control and engine generator room; concrete canopy over entrances.



Tower: 4-leg steel lattice

TIER II
SYSTEM
EXPANSION



- ⊛ Rockdale Microwave Radio Station
- City
- Covington District

1955



ROCKDALE MICROWAVE RADIO STATION



NORTH
REGION

COVINGTON
DISTRICT

ROCK / King County, Washington

History

The Rockdale Microwave Radio Station was constructed in 1955 as part of Snohomish–Beverly, BPA's third microwave communication circuit. This circuit linked the microwave radio stations at Snohomish and Beverly, establishing a connection with the Ross–Spokane circuit. The Snohomish–Beverly circuit provided direct routing for protective relay channels associated with transmission lines crossing the northern Cascade mountain range. By connecting with the Ross–Spokane circuit via the Beverly Microwave Radio Station, this link completed a loop that allowed alternate routing to a large number of microwave radio stations in the event of equipment failure at any point on the loop. BPA historic photographs indicate the Rockdale Microwave Radio Station site was surveyed by April 1951. The site and a beam easement were acquired from private landowners Patrick and Ada A. O'Hara on August 18, 1953, for \$250. The Station was under construction by October 1953 and near completion by November 1953. Based on the Rockdale Microwave Radio Station's position at Snoqualmie Pass, operations required the construction of two passive repeaters atop two adjacent mountain peaks.

Significance

The Rockdale Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Rockdale, Washington, area. The period of significance for the Station is 1955, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-858 RADIO 1955

Building style: Modern,
BPA Standard Type 1612

Characteristics: Two-story concrete-block control building used at high elevations to allow second-floor entry in heavy snow; concrete block covered in smooth finish scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two asymmetrical entrances with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



TIER II
SYSTEM
EXPANSION



- ⬠ Squak Mountain Microwave Radio Station
- City
- Covington District

1950



SQUAK MOUNTAIN MICROWAVE RADIO STATION



NORTH
REGION

COVINGTON
DISTRICT

SQAK / King County, Washington

History

The Squak Mountain Microwave Radio Station was designed as a component of Ross–Snohomish, BPA's initial microwave communication circuit. Ross–Snohomish linked the Ross Control Center in Vancouver, Washington, with the Snohomish Substation via intermediate radio stations at Rainier, Chehalis, Olympia, and Squak Mountain. BPA estimated that it would cost \$900,000 to construct and predicted completion by February or March 1950. When placed into service on October 5, 1950, BPA engineer and Design Section chief Richard F. Stevens described the 200-mile circuit as “the first installation of its size and scope by a power utility,” while *The Oregonian* hailed it as the “largest microwave radio communication system in the world.” (Stevens, 1950; *The Oregonian*, Oct. 6, 1950)

Historic BPA photographs indicate construction of the Squak Mountain Microwave Radio Station had begun by May 1950, and microwave equipment was being installed in the station building in August 1950. At 1,980 feet elevation, the Station was the highest within BPA's initial microwave circuit. With its 50-foot antenna towers, the Station was able to beam a signal 54.7 miles to Olympia, the longest “hop” in BPA's microwave system at the time. In August 1965, BPA awarded the Collins Radio Company of Richardson, Texas, a \$422,110 contract to install BPA microwave radio equipment in BPA facilities in northwest Washington. The new equipment was integrated into BPA's existing control and communication system and became part of the dispatch system linking BPA's Portland headquarters with northwest Washington. The equipment also provided an interconnection with B.C. Hydro and Power Authority transmission equipment near Vancouver, British Columbia.

Significance

The Rockdale Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Rockdale, Washington, area. The period of significance for the Station is 1955, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-879 RADIO 1950

Building style: Early Modern, BPA Standard Type 1612

Characteristics: One of BPA's earliest microwave radio station building designs; two-story control building used at high elevations to allow second-floor entry in heavy snow; concrete-block construction; nearly flat roof; two asymmetrical entrances with separate access to control and engine generator room; concrete canopies over entrances; original glass-block windows are infilled with concrete.



Tower: 4-leg steel lattice

TIER I

MASTER GRID



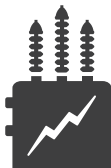
▲ Tacoma Substation

• City

■ Covington District



1942



TACOMA SUBSTATION



NORTH
REGION

COVINGTON
DISTRICT

TACO / 3702 Taylor Way, Tacoma, WA 98421 / Pierce County

HISTORIC PAINT: 1950 SCHEME

History

Tacoma Substation was constructed approximately 4 miles east of downtown Tacoma on tidal flats of the Commencement Bay between the Blair and Hylebos waterways. The area is heavily developed for industrial use and is home to the Port of Tacoma. Tacoma Substation was built solely to serve the aluminum plant built by the federal government for wartime aluminum production. Olin Corporation operated the plant until Kaiser Aluminum purchased it in 1947. The Substation was one of six that BPA built specifically supply aluminum plants in Oregon and Washington as part of its 1939 agreement with the Aluminum Corporation of America, and helped Washington become the nation's largest aluminum producer. The Tacoma Substation was planned and designed as the "Tacoma Aluminum Substation," as reflected by BPA drawings and plans.

When energized on July 7, 1942, the Substation was fed by BPA's Covington Substation through the 115-kV Covington No. 1 transmission Line, and serviced the aluminum plant via feeder. Shortly afterwards, two permanent service lines to the aluminum plant were constructed: the Tacoma — Olin No. 1 and Tacoma — Olin No. 2 lines. Tacoma Aluminum Substation remained a small 115-kV facility servicing just the aluminum plant through the end of the 1950's. The Substation substantially expanded during the 1960s and early 1970s, with an enlarged switchyard and the addition of 230-kV and 500-kV yards.

Significance

Tacoma Substation is significant under Criterion A in the areas of Industry and Government. The Substation was constructed to solely serve the adjacent aluminum plant (now demolished) for the production of aluminum during World War II. The Substation reflects BPA's contribution to the war effort and the initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). The Control House and Condenser Building are both individually significant under Criterion C in the area of Architecture as rare examples of BPA's brick building designs. The Control House is the best example of BPA's Standard Type 150 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-892 CONTROL HOUSE	1942	Tier I - Historic/Contributing; Individually Eligible
Z-890 Condenser Building	1942	Tier I - Historic/Contributing; Individually Eligible
SWITCHYARD	1942	Tier II - Historic/Contributing
Z-9095 STORAGE	1990	Out of Period/Non-contributing
Z-9096 STORAGE	1990	Out of Period/Non-contributing
Z-9097 STORAGE	1983	Out of Period/Non-contributing

TIER I Z-892 CONTROL HOUSE 1943

Building style: Streamline Moderne, BPA Standard Type 150

Characteristics: tall one story with shorter wings, rectangular plan, flat roof, brick cladding with full height pilasters, large multi-pane steel windows.



TIER I Z-890 MAINTENANCE (OLD CONDENSOR BUILDING) 1943

Building style: Streamline
Moderne, BPA Standard
Type 150

Characteristics: Tall one story, irregular plan, flat roof, brick cladding, large multi-pane steel windows.



TIER II SWITCHYARD 1943

Characteristics: Flat, rectangular gravel yard, chain link fence, three aluminum storage containers, 230 kV and 500 kV equipment in two main areas. The western section includes five rows of dead-end towers with power transformers, gas circuit breakers, and capacitor banks. The eastern section includes one central row of dead end towers with power transformers, gas circuit breakers, buswork, and capacitor banks.





Historic photo.



Historic photo.



Historic photo.

OLYMPIA DISTRICT



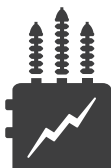
LOCATION	HISTORICAL SIGNIFICANCE
Aberdeen Substation.....	X
Centralia Substation.....	TIER II
Chehalis Microwave Radio Station	TIER II
Chehalis Substation	TIER I
Cosmopolis Substation	X
Fairmount Substation.....	X
Holcomb Substation.....	X
Kitsap Substation.....	X
Olympia Passive Repeater	X
Olympia Substation and Maintenance Headquarters	TIER III
Paul Substation	TIER I
Port Angeles Substation and Maintenance Headquarters.....	TIER II
Potlatch Substation.....	TIER II
Raymond Substation.....	X
Shelton Substation	X
Silver Creek Substation.....	TIER III

TIER II
**SYSTEM
EXPANSION**



- ▲ Centralia Substation
- City
- Olympia District

1950



CENTRALIA SUBSTATION



NORTH
REGION

OLYMPIA
DISTRICT

CENT / 1205 Prospect Avenue, Centralia, WA 98531 / Lewis County

HISTORIC PAINT: 1950 SCHEME

History

Centralia Substation was constructed north of central Centralia, Lewis County, Washington, to provide power to the city of Centralia's 4,500 residential, business, and industrial customers as well as 250 rural and residential Lewis County Public Utility District (PUD) customers. BPA built the Centralia Substation for \$25,000 and energized it on September 28, 1950. Located two blocks from the city's substation, the Centralia Substation was built with a "prefabricated control house of aluminum and glass construction, a 250,000 kVa oil circuit breaker and switching, metering and control equipment" (*The Oregonian*, Sept. 29, 1950). BPA transmitted power to the substation from an intertie with the 69-kV Centralia-Chehalis transmission line. The Substation's 5,000-kilowatt output was planned to provide for over half the power requirements of the area's customers. In 1965, BPA contracted with the city of

Centralia and Lewis County PUD to construct a second transmission line to Centralia for \$640,000 to be completed in 1966. BPA designed the new transmission line route to run through the Centralia Substation and to reduce the ongoing threat of power blackouts. BPA completely renovated the Substation to accommodate the new transmission line.

Significance

Centralia Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the Centralia area and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Substation is also representative of BPA's distribution of power to communities in southwest Washington through the agency's relationship with local public utility districts.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-50 CONTROL HOUSE	1966	Tier II - Historic/Contributing
SWITCHYARD	1966	Tier II - Historic/Contributing
Z-9010 OIL ABSORBANT BUILDING	1980	Not a historic resource per MPDF

TIER II Z-50 CONTROL HOUSE 1966

Building style: Utilitarian, BPA Standard Type 190

Characteristics: one story, rectangular plan, metal panel construction, flat roof, multi-pane steel windows, metal door.



TIER II SWITCHYARD 1950, rebuilt 1966

Characteristics: Small flat, gravel yard, chain link fence, concrete paths, aluminum storage shed, and 69-kV equipment, including multi-part dead-end tower, potential transformers, oil circuit breakers, and buswork (no power transformers). Capacitor bank near south and meters near southwest corner. Metal cover for underground access near control house.



TIER II
SYSTEM
EXPANSION

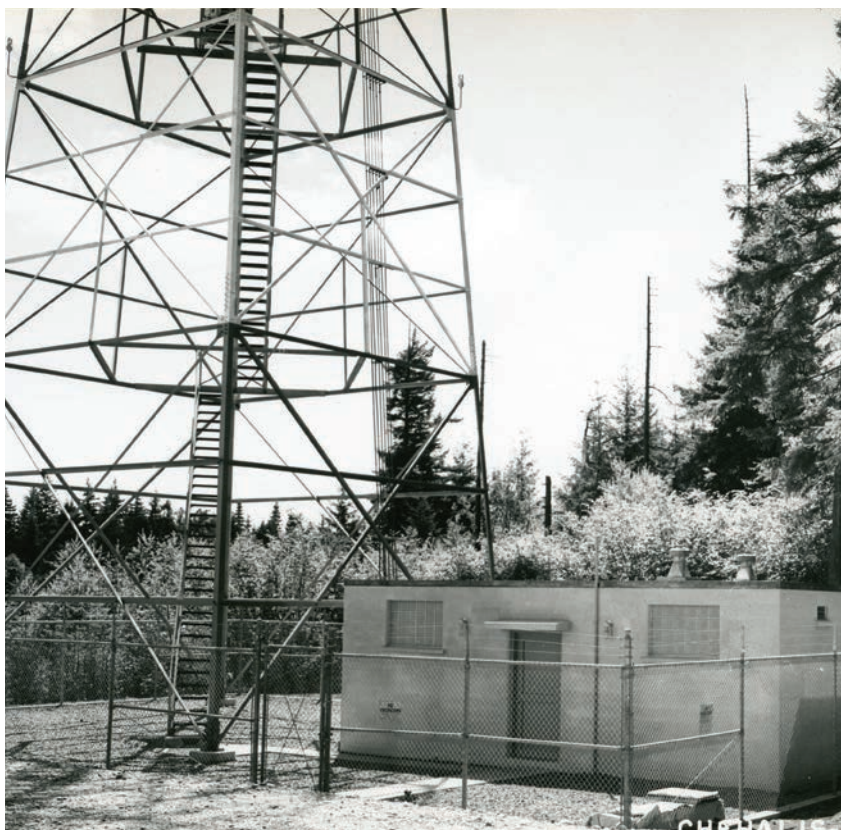


-  Chehalis Microwave Radio Station
-  City
-  Olympia District

1950



CHEHALIS MICROWAVE RADIO STATION



NORTH
REGION

OLYMPIA
DISTRICT

CHAL / Lewis County, Washington

History

The Chehalis Microwave Radio Station was designed as one component of BPA's initial microwave communication circuit establishing a connection between the Ross Control Center in Vancouver, Washington, and the Snohomish Substation via stations at Rainier, Chehalis, Olympia, and Squak Mountain. BPA estimated the cost to construct at \$900,000, and by November 1949, predicted it would be completed in February or March 1950. When placed into service on October 5, 1950, BPA engineer and Design Section chief Richard F. Stevens described the 200-mile section as "the first installation of its size and scope by a power utility," while *The Oregonian* hailed it as the "largest microwave radio communication system in the world" (Stevens, 1950; *The Oregonian*, Oct. 6, 1950).

On May 17, 1949, the city commission of Chehalis announced that BPA had been granted the right-of-way to construct a radio station southwest of the city. On July 22, 1949, BPA acquired the site from private landowners Tip E. and Bernice L. Gabel for \$100. Contracts for the construction of BPA's initial microwave radio stations between Seattle and Portland were announced on January 18, 1950. BPA historic photographs indicate the Chehalis Station was complete or near completion by August 1950.

Significance

The Chehalis Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Chehalis, Washington, area. The period of significance for the Station is 1950, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-879 RADIO 1950

Building style: Early Modern, BPA Standard Type 1600

Characteristics: One of BPA's earliest microwave radio station building designs; one-story control building; concrete-block construction; nearly flat roof; asymmetrical entrance with concrete canopy; original glass-block windows are infilled with concrete.

Tower: 4-leg steel lattice with staircase

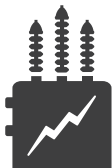


TIER I
MASTER
GRID



- ▲ Chehalis Substation
- City
- Olympia District

1941



CHEHALIS SUBSTATION



NORTH
REGION

OLYMPIA
DISTRICT

CHEH / 1140 Highway 603, Chehalis, WA 98532 / Lewis County

HISTORIC PAINT: 1950 SCHEME

History

Chehalis Substation was constructed northwest of Napavine, Lewis County, Washington, as a vital link in the 230 kV transmission system between Washington's Puget Sound and the Portland, Oregon, metropolitan area. The Chehalis Substation is a distribution point for transmission lines in southwestern Washington and provides reduced voltage for smaller feeder lines. The Substation provided power to the Raymond, Centralia, and Mossy Rock Substations within the Lewis County PUD service area. In 1951, BPA engineers successfully tested a new \$250,000 series capacitor at Chehalis Substation. The capacitor delivered 185,000 kW over a 300-mile 230 kV line, an increase from the 120,000 watts typically delivered at that distance. During the 1950s, BPA also constructed major substation additions to help meet the PUD's growing power demands. During the late 1960s, BPA constructed substation ad-

ditions in conjunction with completion of the new Mossyrock Dam. BPA's Mossyrock Dam double-circuit transmission line, which terminated at Chehalis Substation, helped integrate power generated at Tacoma City Light's Mossyrock and Mayfield dams into the main grid. Chehalis's upgrades made it one of the major stations on the main power grid by providing a key power distribution point for stabilizing electricity transmitted over long distances.

Significance

Chehalis Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, and Community Planning and Development. The Substation is representative of BPA's distribution of power to southwestern Washington cities and rural communities. The Substation also reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). Both the Control House and Untanking Tower are individually significant under Criterion C in the area of Architecture for exemplifying the Streamline Moderne style. The Control House represents the best version of BPA's Standard Type 110 design. The Untanking Tower represents the second-best version of BPA's Streamline Moderne style Untanking Tower, after the Midway Untanking Tower.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-959 CONTROL HOUSE	1941	Tier I - Historic/Contributing; Individually Eligible
Z-960 UNTANKING TOWER	1941	Tier I - Historic/Contributing; Individually Eligible
SWITCHYARD	1941	Tier II - Historic/Contributing
TRANSFER TRACK	1941	Tier II - Historic/Contributing
Z-9096 STORAGE	1990	Out of Period/Non-contributing
Z-9097 STORAGE	1983	Out of Period/Non-contributing
Z-892 CONTROL HOUSE	1943	Out of Period/Non-contributing
Z-518 ENGINE GENERATOR BUILDING	1976	Out of Period/Non-contributing
Z-651 VEHICLE STORAGE	1978	Not a historic resource per MPDF
Z-0000 STORAGE SHED	1980	Not a historic resource per MPDF
Z-0000 STORAGE #3	1980	Not a historic resource per MPDF
Z-9012 STORAGE	1980	Out of Period/Non-contributing
Z-1161 AUTOMOTIVE STORAGE	1987	Out of Period/Non-contributing
Z-1233 TRACTOR STORAGE	1989	Not a historic resource per MPDF
Z-0000 STORAGE #2	1990	Not a historic resource per MPDF
Z-0000 STORAGE #4	1990	Not a historic resource per MPDF
Z-0000 STORAGE - HAZARDOUS MATERIALS	1990	Not a historic resource per MPDF
Z-0000 STORAGE #1	1990	Not a historic resource per MPDF
Z-343 STORAGE	1990	Not a historic resource per MPDF
Z-345 STORAGE	1990	Not a historic resource per MPDF
Z-1234 COMPRESSOR HOUSE	1990	Out of Period/Non-contributing
Z-1455 POLE BARN	1996	Out of Period/Non-contributing

TIER I Z-959 CONTROL HOUSE 1941

Building style: Streamline Moderne, BPA Standard Type 110

Characteristics: One story, concrete construction, flat roof with parapet and metal coping, curved walls at main entrance, steel multi-pane windows, curved metal railing.



TIER I Z-960 UNTANKING TOWER 1941

Building style: Streamline Moderne, BPA Standard Type 110

Exterior characteristics: Tall central tower, concrete construction, flat roof, porthole windows, steel multi-pane windows.

Interior characteristics: brass wall registers



TIER II SWITCHYARD 1941, expanded circa 1964 and 1969

Characteristics: Flat, gravel yard, chain link fence, transfer track and transfer cart, and aluminum storage sheds. 69-kV, 115-kV, and 230-kV equipment includes steel lattice superstructure, dead-end towers, power transformers, current transformers, potential transformers, gas and oil circuit breakers, and buswork.



TIER II TRANSFER TRACK 1941

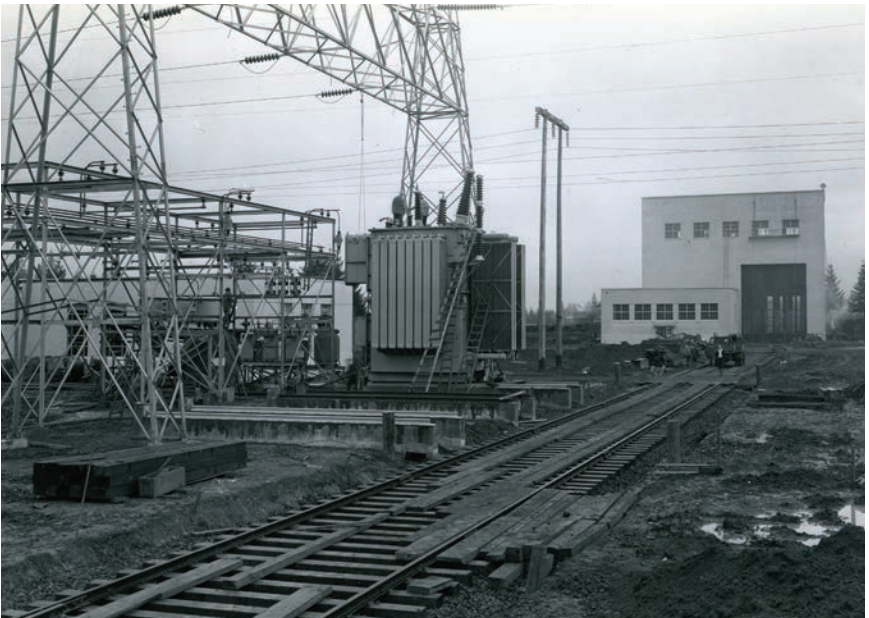
BPA standard type: Rails

Characteristics: Steel rails



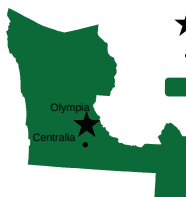


Historic photo.



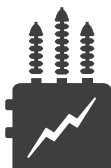
Historic photo.

TIER III
SYSTEM
EXPANSION



- ★ Olympia Substation & Maintenance HQ
- City
- Olympia District

1949



OLYMPIA SUBSTATION AND MAINTENANCE HEADQUARTERS



NORTH
REGION

OLYMPIA
DISTRICT

OLYM/OLMH / 5240 Trosper Road SW, Olympia, WA 98512 / Thurston County

HISTORIC PAINT: 1950 SCHEME

History and Significance

Olympia Substation and Maintenance Headquarters in Olympia Washington, was constructed to serve the Grays Harbor Public Utility District and, later, the Quinalt Light Company. During the 1950s, BPA completed substation additions, including terminal facilities for new transmission lines, making the Substation “a focal point for service to the Olympic Peninsula” (*The Oregonian*, 1956). The property is significantly associated with community development in the region. Substantial alterations to the Control House and Maintenance/Compressor Building have diminished the Substation’s integrity. The Substation no longer conveys its significance as a historic district, and individual buildings are not eligible for the NRHP for their architectural significance. The Oil House is a notable resource as a rare and distinct building type associated with BPA’s System Expansion Period from 1946 to 1974. In addition, the Transfer Track remains a notable and rare resource associated with BPA’s substations.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-1201 STORAGE (OLD OIL HOUSE)	1956	Tier III – Notable but Not Eligible
TRANSFER TRACK	1951	Tier III – Notable but Not Eligible
ALL OTHER RESOURCES	-	X – Non-contributing

TIER III Z-1201 STORAGE (OLD OIL HOUSE) 1956

Building style: Utilitarian Oil House

Characteristics: One story, semi-subterranean, rectangular plan, concrete construction, flat roof, smooth concrete finish, steel multi-pane windows.



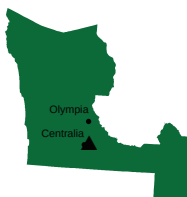
TIER III TRANSFER TRACK 1951

BPA Standard Type: Rails

Characteristics: Steel rails



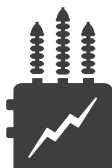
TIER I
SYSTEM
EXPANSION



- ▲ Paul Substation
- City
- Olympia District



1971



PAUL SUBSTATION



NORTH
REGION

OLYMPIA
DISTRICT

PAUL / 800 Big Hanaford Road, Centralia, WA 98531 / Lewis County

HISTORIC PAINT: SCHEME A

History

Clarence W. Paul Substation (Paul Substation) was constructed in 1971 to serve as a regional “power hub,” connecting the Centralia Steam Electric Plant to high voltage BPA transmission lines in the Seattle, Olympia, and Portland areas. The Centralia plant was the first thermal power plant constructed under the Pacific Northwest’s hydro-thermal power program, which converted the regional power to a mixed hydro-thermal system to meet growing power needs. The Paul Substation was completed or about \$3.4 million as one of BPA’s first new substations “designed for functional efficiency as well as pleasing appearance” (*Daily Chronicle*, 1971). BPA architects George Poole and Charles Lovett designed the Control House. The Paul Substation was initially connected to the Centralia plant by a mile-long, 500-kV Pacific Power and Light Company transmission line, enabling integration of power from the thermal plant. The second connection was the Paul –

Allston Line No. 2. BPA dedicated the substation in memory of Clarence W. Paul (1900–1964), who began working for BPA in 1939 as a carpenter-foreman and from 1949 to 1962 as a substation construction superintendent. Paul developed new construction methods, tools, and techniques; represented management in labor-management committees; and assisting with training development for journeymen and supervisors.

Significance

Paul Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, and Government. The Substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946-1974). The Substation is directly connected to the Centralia Steam Electric Plant and provides power to southwest Washington through an interconnected network of substations in BPA's Olympia district. The Control House is individually significant under Criterion C in the area of Architecture for exemplifying a contemporary-style control house and expressing BPA's beauty design concepts. Designed by George Poole and Charles Lovett, the building is unique in the BPA system.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-702 CONTROL HOUSE / MAINTENANCE	1971	Tier I - Historic/Contributing; Individually Eligible
Z-7789 SWITCHYARD	1971	Tier II - Historic/Contributing
Z-1223 POLE VEHICLE STORAGE	1990	Out of Period/Non-contributing

TIER I Z-702 CONTROL HOUSE / MAINTENANCE 1971

Building style:

Modern/Contemporary

Exterior characteristics:

One story sections of varying heights, asymmetrical plan, exposed steel structural elements, complex roof with low pitch cross gable and wide airplane eaves, glazed gables, concrete masonry units finished with plaster, brick cladding, band of tall and narrow fixed windows, glass and brick materials, recessed entrance.



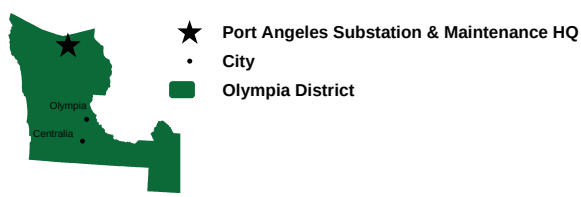
Interior characteristics: Spiral staircase, brick walls

TIER II SWITCHYARD 1971

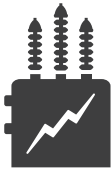
Characteristics: Flat, gravel yard, chain link fence, concrete paths, and 500-kV equipment, including multi-part dead-end towers, power transformers, current transformers, gas circuit breakers, and buswork.



TIER II
SYSTEM
EXPANSION



1949



**PORT ANGELES SUBSTATION
AND MAINTENANCE
HEADQUARTERS**



NORTH
REGION

OLYMPIA
DISTRICT

POAN/POHQ / 1400 E Park Avenue, Port Angeles, WA / Clallam County

HISTORIC PAINT: SCHEME A

History

Port Angeles Substation and Maintenance Headquarters was constructed in Port Angeles, Clallam County, Washington, to transmit power from Grand Coulee Dam, to the northern Olympic Peninsula and relieve power shortages affecting Port Angeles industries. BPA contracted with Electric Company of Port Angeles for \$64,276 to construct the Substation, which was part of BPA's \$4 million, 91-mile 115-kV Shelton–Port Angeles transmission line project. During the 1960s, BPA built additional transmission lines and switchyard upgrades to connect Port Angeles Substation with the Clallam County Public Utility District and with other BPA substations such as Fairmount to serve the area's growing population and expanding local industries.

Significance

Port Angeles Substation and Maintenance Headquarters is significant under NRHP Criterion A in the area of Government. The Substation was constructed to provide reliable power to local communities and relieve a power shortage for Port Angeles's industrial plants. The Substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the only remaining example of BPA's Standard Type 100-2 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-982 CONTROL HOUSE	1950	Tier II - Historic/Contributing
Z-983 OIL HOUSE	1950	Tier II - Historic/Contributing
Z-984 MAINTENANCE	1950	Tier II - Historic/Contributing
Z-7790 SWITCHYARD	1950	Tier II - Historic/Contributing
Z-0000 CABLE TUNNEL	1950	Feature of Switchyard
Z-9082 OIL ABSORBENTS	1979	Not a historic resource per MPDF
Z-9083 OIL ABSORBENTS	1979	Not a historic resource per MPDF
Z-1004 RELAY HOUSE	1979	Out of Period/Non-contributing
Z-1050 ENGINE GENERATOR BUILDING	1979	Out of Period/Non-contributing
Z-0000 STORAGE - CONEX	1980	Not a historic resource per MPDF
Z-1250 EMERGENCY LINE STORAGE	1990	Not a historic resource per MPDF
Z-9081 OIL ABSORBENTS	1990	Not a historic resource per MPDF
Z-1231 STORAGE - HAZARDOUS MATERIALS	1990	Out of Period/Non-contributing
Z-1249 STORAGE - HAZARDOUS MATERIALS	1990	Out of Period/Non-contributing
Z-1251 EMERGENCY LINE MATERIAL STORAGE	1990	Out of Period/Non-contributing
Z-9174 FLAMMABLE STORAGE	1990	Out of Period/Non-contributing
Z-1368 VEHICLE STORAGE	2000	Out of Period/Non-contributing
Z-9004 STORAGE - HAZARDOUS MATERIALS	2014	Out of Period/Non-contributing

TIER II Z-982 CONTROL HOUSE 1950

Building style: Streamline Moderne, BPA Standard Type 100-2

Exterior characteristics: One story, concrete construction, steel windows, glass blocks, curved metal railing.

Interior characteristics:
Brass wall registers



TIER II Z-983 OIL HOUSE 1950

Building style: Utilitarian,
BPA Standard Type Oil House

Exterior characteristics:

One story, semi-subterranean,
rectangular plan, flat roof, glass
block windows, steel windows,
concrete retaining walls.



TIER II Z-984 MAINTENANCE 1950

Building style: Utilitarian

Exterior characteristics: Tall
one story, rectangular plan, flat
roof, smooth concrete finish,
steel windows, double door.

Interior characteristics:

Bell-shaped metal light fixtures



TIER II SWITCHYARD 1950, expanded circa 1967 and circa 1974

Characteristics: Flat, gravel
yard, chain link fence, concrete
paths, aluminum storage sheds,
and subterranean access to
the cable tunnel. 115-kV and
230-kV equipment includes
multi-part dead-end towers,
power transformers, potential
transformers, gas and oil circuit
breakers, capacitor banks, oil tank, and buswork.





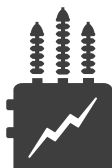
TIER II
SYSTEM
EXPANSION



- ▲ Potlatch Substation
- City
- Olympia District



1960



POTLATCH SUBSTATION



NORTH
REGION

OLYMPIA
DISTRICT

POTL / Cushman-Potlatch Road, Shelton, WA 98584 / Mason County

HISTORIC PAINT: 1956 SCHEME

History

Potlatch Substation was constructed approximately 2 miles northwest of Potlatch, Mason County, Washington. Potlatch is an unincorporated community on the western shore of Hood Canal's Great Bend near the mouth of the Skokomish River. The Potlatch Substation serves the customers of Mason County Public Utility Districts (PUD) No. 1 and No. 3. PUD No. 3, organized in 1939, was originally powered by Tacoma City Light's Cushman Hydro Project. In 1948, PUD No. 3 contracted with BPA, which now provides the PUD with virtually all its electricity. PUD No. 3 presently operates the Potlatch Substation.

Significance

Potlatch Substation is significant under NRHP Criterion A in the area of Government and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Substation is also representative of BPA's distribution of power to rural communities in southwest Washington through its relationship with local public utility districts. The Control House represents the second best example of BPA's Standard Aluminum Control House Type-193 design, after the Gardiner Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-323 CONTROL HOUSE	1961	Tier II - Historic/Contributing
SWITCHYARD	1961	Tier II - Historic/Contributing
Z-1067 METER HOUSE	1983	Not a historic resource per MPDF
Z-9025 STORAGE - HAZARDOUS MATERIAL	1997	Not a historic resource per MPDF

TIER II Z-323 CONTROL HOUSE 1961

Building style: Utilitarian, BPA Standard Type 193

Characteristics: One story, rectangular plan, metal panel construction, flat roof, metal doors, metal canopy.



TIER II SWITCHYARD 1961

Characteristics: Flat, gravel yard, chain link fence, and aluminum storage shed. 115-kV equipment includes dead-end tower, power transformers, potential transformers, oil and vacuum circuit breaker, and buswork.

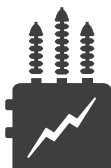


TIER III
SYSTEM
EXPANSION



- ▲ Silver Creek Substation
- City
- Olympia District

1958



SILVER CREEK SUBSTATION



NORTH
REGION

OLYMPIA
DISTRICT

SICR / 2864 US-12, Silver Creek, WA 98582 / Lewis County

HISTORIC PAINT: 1956 SCHEME

History and Significance

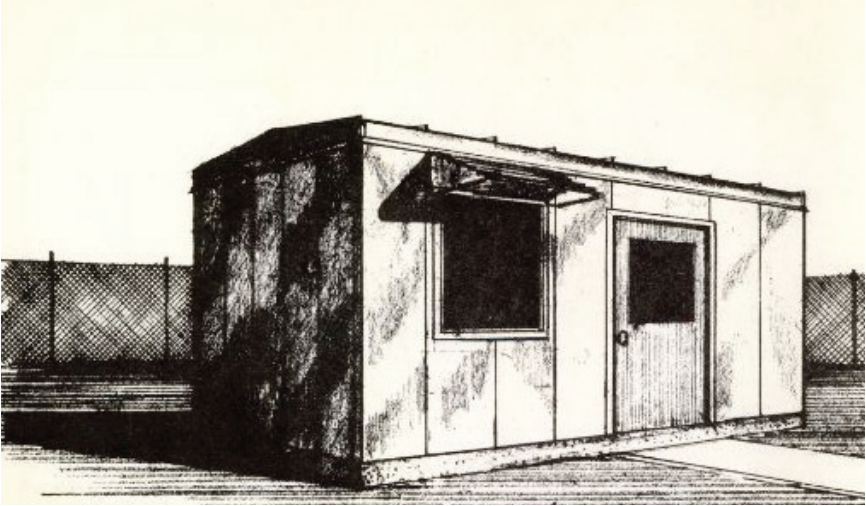
Silver Creek Substation near Silver Creek, Washington was constructed to serve the Lewis County Public Utility District and is associated with community development in the region. Construction of a new Control House in 2012 diminished the Substation's integrity. The Substation no longer conveys its significance as a historic district, and individual buildings are not eligible for the NRHP for their architectural significance. The 1958 Control House has undergone minimal alterations since its construction and remains a notable resource as a rare and distinct building type associated with BPA's System Expansion Period of 1946 to 1974.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-308 CONTROL HOUSE	1958	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-308 CONTROL HOUSE 1958

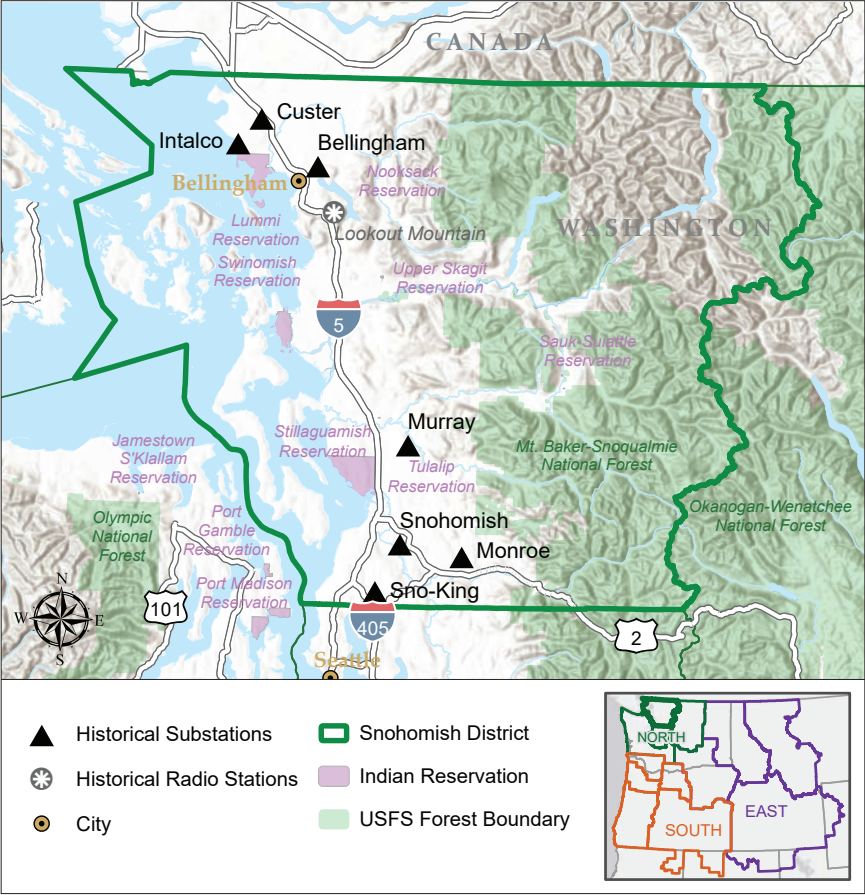
Building style: Utilitarian,
BPA Standard Type 192

Characteristics: One story,
rectangular plan, aluminum
panel construction, flat roof,
metal windows, metal door.



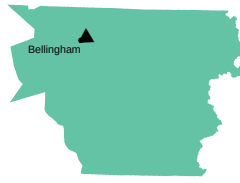
Historic drawing.

SNOHOMISH DISTRICT



LOCATION	HISTORICAL SIGNIFICANCE
Bellingham Substation	TIER II
Custer Substation.....	X
Intalco Substation	TIER II
Lookout Mountain Microwave Radio Station	X
Monroe Substation	X
Murray Substation	TIER I
Sno-King Substation	X

TIER II
SYSTEM
EXPANSION



- ▲ Bellingham Substation
- City
- Snohomish District

1954



BELLINGHAM SUBSTATION



NORTH
REGION

SNOHOMISH
DISTRICT

BELG / 4334 Dewey Road, Bellingham, WA 98225 / Whatcom County

HISTORIC PAINT: 1950 SCHEME

History

Bellingham Substation was constructed in Bellingham, Whatcom County, Washington to serve the Whatcom County Public Utility District (PUD) and the Puget Sound Power and Light Company. The PUD needed BPA power to serve a nearby Mobil oil refinery via the PUD's 115-kV transmission line. Although BPA acquired the Substation land in 1947, construction was delayed for lack of funding. After completion Bellingham, the first BPA substation north of Snohomish, was looped into what was then the 230-kV Snohomish-Ingledow line in October 1954.

Significance

Bellingham Substation is significant under NRHP Criterion A in the areas of Government and Commerce. Constructed to serve the Whatcom County PUD and the Puget Sound Power & Light Company, the Substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the second best example of BPA's Standard Type 111 design, after the Fairview Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-840 CONTROL HOUSE	1955	Tier II - Contributing
SWITCHYARD	1954	Tier II - Contributing
Z-8956 STORAGE - SRU #1	1968	X - Non-contributing
Z-8957 STORAGE - SRU #2	1968	X - Non-contributing
Z-8958 STORAGE - SRU #4	1968	X - Non-contributing
Z-553 ENGINE GENERATOR BUILDING	1976	X - Non-contributing

TIER II Z-840 CONTROL HOUSE 1955

Building style: Modern, BPA Standard Type 111

Exterior characteristics: one story, flat roof with parapet, smooth concrete finish with grid pattern, glass and metal entrance, original steel window

Interior characteristics: historic inset lighting in control room

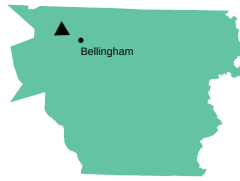


TIER II SWITCHYARD 1955

Characteristics: Flat, gravel yard, chain link fence, concrete paths, aluminum storage sheds. 230-kV equipment includes multi-part dead-end towers, power transformers, gas and oil circuit breakers, potential transformers, oil tank, and buswork.



TIER II
SYSTEM
EXPANSION



- ▲ Intalco Substation
- City
- Snohomish District



1966



INTALCO SUBSTATION



NORTH
REGION

SNOHOMISH
DISTRICT

INTA / 4050 Mountain View Road, Ferndale, WA 98248 / Whatcom County

HISTORIC PAINT: SCHEME A

History

Intalco Substation was constructed approximately 5 miles west of Ferndale, Whatcom County, Washington, to provide power to the Intalco Aluminum Corporation's (now Alcoa Intalco Works) aluminum reduction plant. Intalco was a partnership of American Metal Climax, Inc. (later Alumax), Howmet, and the French company Pechiney. In July 1964, Intalco announced construction of a \$60 million aluminum reduction plant west of Ferndale, Washington. After completion, the plant was regarded as one of the world's most highly automated and efficient reduction plants. BPA's \$4.3 million transmission line and substation facilities powered the Intalco plant, and completion of the 500-kV transmission line segment from Renton to Blaine was to correspond with the plant's 1966 opening. By the time the new plant was announced, BPA had begun construction of a 70-mile, 500-kV transmission line

between Arlington and Blaine, Washington. BPA architect C. Tetherow designed the Substation Control House, which was built by Mowat Bros. Construction Company of Seattle, Washington. BPA also contracted with Leo A. Daly Company of Seattle for \$19,775 to design substation additions. Alcoa Intalco Works acquired the aluminum reduction plant facility in the late 1990s.

Significance

Intalco Substation is significant under NRHP Criterion A in the areas of Government and Industry. The Substation's establishment was integral to delivering power to the adjacent Intalco aluminum reduction plant and reflects BPA's association with the aluminum industry in the Pacific Northwest. The Substation also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the only remaining example of BPA's Standard Type 181 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-748 CONTROL HOUSE	1966	Tier II - Contributing
SWITCHYARD	1966	Tier II - Contributing
Z-1220 MAINTENANCE / VEHICLE STORAGE	1991	X - Non-contributing
Z-1485 BATTERY HOUSE	2011	X - Non-contributing

TIER II Z-748 CONTROL HOUSE 1966

Building Style: International, BPA Standard Type 181

Exterior Characteristics:

One story, asymmetrical plan, flat roof, insulated asbestos cement board panels with extruded aluminum mullions, multi-pane aluminum windows



TIER II SWITCHYARD 1966, expanded circa 1968

Characteristics: Stepped, gravel yard, chain link fence, concrete paths, gravel utility access roads, equipment connections to Alcoa Intalco Works aluminum plant property to southeast. 230-kV equipment includes dead-end towers, power transformers, potential transformers, gas circuit breakers, oil tanks, capacitor banks, and buswork.

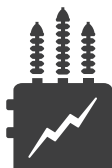


TIER I
SYSTEM
EXPANSION



- ▲ Murray Substation
- City
- Snohomish District

1972



MURRAY SUBSTATION



NORTH
REGION

SNOHOMISH
DISTRICT

MURY / 17520 Burn Road, Arlington, WA 98223 / Snohomish County

HISTORIC PAINT: SCHEME A

History

Vernon M. Murray Substation (Murray Substation) was constructed approximately 4 miles southeast of Arlington, Snohomish County, Washington, to provide a 115-kV point of delivery for Snohomish County Public Utility District (PUD) in the Puget Sound area. Snohomish County PUD is the second largest publicly-owned utility in the Pacific Northwest and the 12th largest in the nation in terms of customers served. The PUD's service area consists of 2,200 square miles, including all of Snohomish County and Camano Island. The utility maintains about 5,800 miles of distribution line. The Murray Substation was named for Vernon M. Murray (1897–1960), one of BPA's first field office managers. BPA architects George Poole and Charles Lovett designed the control house.

Significance

Murray Substation is significant under NRHP Criterion A in the area of Government. The Substation is representative of BPA's growth in the Pacific Northwest during BPA's System Expansion Period (1946-1974). The Substation served the Snohomish County PUD to support population growth in the Pacific Northwest. The Control House is individually significant under Criterion C in the area of Architecture for its representation of a contemporary-style control house and expressing BPA's beauty design concepts. The building's design is unique within the BPA system.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-699 CONTROL HOUSE	1972	Tier I - Contributing/Individually Eligible
SWITCHYARD	1972	Tier II - Contributing

TIER I Z-699 CONTROL HOUSE 1972

Building Style: Modern/
Contemporary

Exterior Characteristics:

One story, asymmetrical plan, exposed steel structural elements, complex roof with low pitch cross gable and wide airplane eaves and dropped hip roof with wide eaves, glazed gables, concrete masonry units finished with stucco, roman brick cladding arranged in a running bond, band of tall and narrow fixed windows, glass and brick materials, recessed entrance.



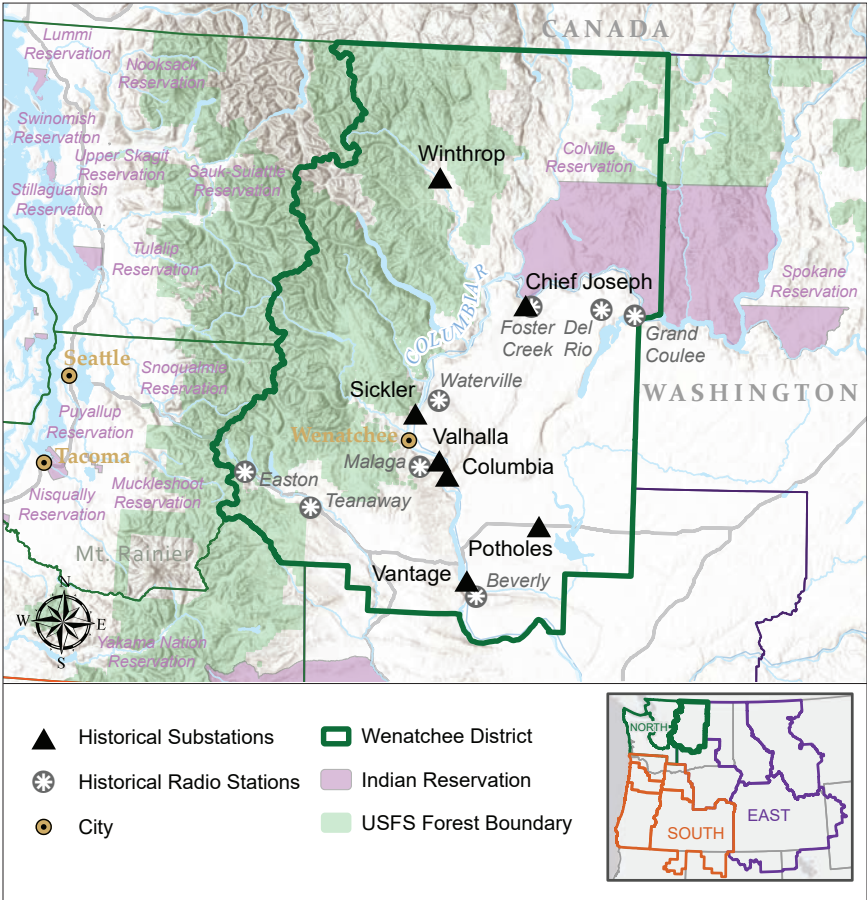
Interior Characteristics: Interior spiral staircase, brick walls

TIER II SWITCHYARD 1972

Characteristics: Flat, gravel yard, chain link fence, concrete paths, metal storage containers, and subterranean access to the cable tunnel. 230-kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers, capacitor banks, oil tanks, and buswork.



WENATCHEE DISTRICT



LOCATION	HISTORICAL SIGNIFICANCE
Beverly Microwave Radio Station	TEIR II
Chief Joseph Substation	TEIR II
Columbia Substation.....	TIER I
Del Rio Microwave Radio Station.....	X
Easton Microwave Radio Station	TIER II
Foster Creek Microwave Radio Station.....	TIER II
Grand Coulee Microwave Radio Station	TIER II
Malaga Microwave Radio Station.....	TIER II
Potholes Substation	TIER I
Sickler Substation	TIER I
Teanaway Microwave Radio Station	TIER II
Valhalla Substation	TIER II
Vantage Substation	TIER II
Waterville Microwave Radio Station.....	TIER II
Winthrop Substation.....	X

TIER II
SYSTEM
EXPANSION

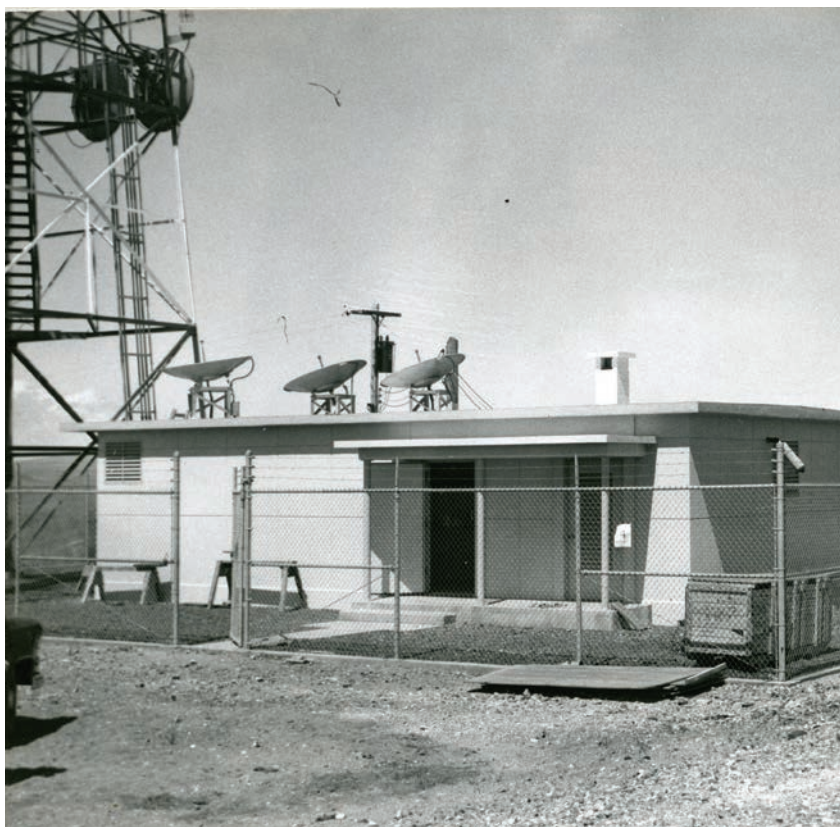


- Beverly Microwave Radio Station
- City
- Wenatchee District

1953



BEVERLY MICROWAVE RADIO STATION



NORTH
REGION

WENATCHEE
DISTRICT

BEVR / Grant County, Washington

History

The Beverly Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with BPA facilities in Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee and other intermediate substations. The Ross–Spokane circuit was the first microwave link to cross the Cascade mountain range. The Beverly Microwave Radio Station also served as the terminal point of BPA's third microwave circuit. This circuit extended from the Snohomish Microwave Radio Station to the Beverly Microwave Radio Station, establishing a connection with the Ross–Spokane circuit. The Snohomish–Beverly circuit provided direct routing for protective relay channels associated with transmission lines crossing the northern Cascade mountain range. This link also completed a loop that allowed alternate routing to a large number of microwave radio stations in the event of equipment failure at any point on the loop. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. On November 19, 1951, BPA signed a Memorandum of Understanding (MOU) with the United States Bureau of Reclamation to enable construction of the Beverly Microwave Radio Station site.

Significance

The Beverly Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Beverly, Washington, area. The period of significance for the Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-1393 RADIO 1953

Building style: Modern, BPA Standard Type 1606

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.



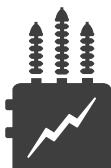
Tower: 4-leg steel lattice with staircase

TIER II
SYSTEM
EXPANSION



- ▲ Chief Joseph Substation
- City
- Wenatchee District

1958



CHIEF JOSEPH SUBSTATION



NORTH
REGION

WENATCHEE
DISTRICT

CHJO / 2450 State Route 17 NE, Bridgeport, WA 98813 / Douglas County

HISTORIC PAINT: 1956 SCHEME

History

Chief Joseph Substation was constructed near the Chief Joseph Dam site, approximately 2 miles southeast of Bridgeport, Douglas County, Washington, to power the Puget Sound and Olympic Peninsula areas. Built by the U.S. Army Corps of Engineers in 1955, Chief Joseph Dam is a key hydroelectric facility on the Columbia River. When completed, the structure was the world's second largest hydroelectric generating dam, next to Grand Coulee. The dam was authorized as an irrigation project, but produces revenue for hydroelectric power marketed by BPA. The Control House and Switchyard were built in conjunction with plans for the Chief Joseph — Covington 345-kV transmission line, serving Washington's Puget Sound and the Olympic Peninsula, and the Chief Joseph — Snohomish 345-kV line, serving the Seattle and North Puget Sound areas (the lines were completed in 1972). In 1967, BPA began construction on the 500-kV Chief Joseph — Sickler transmission line which helped

provide increased peaking power and energy to coastal load centers and as part of the 500-kV network required to integrate the third powerhouse at Grand Coulee into the BPA grid. In 1970, BPA built a new substation relay house and relocated an existing maintenance building.

Significance

Chief Joseph Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment was part of BPA's 500-kV network and provided increased power supplies from the Columbia River to BPA's transmission grid. Collectively, the district reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946-1974). The Control House also represents the only remaining example of BPA's Standard Type 187 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-829 CONTROL HOUSE	1956	Tier II - Contributing
Z-828 STORAGE (OLD OIL HOUSE)	1956	Tier II - Contributing
Z-827 RELAY HOUSE #1	1956	Tier II - Contributing
Z-779 MAINTENANCE	1957	X - Non-contributing
Z-701 RELAY HOUSE #2	1972	Tier II - Contributing
SWITCHYARD	1956	Tier II - Contributing
TRANSFER TRACK	1956	Tier II - Contributing
Z-7815 CABLE TUNNEL	1956	Contributing Feature of Switchyard
Z-6009 SHED	1985	X - Non-contributing

TIER II Z-829 CONTROL HOUSE 1956

Building Style: Modern, BPA Standard Type 187

Exterior Characteristics: One story, steel and concrete frame construction, flat roof, cast-in-place concrete exterior with grid pattern, steel and glass door with sidelites and transoms.



