United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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

1. Name of Property

Historic name: ___Milwaukee Road Railroad Substation No. 10_____
Other names/site number: ___Primrose Substation/24MO1648_____
Name of related multiple property listing**:**
_____N/A_____
(Enter "N/A" if property is not part of a multiple property listing

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2. Location

Street & number: __5901 Primrose Drive_____
City or town: __Missoula___ State: __MT_____ County: ___Missoula_
Not For Publication: [ ] Vicinity: [X]

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3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this _x__ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property _x_ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___national _X_statewide _X_local
Applicable National Register Criteria:

_X_A ___B _X_C ___D

_____
Signature of certifying official/Title: **Date**
_____
State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.
_____
Signature of commenting official: **Date**
_____
Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

_____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

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

Category of Property

(Check only **one** box.)

Building(s)	X
District	
Site	
Structure	
Object	

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

Contributing	Noncontributing	
1		buildings
		sites
		structures
		objects
1	0	Total

Number of contributing resources previously listed in the National Register N/A

6. Function or Use
Historic Functions
(Enter categories from instructions.)
INDUSTRY/PROCESSING EXTRACTION: energy facility = electrical substation for railroad
TRANSPORTATION: rail-related = electrical substation for railroad

Current Functions
(Enter categories from instructions.)
VACANT/NOT IN USE

7. Description

Architectural Classification

(Enter categories from instructions.)

__LATE 19TH AND EARLY 20TH CENTURY AMERICAN MOVEMENTS: Commercial (Industrial) _

Materials: (enter categories from instructions.)

Principal exterior materials of the property: WOOD, BRICK, METAL, CONCRETE

Narrative Description

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

Summary Paragraph

Milwaukee Road Railroad Substation No. 10, an Industrial style building, is located on Mullan Road (Montana Secondary Highway 263) about ten miles west of the City of Missoula in Missoula County, Montana. The substation sits in the northwest quadrant of the junction of Mullan Road and Primrose Drive and faces south toward Mullan Road. The substation served as a significant component of the railroad's electrified section between Harlowton, Montana and Avery, Idaho from 1915 to 1974. One of 22 substations on the line, it stands as the best preserved of the four existing substations in Montana. The abandoned Milwaukee Road Railroad grade (24MO0713) passes by the substation to the south.

The T-shaped substation measures 87 x 74 feet, fronting on the abandoned Milwaukee Road Railroad grade. Composed of brick, a flat roof protects it from the elements. Large windows on the substation's south façade allow ample natural sunlight to illuminate much of the interior. The substation is divided into two sections: that which housed the motor-generator sets and the operator's office, and the 2½ story section, which sheltered the transformers and switches. The 2½ story section still features the original lightning arresters and dissipaters (horn gaps) on the roof. The rather austere appearance of the substation is accented by recessed bays and brick

detailing on all four sides of the building. The entry on the façade of the substation displays a decorative brick cornice.

Narrative Description

Milwaukee Road Substation No. 10, commonly referred to as Primrose Substation, is a T-shaped Industrial-style brick building constructed in 1915 by the Chicago, Milwaukee and St. Paul Railroad (Milwaukee Road). The building consists of a 2½ story section attached to a two story section to the south facing the abandoned railroad grade. Integration of the two sections occurs through a corniced brick header string course and a decorative 20-inch wide brick water table. The walls consist of red brick laid in running bond with a brick header. Brick pilasters divide the walls into bays on all sides of the building. A header brick continuous sill girdles the upper story windows. All windows are warehouse-type multi-lite units designed to provide natural lighting and supplement ventilation to the electrical equipment inside the building. The substation rests on a plinthed concrete foundation. The building features a flat roof with parapet walls sheathed in asphalt. The 2½ story section still displays the original lightning arresters and dissipaters (horn gaps) associated with its function as a substation for an electrified railroad. Tiles decorate the roof cornice, terracotta tile on the roof edge. Entries occur on the façade and west elevation of the two-story section of the building. The substation sits roughly north and south. It fronts the abandoned Milwaukee Road Railroad grade a few yards to the south; the grade presently serves as an access road to a building. The substation represented the most distinctive feature of the once larger Milwaukee Road's Primrose railroad station complex.