Interior Characteristics: Historic metal dome light fixtures

TIER II Z-828 STORAGE (OLD OIL HOUSE) 1956

Building Style: Utilitarian

Exterior Characteristics: One story, rectangular plan, metal panel construction, front-gable roof, metal door, metal window.

Interior Characteristics: Historic overhead metal dome light fixture



TIER II Z-827 RELAY HOUSE #1 1956

Building Style: Utilitarian

Exterior Characteristics:

one story, rectangular plan, concrete construction, low pitch front gable roof, concrete finish with grid pattern



TIER II Z-701 RELAY HOUSE #2 1972

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel siding, shed roof, wall sconce east of each entrance



TIER II SWITCHYARD 1956, expanded circa 1966, circa 1971, and circa 1973

Characteristics:

Flat gravel yard, chain-link fence, concrete paths, aluminum storage shed, cable tunnel, and transfer track. 230 kV, 345 kV, and 500 kV equipment includes multi-part dead-end towers, power transformers, current transformers, gas circuit breakers, fuel tanks, historic light fixtures, and buswork.

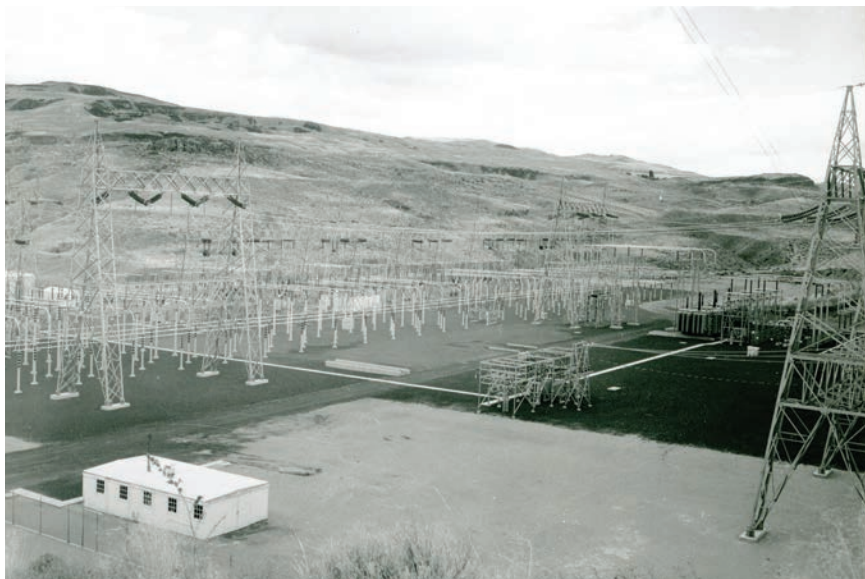


TIER II TRANSFER TRACK 1956

BPA Standard Type: Rails

Characteristics: Steel rails





Historic photo, 1960.



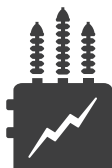
Historic photo.

TIER II
MASTER
GRID



- ▲ Columbia Substation
- City
- Wenatchee District

1945



COLUMBIA SUBSTATION



NORTH
REGION

WENATCHEE
DISTRICT

COLU / 48 BPA Substation Road, Rock Island, WA 98850 / Douglas County

HISTORIC PAINT: 1950 SCHEME

History

Columbia Substation was constructed near Rock Island, Douglas County, Washington, to help meet regional power demands. It was one of the last Master Grid substations built by BPA. From the Columbia Substation, the 230 kV transmission lines linking Grand Coulee Dam and the Seattle–Tacoma area crossed the Columbia on their way through the Cascade mountain range. In November 1951, BPA energized a fourth 230 kV transmission line from Grand Coulee Dam to the Columbia Substation, which supplied energy to the Northwest Power Pool. “The additional installations at Columbia Substation and completion of the new line eliminated one of the primary bottlenecks in transmitting Grand Coulee generation to the Washington and Oregon coasts” (*The Oregonian*, June 6, 1950). BPA built additional transmission lines to connect Columbia Substation and service areas in western Washington and

to power industrial production at Wenatchee's Aluminum Company of America (ALCOA) plant and Keokuk Metals. Beginning in the late 1950s, BPA increased the Columbia Substation's vital role in delivering hydropower to Portland General Electric (PGE) customers. In August 1958, BPA and PGE entered into two contracts to bring power from the Priest Rapids and Rocky Reach hydroelectric projects to PGE load centers. By 1962, power from both dams was to enter BPA's grid in central Washington at BPA's Midway and Columbia Substations, and a new substation was to be built in Maple Valley.

Significance

Columbia Substation is significant under NRHP Criterion A in the areas of Commerce and Industry. The Substation's establishment significantly impacted business and industrial development throughout the region, enhancing service to PGE customers. The Substation also reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-962 CONTROL HOUSE	1945	Tier II - Contributing
Z-963 STORAGE (OLD OIL HOUSE)	1945	Tier II - Contributing
Z-750 MAINTENANCE	1965	Tier II - Contributing
SWITCHYARD	1945	Tier II - Contributing

TIER II Z-962 CONTROL HOUSE 1945

Building Style: BPA Standard Type 110

Exterior Characteristics: One story, concrete construction, flat roof with parapet, curved walls at main entrance, curved metal railing.

Interior Characteristics:
Brass wall registers



TIER II Z-963 STORAGE (OLD OIL HOUSE) 1945

Building Style: Utilitarian, BPA Standard Type Oil House

Exterior Characteristics: One story, semi-subterranean, rectangular plan, flat roof, glass-block windows, steel casement windows, concrete retaining walls.



TIER II Z-750 MAINTENANCE 1965

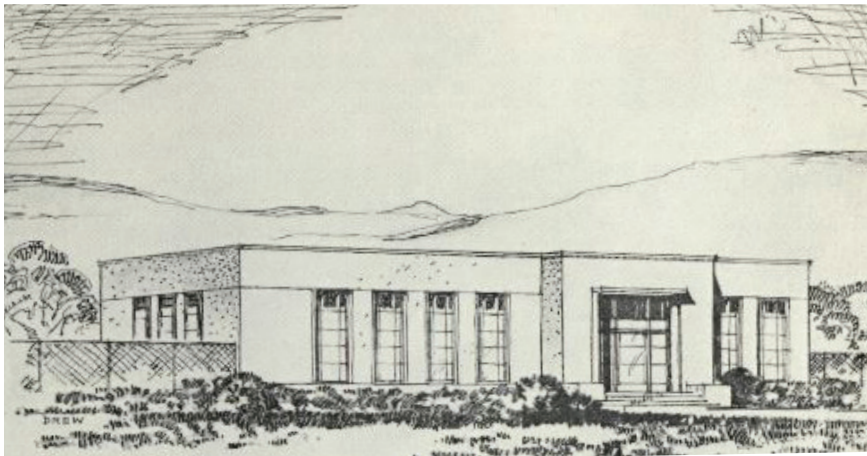
Building Style: Utilitarian

Exterior Characteristics: One story, rectangular plan, flat roof, asbestos panel siding, wood panel overhead garage door, aluminum window with awning operation.



TIER II SWITCHYARD 1945, expanded 1971

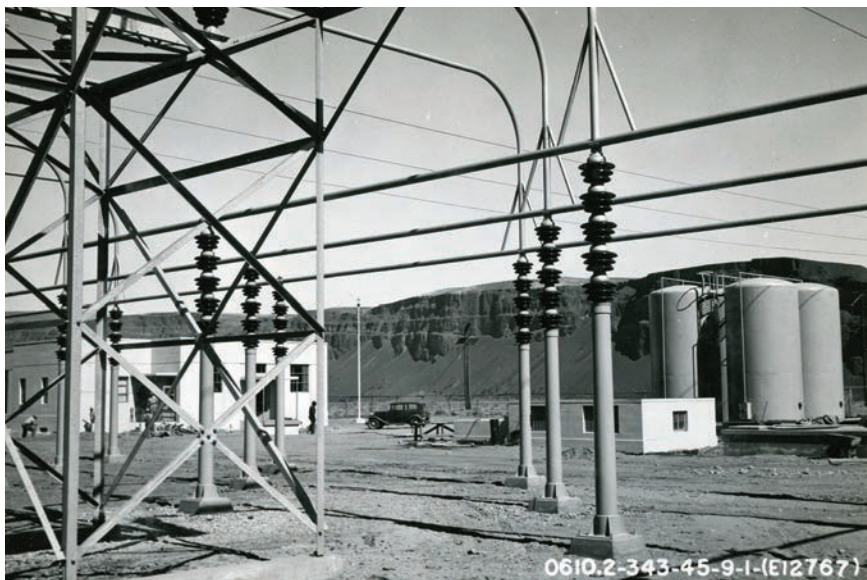
Characteristics: Flat gravel yard, chain-link fence, concrete paths, aluminum storage sheds, and cable tunnel, 115 kV and 230 kV equipment includes multi-part dead-end towers, power transformers, current transformers, potential transformers, oil and gas circuit breakers, oil tanks, capacitor banks, and buswork.



Historic photo.



Historic photo.



Historic photo.

TIER II
SYSTEM
EXPANSION



- Easton Microwave Radio Station
- City
- Wenatchee District

1954



EASTON MICROWAVE RADIO STATION



NORTH
REGION

WENATCHEE
DISTRICT

EAST / Kittitas County, Washington

History

The Easton Microwave Radio Station was constructed in 1954 as part of Snohomish–Beverly, BPA's third microwave circuit. This circuit extended between the Snohomish and Beverly Microwave Radio Stations, establishing a connection with the Ross–Spokane circuit. The Snohomish–Beverly circuit provided direct routing for protective relay channels associated with transmission lines crossing the northern Cascade mountain range. By connecting with the Ross–Spokane circuit via the Beverly Microwave Radio Station, the Snohomish–Beverly circuit completed a loop that allowed alternate routing to a large number of microwave radio stations in the event of equipment failure.

BPA internal records indicate that, on September 6, 1941, the Northern Pacific Railway Company granted BPA a permanent easement at the site for the construction and maintenance of telephone and/or transmission lines as well as other transmission-related structures for \$113.86. BPA historic photographs indicate that BPA surveyed the site for a microwave radio station as early as May 1951. By May 1954, the Station was near completion. By 1992, BPA had obtained fee simple ownership of the site.

Significance

The Easton Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Easton, Washington, area. The period of significance is 1954, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-859 RADIO 1954

Building style: Modern, BPA Standard Type 1612

Characteristics: Two-story concrete-block control building used at high elevations to allow second-floor entry in heavy snow; concrete block covered in smooth finish scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two asymmetrical entrances with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



TIER II
SYSTEM
EXPANSION

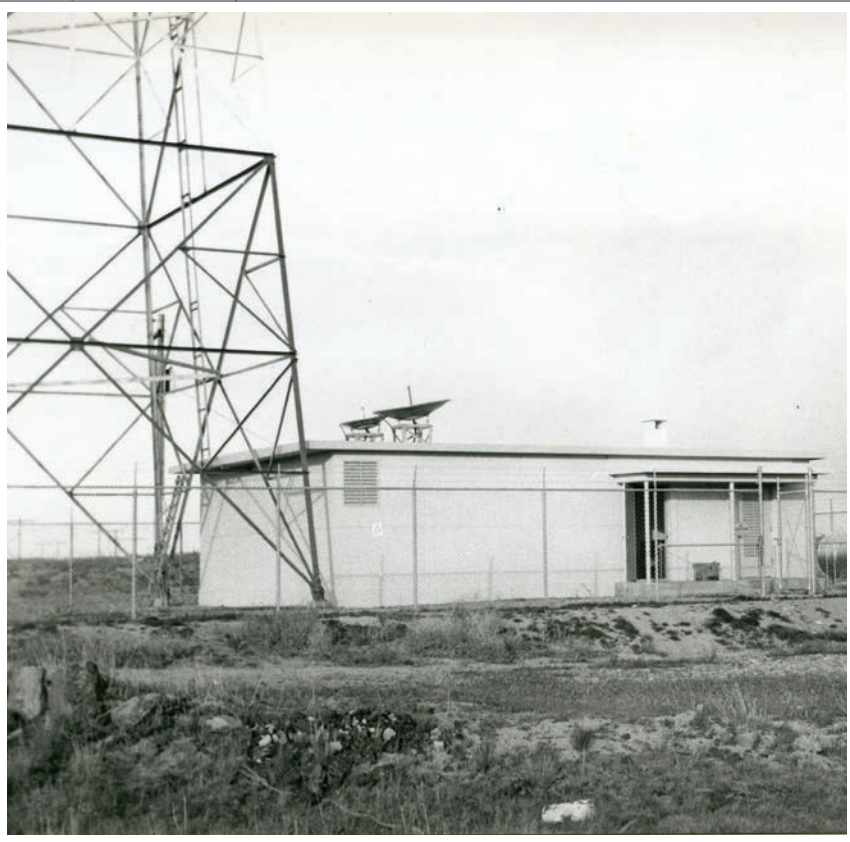


- Foster Creek Microwave Radio Station
- City
- Wenatchee District

1953



FOSTER CREEK
MICROWAVE
RADIO STATION



NORTH
REGION

WENATCHEE
DISTRICT

FOSC / Douglas County, Washington

History

The Foster Creek Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee and other intermediate substations. The circuit was the first microwave installation to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. On September 24, 1951, private landowners W. F. Shaw and Erma Shaw sold the Foster Creek site to BPA for \$75. BPA historic photographs indicate the Foster Creek Station was complete or near completion by June 1953.

Significance

The Foster Creek Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Bridgeport, Washington, area. The period of significance for the Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-7641 RADIO 1953

Building style: Modern, BPA Standard Type 1606

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



TIER II
SYSTEM
EXPANSION



- ★ Grand Coulee Microwave Radio Station
- City
- Wenatchee District

1953



GRAND COULEE
MICROWAVE
RADIO STATION



NORTH
REGION

WENATCHEE
DISTRICT

GCNC / Grant County, Washington

History

The Grand Coulee Microwave Radio Station was designed as one component of Ross–Spokane, BPA's second microwave circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with BPA facilities in Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee and other intermediate substations. The Ross–Spokane circuit was the first microwave link to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. BPA historic photographs indicate construction of the Grand Coulee station building had begun by January 13, 1953.

Significance

The Grand Coulee Microwave Radio Station is significant under NRHP Criterion A for its significance in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Grand Coulee, Washington, area. The period of significance for the Grand Coulee Microwave Radio Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-869 RADIO 1953

Building style: Modern,
BPA Standard Type 1607

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at left) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: No tower (roof-mounted)



TIER II
SYSTEM
EXPANSION



- **Malaga Microwave Radio Station**
- **City**
- **Wenatchee District**

1955



**MALAGA
MICROWAVE
RADIO STATION**



NORTH
REGION

WENATCHEE
DISTRICT

MALG / Chelan County, Washington

History

The Malaga Microwave Radio Station was constructed in 1955 as part of Ross–Spokane, BPA's second microwave circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with BPA facilities in Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee and other intermediate substations. The Ross–Spokane circuit was the first microwave circuit to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. In April 1950, the Malaga Microwave Radio Station site was acquired from the Coffing Bros Corporation for \$50. BPA historic photographs indicate surveying of the site had begun by October 1951, and development had commenced by July 1952. The Malaga Station was complete or near completion by September 1953.

Significance

The Malaga Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Malaga, Washington, area. The period of significance for the Station is 1955, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-871 RADIO 1955

Building style: Modern, BPA Standard Type 1607

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at left) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice

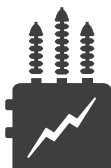


TIER I
SYSTEM
EXPANSION



- ▲ Potholes Substation
- City
- Wenatchee District

1958



POTHOLES SUBSTATION



NORTH
REGION

WENATCHEE
DISTRICT

POTH / 1792 N Frontage Road NE, Moses Lake, WA 98837 / Grant County

HISTORIC PAINT: 1956 SCHEME

History

Potholes Substation was constructed approximately 6 miles west of Moses Lake, Grant County, Washington, to serve Grant County. The substation was necessary to meet rapidly increasing power loads of the Grant County PUD, U.S. Bureau of Reclamation, and Washington Water Power Company. Work on the Substation began in 1957, when BPA contracted with Westinghouse Electric Corporation of Portland, Oregon, for \$876,670 to install three autotransformers. Skeva Construction Company of Spokane, Washington, was awarded \$60,985 to construct the Substation's Control House, designed by BPA architects C. Tetherow and Dean Wright. By 1958, the Substation was planned for integration into the Midway–Coulee transmission line No. 1 to increase the power supply in the Columbia Basin area. A major grid addition noted in BPA's 1959 annual report was the 115 kV transmission line between

Potholes Substation and Sand Dunes near Moses Lake to “meet the rapid growth of the Columbia reclamation area in Washington” (Bonneville Power Administration, 1959).

Significance

Potholes Substation reflects BPA’s expansion of its transmission system in the Pacific Northwest during BPA’s System Expansion Period (1946–1974). However, the Substation is ineligible for the NRHP due to the removal of 50 percent of the original switchyard. The Control House is individually significant under NRHP Criterion C in the area of Architecture for embodying the distinctive characteristics of BPA’s early iterations of the Modern architectural style and is representing BPA’s Type 113 design. The building represents the only remaining example of this design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-800 CONTROL HOUSE	1958	Tier I - Contributing/Individually Eligible
SWITCHYARD	1958	X - Non-contributing
Z-0000 CABLE TUNNEL	1958	X - Contributing Feature of Switchyard

TIER I Z-800 CONTROL HOUSE 1958

Building Style: Modern, BPA Standard Type 113

Exterior Characteristics:

One story, stepped flat roof with aluminum cornice, wide overhanging eaves with exposed tapered rafter tails and wide aluminum fascia, cement plaster finish with grid pattern, multi-pane metal windows, aluminum canopy at north side.



Interior Characteristics:

Original light fixtures



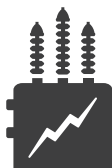
Historic drawing.

TIER I
SYSTEM
EXPANSION



- ▲ Sickler Substation
- City
- Wenatchee District

1968



SICKLER SUBSTATION



NORTH
REGION

WENATCHEE
DISTRICT

SCLR/SCHQ / 13294 Lincoln Park Road, East Wenatchee, WA 98802 / Douglas County

HISTORIC PAINT: SCHEME A

History

Barclay J. Sickler Substation was constructed near the Rocky Reach Dam site approximately 7 miles northeast of Wenatchee, Douglas County, Washington, to increase service to northwestern Washington. By 1967, construction was underway for the 127-mile, 500 kV Sickler–Raver–Covington transmission line. The line integrated generation from the Douglas County PUD's Wells Dam into the BPA system and added capacity to serve new loads in northwestern Washington. At the same time, BPA was constructing the 45-mile, 500 kV Chief Joseph–Sickler transmission line. In conjunction with the Chief Joseph–Monroe line, the Chief Joseph–Sickler line provided increased peaking power and energy to coastal load centers and helped integrate the third powerhouse at Grand Coulee Dam into the BPA grid. The architecture firm of Barnard & Holloway designed the Substation Control House. In 1972, BPA contracted with Prime Construction Company of Seattle for \$448,000 for a new substation

maintenance building. Sickler Substation was named after BPA executive Barclay J. Sickler (1905–1950), who improved the rate structure for the Pacific Northwest's sale of federal power. Sickler worked as chief statistician for the Federal Communications Commission before joining BPA in August 1939 as chief with the rates and statistics section. After World War II, he was appointed assistant power manager.

Significance

Sickler Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided increased power supplies to growing populations in northwestern Washington and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture for exemplifying an International-style control house and expressing BPA's beauty design concepts. The Control House also represents the only example of BPA's Standard Type 2006 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-713 CONTROL HOUSE	1969	Tier I - Contributing/Individually Eligible
SWITCHYARD	1969	Tier II - Contributing
Z-534 ENGINE GENERATOR BUILDING	1975	X - Non-contributing
Z-673 MAINTENANCE	1975	X - Non-contributing
Z-7828 STORAGE - WASTE	1985	X - Non-contributing
Z-1059 STORAGE	1985	X - Non-contributing
Z-7829 STORAGE - FLAMMABLE	1995	X - Non-contributing
Z-7830 STORAGE - SRU #1	1995	X - Non-contributing

TIER I Z-713 CONTROL HOUSE 1969

Building Style: International, BPA Standard Type 2006

Exterior Characteristics:

One story, asymmetrical plan, stepped flat roof, asbestos cement board panel siding with extruded aluminum mullions, flush aluminum windows, aluminum doors.



Interior Characteristics: Metal wall registers, original control equipment

TIER II SWITCHYARD 1969

Characteristics: Flat gravel yard, chain-link fence, concrete paths, and aluminum storage sheds. 230 kV and 500 kV equipment includes multi-part dead-end towers, power transformers, potential transformers, gas circuit breakers, oil tanks, reactor, and buswork.



TIER II
SYSTEM
EXPANSION



- Teanaway Microwave Radio Station
- City
- Wenatchee District

1954



TEANAWAY MICROWAVE RADIO STATION



NORTH
REGION

WENATCHEE
DISTRICT

TEAN / Kittitas County, Washington

History

The Teanaway Microwave Radio Station was constructed in 1954 as part of Snohomish–Beverly, BPA's third microwave communication circuit. This circuit extended between the Snohomish and Beverly Microwave Radio Stations in Washington and established a connection with the Ross–Spokane circuit. The circuit provided direct routing for protective relay channels associated with transmission lines crossing the northern Cascade mountain range. By connecting with the Ross–Spokane circuit via the Beverly Microwave Radio Station, this link completed a loop that allowed alternate routing to a large number of microwave radio stations in the event of equipment failure at any point on the circuit.

BPA historic photographs indicate the site was surveyed as early as May 1951. Construction of the Teanaway Station appears to have begun by October 1953 and was near completion by May 1954. BPA internal records indicate BPA used eminent domain to expropriate perpetual easements for the site and associated power lines. In May 1958, BPA acquired an easement from the Northern Pacific Railway Company for \$577.42, to construct and maintain access roads along the microwave power service lines.

Significance

The Teanaway Microwave Radio Station is significant under Criterion A for its significance in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Teanaway, Washington, area. The period of significance for the Station is 1954, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-860 RADIO 1954

Building style: Modern, BPA Standard Type 1610

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



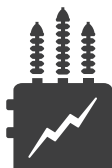
TIER II
SYSTEM
EXPANSION



- ▲ Valhalla Substation
- City
- Wenatchee District



1953



VALHALLA SUBSTATION



NORTH
REGION

WENATCHEE
DISTRICT

VALH / 4101 Colockum Road, Malaga, WA 98828 / Chelan County

HISTORIC PAINT: 1950 SCHEME

History

Valhalla Substation was constructed near the Columbia River's south shore in Malaga, approximately 11 miles southeast of Wenatchee, Chelan County, Washington. The Substation powered the ALCOA aluminum reduction plant near Wenatchee. This ALCOA plant was one of nine aluminum facilities operated in the Pacific Northwest. ALCOA also had plants in Vancouver, Troutdale, and Spokane. BPA began planning for the Valhalla Substation in 1951 when ALCOA announced upcoming installation of a "four pot line" aluminum reduction plant (*La Grande Observer*, 1951). Congress supplied BPA with \$3,672,000 to build transmission facilities for the new plant. The allocation financed the 150 kV Valhalla Substation and two 115 kV transmission lines from Columbia Substation. BPA contracted with E. E. Settergreen of Portland, Oregon, for \$107,630 to build the Substation Control House and Oil House. Later, in 1974, the Chelan County PUD began construction of a second powerhouse at the Rock Island Dam. The powerhouse project involved construction of a 115 kV line to BPA's Valhalla Substation.

Significance

Valhalla Substation is significant under Criterion A in the areas of Government and Industry for powering the adjacent ALCOA aluminum plant. The substation reflects BPA's critical role in the regional aluminum industry and the extension of its transmission facilities during the System Expansion Period (1946–1974). The control house represents the only example of BPA's Standard Type 135 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-886 CONTROL HOUSE	1953	Tier II - Contributing
Z-885 OIL HOUSE	1953	Tier II - Contributing
SWITCHYARD	1953	Tier II - Contributing
Z-0000 CABLE TUNNEL	1953	Contributing Feature of Switchyard

TIER II Z-886 CONTROL HOUSE 1953

Building Style: Modern,
BPA Standard Type 135

Exterior Characteristics:

One story, concrete construction, flat roof with parapet, glass and metal entrance with concrete canopy.



Interior Characteristics:

Brass wall registers, pendant globular light fixtures

TIER II Z-885 OIL HOUSE 1953

Building Style: Utilitarian,
BPA Standard Type Oil House

Exterior Characteristics:

One story, semi-subterranean, rectangular plan, flat roof, concrete retaining walls, metal multi-pane windows, sconce



Interior Characteristics: Original light fixtures

TIER II SWITCHYARD 1953

Characteristics: Flat gravel yard, chain-link fence, concrete paths, historic lampposts and light fixtures, cable tunnel, aluminum storage sheds, and connection to adjacent ALCOA aluminum plant. 115 kV equipment includes dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, oil tank, and buswork.



TIER II
SYSTEM
EXPANSION



- ▲ Vantage Substation
- City
- Wenatchee District

1963



VANTAGE SUBSTATION



NORTH
REGION

WENATCHEE
DISTRICT

VANT / 14351 Highway 243, Beverly, WA 99321 / Grant County

HISTORIC PAINT: 1956 SCHEME

History

Vantage Substation was constructed in Vantage, Grant County, Washington, to integrate power from the Hanford atomic steam plant into BPA's main grid. In December 1961, Pacific Power and Light Company (Pacific Power) contracted for BPA to deliver power into the Pacific Power system from the Wapnum project along the Columbia River in Washington state. BPA incorporated the power into its grid at Vantage Substation and transmitted it by "exchange and displacement" to more than 25 delivery points where the BPA and Pacific Power systems interconnected (*Corvallis Gazette-Times*, 1961). The 45-year contract between BPA and Pacific Power set a precedent for similar contracts where BPA had sufficient reserve capacity on its grid, and the regional utilities had large blocks of new power for delivery to distant or dispersed load centers. Three

years after BPA and Pacific Power entered into the power delivery contract, Brandon Company, Inc., of Vancouver, Washington, installed two power circuit breakers at the Vantage Substation. The Hanford atomic steam plant, constructed by Washington Public Power Supply System, began providing power to the BPA system in April 1966. The plant's output flowed through the Vantage Substation and then over the region's first 500 kV line to Covington, Washington, to power the Puget Sound area.

Significance

Vantage Substation is significant under Criterion A in the area of Government for delivering power from the Hanford atomic steam plant to BPA transmission facilities that supplied the Puget Sound area. The Substation reflects BPA's use of alternative energy sources during the System Expansion Period (1946–1974). The Control House represents the only remaining example of BPA's Standard Type 115 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-754 CONTROL HOUSE	1964	Tier II - Contributing
Z-411 STORAGE	1967	X - Non-contributing
Z-725 MAINTENANCE	1968	Tier II - Contributing
Z-545 ENGINE GENERATOR BUILDING	1974	Tier II - Contributing
SWITCHYARD	1964	Tier II - Contributing

TIER II Z-754 CONTROL HOUSE 1964

Building Style: Modern, BPA Standard Type 115

Exterior Characteristics:

One story, concrete construction, flat roof, cement plaster finish with grid pattern, multi-pane windows, concrete canopy.

Interior Characteristics:

Original light fixtures



TIER II Z-725 MAINTENANCE 1968

Building Style: Utilitarian

Exterior Characteristics:

Tall one story, rectangular plan, concrete masonry unit construction, flat roof, metal windows, metal multi-panel overhead door, projecting concrete surround, concrete canopy, sconces.



TIER II Z-545 ENGINE GENERATOR BUILDING 1974

Building Style: Utilitarian

Characteristics: One story, rectangular plan, metal panel construction, low-pitch front-gable roof, metal door.



TIER II SWITCHYARD 1964, expanded circa 1968

Characteristics: kV equipment includes multi-part dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers, oil tanks, and buswork.



Light detail.



Historic photo.



Historic photo.

TIER II
SYSTEM
EXPANSION

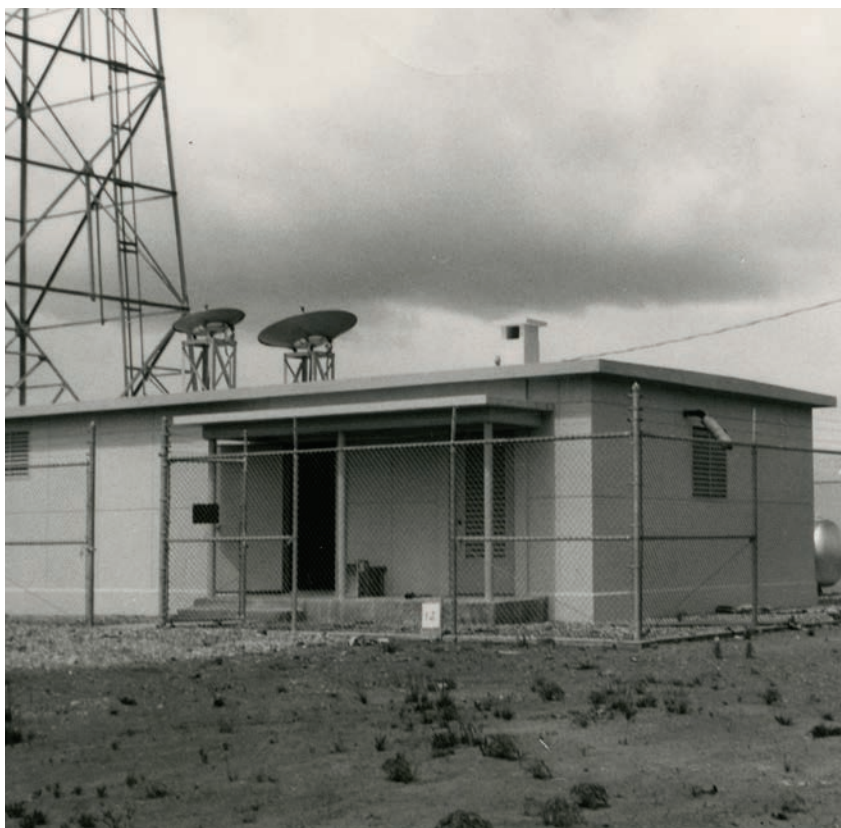


- Waterville Microwave Radio Station
- City
- Wenatchee District

1953



WATERVILLE MICROWAVE RADIO STATION



NORTH
REGION

WENATCHEE
DISTRICT

WATR / Douglas County, Washington

History

The Waterville Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave communication circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee and other intermediate substations. The circuit was the first microwave installation to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. On March 21, 1950, BPA acquired the Waterville Microwave Radio Station site from private landowners Andrew and Merle Janssen for \$25. BPA historic photographs indicate that the Waterville Station was complete or near completion by September 1953.

Significance

The Waterville Microwave Radio Station is significant under Criterion A for its significance in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Waterville, Washington, area. The period of significance for the Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-882 RADIO 1953

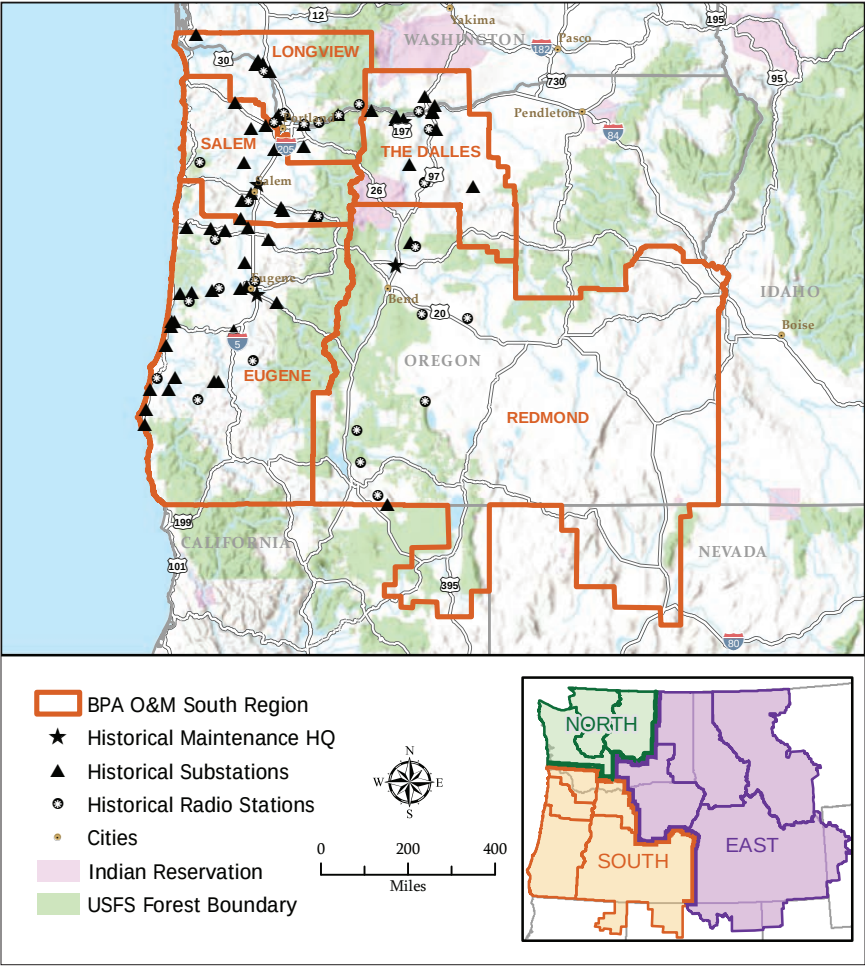
Building style: Modern,
BPA Standard Type 1606

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice

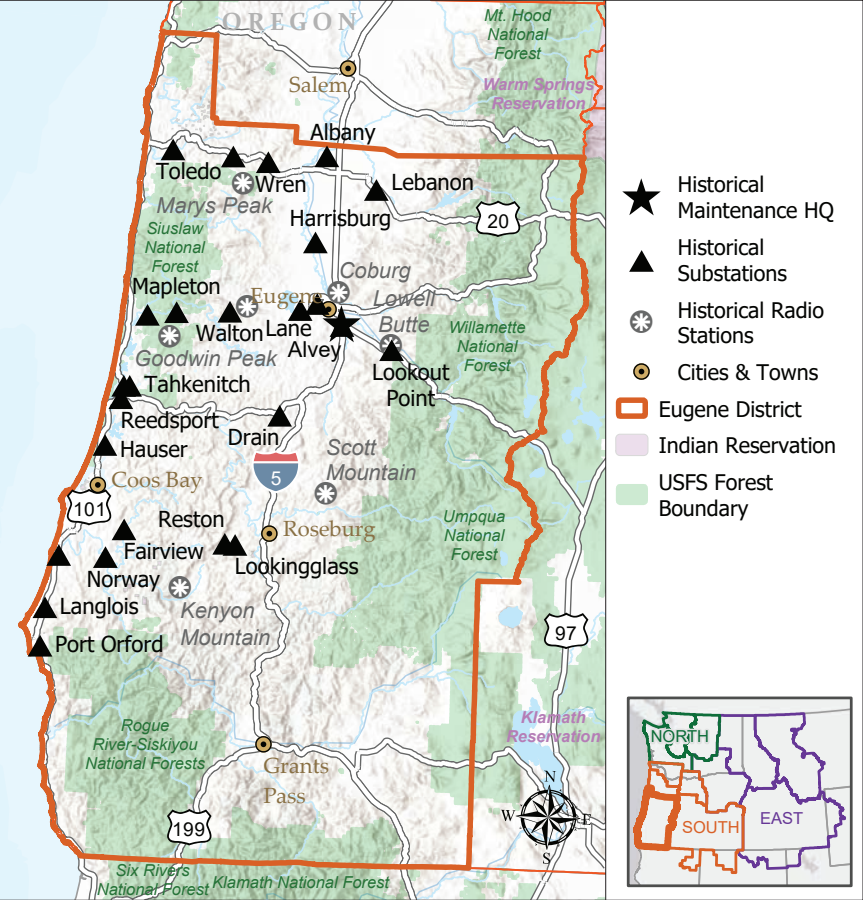


SOUTH REGION



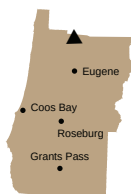
DISTRICT	PAGE
EUGENE.....	148
LONGVIEW.....	202
REDMOND	244
SALEM.....	248
THE DALLES	282

EUGENE DISTRICT



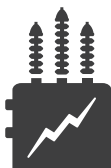
LOCATION	HISTORICAL SIGNIFICANCE
Albany Substation	TIER II
Alvey Substation and Maintenance Headquarters.....	TIER I
Bandon Substation.....	X
Burnt Woods Substation	TIER I
Coburg Microwave Radio Station	X
Drain Substation	X
Eugene Substation	TIER I
Fairview Substation	TIER I
Gardiner Substation	TIER I
Goodwin Peak Microwave Radio Station.....	TIER II
Harrisburg Substation	TIER III
Hauser Substation.....	TIER III
Kenyon Mountain Microwave Radio Station	X
Lane Substation	TIER II
Langlois Substation.....	TIER I
Lebanon Substation	X
Leneve Microwave Radio Station.....	X
Lookingglass Substation.....	TIER III
Lookout Point Substation.....	TIER I
Mapleton Substation	X
Marys Peak Microwave Radio Station	TIER II
Norway Substation	TIER III
Noti Microwave Radio Station.....	TIER II
Port Orford Substation	X
Reedsport Substation	TIER II
Reston Substation.....	TIER II
Scott Mountain Microwave Radio Station.....	X
Tahkenitch Substation	TIER II
Toledo Substation.....	TIER I
Walton Substation	TIER I
Wendson Substation	TIER II
Wren Substation	TIER II

TIER II
SYSTEM
EXPANSION



- ▲ Albany Substation
- City
- Eugene District

1954



ALBANY SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

ALBA / 2102 Queen Avenue SW, Albany, OR 97321 / Linn County

HISTORIC PAINT: 1950 SCHEME

History

Albany Substation was originally activated in Albany, Linn County, Oregon, in 1942 as a temporary substation. BPA converted it into a permanent substation in 1954 after funding became available. The Albany Substation served the Benton–Lincoln Electric Cooperative and enabled BPA's first sale of power to a cooperative power distribution agency organized under the Rural Electrification Administration. Substation construction began in August 1940 on the Henderson property, with 40 workers erecting the temporary substation facilities. An old house on the property served as a provisional office. The Albany substation would initially supply 950 farms and homes with electricity for \$2.50 per month for 30 kilowatt hours or less, with additional kilowatthours charged at about 1 to 3 cents. In late 1940, BPA installed the substation transformer, fabricated at the General Electric plant in Pittsfield, Massachu-

setts, and energized the Benton–Lincoln Electric Cooperative transmission lines. BPA continued to improve service provided by the Albany Substation with substation upgrades and expansion and through construction of new transmission lines.

Significance

Albany Substation is significant under NRHP Criterion A in the area of Government. The Substation’s establishment provided reliable power to growing populations in the Willamette Valley and on the Oregon Coast and reflects BPA’s expansion of its transmission system in the Pacific Northwest during BPA’s System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-151 MAINTENANCE	1951	X - Non-contributing
Z-939 CONTROL HOUSE	1954	Tier II - Contributing
SWITCHYARD	1942/1954	Tier II - Contributing

TIER II Z-939 CONTROL HOUSE 1954

Building style: Minimal
raditional

Exterior Characteristics: One
story, T-shaped plan, side-gable
roof, exposed rafter tails

Interior Characteristics:
Historic circular glass globes
and metal dome lamps



TIER II SWITCHYARD 1942, expanded in 1954, and capacitor banks added circa 1963

Characteristics: Flat, L-shaped
gravel yard, chain-link fence,
two areas with 115 kV and 230
kV equipment. Southwest area
contains dead-end towers,
power transformers, current
transformers, potential trans-
formers, gas circuit breakers,
buswork, and capacitor banks.
Northwest area contains multi-part dead-end tower, power transformer, gas, oil,
and vacuum circuit breakers, potential transformers, and buswork.



TIER I
SYSTEM
EXPANSION



- ★ Alvey Substation & Maintenance HQ
- City
- Eugene District



1950



ALVEY SUBSTATION AND MAINTENANCE HEADQUARTERS



SOUTH
REGION

EUGENE
DISTRICT

ALVY/ALVM / 86000 Highway 99 S, Eugene, OR 97405 / Lane County

HISTORIC PAINT: 1956 SCHEME

History

J. P. Alvey Substation and Maintenance Headquarters (Alvey Substation) was previously known as the Goshen Substation and was built about 6 miles southeast of Eugene, Lane County, Oregon. The Alvey Substation distributed power throughout southwestern Oregon, primarily Eugene, Springfield, and coastal areas. BPA anticipated that the Alvey Substation would be the third largest substation in the system and would promote industrial development in the Eugene–Springfield area. BPA purchased the 33-acre substation site from George A. Mounts and began construction in 1950, with installation of a 6,000 kV transformer to supply power to Lane County Cooperative and the Meridian Dam construction site. The modern \$3 million Control House was “designed in glass and bright metal finish, a functional and modernistic structure in keeping with the modern power theme.” The building design reflected

BPA's concern about its resources contributing to "the general attractiveness of the surroundings" (*The Register-Guard*, 1950). The substation was named in honor of John Perry Alvey (1885–1949), one of BPA's original engineers.

Significance

Alvey Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to cities and communities in southwestern Oregon, primarily Eugene, Springfield, and coastal communities. The Maintenance Headquarters has served as an operations and maintenance facility for BPA's Eugene district. Collectively, the district reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture. The building's unique design is exemplary of its property type and the International architectural style design concepts deployed by the BPA during its System Expansion Period. The building also represents the only remaining example of BPA's Standard Type 180 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-945 CSE BUILDING	1951	Tier II - Contributing
Z-948 CONTROL HOUSE	1952	Tier I - Contributing/Individually Eligible
Z-944 MAINTENANCE	1952	Tier II - Contributing
Z-943 AUTOMOTIVE SHOP	1953	Tier II - Contributing
Z-312 ENGINE GENERATOR BUILDING	1957	Tier II - Contributing
Z-771 AUTOMOTIVE STORAGE	1959	Tier II - Contributing
SWITCHYARD	1952	Tier II - Contributing
Z-0000 TRANSFER TRACK	1952	Tier II - Contributing
Z-0000 STORAGE SHED	1962	X - Non-contributing
Z-630 MAINTENANCE STORAGE	1980	X - Non-contributing
Z-622 FLAMMABLE STORAGE	1986	X - Non-contributing
Z-606 MAINTENANCE HEADQUARTERS	1989	X - Non-contributing
Z-607 HMEM GARAGE	1989	X - Non-contributing
Z-608 TOOL ROOM STORAGE	1989	X - Non-contributing
Z-1336 MODULAR BUILDING	1992	X - Non-contributing
Z-7914 STORAGE - HAZARDOUS MATERIALS	1993	X - Non-contributing
Z-1325 RELAY HOUSE - 500KV	1994	X - Non-contributing
Z-7913 STORAGE	1997	X - Non-contributing
Z-1521 OEP SHED	2014	X - Non-contributing

TIER II Z-945 CSE BUILDING 1951

Building style: Utilitarian

Exterior Characteristics: One story, rectangular plan, concrete masonry unit siding with stucco finish, concrete water table



TIER I Z-948 CONTROL HOUSE 1952

Building style: International, BPA Standard Type 180

Exterior Characteristics: One story, bi-level flat roof, metal siding, multi-lite fixed metal windows (painted over), large spans of glass, recessed entrance with transom window



Interior Characteristics: Original square wood panel walls, historic metal dome light fixture

TIER II Z-944 MAINTENANCE 1952

Building style: Utilitarian

Exterior Characteristics: One story, rectangular, concrete and corrugated metal panels, side-gable roof section and flat roof section, multi-pane metal windows



Interior Characteristics:
Original square wood panel walls, historic metal dome light fixture

TIER II Z-943 AUTOMOTIVE SHOP 1953

Building style: Utilitarian

Exterior Characteristics: One story, rectangular plan, flat roof, symmetrically spaced vehicle bays, large multi-pane windows, garage doors with square multi-pane windows and wood panels



Interior Characteristics:
Historic metal dome light fixture

TIER II Z-312 ENGINE GENERATOR BUILDING 1957

Building style: Utilitarian

Exterior Characteristics:

Small, one story, prefabricated metal panel construction, shed roof clad in standing seam sheet metal, metal door with three-pane inset window

Interior Characteristics:

Historic metal dome light fixture



TIER II Z-771 AUTOMOTIVE STORAGE 1959

Building Style: Utilitarian

Exterior Characteristics: One story, flat roof, corrugated metal siding, symmetrically spaced vehicle bays.

Interior Characteristics:

Historic metal dome light fixture



TIER II SWITCHYARD 1952, expanded 1955, 1959, 1961, 1966, and circa 1971

Characteristics: Flat, rectangle-shaped gravel yard; chain-link fence; concrete paths; 115 kV, 230 kV, and 500 kV equipment in two main areas divided by transfer track with transfer cart and driveway. West area includes multi-part dead-end towers, gas and oil circuit breakers, potential transformers, current transformers, and buswork. Power transformers and buswork north and south of control house; oil tanks to south.



TIER II Z-0000 TRANSFER TRACK 1952

BPA Standard Type: Rails

Characteristics: Steel rails extending to Oregon & California Railroad spur

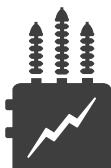


TIER I
SYSTEM
EXPANSION



- ▲ Burnt Woods Substation
- City
- Eugene District

1954



BURNT WOODS SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

BUWD / 266 Clem Road, Blodgett, OR 97326 / Benton County

HISTORIC PAINT: 1950 SCHEME

History

Burnt Woods Substation was constructed near Burnt Woods, Lincoln County, Oregon, to serve customers of local public utility districts. Two years earlier, in July 1952, BPA had announced \$27 million in western Oregon projects, including construction of the Burnt Woods Substation along transmission lines serving the Benton–Lincoln Electric Cooperative (later known as Consumers Power, Inc.). BPA awarded the Substation construction contract for \$12,976 to Walton Brown Electric Company of Salem, Oregon. Upon completion, the substation connected to the 115 kV Albany–Toledo transmission line, which improved service to Coos Bay and central Lincoln County.

Significance

Burnt Woods Substation is significant under NRHP Criterion A in the area of government. The Substation’s establishment provided reliable power to the local public utility district for distribution to communities in the Willamette Valley and reflects BPA’s expansion of its transmission system in the Pacific Northwest during BPA’s System Expansion Period (1946–1974). The Control House is individually eligible under NRHP Criterion C in the area of Architecture as an exemplary representation of the BPA’s Standard Type 191 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-213 CONTROL HOUSE	1954	Tier I - Contributing/Individually Eligible
SWITCHYARD	1954	Tier II - Contributing

TIER I Z-213 CONTROL HOUSE 1954

Building style: Utilitarian,
BPA Standard Type 191

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, metal door.

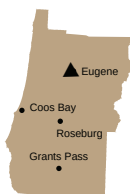


TIER II SWITCHYARD 1954

Characteristics: Small, flat,
gravel yard; chain-link fence;
and 115 kV equipment, includ-
ing steel superstructure, one
power transformer, current
transformers, potential trans-
former, oil circuit breaker, and
buswork.

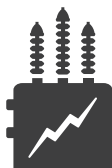


TIER I
MASTER
GRID



- ▲ Eugene Substation
- City
- Eugene District

1941



EUGENE SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

EUGE / 1305 Highway 99N, Eugene, OR 97402 / Lane County

HISTORIC PAINT: 1950 SCHEME

History

Eugene Substation was constructed in Eugene, Lane County, Oregon, as the terminus for the Vancouver–Eugene 115 kV transmission line serving the Eugene vicinity. The Eugene Substation was one of BPA's first four master grid substations. In 1946, BPA increased power delivery to the city of Drain and Douglas Electric Cooperative by installing a new transformer at the Eugene Substation. The new 33 kV Eugene–Drain transmission line completed by Douglas Electric Cooperative provided a second point of delivery for BPA power to the Lane County Electric Cooperative. The Lane County agency supplied electricity to Cottage Grove, Fox Hollow, and the Creswell vicinity. In 1954, BPA contracted with Western Electrical Construction Company for installation of a second large-capacity transformer at the Eugene Substation to relieve winter peak power loads for the Eugene Water & Electric Board.

Significance

Eugene Substation is significant under NRHP Criterion A in the areas of Commerce and Industry. The Substation’s establishment impacted business and industrial development throughout the region, particularly the Eugene area. The Substation also reflects BPA’s initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). The Control House is individually significant under Criterion C in the area of Architecture as an excellent example of a Streamline Moderne style control house. The building represents the only remaining example of BPA’s Standard Type 100 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-940 CONTROL HOUSE	1941	Tier I - Contributing/Individually Eligible
Z-941 STORAGE	1952	Tier II - Contributing
Z-287 STORAGE SHED	1952	Tier II - Contributing
SWITCHYARD	1941	Tier II - Contributing

TIER I Z-940 CONTROL HOUSE 1941

Building style: Streamline Moderne, BPA Standard Type 100

Exterior Characteristics: One story, concrete construction, flat roof with parapet, curved walls at main entrance, curved metal railing, original brass signage above entrance “Columbia River Power Eugene Substation,” original brass signage adjacent to entrance “Bonneville Power Administration.”



Interior Characteristics: Brass wall registers, brass thermostats

TIER II Z-941 STORAGE 1952

Building style: Utilitarian, BPA Standard Type 1

Exterior Characteristics: One story, rectangular plan, concrete masonry unit construction, flat roof, fixed metal window.



TIER II Z-287 STORAGE SHED 1952

Building style: Utilitarian, BPA Standard Type 6'-8"x8'-0"

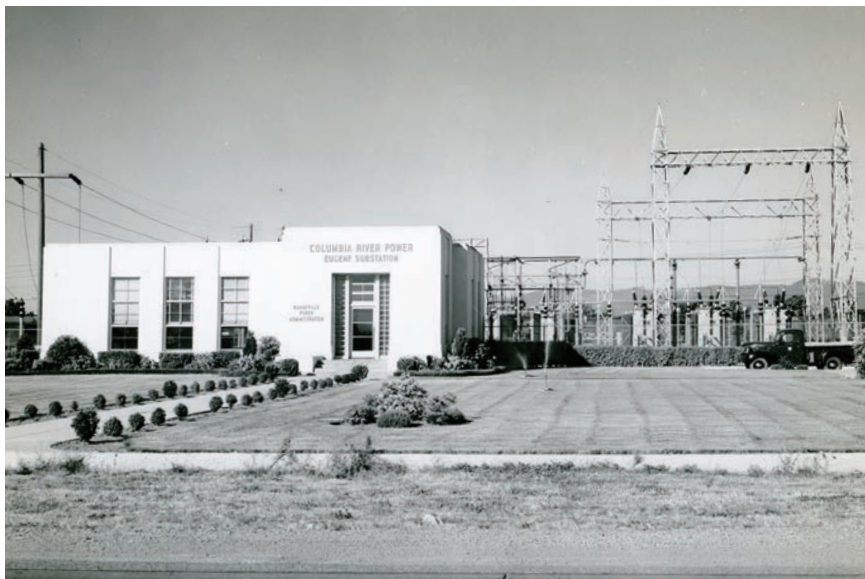
Exterior Characteristics: One story, rectangular plan, metal panel construction, shed roof clad in corrugated metal panels, metal door



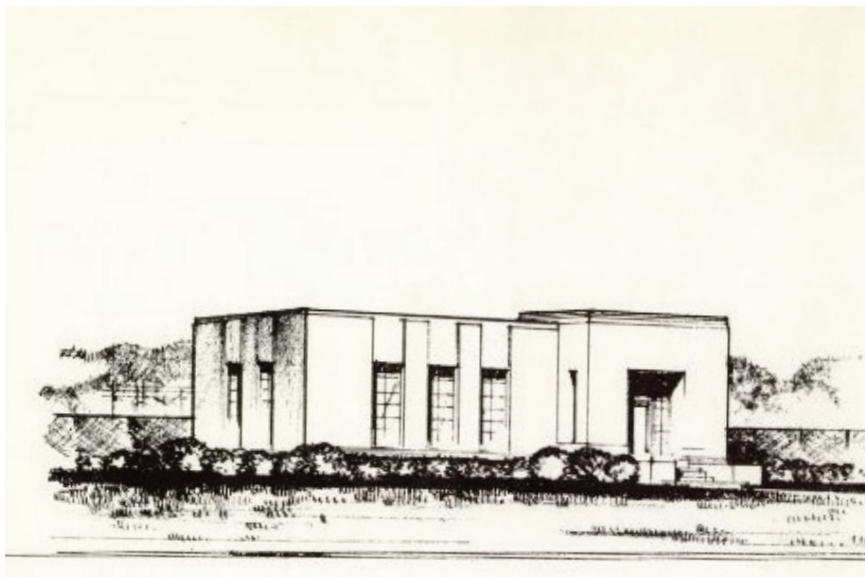
TIER II SWITCHYARD 1941, expanded circa 1966

Characteristics: Flat gravel yard, chain-link fence, concrete paths, 115 kV equipment, including original steel superstructure, dead-end towers with original light fixtures, power transformers, potential transformers, current transformers, oil and gas circuit breakers, buswork.



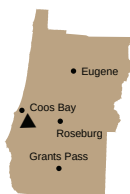


Historic photo.



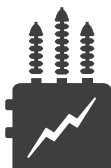
Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ Fairview Substation
- City
- Eugene District

1958



FAIRVIEW SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

FAVW / 96872 Lone Pine Lane, Coquille, OR 97423 / Coos County

HISTORIC PAINT: 1956 SCHEME

History

Fairview Substation was constructed approximately 7 miles east of Coquille, Coos County, Oregon, to increase power delivery to southwest Oregon. In 1956, BPA announced the new 230 kV Alvey–Reston–Fairview transmission line that would transmit power generated at McNary Dam from Alvey Substation to Fairview and help provide increased capacity and loop service for all southwest Oregon BPA power loads. The new transmission facilities, completed in 1958, constituted the primary power source for the southwest Oregon Coast. BPA contracted with George S. Smith of Bothell, Washington, for \$158,153 to build the Fairview Substation. The final cost of the Substation was \$1.75 million. Upon completion of its final transmission link, the Fairview Substation became the largest transmission facility in the region. In 1963, BPA initiated work on the 230 kV Reston–Fairview No. 2 transmission

line to increase power delivery to coastal customers of the Central Lincoln Peoples' Utility District, Douglas Electric Cooperative, Pacific Power and Light Company, the city of Bandon, and Coos–Curry Electric Cooperative. Using BPA power, Central Lincoln Peoples' Utility District serves portions of Lincoln, Lane, Douglas, and Coos counties and supports thousands of jobs in the tourism, fishing, and forest products industries. The Georgia Pacific paper mill is the utility district's largest load.

Significance

Fairview Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to coastal communities in Oregon and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is also individually significant under Criterion C in the area of Architecture for its reflection of BPA's use of standardized designs in substation development. The building represents the best version of BPA's Standard Type 111 control house design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-807 CONTROL HOUSE	1958	Tier I - Contributing/Individually Eligible
Z-378 STORAGE	1958	Tier II - Contributing
Z-381 STORAGE (OLD OIL HOUSE)	1958	Tier II - Contributing
SWITCHYARD	1958	Tier II - Contributing

TIER I Z-807 CONTROL HOUSE 1958

Building style: Modern, BPA Standard Type 111

Exterior Characteristics: One story, bi-level flat roof, concrete finish with grid pattern, multi-pane steel windows, recessed entrance



TIER II Z-378 STORAGE 1958

Building style: Utilitarian

Exterior Characteristics: One story, rectangular plan, metal panel construction, flat roof, metal doors



TIER II Z-381 STORAGE (OLD OIL HOUSE) 1958

Building style: Utilitarian

Exterior Characteristics: One story, rectangular plan, metal panel construction, front-gable roof, metal windows, metal doors.

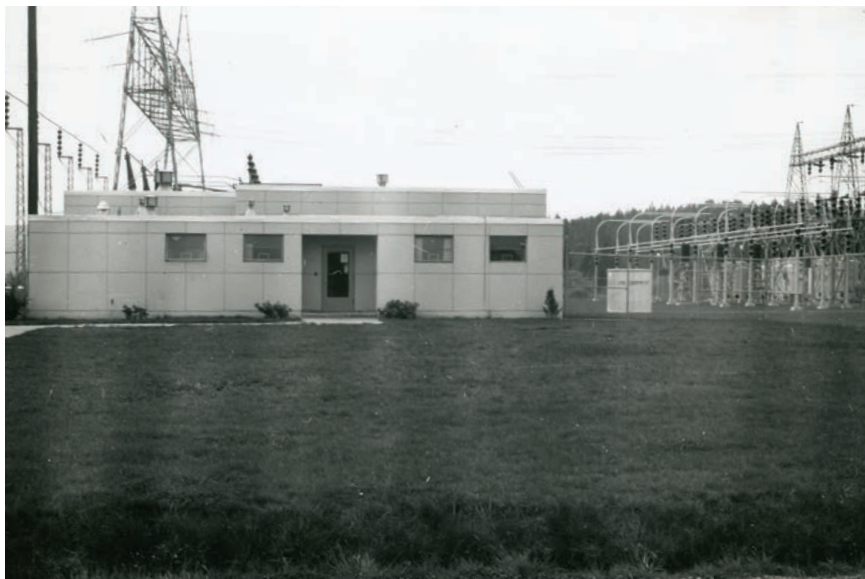


TIER II SWITCHYARD 1958, expanded circa 1968 and circa 1972

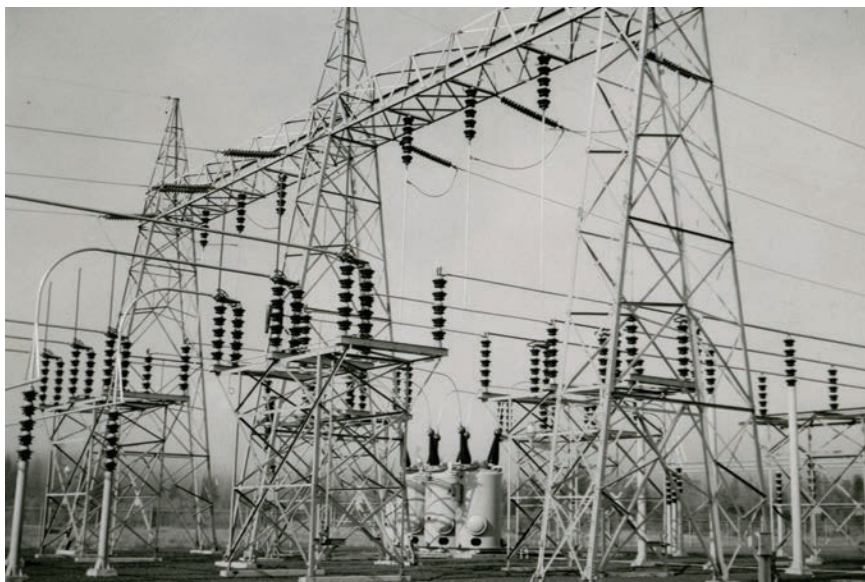
Building style: Utilitarian

Characteristics: Flat gravel yard, chain-link fence, concrete paths, light posts. 115 kV and 230 kV equipment includes multi-part dead-end towers with original light fixtures, power transformers, potential transformers, current transformers, oil and gas circuit breakers, oil tanks, capacitor bank, and buswork.



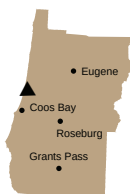


Historic photo.



Historic photo.

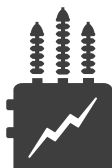
TIER I
SYSTEM
EXPANSION



- ▲ Gardiner Substation
- City
- Eugene District



1964



GARDINER SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

GARD / 77624 US-101, Gardiner, OR 97441 / Douglas County

HISTORIC PAINT: 1956 SCHEME

History

Gardiner Substation was constructed north of Gardiner, Douglas County, Oregon, as part of a \$5.5 million BPA system expansion, intended to meet rising power demand at the central Oregon Coast. BPA designed Gardiner Substation as an initial step toward serving coastal industries, including the proposed International Paper Corporation mill, and normal area load growth through power delivery to the Douglas Electric Cooperative and Central Lincoln Peoples' Utility District. BPA planned to contract for construction of both the Gardiner and Tahkenitch substation facilities, which would be linked, in spring 1963. That year, work began on the proposed 115 kV Tahkenitch–Gardiner transmission line. BPA contracted with Lebanon Electric Company of Lebanon, Oregon, for \$17,201 to construct the Gardiner Substation, including “foundations, conduit system and grounding system, assembly and erection of steel

structures, station equipment, aluminum and copper bus, ground wires and lighting fixtures, surfacing of switchyard parking area and entrance road, and painting station equipment" (*News-review*, 1963).

Significance

Gardiner Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the local public utility district for distribution to communities on the southern Oregon Coast and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture for exemplifying BPA's Standard Aluminum Control House Type 193 design. The building is the best example of this design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-363 CONTROL HOUSE	1964	Tier I - Contributing/Individually Eligible
SWITCHYARD	1963	Tier II - Contributing
Z-7754 STORAGE SHED	1964	X - Non-contributing
Z-7755 STORAGE SHED	1995	X - Non-contributing

TIER I Z-363 CONTROL HOUSE 1964

Building style: Utilitarian, BPA Standard Type 193

Exterior Characteristics: One story, rectangular plan, metal panel construction, flat roof, metal doors.



TIER II SWITCHYARD 1964

Building style: Utilitarian

Characteristics: Flat gravel yard, chain-link fence, two aluminum storage sheds. 115 kV equipment includes steel lattice superstructure, dead-end towers, one power transformer, potential transformers, oil and vacuum circuit breakers, oil tank, and buswork.



TIER II
SYSTEM
EXPANSION



- Goodwin Peak Microwave Radio Station
- City
- Eugene District

1953



GOODWIN PEAK MICROWAVE RADIO STATION



SOUTH
REGION

EUGENE
DISTRICT

GWIN / Douglas County, Washington

History

During the 1940s and 1950s, BPA served Oregon's South Coast area with a 115 kV transmission line, the area's only large-scale power source. Before BPA installed its coastal microwave link in 1954, intense coastal storms and flooding could leave the isolated area between Coos Bay and Gold Beach without power for extended periods. BPA's transmission line maintenance crews, using medium frequency (MF) radio sets in the field, were capable of only intermittent contact with each other and with the Alvey substation near Eugene. The communication system was clearly inadequate to address local line failures. In the fall of 1950, BPA began investigating how to replace MF channels with very high frequency (VHF) channels and repeater stations to facilitate reliable communication between coastal BPA substations and field maintenance crews.

The southwest Oregon microwave link connected to the BPA microwave communication system at the Coburg Microwave Radio Station and extended south along the coastline to the Cape Blanco Microwave Radio Station. Each station in the southwest Oregon link was specifically designed to withstand the most severe local weather and maintain system reliability. By 1955, the system was operational more than 97 percent of the time, a substantial improvement from the earlier MF system. BPA historic photographs indicate BPA began surveying the Goodwin Peak site as early as May 1952. At that time, the site was also used by the U.S. Forest Service (USFS), which owned a lookout tower and cabin adjacent to the site. The Station appeared complete or near completion by December 1953. Once finished, the Station provided communications to the Mapleton and Florence Substations and highway coverage from Greenleaf to Winchester Bay.

Significance

The Goodwin Peak Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Mapleton, Oregon, area. The period of significance for the Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-240 RADIO 1953

Building style: Utilitarian,
BPA Standard Type 1503

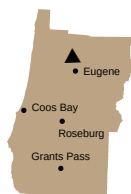
Characteristics: One-story
aluminum-panel control building;
nearly flat roof; two entrances
with separate access to radio
equipment and emergency
power rooms; no windows.

Tower: 4-leg steel lattice



TIER III

**SYSTEM
EXPANSION**

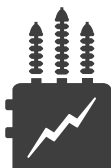


▲ Harrisburg Substation

• City

■ Eugene District

1946



HARRISBURG SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

HARB / 30195 Substation Road, Harrisburg, OR 97446 / Linn County

HISTORIC PAINT: 1950 SCHEME

History and Significance

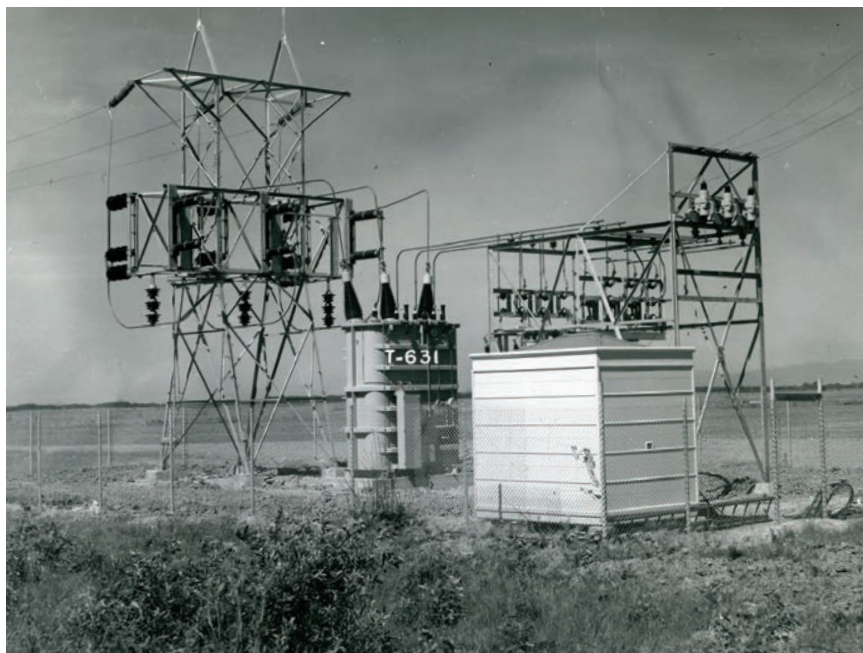
Harrisburg Substation near Harrisburg, Oregon, was constructed in conjunction with BPA's Albany Substation to serve the Benton–Lincoln Electric Cooperative and is associated with community development in the region. The Benton–Lincoln Electric Cooperative was organized in 1939 through rural sponsors and county agricultural agents. Construction of the 2012 Control House diminished the Substation's integrity, and it is not eligible for the NRHP. However, the Control House is relatively unchanged and is notable as the best version of BPA's Standard Type 161 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-23 CONTROL HOUSE	1946	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-23 CONTROL HOUSE 1946

Building style: Utilitarian,
BPA Standard Type 161

Exterior Characteristics:
Small, one story, flat roof



Historic photo.

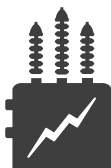
TIER III
SYSTEM
EXPANSION



- ▲ Hauser Substation
- City
- Eugene District



1954



HAUSER SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

HAUS / 980 Shutters Landing Lane, North Bend, OR 97459 / Coos County

HISTORIC PAINT: 1950 SCHEME

History and Significance

Hauser Substation near Hauser, Oregon, was constructed to provide power to Lincoln County through the Central Lincoln People's Utility District and is associated with community development in the region. The Central Lincoln People's Utility District, which organized in 1943, powers coastal areas of Lincoln, Lane, Douglas, and Coos counties. Substantial alterations to the Switchyard diminished the Substation's integrity, and it is not eligible for the NRHP. However, the Control House is notable as the second best example (following the Langlois Substation Control House) of BPA's Standard Type 192 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-233 CONTROL HOUSE	1954	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

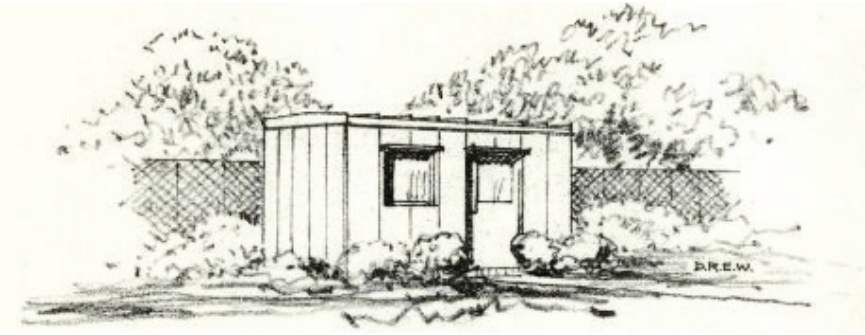
TIER III Z-233 CONTROL HOUSE 1954

Building style: Utilitarian, BPA Standard Type 192

Exterior Characteristics: One story, metal panel construction, low-pitch side-gable roof, metal window, metal door

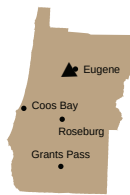


Historic photo.



Historic drawing.

TIER II
SYSTEM
EXPANSION



- ▲ Lane Substation
- City
- Eugene District

1966



LANE SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

LANE / 28190 Ken Neilsen Road, Eugene, OR 97402 / Lane County

HISTORIC PAINT: SCHEME A

History

Lane Substation was constructed approximately 8 miles west of Eugene, Lane County, Oregon, to serve Eugene customers. BPA constructed the Lane Substation for \$2.2 million as part of the 72-mile, 500 kV Marion–Lane transmission line. Westinghouse Electrical Corporation of Portland, Oregon, supplied the Substation’s transformers. In conjunction with the Marion–Alvey transmission line, the Marion–Lane line provided the second 500 kV line to Eugene, Oregon. BPA architect C. Tetherow designed the Substation Control House. On October 21, 1966, Oregon Congressman Robert Duncan dedicated the new Lane Substation by throwing a switch to energize what was then the state’s largest power transformer. During the dedication, Duncan predicted that states in the Pacific Northwest would retain “the economic advantage

of low-cost power” with continued cooperation between public and private utilities (*The Oregonian*, 1966).

Significance

Lane Substation is significant under NRHP Criterion A in the area of Government. The Substation’s establishment provided increased power to growing populations in the Eugene area during BPA’s System Expansion Period (1946–1974) and reflects BPA’s expansion of its transmission system in the Pacific Northwest. The Control House represents the only remaining example of BPA’s Standard Type 2002 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-742 CONTROL HOUSE	1966	Tier II - Contributing
SWITCHYARD	1966	Tier II - Contributing
Z-8342 CABLE TUNNEL	1966	Contributing Feature of Switchyard

TIER II Z-233 CONTROL HOUSE 1966

Building style: International, BPA Standard Type 2002

Exterior Characteristics:

One story, asymmetrical plan, stepped flat roof, insulated asbestos cement board panels with extruded aluminum mullions, multi-pane aluminum windows



TIER II SWITCHYARD 1966, expanded circa 1971

Building style: International, BPA Standard Type 2002

Characteristics: Stepped gravel yard, chain-link fence, concrete paths, aluminum storage sheds, and cable tunnel. 115 kV, 230 kV, 500 kV equipment includes multi-part dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, oil tanks, capacitor bank, and buswork.



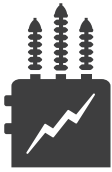
TIER I
SYSTEM
EXPANSION



- ▲ Langlois Substation
- City
- Eugene District



1957



LANGLOIS SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

LANG / 94205 Cope Lane, Langlois, OR 97450 / Curry County

HISTORIC PAINT: 1956 SCHEME

History

Langlois Substation was constructed approximately 1 mile south of Langlois, Curry County, Oregon, to accommodate a tap along the 51-mile, 115 kV Bandon–Port Orford–Gold Beach transmission line. The new line extended the BPA transmission system further along the southern Oregon Coast, which routinely suffered power shortages. Witzig Electric Company constructed the small substation, which was energized in October 1957.

Significance

Langlois Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the local public utility district for distribution to rural communities on the southern Oregon Coast and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture as exemplary of BPA's Standard Aluminum Control House Type 192 design. The Control House also represents the best example of this design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-291 CONTROL HOUSE	1957	Tier I - Contributing/Individually Eligible
SWITCHYARD	1957	Tier II - Contributing
Z-1225 STORAGE	1990	X - Non-contributing

TIER I Z-291 CONTROL HOUSE 1957

Building style: Utilitarian, BPA Standard Type 192

Exterior Characteristics:

One story, rectangular plan, metal panel construction, flat roof, metal windows, metal door.



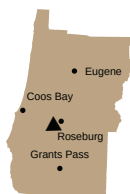
TIER II SWITCHYARD 1957

Characteristics: Flat gravel yard, chain-link fence, aluminum storage sheds, and 115 kV equipment, including dead-end towers, power transformer, oil and vacuum circuit breakers, and buswork.



TIER III

**SYSTEM
EXPANSION**

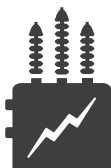


▲ Lookingglass Substation

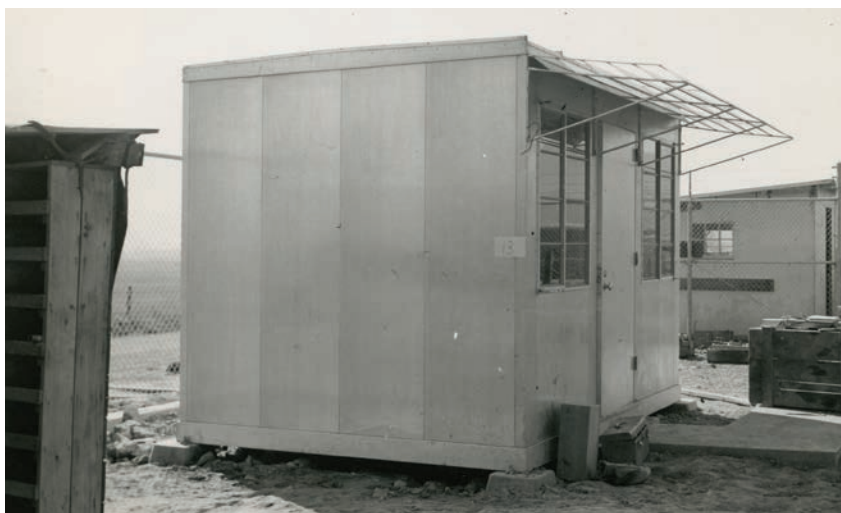
• City

■ Eugene District

1951



LOOKINGGLASS SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

LOOK / 2818 Dairy Loop Road, Roseburg, OR 97471 / Douglas County

HISTORIC PAINT: 1950 SCHEME

History and Significance

Lookingglass Substation near Lookingglass, Oregon, was constructed to serve customers of Douglas Electric Cooperative, a rural electric cooperative and is associated with community development in the region. Substantial alterations to the Switchyard have diminished the Substation’s integrity, and it is not eligible for the NRHP. However, the Control House is a notable resource representing the best example of BPA’s Standard Type 190 design.

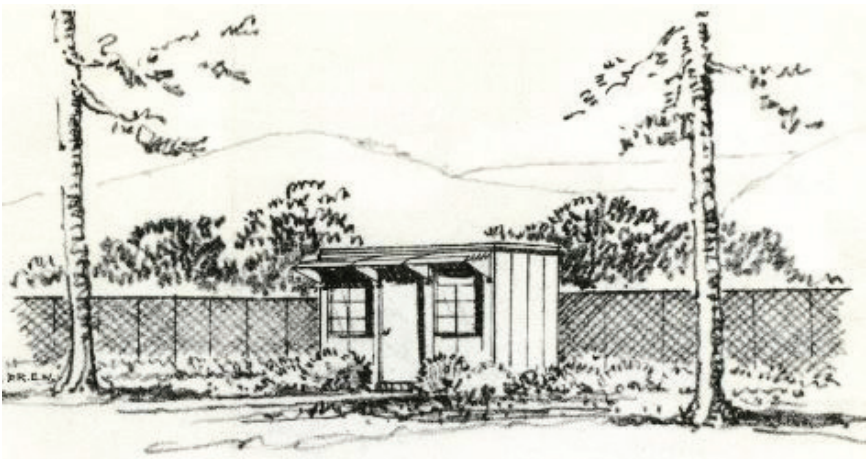
RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-14 CONTROL HOUSE	1951	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-14 CONTROL HOUSE 1951

Building Style: Utilitarian,
BPA Standard Type 190

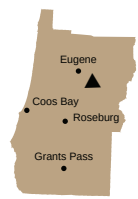
Exterior Characteristics:

One story, rectangular plan,
metal panel construction, flat
roof, multi-pane metal windows,
metal door, metal canopy



Historic drawing.

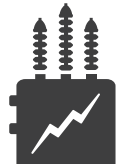
TIER I
SYSTEM
EXPANSION



- ▲ Lookout Point Substation
- City
- Eugene District



1954



LOOKOUT POINT SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

LKPT / 40249 West Boundary Road, Lowell, OR 97452 / Lane County

HISTORIC PAINT: 1950 SCHEME

History

Lookout Point Substation was constructed approximately 15 miles southeast of Goshen, Lane County, Oregon, to transmit power generated at Lookout Point Dam to southwestern Oregon. Construction of the Substation coincided with work on the 115 kV Lookout Point–Goshen Nos. 1 and 2 lines extending from Lookout Point Dam to BPA's Alvey Substation. The 16.6-mile No. 2 line integrated additional dam-generated power into the BPA system and represented the final phase of a plan to link the power generation at Lookout Point and Dexter dams with the Northwest Power Pool. In December 1954, Lookout Point Dam's first 40,000-kilowatt generator transmitted its power into the BPA system. The 115,000-volt Lookout Point Substation received the initial power, which it transmitted to the Oakridge Substation, serving the Lane County Electric Cooperative, and to the Alvey Substation, serving southwest Oregon.

Significance

Lookout Point Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power generated at Lookout Point Dam to communities in southwest Oregon and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture as an exemplary representation of the Minimal Traditional style. The building also represents the only remaining example of BPA's Standard Type 166 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-832 CONTROL HOUSE	1954	Tier I - Contributing/Individually Eligible
SWITCHYARD	1954	Tier II - Contributing

TIER I Z-832 CONTROL HOUSE 1954

Building Style: Minimal Traditional, BPA Standard Type 166

Exterior Characteristics: One story, rectangular plan, concrete construction, hipped roof, concrete finish with grid pattern, metal windows.

Interior Characteristics:
Globular light fixtures



TIER II SWITCHYARD 1954

Characteristics: Flat gravel yard, chain-link fence, and 115 kV equipment, including dead-end towers, potential transformers, gas circuit breakers, and buswork.



TIER II
SYSTEM
EXPANSION



-  Marys Peak Microwave Radio Station
-  City
-  Eugene District

1961



MARYS PEAK
MICROWAVE
RADIO STATION



SOUTH
REGION

EUGENE
DISTRICT

MARY / Benton County, Oregon

History

Development of Mary's Peak began in June 1941, when the city of Corvallis leased 400 acres of land to the USFS for a 40-year period. The lease stipulated that the land was to be developed for public use. In September 1958, BPA opened bids for the construction of a combination VHF radio station and USFS lookout on Mary's Peak. The development of the multi-use building was stalled when the proposed plans exceeded the USFS's \$27,000 budget. Due to insufficient funds, the USFS decided to construct its own building at a former USFS lookout site. Meanwhile, BPA decided to relocate its proposed site to a public domain property on the northeast side of the peak. The newly selected site was surrounded by land owned by the city of Corvallis and USFS and that drained into the city's watershed. Both the city and USFS protested BPA's new plans, arguing it would jeopardize the watershed and interfere with lookout operations.

On October 2, 1959, the Corvallis Gazette Times reported that BPA and the USFS had signed a memorandum of understanding, stipulating to the construction of a BPA microwave radio station next to the USFS's lookout on Mary's Peak. The MOU also stipulated that the BPA building would provide space for radio equipment for the Federal Bureau of Investigation and the Bureau of Land Management (BLM). Bids for the construction of the Mary's Peak, Kenyon Mountain, and Scott Mountain radio stations were announced in the *Eugene Register-Guard* on May 30, 1960. Each station would supplement the BPA's land mobile network in the Willamette Valley and southwest Oregon. BPA identified Peifer and Pierce of Battle Ground, Washington, as the lowest bidders for all three sites. Completion of the sites was expected within 120 days. BPA historic photographs indicate the Mary's Peak Station was complete or near completion by November 1960.

Significance

The Mary's Peak Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Corvallis, Oregon, area. The period of significance for the Station is 1961, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-882 RADIO 1953

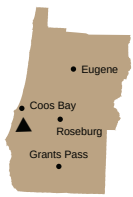
Building style: Utilitarian,
BPA Standard Type 1530

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish; nearly flat roof; one asymmetrical single-lite entrance with no additional windows.

Tower: Wood monopole



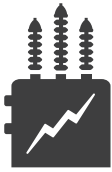
TIER III
SYSTEM
EXPANSION



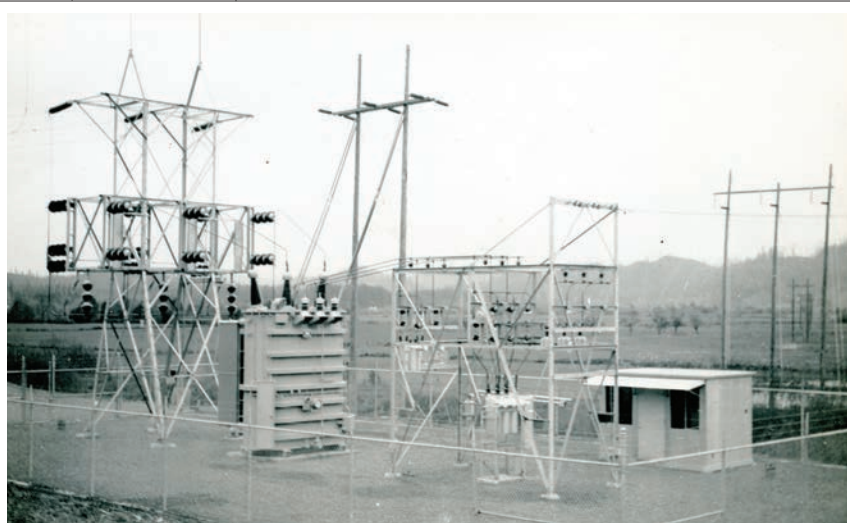
- ▲ Norway Substation
- City
- Eugene District



1950



NORWAY SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

NORW / Old Highway 42, Myrtle Point, OR 97458 / Coos County

HISTORIC PAINT: 1950 SCHEME

History and Significance

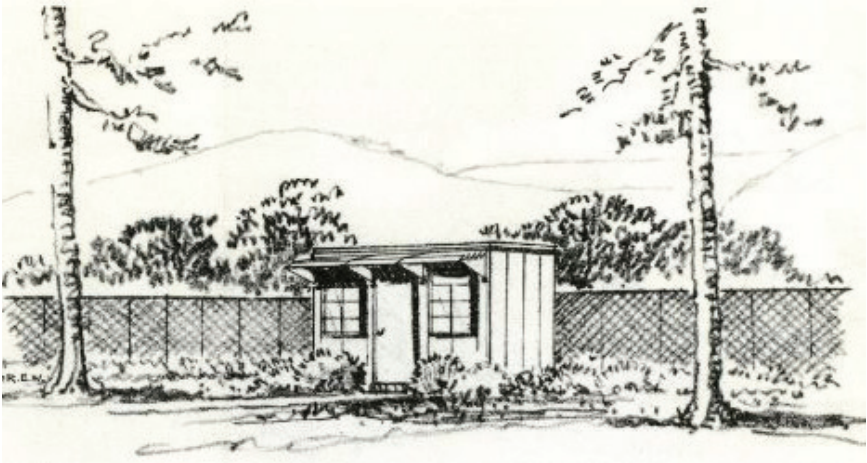
Norway Substation near Norway, Oregon, was constructed to provide additional power facilities in southwestern Oregon and is associated with community development in the region. The removal of all switchyard equipment and retirement of the Substation has diminished the Substation's integrity, and it is not eligible for the NRHP. However, the Control House is mostly unchanged since its original construction and is the second-best example (following the Lookingglass Substation Control House) of BPA's Standard Type 190 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-13 CONTROL HOUSE	1951	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-13 CONTROL HOUSE 1951

Building Style: Utilitarian,
BPA Standard Type 190

Exterior Characteristics: One story, rectangular plan, aluminum panel construction, flat roof, multi-pane metal windows, metal awning with brackets.



Historic drawing.

TIER II
SYSTEM
EXPANSION



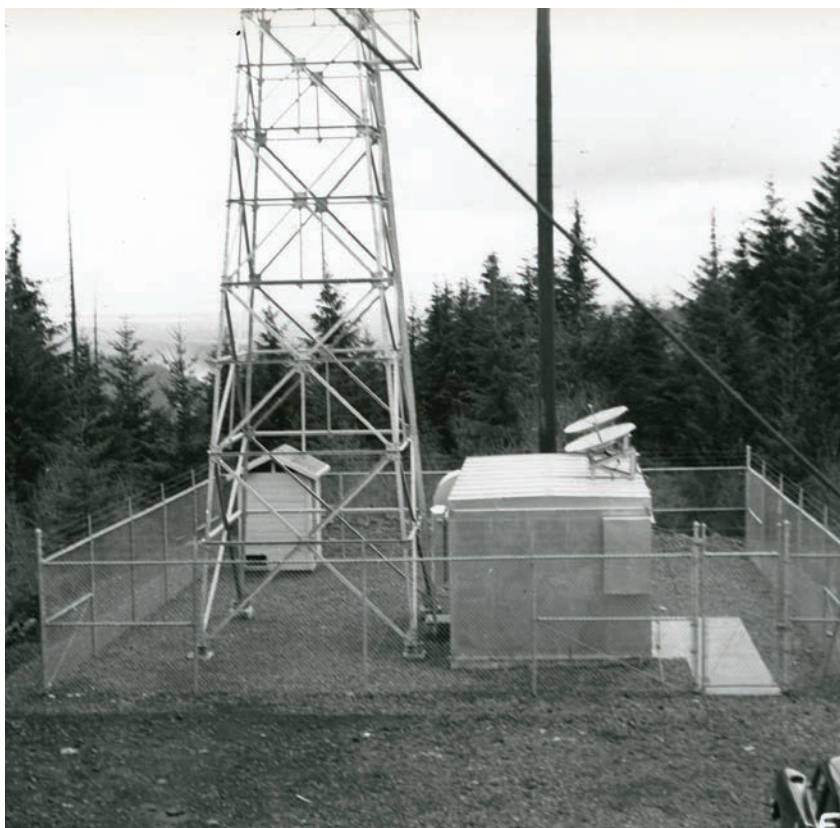
- ⊛ Noti Microwave Radio Station
- City
- Eugene District



1954



NOTI MICROWAVE RADIO STATION



SOUTH
REGION

EUGENE
DISTRICT

NOTI / Lane County, Oregon

History

During the 1940s and 1950s, BPA served Oregon's South Coast area with a 115-kV transmission line, the area's only large-scale power source. Before BPA installed its coastal microwave link in 1954, intense coastal storms and flooding could leave the isolated area between Coos Bay and Gold Beach without power for extended periods. BPA's transmission line maintenance crews, using MF radio sets in the field, were capable of only intermittent contact with each other and with the Alvey Substation near Eugene. The communication system was clearly inadequate to address local line failures. In fall 1950, BPA began investigating how to replace MF channels with VHF channels and repeater stations to facilitate reliable communication between coastal BPA substations and field maintenance crews.

The southwest Oregon microwave link connected to the BPA microwave communication system at the Coburg Microwave Radio Station and extended south along the coastline to the Cape Blanco Microwave Radio Station. These stations were specifically designed to withstand the most severe local weather and maintain system reliability. Each station's modular aluminum building was prefabricated at BPA's central workshop, transported to the station site, and mounted on a concrete slab. By 1955, the system was operational more than 97 percent of the time, a substantial improvement from the earlier MF system. In June 1953, BPA acquired easements for the construction and maintenance of the Noti Station, a parking area, access road, and microwave beams from the BLM. BPA historic photographs indicate the Station was complete or near completion by December 1953. Located on BLM land, the site was shared with the USFS, which operated an adjacent lookout since at least 1954.

Significance

The Noti Microwave Radio Station is significant under Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Noti, Oregon, area. The period of significance for the Station is 1954, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-241 RADIO 1954

Building style: Utilitarian, BPA Standard Type 1503

Characteristics: One-story aluminum-panel control building; nearly flat roof; one entrance; no windows.

Tower: 4-leg steel lattice

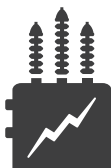


TIER II
SYSTEM
EXPANSION



- ▲ Reedsport Substation
- City
- Eugene District

1957



REEDSPORT SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

NORW / 210 N 22nd St, Reedsport, OR 97467 / Douglas County

HISTORIC PAINT: 1950 SCHEME

History

Reedsport Substation was constructed in Reedsport, Douglas County, Oregon, to provide direct service to the Central Lincoln Peoples' Utility District and Douglas County Electric Cooperative. BPA contacted with the Electric Company of Port Angeles, Washington, for \$23,321 to construct the 6,000 kilowatt Substation. The Substation distributed power from Bonneville Dam through a 200-mile, 115 kV transmission line extending from Vancouver, Washington, via Eugene, Oregon, to Reedsport. This was the first 115 kV connection for Oregon's south-central coast area. The community of Reedsport credited inexpensive Columbia River power delivered by BPA for playing an important role in nearly every aspect of the local economy.

Significance

Reedsport Substation is significant under NRHP Criterion A in the area of Government and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the only remaining example of BPA's Standard Type 165-1 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-804 CONTROL HOUSE	1957	Tier II - Contributing
SWITCHYARD	1957	Tier II - Contributing

TIER II Z-804 CONTROL HOUSE 1957

Building Style: Minimal Traditional, BPA Standard ype 165-1

Exterior Characteristics: One story, rectangular plan, concrete construction, Dutch hip roof, smooth concrete finish with grid pattern, concrete canopies.



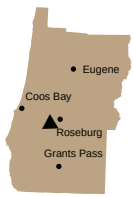
TIER II SWITCHYARD 1957

Characteristics: Flat gravel yard, chain-link fence, concrete paths, and aluminum storage sheds. 115 kV equipment includes dead-end towers, power transformers, potential transformers, gas circuit breakers, and buswork.



Historic photo.

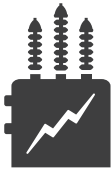
TIER II
SYSTEM
EXPANSION



- ▲ Reston Substation
- City
- Eugene District



1960



RESTON SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

REST / 4466 Coos Bay Wagon Road, Roseburg, OR 97471 / Douglas County

HISTORIC PAINT: 1956 SCHEME

History

Reston Substation was constructed north of Reston, Douglas County, Oregon, to increase power delivery to the southwest Oregon Coast and serve as an intertie facility for Oregon and California. During 1956, BPA constructed 230 kV transmission facilities from the Alvey Substation near Eugene, Oregon, through Reston to Fairview, Oregon, to transmit power generated at McNary Dam. BPA expected that the proposed 97-mile Alvey–Reston–Fairview line would augment power flows to southwest Oregon and substantially increase capacity and loop service for BPA's southwestern Oregon power loads. The new transmission facilities, completed in 1958, constituted the primary power source for the southwest Oregon Coast. The Reston Substation also served as an intertie facility with the California Oregon Power Company (Copco), allowing BPA to market surplus power generated by the Columbia River

during high runoff periods in May, June, and July, to California. BPA contracted with Lebanon Electric Company of Lebanon, Oregon, for \$50,428 to construct a 230 kV switchyard at the Reston Substation site in anticipation of the proposed 23-mile transmission line from Copco's Dixonville, Oregon, substation to BPA's Reston Substation. In 1963, BPA began building the 29.5-mile, 230 kV Reston–Fairview No. 2 transmission line, which increased power delivery to coastal customers of the Central Lincoln Peoples' Utility District, Douglas Electric Cooperative, Pacific Power and Light Company, the city of Bandon, and Coos–Curry Electric Cooperative.

Significance

Reston Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the local public utility district for distribution to rural communities in southern Oregon and served as an intertie facility for Oregon and California. The Substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-326 CONTROL HOUSE	1960	Tier II - Contributing
SWITCHYARD	1960	Tier II - Contributing

TIER II Z-326 CONTROL HOUSE 1961

Building Style: Utilitarian,
BPA Standard Type 193

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, metal windows, metal
door.



TIER II SWITCHYARD 1961

Characteristics: Flat gravel
yard, chain-link fence, and 115
kV equipment, including a dead-
end tower, potential transform-
ers, current transformers (no
power transformers), oil circuit
breakers, and buswork.



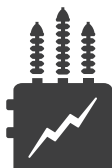
TIER II
SYSTEM
EXPANSION



- ▲ Tahkenitch Substation
- City
- Eugene District



1963



TAHKENITCH SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

TAHK / 345 Old Lower Smith River Road, Reedsport, OR 97467 / Douglas County

HISTORIC PAINT: 1956 SCHEME

History

Tahkenitch Substation was constructed approximately 3 miles west of Gardiner, Douglas County, Oregon to provide additional power to the Oregon Coast. The Substation supplied power for industrial, commercial, and residential use to the Douglas Electric Cooperative and the Central Lincoln Peoples' Utility District, which distributed electricity to the new International Paper Corporation plant in Gardiner. The Lebanon Electric Company of Lebanon, Oregon, built the Tahkenitch Substation's Control House, steel structures, and fencing, and installed the conduit system, grounding system, oil tanks, sidewalks, roads, curbs, drainage, and station equipment. Concurrently, construction was underway on a 73-mile, 230 kV transmission line between the Alvey Substation, near Eugene, Oregon, and Tahkenitch Substation. BPA planned for the new line to operate initially at 115 kV, with the option to increase

the operating voltage as needed. In 1964, BPA began construction on a 2-mile, 230 kV loop from the Alvey–Tahkenitch transmission line and a 6-mile, 115 kV loop from the Eugene–Mapleton line to Lane Substation west of Eugene to add capacity for winter peaks in Eugene.

Significance

Tahkenitch Substation is significant under Criterion A in the areas of Industry and Government for powering Oregon Coast industries, notably the International Paper Corporation. The Substation also provided reliable power to the local public utility district for distribution to rural coastal communities in Oregon and reflects the extension of BPA's transmission facilities to the Oregon Coast during the System Expansion Period (1946–1974). The Control House represents the second-best version of BPA's Standard Type 144-1 design, after the Cardwell Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-753 CONTROL HOUSE	1963	Tier II - Contributing
SWITCHYARD	1963	Tier II - Contributing
Z-0000 STORAGE #1	1983	X - Non-contributing
Z-0000 STORAGE #2	1983	X - Non-contributing
Z-1266 OIL ABSORBENT BUILDING	1993	X - Non-contributing

TIER II Z-753 CONTROL HOUSE 1963

Building Style: Minimal Traditional, BPA Standard Type 144-1

Exterior Characteristics: One story, rectangular plan, concrete masonry unit construction, hipped roof, smooth concrete finish, metal multi-pane windows.



Interior Characteristics: Historic metal dome light fixtures, historic clear glass dome light fixtures

TIER II SWITCHYARD 1963, expanded circa 1972

Characteristics: Stepped, three-tiered gravel yard situated on a hillside, chain-link fence, concrete paths, and aluminum storage sheds. 115 kV and 230 kV equipment includes dead-end towers, power transformers, potential transformers, gas circuit breakers, oil tank, capacitor bank, and buswork.

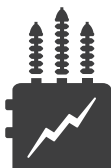


TIER I
SYSTEM
EXPANSION



- ▲ Toledo Substation
- City
- Eugene District

1958



TOLEDO SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

TOLE / 250 NE Sturdevant Road, Toledo, OR 97391 / Lincoln County

HISTORIC PAINT: 1956 SCHEME

History

Toledo Substation was constructed approximately 2 miles east of Toledo, Lincoln County, Oregon, to address power shortages along the southern Oregon Coast. Toledo Substation was placed in service in 1948, but the existing Control House, designed by BPA architects C. Tetherow and Dean R. Wright, was not built until 1958. During the mid to late 1940s, BPA constructed the 48-mile Albany–Toledo transmission line and line extension facilities to improve service for Coos Bay and central Lincoln County, especially for areas most seriously impacted by power shortages. During the 1950s, BPA installed a series of additions at Toledo Substation, such as “115 kV and 69 kV additions,” carrier communications facilities, and storage space for maintenance parts, auto-transformers, and equipment (*Corvallis Gazette-Times*, 1952). The upgrades provided additional capacity for the Central Lincoln Peoples’ Utility District and Con-

sumers Power, Inc. (previously the Benton–Lincoln Electric Cooperative). In 1973, BPA completed the 230 kV Toledo–Wendson transmission line, which closed the Santiam–Toledo–Wendson–Eugene area loop. The new line improved the reliability of service to coastal areas and prevented transmission line overloads from the Willamette Valley to the coast.

Significance

Toledo Substation is significant under Criterion A in the area of Government for extending reliable power to Oregon’s coastal communities during the System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture for exemplifying BPA’s Standard Type 112 design. The building also represents the only remaining example of this design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-808 CONTROL HOUSE	1958	Tier I - Contributing/Individually Eligible
SWITCHYARD	1958	Tier II - Contributing
Z-0000 STORAGE	1979	X - Non-contributing
Z-1300 MAINTENANCE STORAGE	1979	X - Non-contributing
Z-1266 OIL ABSORBENT BUILDING	1993	X - Non-contributing

TIER I Z-808 CONTROL HOUSE 1958

Building Style: Modern,
BPA Standard Type 112

Exterior Characteristics: One story, rectangular plan, concrete construction, bilevel flat roof, stucco finish with grid pattern, multi-pane steel windows, recessed entrance.



Interior Characteristics: Original globular light fixtures, original overhead metal dome light fixtures

TIER II SWITCHYARD 1958, expanded circa 1970 and circa 1974

Characteristics: Stepped gravel yard, chain-link fence, concrete paths, and aluminum storage shed. 230 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, gas and oil circuit breakers, capacitor banks, oil tanks, and buswork.



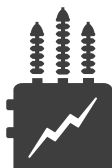
TIER I
SYSTEM
EXPANSION



- ▲ Walton Substation
- City
- Eugene District



1949



WALTON SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

WALT / 1336 R Street, Walton, OR 97490 / Lane County

HISTORIC PAINT: 1950 SCHEME

History

Walton Substation was constructed northwest of Walton, Lane County, Oregon, to connect with the Eugene–Mapleton transmission line and provide additional power to the Blachly–Lane County Electric Cooperative (BLCEC). The BLCEC formed in 1936 as one of Oregon's first electric cooperatives. BPA contracted with Davidson Electric Company of Milwaukie, Oregon, for \$12,699 contract to build the Walton Substation, which was scheduled for completion on July 1, 1949. By 1950, soon after the Walton Substation had been completed, the BLCEC was serving about 1,000 customers in

northwestern Lane County and was in the process of extending service to 150 rural households in the Indian Creek and Deadwood valleys.

Significance

Walton Substation is significant under Criterion A in the area of Government for providing reliable power to rural communities in eastern Washington. The Substation reflects the extension of BPA transmission facilities during the System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture for exemplifying BPA’s Standard Type 190 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-20 CONTROL HOUSE	1949	Tier I - Contributing/Individually Eligible
SWITCHYARD	1949	Tier II - Contributing

TIER I Z-20 CONTROL HOUSE 1949

Building Style: Utilitarian, BPA Standard Type 190

Exterior Characteristics: One story, rectangular plan, metal panel construction, flat roof, multi-pane metal windows, metal door, metal canopy.

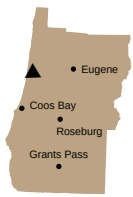


TIER II SWITCHYARD 1949

Characteristics: Flat gravel yard, chain-link fence, and 115 kV equipment, including a dead-end tower, power transformer, potential transformer, oil circuit breaker, and buswork.



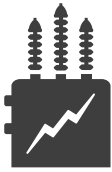
TIER II
SYSTEM
EXPANSION



- ▲ Wendson Substation
- City
- Eugene District



1973



WENDSON SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

WEND / 7931 Highway 126, Florence, OR 97439 / Lane County

HISTORIC PAINT: SCHEME A

History

Wendson Substation was constructed approximately 4 miles north of Florence, Lane County, Oregon, to provide reliable power delivery to the coastal areas. BPA began planning for the Wendson Substation in the late 1950s. The proposed substation was intended to help supply more reliable power to the Central Lincoln Peoples' Utility District and Douglas Electric Cooperative in the Florence–Reedsport area and to reinforce service to the Pacific Power and Light Company, Coos–Curry Electric Cooperative, and the city of Bandon in the Coos Bay area. Although BPA acquired land for the proposed Wendson Substation in 1959, it did not construct it until the early 1970s. Finally, in 1973, BPA energized the Wendson Substation and completed the 230 kV Toledo–Wendson transmission line, “thereby closing the Santiam–Toledo

–Wendson–Eugene area loop” (Bonneville Power Administration, 1973). The new line improved the reliability of service to coastal areas and safeguarded against transmission line overloads from the Willamette Valley to the coast.

Significance

Wendson Substation is significant under Criterion A in the area of Government for providing reliable power to Oregon’s coastal communities. The Substation reflects the extension of BPA transmission facilities to the coastal region during the System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-689 CONTROL HOUSE	1973	Tier II - Contributing
SWITCHYARD	1973	Tier II - Contributing
Z-0000 PUMP HOUSE	1973	X - Non-contributing
Z-1262 OIL ABSORBENT BUILDING	1993	X - Non-contributing
Z-1264 OIL ABSORBENT BUILDING	1993	X - Non-contributing
Z-7235 FIBER HUT	2002	X - Non-contributing

TIER II Z-689 CONTROL HOUSE 1973

Building Style: Utilitarian

Exterior Characteristics:

all one story, metal panel construction, side-gable roof, metal door, metal canopy.



TIER II SWITCHYARD 1973

Characteristics: Flat gravel yard, chain-link fence, concrete paths, historic light fixtures, and aluminum storage sheds and containers. 115 kV and 230 kV equipment includes dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, oil tank, capacitor banks, and buswork.



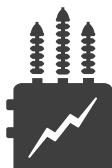
TIER II
SYSTEM
EXPANSION



- ▲ Wren Substation
- City
- Eugene District



1947



WREN SUBSTATION



SOUTH
REGION

EUGENE
DISTRICT

WREN / 35227 Kings Valley Highway, Philomath, OR 97370 / Benton County

HISTORIC PAINT: 1950 SCHEME (SWITCHYARD), SCHEME A (CONTROL HOUSE)

History

Wren Substation was constructed north of Wren, Benton County, Oregon, to serve Benton–Lincoln Electric Cooperative (later Consumers Power, Inc.) customers. Emergency funding for the Wren Substation and other urgent projects was authorized by the U.S. Secretary of the Interior. Upon its completion, Wren Substation was integrated into the 115 kV Albany–Toledo transmission line. Major substation additions in 1961 included a new control house, transformer addition, and other substation facilities by Witzig Construction, Inc., of Corvallis, Oregon. The transformer addition housed a step-down transformer to reduce voltage from 115 kV to 69 kV and, along with other substation additions, created a new point of delivery for Consumers Power, Inc., customers.

Significance

Wren Substation is significant under Criterion A in the area of Government for providing reliable power to rural communities in the Willamette Valley. The Substation reflects the extension of BPA transmission facilities in the Willamette Valley during the System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-87 CONTROL HOUSE	1961	Tier II - Contributing
SWITCHYARD	1947/1961	Tier II - Contributing

TIER II Z-87 CONTROL HOUSE 1961

Building Style: Utilitarian, BPA Standard Type 190

Characteristics:

One story, rectangular plan, metal panel construction, low-pitch side-gable roof, multi-pane metal windows, metal door, metal canopy

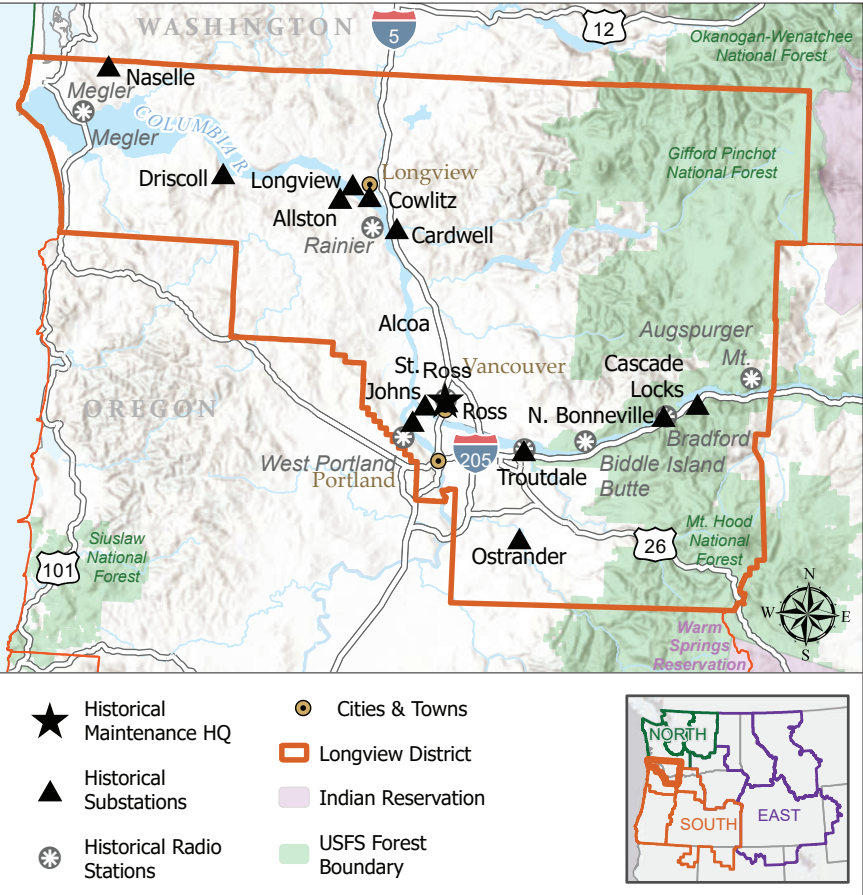


TIER II SWITCHYARD 1947, expanded circa 1961

Characteristics: Flat gravel yard, chain-link fence, and historic light fixtures. 115 kV equipment includes dead-end towers, power transformers, potential transformers, current transformer, gas and oil circuit breakers, capacitor banks, and buswork



LONGVIEW DISTRICT



LOCATION	HISTORICAL SIGNIFICANCE
Alcoa Substation	TIER I
Alston Substation	TIER I
Augspurger Mountain Microwave Radio Station.....	TIER II
Biddle Butte Microwave Radio Station	X
Bradford Island Microwave Radio Station.....	X
Cardwell Substation	TIER I
Cowlitz Substation	X
Driscoll Substation	TIER II
Longview Substation.....	TIER III
Naselle Substation	X
North Bonneville Substation.....	TIER I
Ostrander Substation	TIER I
Rainier Microwave Radio Station	TIER II
Ross Complex	TIER I
Ross Microwave Radio Station	X
St. Johns Substation.....	TIER I
Troutdale Microwave Radio Station	TIER II
Troutdale Substation	TIER I
West Portland Microwave Radio Station.....	X

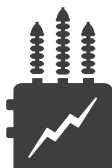
TIER I
MASTER
GRID



- ▲ Alcoa Substation
- City



1940



ALCOA SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

ALCO / 5500 Old Lower River Road, Vancouver, WA 98660 / Clark County

HISTORIC PAINT: 1950 SCHEME

History

Alcoa Substation was constructed near Vancouver, Clark County, Washington, to transmit power to the ALCOA Vancouver aluminum reduction plant. The Alcoa Substation was the first of six BPA facilities constructed to power aluminum plants. By late 1940, BPA had constructed the 115 kV transmission line from Bonneville Dam to Alcoa Substation, and the ALCOA plant was nearing completion. Supplying power to ALCOA was a priority for BPA, because the company's aluminum production was a vital defense industry, supplying the materials to build airplanes and ships. When the ALCOA plant was energized on September 1, 1940, BPA began supplying power from Bonneville Dam to the 115 kV transmission line. The substation operated

with temporary equipment until BPA installed permanent facilities, including the concrete Control House completed in June 1941.