South Section

South Elevation (Front)

The south section of the building measures 53 x 17 feet. Brick pilasters serve to accentuate recessed bays; the northern 2 ½ story portion is visible above the roofline. This southern section housed the motor-generator sets which stepped the 100,000 volt alternating current (AC) that entered the building down to 3,300 volts direct current (DC) distributed to the locomotives. This section also contained the switches used to control the amount of electricity fed to the lines powering the locomotives. The upper story contains three rectangular horizontal window openings each with 30-lite fixed windows. The central and west bays of the lower story are occupied by two large 20-lite windows currently protected by fiberglass sheets. The windows consist of single center-pivot 6-lite units bordered by fixed lites.

A 17 x 5-foot gable pedimented roofed brick entry projects from the east bay of the east side of the façade. It served as the office of the substation operator, the ticket window, and a waiting room. Asphalt sheaths the entry's roof which features a tile cornice, a brick header course, and a corniced string course consisting of a row of header bricks sandwiched between a row of stretcher bricks above and a row of rowlock bricks below. A sandstone panel etched with "SUBSTATION N$^{o.}$ 10" adorns the gable-end. A large 50-lite window consisting of two center-pivot 9-lite units bordered by fixed lites, and presently protected by a clear sheet of fiberglass, occupies the majority of the elevation below the gable. The window features a lintel composed of two rows of rowlock brick and a rowlock brick sill. Admittance to the substation occurs through the original one-lite/two-panel wood door on the east elevation of entry. A large fixed-

lite transom sits above the door. The west elevation of the entry sports a 9-lite industrial style window that allowed the operator a view of the track to the west.

Copper electrical catenary wires entered and exited the building through conduit openings on the façade above the large centered window on the south elevation of the entry. An I-beam and angle section structure also supported the wires that provided power to the locomotives. Both the conduits and wire support structure remain and projects from the wall above the entry's central window.

East Elevation
The upper story contains two 30-lite fixed windows. No window openings occur within the recessed bays of the lower story. A small concrete foundation extends 14 x 8 feet at the ell. Standard substation design suggests the foundation may have originally supported a small flat-roof brick addition, though whether this feature existed at this specific substation remains unknown as modifications occurred in the standard designs according to site needs. The foundation currently supports a metal grate installed to supplement the ventilation of the machinery inside the building.

West elevation
The west elevation upper story fenestration mimics that of the east elevation. On the ground floor, however, a window opening occupies the south bay of the elevation; a fiberglass sheet currently covers the opening (the opening originally contained a 20-lite unit based on the intact window muntins that remain). The north bay contains the original double leaf wood door entry. Comprised of vertical boards with exterior braces, both doors feature a 3-lite transom; the north bay door contains a smaller modern 6-panel man-door entry. A railroad spur accessed this entry, the tracks of which terminated inside the building, allowing the railroad to remove and replace the heavy equipment in the building. The pilaster separating the recessed bays supports a metal ladder embedded in the wall that provide access to the roof.

North Section
The 2 ½ story north section once housed the high tension transformers and switches for the substation. All of the multi-lite industrial style window panes on the north elevation are broken out.

South Elevation (Front)
The upper story of the south elevation contains seven 12-lite Industrial-style fixed windows. The proximity of these windows to the roof of the 2-story south portion of the building virtually obscures them at close distance; however, they become visible as one moves further way from the building.

East Elevation
The central bay of the upper story exhibits paired 12-lite fixed windows. The central bay of the ground floor contains a single window opening that once held a 72-lite window. Plywood sheeting currently fills the opening.

West Elevation

The west elevation displays the same window configuration as the east elevation, including the paired multi-lite casement windows on the second floor. The window opening on the ground floor has been enlarged, possibly in the 1970s, to remove the electrical machinery from the building. As on the east elevation, the opening originally contained a 72-lite window. Plywood sheeting currently fills the opening.

North Elevation (Rear)

The upper story of the rear elevation contains three sets of paired 12-lite casement fixed windows corresponding to the three interior (of five total) bays. None of the window glass remains. The ground floor contains three large windows openings, none which contain glass or muntins; the lower third of these openings are partially in-filled with plywood.