Significance

Constructed by BPA to power the adjacent ALCOA aluminum reduction plant, Alcoa Substation is significantly associated with defense-related industrial development in the region. The ALCOA plant is no longer in operation and has been mostly dismantled. Due to the Substation’s diminished integrity, it is not eligible as a historic district. The Control House is individually eligible under NRHP Criterion C in the area of Architecture for exemplifying the Streamline Moderne style deployed by BPA during its Master Grid Development Period (1938–1945). The Control House also represents the only remaining example of BPA’s Standard Type 155 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-950 CONTROL HOUSE	1941	Tier I - Individually Eligible
SWITCHYARD	1940	X - Non-contributing

TIER I Z-950 CONTROL HOUSE 1941

Building Style: Streamline Moderne, BPA Standard Type 155

Exterior Characteristics:
One story, concrete construction, symmetrical façade, flat roof with parapet and metal coping, curved walls at main entrance, steel multi-pane windows, curved metal railing.

Interior Characteristics:
Brass wall registers, metal radiator grates with coils

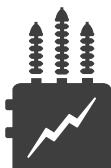


TIER I
SYSTEM
EXPANSION



- ▲ Allston Substation
- City

1969



ALSTON SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

ALSN / 76528 Heath Road, Rainier, OR 97048 / Columbia County

HISTORIC PAINT: SCHEME A

History

Alston Substation was constructed approximately 6 miles northwest of Rainier, Columbia County, Oregon. The first transmission lines linked to the Alston Substation were the 500 kV Keeler–Allston and Tenino–Allston lines, which provided the first two power links between the Puget Sound region in Washington and Portland. BPA consulted with Ralph Appleman Architects and Associated Engineers for the Substations' Control House design and furnished the Substation with transformers fabricated by Fuji Electric Company of Chiba, Japan. In September 1968, the Japanese "locomotive carrier Nachi Maru" was scheduled to arrive at Beaver Dock, 10 miles west of Rainier, to offload three huge transformers, each weighing over 200 tons (*The Oregonian*, Sept. 20, 1968). In 1971, work began

on the proposed \$2.4 million Paul–Allston No. 2 transmission line. Part of the Hydro-Thermal Power Program planned by the Pacific Northwest Joint Power Planning Council, the line extended 65 miles from BPA's Paul Substation near Centralia, Washington, to the Alston Substation. The Paul–Allston line, in combination with the 47-mile, 500 kV Raver–Paul line, would complete the Puget Sound–Portland tie for increased reliability of transmountain lines into both areas. In 1974, BPA's budget included funds for a \$4.5 million Allston–Skipanon transmission line to supply power to Astoria and the Lower Columbia River area, which included the 21.5-mile Alston–Driscoll section.

Significance

Alston Substation is significant under NRHP Criterion A in the area of Government. The Substation is representative of BPA's growth and transmission of high-voltage power to the Pacific Northwest's growing urban populations during the System Expansion Period (1946–1974). Thirteen transmission lines connect to the Substation's switchyard, with voltages ranging from 115 kV to 500 kV, conveying the Substation's important role in BPA's transmission grid. The Control House is individually significant under Criterion C in the area of Architecture. The building is exemplary of a Modern/Brutalist-style control house constructed during the System Expansion Period and is expressive of BPA's beauty design concepts. Designed by Ralph Appleman Architect and Associated Engineers, the building represents the only remaining example of BPA's Standard Type 2010 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-710 CONTROL HOUSE / MAINTENANCE	1969	Tier I - Contributing/Individually Eligible
SWITCHYARD	1969	Tier II - Contributing
Z-0000 CONTROL CABLE TUNNEL - 1	1969	Contributing Feature of Switchyard
Z-0000 CONTROL CABLE TUNNEL - 2	1969	Contributing Feature of Switchyard
Z-7010 STORAGE SHED	1991	X - Non-contributing
Z-1224 POLE EQUIPMENT STORAGE	1991	X - Non-contributing
Z-1337 CONTROL HOUSE 115 KV (RELAY HOUSE – 115 KV)	1996	X - Non-contributing

TIER I Z-710 CONTROL HOUSE / MAINTENANCE 1969

Building Style: Modern/Brutalist, BPA Standard Type 2010

Exterior Characteristics:

One story, rectangular plan, concrete construction, flat roof, concrete panel exterior with stucco-like texture, repeated narrow modular windows with projecting precast concrete frame, recessed glass and metal entrance, tall adjacent radio tower.



TIER II SWITCHYARD 1969, expanded circa 1974

Characteristics: Flat gravel yard, chain-link fence, concrete paths, cable openings, two aluminum storage sheds, five oil tanks, and 115 kV, 230 kV, and 500 kV equipment in two main areas. East area includes dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers. West area includes dead-end towers, power transformers, circuit breakers, current transformers, and buswork.





Historic photo.



Historic photo.

TIER II
SYSTEM
EXPANSION



- Longview
- Vancouver
- Portland
- Augspurger Mt. Microwave Radio Station
- City

1953



AUGSPURGER
MOUNTAIN MICROWAVE
RADIO STATION



SOUTH
REGION

LONGVIEW
DISTRICT

AUGS / Skamania County, Washington

History

The Augspurger Mountain Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave communication circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with BPA facilities in Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee and other intermediate substations. The Ross–Spokane circuit was the first microwave link to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. BPA purchased the Augspurger Station site on July 18, 1951, from private landowners Anna Mae Robbins, J. A. Robbins, and George Klatt for \$165. Construction of the station building had begun by October 1951 and was near completion or finished by October 1952.

Significance

The Augspurger Mountain Microwave Radio Station is significant under NRHP Criterion A for its significance in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Cook, Washington, area. The period of significance is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-440 APPLGATE RS 1

Building style: Modern,
BPA Standard Type 1612

Characteristics: Two-story concrete-block control building used at high elevations to allow second-floor entry in heavy snow; concrete block covered in smooth finish scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two asymmetrical entrances with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



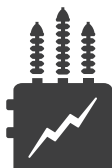
TIER I
SYSTEM
EXPANSION



- ▲ Cardwell Substation
- City



1963



CARDWELL SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

CARD / 360 Kalama River Road, Kelso, WA 98626 / Cowlitz County

HISTORIC PAINT: 1956 SCHEME

History

Cardwell Substation was constructed about 3 miles north of Kalama, Cowlitz County, Washington, to improve service to the Kalama Industrial Complex and the Longview Fibre-International Paper Port. The Merwin Hydroelectric Facility, operated by PacifiCorp, provides power to the Cardwell Substation. In May 1963, BPA and Cowlitz PUD officials attended a dedication ceremony for the new Substation, which served a new high voltage loop. Cowlitz County PUD No. 1 manages and operates the Electric and Production (Swift No. 2 Hydroelectric) Systems. The Electric System power supply is provided through contracts with BPA and the Grant County PUD, as well as from purchase of the output from the PUD's Swift No. 2 Hydroelectric Production System on the Lewis River and the power associated with Energy Northwest's Nine Canyon Wind Project.

Significance

Cardwell Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, and Government. The Substation's establishment improved service to local industries and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture for its reflection of BPA's use of standardized designs in substation development. The building represents the best example of BPA's Standard Type 144-1 Control House design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-756 CONTROL HOUSE	1963	Tier I - Contributing/Individually Eligible
SWITCHYARD	1963	Tier II - Contributing
Z-7512 STORAGE	1963	X - Non-contributing

TIER I Z-756 CONTROL HOUSE 1963

Building Style: Minimal Traditional, BPA Standard Type 144-1

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, hipped roof, smooth concrete finish, metal multi-pane windows.



Interior Characteristics: Wall heater, metal wall registers

TIER II SWITCHYARD 1963

Characteristics: Small, flat gravel yard; chain-link fence; concrete paths; aluminum storage shed; and 115 kV equipment, including multi-part dead-end towers, one power transformer, current transformers, potential transformers, gas circuit breakers, and buswork.



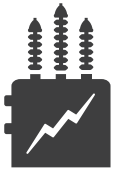
TIER II
SYSTEM
EXPANSION



- ▲ Driscoll Substation
- City



1968



DRISCOLL SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

DRIS / 92328 Taylorville Road, Clatskanie, OR 97016 / Clatsop County

HISTORIC PAINT: SCHEME A

History

Driscoll Substation was constructed approximately 3 miles northwest of Westport, Clatsop County, Oregon, to help meet the increasing power requirements in the Lower Columbia River area. The Driscoll Substation was built as part of BPA's 1966 Lower Columbia River Area Service construction program, which produced new substation and transmission line facilities. After its construction, the Driscoll Substation became part of BPA's plan to power the Northwest Aluminum Company's proposed aluminum reduction plant in Warrenton, Oregon, near the mouth of the Columbia River. In 1969, BPA contracted with Northwest Aluminum Company to supply 240,000 kilowatt of power for the proposed plant, estimated to generate \$4,300,000 a year in revenue for BPA. In September 1970, the Northwest Aluminum Company assigned its con-

tract with BPA to Alumax. Alumax withdrew its permit applications for the Warrenton site in 1975 after the results of an environmental impact study, and the aluminum reduction plant was never built.

Significance

Driscoll Substation is significant under NRHP Criterion A in the area of Community Planning and Development. The Substation is representative of BPA's distribution of power to rural communities in northwest Oregon and southwest Washington through the agency's relationship with local public utility districts. It also reflects the design, construction, and operation of the BPA Transmission System in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is the only remaining example of BPA's Standard Type 2007 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-724 CONTROL HOUSE	1968	Tier II - Contributing
SWITCHYARD	1968	Tier II - Contributing

TIER II Z-724 CONTROL HOUSE 1968

Building Style: Modern/
Utilitarian, BPA Standard Type
2007

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, side-gable roof, concrete stucco finish.



TIER II SWITCHYARD 1968

Characteristics: Small, flat gravel yard; chain-link fence; concrete paths; aluminum storage shed; and 115 kV equipment, including multi-part dead-end towers, one power transformer, current transformers, potential transformers, gas circuit breakers, and buswork.



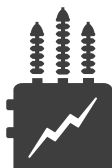
TIER III
MASTER
GRID



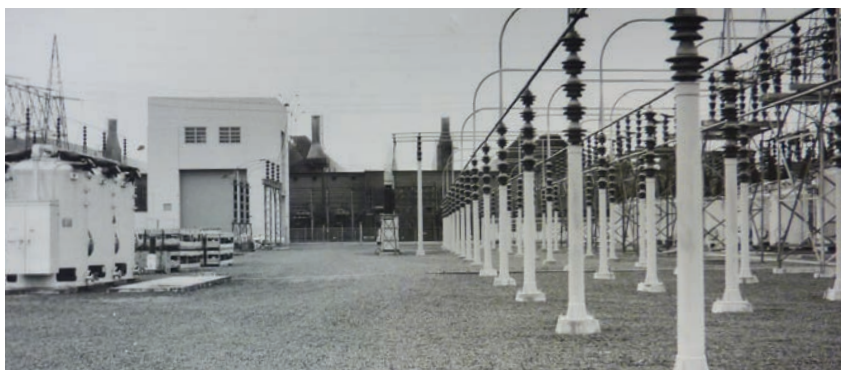
- ▲ Longview Substation
- City



1941



LONGVIEW SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

LONG / 4029 Industrial Way, Longview, WA 98632 / Cowlitz County

HISTORIC PAINT: 1950 SCHEME

History and significance

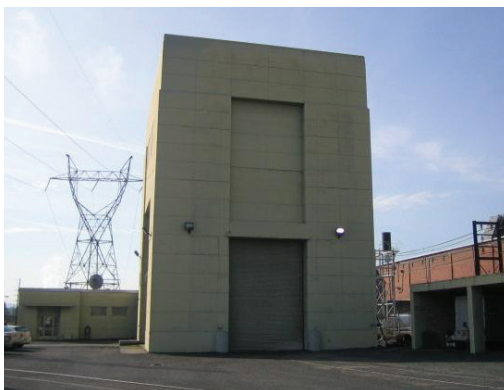
Longview Substation in Longview, Washington, was constructed to power the Reynolds Metals Company's aluminum reduction plant and is associated with community planning and industrial development in the region. The Reynolds plant was decommissioned in 2001. Substantial alterations to the Substation have diminished its integrity, and it is not eligible for the NRHP. However, the Control House is a notable resource as the only remaining example of BPA's Standard Type 107 design. The Untanking Tower is also a notable and rare resource associated with BPA's Master Grid development from 1938–1945.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-970 UNTANKING TOWER	1941	Tier III - Notable but Not Eligible
Z-969 CONTROL HOUSE	1948	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-970 UNTANKING TOWER 1941

Building Style: Streamline Moderne, BPA Standard Type Untanking Tower

Exterior Characteristics:
Tall and narrow vertical tower, concrete frame, lettering over entry, vertical sliding door, infilled windows.



TIER III Z-969 CONTROL HOUSE

Building Style: Streamline Moderne, BPA Standard Type 107

Exterior Characteristics:
One story, asymmetrical form, reinforced concrete construction, concrete canopy at entrance, steel multi-pane windows.

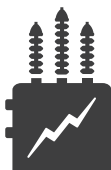


TIER I
MASTER
GRID



- ▲ North Bonneville Substation
- City

1941



NORTH BONNEVILLE SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

NBON / 651 E Cascade Drive, North Bonneville, WA 98639 / Skamania County

HISTORIC PAINT: 1950 SCHEME

History

North Bonneville Substation was constructed near the town of North Bonneville, Skamania County, Washington, across the Columbia River from Bonneville Dam and hydroelectric power plant. The Substation functioned primarily as a high-voltage switching station to interconnect the 230 kV transmission lines with the Bonneville Plant, North Vancouver Substation, and Grand Coulee Plant. The 233-mile Bonneville–Coulee transmission line extending from the North Bonneville Substation to Grand Coulee Dam served as the interconnection between the Bonneville and Grand Coulee hydroelectric plants and also powered areas in southeastern Washington and northeastern Oregon. The Substation also provided power to the Skamania County PUD. By late 1940, the Control House was under construction, and temporary facilities for the control of the No. 2 Bonneville–Coulee line were in operation. North Bonneville

Substation was scheduled for \$123,000 worth of additions as part of BPA's 1952–1953 budget and, in 1956, BPA contracted with R. W. O'Neal for \$12,412 to construct a 20-foot by 40-foot maintenance building.

Significance

North Bonneville Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, and Government. The Substation's establishment impacted business and industrial development throughout the region, particularly during World War II. The Substation also reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). The Control House is individually significant under Criterion C in the area of Architecture as exemplary of a Streamline Moderne style control house. The building is the second-best example of BPA's Standard Type 130 control house, after the Walla Walla Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-974 CONTROL HOUSE	1941	Tier I - Contributing/Individually Eligible
Z-975 STORAGE - OLD OIL HOUSE	1941	Tier II - Contributing
SWITCHYARD	1941	Tier II - Contributing
Z-0000 CABLE TUNNEL	1941	Contributing Feature of Switchyard
Z-7532 STORAGE	1941	X - Non-contributing

TIER I Z-974 CONTROL HOUSE 1941

Building Style: Streamline Moderne, BPA Standard Type 130

Exterior Characteristics:

One story, concrete construction, flat roof with parapet, curved walls, concrete canopy, steel multi-pane windows, curved metal railing.



Interior Characteristics: Brass wall registers, brass fixtures

TIER II Z-975 STORAGE (OLD OIL HOUSE) 1941

Building Style: BPA Standard Type Oil House

Exterior Characteristics:

One story, semi-subterranean, rectangular plan, flat roof, glass-block windows, steel casement windows, concrete retaining walls

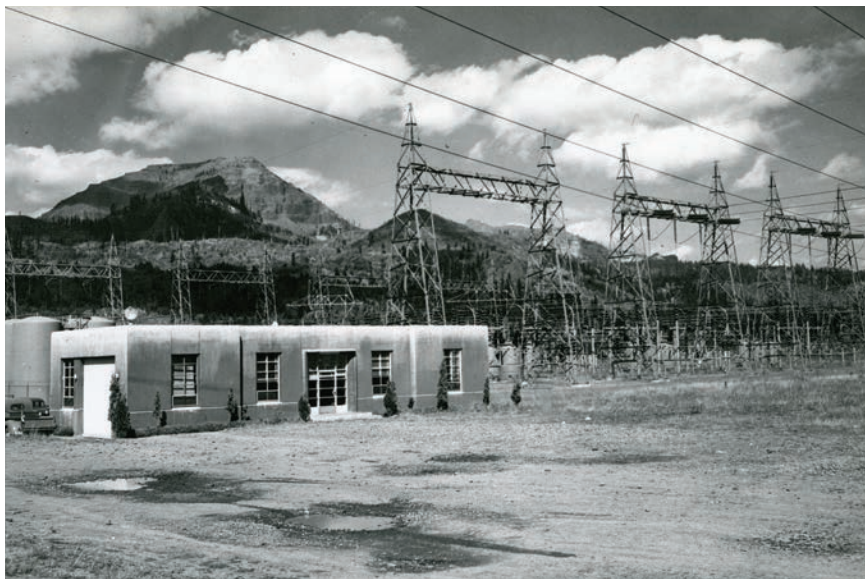


TIER II SWITCHYARD 1941, expanded circa 1966

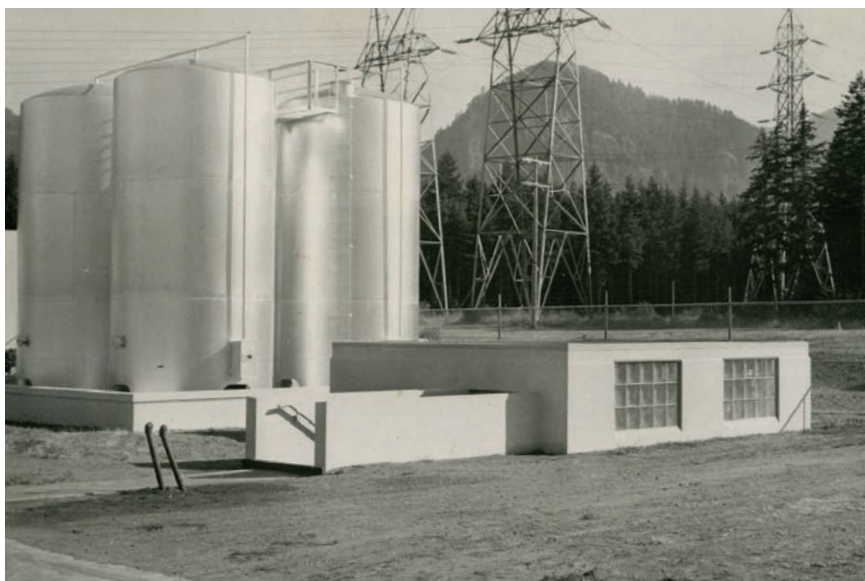
Characteristics:

Flat gravel yard, chain-link fence, concrete paths, aluminum storage sheds, cable tunnel, and 230 kV equipment, including multi-part dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, capacitor banks, and buswork.





Historic photo.



Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ Ostrander Substation
- City

1970		OSTRANDER SUBSTATION
SOUTH REGION		LONGVIEW DISTRICT
OSTD / 16885 Eaden Road S, Oregon City, OR 97045 / Clackamas County		
HISTORIC PAINT: SCHEME A		

History

Earl D. Ostrander Substation (Ostrander Substation) was constructed approximately 11 miles east of Oregon City, Clackamas County, Oregon, to facilitate power transmission from John Day Dam and the Hanford Nuclear Reservation to Portland's eastern metropolitan area. BPA consulted with Ralph Appleman Architects and Associated Engineers for the Control House design, which was also applied to the Marion Substation. James S. Hickey Inc. of Portland, Oregon, constructed the Ostrander Substation's Control House and Maintenance Building for \$273,022. The following month, BPA awarded Nortec Inc. of Portland the \$25,700 Substation design contract and John M. King Company of Tacoma the \$518,396 construction contract. In 1971, a major section of the Hanford–Ostrander 500 kV transmission line was under construction on the right-of-way formerly occupied by the 115 kV Bonneville–Oregon City

Nos. 1 and 2 lines and the 230 kV North Bonneville–Midway No. 2 line. In 1972, BPA awarded John M. King Company of Tacoma, Washington, the \$2,958,183 contract to construct 86.2 miles of the Hanford–Ostrander line in Washington and remove the 230 kV North Bonneville–Midway line. The new Hanford–Ostrander line, with towers fabricated in Japan, was scheduled for energization in October 1973. That same year, BPA continued construction of the Ostrander–Troutdale 500 kV transmission line, with a 500 kV transformer bank at Troutdale. The Ostrander Substation was named for Earl D. Ostrander (1906–1964), a principal financial officer and Division of Administrative Management director for BPA.

Significance

Ostrander Substation is significant under NRHP Criterion A in the area of Government. The Substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). Thirteen transmission lines connect to the Substation's switchyard with voltages ranging from 115 kV to 500 kV, conveying the Substation's important role in BPA's transmission grid. When constructed, the Substation facilitated power transmission from the John Day Dam and the Hanford Nuclear Reservation to Portland's eastern metropolitan area. The Control House is individually significant under Criterion C in the area of Architecture as an exemplary Modern/Brutalist-style control house expressing BPA's beautyity design concepts. It is an exemplary design of Ralph Appleman Architect and Associated Engineers. The building is the best example of BPA's Standard Type 2008 control house.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-711 CONTROL HOUSE/MAINTENANCE	1970	Tier I - Contributing/Individually Eligible
SWITCHYARD	1970	Tier II - Contributing
Z-0000 CABLE TUNNEL	1970	Contributing Feature of Switchyard
Z-7014 FLAMMABLE STORAGE	1993	X - Non-contributing
Z-7015 STORAGE SHED	1993	X - Non-contributing

TIER I Z-711 CONTROL HOUSE/MAINTENANCE 1970

Building Style: Modern/
Brutalist, BPA Standard Type
2008

Exterior Characteristics:

One story, rectangular plan, flat roof, concrete paneled exterior, repeated modular tall narrow aluminum windows with projecting pre-cast concrete frames.

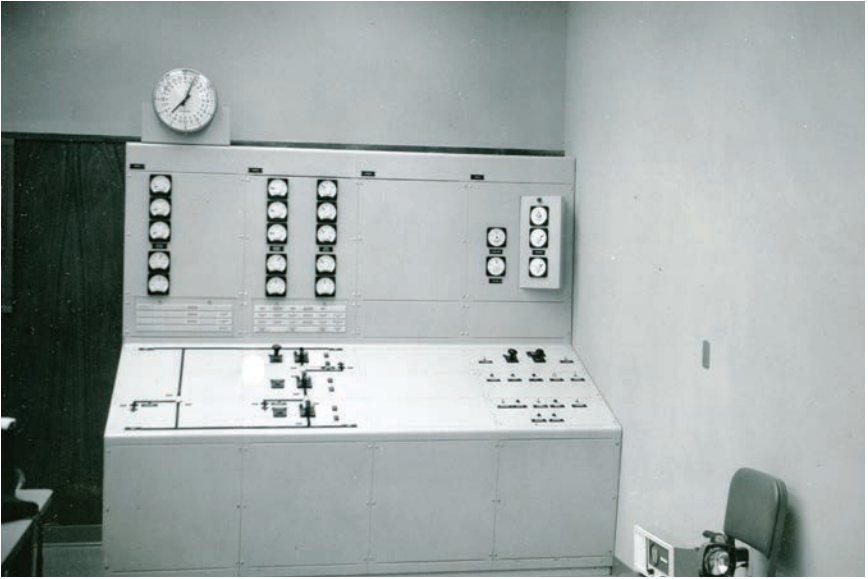


TIER II SWITCHYARD 1970, expanded circa 1966

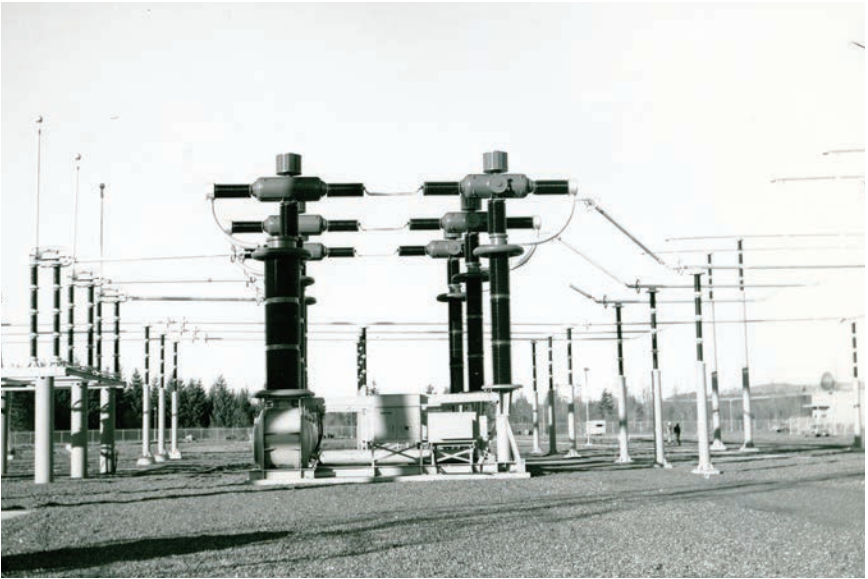
Characteristics:

Flat gravel yard, chain-link fence, concrete paths, aluminum storage sheds, and cable tunnel. 230 kV and 500 kV equipment includes multi-part dead-end towers, power transformers, current transformers, gas circuit breakers, capacitor banks, oil tanks, and buswork.





Historic photo.



Historic photo.

TIER II
SYSTEM
EXPANSION



- Rainier Microwave Radio Station
- City

1950



RAINIER MICROWAVE RADIO STATION



SOUTH
REGION

LONGVIEW
DISTRICT

RAIR / Columbia County, Oregon

History

The Rainier Microwave Radio Station was designed as one component of BPA's initial microwave communication system establishing a connection between the Ross Control Center in Vancouver, Washington, and the Snohomish Substation via stations at Rainier, Chehalis, Olympia, and Squak Mountain. BPA estimated the cost at \$900,000 and, by November 1949, predicted it would be completed in February or March 1950. When placed into service on October 5, 1950, BPA engineer and Design Section chief Richard F. Stevens described the 200-mile section as "the first installation of its size and scope by a power utility," while *The Oregonian* hailed it as the "largest microwave radio communication system in the world" (Stevens, 1950; *The Oregonian*, Oct. 6, 1950). BPA acquired the Rainier Station site from the city of Rainier on June 10, 1949, for \$25. A contract for the construction of the Rainier Station, as well as others at Chehalis, Olympia, and Vancouver, was announced on January 18, 1950. BPA historic photographs indicate the Station was under construction by May 1950.

Significance

The Rainier Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Rainier, Oregon, area. The period of significance for the Station is 1950, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-887 RADIO

Building style: Early Modern, BPA Standard Type 1600

Characteristics: One of BPA's earliest microwave radio station building designs; one-story control building; concrete-block construction; nearly flat roof; asymmetrical entrance with concrete canopy; original glass-block windows are infilled with concrete.

Tower: 4-leg steel lattice



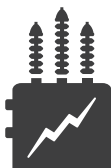
TIER I
MASTER
GRID



- ★ Ross Complex
- City



1940



ROSS COMPLEX



SOUTH
REGION

LONGVIEW
DISTRICT

RSSB/ROHQ / 5411 NE Highway 99, Vancouver, WA 98663 / Clark County

HISTORIC PAINT: 1950 SCHEME

History

The John Delmage (J.D.) Ross (Ross) Complex was constructed in Vancouver, Clark County, Washington. Previously known as Ampere and North Vancouver, Ross is BPA's first and longest-operating substation and was the primary distribution hub for the Master Grid. The Substation covers approximately 278 acres and contains numerous power transmission facilities, such as switchyards, testing facilities, administration buildings, and maintenance structures. BPA energized the Substation Switchyard on April 28, 1940. The Switchyard was the region's largest in terms of load handled, area served, and capital invested. By 1941, the Substation had been renamed to honor (J.D.) Ross. That year, BPA also completed construction of its first office buildings outside of Portland, making the Ross Complex a critical element of the grid. When the Northwest Power Pool was organized in late 1941, BPA had

already spent over \$6 million in equipment and buildings at the Ross Complex. Additional facilities and ongoing development of the Ross Complex continued to increase its importance within the BPA system.

Significance

The Ross Complex is one of BPA's most significant facilities, acting as the hub for BPA's entire transmission system, including power distribution, communication, and maintenance and operations. The Substation has been determined not eligible for listing in the NRHP as a district as more than half of the historic resources have been determined not eligible for the NRHP. However, several individual resources and smaller districts have been identified as NRHP eligible. The 1939/1940 Control House, 230 kV Switchyard, Oil House, Untanking Tower, Cooling Pond, Rail Spurs, and Transformer Rail Carts are eligible under NRHP Criteria A and C in the areas of Government and Architecture. These original elements of BPA's first substation exemplify the modular and streamlined architectural practices of BPA's earliest facilities. The Control House also represents the only remaining example of BPA's Standard Type 109 design. The 1958 Control House and Switchyard are also eligible as a historic district under NRHP Criteria A and C as representative of the post-1949 standardized vault control house and switchyard. The grouping of five test buildings has also been determined eligible for listing in the NRHP as a historic district under Criterion A for their association with the implementation of new technologies and techniques in transmitting electricity during the System Expansion Period (1946–1974). These buildings include the Medium Voltage Testing Station, High Current Test Installation Lab, Mangan High Voltage Lab, Fog Test Site, and Carey High Voltage Lab. The Dittmer Control Center is individually eligible under Criterion A in the area of Communication for its role as the operational and management hub of BPA's system through computer and communication technologies. The BPAX 900 and BPAX 901 transformer rail cars are individually eligible for the NRHP under Criterion A in the area of Government for their contribution to the function and maintenance of BPA's transmission system.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-987 CONTROL HOUSE / ROSS SWITCHYARD	1939	Tier II - Contributing
Z-991 AMPERE BUILDING (South)	1939	Tier II - Contributing Part of Untanking tower
Z-990 AMPERE BUILDING (Untanking Tower)	1940	Tier II - Contributing Part of Untanking tower
Z-989 AMPERE BUILDING (North)	1940	Tier II - Contributing Part of Untanking tower
Z-995 AMPERE ANNEX	1943	Tier II - Contributing Part of Untanking tower
Z-988 STORAGE - OLD OIL HOUSE	1940	Tier II - Contributing
Z-993 DOB #1	1941	Tier II - Contributing
Z-992 COMPLEX COMMUNICATION BUILDING	1943	X - Non-contributing
Z-998 SERVICE STATION (Storage)	1946	X - Non-contributing

CONT. RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-271 CONTROL HOUSE / 345 KV	1958	Tier II - Contributing
Z-760 HIGH VOLTAGE LAB	1961	Tier II - Contributing
Z-503 FOG TEST CHAMBER	1972	Tier II - Contributing
Z-700 CAREY TEST LAB	1972	Tier II - Contributing
ALL OTHER RESOURCES	-	X - Non-contributing
Z-181 RADIO	1950	X - Non-contributing
Z-996 BLACKSMITH SHOP (Medium Voltage Testing)	1953	Tier II - Contributing
Z-258 SHIPPING DOCK	1953	X - Non-contributing
Z-765 PLANT SERVICES ANNEX BLDG	1960	X - Non-contributing
Z-760 HIGH VOLTAGE LAB	1961	Tier II - Contributing
Z-339 MOTOR GENERATOR/HV LAB	1961	X - Non-contributing
Z-638 LOAN POOL STORAGE (Old Capacitor Lab)	1961	X - Non-contributing
Z-761 UTILITY/DISP BLDG (Investment Recover Center)	1961	X - Non-contributing
Z-350 WAREHOUSE GAS CYLINDER STORAGE	1963	X - Non-contributing
Z-367 LANDSCAPERS STORAGE BUILDING	1963	X - Non-contributing
Z-759 ROSS WAREHOUSE (Warehouse/Switchboard Shop)	1963	X - Non-contributing
Z-482 EXPLOSIVES STORAGE	1969	X - Non-contributing
Z-1369 STORAGE GARAGE NO 1	1970	X - Non-contributing
Z-1370 STORAGE GARAGE NO 2	1970	X - Non-contributing
Z-695 DITTMER CONTROL CENTER	1971	Tier I - Contributing/Individually Eligible
Z-503 FOG TEST CHAMBER	1972	Tier II - Contributing
Z-700 CAREY TEST LAB	1972	Tier II - Contributing
Z-814 FLAMMABLE STORAGE	1980	X - Non-contributing
Z-691 CONSTRUCTION MAINTENANCE (TLM Building)	1973	X - Non-contributing

Note: only resources built in or prior to 1974 are included in this table due to the large quantity of buildings and structures present at Ross Complex.

TIER I Z-695 DITTMER CONTROL CENTER 1971

Building Style: Modern/
Brutalist

Exterior Characteristics:

Concrete radio tower, concrete construction, bands of narrow windows.

**TIER II Z-987 CONTROL HOUSE / ROSS 1939**

Building Style: Streamline
Moderne, BPA Standard
Type 109

Exterior Characteristics:

One story, asymmetrical plan with recessed side wings, concrete construction, flat roof, original doors, glass-block sidelights, clerestory window, multi-pane windows.

**TIER II Z-991 AMPERE BUILDING (South) 1939**

Building Style: Streamline
Moderne

Exterior Characteristics:

Part of Untanking Tower, two story, irregular plan, flat roof, loading bays with roll-up garage doors.

**TIER II Z-990 AMPERE BUILDING (Untanking Tower) 1940**

Building Style: Streamline
Moderne, BPA Standard Type
Untanking Tower

Exterior Characteristics:

Tall tower, rectangular plan, concrete construction, flat roof, massive vertical sliding door with multi-light steel windows, multi-pane steel windows.



TIER II Z-989 AMPERE BUILDING (North) 1940

Building Style: Streamline
Moderne

Exterior Characteristics:

Two story, irregular plan, concrete construction, flat roof, entrance with multi-pane sidelights and transom, multiple vehicle bays.



TIER II Z-995 AMPERE ANNEX 1943

Building Style: Streamline
Moderne

Exterior Characteristics:

One story, rectangular plan, concrete construction, flat roof, skylight.



TIER II Z-988 STORAGE - OLD OIL HOUSE 1940

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, concrete construction, flat roof, recessed entrance, steel sash windows.



TIER II Z-993 DOB #1 1941

Building Style: Streamline
Moderne

Exterior Characteristics:

One story, T-shaped plan, cross gable roof with elevated clerestory, multiple window bays.



TIER II Z-996 BLACKSMITH SHOP (Medium Voltage Testing) 1953**Building Style:** Utilitarian**Exterior Characteristics:**

One story, rectangular plan, concrete construction, flat roof, simple cornice, original corner entrance door, original metal windows.

**TIER II Z-271 CONTROL HOUSE / 345 KV 1958****Building Style:** Utilitarian**Exterior Characteristics:**

One story, rectangular plan, low-pitch gable roof, aluminized-steel panel siding, fixed window, metal door.

**TIER II Z-760 HIGH VOLTAGE LAB 1961****Building Style:** Utilitarian**Exterior Characteristics:**

Approximately six stories, rectangular plan, flat roof, aluminum panel siding, roll-up garage doors, original metal sign "Charles E. Carey Testing Station."

**TIER II Z-503 FOG TEST CHAMBER 1972****Building Style:** Utilitarian**Exterior Characteristics:**

One- and two-story sections, rectangular plan, low-pitch shed roofs, aluminized steel panel siding, large sliding doors, aluminum sliding windows.



TIER II Z-700 CAREY TEST LAB 1972

Building Style: Utilitarian

Exterior Characteristics:

Approximately nine stories, rectangular plan, flat roof, seven vertical bays with five horizontal rows, aluminum panel siding, exposed steel structural frame, tall pocket doors.



TIER II SWITCHYARD 1939

Characteristics:

Flat gravel yard, chain-link fence, concrete paths, historic lamp-posts and light fixtures, and aluminum storage sheds. 115 kV, 230 kV, and 345 kV equipment includes dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, and buswork.



Historic photo, Dittmer.



Historic photo, control house.



Historic photo, lab.



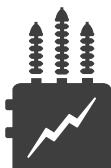
Historic photo, untanking tower.

TIER I
MASTER
GRID



- ▲ St. Johns Substation
- City

1941



ST. JOHNS SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

STJO / 12567 N Columbia Boulevard, Portland, OR 97203 / Multnomah County

HISTORIC PAINT: 1950 SCHEME

History

St. Johns Substation was constructed approximately 3 miles northwest of St. Johns, Multnomah County, Oregon to provide power to Portland, Portland General Electric Company, and vital war-era industries such as the Electro Metallurgical Company and shipbuilding facilities. The Substation was located in a “concentrated load center” and maintained all of the Portland area’s switching facilities (Bonneville Power Administration, 1940). The Substation also contained the switchgear for BPA’s Vancouver–Eugene and St. Johns–Astoria 115 kV lines transmitting power from Bonneville Dam to the Willamette Valley and the Oregon Coast. St. Johns Substation received power from two 115 kV transmission lines originating at North Vancouver Substation (Ross Complex) and delivered power to the Salem, Albany, and Eugene Substations. In June 1940, before St. Johns

Substation was completed, BPA contracted with Pacific Power and Light Company (Pacific Power) to distribute excess energy over the Pacific Power transmission lines from the St. Johns Substation to Clatsop County, Oregon. BPA continued to install major additions and new transmission lines in the 1950s to enhance the power delivery in the Salem, Forest Grove, and McMinnville areas as well as relieve Portland power overloads.

Significance

St. Johns Substation is significant under NRHP Criterion A in the areas of Commerce and Industry. The Substation's establishment impacted business and industrial development throughout the region, most clearly demonstrated by the creation of defense-related shipyards during World War II. The Substation also reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). The Control House is individually significant under Criterion C in the area of Architecture for exemplifying the Streamline Moderne style.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-900 CONTROL HOUSE	1941	Tier I - Contributing/Individually Eligible
Z-899 STORAGE - OLD OIL HOUSE	1941	Tier II - Contributing
Z-898 STORAGE	1951	Tier II - Contributing
SWITCHYARD	1941	Tier II - Contributing
RAILROAD	1941	Tier II - Contributing

TIER I Z-900 CONTROL HOUSE 1941

Building Style: Streamline Moderne, BPA Standard
Type 110

Exterior Characteristics:

One story, rectangular plan, flat
One story, concrete construction, flat roof with parapet, curved walls, concrete canopy, steel multi-pane windows, curved metal railing.

Interior Characteristics:

Brass wall registers.



TIER II Z-899 STORAGE - OLD OIL HOUSE 1941

Building Style: Utilitarian, BPA Standard Type Oil House

Exterior Characteristics:

One story, rectangular plan, concrete construction, flat roof, grooved lintel belt, multi-pane steel windows, sconce.

Interior Characteristics:

Metal light fixtures



TIER II Z-898 STORAGE 1951

Building Style: Utilitarian, BPA Standard Type 1

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, flat roof, fixed metal window.



TIER II SWITCHYARD 1941, expanded circa 1963

Characteristics:

Flat gravel yard, chain-link fence, concrete paths, historic light fixtures, transfer track rails and cart. 115 kV and 230 kV equipment includes original box-like superstructure, dead-end towers, power transformers, potential transformers, oil circuit breakers, and buswork.

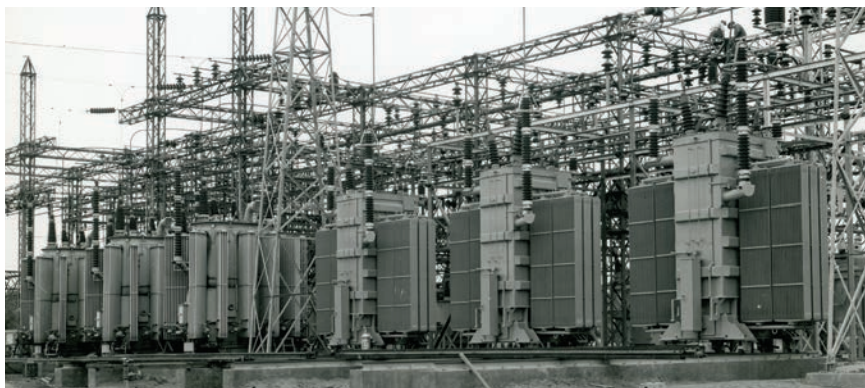


TIER II RAILROAD 1941

BPA Standard Type: Rails

Characteristics: Steel rails





Historic photo, switchyard.



Historic photo, control house.



Transfer track.

TIER II
SYSTEM
EXPANSION

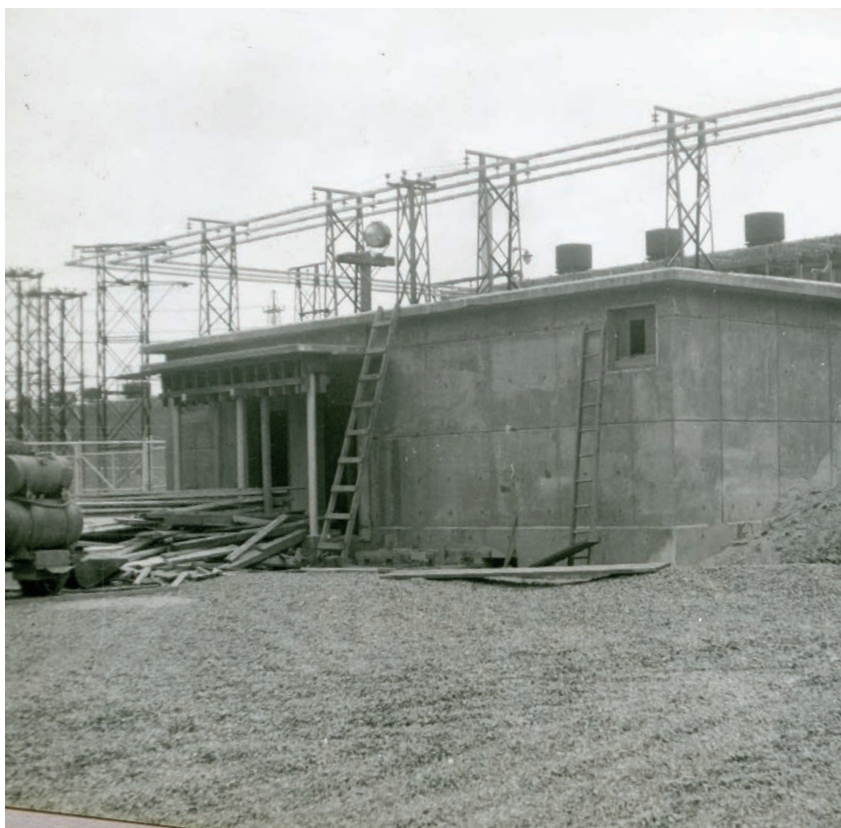


- Troutdale Microwave Radio Station
- City

1953



TROUTDALE MOUNTAIN MICROWAVE RADIO STATION



SOUTH
REGION

LONGVIEW
DISTRICT

TRMH / Multnomah County, Oregon

History

The Troutdale Microwave Radio Station was constructed circa 1953 as a branch spur of Ross–Spokane, BPA's second microwave communication circuit. The circuit connected the Ross Control Center in Vancouver, Washington, with Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee dams and other intermediate substations. The circuit was the first microwave installation to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. BPA historic photographs indicate construction of the Troutdale Microwave Radio Station had begun by June 1952.

Significance

The Troutdale Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Troutdale, Oregon, area. The period of significance for the Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-880 RADIO

Building style: Modern, BPA Standard Type 1605

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at left) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



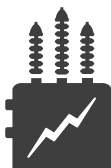
TIER I
MASTER
GRID



- ▲ Troutdale Substation
- City



1942



TROUTDALE SUBSTATION



SOUTH
REGION

LONGVIEW
DISTRICT

TROU / 2702 NW Sundial Road, Troutdale, OR 97060 / Multnomah County

HISTORIC PAINT: 1950 SCHEME

History

Troutdale Substation was constructed in Troutdale, Multnomah County, Oregon, on the south bank of the Columbia River in an area heavily developed for industrial use. BPA energized the temporary 115 kV facilities in April 1942 to power the Troutdale aluminum plant, built by the federal government and operated for the Department of Defense. By September that year, BPA energized 230 kV feeder lines to the plant. The plant was one of nine aluminum facilities operated in the Pacific Northwest beginning in 1939. The Troutdale Substation Control House and Oil House were completed by January 1943. In 1946, Reynolds Metal Company leased the plant and later purchased it. The plant was known as the Reynolds Metal Company Troutdale Aluminum Reduction Plant until it was decommissioned in 2000. The Substation's Untanking Tower and Condenser Building were removed in 2004.

Significance

Constructed by BPA to power the adjacent aluminum reduction plant (now demolished), Troutdale Substation is significantly associated with aluminum production and defense-related industrial development in the region. Due to the substation's diminished integrity, it is not eligible as a historic district. The Control House is individually eligible under NRHP Criterion C in the area of Architecture for exemplifying the Streamline Moderne style deployed by BPA during its Master Grid Development Period (1938–1945). The Control House is a rare example of BPA's brick building designs. The building is the second-best example of BPA's Standard Type 150 design, after the Tacoma Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-888 CONTROL HOUSE	1943	Tier I - Individually Eligible
Z-880 RADIO	1943	Tier II - Eligible–See Troutdale Microwave Radio Station
Z-309 ENGINE GENERATOR BUILDING	1958	X - Non-contributing
Z-706 RELAY HOUSE	1969	X - Non-contributing
SWITCHYARD	1942	X - Non-contributing
Z-8083 SITE - RAILROAD	1942	X - Non-contributing
Z-5101 MAINTENANCE STORAGE	1978	X - Non-contributing

TIER I Z-888 CONTROL HOUSE 1943

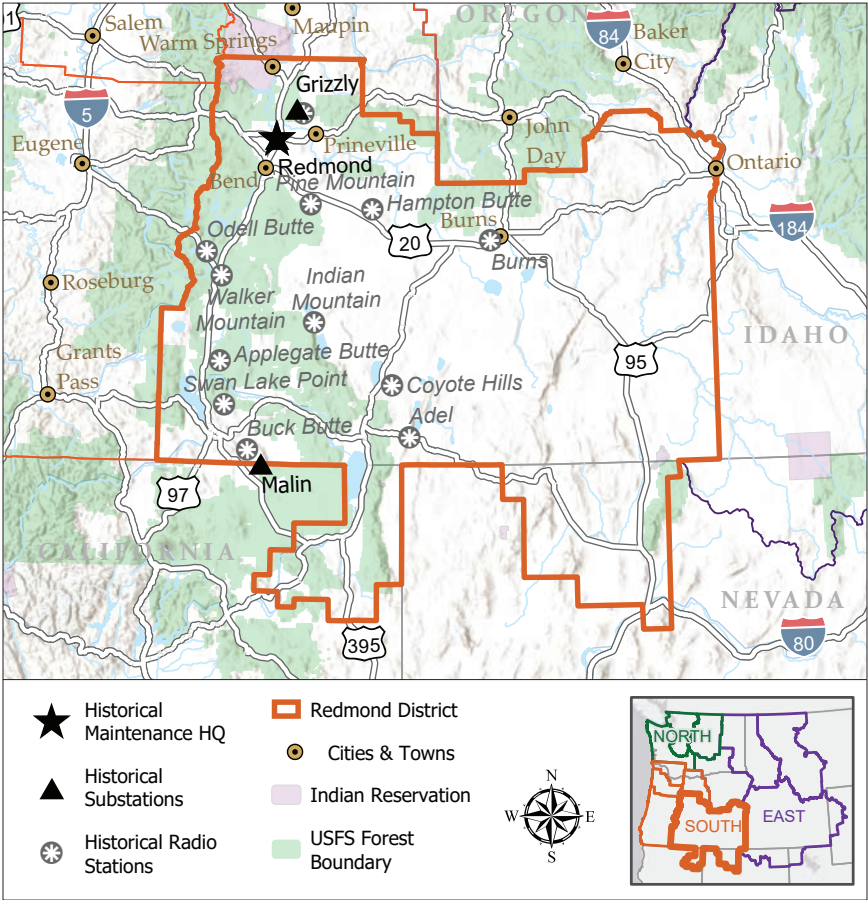
Building Style: Streamline Moderne, BPA Standard Type 150

Exterior Characteristics:

Tall one story with two shorter wings, rectangular plan, flat roof with parapet, exposed brick with full height pilasters, in-kind replacement steel windows.



REDMOND DISTRICT



LOCATION	HISTORICAL SIGNIFICANCE
Applegate Butte Microwave Radio Station	X
Buck Butte Microwave Radio Station	X
Grizzly Mountain Microwave Radio Station	X
Grizzly Substation	X
Hampton Butte Microwave Radio Station.....	X
Indian Mountain Microwave Radio Station	X
Malin Substation.....	X
Pine Mountain Microwave Radio Station	X
Redmond Substation and Maintenance Headquarters.....	TIER III
Swan Lake Point Microwave Radio Station	X

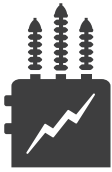
TIER III
SYSTEM
EXPANSION



- ★ Redmond Substation & Maintenance HQ
- City
- Redmond District



1952



REDMOND SUBSTATION AND MAINTENANCE HEADQUARTERS



SOUTH
REGION

REDMOND
DISTRICT

RDMD/RDHQ / 3655 SW Highland Avenue, Redmond, OR 97756 / Deschutes County

HISTORIC PAINT: 1950 SCHEME

History and Significance

Redmond Substation and Maintenance Headquarters near Redmond, Oregon, was constructed to deliver power to Central Oregon utilities and is associated with community and industrial development in the region. BPA substantially expanded the Substation with completion of a Maintenance Headquarters and heliport in 1969, designed by Barnard & Holloway Architects. Substantial alterations to the Substation have diminished its integrity, and it is not eligible for the NRHP. However, the heliport is a notable resource as a rare and distinct building type associated with BPA's System Expansion Period from 1946 to 1974.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-717 HELIPORT	1969	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-717 HELIPORT 1969

Building Style: Streamline Moderne, BPA Standard Type 150

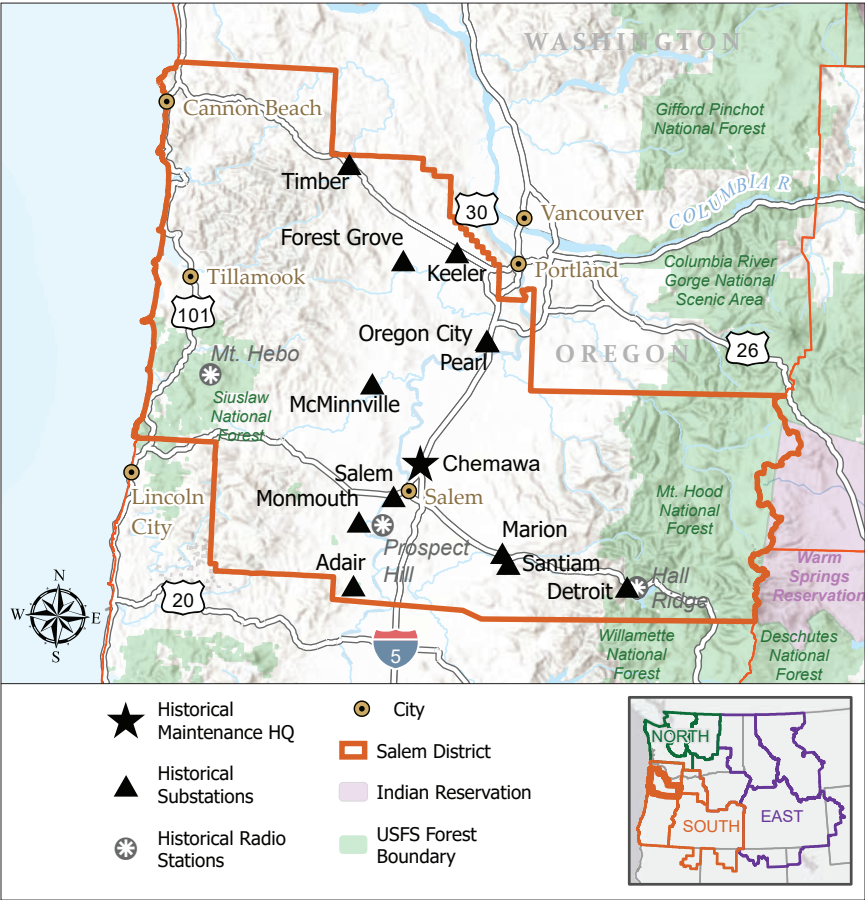
Exterior Characteristics:

Tall one story with two shorter wings, rectangular plan, flat roof with parapet, exposed brick with full height pilasters, in-kind replacement steel windows



Historic photo

SALEM DISTRICT



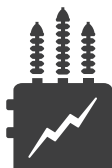
LOCATION	HISTORICAL SIGNIFICANCE
Adair Substation	TIER II
Chemawa Substation and Maintenance Headquarters	TIER II
Detroit Substation	TIER II
Forest Grove Substation	TIER III
Hall Ridge Microwave Radio Station.....	TIER II
Keeler Substation.....	TIER III
Marion Substation	TIER II
McMinnville Substation	X
Monmouth Substation.....	TIER II
Mt. Hebo Microwave Radio Station	X
Oregon City Substation	TIER II
Pearl Substation	TIER III
Prospect Hill Microwave Radio Station.....	X
Salem Substation	TIER I
Santiam Substation.....	TIER II
Timber Substation	TIER II

TIER II
SYSTEM
EXPANSION



- ▲ Adair Substation
- City
- Salem District

1969



ADAIR SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

ADAR / Quinlan Road, Monmouth, OR 97361 / Benton County

HISTORIC PAINT: SCHEME A

History

Adair Substation was constructed in Adair Village approximately 5.5 miles north of Lewisburg, Benton County, Oregon, to serve customers of Consumer's Power, Inc., in the Camp Adair, Albany, and Monmouth areas. BPA contracted with Poysky Construction Company of Clatskanie, Oregon, for \$31,489 to construct the Adair Substation.

Significance

Adair Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the local public utility district for distribution to communities in the Willamette Valley and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-465 CONTROL HOUSE	1969	Tier II - Contributing
SWITCHYARD	1969	Tier II - Contributing

TIER II Z-465 CONTROL HOUSE 1969

Building Style: Utilitarian,
BPA Standard Type 193

Exterior Characteristics:

One story, aluminum panel construction, flat roof clad in standing seam sheet metal, simple entrances and windows.

Interior Characteristics:

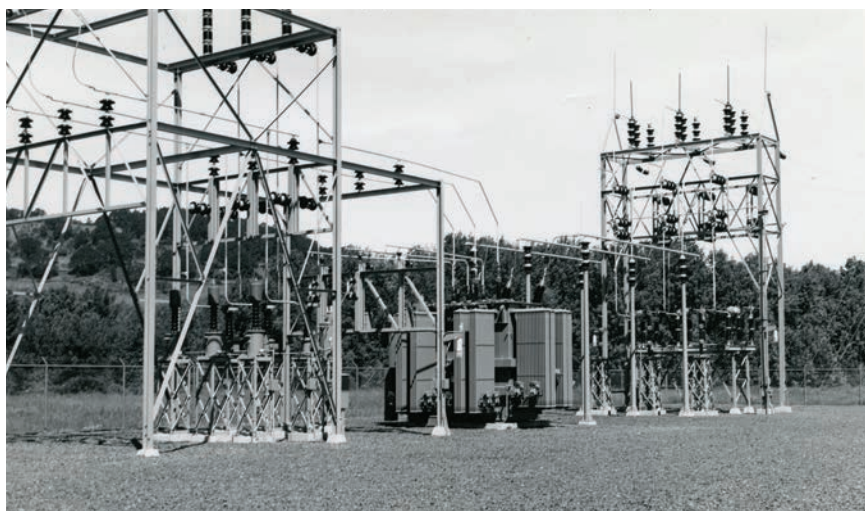
Concrete flooring, hardboard walls and ceiling, overhead linear fluorescent lighting.



TIER II SWITCHYARD 1969

Characteristics:

Small, flat, rectangular gravel yard; chain-link fence; 115 kV equipment, including steel lattice superstructure, one power transformer, current transformers, potential transformers, gas circuit breakers, and buswork.



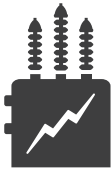
Historic photo.

TIER II
SYSTEM
EXPANSION



- ★ Chemawa Sub & Maintenance HQ
- City
- Salem District



1954		CHEMAWA SUBSTATION AND MAINTENANCE HEADQUARTERS
		
SOUTH REGION	SALEM DISTRICT	
CHEM/CHHQ / 2715 Tepper Lane NE, Keizer, OR 97303 / Marion County		
HISTORIC PAINT: 1956 SCHEME		

History

Chemawa Substation and Maintenance Headquarters was constructed at Keizer, near Salem, Marion County, Oregon, to serve local Portland General Electric Company (PGE) customers. Chemawa Substation was part of the first circuit designed to deliver power from the new McNary Dam into the Willamette Valley. In June 1953, BPA contracted with Charles R. Schmiedeskamp of Portland, Oregon, for \$92,418 to build the Substation Control House and Oil House. When energized, the Substation received power from the Columbia and Willamette rivers and connected with BPA's existing 115 kV Oregon City–Chemawa transmission line. In 1955, BPA began work on a new 230 kV transmission line between the Santiam and Chemawa Substations to provide additional service to PGE. The line also delivered BPA power into the Willamette Valley areas between Salem and Eugene. BPA con-

tinued to improve the Chemawa Substation facilities during the 1950s and 1960s with new equipment such as steel dead-end towers for a new 230 kV line from Oregon City, high-voltage/high-speed circuit breakers, transmission line terminals, and capacitors.

Significance

Chemawa Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided an important interconnection for power distribution to communities in Oregon's Willamette Valley and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the best example of BPA's Standard Type 125 design.

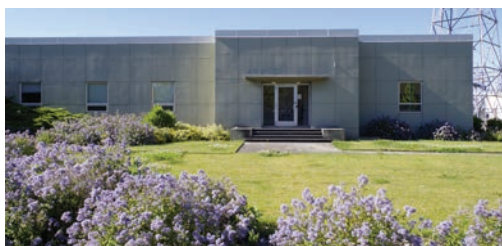
RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-934 CONTROL HOUSE	1954	Tier II - Contributing
Z-359 ENGINE GENERATOR BUILDING	1963	Tier II - Contributing
SWITCHYARD	1954	Tier II - Contributing
Z-8190 RAILROAD	1954	Tier II - Contributing
Z-8183 CABLE TUNNEL	1954	Contributing Feature of Switchyard
Z-667 STORAGE	1977	X - Non-contributing
Z-670 O&M HEADQUARTERS BUILDING	1977	X - Non-contributing
Z-623 VEHICLE STORAGE	1982	X - Non-contributing
Z-1286 FLAMMABLE STORAGE	1990	X - Non-contributing
Z-1287 VEHICLE STORAGE	1990	X - Non-contributing
Z-1303 VEHICLE STORAGE	1995	X - Non-contributing
Z-1410 TLM STORAGE	1995	X - Non-contributing
Z-5240 STORAGE	1995	X - Non-contributing
Z-9128 FUELING STATION	1995	X - Non-contributing
Z-9127 WASH RACK	2014	X - Non-contributing

TIER II Z-934 CONTROL HOUSE 1954

Building Style: Modern,
BPA Standard Type 125

Exterior Characteristics:

One story, steel and concrete frame construction, flat roof, cast-in-place concrete exterior with grid pattern, steel and glass door with sidelights.



Interior Characteristics:

Original glass lamps and pendant light fixtures

TIER II Z-359 ENGINE GENERATOR BUILDING 1963

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, shed roof, metal door



TIER II SWITCHYARD 1954, expanded 1956, circa 1963, and circa 1966

Characteristics:

Flat gravel yard, chain-link fence, concrete paths, historic light fixtures, transfer track rails and cart. 115 kV and 230 kV equipment includes original box-like superstructure, dead-end towers, power transformers, potential transformers, oil circuit breakers, and buswork.



TIER II Z-8190 RAILROAD 1954

BPA Standard Type: Rails

Characteristics: Steel rails





Historic photo.



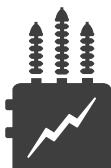
Historic photo.

TIER II
SYSTEM
EXPANSION



- ▲ Detroit Substation
- City
- Salem District

1952



DETROIT SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

DETR / Detroit Dam Powerhouse Road, Mill City, OR 97360 / Marion County

HISTORIC PAINT: 1950 SCHEME

History

Detroit Substation was constructed approximately 8 miles southeast of Gates, Marion County, Washington, to power construction of the Detroit and Big Cliff dams. The Detroit Dam is part of the U.S. Army Corps of Engineers' Willamette Valley Project, which involved construction of seven dams for flood control and hydroelectric generation. In 1953, after the dams were completed and generating power, the Detroit Substation integrated the dam generation with the BPA system. In addition to completing the Detroit Substation, BPA also completed an important 230 kV Midway–Detroit transmission line in 1952 to tie in the existing power facilities between Grand Coulee Dam and Midway as well as Detroit Dam and Alvey Substation. The new line established a direct 230 kV transmission circuit between Grand Coulee Dam and west-central Oregon.

Significance

Detroit Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power for the construction of the Detroit Dam and Big Cliff Dam on the Santiam River. Following construction, the Substation transmitted hydroelectric power to the grid, reflecting BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-77 CONTROL HOUSE	1952	Tier II - Contributing
SWITCHYARD	1952	Tier II - Contributing

TIER II Z-77 CONTROL HOUSE 1952

Building Style: Utilitarian,
BPA Standard Type 190

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, steel casement windows,
metal door, historic light fixture.



TIER II SWITCHYARD 1952, expanded circa 1956

Characteristics:
Small flat gravel yard, chain-link fence, 230 kV equipment, including dead-end towers, potential transformers (no power transformer), gas circuit breaker, and buswork.



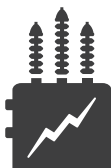
Historic photo.

TIER III
SYSTEM
EXPANSION



- ▲ Forest Grove Substation
- City
- Salem District

1946



FOREST GROVE SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

FORG / 2300 Oak Street, Forest Grove, OR 97116 / Washington County

HISTORIC PAINT: 1950 SCHEME (SWITCHYARD),
SCHEME A (CONTROL HOUSE)

History and Significance

Forest Grove Substation was constructed in 1946 to serve the city of Forest Grove, Oregon and to increase power supply to Yamhill County. BPA expanded the Substation in 1968 and constructed a new Control House. The Substation is associated with community development in the region. The replacement of the original Control House and alterations to the Switchyard has diminished the Substation’s integrity, and the district is not eligible for the NRHP. However, the Control House remains relatively unaltered and is a notable resource representing BPA’s standardized Type 144-1 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-735 CONTROL HOUSE	1968	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-735 CONTROL HOUSE 1968

Building Style: Minimal
Traditional, BPA Standard
Type 144-1

Exterior Characteristics:
One story, rectangular plan, concrete masonry unit construction, hipped roof, wide eaves, metal window, wall sconce

Interior Characteristics:
Overhead glass light fixture in bathroom, overhead metal dome light fixture in storage room, overhead light fixtures in battery room



TIER II
SYSTEM
EXPANSION



- ⊛ Hall Ridge Microwave Radio Station
- City
- Salem District

1973



HALL RIDGE MICROWAVE RADIO STATION



SOUTH
REGION

SALEM
DISTRICT

HALL / Marion County, Oregon

History

BPA internal records indicate the USFS granted BPA permission to construct and maintain the Hall Ridge Microwave Radio Station on USFS land in August 1969. The Station appears to have been constructed as part of a microwave spur from the Mario Substation and the Prospect Hill Microwave Radio Station.

Significance

The Hall Ridge Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Detroit, Oregon, area. The period of significance for the Station is 1973, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-523 RADIO

Building style: Utilitarian, BPA Standard Type 1136-1

Characteristics: One-story aluminum-panel control building; nearly flat roof; single entrance with no windows.

Tower: 3-leg steel lattice

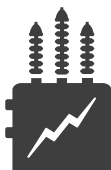


TIER III
SYSTEM
EXPANSION



- ▲ Keeler Substation
- City
- Salem District

1956



KEELER SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

KEEL / 4123 NW Rickey Terrace, Hillsboro, OR 97124 / Washington County

HISTORIC PAINT: 1956 SCHEME

History and Significance

Doris Rae Keeler (Keeler) Substation was constructed in Hillsboro, Washington County, Oregon, as part of BPA's postwar plan to improve electrical supply and distribute power from McNary Dam to the growing Portland–Vancouver region. Originally known as “Bethany,” the substation was named for Doris Rae Keeler, BPA's third employee and first female employee. Keeler was a licensed Oregon attorney and, in 1938, was appointed as assistant to the general counsel at BPA. Keeler specialized in property acquisition and contracts and pioneered legal processes related to BPA procurements and construction during the 1940s and 1950s. The Substation no longer conveys its significance as a historic district and is not eligible for the NRHP.

However, the Control House and Oil House are notable resources as rare and distinct building types associated with BPA's System Expansion Period from 1946 to 1974. The Control House represents the only remaining example of BPA's Standard Type 121 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-818 CONTROL HOUSE	1957	Tier III - Notable but Not Eligible
Z-817 OIL HOUSE	1957	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-735 CONTROL HOUSE 1957

Building Style: Modern,
BPA Standard Type 121

Exterior Characteristics:

Two story, concrete construction, flat roof, smooth concrete finish with grid pattern, multi-pane metal windows

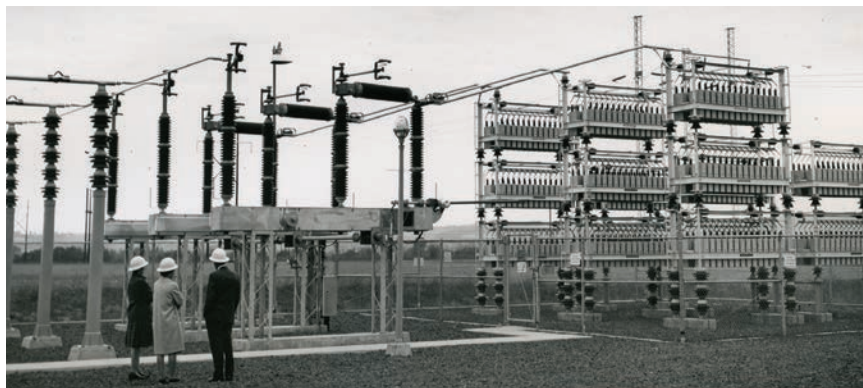


TIER III Z-817 OIL HOUSE 1957

Building Style: Utilitarian

Exterior Characteristics:

One story, front-gable roof, wood frame construction, metal panel siding, multi-pane metal window, bronze dedication plaque



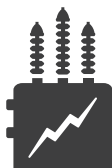
Historic photo, 1966

TIER II
SYSTEM
EXPANSION



- ▲ Marion Substation
- City
- Salem District

1970



MARION SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

MARN / 17483 Old Mehama Road SE, Stayton, OR 97383 / Marion County

HISTORIC PAINT: SCHEME A

History

Marion Substation was constructed in Stayton, Oregon, to deliver power to the Eugene area. BPA consulted with Ralph Appleman Architects and Associated Engineers for the Control House and Maintenance Building designs. Appleman's control house design was also applied to the Ostrander Substation. During fiscal year 1966, several BPA construction projects related to the proposed Marion Substation were underway. The new 129-mile transmission lines between the John Day and Marion Substations completed the 500 kV loop from the main grid into Marion Substation. This provided alternate east-west transmission into the Willamette Valley. In addition, the 72-mile, 500 kV Marion-Lane line, energized in 1970, provided a second 500 kV line to Eugene.

Significance

Marion Substation is significant under NRHP Criterion A in the area of Government. The Substation is representative of BPA's growth and transmission of high-voltage power to the Pacific Northwest's growing urban populations during the System Expansion period (1946–1974). The Substation also held an important role as a high-voltage switching facility to complete BPA's 500 kV transmission loop. The Control House represents the second-best example of BPA's Standard Type 2008 design, after the Ostrander Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-709 CONTROL HOUSE / MAINTENANCE	1970	Tier II - Contributing
SWITCHYARD	1970	Tier II - Contributing
Z-8152 CABLE TUNNEL	1970	Contributing Feature of Switchyard

TIER II Z-709 CONTROL HOUSE / MAINTENANCE 1970

Building Style: Modern/
Brutalist, BPA Standard
Type 2008

Exterior Characteristics:

One story, rectangular plan, concrete construction, flat roof, concrete panel exterior with stucco-like texture, repeated narrow modular windows, recessed glass and metal entrance

Interior Characteristics:

Wood paneling



TIER II SWITCHYARD 1970

Characteristics:

Flat gravel yard, chain-link fence, aluminum storage sheds, and cable tunnel. 500 kV equipment includes dead-end towers, power transformers, potential transformers, gas circuit breakers, capacitor bank, oil tanks, and buswork.

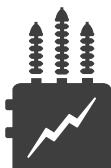


TIER II
SYSTEM
EXPANSION



- ▲ Monmouth Substation
- City
- Salem District

1954



MONMOUTH SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

MONM / Hoffman Road, Independence, OR 97351 / Polk County

HISTORIC PAINT: 1950 SCHEME

History

Monmouth Substation was constructed approximately 2 miles northeast of Monmouth, Polk County, Oregon, to serve the city of Monmouth and vicinity. In November 1940, J. E. Winegar sold property to BPA in Monmouth's northern section for a substation site. The associated transmission lines followed the route of an abandoned railroad that extended northwest of town into Monmouth. In August 1948, BPA contracted with L. H. Leonardi Electric Construction Company of San Rafael, California, for \$63,085 to build the 23-mile Salem-Albany No. 2 transmission line. After completion of the Monmouth Substation, the line provided additional service to Monmouth's municipal electric system. The new three-phase 115 kV Substation, energized in December 1948, provided increased capacity and improved voltage conditions for Monmouth and the Benton-Lincoln Electric Cooperative. The

substation was rebuilt in 1954 with a new control house and switchyard equipment. In July 1970, BPA completed an expansion of the Monmouth Substation, which involved a power transformer upgrade and installation of additional equipment.

Significance

Monmouth Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the local public utility district for distribution to rural communities in the Willamette Valley and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-179 CONTROL HOUSE	1954	Tier II - Contributing
SWITCHYARD	1954	Tier II - Contributing
Z-7389 OIL ABSORBENTS BUILDING	1954	X - Non-contributing

TIER II Z-179 CONTROL HOUSE 1954

Building Style: Utilitarian,
BPA Standard Type 190

Exterior Characteristics:

One story, rectangular plan, metal panel construction, flat roof, multi-pane metal windows, metal door, metal canopy.



TIER II SWITCHYARD 1954, expanded circa 1971

Characteristics:

Flat gravel yard, chain-link fence, aluminum storage shed, and 115 kV equipment, including dead-end towers, power transformers, potential transformers, gas circuit breakers, capacitor bank, oil tank, and buswork.



TIER II
MASTER
GRID



- ▲ Oregon City Substation
- City
- Salem District

1941



OREGON CITY SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

OREC / 10015 SW Ridder Road, Wilsonville, OR 97070 / Washington County

HISTORIC PAINT: 1950 SCHEME

History

Oregon City Substation was constructed in Oregon City, Clackamas County, Oregon, to supply power to Portland and the Willamette Valley. The Substation cost about \$400,000 to build. Approximately 250 Works Progress Administration (WPA) workers prepared for construction of the 51.2-mile Bonneville–Oregon City transmission line by cutting through timber on Larch Mountain's southwestern side. Another 100 WPA workers, based at Bonneville's Camp Moffitt, labored on the mountain's eastern side. Construction of the new double-circuit line was expedited to transmit power to defense industries in and around Portland. In 1951, BPA authorized the installation of supervisory equipment to provide remote control of the Oregon City Substation from the Ross Complex. The equipment replaced four operators at the Oregon City Substation. In 1952, BPA installed a new 100,000 kV transformer and hired Juhr &

Sons of Portland to construct control house additions for \$42,658. In 1964, BPA contracted with Witzig Construction Company, Inc. to remove connections, control wiring, and concrete footings from the Oregon City Substation and install them at the McMinnville Substation to provide for McMinnville's increasing power demands. In 1968, BPA constructed the Pearl Substation across Ridder Road from the Oregon City Substation to further develop the 500 kV transmission system.

Significance

Oregon City Substation is significant under NRHP Criterion A in the areas of Commerce and Industry. The Substation's establishment impacted business and industrial development throughout the region, most clearly demonstrated by its supply of power to defense-related industries in Portland and the Willamette Valley during World War II. The Substation also reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). The Control House represents the only remaining example of BPA's Standard Type 120 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-980 CONTROL HOUSE	1943	Tier II - Contributing
Z-981 PUMP HOUSE	1953	Tier II - Contributing
SWITCHYARD	1941	Tier II - Contributing
Z-0000 RAILROAD	1943	Tier II - Contributing

TIER II Z-980 CONTROL HOUSE 1943

Building Style: Streamline Moderne, BPA Standard Type 120

Exterior Characteristics:
One story, concrete construction, flat roof with parapet, curved walls, concrete canopy, steel and glass door, wood windows.

Characteristics:
Brass wall registers



TIER II Z-981 PUMP HOUSE 1953

Building Style: Utilitarian

Exterior Characteristics:
One story, rectangular plan, concrete masonry unit construction, flat roof, double wood door, multi-pane metal windows.



TIER II SWITCHYARD 1941, expanded circa 1971

Characteristics:

Flat gravel yard, chain-link fence, historic light fixtures, concrete paths, and transfer track rails. 115 kV equipment includes dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, capacitor bank, oil tank, and buswork.



TIER II Z-0000 RAILROAD 1943

BPA Standard Type: Rails

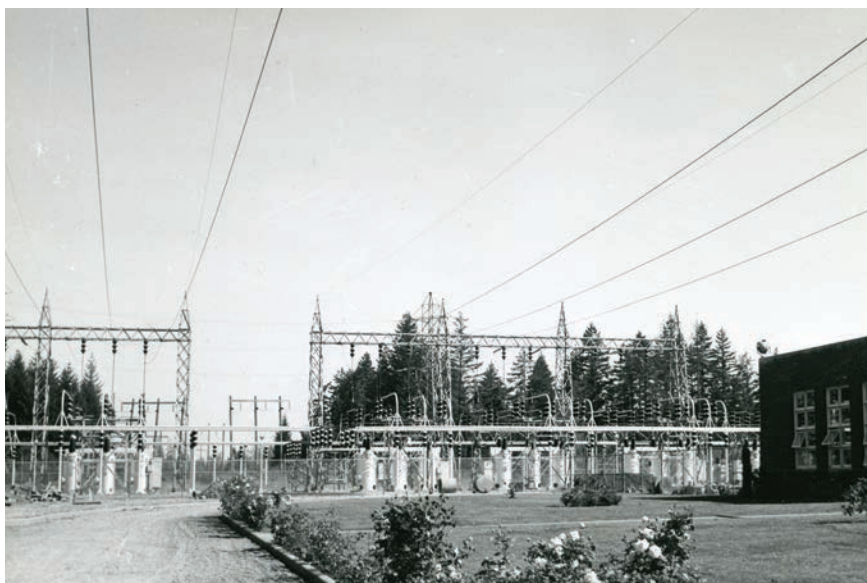
Characteristics:

Steel rails





Historic photo.



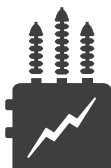
Historic photo.

TIER III
SYSTEM
EXPANSION



- ▲ Oregon City Substation
- City
- Salem District

1968



PEARL SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

PERL / 10000 SW Ridder Road, Wilsonville, OR 97070 / Clackamas County

HISTORIC PAINT: SCHEME A

History and Significance

Pearl Substation in Wilsonville, Oregon, was constructed to provide additional service to the swiftly developing Portland area and is associated with community development in the region. The Pearl Substation was named after William A. Pearl, BPA Administrator from 1954 to 1961 . Substantial alterations to the Control House/ Maintenance Building and Switchyard have diminished the Substation’s integrity and it is not eligible for the NRHP. However, the Control House/Maintenance Building is a notable resource as a rare and distinct building type associated with BPA’s System Expansion Period from 1946 to 1974.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-716 CONTROL HOUSE/MAINTENANCE	1968	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-716 CONTROL HOUSE / MAINTENANCE 1968

Building Style: International

Characteristics:

N/A (ranked for name association)



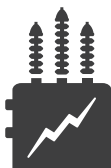
TIER I
MASTER
GRID



- ▲ Salem Substation
- City
- Salem District



1942



SALEM SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

SALE / 3105 Dallas Highway, Salem, OR 97304 / Polk County

HISTORIC PAINT: 1950 SCHEME

History

Salem Substation, constructed approximately 3 miles west of Salem, Polk County, Oregon, enhanced service to local Portland General Electric Company customers and provided a terminus for BPA's wholesale customers in Marion, Yamhill, Linn, Polk, and Benton counties. BPA acquired the Substation site, a former ranch, on March 21, 1940, and used temporary substation structures until the permanent ones were completed. H. Hoffman of Portland, Oregon, constructed the Control House for \$59,975. The "modernistic concrete building" had a three-story untanking tower, equipped with a traveling ceiling crane, for overhauling transformers and circuit breakers (*Oregon Statesman*, 1940). This was the first instance in which BPA combined the control, untanking, and condenser units into a single building. During Substation construction in summer 1940, BPA leased a lot along Second Street in Salem. There, tons

of machinery and equipment arrived by rail from the Allis-Chalmers Company in Milwaukee, Wisconsin, the General Electric Company in Philadelphia, and the Westinghouse companies. The items were unloaded from Southern Pacific rail cars for delivery to the Substation. In June 1945, the Substation became a secondary delivery point for the Salem Electric Cooperative, and a new transmission line to the Substation began transmitting power to the Salem aluminum plant and the North Salem vicinity. The same transmission load also served the Capitol Lumber Company and a new lumber waste by-products plant. In November 1955, BPA contracted with Mann Construction Company of Redmond, Oregon, for \$23,264 to construct a 2,400-square-foot substation maintenance and storage building.

Significance

Salem Substation is significant under NRHP Criteria A and C in the areas of Commerce, Industry, and Architecture. The Substation's establishment impacted business and industrial development throughout the region and reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). The Control House is individually significant under Criterion C in the area of Architecture as it depicts the Streamline Moderne style. The building represents the only remaining example of BPA's Standard Type 105 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-936 CONTROL HOUSE	1942	Tier I - Contributing/Individually Eligible
Z-935 OIL HOUSE	1942	Tier II - Contributing
Z-816 MAINTENANCE	1956	Tier II - Contributing
SWITCHYARD	1942	Tier II - Contributing
Z-8175 RAILROAD	1942	Tier II - Contributing
Z-0000 STORAGE SHED	1962	X - Non-contributing

TIER I Z-936 CONTROL HOUSE 1942

Building Style: Streamline Moderne, BPA Standard Type 105

Exterior Characteristics:

Tall central untanking tower with symmetrical wings, concrete construction, flat roof with concrete parapet, projecting entrance, corbeled corners, concrete dentils, steel multi-pane windows and transoms.



Interior Characteristics: Brass wall registers, ceramic tile sills, pendant globular light fixtures, original tower ceiling light fixtures.

TIER II Z-935 OIL HOUSE 1942

Building Style: Utilitarian,
BPA Standard Type Oil House

Exterior Characteristics:

One story, semi-subterranean, rectangular plan, flat roof, glass-block windows, multi-pane metal casement windows, concrete retaining walls.



Interior Characteristics:

Metal light fixtures

TIER II Z-816 MAINTENANCE 1956

Building Style: Utilitarian,
BPA Standard Type 902

Exterior Characteristics:

Tall one story, rectangular plan, side-gable roof, corrugated metal siding, steel multi-pane windows.



TIER II SWITCHYARD 1942

Characteristics: Stepped gravel yard, chain-link fence, concrete paths, historic light fixtures, transfer track rails, and a wood storage shed. 115 kV and 230 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers, and buswork.

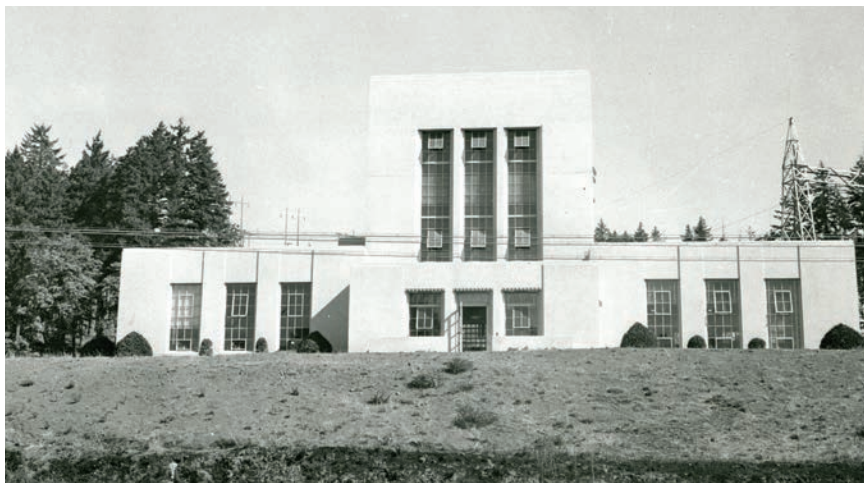


TIER II Z-8175 RAILROAD 1942

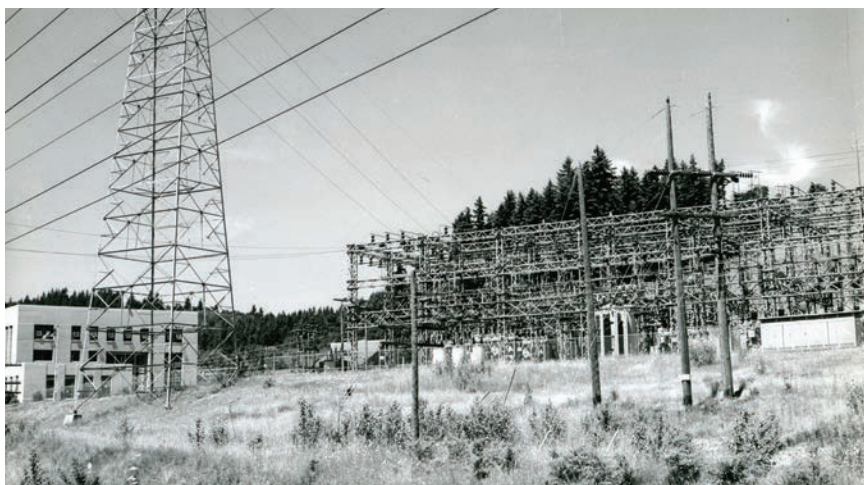
BPA Standard Type: Rails

Characteristics: Steel rails





Historic photo.



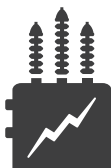
Historic photo.

TIER II
SYSTEM
EXPANSION



- ▲ Santiam Substation
- City
- Salem District

1954



SANTIAM SUBSTATION



SOUTH
REGION

SALEM
DISTRICT

SANT / 43650 Substation Drive, Stayton, OR 97383 / Linn County

HISTORIC PAINT: 1950 SCHEME

History

Santiam Substation, constructed approximately 3 miles west of Lyons, Linn County, Washington, supplied power to the Mountain States Power Company and Benton–Lincoln Electric Cooperative in the Santiam Valley. In 1953, BPA contracted with Frank Lyons and Company of Portland, Oregon, for \$15,507 to grade the Santiam Substation Switchyard and spur track. City Electric Company and Nottingham Construction Company of Boise, Idaho, completed the Substation for \$128,661. The new facility enabled power distribution in the Santiam Valley. BPA enlarged the Santiam Substation in 1955, making it BPA's primary Willamette Valley switching station. The Substation connected with transmission lines originating at The Dalles and McNary dams, as well as the Detroit Dam. In April that year, BPA awarded the Brandon Company of Vancouver, Washington, a \$96,594 contract to construct the Substa-

tion's new bus and switching facilities, circuit breakers, and a microwave tower. The substation additions enabled BPA to extend the 230 kV grid to Chemawa.

Significance

Santiam Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to local public utility districts in the Willamette Valley and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the only remaining example of BPA's Standard Type 126 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-843 CONTROL HOUSE	1954	Tier II - Contributing
Z-842 OIL HOUSE	1954	Tier II - Contributing
SWITCHYARD	1954	Tier II - Contributing

TIER II Z-843 CONTROL HOUSE 1954

Building Style: Modern,
BPA Standard Type 126

Exterior Characteristics:

One story, rectangular plan, flat roof, cement plaster finish with grid pattern, multi-pane metal windows, concrete canopy.



Interior Characteristics: Original light fixtures

TIER II Z-842 OIL HOUSE 1954

Building Style: Utilitarian,
BPA Standard Type Oil House

Exterior Characteristics:

One story, semi-subterranean, rectangular plan, flat roof, concrete retaining walls, metal windows, sconce.



Interior Characteristics: Original small metal heating terminal

TIER II SWITCHYARD 1954, expanded circa 1964, 1968, and 1974

Characteristics:

Flat gravel yard, chain-link fence, concrete paths, and cable tunnel. 230 kV and 500 kV equipment includes multi-part dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, capacitor bank, and buswork.



TIER II
SYSTEM
EXPANSION



- ▲ Timber Substation
- City
- Salem District



1955	TIMBER SUBSTATION
SOUTH REGION	SALEM DISTRICT
TIMB / Timber Road, north of OR-26, Timber, OR 97144 / Washington County	
HISTORIC PAINT: 1956 SCHEME	

History

Timber Substation was constructed approximately 3 miles north of Timber, Washington County, Oregon, to serve the West Oregon Electric Cooperative (WOEC). BPA contracted with H. B. Nesheim of Seattle, Washington, for \$14,760 to build the Timber Substation, which would “supply a central point of delivery” for WOEC (*The Oregonian*, 1955). WOEC formed in 1944 with funds from Rural Utility Service (formerly Rural Electrification Administration) loans to merge several small electric cooperatives in the Timber and Nehalem Valley areas. Before BPA constructed the Timber Substation, WOEC used facilities at Warren, about 5 miles east of Timber, until increasing local power needs rendered WOEC’s Warren facilities inadequate.

Significance

Timber Substation is significant under Criterion A in the area of Government for providing reliable power to rural communities near Oregon’s northern coast. The Substation reflects the extension of BPA transmission facilities to coastal communities during the System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-245 CONTROL HOUSE	1955	Tier II - Contributing
SWITCHYARD	1955	Tier II - Contributing

TIER II Z-245 CONTROL HOUSE 1955

Building Style: Utilitarian,
BPA Standard Type 192

Exterior Characteristics:

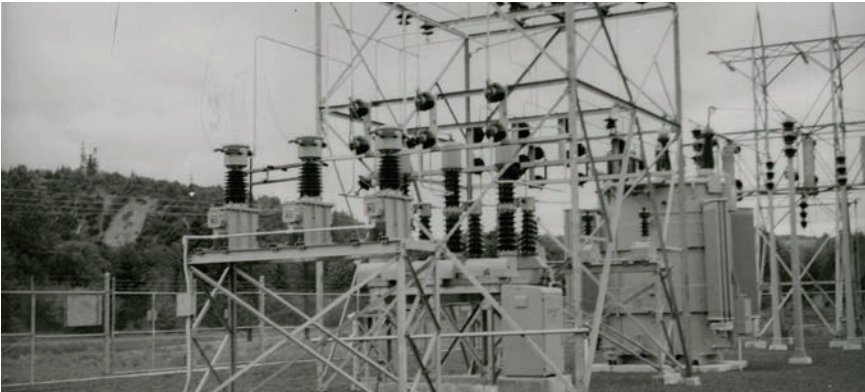
One story, rectangular plan, metal panel construction, low-pitch side-gable roof, metal doors.



TIER II SWITCHYARD 1955

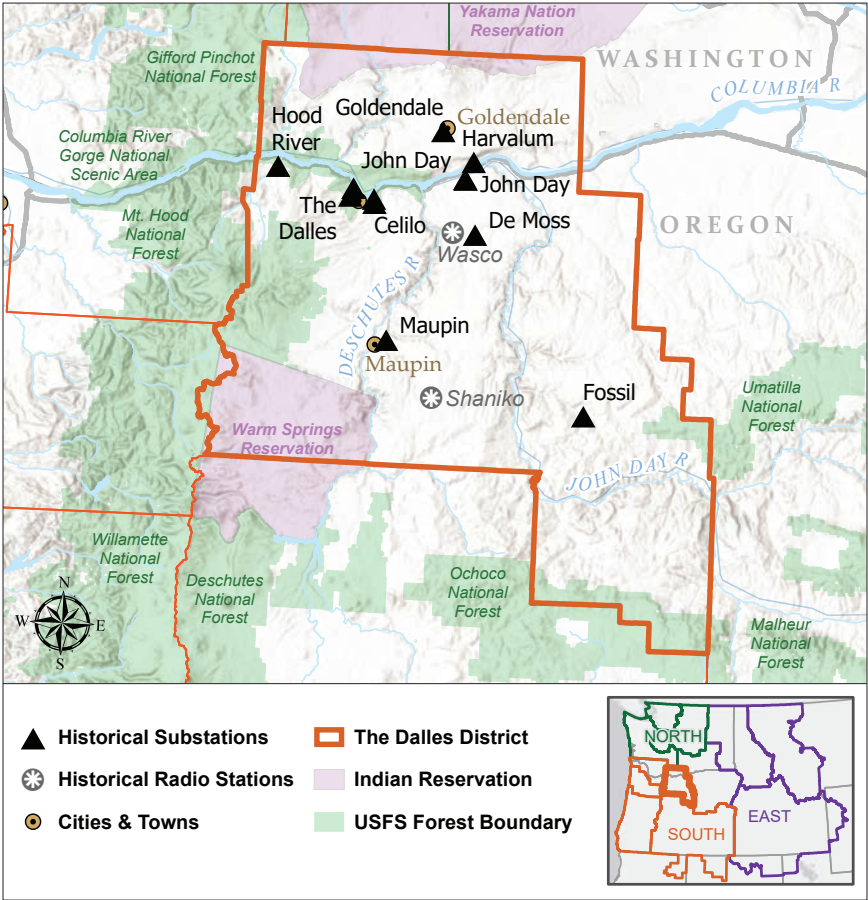
Characteristics:

Flat gravel yard, chain-link fence, concrete paths, historic light fixtures, and aluminum storage shed. 115 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, vacuum circuit breakers, and buswork.



Historic photo.

THE DALLES DISTRICT



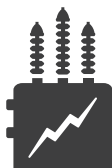
LOCATION	HISTORICAL SIGNIFICANCE
Big Eddy Substation.....	TIER II
Celilo Converter Station	TIER I
Chenoweth Substation.....	X
De Moss Substation	X
Fossil Substation	X
Goldendale Substation.....	TIER I
Harvalum Substation.....	TIER III
Hood River Substation	X
John Day Substation	TIER I
Maupin Substation	TIER II
Shaniko Microwave Radio Station	X
The Dalles Substation	X
Wasco Microwave Radio Station	TIER II

TIER II
SYSTEM
EXPANSION



- ▲ Big Eddy Substation
- City
- The Dalles District

1956



BIG EDDY SUBSTATION



SOUTH
REGION

THE DALLES
DISTRICT

BIGE / 3920 Columbia View Drive E, The Dalles, OR 97058 / Wasco County

HISTORIC PAINT: 1956 SCHEME

History

Big Eddy Substation was constructed near The Dalles, Wasco County, Oregon, and has been continually developed since 1952. Big Eddy receives power generated at The Dalles Dam and transmits it to utilities and direct users. One of the substation's original power consumers was the Harvey Company Aluminum plant near The Dalles. The Big Eddy Substation is located within the Big Eddy site, which contains the substation, microwave reflector, 500 kV switchyard, the High Voltage Direct Current Test Center, and maintenance headquarters. The Big Eddy site is situated within a larger, 762-acre BPA site known as the Starr Complex, which Big Eddy shares with the Celilo Converter Station. Big Eddy supplies the Celilo Converter Station with electricity. Eugene C. Starr, for whom the Starr Complex was named, began working for BPA in 1961 as a consulting engineer. He specialized in extra high-voltage alternating

current–direct current transmission and in nuclear power development. Starr won awards for his research in the field of high-voltage engineering and aircraft radio coordination. In 1965, he was named Oregon's Engineer of the Year.

Significance

Big Eddy Substation is significant under NRHP Criterion A in the areas of Commerce, Engineering, Industry, and Government. The Substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House represents the only remaining example of BPA's Standard Type 186 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-824 BIG EDDY 230KV CONTROL HOUSE	1956	Tier II - Contributing
Z-821 BIG EDDY 230KV OIL HOUSE	1956	Tier II - Contributing
Z-823 BIG EDDY 230KV RELAY HOUSE #1	1956	Tier II - Contributing
Z-822 BIG EDDY 230KV RELAY HOUSE #2	1956	Tier II - Contributing
Z-285 BIG EDDY 230KV ENGINE GENERATOR BUILDING	1956	Tier II - Contributing
BIG EDDY SWITCHYARD	1956	Tier II - Contributing
Z-7814 BIG EDDY 230KV CABLE TUNNEL	1956	Contributing Feature of Switchyard
Z-819 THE DALLES MAINTENANCE HQ STORAGE	1956	X - Non-contributing
Z-820 THE DALLES MAINTENANCE HQ HEADQUARTERS PSC & SPC	1956	X - Non-contributing
Z-403 THE DALLES MAINTENANCE HQ COLD STORAGE	1965	X - Non-Contributing
Z-683 THE DALLES MAINTENANCE HQ MAINTENANCE	1974	X - Non-contributing
Z-1338 BIG EDDY 230KV STORAGE	1979	X - Non-contributing
Z-1198 BIG EDDY 500KV CONTROL HOUSE	1987	X - Non-contributing
Z-612 THE DALLES MAINTENANCE HQ HERBICIDE FLAMMABLE STORAGE	1989	X - Non-contributing
Z-1269 THE DALLES MAINTENANCE HQ TLM STORAGE BUILDING (POLE)	1993	X - Non-contributing
Z-6000 BIG EDDY 230KV STORAGE	1993	X - Non-contributing
Z-1324 THE DALLES MAINTENANCE HQ OPERATORS	1994	X - Non-contributing
Z-9131 THE DALLES MAINTENANCE HQ WASHRACK	1999	X - Non-contributing
Z-1383 THE DALLES MAINTENANCE HQ HMEM GARAGE	2002	X - Non-contributing
Z-1403 THE DALLES MAINTENANCE HQ GUARD SHACK	2002	X - Non-contributing
Z-7531 BIG EDDY 230KV STORAGE #2	2013	X - Non-contributing

TIER II Z-824 BIG EDDY 230KV CONTROL HOUSE 1956

Building Style: Modern,
BPA Standard Type 186

Exterior Characteristics:

One story, steel and concrete construction, flat roof, smooth concrete finish with rectangular pattern, protruding main entrance with multi-lite steel windows.



TIER II Z-821 BIG EDDY 230KV OIL HOUSE 1956

Building Style: Utilitarian

Exterior Characteristics: One story, rectangular plan, metal panel construction, front gable roof, 2 lite metal pedestrian doors, and 4 lite metal window.



TIER II Z-823 BIG EDDY 230KV RELAY HOUSE #1 1956

Building Style: Utilitarian

Exterior Characteristics: One story, rectangular plan, concrete construction, low pitch front gable roof, concrete finish with rectangular grid pattern.



TIER II Z-822 BIG EDDY 230KV RELAY HOUSE #2 1956

Building Style: Utilitarian

Exterior Characteristics: One story, rectangular plan, concrete construction, low pitch front gable roof, concrete finish with rectangular grid pattern.



TIER II Z-285 BIG EDDY 230KV ENGINE GENERATOR BUILDING 1957**Building Style:** Utilitarian**Exterior Characteristics:**

One story, rectangular plan, metal panel construction, flat roof, single-lite steel window.

Interior Characteristics:

Utilitarian overhead metal light fixture, pot-belly door closer

**TIER II SWITCHYARD 1953, expanded with new 500-kV switchyard in 1967, 1987, 2012**

Characteristics: Flat, rectangular gravel yard enclosed by a chain link fence. 115-kV equipment at west end with dead-end towers, conductors, insulators, transformers, circuit breakers, switches, buswork and other equipment. 230-kV equipment at west end with dead-end towers, conductors, insulators, transformers, circuit

breakers, switches buswork, and other equipment. 500-kV equipment at southeast end with dead-end towers, conductors, insulators, transformers, circuit breakers, switches, buswork, and other equipment.



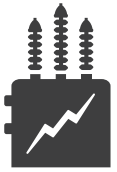
TIER I
SYSTEM
EXPANSION



- ▲ Celilo Converter Station
- City
- The Dalles District



1971



CELILO CONVERTER STATION



SOUTH
REGION

THE DALLES
DISTRICT

CELO/CEHQ / 3920 Columbia View Drive E, The Dalles, OR 97058 / Wasco County

HISTORIC PAINT: SCHEME A

History

Celilo Converter Station was constructed near The Dalles, Wasco County, Oregon to convert alternating current to direct current for the Pacific Northwest — Pacific Southwest Intertie. When energized in May 1970, the Intertie was the world’s first and longest ultra-high voltage (800 kV) transmission line (Kramer, 2021). The Celilo Converter Station is the northern terminus of the Intertie, with its counterpart located in Sylmar, California, north of Los Angeles. Direct current systems are notable for their ability to transmit large amounts of electricity over long distances more efficiently than alternating current lines of a similar length, because less power is lost to the air as heat. The Celilo Converter Station is located on the 762-acre BPA site known as the Eugene C. Starr Complex. Celilo shares the site with the Big Eddy site, which consists of a substation, microwave reflector, 500-kV switchyard, Extreme High Voltage Direct Current (HVDC) Test Center, and maintenance headquarters. Celilo is associated with the Big Eddy site in location and function. Big Eddy’s HVDC test site was built in 1963

to develop design concepts and specifications for the Intertie's HVDC backbone transmission line. Big Eddy also supplies the Celillo Converter Station with electricity.

Significance

The Celillo Converter Station is significantly associated with the high voltage direct current (HVDC) testing program and development of the Celillo-Sylmar HVDC Intertie. However, the district lacks sufficient integrity to be eligible as a NRHP district. The Converter Station Control House is significant under NRHP Criterion A in the area of Government for its association with the HVDC testing program and the Celillo-Sylmar HVDC Intertie line. The building is also significant under Criterion C in the area of Architecture for expressing BPA's beauty design concepts. The Converter Station Control House also represents the only remaining example of BPA's Standard Type 907 Control House design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-704 CELILO DC CONVERTER STATION CONTROL HOUSE	1970	Tier I - Individually Eligible
CELILLO SWITCHYARD	1970	X - Non-contributing
Z-8424 CELILO DC CONVERTER STATION CABLE TUNNEL	1956	X - Non-contributing
Z-483 CELILO DC CONVERTER STATION PUMP HOUSE/RIVER WATER	1970	X - Non-contributing
Z-605 CELILO DC CONVERTER STATION CONTROL HOUSE - VALVE HALL GP 7 & 8	1985	X - Non-contributing
Z-617 CELILO DC CONVERTER STATION MAINTENANCE HEADQUARTERS	1987	X - Non-contributing
Z-1200 CELILO DC CONVERTER STATION STORAGE - HAZARDOUS MATERIALS	1987	X - Non-contributing
Z-0000 CELILO MRTB & GRTS CONTROL BUILDING	1989	X - Non-contributing
Z-1207 CELILO DC CONVERTER STATION CONTROL/MAINTENANCE - STA SERV FEEDER 4SWIT	1989	X - Non-contributing
Z-1208 CELILO DC CONVERTER STATION CONTROL/MAINTENANCE - STA SERV FEEDER 5	1989	X - Non-contributing
Z-1211 CELILO DC CONVERTER STATION POTABLE WELL HOUSE	1989	X - Non-contributing
Z-1339 CELILO DC CONVERTER STATION CONV 1 & 2 VALVE HALL	1989	X - Non-contributing
Z-1340 CELILO DC CONVERTER STATION RELAY HOUSE - AC SWITCH YARD	1989	X - Non-contributing
Z-1341 CELILO DC CONVERTER STATION RELAY HOUSE - AC FILTER SWITCH YARD	1989	X - Non-contributing
Z-1343 CELILO DC CONVERTER STATION CONV 1 & 2 POWER PANELS	1989	X - Non-contributing
Z-1404 CELILO DC CONVERTER STATION COVERED PARKING	1989	X - Non-contributing

RESOURCES/ASSETS continued	DATE	ELIGIBILITY
Z-6004 CELILO DC CONVERTER STATION STORAGE SHED	1989	X - Non-contributing
Z-1205 CELILO DC CONVERTER STATION EQUIPMENT STORAGE BUILDING	1990	X - Non-contributing
Z-1407 CELILO DC CONVERTER STATION MAIN COOLING BUILDING 3 & 4	2002	X - Non-contributing
Z-1405 CELILO DC CONVERTER STATION EQUIPMENT STORAGE BUILDING	2003	X - Non-contributing
Z-1406 CELILO DC CONVERTER STATION MAIN COOLING BUILDING 1 & 2	2004	X - Non-contributing
Z-1551 CELILO DC-1 CONVERTER	2015	X - Non-contributing
Z-1552 CELILO DC-1 CONVERTER	2015	X - Non-contributing
Z-1552 CELILO DC-1 CONVERTER	2015	Out of Period/Non-contributing

TIER I Z-704 CELILO DC CONVERTER STATION CONTROL HOUSE 1970

Building Style: Modern

Exterior Characteristics:

Three story central block with two single-story wings, irregular plan, flat roof with small parapet, and brick and cast stone siding. Main entrance with a five-bay, three-story glass curtain wall with brick piers and cast stone ornamentation. Secondary elevations with glass curtain walls.



Interior Characteristics: Two double-spine curved staircases with terrazzo steps, and wood handrails; planters below the staircases; terrazzo flooring and textured ceiling tiles; cast stone and brick paneling; second floor mezzanine; hanging chandeliers and pendant lights.



Historic photo.



Historic photo.



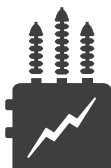
Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ Goldendale Substation
- City
- The Dalles District

1957



GOLDENDALE SUBSTATION



SOUTH
REGION

THE DALLES
DISTRICT

GOLD / 922 W Darland Street, Goldendale, WA 98620 / Klickitat County

HISTORIC PAINT: 1956 SCHEME

History

Goldendale Substation was constructed approximately 1 mile southwest of Goldendale, Klickitat County, Washington to serve the Klickitat County Public Utility District (PUD). Organized as a rural utility district in 1938, Klickitat became the first PUD in Washington to apply for BPA power. Prior to formation of the PUD, Klickitat County received power from Pacific Power and Light Company and small local power plants. Large areas of the county functioned without electricity until BPA began providing the PUD with power. Upon completion, the Goldendale Substation connected with the 115-kV The Dalles – Goldendale transmission line.

Significance

Goldendale Substation is significant under NRHP Criterion A in the area of government. The Substation's establishment provided reliable power to the local public utility district for distribution to rural communities in Washington and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The Control House is individually significant under Criterion C in the area of Architecture for exemplifying BPA's Standard Aluminum Control House Type-192.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-301 CONTROL HOUSE	1958	Tier I - Historic/Contributing; Individually Eligible
SWITCHYARD	1958	Tier II- Historic/Contributing

TIER I Z-301 CONTROL HOUSE 1957

Building Style: Utilitarian,
BPA Standard Type 192

Exterior Characteristics:

One story, rectangular plan,
metal panel construction, flat
roof, metal window, metal door



TIER II SWITCHYARD 1957

Characteristics: Flat, gravel
yard, chain link fence, met-
al storage container, 115-kV
equipment, including dead-end
towers, power transformers,
potential transformers, oil and
gas circuit breakers, oil tank,
and buswork.



TIER III
SYSTEM
EXPANSION



- ▲ Harvalum Substation
- City
- The Dalles District



1964



HARVALUM SUBSTATION



SOUTH
REGION

THE DALLES
DISTRICT

HRVL / 85 John Day Dam Road, Goldendale, WA 98620 / Klickitat County

HISTORIC PAINT: SCHEME A

History and Significance

Substation was constructed near John Day Dam and Goldendale, Washington, to power the Harvey Aluminum Company Aluminum Reduction Plant (Harvey Plant) and is associated with community and industrial development in the region. The Harvey Plant was one of nine aluminum facilities operated in the Pacific Northwest. The aluminum plant was dismantled in 2003, and the substation is not eligible for the

NRHP. However, the Control House remains a notable resource associated with the region's aluminum industry and exemplifies BPA's utilitarian control house designs deployed during the System Expansion Period.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-1391 CONTROL HOUSE	1970	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-1391 CONTROL HOUSE 1970

Building Style: Utilitarian

Exterior Characteristics: one story, concrete masonry unit construction, shed roof



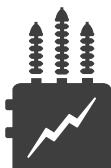
Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ John Day Substation
- City
- The Dalles District

1968



JOHN DAY SUBSTATION



SOUTH
REGION

THE DALLES
DISTRICT

JDAY/JDTW / 72648 China Hollow Road, Oregon / Sherman County

HISTORIC PAINT: SCHEME A

History

John Day Substation was constructed approximately 1 mile south of Rufus, Sherman County, Oregon, as part of the first 500-kV transmission subsystem serving the Portland metropolitan area. BPA contracted with Power City Electric, Inc. of Spokane, Washington, for \$675,373 to build the John Day Substation. BPA architects M. Hartford and Dean Wright designed the Substation Control House and Charles R. Schmiedeskamp of Portland, Oregon, was the builder. Work began on the John Day Substation after Congress allocated BPA a \$100 million construction budget for 1965, nearly triple the 1964 budget. The increase helped fund construction related to the Pacific Northwest – Pacific Southwest Intertie. In conjunction with the new John Day Substation, BPA built the 97-mile, 500-kV Hanford – John Day line to increase transmission capacity from Vantage, Hanford, and the Lower Snake plants to western

Oregon. By 1966, 500-kV lines from John Day to the Lower Monumental, Hanford, and Keeler substations were in various stages of completion. On March 28, 1968, BPA energized the new \$17 million, 128-mile John Day – Keeler line, the first 500-kV BPA transmission line to power the Portland metropolitan area. The new line capacity was equivalent to the full output of two Bonneville Dams and carried power equivalent to four older style 230-kV lines. BPA characterized energization of the new line as “a milestone in power transmission and distribution technology” (*The Oregonian*, March 29, 1968).