Interior

An interior brick wall divides the two sections of the building. A large vertical opening infilled with steel plating and a steel man-door occupies much of the west side of the wall and provides access to both halves of the building. The northern 2 ½ story portion of the building features a large pit along the north wall that facilitated the ventilation and cooling of the equipment that once occupied the spot. A ten-ton hand-operated traveling crane once used to load and unload materials off the railroad spur that entered the building through the west elevation, rests in the south portion of the building. The south portion also features a two section machinery bay separated by brick partitions and conduits through which wiring passed between the two sections of the building. The interior has a concrete floor. The interior reveals that trusses were used to support the roof of the motor-generator sets section of the building, while steel I-beams supported the roof of the 2½ story section – just as indicated in the standard Milwaukee Road substation plans. The Milwaukee Road removed and salvaged the original electrical equipment inside the substation in the late 1970s.

Integrity

The Milwaukee Road Railroad Substation No. 10 displays excellent integrity. The building retains its entire original architectural detailing, footprint, and features standard to the design development by the Milwaukee Road Railroad in 1915 with the result that integrity of design, workmanship, materials, and location are very evident. The fenestration is largely intact as are many of the original lites. Openings on the east and west elevations contain in-filling with plywood sheets, but the openings themselves remain unaltered. The brick walls retain their original detailing and the lightning arresters and dissipaters on the roof are intact along with the catenary support on the façade. The building, which stands in its original location, exhibits more than enough of its original appearance to convey its historic association as a Milwaukee Road substation. Although the Milwaukee Road ceased to operate and many of the resources associated with it, such as the tracks, ties, ballast, and other appurtenances no longer remain, the nearby abandoned grade remains extant and easily recognizable, providing strong integrity of feeling and setting to the substation which continues to stand in a rural area. All but one of the

buildings[1] and structures associated with the substation have been removed, but their elimination detracts little from the overall integrity of the building. No intrusive buildings or structures occur near the substation.

[1] One of the residences still exists to the west of the substation. It has, however, been significantly remodeled and no longer retains enough integrity for listing in the National Register of Historic Places. It is not located near the substation and does not visually impact it.

8. Statement of Significance

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

[X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.

[ ] B. Property is associated with the lives of persons significant in our past.

[X] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values,
D. or represents a significant and distinguishable entity whose components lack individual distinction.

[ ] E. Property has yielded, or is likely to yield, information important in prehistory or history.

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

[ ] A. Owned by a religious institution or used for religious purposes

[ ] B. Removed from its original location

[ ] C. A birthplace or grave

[ ] D. A cemetery

[ ] E. A reconstructed building, object, or structure

[ ] F. A commemorative property

[ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
_TRANSPORTATION _

Period of Significance
___1915-1974 ____

Significant Dates
___1915, 1916, 1974__

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

Cultural Affiliation

Architect/Builder
_Chicago, Milwaukee, St. Paul & Pacific Railroad (Milwaukee Road)

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

The Milwaukee Road Railroad Substation No. 10, also known as Primrose Substation, is eligible for listing in the National Register of Historic Places under criteria A and C. The building is eligible under Criterion A for its association with the Chicago, Milwaukee, St. Paul and Pacific Railroad (Milwaukee Road), the third transcontinental railroad to cross Montana. It is also associated with the Milwaukee Road's electrification of its line between Harlowton, Montana and Avery, Idaho in 1915. The electrification enabled the railroad to efficiently traverse the Rocky Mountains and made the line one of the most technologically advanced in the United States at the time. The substation served as a critical component of that electrified line. The Milwaukee Road significantly impacted the agricultural and commercial development of the state between 1909 and 1980.

The substation gains additional significance under Criterion C as a representative example of the standard design of Milwaukee Road substations developed by the railroad's architects in 1914.

The building exemplifies this architectural style with its footprint, fenestration, and architectural detailing intact and unchanged. Though other substations associated with the operation of the Milwaukee Road exist in the state, Substation No. 10 represents the most intact remaining example in Montana.

The Significant Dates of 1915, 1916, and 1974 relate to the construction of the substation, the start of operation of the substation, and the closure of the substation, respectively.

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

The Primrose Substation is eligible for the National Register under Criterion A for its association with the electrification of the Milwaukee Road in 1915, "an historic step . . . thus far unprecedented in the history of American railroads."[2] The railroad's reputation in the early twentieth century as the most technologically advanced line in the United States sprang largely from the electrification of its Pacific Extension in 1915. The Primrose Substation served as a critical component of that system. One of 13 substations strung along the 440-mile length of the Milwaukee Road's Rocky Mountain Division between Harlowton, Montana and Avery, Idaho, the Primrose Station is one of only four substations remaining in Montana. The Milwaukee Road played a significant role in the economy of Montana, and the electrified section carried freight from and destined for Montana consumers. The substation also contributed to the operation of the Milwaukee Road's passenger trains, such as the *Hiawatha* and *Olympian Hiawatha*. In addition, the Primrose Station served as a railroad station and was important to the development of this section of the Missoula Valley. Emblematic of the standard Milwaukee Road substation design, the Primrose Substation operated from 1915 to 1974.