Significance

John Day Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment introduced high-voltage 500 kV power to the Portland metropolitan area during BPA's System Expansion Period (1946–1974) and reflects BPA's expansion of its transmission system in the Pacific Northwest. The Control House is individually significant under Criterion C in the area of Architecture as an exemplary example of the International architectural style and the beauty design concepts deployed by BPA during the System Expansion Period. The Control House also represents the only remaining example of BPA's Standard Type 2000 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-737 CONTROL HOUSE	1968	Tier I – Contributing/ Individually Eligible
Z-723 MAINTENANCE SWITCHYARD	1968	Tier II - Contributing
Z-8427 CABLE TUNNEL	1968	Contributing Feature of Switchyard
Z-1446 230KV YARD CONTROL HOUSE	2007	X - Non-contributing

TIER I Z-737 CONTROL HOUSE 1968

Building Style: International, BPA Standard Type 2000

Exterior Characteristics:

one story, asymmetrical plan, stepped flat roof, asbestos cement board panel siding with extruded aluminum mullions, curtain wall construction, flush aluminum windows, aluminum doors



Interior Characteristics: original wood laminate walls, bulletin board, and entrance counter

TIER II Z-723 MAINTENANCE 1968

Building Style: International

Exterior Characteristics:

one story, asymmetrical plan, stepped flat roof, anodized bronze-colored aluminum battens and cement asbestos thermal panels, aluminum windows, service bays with multi-panel aluminum overhead doors

Interior Characteristics:

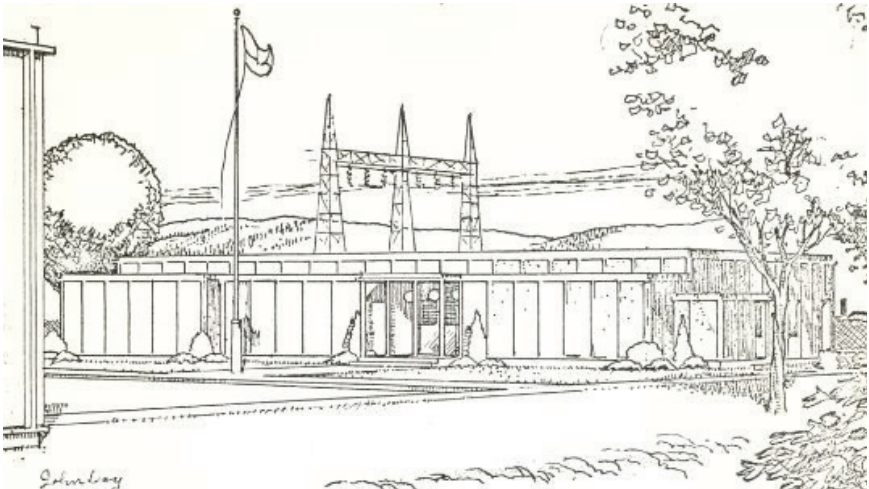
exposed glulam beams



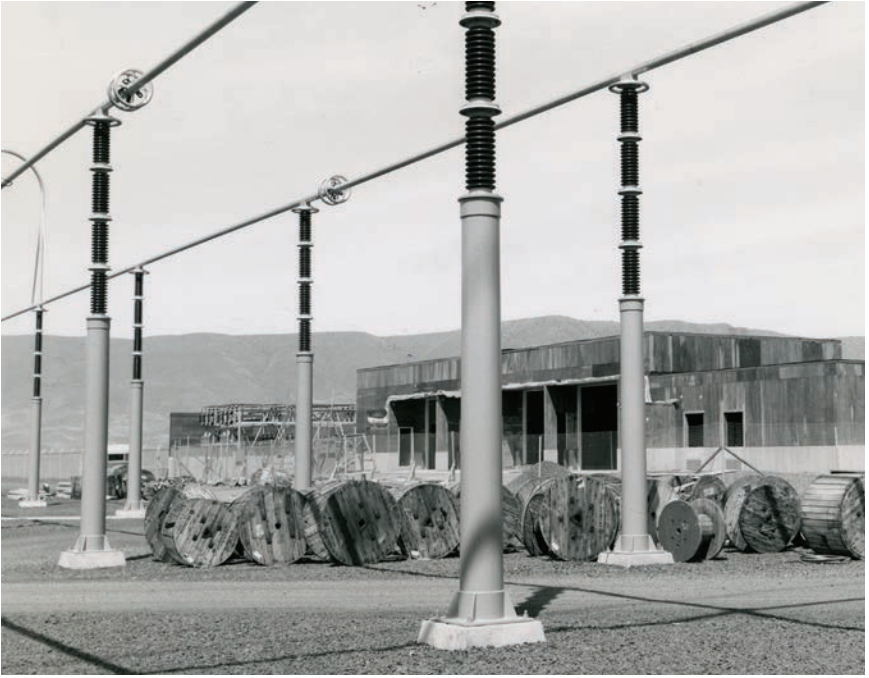
TIER II SWITCHYARD 1968, expanded in 2007

Characteristics: Flat gravel

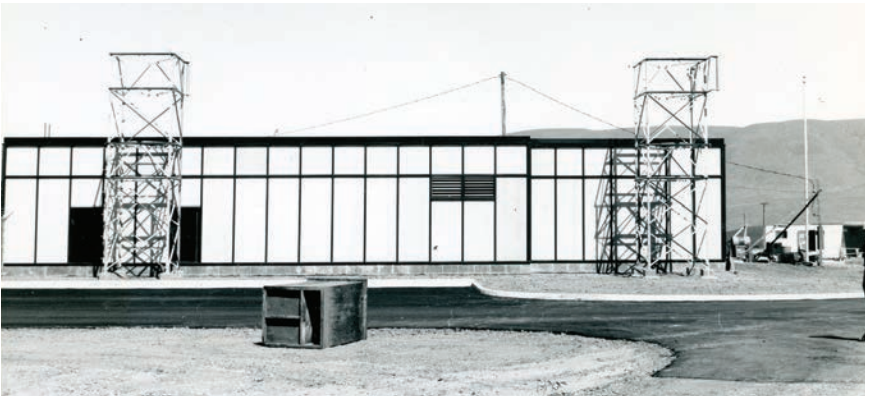
yard, chain-link fence, concrete paths, aluminum storage sheds, and cable tunnel. 500 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers, and buswork.



Historic photo.



Historic photo.



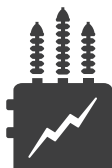
Historic photo.

TIER II
SYSTEM
EXPANSION



- ▲ Maupin Substation
- City
- The Dalles District

1974



MAUPIN SUBSTATION



SOUTH
REGION

THE DALLES
DISTRICT

MOPN / 86295 Bakeoven Road, Maupin, OR 97037 / Wasco County

HISTORIC PAINT: SCHEME A

History

Maupin Substation was constructed approximately 5 miles northeast of Maupin, Wasco County, Oregon, to enhance service to northcentral Oregon. In May 1973, BPA contracted with Louis Kowolowski of Madras, Oregon, for \$158,000 to construct the 230 kV Maupin Substation. The Substation connected BPA's 230 kV Big Eddy–Redmond transmission line to the 69 kV BPA facilities in northcentral Oregon.

Significance

Maupin Substation is significant under NRHP Criterion A in the area of Government. The Substation's establishment provided reliable power to the local public utility district for distribution to rural communities in central Oregon and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-521 CONTROL HOUSE	1974	Tier II - Historic/Contributing
SWITCHYARD	1974	Tier II - Historic/Contributing

TIER II Z-521 CONTROL HOUSE 1974

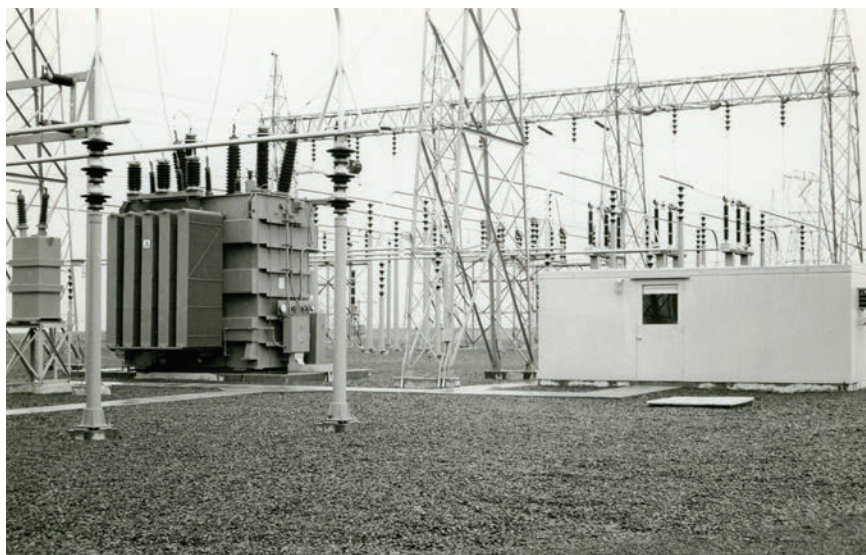
Building Style: Utilitarian,
BPA Standard Type 193

Exterior Characteristics: one story, rectangular plan, metal panel construction, flat roof, front metal door



TIER II SWITCHYARD 1974

Characteristics: Flat, gravel yard, chain link fence, and an aluminum storage shed. 115-kV and 230-kV equipment includes multi-part dead-end towers, a power transformer, potential transformers, current transformers, gas circuit breaker, and buswork.



Historic photo.

TIER II
SYSTEM
EXPANSION



- Wasco Microwave Radio Station
- City
- The Dalles District

1953



WASCO MICROWAVE
RADIO STATION



SOUTH
REGION

THE DALLES
DISTRICT

WASC / Sherman County, Oregon

History

The Wasco Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee dams and other intermediate substations. The circuit was the first microwave installation to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. BPA historic photographs indicate the Wasco Station was under construction by February 1952 and complete or near completion by May 1952. BPA acquired perpetual easements for beam paths from private landowners Carroll and Helen W. Sayrs.

Significance

The Wasco Microwave Radio Station is significant under Criterion A for its significance in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Wasco, Oregon, area. The period of significance for the Station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-881 RADIO

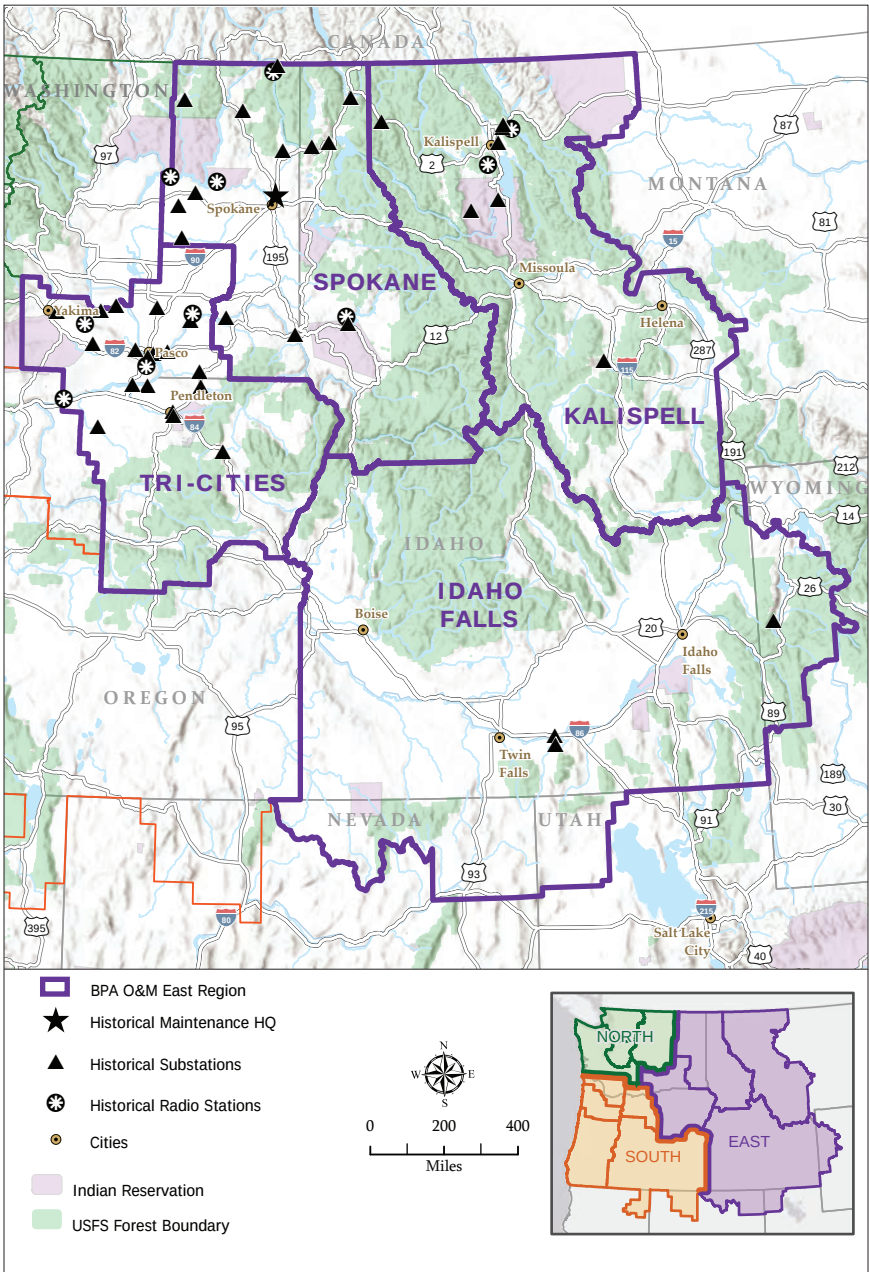
Building style: Utilitarian, BPA Standard Type 1136-1

Characteristics: One-story aluminum-panel control building; nearly flat roof; single entrance with no windows.

Tower: 4-leg steel lattice

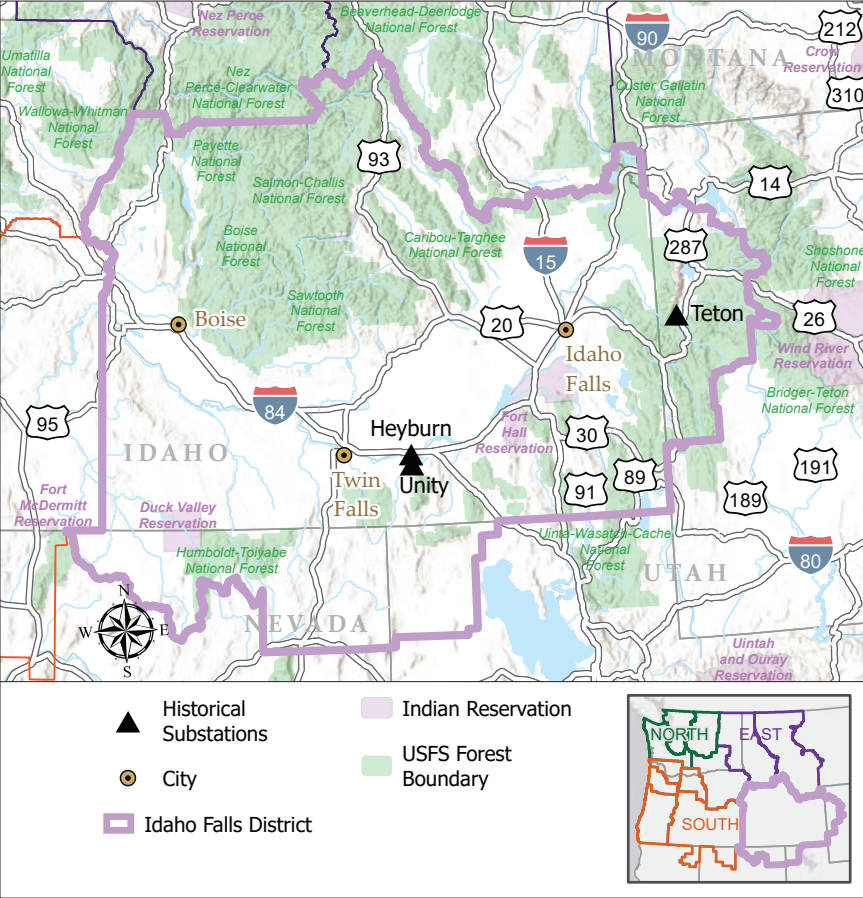


EAST REGION



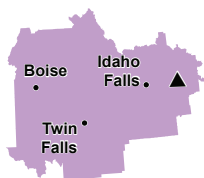
DISTRICT	PAGE
IDAHO FALLS.....	306
KALISPELL.....	313
SPOKANE.....	332
TRI-CITIES.....	362

IDAHO FALLS DISTRICT



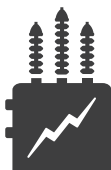
LOCATION	HISTORICAL SIGNIFICANCE
Heyburn Substation	X
Teton Substation	TIER III
Unity Substation	TIER II

TIER III
SYSTEM
EXPANSION



- ▲ Teton Substation
- City
- Idaho Falls District

1969



TETON SUBSTATION



EAST
REGION

IDAHO FALLS
DISTRICT

TETN / 3755 N Moose-Wilson Road, Wilson, WY 83014 / Teton County

HISTORIC PAINT: SCHEME A

History and Significance

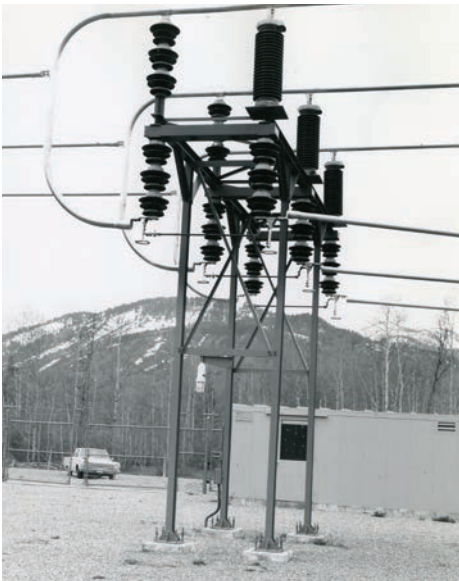
Teton Substation in Wilson, Wyoming, was built as part of the \$3.3 million Teton Project that involved construction of a 36-mile, 115 kV transmission line from Swan Valley, Idaho, to Jackson, Wyoming. The substation is associated with community development in the region and BPA’s expansion into the Idaho–Wyoming region during BPA’s System Expansion Period of 1946–1974. Substantial alterations to the switchyard diminished the substation’s integrity, and it is not eligible for the NRHP. However, the control house is a notable resource as BPA’s only substation built in Wyoming during the historic period.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-454 CONTROL HOUSE	1969	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-454 CONTROL HOUSE 1969

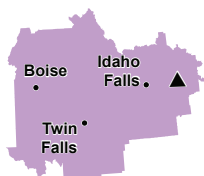
Building Style: Utilitarian

Exterior Characteristics: One story, rectangular plan, metal panel construction, low-pitch side-gable roof, metal door



Historic photo.

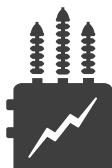
TIER II
SYSTEM
EXPANSION



- ▲ Teton Substation
- City
- Idaho Falls District



1967



UNITY SUBSTATION



EAST
REGION

IDAHO FALLS
DISTRICT

UNITY / 250 E 350 S Burley, Burley, ID 83318 / Cassia County

HISTORIC PAINT: SCHEME A

History

Unity Substation was constructed approximately 4 miles southeast of Burley, Cassia County, Idaho, after BPA acquired and subsequently retired the U.S. Bureau of Reclamation's old Unity Substation (about 2 miles north of the new one). BPA assumed operations of the old Unity Substation in 1963, then built the new substation to address increasing power requirements of the Unity Light & Power Company based near Burley, Idaho. In addition to the new substation, BPA built a 2-mile, 34.5 kV transmission line from a point on BPA's Burley–Minidoka line that connected to the new Unity Substation. As part of a proposed \$139 million BPA budget for 1967, BPA scheduled construction of a \$450,000, 138 kV Minidoka–Unity transmission line for energization in July 1969. BPA planned to eventually extend the transmission line to Heyburn to provide additional transmission capacity. In 1970, BPA proposed

a 9-mile, 138 kV transmission line between its Unity and Heyburn substations to “provide acceptable service and additional transmission capacity for serving increasing loads in the Unity-Heyburn area” (Bonneville Power Administration, 1970). The line completed a 57-mile, 138 kV loop and enabled BPA to satisfy system reliability requirements for the Minidoka project area by providing an alternate source of power should either substation experience power failure.

Significance

Unity Substation is significant under Criterion A in the area of Government for providing reliable power to the local Unity Light & Power PUD, which electrified rural communities in Idaho. The substation reflects BPA's extension of transmission facilities into Idaho during its System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-391 CONTROL HOUSE	1969	Tier II - Contributing
SWITCHYARD	1967	Tier II - Contributing

TIER II Z-391 CONTROL HOUSE 1969

Building Style: Utilitarian, BPA Standard Type 193

Exterior Characteristics: One story, rectangular plan, metal panel construction, low-pitch side-gable roof, metal windows, metal doors, metal canopy

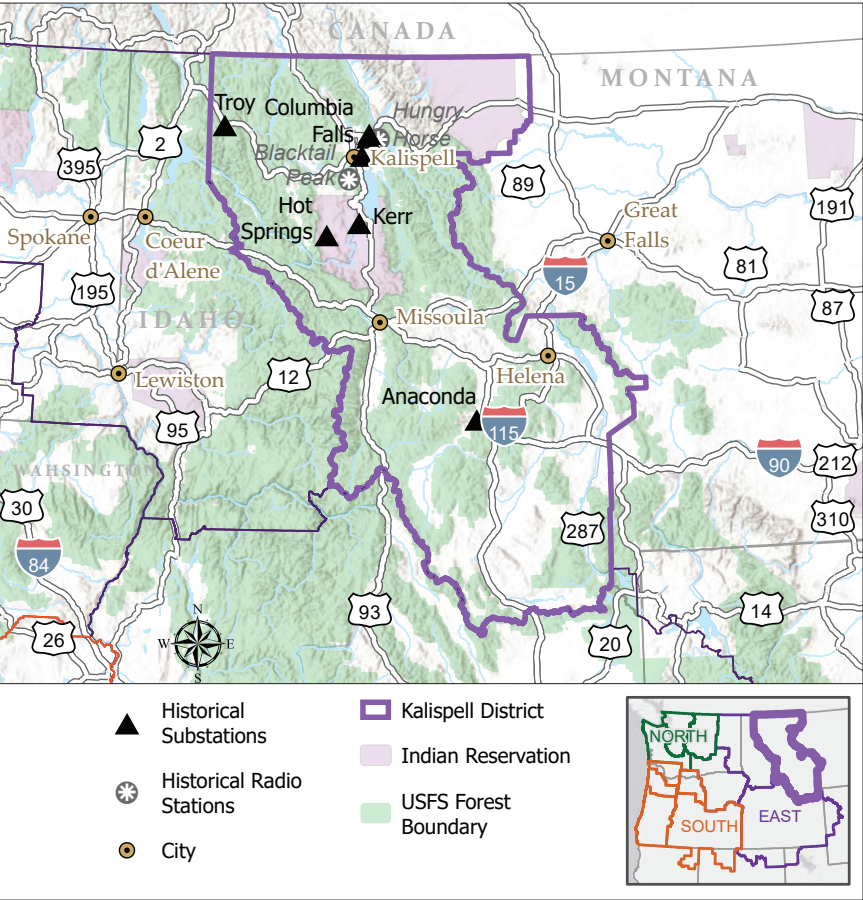


TIER II SWITCHYARD 1967, upgraded 1970–71

Characteristics: Flat gravel yard, chain-link fence. 138 kV equipment includes dead-end towers, power transformers, potential transformers, gas circuit breakers, and buswork.



KALISPELL DISTRICT



LOCATION	HISTORICAL SIGNIFICANCE
Anaconda Substation	TIER I
Blacktail Peak Microwave Radio Station.....	TIER II
Columbia Falls Substation	X
Conkelley Substation	TIER I
Hot Springs Substation	TIER I
Hungry Horse Microwave Radio Station	X
Kalispell Substation.....	X
Kerr Substation	TIER II
Troy Substation	TIER II

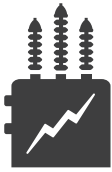
TIER I
SYSTEM
EXPANSION



- ▲ Anaconda Substation
- City
- Kalispell District



1953



ANACONDA SUBSTATION



EAST
REGION

KALISPELL
DISTRICT

ANAC / 241 Willow Glen Road, Anaconda, MT 59711 / Deer Lodge County

HISTORIC PAINT: 1950 SCHEME

History

Anaconda Substation was constructed approximately 4 miles southeast of Anaconda, Deer Lodge County, Montana. The Anaconda Substation helped provided a high-voltage transmission tie between the BPA main grid, powered by the Hungry Horse Dam, and western Montana. Completion of the Hungry Horse Dam in 1953 stimulated local industrial growth, including construction of the Anaconda Copper Company's aluminum plant in Columbia Falls, Montana. George Chica Company of Spokane, Washington, built the substation control house and oil pump house. Kiely Construction Company completed the Switchyard railroad spur in 1952, and BPA energized the 46-acre, \$2.5 million Anaconda Substation in March 1953. The substation provided direct service to the Victor Chemical Works and Montana Power Company. Once completed, the switchyard included three air-cooled 250,000 kV

transformers, which were the largest transformers in the world at the time in terms of capacity and physical size. One transformer installation could handle nearly the total output of Hungry Horse Dam.

Significance

Anaconda Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, and Government, primarily for its role in powering the Anaconda Mining Company and providing electricity across western Montana. The district also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house represents the second-best version of BPA's Standard Type 145 design, after the Hot Springs Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-951 CONTROL HOUSE	1953	Tier I - Contributing/Individually Eligible
Z-330 STORAGE	1957	Tier II - Contributing
Z-510 ENGINE GENERATOR / STORAGE BUILDING	1973	Tier II - Contributing
Z-684 MAINTENANCE / VEHICLE STORAGE T-SHAPED	1974	Tier II - Contributing
SWITCHYARD	1953	Tier II - Contributing
Z-8575 RAILROAD SPUR & TRANSFER TRACK	1953	Tier II - Contributing

TIER I Z-951 CONTROL HOUSE 1953

Building Style: Modern,
BPA Standard Type 145

Exterior Characteristics: One story, bi-level flat roof, concrete masonry unit construction, recessed entrance, multi-pane aluminum windows

Interior Characteristics:
Metal wall registers



TIER II Z-330 STORAGE 1957

Building Style: Utilitarian

Exterior Characteristics: One story, metal panel construction, shed roof clad in standing seam sheet metal, metal door with two-pane inset window



TIER II Z-510 ENGINE GENERATOR / STORAGE BUILDING 1973

Building Style: Utilitarian

Exterior Characteristics: One story, metal panel construction, flat roof clad in standing seam sheet metal, metal door with one-pane inset window



TIER II Z-684 MAINTENANCE / VEHICLE STORAGE T-SHAPED 1974

Building Style: Utilitarian

Exterior Characteristics: One story, T-shape plan, two building sections, bi-level flat roof, horizontal cedar siding, symmetrically spaced vehicle bays,



TIER II SWITCHYARD 1953

Characteristics: Flat gravel yard with expansion at south-east corner, chain-link fence, concrete paths, railroad spur and transfer track, two aluminum storage sheds, and oil tanks. 115 kV and 230 kV equipment, including multi-part dead-end towers, power transformers, gas circuit breakers, potential transformers, current transformers, and buswork.

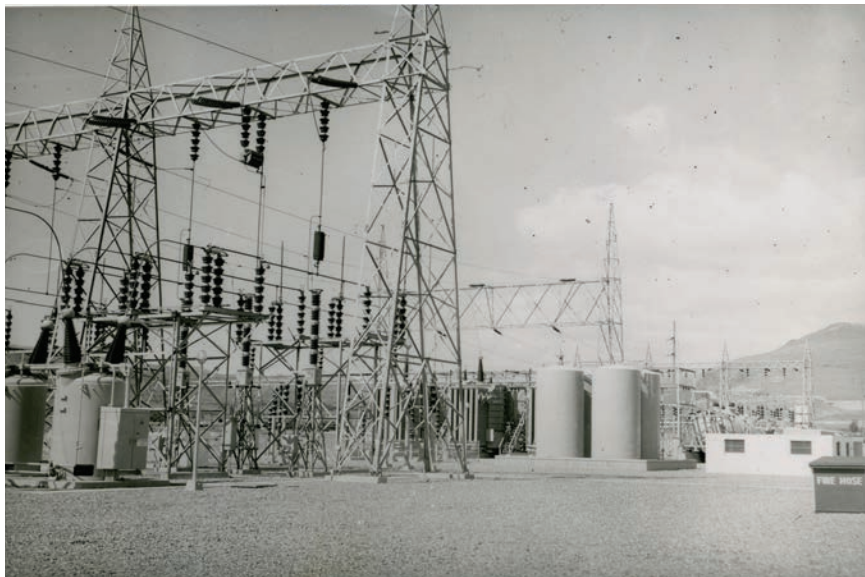


TIER II Z-8575 RAILROAD SPUR & TRANSFER TRACK 1953

BPA Standard Type Rails

Characteristics: Steel rails extending to Butte Anaconda & Pacific Railroad spurtransformers, current transformers, and buswork.





Historic photo



Historic photo

TIER II
SYSTEM
EXPANSION



- ⦿ Blacktail Peak Microwave Radio Station
- City
- Kalispell District

1968



**BLACKTAIL PEAK
MOUNTAIN MICROWAVE
RADIO STATION**



EAST
REGION

KALISPELL
DISTRICT

BLKT / Flathead County, Montana

History

During the 1950s, BPA's new microwave radio communication system continued expanding to support the growing power grid. An extension from Spokane, Washington, to the Hungry Horse Dam in western Montana was scheduled for late 1952. However, the Blacktail Peak Microwave Radio Station was not constructed until 1968 as part of BPA's Montana/Idaho expansion and the Q microwave system extension. Beginning in Pomeroy, Washington, the Q microwave system extended into Idaho and Montana to provide VHF land mobile coverage for the 500-kV Dworshak–Hot Springs transmission line and other transmission facilities in western Montana. The Dworshak–Hot Springs transmission system was intended to provide western Montana with power when power production from the hydroelectric plants in the area would be limited. The Q microwave system extension provided automated control and protection for the transmission additions and related power facilities at the Conkelley Substation and Hungry Horse Dam. BPA internal records indicate the station building was constructed by the Federal Aviation Administration in 1968 and later purchased by the USFS. BPA eventually purchased the building in 2002 from the U.S. Department of Agriculture. By 1971, the building was used by both BPA and the local TV station KCFW-TV.

Significance

Blacktail Peak Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The station's operations expanded BPA's coverage into western Montana, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Lakeside, Montana, area. The period of significance for the station is 1968, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-1401 RADIO

Building style: Utilitarian

Characteristics: BPA shares this control building with a local television service. One-story control building; concrete-block construction; two entrances with separate access for BPA and television station service; one entrance has concrete-block vestibule with double-door opening and flat roof; original steel-frame window is infilled with concrete; non-historic battery bank addition and snow entry.



Tower: 3-leg steel lattice; guyed steel lattice

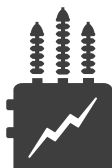
TIER I
SYSTEM
EXPANSION



- ▲ Conkelley Substation
- City
- Kalispell District



1968



CONKELLEY SUBSTATION



EAST
REGION

KALISPELL
DISTRICT

COKY / 2000 Aluminum Drive, Columbia Falls, MT 59912 / Flathead County

HISTORIC PAINT: SCHEME A

History

Conkelley Substation was constructed approximately 3 miles east of Columbia Falls, Flathead County, Montana, to power the Anaconda Aluminum Company's aluminum reduction plant at Columbia Falls. Conkelley Substation was one of six BPA facilities built to power aluminum plants. Work on the Anaconda Company plant began in February 1955 and plant expansion continued through the 1960s. To satisfy the increasing power demands of the plant, BPA contracted with Charles R. Schmiedeskamp of Portland, Oregon, to build Conkelley Substation. The substation was constructed in conjunction with the proposed 230 kV Noxon–Conkelley line, which transmitted power generated at Libby Dam. The substation and Switchyard remain but are no longer owned or operated by BPA. In March 2015, the Columbia Falls aluminum plant's last owner–Glencore–announced plans to permanently close the

plant. Decommissioning and deconstruction of the plant's 50+ structures began in January 2016.

Significance

Conkelley Substation is significant under NRHP Criterion A in the area of Industry. Constructed by BPA to power the adjacent Anaconda Aluminum Company reduction plant, the substation is significantly associated with industrial development in the region. The substation also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house is individually significant under Criterion C in the area of Architecture as exemplary of an International style control house. The building also represents the only remaining example of BPA's Standard Type 2005 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-722 CONTROL HOUSE	1968	Tier I - Contributing/Individually Eligible
Z-427 STORAGE	1970	Tier II - Contributing
Z-696 MAINTENANCE	1973	Tier II - Contributing
SWITCHYARD	1966/1968	Tier II - Contributing
TRANSFER TRACK	1966	Tier II - Contributing

TIER I Z-722 CONTROL HOUSE 1968

Building Style: International, BPA Standard Type 2005

Exterior Characteristics:

One story, asymmetrical plan, stepped flat roof, asbestos cement board panel siding with extruded aluminum mullions, flush aluminum windows, aluminum doors



Interior Characteristics:

Metal wall registers, pendant globe light fixture

TIER II Z-427 STORAGE 1970

Building Style: Utilitarian

Exterior Characteristics: One

story, rectangular plan, metal panel construction, shed roof, metal door



TIER II Z-696 MAINTENANCE 1973

Building Style: Utilitarian

Exterior Characteristics:

Tall one story, rectangular plan, front-gable roof, corrugated metal siding, metal roll-up door



TIER II SWITCHYARD 1966, expanded 1968 and circa 1970

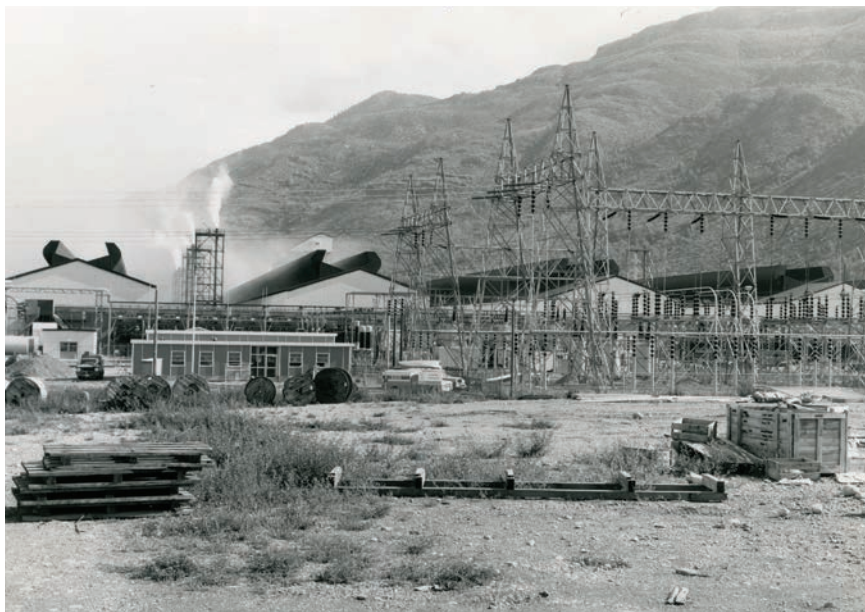
Characteristics: Flat gravel yard, chain-link fence, concrete paths, and transfer track, aluminum storage building, and small pump house. 230 kV equipment includes multi-part dead-end towers, power transformers, current transformers, potential transformers, oil and gas circuit breakers, oil tanks, and buswork.



TIER II TRANSFER TRACK 1966

Characteristics: Flat gravel yard, chain-link fence, concrete paths, and transfer track, aluminum storage building, and small pump house. 230 kV equipment includes multi-part dead-end towers, power transformers, current transformers, potential transformers, oil and gas circuit breakers, oil tanks, and buswork.





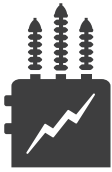
Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ Hot Springs Substation
- City
- Kalispell District



1953		HOT SPRINGS SUBSTATION
		
EAST REGION	KALISPELL DISTRICT	
HOTS / 1655 MT-28, Hot Springs, MT 59845 / Sanders County		
HISTORIC PAINT: 1950 SCHEME		

History

Hot Springs Substation was constructed approximately 3 miles south of Hot Springs, Sanders County, Montana, to help power western Montana and to serve as the main switching point for three 230 kV lines that transmitted power from Hungry Horse Dam throughout western Montana, Idaho, and eastern Washington. BPA's transmission facilities in Montana transmitted energy generated at the Hungry Horse Dam into the larger BPA system. The Hungry Horse Dam, completed in 1953, stimulated local industrial growth, including construction of the Anaconda Copper Company's aluminum plant in Columbia Falls, Montana. The planned Hot Springs–Anaconda line would comprise about 147 of the nearly 400 miles of 230 kV transmission lines that BPA was building between northern Idaho and western Montana. At the time, the \$10 million venture was one of the nation's largest power transmission line proj-

ects. BPA contracted with the Electric Company of Port Angeles, Washington, for \$101,807 to build the Hot Springs Substation Switchyard and with Clifton–Applegate of Spokane, Washington, for \$72,484 to build the Substation Control House. BPA continued to add major substation facilities, including a maintenance headquarters building, headquarters office, and shop facilities for BPA maintenance crews in western Montana.

Significance

Hot Springs Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, and Government, particularly through its association with the Hungry Horse Dam and Anaconda Mining Company. The substation reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house is individually significant under Criterion C in the area of Architecture as it reflects the modern industrial architectural style influences BPA applied in its designs during the System Expansion Period. The control house also represents the best example of BPA's Standard Type 145 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-968 CONTROL HOUSE	1953	Tier I - Contributing/Individually Eligible
Z-837 AUTOMOTIVE SHOP	1954	Tier II - Contributing
Z-294 PUMP HOUSE / FRESH WATER	1956	Tier II - Contributing
Z-316 PUMP HOUSE / FIRE	1958	Tier II - Contributing
SWITCHYARD	1953	Tier II - Contributing
Z-560 STORAGE / MOWER	1975	X - Non-contributing
Z-1010 STORAGE / FLAMMABLE	1984	X - Non-contributing

TIER I Z-968 CONTROL HOUSE 1953

Building Style: Modern,
BPA Standard Type 145

Exterior Characteristics: One story, bi-level flat roof, smooth exterior finish, multi-pane aluminum windows, aluminum doors



TIER II Z-837 AUTOMOTIVE SHOP 1954

Building Style: Utilitarian

Exterior Characteristics: Tall one story, rectangular plan, side-gable roof, metal panel siding



TIER II Z-294 PUMP HOUSE / FRESH WATER 1956

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, shed roof, metal door



TIER II Z-316 PUMP HOUSE / FIRE 1958

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, shed roof, metal doors

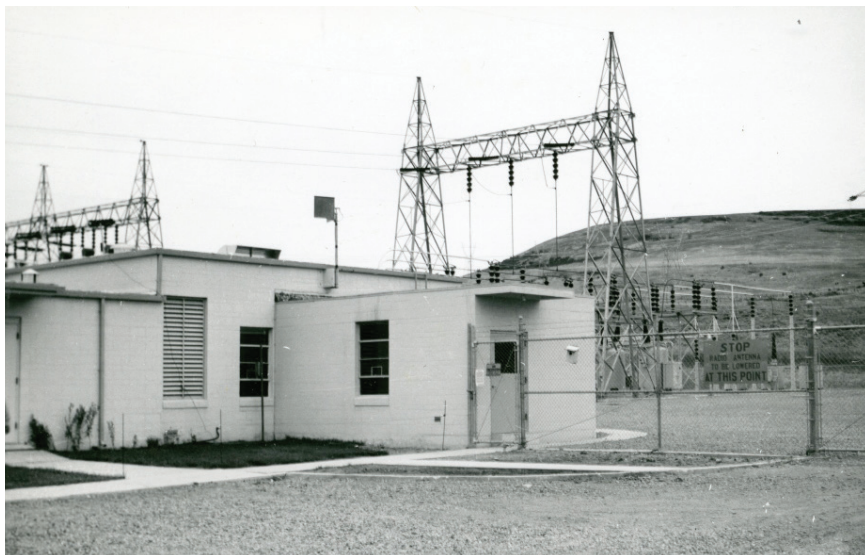


TIER II SWITCHYARD 1953, expanded circa 1972

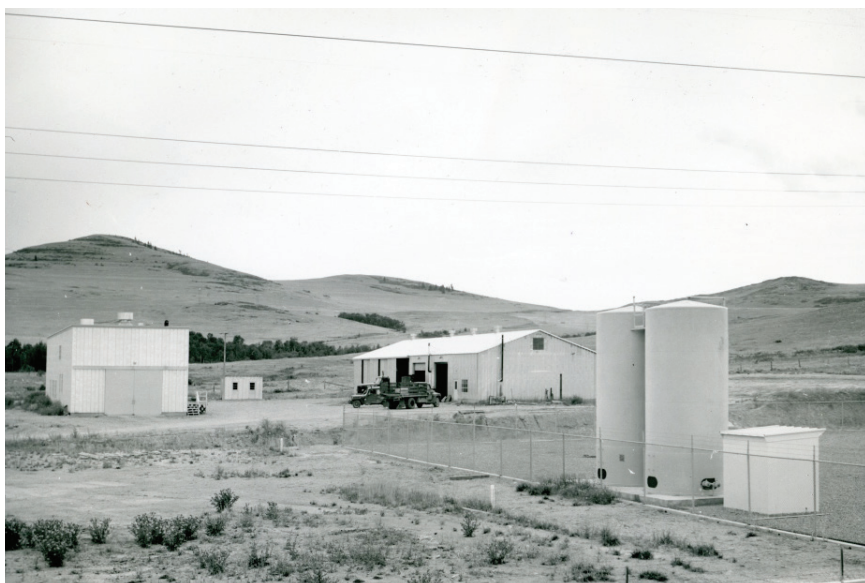
Characteristics:

Lower (original) and upper (circa 1972) areas of flat gravel yard connected by a sloping path, chain-link fence, concrete paths. 230 kV and 500 kV equipment includes dead-end towers, power transformers, potential transformers, oil and gas circuit breakers, oil tanks, and buswork.





Historic photo.



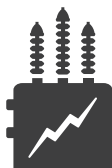
Historic photo.

TIER II
SYSTEM
EXPANSION



- ▲ Kerr Substation
- City
- Kalispell District

1948



KERR SUBSTATION



EAST
REGION

KALISPELL
DISTRICT

KERR / 7052 Kerr Dam Road, Polson, MT 59860 / Lake County

HISTORIC PAINT: 1950 SCHEME

History

Kerr Substation was constructed approximately 4 miles southwest of Polson, Lake County, Montana, to power the construction of Hungry Horse Dam. The Kerr–Hungry Horse transmission line, energized in 1947, provided power from the Montana Power Company's Kerr Dam to Kalispell and then to the Hungry Horse Dam site in Columbia Falls. Following dam completion, the transmission line provided intercon-

nections from the privately owned Kerr Dam, completed by Montana Power Company in 1938, and the federally operated Hungry Horse Dam, distributing hydroelectric power across Montana. The Kerr Substation is situated along the south bank of the Flathead River, just west of the Kerr Dam. In 1948, to celebrate completion of the Kerr–Hungry Horse transmission line, the Flathead Valley Citizens Committee sponsored a celebration with officials from BPA, the U.S. Bureau of Reclamation, private power companies, chambers of commerce, the Rural Electrification Administration, and farm and labor organizations. The Kerr Substation is currently situated between switchyards operated by Mission Valley Power and Northwest Energy.

Significance

Kerr Substation is significant under NRHP Criterion A in the areas of Commerce and Industry, particularly for its role in powering the construction of the Hungry Horse Dam, and later for transmitting energy from the hydroelectric facility into the broader transmission network to fuel commercial and industrial growth throughout western Montana, Idaho, and eastern Washington. The substation also reflects BPA’s expansion of its transmission system in the Pacific Northwest during BPA’s System Expansion Period (1946–1974). The control house represents the second-best version of BPA’s Standard Type161 design, after the Harrisburg Control House.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-130 CONTROL HOUSE	1948	Tier II - Contributing
SWITCHYARD	1948	Tier II - Contributing

TIER II Z-130 CONTROL HOUSE 1948

Building Style: Utilitarian,
BPA Standard Type 161

Exterior Characteristics:
One story, rectangular plan, flat
roof, metal panel siding, metal
windows, metal doors



TIER II SWITCHYARD 1948

Characteristics:
Flat gravel yard, chain-link
fence, concrete paths, historic
light fixture, and 115 kV
equipment including dead-end
towers, potential transformers,
current transformers, (no power
transformers), gas circuit
breaker, and buswork.



TIER II
SYSTEM
EXPANSION



- ▲ Troy Substation
- City
- Kalispell District

1953



TROY SUBSTATION



EAST
REGION

KALISPELL
DISTRICT

KERR / 15 Cole Road, Troy, MT 59935 / Lincoln County

HISTORIC PAINT: 1950 SCHEME

History

Troy Substation was constructed approximately 2 miles southeast of Troy, Lincoln County, Montana. As part of the Bonners Ferry–Troy transmission facilities, the Troy Substation helped power construction of the Libby Dam and improved service to rural and residential customers of Northern Lights, Inc. Cooperative in the Troy–Libby area. In 1950, three years before Troy Substation was completed, BPA began work on the Sandpoint–Newport transmission line, with plans to extend the line to the proposed Troy Substation. The Sandpoint and Newport Substations connected a 115 kV line, providing an important high-voltage transmission link into the Northern Idaho panhandle area. The 115 kV line extended through Bonners Ferry, Idaho, to connect with Troy. To build the Troy Substation, BPA contracted with Casey Electric Company

of Seattle, Washington, for \$14,910. The transformer stepped down power from 115 kV to 13.8 kV for distribution to local rural and domestic consumers. The Troy Substation was completed for \$75,000 and energized on December 17, 1953, the same date that the Bonners Ferry–Troy 115 kV transmission line was placed in service. The Libby Dam, with construction powered by the Bonners Ferry and Troy facilities, was built on the Kootenai River and completed in 1972 as a joint project of the United States and Canada. The dam provided flood protection and generated hydropower. BPA integrated the dam's hydroelectric power into its main grid to serve increasing loads in northwestern Montana and throughout the BPA system.

Significance

Troy Substation is significant under Criterion A in the areas of Commerce and Industry for its association with the construction of the Libby Dam along the Kootenai River and the delivery of power to local rural and residential customers. The substation was established during an era of tremendous growth in western Montana and reflects the extension of BPA facilities into Montana during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-238 CONTROL HOUSE	1954	Tier II - Contributing
SWITCHYARD	1953	Tier II - Contributing

TIER II Z-130 CONTROL HOUSE 1954

Building Style: Utilitarian,
BPA Standard Type 192

Exterior Characteristics:

One story, rectangular plan,
flat roof, metal panel siding,
metal window, metal door



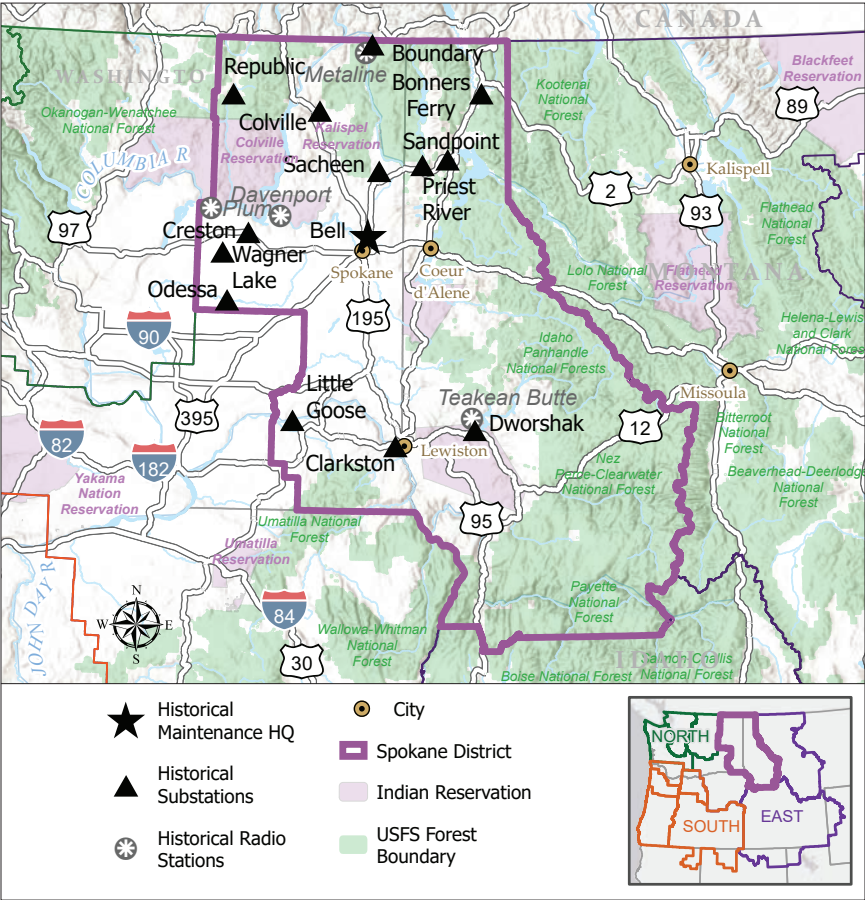
TIER II SWITCHYARD 1953

Characteristics:

Flat gravel yard, chain-link fence,
concrete paths, and 115 kV
equipment including dead-end
towers, potential transformers,
power transformer, oil circuit
breakers, and buswork.



SPOKANE DISTRICT



LOCATION	HISTORICAL SIGNIFICANCE
Bell Substation and Maintenance Headquarters.....	TIER III
Bonnors Ferry Substation.....	X
Boundary Substation.....	TIER II
Clarkston Substation.....	TIER I
Colville Substation.....	X
Creston Substation.....	X
Davenport Microwave Radio Station.....	TIER II
Dworshak Substation	TIER II
Little Goose Substation	TIER I
Metaline Microwave Radio Station.....	X
Mt. Spokane Microwave Radio Station.....	X
Odessa Substation	TIER III
Plum Microwave Radio Station	TIER II
Priest River Substation.....	X
Republic Substation	TIER II
Sacheen Substation	TIER II
Sandpoint Substation.....	TIER I
Teakean Butte Microwave Radio Station	X
Wagner Lake Substation	TIER II

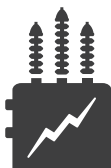
TIER III
MASTER
GRID



- ★ Bell Substation & Maintenance HQ
- City
- Spokane District



1942



BELL SUBSTATION AND MAINTENANCE HEADQUARTERS



EAST
REGION

SPOKANE
DISTRICT

BELL/BMHQ / 2410 E Hawthorne Road, Mead, WA 99021 / Spokane County

HISTORIC PAINT: 1950 SCHEME

History and Significance

Bell Substation in Mead, Washington, was constructed to power the adjacent ALCOA (Kaiser) aluminum reduction plant and is associated with defense-related industrial development in the region. The aluminum plant is no longer in operation and was demolished in 2013. Substantial alterations to the substation have diminished its integrity and it is not eligible for the NRHP. However, the untanking tower and transfer track are notable as rare and distinct resource types associated with BPA's Master Grid development from 1938–1945.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-961 UNTANKING TOWER	1952	Tier III - Notable but Not Eligible
TRANSFER TRACK	1942	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-961 UNTANKING TOWER 1952

Building Style: Utilitarian,
BPA Standard Type Untanking
Tower

Exterior Characteristics: Tall
tower, flat roof, steel multi-pane
windows

Interior Characteristics: Metal
wheels for window operation,
crane



TIER III TRANSFER TRACK 1942

BPA Standard Type Rails

Characteristics:
Steel rails



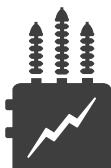
Historic photo.

TIER II
SYSTEM
EXPANSION



- ▲ Boundary Substation
- City
- Spokane District

1967



BOUNDARY SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

BOUN / Boundary Road, north of Boundary Access Road, Metaline Falls, WA 99153
Spokane County

HISTORIC PAINT: SCHEME A

History

Boundary Substation was constructed approximately 8 miles north of Metaline Falls, Pend Oreille County, Washington. The substation integrated power from Seattle City Light Company's Boundary Dam on the Pend Oreille River into the BPA system. BPA architects C. Tetherow and Dean Wright developed the substation's control house design and Jack O. Rasmussen, Inc., of Sunnyside, Washington, was hired as the builder. BPA placed the Boundary Substation into operation on June 29, 1967. As the "receiving switchyard" for Boundary Dam, the new substation linked to the existing 230 kV transmission line (Bell–Boundary No. 1) between West Kootenay Power and Light Company's system in British Columbia and the Bell Substation in Mead, Washington (*The Oregonian*, 1967). BPA had energized the Bell–Boundary No. 1 transmission line, which provided the interconnection to Canada, in November 1965. In 1966, BPA

began construction on the Bell–Boundary No. 2 line, a 91-mile, 230 kV line scheduled for energization in 1967. BPA designed the Bell–Boundary No. 2 line to help the No. 1 line integrate power from Boundary into the BPA grid. The No. 2 line fed the Boundary am output into the BPA system. By placing the Boundary Substation into service, BPA also enabled Seattle City Light Company to begin testing its generators at the Boundary Dam.

Significance

Boundary Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment was integral to delivering hydroelectric power generated at the Pend Oreille River Boundary Dam to growing populations served by the Seattle City Light Company. The substation also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house represents the only remaining example of BPA's Standard Type 2009 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-741 CONTROL HOUSE	1967	Tier II - Contributing
SWITCHYARD	1967	Tier II - Contributing

TIER II Z-741 CONTROL HOUSE 1967

Building Style: International, BPA Standard Type 2009

Exterior Characteristics: One story, asymmetrical plan, flat bi-level roof, insulated asbestos cement board panels with extruded aluminum mullions, multi-pane aluminum windows

Interior Characteristics:
Pendant globe light fixture



TIER II SWITCHYARD 1967

Characteristics:

Flat gravel yard, chain-link fence, two aluminum storage sheds, cable tunnel, and three oil tanks. 115 kV and 230 kV equipment includes multi-part dead-end towers, power transformers, gas and oil circuit breakers, potential transformers, current transformers, and buswork.