[2] August Derleth, *The Milwaukee Road: Its First Hundred Years*, (Iowa City, Iowa: University of Iowa Press, 2002), 189).

Under Criterion C, the substation serves as a very good and intact example of Industrial architecture. The substation was constructed from a standard plan developed by Milwaukee Road Railroad architects in 1914. The fenestration, footprint, and architectural detailing standard to this design remain intact and unchanged allowing for easy recognition as a Milwaukee Road substation; it remains virtually identical in appearance as when first constructed in 1915. Although the setting of the property has diminished somewhat with the removal of the railroad tracks and buildings associated with its operation, the essential characteristics that contribute to the National Register eligibility of this building under Criterion C remain. It is the most intact example of this design remaining in Montana.

History

The Lewis and Clark Expedition in 1806 and British North West Company agent David Thompson in 1812 were the first known Euro-Americans to provide descriptions of the Missoula Valley. The valley, part of the aboriginal territory of the Salish, Pend d'Oreille, and Kalispell people, provided a link between the Bitterroot Valley to the south and the Jocko Valley to the north. The valley's central location made it an important gathering place for Native Americans and, by the 1820s, of the British Hudson Bay Company (HBC). In 1846, Great Britain relinquished what became known as Oregon Territory, turning over land south of the 49th parallel to the United States. The HBC, however, remained active in the area, as did American fur companies. American influence in the area became much more pronounced in 1841, when the Jesuits established St. Mary's mission in the Bitterroot Valley about 40 miles south of the location of the future Primrose Substation. In 1850, Major John Owen purchased the mission site and converted it to a trading post known as Fort Owen.[3]

In 1853, the federal government initiated surveys to determine potential routes for a transcontinental railroad. Isaac Stevens drew the assignment for the northern transcontinental route across the northern Rocky Mountains and Pacific Northwest. In 1855, Stevens met with representatives of the Salish, Pend d'Oreille, and Kootenai tribes at Council Grove about a mile south of the future site of the Milwaukee Road substation. They managed to hash out a treaty that established a reservation and allowed the federal government to build roads across their territory. Five years later, in 1860, Lieutenant John Mullan constructed a 624-mile wagon road between Walla Walla, Washington and Fort Benton, Montana. Part of the road traversed the Missoula Valley along the route of present Secondary Highway 263 (also known as Mullan Road) just south of the substation. The Mullan Road connected Missoula with nearby Frenchtown, the Cedar Creek Mines near present Superior and, ultimately, the settlements in Idaho and Washington. For a time between 1914 and 1925, the Mullan Road also functioned as a component of one of the nation's first interstate highways, the Yellowstone Trail. The route, which consisted of a series of interlinked county roads, connected Plymouth, Massachusetts and Seattle, Washington. In 1925, the Montana Department of Transportation constructed a new

[3] Merril G. Burlingame, *The Montana Frontier*, (Helena: State Publishing Company, 1942), 15; James McClellan Hamilton, *History of Montana: From Wilderness to Statehood*, (Portland, Oregon: Binfods & Mort, Publishers, 1957), 61; Jack Nisbet, *Sources of the River*, (Seattle: Sasquatch Books, 1994), 234-235; Michael P. Malone, Richard B. Roeder and William L. Lang, *Montana: A History of Two Centuries*, Rev ed (Seattle: University of Washington Press, 1992), 62.

alignment of the highway to the north of the Mullan Road and designated it U.S. Highway 10. The old road became a secondary highway in 1942.[4]