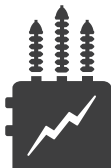
TIER I
SYSTEM
EXPANSION



- ▲ Clarkston Substation
- City
- Spokane District



1958



CLARKSTON SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

CLAK / Wilma Drive, Clarkston, WA 99403 / Whitman County

HISTORIC PAINT: 1956 SCHEME

History

Clarkston Substation was constructed on the north bank of the Snake River, approximately 2 miles west of Clarkston, Asotin County, Washington, to provide power to the Clearwater Power Company. The company formed as an electric cooperative under the Rural Electrification Administration in 1937 and purchased all of its power from BPA. In early 1956, BPA allocated \$77,000 to design and build the new Clarkston Substation.

Significance

Clarkston Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment provided reliable power to the local public utility district for distribution to the city of Clarkston and reflects BPA's expansion of its transmission system to rural communities in eastern Washington during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-292 CONTROL HOUSE	1958	Tier I - Contributing/Individually Eligible
SWITCHYARD	1958/1966	Tier II - Contributing

TIER I Z-292 CONTROL HOUSE 1958

Building Style: Utilitarian,
BPA Standard Type 192

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, metal door, metal window



TIER II SWITCHYARD 1958, rebuilt 1966

Characteristics:
Small, flat gravel yard; chain-link
fence; 115 kV equipment,
including steel lattice
superstructure, one power
transformer, oil circuit breaker,
and buswork



TIER II
SYSTEM
EXPANSION



- ☼ Davenport Microwave Radio Station
- City
- Spokane District

1955



DAVENPORT MICROWAVE RADIO STATION



EAST
REGION

SPOKANE
DISTRICT

DAVN / Lincoln County, Washington

History

The Davenport Microwave Radio Station was constructed in 1955 as part of Ross–Spokane, BPA's second microwave circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with BPA facilities in Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee dams and other intermediate substations. The Ross–Spokane circuit was the first microwave link to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. BPA historic photographs indicate that survey of the Davenport Microwave Radio Station site began by February 1951. Construction of the station commenced by January 13, 1953 and was close to completion by July 28, 1954.

Significance

The Davenport Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and impacted business and industrial development throughout the region, particularly the Deer Mountain, Washington, area. The period of significance for the Station is 1955, the station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-867 RADIO

Building style: Modern, BPA Standard Type 1606

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



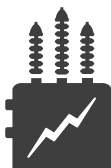
TIER II
SYSTEM
EXPANSION



- ▲ Dworshak Substation
- City
- Spokane District



1972



DWORSHAK SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

DWOK / 4155 South Road/Old Ashanke Grade Road, Lenore, ID 83541 / Clearwater County

HISTORIC PAINT: SCHEME A

History

Dworshak Substation was constructed approximately 6 miles northwest of Orofino, Clearwater County, Idaho, to transmit power to western Montana, particularly during periods when Hungry Horse Dam was not generating power. BPA contracted with Hazen & Clark, Inc., of Spokane, Washington, for \$196,969 to construct the Dworshak Substation Control House. The 500 kV Dworshak–Hot Springs transmission line constituted the final phase of the \$30 million Dworshak–Hot Springs Project, which had begun in 1968. The construction included nearly 143 miles of line between Dworshak Substation and Hot Springs Substation in Montana. BPA scheduled the transmission line for energization in fall 1972, after the Dworshak Dam generator was expected to begin operating. Soon afterwards, in 1973, BPA energized the 143-mile, 500 kV Dworshak–Hot Springs transmission line. By then, Dworshak Dam, named after Senator Henry Dworshak, had been completed and the reservoir filled to provide about 2 million acre-feet of storage for flood control and power generation. The 717-foot-tall concrete gravity dam, situated on the North Fork Clearwater River is the third tallest dam in the United States. The Dworshak–Hot Springs and Little Goose–Dworshak lines were BPA's first 500 kV transmission lines into Idaho and Montana.

Significance

Dworshak Substation is significant under NRHP Criterion A in the areas of Commerce and Industry. The substation's establishment impacted business, industrial, and infrastructure development throughout the region, most clearly demonstrated by its delivery of 500 kV power from the Dworshak Dam across Idaho and Montana. The substation also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-692 CONTROL HOUSE	1972	Tier II - Contributing
Z-693 MAINTENANCE	1972	Tier II - Contributing
Z-508 ENGINE GENERATOR BUILDING	1973	Tier II - Contributing
SWITCHYARD	1972	Tier II - Contributing

TIER II Z-692 CONTROL HOUSE 1972

Building Style: Utilitarian

Exterior Characteristics:

One story, asymmetrical plan, gable roof, wide airplane eaves, corrugated steel siding



TIER II Z-693 MAINTENANCE 1972

Building Style: Utilitarian

Exterior Characteristics:

Tall one story, rectangular plan, front-gable roof, corrugated metal siding, metal roll-up door



TIER II Z-508 ENGINE GENERATOR BUILDING 1973

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, flat roof, metal window, metal door



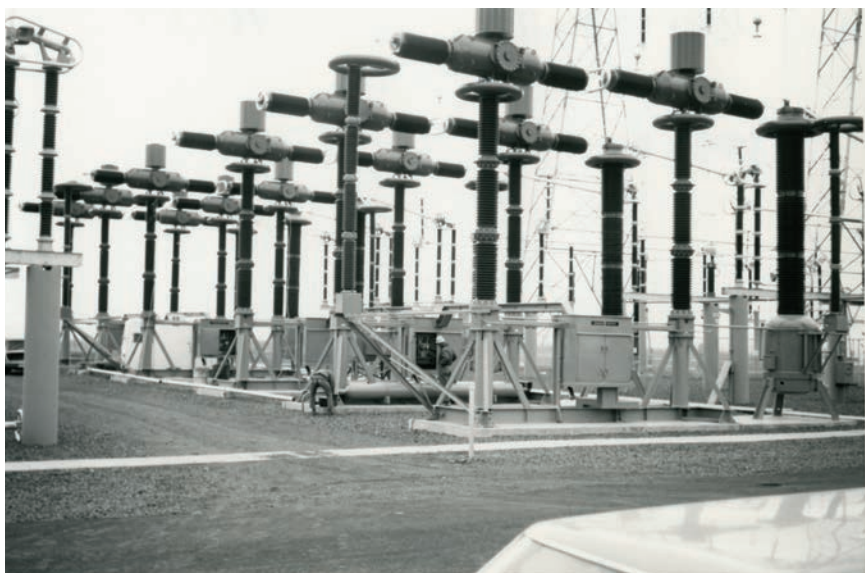
TIER II SWITCHYARD 1972

Characteristics: Flat gravel yard, chain-link fence, aluminum storage shed. 500 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, capacitor banks, gas circuit breakers, oil tank, and buswork.





Historic photo.



Historic photo.

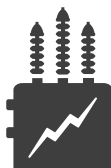
TIER I
SYSTEM
EXPANSION



- ▲ Little Goose Substation
- City
- Spokane District



1970



LITTLE GOOSE SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

LIGO / Little Goose Dam Road, LaCrosse, WA 99143 / Whitman County

HISTORIC PAINT: SCHEME A

History

Little Goose Substation was constructed approximately 1 mile from the Little Goose Dam, approximately 2 miles east of Riparia, Whitman County, Washington. BPA architects M. Hartford and Dean R. Wright designed the control house. As part of the Little Goose Hydroelectric Project, the substation transmitted power from the dam into BPA's main grid. Little Goose was the third of four Snake River dams completed by the United State Army Corps of Engineers during the 1960s and 1970s as part of the Federal Columbia River Power System. While BPA markets power from 31 federal dams, the Snake River dams are four of the largest. By March 1970, BPA had energized several transmission facilities associated with the Little Goose Dam: Little Goose Substation; the 2-mile Little Goose powerhouse transmission line; and the 24-mile, 500 kV transmission line to the Lower Monumental Dam. By late 1972,

BPA energized two more Little Goose transmission lines and erected a maintenance building at the Little Goose Substation. A second 24-mile, 500 kV transmission line extended to Lower Monumental Dam, and a 31-mile, 500 kV line paralleled the Snake River east from Little Goose Dam to Lower Granite Dam.

Significance

Little Goose Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment was integral to connecting Snake River power to BPA's Intertie, which transmits high-voltage power through an interconnected grid. The substation also reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house is individually significant under Criterion C in the area of Architecture as an exemplary representation of a modern-style control house. The building represents the only remaining example of BPA's Standard Type 2012 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-707 CONTROL HOUSE	1970	Tier I - Contributing/Individually Eligible
Z-694 MAINTENANCE	1970	Tier II - Contributing
Z-497 ENGINE GENERATOR BUILDING	1973	Tier II - Contributing
SWITCHYARD	1970	Tier II - Contributing

TIER I Z-707 CONTROL HOUSE 1970

Building Style: Modern,
BPA Standard Type 2012

Exterior Characteristics:

One story, rectangular plan, concrete construction, flat roof, smooth concrete finish with vertical grooves, tall fixed metal windows, concrete canopy



TIER II Z-694 MAINTENANCE 1970

Building Style: Utilitarian

Exterior Characteristics:

Tall one story, rectangular plan, front-gable roof, metal panel siding, metal roll-up door



TIER II Z-497 ENGINE GENERATOR BUILDING 1973

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, flat roof, metal window, metal door



TIER II SWITCHYARD 1972

Characteristics: Flat gravel yard, chain-link fence, aluminum storage shed. 500 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, capacitor banks, gas circuit breakers, oil tank, and buswork.





Historic photo.



Historic photo.

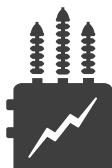
TIER III
SYSTEM
EXPANSION



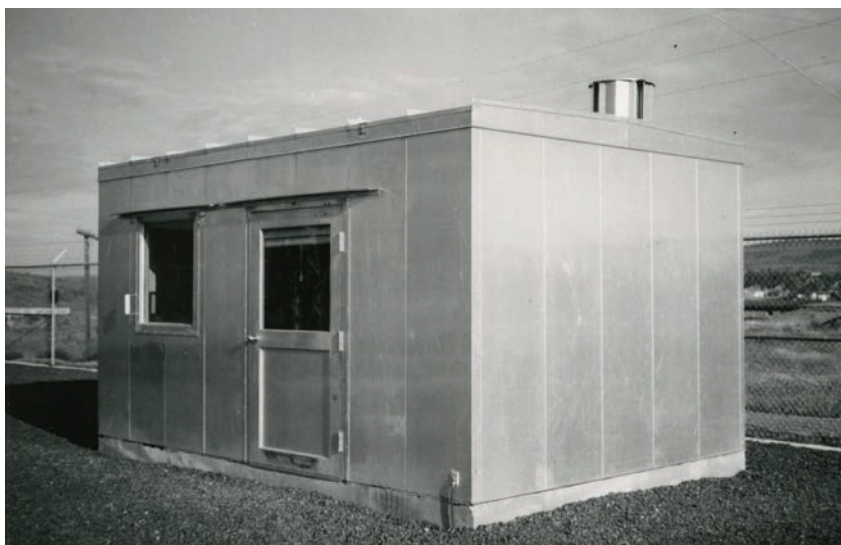
- ▲ Odessa Substation
- City
- Spokane District



1962



ODESSA SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

ODES / WA-21 and N 1st Street, Odessa, WA 99159 / Lincoln County

HISTORIC PAINT: 1956 SCHEME

History and Significance

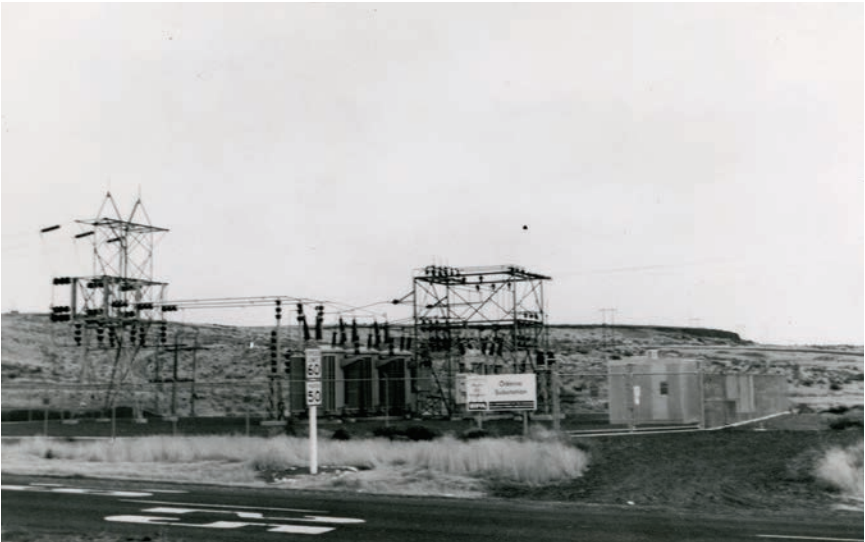
Odessa Substation near Odessa, Washington, was constructed to supply power to the Lincoln Electric Cooperative and is associated with community development in the region. The substation is not eligible for the NRHP. However, the control house is a notable resource as a good example of BPA's Standard Type 193 control house associated with BPA's System Expansion Period of 1946–1974.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-336 CONTROL HOUSE	1962	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-336 CONTROL HOUSE 1962

Building Style: Utilitarian,
BPA Standard Type 193

Exterior Characteristics:
One story, aluminum panel
construction, flat roof, metal
window, metal door with
inset pane



Historic photo.

TIER II
SYSTEM
EXPANSION



- ★ Plum Microwave Radio Station
- City
- Spokane District

1953



PLUM MICROWAVE
RADIO STATION



EAST
REGION

SPOKANE
DISTRICT

PLUM / Lincoln County, Washington

History

The Plum Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave communication circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee dams and other intermediate substations. The Ross–Spokane circuit was the first microwave installation to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. BPA historic photographs indicate that the Plum Microwave Radio Station site was identified by August 1949 and was under construction by January 1953. BPA acquired the site and a beam path easement in February 1953 from private landowners Susan E. Wilson, Alonzo Wilson, Ruth Dyer Adams, and Elbert Dyer for \$400.

Significance

The Plum Microwave Radio Station is significant under NRHP Criterion A in the areas of Communications and Industry. The station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Grand Coulee, Washington, area. The period of significance is 1953, the station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-876 RADIO

Building style: Modern,
BPA Standard Type 1606

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice



TIER II
SYSTEM
EXPANSION



- ▲ Republic Substation
- City
- Spokane District

1953



REPUBLIC SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

REPU / 313 Creamery Road, Republic, WA 99166 / Ferry County

HISTORIC PAINT: 1950 SCHEME

History

Republic Substation was constructed as a result of a 1945 power supply contract between BPA and the Ferry County PUD. In 1953, BPA contracted with M. A. Pithoud of Vancouver, Washington, for \$243,442 to construct the Republic–Colville transmission line. The 45-mile, 115 kV single-circuit transmission line tapped BPA's Spokane–Metaline Falls 115 kV line near Colville and extended west across the Kettle River mountain range to the Republic Substation to serve the Ferry County PUD's northern system. As part of its arrangement with BPA, Ferry County constructed a 33 kV transmission line from Republic Substation to the PUD's existing substation. In June 1953, BPA contracted with W. & W. Company of Seattle for \$13,005 to build the Republic Substation, which would provide equipment for the Midway–Ellensburg, Pacific Power and Light Company, and U.S. Bureau of Reclamation transmission

lines. The Republic Substation Control House was constructed as a standard aluminum control house like those found at BPA's Columbia Falls and Troy substations in Montana. Ferry County PUD's adjacent switching station was designed for interconnection with the Republic Substation. BPA energized the Republic Substation and the Colville–Republic transmission line in 1953.

Significance

Republic Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment provided reliable power to the local public utility district for distribution to rural communities in eastern Washington and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-236 CONTROL HOUSE	1953	Tier II - Contributing
SWITCHYARD	1953	Tier II - Contributing

TIER II Z-707 CONTROL HOUSE 1953

Building Style: Utilitarian,
BPA Standard Type 192

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, metal window, metal door



TIER II SWITCHYARD 1953

Characteristics: Flat gravel yard, chain-link fence, historic light fixtures, and an aluminum storage shed. 115 kV equipment includes a dead-end tower, power transformers, potential transformers, oil circuit breakers, and buswork.

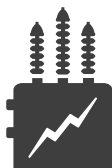


TIER II
SYSTEM
EXPANSION



- ▲ Sacheen Substation
- City
- Spokane District

1973



SACHEEN SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

SACH / Sub Station Road, Newport, WA 99156 / Pend Oreille County

HISTORIC PAINT: SCHEME A

History

Sacheen Substation was constructed approximately 11 miles west of Newport, Pend Oreille County, Washington, to provide more reliable power transmission in the rural Newport area. BPA determined that the new substation would require a 12-acre parcel to contain a transformer, terminal facilities, power systems control, and protective equipment. BPA's substation design entailed a special low-profile box girder and tubular steel yard structures, as well as BPA's standard color scheme. The 230 kV Bell-Boundary transmission line was looped into the new Sacheen Substation, while the proposed 115 kV Sacheen-Albeni Falls line would originate at the Sacheen Substation.

Significance

Sacheen Substation is significant under NRHP Criterion A in the area of Government. The substation was established to provide reliable power to the local public utility district for distribution to rural communities in eastern Washington and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-685 CONTROL HOUSE	1973	Tier II - Contributing
SWITCHYARD	1973	Tier II - Contributing

TIER II Z-685 CONTROL HOUSE 1973

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, low-pitch side-gable roof, metal doors



TIER II SWITCHYARD 1973

Characteristics: Flat gravel yard, chain-link fence, historic lamppost and light fixture, and aluminum storage sheds. 230 kV equipment includes multi-part dead-end towers, a power transformer, potential transformers, current transformers, gas circuit breakers, oil tanks, and buswork.

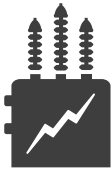


TIER I
SYSTEM
EXPANSION



- ▲ Sandpoint Substation
- City
- Spokane District

1950



SANDPOINT SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

SAND / 140 McGhee Road, Sandpoint, ID 83864 / Bonner County

HISTORIC PAINT: 1950 SCHEME

History

Sandpoint Substation was constructed approximately 4 miles southwest of Sandpoint, Bonner County, Idaho, to provide power to customers in northern Idaho. BPA designated William C. Shirran, an electrical engineer at BPA's Kalispell office, to supervise construction. The Sandpoint Substation, in conjunction with the Newport Substation, constituted an important high-voltage transmission link into the northern Idaho panhandle area. The two substations, connected by a 24-mile, 115 kV transmission line, later extended power transmission to Bonners Ferry, Idaho, and Troy, Montana. In September 1950, BPA publicized its \$11.7 million construction program for 1951-1952, including a 33.7-mile, 115 kV transmission line between the Sandpoint and Bonners Ferry Substations in Idaho. The Sandpoint community celebrated

the new BPA facilities, including Sandpoint Substation and the Sandpoint–Newport transmission line, at a dedication ceremony in November 1950.

Significance

Sandpoint Substation is significant under NRHP Criterion A in the area of Government. The substation was designed to provide local public utility districts with reliable power and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house is individually significant under Criterion C in the area of Architecture as an exemplary representation of BPA's Standard Aluminum Control House Type 190 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-89 CONTROL HOUSE	1950	Tier I - Contributing/Individually Eligible
SWITCHYARD	1950	Tier II - Contributing

TIER I Z-89 CONTROL HOUSE 1950

Building Style: Utilitarian,
BPA Standard Type 190

Exterior Characteristics:

One story, rectangular plan,
metal panel construction, flat
roof, multi-pane metal windows,
metal doors, metal canopy



TIER II SWITCHYARD 1950

Characteristics: Stepped
gravel yard, chain-link fence,
and aluminum storage shed.
115 kV equipment in original
southern area includes a dead-
end tower, a power transformer,
potential transformers, oil and
vacuum circuit breakers, and
buswork. Northern area is
non-contributing.

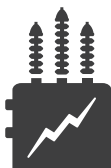


TIER II
SYSTEM
EXPANSION



- ▲ Wagner Lake Substation
- City
- Spokane District

1974



WAGNER LAKE SUBSTATION



EAST
REGION

SPOKANE
DISTRICT

WAGL / 11001 Quirk Road E, Wilbur, WA 99185 / Lincoln County

HISTORIC PAINT: SCHEME A

History

Wagner Lake Substation was constructed approximately 11 miles south of Wilbur, Lincoln County, Washington, to relieve the overload on existing power facilities in the Almira service area and improve reliability of service. BPA's 1974 construction plan included the Wilbur-Wagner Lake transmission line for the Almira service area. The 10-mile, 115 kV line would begin near Washington Water Power System's Wilbur

Substation and extend to the proposed BPA Wagner Lake Substation. The approximately 1.5-acre substation would contain a 115 kV/34.5 kV transformer, terminal facilities, power system control, and protective equipment. BPA planned that, “The substation will be of standard scheme ... utilizing landscaping and BPA’s standard color scheme” (Bonneville Power Administration, 1974). The Wagner Lake Substation was energized on January 22, 1974, the same day as the 115 kV Wagner Lake Tap to the Grand Coulee–Bell No. 1 and 2 transmission lines.

Significance

Wagner Lake Substation is significant under Criterion A in the area of Government for providing reliable power to rural communities in eastern Washington. The substation reflects the extension of BPA’s transmission facilities in the Pacific Northwest during the System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-516 CONTROL HOUSE	1974	Tier II - Contributing
SWITCHYARD	1974	Tier II - Contributing

TIER II Z-516 CONTROL HOUSE 1974

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, metal panel construction, flat roof, metal doors

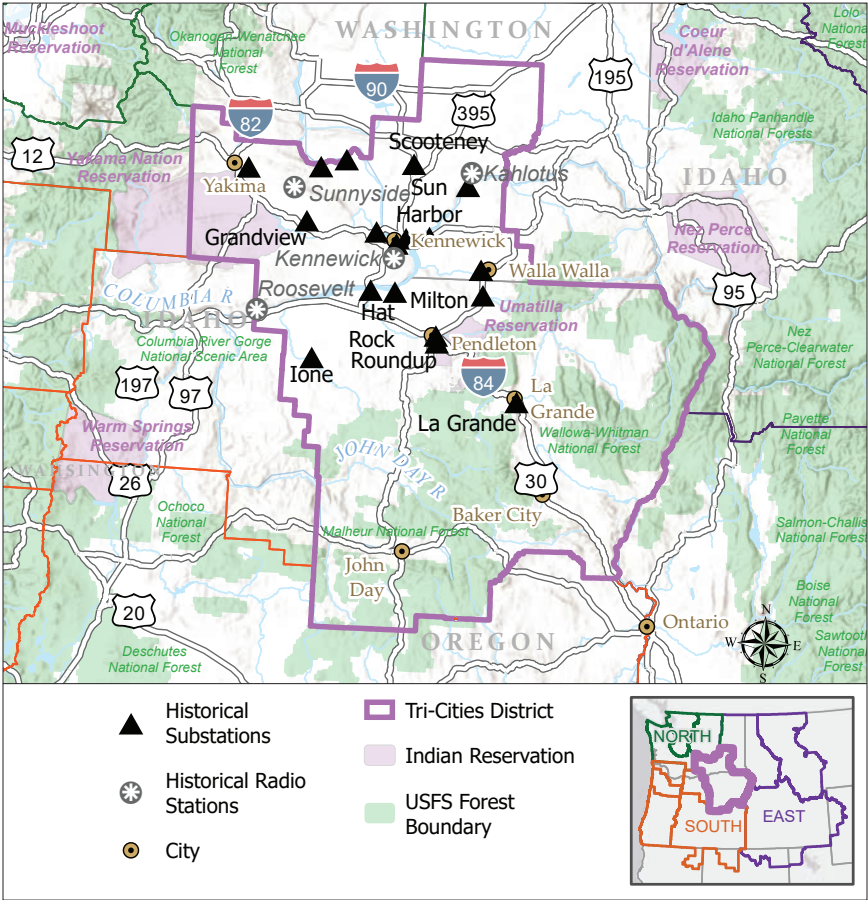


TIER II SWITCHYARD 1974

Characteristics: Flat gravel yard, chain-link fence, and 115 kV equipment, including a dead-end tower, power transformer, potential transformers, and buswork.



TRI-CITIES DISTRICT



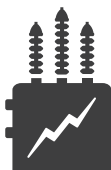
LOCATION	HISTORICAL SIGNIFICANCE
Franklin Substation.....	TIER III
Grandview Substation.....	TIER II
Hanford Substation.....	TIER I
Hat Rock Substation.....	X
Ione Substation.....	TIER II
Kahlotus Microwave Radio Station.....	X
Kennewick Microwave Radio Station.....	X
La Grande Substation.....	TIER II
Lower Monumental Substation.....	TIER III
McNary Substation.....	TIER I
Midway Substation.....	TIER I
Milton Substation.....	X
Moxee Substation.....	TIER I
Pendleton Substation.....	X
Richland Substation.....	TIER II
Roosevelt Microwave Radio Station.....	TIER II
Roundup Substation.....	TIER II
Scooteney Substation.....	TIER II
Sunnyside Microwave Radio Station.....	X
Walla Walla Substation.....	TIER I

TIER III
SYSTEM
EXPANSION



- ▲ Franklin Substation
- City
- Tri-Cities District

1953



FRANKLIN SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

FRAN / 22 Pasco Kahlotus Road, Pasco, WA 99301 / Franklin County

HISTORIC PAINT: 1950 SCHEME

History and Significance

Franklin Substation near Pasco, Washington, was constructed in 1953 along the 29-mile, 115 kV Franklin–McNary transmission line and is associated with community development in the region. In 1956, BPA energized a new dispatching center at the substation that increased the system's reliability of power transmission. Substantial alterations to the control house have diminished the substation's integrity and it is not eligible for the NRHP. However, the control house is notable as the second-best example (following Chemawa Substation Control House) of BPA's Standard Type 125 design. The former oil house is also notable as a rare and distinct building type associated with BPA's System Expansion Period from 1946–1974.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-854 CONTROL HOUSE	1953	Tier III - Notable but Not Eligible
Z-967 STORAGE (OLD OIL HOUSE)	1953	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-854 CONTROL HOUSE 1953

Building Style: Modern,
BPA Standard Type 125

Exterior Characteristics:

One story, steel and concrete frame construction, flat roof, cast-in-place concrete exterior with grid pattern, steel and glass door with sidelights



TIER III Z-967 STORAGE (OLD OIL HOUSE) 1953

Building Style: Utilitarian,
BPA Standard Type Oil House

Exterior Characteristics:

One story, semi-subterranean, rectangular plan, flat roof, steel windows



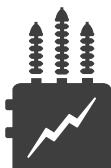
Historic photo.

TIER II
SYSTEM
EXPANSION



- ▲ Grandview Substation
- City
- Tri-Cities District

1947



GRANDVIEW SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

GRAN / 3260 N County Lane Road, Grandview, WA 98930 / Yakima County

HISTORIC PAINT: 1950 SCHEME

History

Grandview Substation was constructed approximately 4 miles northeast of Grandview, Yakima County, Washington, to serve facilities of the Bureau of Indian Affairs, U.S. Bureau of Reclamation, and Benton Rural Electric Cooperative Association. In May 1947, BPA completed the 25.1-mile, 115 kV Midway–Grandview transmission line to relieve power shortages in central Washington. Two years later, in January 1949, BPA energized the 28-mile, 115 kV Grandview–Richland line to further address Yakima County's critical power shortages. BPA budgeted for major additions to Grandview Substation in 1956, such as \$80,000 for installation of two-way 115 kV metering for interconnection with Pacific Power and Light Company. BPA also budgeted \$16,000 to upgrade the existing transformer to meet power demands

of the Benton Rural Electric Cooperative Association. BPA awarded Witzig Electric Company the \$24,793 contract for “a 15,000 volt switchyard, line terminals and a new service terminal,” to enhance service to the bureaus of Indian Affairs and Reclamation, as well as the Benton cooperative (*News-Review*, 1956).

Significance

Grandview Substation is significant under NRHP Criterion A in the area of Government. The substation’s establishment provided reliable power for the electrification of rural communities in central Washington and reflects BPA’s expansion of its transmission system in the Pacific Northwest during BPA’s System Expansion Period (1946–1974). The control house represents the only remaining example of BPA’s Standard Type 143 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-852 CONTROL HOUSE	1954	Tier II - Contributing
SWITCHYARD	1947/1954	Tier II - Contributing

TIER II Z-852 CONTROL HOUSE 1954

Building Style: Minimal Traditional, BPA Standard Type 143

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, hipped roof, steel windows



TIER II SWITCHYARD 1947, expanded 1954

Characteristics: Flat gravel yard, chain-link fence, concrete paths, historic and modern lampposts with light fixtures. 115 kV equipment includes dead-end towers, power transformers, potential transformers, gas circuit breakers, oil tanks, capacitor bank, and buswork.

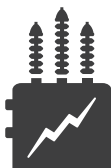


TIER I
SYSTEM
EXPANSION



- ▲ Hanford Substation
- City
- Tri-Cities District

1970



HANFORD SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

HANF / 100 N Area, Richland, WA 99352 / Benton County

HISTORIC PAINT: SCHEME A

History

Hanford Substation was constructed beginning in 1967 and was energized in 1971 on the Hanford Reservation, in Richland, Benton County, Washington, to transmit power generated at Hanford Site's N Reactor. BPA transmitted the power from the reactor to meet area power demands as well as support the Pacific Northwest–Pacific Southwest Intertie. BPA architects George Poole and Charles Lovett designed the substation control house. The 560-square-mile Hanford Site was established in 1943 as part of the Manhattan Project. Plutonium produced at the site was used in the first nuclear bomb and in the bomb deployed at Nagasaki, Japan, near the end of World War II. As of 1992, the Hanford Substation was one of six BPA substations on the Hanford Site, including Midway Substation. The N reactor was unique in that it generated plutonium as well as electricity. Its power-generating component, the Hanford Generating Plant (HGP), was built by the Washington Public Power Supply

System (WPPSS) and operated from 1966 to 1986. Exchange agreements in the 1960s between BPA, the WPPSS, and 76 other utilities enabled BPA to receive the power generated by the HGP. In return, BPA provided utility participants “an amount of power equal in value, at BPA rates, to the annual costs of operating the steam plant [HGP] and retiring bonds issued in 1963 to construct the plant” (Bonneville Power Administration, 1968). Hanford Substation was one of the BPA system’s most important switching stations, equipped with transmission facilities to prevent power delivery failures to the Pacific Northwest Power Pool and the Pacific Northwest–Pacific Southwest Intertie. By 1968, Hanford Substation was also the termination point for three 500 kV transmission lines supporting the Intertie. Although the N Reactor has ceased operations, the Hanford Substation continues to provide power to the Hanford Site’s infrastructure.

Significance

Hanford Substation is significant under NRHP Criterion A in the area of Government. The substation was constructed to meet area power demands and support the Pacific Northwest –Pacific Southwest Intertie. The substation reflects BPA’s expansion of its transmission system and introduction of additional power sources and larger voltages in the Pacific Northwest during BPA’s System Expansion Period (1946–1974). Although the associated Hanford reactor has been decommissioned, the substation remains an important switching facility for BPA’s 500 kV transmission lines. The control house is individually significant under Criterion C in the area of Architecture as exemplary of a contemporary-style control house and expressing BPA’s beauty design concepts. Designed by BPA architects George Poole and Charles Lovett, the building is unique within the BPA system.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-703 CONTROL HOUSE / MAINTENANCE	1970	Tier I - Contributing/Individually Eligible
SWITCHYARD	1970	Tier II - Contributing
Z-7001 ENGINE GENERATOR BUILDING	1992	X - Non-contributing

TIER I Z-703 CONTROL HOUSE / MAINTENANCE 1970

Building Style: Modern/
Contemporary

Exterior Characteristics:

One-story sections of varying heights, asymmetrical plan, exposed steel structural elements, complex roof with side gable and wide airplane eaves, dropped hip roof with wide eaves, side-gable plenum,

and front-gable forms, concrete masonry units finished with stucco, roman brick cladding arranged in a running bond, recessed entrance, glass and brick materials, band of tall and narrow fixed windows



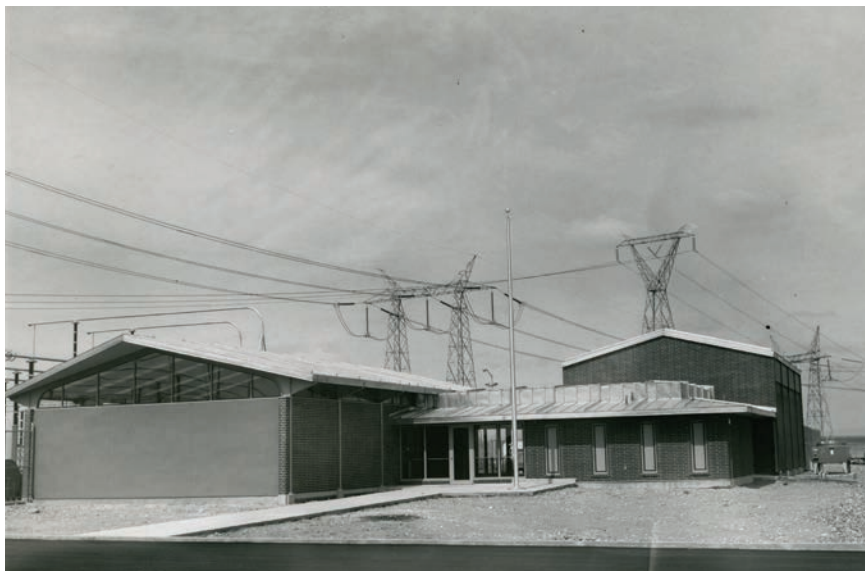
Interior Characteristics: Spiral staircase, brick walls, original pendant light fixture

TIER II SWITCHYARD 1970

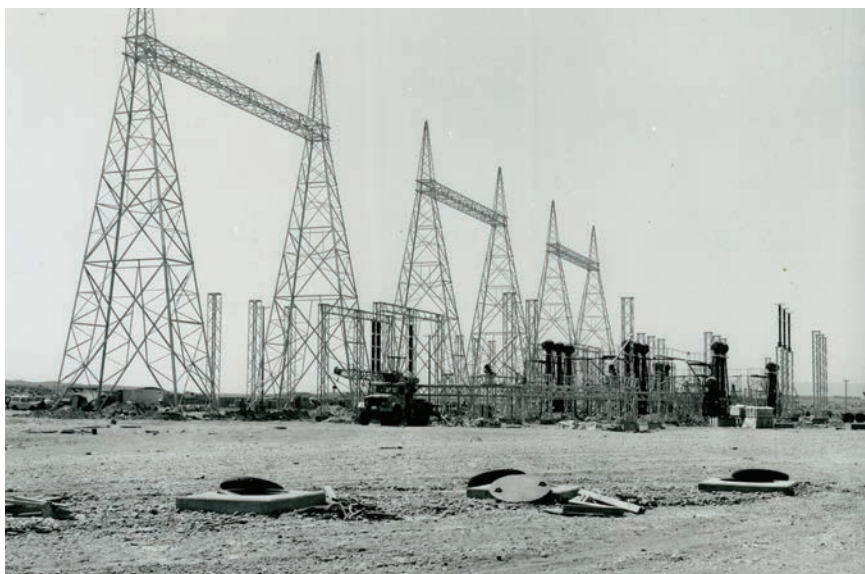
Characteristics:

Flat gravel yard, chain-link fence, concrete paths, telephone booth and 500 kV equipment, including dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers, and buswork.



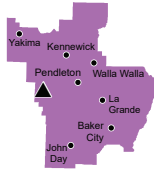


Historic photo.



Historic photo, 1965.

TIER II
SYSTEM
EXPANSION



- ▲ Ione Substation
- City
- Tri-Cities District

1949



IONE SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

IONE / 69799 Baseline Lane, Ione, OR 97843 / Morrow County

HISTORIC PAINT: 1950 SCHEME

History

Ione Substation was constructed approximately 3 miles northeast of Ione, Morrow County, Oregon, to serve the Columbia Basin Electric Cooperative's (Cooperative) distribution system, including the towns of Ione, Heppner, and Condon, with additional service to the Columbia Power Cooperative. BPA constructed the Ione Substation based on an agreement to lease 35 miles of the Cooperative's transmission line between Ione and Hermiston, where the line would connect to the Pacific Power and Light Company's (Pacific Power) system. BPA's separate contract with Pacific Power provided that the company would supply BPA with power at Hermiston and that BPA would transmit power from Hermiston to Ione for the company to use in reinforcing its

central Oregon power system. Construction by the Cooperative included 500 miles of distribution lines. Another power cooperative, the Columbia Power Cooperative, leased the lone–Kinzua 66 kV transmission line to BPA. The lone–Kinzua line was connected to the Hermiston–lone line, operated by Pacific Power. Consequently, the power supply for both cooperatives relied upon BPA's delivery arrangement with Pacific Power.

Significance

lone Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment provided reliable power to the local public utility district for distribution to rural communities in Eastern Oregon and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-117 CONTROL HOUSE	1950	Tier II - Contributing
SWITCHYARD	1949	Tier II - Contributing

TIER II Z-117 CONTROL HOUSE 1950

Building Style: Utilitarian,
BPA Standard Type 190

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, multi-pane metal windows,
metal door



TIER II SWITCHYARD 1949

Characteristics: Flat gravel
yard, chain-link fence, and 69
kV equipment, including dead-
end towers, power transformer,
potential transformers, oil and
vacuum circuit breakers, capaci-
tor bank, and buswork.

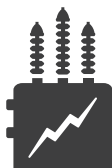


TIER II
SYSTEM
EXPANSION



- ▲ La Grande Substation
- City
- Tri-Cities District

1962



LA GRANDE SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

LAGD / 2805 Gekeler Lane, La Grande, OR 97850 / Union County

HISTORIC PAINT: 1956 SCHEME

History

La Grande Substation was constructed at La Grande, Union County, Oregon, as part of the McNary–Pendleton–La Grande transmission line. It was first developed in 1952 with substantial changes in 1962. Westinghouse Electric Corporation of Portland built the La Grande Substation transformer for \$300,000. In July 1954, California–Pacific Utilities (Cal-Pac), a private utility, assumed La Grande Substation’s operations. BPA had agreed to supply power to Cal-Pac’s eastern Oregon division. Similar to arrangements between BPA and other private utilities, the agreement provided Cal-Pac with surplus BPA power after BPA’s commitments to public agencies and long-term industrial users had been met. In 1955, BPA upgraded the La Grande

and Roundup Substations to permit a high-voltage “La Grande” intertie between the Northwest Power Pool and Idaho Power Company (IPC). The 20-year exchange agreement between BPA and IPC helped integrate Utah and Idaho systems with Oregon and Washington utilities, increasing transmission capacity between the Northwest Power Pool’s western and eastern members, and completing a high-voltage loop that linked all major generating facilities of Oregon, Washington, Idaho, western Montana, and Utah. In September 1961, a fire destroyed the La Grande Substation’s small control house. The following month, BPA contracted with Mann Construction Company of Redmond, Oregon, for \$28,844 to construct a new control house.

Significance

La Grande Substation is significant under NRHP Criterion A in the area of Community Planning and Development. The substation is representative of BPA’s distribution of power to rural communities in eastern Oregon, and reflects the design, construction, and operation of the BPA Transmission System in the Pacific Northwest during BPA’s System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-757 CONTROL HOUSE	1962	Tier II - Contributing
SWITCHYARD	1952	Tier II - Contributing

TIER II Z-757 CONTROL HOUSE 1962

Building Style: Minimal Traditional, BPA Standard Type 144-1

Exterior Characteristics: One story, rectangular plan, concrete construction, hipped roof, smooth concrete finish, historic incandescent light fixtures



Interior Characteristics: Historic incandescent light fixtures

TIER II SWITCHYARD 1952

Characteristics: Flat gravel yard, chain-link fence, and 230 kV equipment, including multi-part dead-end towers, power transformers, potential transformers, current transformers, gas circuit breakers, oil tank, capacitor bank, and buswork.

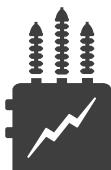


TIER III
SYSTEM
EXPANSION



- ▲ Lower Monumental Substation
- City
- Tri-Cities District

1967



LOWER MONUMENTAL SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

LOMO / Lower Monumental Road, southwest of Lower Monumental Dam
Pasco, WA 99301 / Walla Walla County

HISTORIC PAINT: SCHEME A

History and Significance

Lower Monumental Substation in Matthew, Washington, was constructed as part of the Lower Monumental Hydroelectric Project and a link in the Pacific Northwest–Pacific Southwest Intertie. Substantial alterations to the substation have diminished its integrity, and it is not eligible for the NRHP. Designed by BPA architects M. Hartford and Dean R. Wright, the maintenance building is a notable resource as a rare and distinct building type associated with BPA's System Expansion Period from 1946–1974.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-727 MAINTENANCE	1968	Tier III - Notable but Not Eligible
ALL OTHER RESOURCES	-	X - Non-contributing

TIER III Z-727 MAINTENANCE 1968

Building Style: Utilitarian

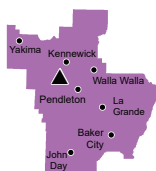
Exterior Characteristics:

Tall one story, rectangular plan, concrete construction, flat roof, smooth concrete finish with panel pattern, multi-panel metal overhead vehicle door



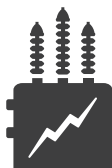
Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ McNary Substation
- City
- Tri-Cities District

1954



MCNARY SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

LAGD / 1910 Third Street, Umatilla, OR 97882 / Umatilla County

HISTORIC PAINT: 1950 SCHEME

History

McNary Substation was constructed near McNary, Umatilla County, Oregon, as part of major grid additions that included new transmission facilities from McNary Dam to Ross Complex and increased transmission capacity to western Oregon and Washington. BPA built McNary Substation in conjunction with the United States Army Corps of Engineers' McNary Dam, the first Columbia River hydroelectric project to follow the Bonneville and Grand Coulee dams. The McNary Substation represents the progression of BPA's Master Grid beyond the original 235 kV system. The McNary–Ross No. 1 transmission line, which originates at the McNary Substation, transmits McNary Dam power and was BPA's first 345 kV transmission line.

Significance

McNary Substation is significant under NRHP Criterion A in the area of Government, as it reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house is also significant under Criterion C in the area of Architecture as an exemplar representation of BPA's Type 185 design. The building also represents the only remaining example of this design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-836 CONTROL HOUSE	1954	Tier I – Contributing/ Individually Eligible
Z-834 RELAY HOUSE #1	1954	Tier II - Contributing
Z-826 RELAY HOUSE #2	1956	Tier II - Contributing
Z-825 RELAY HOUSE #3	1956	Tier II - Contributing
Z-452 STORAGE	1968	X - Non-contributing
SWITCHYARD	1954	Tier II - Contributing
Z-7820 CABLE TUNNEL	1954	Contributing Feature of Switchyard
Z-1111 CHLORINATOR BUILDING	1983	X - Non-contributing
Z-1301 EQUIPMENT STORAGE BUILDING	1995	X - Non-contributing
Z-1394 RELAY HOUSE #4	2002	X - Non-contributing
Z-0000 ATV STORAGE	2014	X - Non-contributing
Z-1497 MAINTENANCE HEADQUARTERS	2014	X - Non-contributing
Z-1498 MAINTENANCE SHOP	2014	X - Non-contributing
Z-1499 VEHICLE STORAGE	2014	X - Non-contributing
Z-1533 HAZMAT BUILDING	2015	X - Non-contributing

TIER I Z-836 CONTROL HOUSE 1954

Building Style: Modern,
BPA Standard Type 185

Exterior Characteristics:
One story, asymmetrical plan,
flat roof, concrete grid pattern,
multi-pane windows at entry,
lettering above door



TIER II Z-834 RELAY HOUSE #1 1954

Building Style: Utilitarian

Exterior Characteristics:
One story, rectangular plan,
concrete grid exterior



TIER II Z-826 RELAY HOUSE #2 1956

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, concrete grid exterior



TIER II Z-825 RELAY HOUSE #3 1956

Building Style: Utilitarian

Exterior Characteristics:

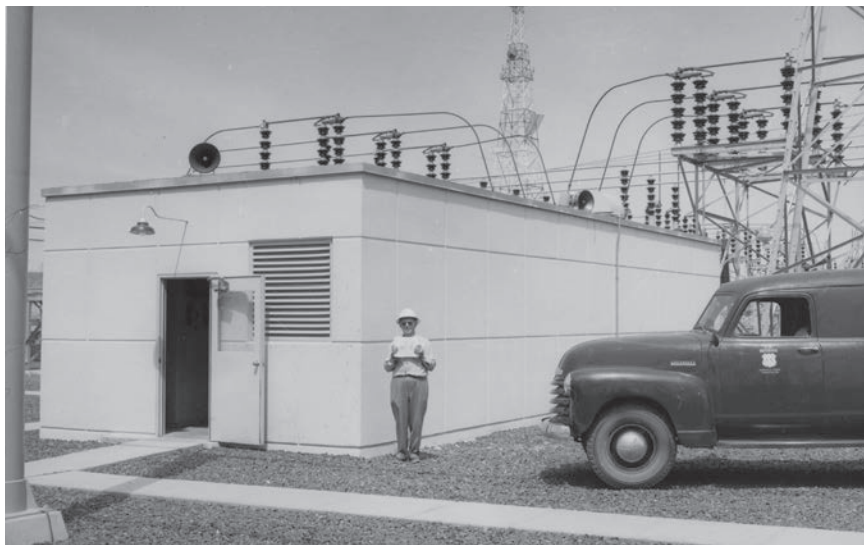
One story, rectangular plan, concrete grid exterior



TIER II SWITCHYARD 1954

Characteristics: Flat gravel yard, chain-link fence, concrete paths, historic lampposts and light fixtures, aluminum storage sheds, and cable tunnel. 115 kV, 230 kV, and 500 kV equipment includes dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, oil tanks, and buswork.



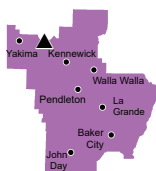


Historic photo.



Historic photo.

TIER I
MASTER
GRID



- ▲ Midway Substation
- City
- Tri-Cities District



1941



MIDWAY SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

MIDW / Priest Rapids Road, Mattawa, WA 99349 / Benton County

HISTORIC PAINT: 1950 SCHEME

History

Midway Substation was constructed near Vernita, Benton County, Washington, to provide power to the Northwest Electric Company and Washington Water Power Company interchange. The Midway Substation is a key distribution point to Puget Sound, Hanford, and eastern Washington. It also helps link the Bonneville and Grand Coulee dams into a single system. BPA expedited completion of the Midway Substation to accommodate pressing wartime power needs. The power Midway Substation delivered to the Hanford atomic works enabled wartime production of plutonium and facilitated development of the nuclear fission bomb deployed at Nagasaki, Japan, in August 1945. BPA contracted with Alan Yonker of Portland, Oregon, for \$151,788

to build the substation's operators' cottages, dormitory, and garages. In 1944, BPA installed 230 kV line terminal facilities at Midway Substation for the Hanford No. 1 and No. 2 transmission lines to increase stable power transmission to the Portland and Puget Sound areas. In 1951, BPA added a third transmission line between Grand Coulee and the Midway Substation. The new 105-mile "steel tower" line ultimately cost about \$4 million and transmitted power at 250 kV, relieving overload on the two existing lines between Grand Coulee Dam and the substation (*Idaho Statesman*, 1951). In 1958, Witzig Construction Company of Corvallis, Oregon, constructed the 230 kV Priest Rapids terminal additions at Midway Substation. The additions permitted BPA to integrate power from Priest Rapids Dam into the Northwest Power Pool and transmit Priest Rapids power to other northwest utilities.

Significance

Midway Substation is significant under NRHP Criterion A in the areas of Commerce, Industry, Science and Engineering, and Military. The substation's establishment impacted business, industrial, and military development throughout the region. This is most clearly demonstrated by its delivery of power to the Hanford atomic works, which developed plutonium during World War II, and as a key element for linking the Bonneville and Grand Coulee dams into a single system. The substation also reflects BPA's initial development of its transmission system in the Pacific Northwest during its Master Grid Development Period (1938–1945). Both the control house and Untanking Tower are individually significant under Criterion C in the area of Architecture for exemplifying the Streamline Moderne style. The control house represents the second-best version of BPA's Standard Type 110 design, after the Chehalis Control House. The untanking tower represents the best example of BPA's Streamline Moderne style Untanking Tower.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-972 CONTROL HOUSE	1941	Tier I - Contributing/Individually Eligible
Z-973 UNTANKING TOWER	1941	Tier I - Contributing/Individually Eligible
Z-626 FLAMMABLE STORAGE	1954	Tier II - Contributing
SWITCHYARD	1941	Tier II - Contributing
Z-0000 RAILROAD	1941	Tier II - Contributing
Z-0000 CABLE TUNNEL	1941	Contributing Feature of Switchyard
Z-6008 STORAGE BUILDING	1956	X - Non-contributing
Z-554 ENGINE GENERATOR BUILDING	1975	X - Non-contributing
Z-0000 STORAGE SHED	1985	X - Non-contributing
Z-7003 STORAGE SHED	1985	X - Non-contributing

TIER I Z-972 CONTROL HOUSE 1941

Building Style: Streamline Moderne, BPA Standard Type 110

Exterior Characteristics:

One story, concrete construction, flat roof with parapet, curved walls, concrete dentils at main entrance, steel multi-pane windows, curved metal railing

Interior Characteristics:

Brass wall registers, pendant globular light fixtures



TIER I Z-973 UNTANKING TOWER 1941

Building Style: Streamline Moderne, BPA Standard Type Untanking Tower

Exterior Characteristics:

Tall central tower, concrete construction, flat roof with parapet and concrete coping, smooth concrete finish, porthole windows, steel multi-pane windows, wood panel overhead doors, patterned metal railing at entrance, glass and steel entrance with concrete canopy



TIER II Z-626 FLAMMABLE STORAGE 1954

Building Style: Quonset

Exterior Characteristics:

Quonset hut design, corrugated metal panel construction



TIER II SWITCHYARD 1941, expanded circa 1948 and circa 1964

Characteristics:

Flat gravel yard, chain-link fence, concrete paths, aluminum storage sheds, cable tunnel, transfer track rails and transfer cart. 115 kV and 230 kV equipment includes dead-end towers, power transformers, potential transformers, current transformers, gas and oil circuit breakers, and buswork.



TIER II Z-0000 RAILROAD 1941

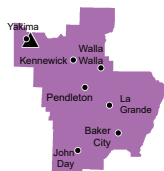
Style: BPA Standard Type Rails

Characteristics: Steel rails



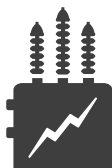
Historic photo.

TIER I
SYSTEM
EXPANSION



- ▲ Moxee Substation
- City
- Tri-Cities District

1954



MOXEE SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

MOXE / 8531 Bittner Road, Yakima, WA 98936 / Yakima County

HISTORIC PAINT: 1950 SCHEME

History

Moxee Substation was constructed approximately 5 miles east of Yakima, Yakima County, Washington, as an interconnection between the BPA and Pacific Power and Light Company (Pacific Power) transmission systems, a feeder point for the U.S. Bureau of Reclamation, and a “sectionalizing point” on the 115 kV Midway–Ellensburg transmission line (Bonneville Power Administration, 1953. BPA strategically located the 115 kV Moxee Substation near the Union Gap and Moxee taps to the Midway–Ellensburg 115 kV transmission lines. BPA contracted with John M. King to build the control house and awarded the Switchyard construction contract to Utility Construction Company. In March 1954, the Moxee–Roza and Moxee–Ellensburg

115 kV transmission line facilities were relocated to the new Moxee Substation, which was then test-energized. Pacific Power's 115 kV Union Gap transmission line facility was also relocated to its permanent terminal at the Moxee Substation Switchyard.

Significance

Moxee Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment provided an important interconnection for power distribution to communities in central Washington and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house is individually significant under Criterion C in the area of Architecture as exemplary of BPA's Standard Type 111-1 design. The building also represents the only remaining example of this design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-855 CONTROL HOUSE	1954	Tier I - Contributing/Individually Eligible
SWITCHYARD	1954	Tier II - Contributing

TIER I Z-855 CONTROL HOUSE 1954

Building Style: Modern,
BPA Standard Type 111-1

Exterior Characteristics:
One story, concrete masonry unit construction, bi-level flat roof, multi-pane steel windows, recessed entrance, band of fixed windows, concrete canopy

Interior Characteristics:
Historic metal dome light fixtures



TIER II SWITCHYARD 1954

Characteristics:
Flat gravel yard, chain-link fence, concrete path, aluminum storage shed, and 115 kV equipment, including multi-part dead-end tower, potential transformers, current transformers, gas circuit breakers, oil tank, and buswork.

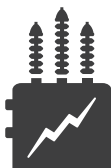


TIER II
SYSTEM
EXPANSION



- ▲ Richland Substation
- City
- Tri-Cities District

1949



RICHLAND SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

RICH / 3000 George Washington Way, Richland, WA 99352 / Benton County

HISTORIC PAINT: 1950 SCHEME

History

Richland Substation was constructed just south of Richland, Benton County, Washington. Before construction of the Richland Substation and associated transmission lines, the Richland area relied on BPA's 115 kV Midway–Pasco transmission line and the Midway–Grandview line. As increasing power demand in the Yakima Valley, especially at Richland, Hanford, and Pasco, was about to exceed the line's capacity, BPA extended the Midway–Grandview line to Richland. BPA also constructed the Richland–Kennewick line to “fill in the gap between Richland and Kennewick” by supplying two-way 115 kV power service to loads at Richland and to reinforce the Midway–Pasco line (Bonneville Power Administration, 1949). In 1956, BPA hired

contractor Stevens and Thompson to build switchyard additions. Since 1960, the city of Richland has owned equipment and switching gear inside the Richland Substation Switchyard as well as a 12.5 kV transmission line to Richmond.