The Mullan Road provided the impetus for development in and around the Missoula Valley. In 1860, Christopher Higgins and Frank Worden established a small trading post, called Hellgate, on the road near where the Blackfoot and Clark Fork rivers joined about twenty miles east of the substation. A rough and tumble settlement, Hellgate was quickly eclipsed by a new community, Missoula, in 1862 when Higgins and Worden established a flour mill in the valley. While Missoula steadily grew through the 1860s and 1870s as an important commercial and transportation center, it boomed after the completion of the Northern Pacific Railroad (NPRR) in 1883. The establishment of the Flathead Indian Reservation in 1855 and the allotment of much of its land for non-homesteading in 1910 also made Missoula an important distribution center for supplies destined for the reservation. In 1893, the State of Montana established Montana State University (the University of Montana after 1965) in Missoula, which further strengthened the city as an important metropolitan area in western Montana. From Missoula, NPRR branch lines radiated down the Bitterroot Valley and up the Jocko Valley to Polson at the foot of Flathead Lake. In 1909, the Chicago, Milwaukee, St. Paul and Pacific Railroad (Milwaukee Road) completed its Pacific extension, thus cementing Missoula's significance as a major transportation hub in western Montana. The City of Missoula continues to experience growth and is now the second largest city in the state.[5]

The Milwaukee Road Railroad

Organized in 1874, the Chicago, Milwaukee, St. Paul & Pacific Railroad (Milwaukee Road) incorporated in Montana in 1905 when company chairman Roswell Miller decided to extend the line through the state to the Pacific Coast. Winston Brothers began construction of the line between Butte and Avery, Idaho in August 1908. The firm employed subcontractors to provide supplies and construct bridges and tunnels along the route. Winston Brothers built different sections of the road concurrently with all segments connected at St. Regis in January 1909. When completed, the 105-mile segment between Missoula and St. Paul Pass ranked among the most scenic along the Milwaukee Road's entire westward extension.[6]

The Milwaukee initiated passenger traffic on its western extension in 1909. Two years later, in 1911, the railroad's famed *Olympian* and *Columbian* passenger trains began service on the line between Chicago and Seattle. Electrification of the section in 1914 resulted in a much smoother and smoke-free ride than what the steam locomotives offered. Indeed, for a small fee, passengers on the *Olympian* could ride in an open observation car attached to the rear of the train. By far the ultimate in mid-20th century passenger trains was the Milwaukee's *Olympian Hiawatha*. Developed by Milwaukee Road engineers in the 1930s, the streamlined art deco-style

[4] Hamilton. *History of Montana*, 345; Malone, et al, *Montana*, 72, 116-117; Burlingame, *The Montana Frontier*, 34; State Wide Highway Planning Survey, *History of the Montana State Highway Department, 1913-1942*, (Helena: Montana State Highway Commission, 1943), 58A.

[5] Don Spritzer, *Roadside History of Montana*, (Missoula: Mountain Press Publishing Company, 1999), 145-147, 164-165; Malone, et al, *Montana*, 184.

[6] McCarter, *Guide to the Milwaukee Road*, 15, 95; Derleth, *The Milwaukee Road*, 185.

steam locomotives rated among the fastest in the world and the specially designed passenger cars incorporated the latest technology to make the rides smoother, quieter, and more comfortable than ever before. The distinctive maroon and gold color scheme of the *Hiawatha* was a common sight to local residents from 1947 to 1961 cruising through the rugged mountains of western Montana at speeds up to 70 miles per hour.[7]

Even before the Milwaukee Road completed its extension westward to the Pacific Ocean, company president A. J. Earling began laying the groundwork to electrify the line in the Rocky Mountain Division, which encompassed 440 miles between Harlowton, Montana and Avery, Idaho. Earling, however, conceived of a plan wherein the railroad would provide its own electricity to power its locomotives. General Electric, at Earling's direction, initiated studies regarding the electrification of the railroad. In 1909, however, the Milwaukee Road's board of directors appointed a new member to represent the Pacific extension, John D. Ryan, president of Montana's Anaconda Copper Mining Company (ACM). Ryan expressed considerable interest in the potential of electrifying the railroad based on his experience with the electrified Butte, Anaconda & Pacific Railroad that operated between Butte and Anaconda. However, an electrified railroad would require large amounts of copper for the line. Ryan's interest in electrifying the Milwaukee Road was two-fold – he also owned majority interests in the Great Falls Power Company, the Thompson Falls Power Company, and power companies in Washington State.[8]

Because of Ryan's experience and influence, he convinced the Board of Directors of the advantages to the railroad to make arrangements with existing power companies, like the Great Falls and Thompson Falls firms, to provide energy to the Milwaukee Road rather than construct its own power stations. The directors also calculated the cost-effectiveness of electrifying the line over the Rocky Mountains rather than depend on more costly and inefficient steam locomotives with their limited travel ranges and frequent stops necessary to take on fuel and water. The director's believed, rightly, that electrification would lower costs and improve service. Consequently, in 1912, the railroad decided to electrify its line through the Rocky Mountain Division and contracted with the Great Falls Power Company for electricity; the directors made a similar deal with the Thompson Falls Power Company the following year.[9]