Significance

Richland Substation is significant under NRHP Criterion A in the area of Government. The substation was designed to provide reliable power to the Yakima Valley and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974).

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-162 CONTROL HOUSE	1949	Tier II - Contributing
SWITCHYARD	1949	Tier II - Contributing

TIER II Z-162 CONTROL HOUSE 1949

Building Style: Utilitarian,
BPA Standard Type 190

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, low-
pitch side-gable roof, metal
windows, metal door



TIER II SWITCHYARD 1949, expanded circa 1970

Characteristics:
Flat gravel yard, chain-link
fence, historic lampposts and
light fixtures. 115 kV equipment
includes a multi-part dead-
end tower, power transformer,
potential transformers, oil circuit
breakers, capacitor bank, and
buswork.



TIER II
SYSTEM
EXPANSION



-  Roosevelt Microwave Radio Station
-  City
-  Tri-Cities District

1953



ROOSEVELT MICROWAVE RADIO STATION



EAST
REGION

TRI-CITIES
DISTRICT

ROOS / Klickitat County, Washington

History

The Roosevelt Microwave Radio Station was constructed in 1953 as part of Ross–Spokane, BPA's second microwave communication circuit. This circuit connected the Ross Control Center in Vancouver, Washington, with Spokane, Washington, by way of the Columbia River power plants at Bonneville, McNary, Chief Joseph, and Grand Coulee dams and other intermediate substations. The circuit was the first microwave installation to cross the Cascade mountain range. Following a preview of Ross–Snohomish, BPA's first microwave circuit, in November 1949, BPA anticipated that Ross–Spokane would be constructed in 1950 for \$2.5 million. On August 25, 1951, BPA acquired the Roosevelt Microwave Radio Station site from private land-owners Daniel S. and Joseph Edward Horrigan for \$100. BPA historic photographs indicate that the Station was under construction by February 1953 and complete or near completion by June 1953. On January 13, 1974, a leak in a liquid propane gas line caused an explosion and fire at the Station. The Automatic Generation Control System was destroyed and several important transmission protection circuits were put out of service.

Significance

The Roosevelt Microwave Radio Station is significant under NRHP Criterion A for its significance in the areas of Communications and Industry. The Station became a key component of BPA's early microwave communications network, facilitated grid operations, and supported business and industrial development throughout the region, particularly the Roosevelt, Washington, area. The period of significance for the station is 1953, the Station's construction date, to 1974, the end of BPA's period of significance for historic resources.

TIER II Z-878 RADIO

Building style: Modern, BPA Standard Type 1606

Characteristics: One-story control building; concrete-block construction covered in smooth concrete finish and scored with 3-foot-by-3-foot grid pattern; nearly flat roof; two entrances (both at right) with separate access to control and engine generator room; concrete canopy over entrances.

Tower: 4-leg steel lattice

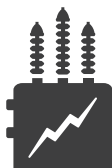


TIER II
SYSTEM
EXPANSION



- ▲ Roundup Substation
- City
- Tri-Cities District

1954



ROUNDUP SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

ROUN / Goad Road and Tutuilla Church Road, Pendleton, OR 97801 / Umatilla County

HISTORIC PAINT: 1950 SCHEME

History

Roundup Substation was constructed approximately 3 miles southeast of Pendleton, Umatilla County, Oregon, to provide additional transformer capacity for the mid-Columbia River area and as part of the La Grande intertie between the Northwest Power Pool and Idaho Power Company (IPC). BPA contracted with Oliver Brandon of Vancouver, Washington, for \$98,554 to complete the 40,000 kVa Roundup Substation by fall 1954. The new substation, built along the McNary–La Grande transmission line, provided additional transformer capacity for the mid-Columbia River area, which received power generated at McNary Dam. Customers included Pacific Power and Light Company and others in the Pendleton area. In 1955, BPA awarded a \$53,791 contract for La Grande and Roundup Substation additions to permit a high-volt-

age “La Grande” intertie between the Northwest Power Pool and IPC. The 20-year exchange agreement between BPA and IPC increased transmission capacity between the Northwest Power Pool’s western and eastern members by completing a five-state high-voltage transmission loop that linked all major generating facilities of Oregon, Washington, Idaho, western Montana, and Utah.

Significance

Roundup Substation is significant under NRHP Criterion A in the area of Government. The substation was designed to provide additional transformer capacity for the mid-Columbia River area and as part of the La Grande intertie between the north-west power pool and IPC. Once completed, the substation provided reliable power to communities in Eastern Oregon. The substation reflects BPA’s expansion of its transmission system in the Pacific Northwest during BPA’s System Expansion Period (1946–1974). The control house represents the only remaining example of BPA’s Standard Type 165 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-844 CONTROL HOUSE	1954	Tier II - Contributing
SWITCHYARD	1954	Tier II - Contributing

TIER II Z-844 CONTROL HOUSE 1954

Building Style: Minimal Traditional, BPA Standard Type 165

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, hipped roof, smooth concrete finish, metal multi-pane windows, original art deco metal and milk glass incandescent light fixtures



Interior Characteristics:

Globular incandescent overhead lighting fixture with a milk glass surround, incandescent ceiling lighting fixtures with clear glass surrounds

TIER II SWITCHYARD 1954

Characteristics:

Flat gravel yard, chain-link fence, historic lampposts and light fixtures, and aluminum storage sheds. 230 kV equipment in two areas includes multi-part dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, oil tank, and buswork.

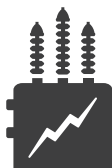


TIER II
SYSTEM
EXPANSION



- ▲ Scootenev Substation
- City
- Tri-Cities District

1953



SCOOTENEV SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

SC00 / 4000 WA-17, Connell, WA 99326 / Umatilla County

HISTORIC PAINT: 1950 SCHEME

History

Scootenev Substation, constructed near Scootenev Reservoir, approximately 7 miles west of Connell, Franklin County, Washington, was designed to supply power to the Columbia Basin. The substation anticipated power needs resulting from plans to bring the first 500,000 acres of Columbia Basin land under irrigation in Washington's Grant,

Adams, Franklin, and Walla Walla counties by 1959. The scheduled construction included 111 miles of 115 kV transmission lines, six new substations, and additions to existing substations to transmit power to new farms, homes, and businesses. In 1951, BPA proposed a new 115 kV line extension from the Benton Substation in Pasco, Washington, to Scooteney. In 1961, BPA built Scooteney Substation additions as part of a \$1 million accelerated construction program intended to provide an immediate boost to the regional economy by employing local residents and purchasing local material. Currently, the Scooteney Tap to Midway–Benton No. 1 115 kV transmission line is one of two lines that bisect the Gable Mountain area in the central portion of the Hanford Nuclear Reservation. The lines were permitted pursuant to a supplemental agreement with the U.S. Atomic Energy Commission, which operated the Hanford site.

Significance

Scooteney Substation is significant under NRHP Criterion A in the area of Government. The substation's establishment provided reliable power to the local public utility district for distribution to rural communities in central Washington and reflects BPA's expansion of its transmission system in the Pacific Northwest during BPA's System Expansion Period (1946–1974). The control house represents the only remaining example of BPA's Standard Type 162 design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-199 CONTROL HOUSE	1953	Tier II - Contributing
SWITCHYARD	1953	Tier II - Contributing

TIER II Z-199 CONTROL HOUSE 1953

Building Style: Utilitarian,
BPA Standard Type 162

Exterior Characteristics:
One story, rectangular plan,
metal panel construction, flat
roof, metal window

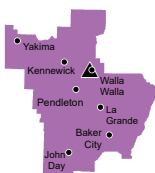


TIER II SWITCHYARD 1953, expanded circa 1973

Characteristics:
Flat gravel yard, chain-link
fence, and 115 kV equipment,
including dead-end towers,
power transformers, potential
transformers, oil circuit breakers,
capacitor bank, and buswork.



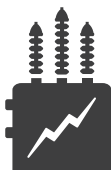
TIER I
MASTER
GRID



- ▲ Walla Walla Substation
- City
- Tri-Cities District



1941



WALLA WALLA SUBSTATION



EAST
REGION

TRI-CITIES
DISTRICT

WAWA / 3072 W Highway 12, Walla Walla, WA 99362 / Walla Walla County

HISTORIC PAINT: 1950 SCHEME

History

Walla Walla Substation was constructed near Walla Walla, Walla Walla County, Washington, to accommodate wartime power needs. On June 1, 1941, the substation began serving the Columbia County Rural Electrification Administration. The 44-mile Walla Walla–Pendleton transmission line, made possible by the new substation, was powered by the 230 kV transmission circuit linking Bonneville and Grand Coulee dams via the Midway and Pasco Substations. Days before the Walla Walla Substation was placed in service, BPA administrator Paul J. Raver told the *Corvallis Gazette-Times* that, “Substations at the two cities [Walla Walla and Pendleton] will make it possible for new industries to locate close to raw material sources in eastern Oregon and Washington” (*Corvallis Gazette-Times*, 1941).

Significance

Walla Walla Substation is significant under Criterion A in the areas of Commerce, Industry, and Government for promoting commercial and industrial development throughout the region and accommodating rapid expansion for wartime power needs. The substation served the Columbia County Rural Electrification Administration and reflects BPA's initial transmission system development during its Master Grid Development Period (1938–1945). The control house is individually significant under Criterion C in the area of Architecture as an excellent example of a Streamline Moderne-style control house. The building is the best example of BPA's Standard Type 130 control house design.

RESOURCES/ASSETS	DATE	ELIGIBILITY
Z-884 CONTROL HOUSE	1941	Tier I - Contributing/Individually Eligible
Z-883 MAINTENANCE	1953	Tier II - Contributing
Z-853 PUMP HOUSE	1954	Tier II - Contributing
SWITCHYARD	1941	Tier II - Contributing

TIER I Z-884 CONTROL HOUSE 1941

Building Style: Streamline Moderne, BPA Standard Type 130

Exterior Characteristics:

One story, concrete construction, flat roof, curved walls, steel multi-pane windows, curved metal railing

Interior Characteristics:

Brass wall registers, pendant globular light fixtures



TIER II Z-883 MAINTENANCE 1953

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, flat roof, bays with wooden overhead doors divided by concrete masonry unit columns, paneled wood door



TIER II Z-853 PUMP HOUSE 1954

Building Style: Utilitarian

Exterior Characteristics:

One story, rectangular plan, concrete masonry unit construction, flat roof, double metal door



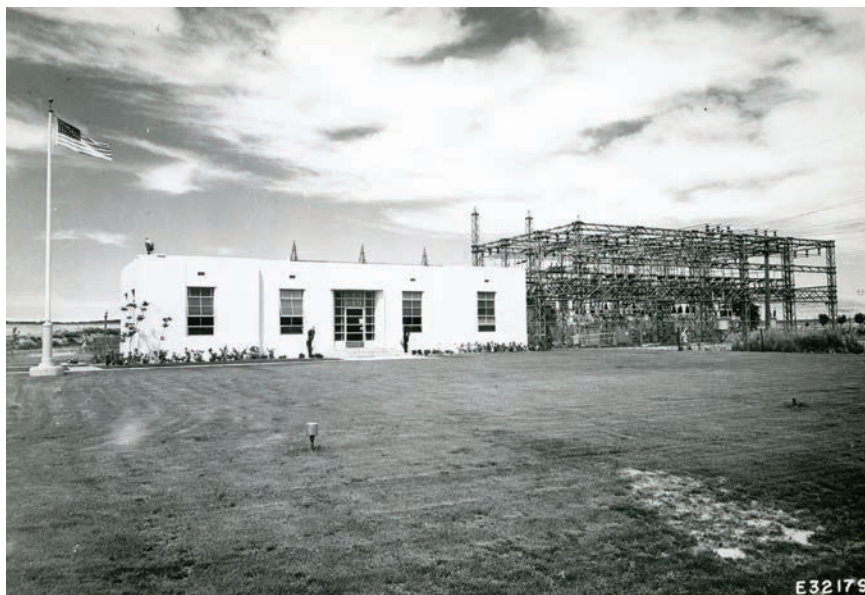
TIER II SWITCHYARD 1941

Building Style: Streamline Moderne, BPA Standard Type Untanking Tower

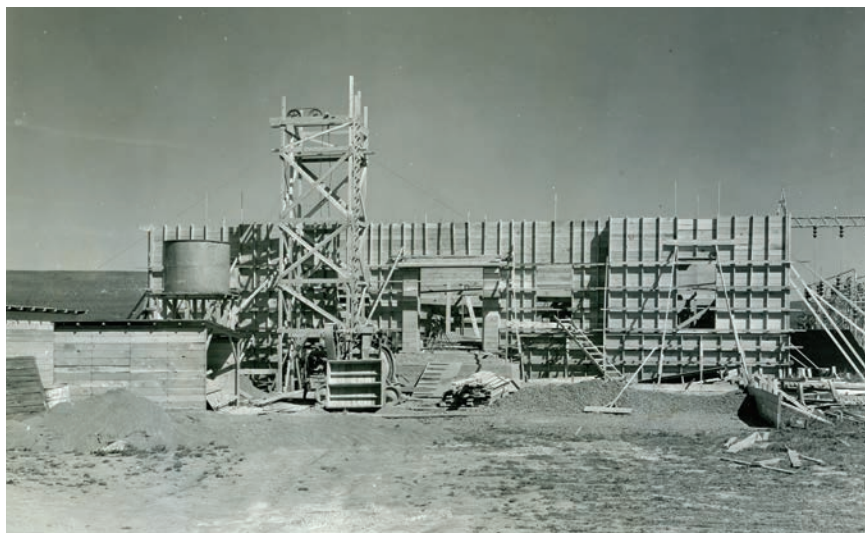
Characteristics: Flat gravel yard, chain-link fence, concrete paths, and aluminum storage sheds. 69 kV and 115 kV equipment includes original lattice superstructure, dead-end towers, power transformers, potential transformers, gas and oil circuit breakers, capacitor banks, and buswork.



Historic photo.



Historic photo.



Historic photo.



Photo by Andrew.I.

8 HISTORIC PAINT COLOR GUIDE

Introduction

The Historic BPA Paint Color Guide guides the application of paint colors to help maintain the appearance of historic BPA resources that are eligible for the National Register of Historic Places. Each color in the index includes a federal standard color number, a representative sample of the color, and information on its historic use. Three historic paint schemes are recommended for NRHP-eligible resources. Current BPA policy is to only match historic paint colors for building exteriors. Matching historic paint colors is not required for building interiors, signage, furniture or switchyard equipment.

A more detailed version of the Historic BPA Paint Color Index with additional information about the history of BPA's paint colors can be found in BPA's Manual for Built Resources.



Sickler Substation, showing building and dead-end towers painted "BPA-1" Blue, 1970.

Federal Standard Paint Color Codes

BPA's historic paint color schemes are based primarily on the Federal Standard Paint Color system (FSPC). The FSPC was developed during World War II to enable the United States government to provide consistent specifications to nationally- and internationally-based military subcontractors. The FSPC was updated in 1968 (FED-STD-595A), 1994 (FED-STD-595B), and 2008 (FED-STD-595C), and replaced in 2017 by SAE International's AMS-STD-595. The updates generally provided additional colors and occasionally retired others.

Each digit in the FSPC five-digit code conveys information about the paint's composition:

- The first number indicates the sheen, with 1 for gloss, 2 for semi-gloss, and 3 for flat (lusterless). The same color could have up to three FSPC codes depending upon its sheen. For example, Bonneville Gray is coded as FS-16314 (gloss), FS-26314 (semi-gloss), and FS-36314 (flat).
- The second number corresponds to the color classification group (0–8). These color groups include (0) brown, (1) red, (2) orange, (3) yellow, (4) green, (5) blue, (6) grey, (7) other, and (8) fluorescent.
- The last three numbers reflect the color intensity.

Directions for Paint Index Tables

1. Identify the appropriate paint scheme (1950, 1956 or Scheme A) in Chapter 7 of the Field Guide.
2. Use the tables below to identify the planned use (e.g. exterior walls) and determine the appropriate paint for the project.
3. Note the Federal Standard number (Column 4) and color "Name" (Column 2) applicable to the paint for the project.
4. Request Federal Standard paint colors at Sherwin-Williams paint stores. For all exteriors, BPA's policy is to use Sherwin-Williams Super Paint and Sherwin-Williams Pro Industrial water-based primers and top coats. BPA's required level of sheen is typically flat or eggshell for the main surface and semi-gloss for the trim. The level of sheen used historically may not match current BPA policy. When a Sherwin-Williams paint store is not available, refer to a Federal Standard 595C fan deck (often available at paint stores) and request color-matching at an available paint supplier.



Paint Test Panel at Franklin Substation.

BPA's Historic Painting Schemes

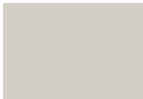
By 1950, BPA had incorporated the FSPC into its substation paint schemes, as well as other colors that later became part of the FSPC. By 1955, BPA had selected 23 federal standard colors from a total of 358 available.

Table 1. 1950 Scheme (Historic Paints c. 1950–1955)

USE	NAME	COLOR	FEDERAL STANDARD	TYPE
1950: Exterior walls; (discontinued by 1956) BPA notes Sno-King Body Color	Engineers Light Gray		FS-26555	Semi- gloss
1950: Exterior trim (discontin- ued by 1956)	Maritime Engine Gray		FS-26306	Semi- gloss

Until the mid-1960s, BPA typically painted substation buildings in two different shades of gray with one for the base color and one for trim. Prior to 1956, Engineers Light Grey (FS-26555) was generally used for exterior base and Maritime Engine Grey (FS-26306) for exterior trim. By 1960, these colors were discontinued and replaced with two unspecified shades of gray coded as FS-36622 for exterior base and FS-16492 for exterior trim.

Table 2. 1956 Scheme (Historic Paints c. 1956–1965)

USE	NAME	COLOR	FEDERAL STANDARD	TYPE
1956: Exterior walls	Gray		FS-36622	Lusterless
1956: Exterior trim	No name		FS-16492	Gloss
1956: Exterior walls (Alvey); suggested by BPA	No name		FS-36586	Lusterless
1956: Exterior trim (Alvey); suggested by BPA	No name		FS-26586	Semi- gloss

In 1966, BPA adopted a new substation paint scheme for new and existing substations as part of its Beauty system appearance planning program. The architectural firm of Stanton, Boles, Maguire, and Church developed standards for this appearance planning program based on BPA station siting policy and the locations of existing substations. Because all stations could not be effectively hidden, the firm recommended that color be used to make the public aware of the components that compose a substation. Thus, the new paint scheme was designed to accentuate the functional components of the substation, simplify visual elements in an ordered appearance, and overall, be visually less objectionable. The new paint scheme, Scheme A, consisted of twelve BPA colors, labeled 1–12, each of which corresponded to a Federal Standard number.

Table 3. Scheme A (Accentuating Colors, established 1966, and other identified colors, 1966–1974)

USE	NAME	COLOR	FEDERAL STANDARD	TYPE
Dead-end and microwave towers (if grouped with yard); select building exteriors (Sickler, Conkelley)	Blue (BPA-1)		FS-15107	Silicone Alkyd Gloss Enamel
Building exteriors, capacitors, racks, and capacitor houses, condenser housing (Silicone Alkyd Gloss Enamel); Masonry racks and surfaces (Acrylic Emulsion)	Yellowish Gray (BPA-7)		FFS-16360	Silicone Alkyd Gloss Enamel; Acrylic Emulsion

9 ILLUSTRATED GLOSSARY



Control House

Primary substation building; contains substation controls, panels, batteries, meters, and relays. Larger control houses also contain office space and other worker facilities.

Eugene Substation (1940)



Untanking Tower

Facilitates on-site maintenance and repair of switchyard equipment, typically containing the mechanical equipment to clean and service power transformers, circuit breakers, and other oil-immersed heavy equipment.

Salem Substation (1942)



Oil House

Houses pumps used to empty and replace oil from circuit breakers, transformers, and other equipment.

North Bonneville Substation (1941)



Pump House

Houses pumps used during substation filtering and maintenance operations.

Oregon City Substation (1953)



Maintenance Building

Contains maintenance equipment and vehicles.

Walla Walla Substation (1953)



Engine Generator Building

Houses backup power equipment for operations.

Dworshak Substation (1973)



Relay House

Contains protective relays and related equipment for activating circuit breakers and switches at a substation.

Chief Joseph Substation (1956)



Testing Station

Testing site for investigating new equipment and technologies for transmitting electricity.

Carey Test Lab, Ross Complex (1972)



Control Center

Operational and management hub with computer-based controls and dispatch communication technologies to govern BPA's power transmission system.

Dittmer Control Center, Ross Complex (1971)

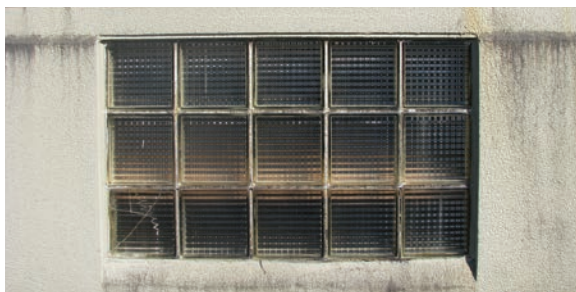


Microwave Radio Station

Site with a station building and microwave antenna to enable microwave transmissions. Microwave radio systems facilitate rapid communication and signaling for controlling power transmission.

Beverly Microwave Radio Station (1954)

EXTERIOR FEATURES – WINDOWS



Glass block window.

North Bonneville Substation Oil House (1941)



Multi-lite steel window.

Bell Substation Untanking Tower (1952)



Steel curtain-wall system.

*Alvey Substation Control House
(1952)*



Brutalist narrow windows are common in concrete control house buildings constructed during the late 1960s and early 1970s.

Alston Substation (1969)



Side-lites and transom window frame the entrance at control houses constructed during the Master Grid Period.

Ross Substation (1939)

EXTERIOR FEATURES – ENTRANCES



Untanking Tower sliding door on a steel overhead track.

Midway Substation (1941)



Streamline Moderne handrail typical at control houses constructed during the Master Grid Period.

Columbia Substation Control House (1945)



Storm entrance.

Aberdeen Substation Control House (1950)



Cantilevered canopy sheltering control house entrance.

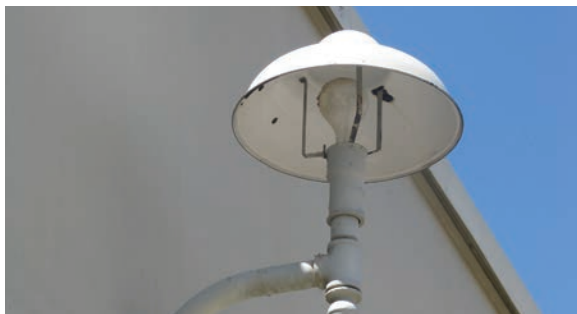
Little Goose Substation Control House (1970)

EXTERIOR FEATURES – LIGHTING



Streamline Moderne light fixtures installed during the Master Grid period.

Roundup Control House (1974), left, and North Bonneville Control House (1941), right



Utilitarian light fixture
installed during the Master
Grid Period.

Midway Untanking Tower (1941)



Modern light fixture installed
during the System
Expansion Period.

*Cello DC Converter Station
Control House (1970)*



Modern Glass Globe light
fixtures used at entrances
during the 1960s.

John Day Control House (1968)



Modern light pole.

Murray Substation (1972)

EXTERIOR FEATURES – DETAILS



Modern cast concrete
ornamental element.

*Celilo DC Converter Station
Control House (1970)*



Concrete dentil course from
Master Grid Period.

*Midway Substation Control
House (1941)*



Modern airplane eave
overhang.

Paul Substation (1971)



Multi-panel overhead garage doors.

*Walla Walla Substation
Maintenance Building (1953)*

INTERIOR FEATURES – LIGHTING



Modern light fixtures.

Albany Control House (1954)



Modern cylinder pendant light fixtures.

*Celilo DC Converter Station
Control House (1970), left,
and Murray Substation Control
House (1972), right*



Utilitarian light fixture.
Midway Untanking Tower (1941)

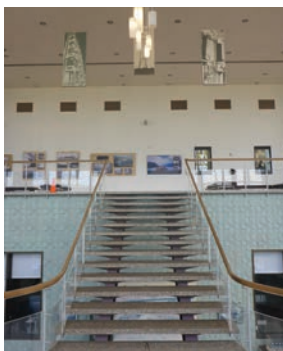


Utilitarian steel light fixtures.
Murray Substation Control House (1972), left, and Midway Substation (1941), right

INTERIOR FEATURES – OTHER



Modern circular stairwell.
Hanford Substation Control House (1970)



Modern interior staircase.
Celilo DC Converter Station Control House (1970)



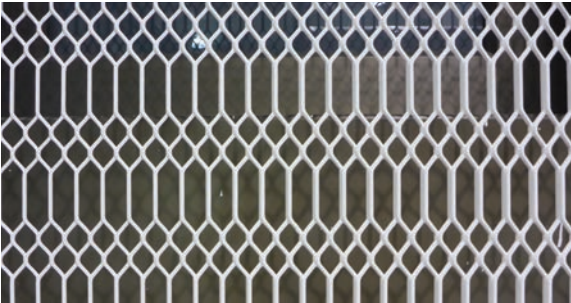
Modern cast stone interior wall panels.

Celilo DC Converter Station Control House (1970)



Tile windowsill.

Chehalis Substation Control House (1941)



Modern steel window grate.

Celilo DC Converter Station Control House (1970)



24-hour clock from Master Grid period.

Alcoa Substation Control House (1940)



Streamline Moderne door hardware common at Master Grid and early System Expansion substations.

Port Angeles Substation Control House (1950)



Brass light switch from Master Grid Period.

North Bonneville Substation Control House (1941)



Decorative brass register from Master Grid Period.

Ross Substation Control House (1939)



Modern-style telephone.

Celilo DC Converter Station Control House (1970)



Hot water tank.

*Alston Substation Control House
(1969)*



Untanking Tower crane for lifting and moving heavy equipment.

*Bell Substation Untanking Tower
(1942)*



Board form concrete construction visible in basement interior.

*Columbia Substation
Control House (1945)*



Cable tunnel housing underground cables between a control house basement and switchyard.

*Boundary Substation
Control House (1967)*



Cable Pull connecting underground cables from a control house to a switchyard.

*Anaconda Substation
Control House (1953)*

SWITCHYARD FEATURES



Steel lattice superstructure built in switchyards during Master Grid Period.

*St. Johns Substation Switchyard
(1941)*



Buswork, steel arrays for routing power in a switchyard.

*Columbia Substation Switchyard
(1945)*



Potential Transformer for stepping down, or decreasing voltage.

*St. Johns Substation Switchyard
(1941)*



Current Transformer for reducing or multiplying currents for monitoring.

Raymond Substation Switchyard (1942).



Dead End Tower, a self-supporting structure anchoring overhead power lines.

St. Johns Substation Switchyard (1941)



Power Transformer for transferring electrical energy between circuits.

Alcoa Substation Switchyard (1940)



Oil Tanks that store oil for substation equipment.

Columbia Substation Switchyard (1945)



Gas circuit breakers, gas-powered equipment for switching circuits and equipment within and outside of a substation system and protecting power transmission by interrupting circuits.

Chief Joseph Substation Switchyard (1945)



Oil Circuit Breakers for switching circuits and equipment within and outside of a substation system; oil-filled to provide cooling and prevent arcing when the switch is activated.

Midway Substation Switchyard (1941)



Capacitor Bank for controlling voltage levels supplied to customers by reducing load impacts.

Alcoa Substation Switchyard (1940)



Transfer Tracks, used with transfer carts to move heavy equipment within a switchyard, often connecting to an untanking tower.

Midway Substation Switchyard (1941)



Transfer Cart for moving heavy equipment on transfer tracks in a switchyard.

St. Johns Substation (1941)



Switchyard light pole.

Cosmopolis Substation (left) and Valhalla Substation (right, 1953)



Switchyard light pole.

Vantage Substation (1963)



Switchyard light fixture.

Monmouth Substation (left, 1954) and Wren Substation (right, 1947)



Switchyard light pole.

Shelton Substation (1957)

10 HISTORIC RESOURCES NAMESAKES

Several historic BPA facilities are named after important individuals who worked at BPA or who were public figures. The information below was prepared with research contributions from BPA Librarian and Archivist Libby Burke. More information is available online at Bonneville Power Administration — The People Behind the Places <http://bpagis.maps.arcgis.com/apps/MapTour/index.html?appid=23f4b5646e9343c588afc3cd6d88aa03#>.



BPA Administrative Advisory Staff, 1942. Those present include J. Perry Alvey, Sol Schultz, C. Allan Hart, Ulric Gendron, Dr. Paul Raver, D. Loring Marlett, William Dittmer, C. Girard Davidson, John Wheeler, among others.



Alvey Substation — Named after J. Perry Alvey (1885–1949) who served as a consulting engineer for BPA from 1937 until his death in 1949. Alvey helped draft the 1937 Bonneville Project Act that led to the formation of BPA and was considered an expert on the economic, social and geographical characteristics of the Northwest. He was posthumously awarded the U.S. Department of the Interior Distinguished Service Award and Gold Medal on October 27, 1950 at the dedication of the substation named in his honor.



Bell Substation — Named after Glenn H. Bell (1900–1950) who joined BPA in 1940 as a liaison officer between BPA and Rural Electrification Administration-financed projects in Washington, Oregon, and Idaho. He later served as the District Manager of the Upper Columbia District. He was posthumously granted the Distinguished Service Award with Gold Medal on October 14, 1951 at the dedication of the substation named in his honor.



Carey Test Laboratory (Ross Complex) Named after Charles E. Carey (1889–1945) who held several positions for BPA including Rate Engineer (1937), Principal Construction Engineer (1938), Acting Administrator (1939), and Chief Consulting Engineer (1939–1942). In 1938 he was responsible for the initial design and construction of a 600-mile transmission system. BPA dedicated the testing station in his name on October 17, 1962.

Photo by Edward S. Curtis, courtesy of Library of Congress



Chief Joseph Substation and Chief Joseph Dam — Named after Chief Joseph (1840–1904) of the Nez Perce tribe. Chief Joseph fought for his tribe to remain on its ancestral lands rather than be forced onto a small reservation. Although eventually compelled to surrender, Chief Joseph continued to oppose injustice and discrimination towards Native Americans..



Dittmer Control Center (Ross Complex)

Named after Dr. William A. Dittmer (1890–1969) who worked for BPA from 1940 to 1953, serving as Power Manager and principal assistant to the Administrator from 1946 to 1953. Prior to his career at BPA, Dittmer taught Classics at Princeton University, served as an Infantry Captain during World War I, worked as director of Pathe Phonograph and Radio Corporation, provided public utilities with consulting services, and supervised Illinois Commerce Commission investigations. Dittmer worked with Dr. Paul J. Raver (BPA's second administrator) at the Illinois Commerce Commission and became BPA's Power Manager when Raver began his term as administrator. Dittmer invented computed demand, established the rules determining when a customer would be given more than one point of delivery and developed the retail rates that BPA customers were allowed to charge end users. The Dittmer Control Center was dedicated on August 19, 1974.



Photo courtesy of Library of Congress

Dworshak Substation — Named after U.S. Senator Henry C. Dworshak (1894–1962) of Idaho who played an integral role in garnering congressional approval for the construction of the Dworshak Dam. Born in Duluth, Minnesota, Dworshak worked in newspaper printing and editorial departments, becoming publisher and editor of the *Burley Bulletin*, which he continued to operate until 1944. He began his career in politics in 1938 when he was first elected to the U.S. House of Representatives. Dworshak served four terms in the House and two years in the Senate. In 1966, the U.S. Army Corps of Engineers began construction on the federal dam named in Dworshak's honor. The dam is located along the North Fork of the Clear-water River, just outside of the city of Orofino, Idaho. It first became operational for flood control in 1972 and the powerhouse went online in 1973. Dworshak is the tallest straight axis gravity dam in the Western Hemisphere and the third highest dam in the United States.



Keeler Substation — Named after Doris Rae Keeler (1903–1955), BPA's first female Acting Administrator (March 29–30, 1950). Keeler was among BPA's first ten employees in 1938 and the first attorney appointed at BPA. She continued to work at BPA until 1954. During her career, she established procedures for handling claims against BPA and was responsible for procurement, supply and construction contracts. The Keeler Substation was dedicated on November 28, 1962.



Mangan High Voltage Laboratory (Ross Complex) — Named after John J. Mangan (1912–1970) who worked as BPA's Chief of Laboratories, managing much of the testing at the DC Test Center in The Dalles, Oregon. Mangan served as an electrical engineer for BPA and coordinated research and development projects and was a member and later chairman of the Direct Current Technical Review Committee which performed research for the Pacific Northwest/Pacific Southwest Intertie. Mangan was posthumously awarded the Department of the Interior's Meritorious Service Award with Silver Medal in 1971.



McNary Substation — Named after Senator Charles L. McNary (1874–1944) who represented Oregon in the U.S. Senate. McNary was integral in securing support and funding for the development of the Northwest power system. In 1945, Congress authorized the construction of McNary Dam near the Umatilla reservation with the stipulation that it be named for McNary. BPA constructed the McNary Substation near the dam.

Photo by Harris & Ewing, courtesy of Library of Congress



Murray Substation — Named after Vernon (Vic) Murray (1897–1960), one of BPA's first field office managers (Yakima Office, 1942). Murray worked as the chief electrical engineer of system development and then later an area manager. He contributed to the preparation of the first comprehensive load estimates for the BPA service area, the first Advance Program, and development of the area organization scheme. Murray received the Department of the Interior's Distinguished Service Award with Gold Medal.



Ostrander Substation — Named after Earl D. Ostrander (1906–1964) who worked for BPA for 23 years, serving as BPA's Chief Accountant and Director of the Division of Administrative Management. Ostrander helped develop the system by which the region would repay the federal government for its investment in dams and transmission facilities and create an accounting system that was cited by the House Appropriations Subcommittee as the best it had observed within the federal government. Ostrander was awarded the U.S. Department of the Interior's Distinguished Service Award with Gold Medal in 1953.

Paul Substation — Named after Clarence W. Paul (1900–1964) who worked for BPA from 1949 to 1962. Initially employed as a carpenter-foreman and later as Superintendent of Substation Construction and then Construction Superintendent, Paul developed new construction techniques, methods, and tools. He represented management on labor-management and safety committees and helped develop training for journeymen and supervisors. Paul was awarded the U.S. Department of the Interior's Distinguished Service Award with Silver Medal in 1960.



Pearl Substation — Named after William A. Pearl, BPA Administrator from 1954 to 1961. Pearl earned his doctorate in engineering at the University of Michigan and was a pioneer instructor of automotive and aeronautical engineering in the Northwest. Pearl worked as a consultant to industries and foreign governments in natural resource development, hydroelectric power, and anti-pollution procedures. Pearl was also a professor of engineering and director of research at the Illinois Institute of Technology in Chicago and had a brief tenure as dean of engineering and acting president of Washington State College. In 1954, the Eisenhower Administration selected Pearl as administrator to implement new policy at BPA. Pearl Substation was named in his honor.



Raver Substation — Named after Dr. Paul J. Raver (1894–1963) who served as BPA's second Administrator from 1939 to 1954. Raver contributed to the national policy for power and water resources and was instrumental in connecting BPA with the aluminum industry and managing BPA during and after World War II. Raver received the U.S. Department of the Interior's Distinguished Service Award with Gold Medal in 1951. Groundbreaking ceremonies for the Raver Substation were held on August 20, 1966.



Ross Substation and Complex —

Named after James Delmage Ross (1872–1939) who was appointed by President Roosevelt as BPA's first Administrator, a position in which he served from 1937–1939. In 1911, Ross became the second superintendent of Seattle City Light, a role that he held simultaneously with that of Bonneville Project Administrator until his death. Ross was a visionary and helped lay the groundwork for low rates and BPA's existing transmission system.



Sickler Substation — Named after Barclay J. Sickler (1905–1950) who joined BPA in 1930 and served as Chief of the Rates and Statistics Section and later as Assistant Power Manager. He is credited with consistent improvements to the rate structures that governed the sale of federal power in the Pacific Northwest. During World War II, he served with the War Production Board and after the war as a consultant of the National Security Resources Board. He returned to BPA in 1945 and was appointed Assistant Power Manager. Sickler was awarded the U.S. Department of the Interior's Distinguished Service Award with Gold Medal.



Starr Complex (including Big Eddy Substation, The Dalles Maintenance Headquarters and Celilo Converter Station)

— Named after Eugene C. Starr (1901–1988) who was a BPA consultant and professor of electrical engineering at Oregon State College (now Oregon State University). BPA hired Starr to study the feasibility of creating direct current lines to link power plants, and his research formed the basis for the Intertie. He later served as BPA's chief engineer from 1954 to 1961. Starr received international recognition for his work in electrical engineering and nuclear physics and received the U.S. Department of the Interior's Distinguished Service Award.

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Resources (Tier I, II or III) Associated with Historically Significant Themes



Dam Development

- Detroit Substation
 - Dworshak Substation
 - Kerr Substation
 - Little Goose Substation
 - Lookout Point Substation
 - Lower Monumental Substation
 - Troy Substation
-



Defense Industry

- Alcoa Substation
 - Longview Substation
 - Midway Substation
 - Tacoma Substation
 - Troutdale Substation
-



Industrial Development

- Alcoa Substation
- Anaconda Substation
- Bell Substation and Maintenance Headquarters
- Cardwell Substation
- Conkelley Substation
- Harvalum Substation
- Hot Springs Substation
- Intalco Substation
- Longview Substation
- Paul Substation
- Tacoma Substation
- Tahkenitch Substation
- Troutdale Substation
- Valhalla Substation



Intertie

- Big Eddy Substation
- Celilo Converter Station
- Hanford Substation
- John Day Substation
- Lower Monumental Substation
- McNary Substation



Maintenance Headquarters

- Alvey Substation and Maintenance Headquarters
- Bell Substation and Maintenance Headquarters
- Chemawa Substation and Maintenance Headquarters
- Covington Substation and Maintenance Headquarters
- Olympia Substation and Maintenance Headquarters
- Port Angeles Substation and Maintenance Headquarters
- Redmond Substation and Maintenance Headquarters
- Snohomish Substation and Maintenance Headquarters



Master Grid

- Alcoa Substation
- Bell Substation and Maintenance Headquarters
- Chehalis Substation
- Columbia Substation
- Covington Substation and Maintenance Headquarters
- Eugene Substation
- Longview Substation
- Midway Substation
- North Bonneville Substation
- Oregon City Substation
- Ross Substation

- Salem Substation
- St. Johns Substation
- Tacoma Substation
- Troutdale Substation
- Walla Walla Substation



Microwave Radio Circuit

- Augsburg Mountain Microwave Radio Station
- Beverly Microwave Radio Station
- Blacktail Peak Microwave Radio Station
- Chehalis Microwave Radio Station
- Davenport Microwave Radio Station
- Easton Microwave Radio Station
- Foster Creek Microwave Radio Station
- Goodwin Peak Microwave Radio Station
- Grand Coulee Microwave Radio Station
- Hall Ridge Microwave Radio Station
- Malaga Microwave Radio Station
- Marys Peak Microwave Radio Station
- North Bend Microwave Radio Station
- Noti Microwave Radio Station
- Plum Microwave Radio Station
- Rainier Microwave Radio Station
- Rockdale Microwave Radio Station
- Roosevelt Microwave Radio Station
- Squak Mountain Microwave Radio Station
- Teanaway Microwave Radio Station
- Troutdale Microwave Radio Substation
- Wasco Microwave Radio Station
- Waterville Microwave Radio Station



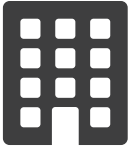
Rural Electrification

- Burnt Woods Substation
- Clarkston Substation
- Driscoll Substation
- Fairview Substation
- Gardiner Substation
- Grandview Substation
- Harrisburg Substation
- Hauser Substation
- Ione Substation
- La Grande Substation
- Langlois Substation
- Maupin Substation
- Monmouth Substation
- Norway Substation
- Odessa Substation
- Potlatch Substation
- Republic Substation
- Reston Substation
- Roundup Substation
- Scooteney Substation
- Timber Substation
- Toledo Substation
- Unity Substation
- Wagner Lake Substation
- Walton Substation
- Wendson Substation
- Wren Substation



Testing Facility

- Celilo Converter Station
- Ross Complex



Untanking Towers

- Bell Substation and Maintenance Headquarters
- Chehalis Substation
- Covington Substation and Maintenance Headquarters
- Longview Substation and Maintenance Headquarters
- Midway Substation
- Ross Substation
- Salem Substation

Known Architect-Designed Buildings

- Alston Control House: Ralph Appleman Architect and Associated Engineers
- Boundary Control House: BPA Architects C. Tetherow and Dean R. Wright
- Cardwell Control House: BPA Architects C. Tetherow and Dean R. Wright
- Celilo Converter Station: Harmon, Pray, & Detrich
- Covington Untanking Tower: BPA designer Albert W. Hilgers
- Covington Control House: BPA designer Albert W. Hilgers
- Cowlitz Control House: BPA Architects A. Corneliusen and C. Tetherow
- Custer Control House: Ralph Appleman Architect and Associated Engineers
- Custer Maintenance Building: BPA Architect Dean R. Wright
- Fairmount Control House: BPA Architect C. Tetherow
- Franklin Control House: BPA Architect E. Hodges
- Hanford Control House: BPA Architect George Poole
- Intalco Control House: BPA Architect C. Tetherow
- John Day Control House: BPA Architects Dean R. Wright and M. Hartford (identical to Ralph Appleman's Custer design)
- Lane Control House: BPA Architect C. Tetherow
- Little Goose Control House: BPA Architects M. Hartford and Dean R. Wright
- Lower Monumental Control House: BPA Architect M. Hartford
- Lower Monumental Maintenance Building: Ralph Appleman Architect and Associated Engineers
- Maple Valley Control House: BPA Architects C. Tetherow and Dean R. Wright
- Marion Control House: Ralph Appleman Architect and Associated Engineers
- Monroe Control House: Ralph Appleman Architect and Associated Engineers

Known Architect-Designed Buildings continued

- Moxee Control House: BPA Architect E. Hodges
- Murray Control House: BPA Architect George Poole
- Ostrander Control House: Ralph Appleman Architect and Associated Engineers
- Paul Control House: BPA Architects George Poole and Charles Lovett
- Port Angeles Control House: BPA Architect Harry Lance
- Potholes Control House: BPA Architect C. Tetherow
- Raver Control House: Architect H. Zinder & Associates
- Raver Maintenance Building: Architect H. Zinder & Associates
- Redmond Maintenance Headquarters: Barnard & Holloway Architects
- Redmond Heliport: Barnard & Holloway Architects
- Shelton Control House: Architect Leo A. Daly Co.
- Sickler Control House: Barnard & Holloway Architects
- Sickler Maintenance Building: Rowe Harris & Associates Architects
- Snohomish Maintenance Building: Rowe Harris & Associates Architects
- Sno-King Control House: BPA Architect C. Tetherow
- Toledo Control House: BPA Architects C. Tetherow and Dean R. Wright
- Valhalla Control House: BPA Architect E. Hodges

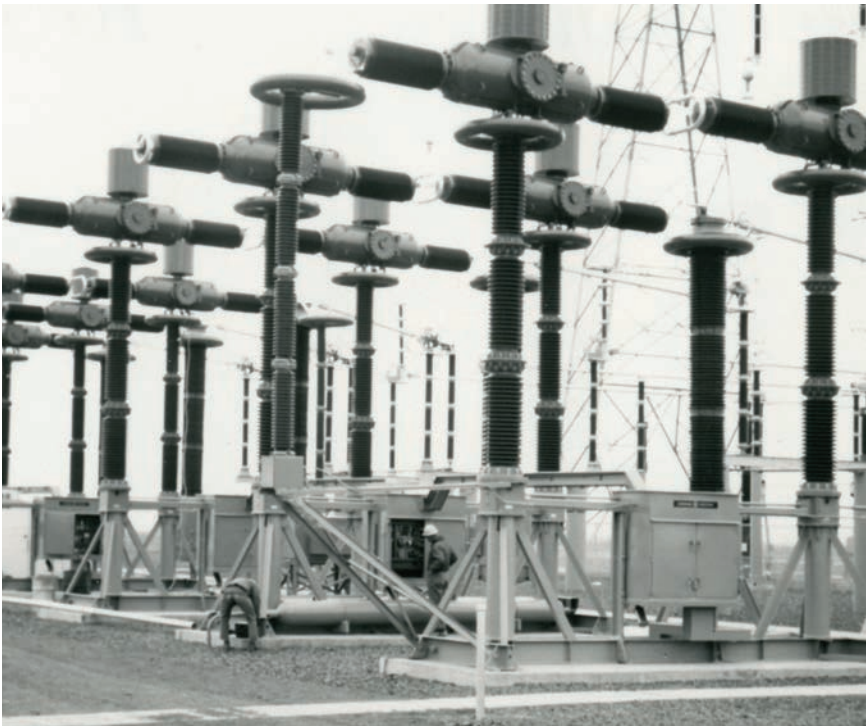
13 ALPHABETICAL INDEX

NAME	PG	TIER	YEAR	REGION	DISTRICT	STATE
Adair Substation	250	II	1969	South	Salem	OR
Albany Substation	150	II	1954	South	Eugene	OR
Alcoa Substation	204	I	1940	South	Longview	WA
Alston Substation	206	I	1969	South	Longview	OR
Alvey Substation & MHQ	152	I	1950	South	Eugene	OR
Anaconda Substation	314	I	1950	East	Kalispell	MT
Augspurger Mountain MW Radio Station	210	II	1953	South	Longview	WA
Bell Substation & MHQ	334	III	1942	East	Spokane	WA
Bellingham Substation	106	II	1954	North	Snohomish	WA
Beverly MW Radio Station	114	II	1953	North	Wenatchee	WA
Big Eddy Substation	336	II	1956	South	The Dalles	OR
Blacktail Peak MW Radio Station	156	II	1968	East	Kalispell	MT
Boundary Substation	212	II	1967	East	Spokane	WA
Burnt Woods Substation	288	I	1954	South	Eugene	OR
Cardwell Substation	84	I	1963	South	Longview	WA
Celilo Converter Station	86	I	1971	South	The Dalles	OR
Centralia Substation	88	II	1950	North	Olympia	WA
Chehalis MW Radio Station	252	II	1950	North	Olympia	WA
Chehalis Substation	116	I	1941	North	Olympia	WA
Chemawa Substation & MHQ	338	II	1953	South	Salem	OR
Chief Joseph Substation	120	II	1958	North	Wenatchee	WA
Clarkston Substation	320	I	1958	East	Spokane	WA
Columbia Substation	68	I	1945	North	Wenatchee	WA
Conkelley Substation	340	I	1958	East	Kalispell	MT
Covington Substation & MHQ	256	II	1942	North	Covington	WA
Davenport MW Radio Station	214	II	1955	East	Spokane	WA
Detroit Substation	342	II	1952	South	Salem	OR
Driscoll Substation	124	II	1966	South	Longview	OR
Dworshak Substation	158	II	1973	East	Spokane	ID
Easton MW Radio Station	162	II	1954	North	Wenatchee	WA
Eugene Substation	158	I	1940	South	Eugene	OR
Fairview Substation	162	I	1957	South	Eugene	OR
Forest Grove Substation	258	III	1946	South	Salem	OR
Foster Creek MW Radio Station	126	II	1953	North	Wenatchee	WA

NAME	PG	TIER	YEAR	REGION	DISTRICT	STATE
Franklin Substation	364	III	1948	East	Tri-Cities	WA
Gardiner Substation	166	I	1963	South	Eugene	OR
Goldendale Substation	292	I	1957	South	The Dalles	WA
Goodwin Peak MW Radio Station	168	II	1953	South	Eugene	OR
Grand Coulee MW Radio Station	128	II	1953	North	Wenatchee	WA
Grandview Substation	366	II	1947	East	Tri-Cities	WA
Hall Ridge MW Radio Station	260	II	1973	South	Salem	OR
Hanford Substation	368	I	1967	East	Tri-Cities	WA
Harrisburg Substation	170	III	1946	South	Eugene	OR
Harvalum Substation	294	III	1971	South	The Dalles	WA
Hauser Substation	172	III	1954	South	Eugene	OR
Hot Springs Substation	324	I	1952	East	Kalispell	MT
Intalco Substation	108	II	1966	North	Snohomish	WA
Ione Substation	372	II	1949	East	Tri-Cities	OR
John Day Substation	296	I	1966	South	The Dalles	OR
Keeler Substation	262	III	1956	South	Salem	OR
Kerr Substation	328	II	1948	East	Kalispell	MT
La Grande Substation	374	II	1952	East	Tri-Cities	OR
Lane Substation	174	II	1967	South	Eugene	OR
Langlois Substation	176	I	1957	South	Eugene	OR
Little Goose Substation	346	I	1970	East	Spokane	WA
Longview Substation	216	III	1941	South	Longview	WA
Lookingglass Substation	178	III	1951	South	Eugene	OR
Lookout Point Substation	180	I	1954	South	Eugene	OR
Lower Monumental Substation	376	III	1967	East	Tri-Cities	WA
Malaga MW Radio Station	130	II	1955	North	Wenatchee	WA
Marion Substation	264	II	1969	South	Salem	OR
Marys Peak MW Radio Station	182	II	1961	South	Eugene	OR
Maupin Substation	300	II	1974	South	The Dalles	OR
McNary Substation	378	I	1953	East	Tri-Cities	OR
Midway Substation	382	I	1941	East	Tri-Cities	WA
Monmouth Substation	266	II	1948	South	Salem	OR
Moxee Substation	386	I	1954	East	Tri-Cities	WA
Murray Substation	110	I	1971	North	Snohomish	WA
North Bend MW Radio Station	72	II	1954	North	Covington	WA
North Bonneville Substation	218	I	1940	South	Longview	WA

NAME	PG	TIER	YEAR	REGION	DISTRICT	STATE
Norway Substation	184	III	1950	South	Eugene	OR
Noti MW Radio Station	186	II	1954	South	Eugene	OR
Odessa Substation	350	III	1961	East	Spokane	WA
Olympia Substation & MHQ	92	III	1949	North	Olympia	WA
Oregon City Substation	268	II	1941	South	Salem	OR
Ostrander Substation	222	I	1969	South	Longview	OR
Paul Substation	94	I	1971	North	Olympia	WA
Pearl Substation	272	III	1968	South	Salem	OR
Plum MW Radio Station	352	II	1953	East	Spokane	WA
Port Angeles Substation & MHQ	96	II	1949	North	Olympia	WA
Potholes Substation	132	I	1958	North	Wenatchee	WA
Potlatch Substation	100	II	1960	North	Olympia	WA
Rainier MW Radio Station	226	II	1950	South	Longview	OR
Redmond Substation & MHQ	246	III	1952	South	Redmond	OR
Reedsport Substation	188	II	1950	South	Eugene	OR
Republic Substation	354	II	1953	East	Spokane	WA
Reston Substation	190	II	1960	South	Eugene	OR
Richland Substation	388	II	1949	East	Tri-Cities	WA
Rockdale MW Radio Station	74	II	1955	North	Covington	WA
Roosevelt MW Radio Station	390	II	1953	East	Tri-Cities	WA
Ross Complex	228	I	1940	South	Longview	WA
Roundup Substation	392	II	1954	East	Tri-Cities	OR
Sacheen Substation	356	II	1973	East	Spokane	WA
Salem Substation	274	I	1940	South	Salem	OR
Sandpoint Substation	358	I	1950	East	Spokane	ID
Santiam Substation	278	II	1954	South	Salem	OR
Scootenev Substation	394	II	1953	East	Tri-Cities	WA
Sickler Substation	134	I	1968	North	Wenatchee	WA
Silver Creek Substation	102	III	1958	North	Olympia	WA
Squak Mountain MW Radio Station	76	II	1950	North	Covington	WA
St. Johns Substation	236	I	1940	South	Longview	OR
Tacoma Substation	78	I	1942	North	Covington	WA
Tahkenitch Substation	192	II	1963	South	Eugene	OR
Teanaway MW Radio Station	136	II	1954	North	Wenatchee	WA
Teton Substation	308	III	1968	East	Idaho Falls	WY
Timber Substation	280	II	1955	South	Salem	OR

NAME	PG	TIER	YEAR	REGION	DISTRICT	STATE
Toledo Substation	194	I	1957	South	Eugene	OR
Troutdale MW Radio Station	240	II	1953	South	Longview	OR
Troutdale Substation	242	I	1942	South	Longview	OR
Troy Substation	330	II	1953	East	Kalispell	MT
Unity Substation	310	II	1967	East	Idaho Falls	ID
Valhalla Substation	138	II	1952	North	Wenatchee	WA
Vantage Substation	140	II	1963	North	Wenatchee	WA
Wagner Lake Substation	360	II	1974	East	Spokane	WA
Walla Walla Substation	396	I	1941	East	Tri-Cities	WA
Walton Substation	196	I	1949	South	Eugene	OR
Wasco MW Radio Station	302	II	1953	South	The Dalles	OR
Waterville MW Radio Station	144	II	1953	North	Wenatchee	WA
Wendson Substation	198	II	1972	South	Eugene	OR
Wren Substation	200	II	1947	South	Eugene	OR



Dworshak switchyard, historic photo.