The Milwaukee began work on electrifying the Rocky Mountain Division's 440-mile line in April 1914. Construction involved the installation of 100,000-volt power lines to the substations strung along the line in Montana and Idaho. The line carried a three-phase alternating current (AC) to the substations, where it was stepped down to a 3,000-volt direct current (DC) that was "applied directly to a heavy copper cable paralleling the track . . . and connected to the trolley on two copper wires . . . supported over the center of the track about twenty-five feet about the rail and directly feeding the locomotives the energy needed for propulsion by means of a pantograph." By use of a regenerative braking system, locomotive systems recovered about 60

[7] McCarter, *Guide to the Milwaukee Road*, 15, 95; Derleth, *The Milwaukee Road*, 186, 187, 239.

[8] The Montana Power Company absorbed the Great Falls and Thompson Falls power companies in 1929. Cecil H. Kirk, *A History of the Montana Power Company*, (Pleasant Hill, Oregon: Donn B. Kirk, 2008), 298; Derleth, *The Milwaukee Road*, 189-190; Karl A. Zimmerman, *The Milwaukee Road Under Wire*, Quadrant Press Review No. 2, (New York: Quadrant Press, 1973), 4.

[9] Derleth, *Ibid*, 188-189; Zimerman, *The Milwaukee Road Under Wire*, 7-8.

percent of the energy required to pull trains upgrade. The first train using an electric locomotive operated between Three Forks and Deer Lodge, Montana in November 1915 with the entire Rocky Mountain Division electrified in 1916. The following year, the Milwaukee's Board of Director's authorized the electrification of the railroad's line between Othello and Tacoma in Washington State. Company historian, August Derleth, later wrote:

> The company discovered almost immediately that the operating efficiency – especially of freight trains – under electrification was astonishing. Compared with the operation of steam locomotives, the tonnage per train was virtually doubled, and the operating maintenance expense, owing to the regenerative braking process, was significantly reduced, while the at the same time safety of operation was increased. Overall efficiency was increased to such an extent that, in the initial eight years of operation, the road estimated a saving of $12,400,000 had been effected by electrification.

Electrification proved an unqualified success, making the Milwaukee Road one of the most technologically advanced railroads in the United States.[10]

The Substations

The Milwaukee Road relied on a series of substations to transform the 100,000 volt AC current to a 3,000 volt DC current to power the railroad's locomotives. General Electric Company electrical engineer A. H. Armstrong and his staff designed the electrical equipment installed in the substations. The railroad ordered the equipment for the stations in November 1914 for delivery in May 1915. Reinier Beeuwkes, also an employee of General Electric, supervised the installation of the equipment. The Milwaukee constructed 22 substations, 13 in Montana and nine in Idaho and Washington. In Montana, the stations were spaced an average of 37.3 miles apart.

The stations were substantial brick buildings that housed the motor-generator sets and low tension switching equipment in the front part of the structure and the high tension transformers and switching equipment in the 2½ story section of the building. The motor-generator sets converted the AC to DC that fed the locomotives. Substations housed either two or three motor-generator sets, with one functioning as a back-up. Lightning arresters and horn gaps[11] sat on the roof of the transformer section and the power lines connected to the building through the motor-generator section. The foundations and roofs of the buildings were reinforced concrete and walls comprised of brick. Construction of the two different styles of substations designed and built by the Milwaukee Road depended on location; the majority were flat-roof buildings, while those in areas of heavy snow-fall featured gable roofs. Only the substations at Drexel and East Portal in Montana sported gable roofs. Pits to aid in air circulation around the electrical equipment were located below the concrete floors. The large windows "are of steel sash construction and are of

[10] The gap between Avery, Idaho and Othello, Washington was never electrified. Zimmerman, *The Milwaukee Road Under Wire*, 8, 12, 14; Derleth, *Ibid*, 190-191; Noel T. Holley, *The Milwaukee Electrics*, (Hicksville, New York: N. J. International, Inc., 1987), 154; F. H. Johnson, *The Chicago, Milwaukee and St. Paul Railway: The Milwaukee Road in Montana*, (Chicago: The Milwaukee Road, 1935), 8.

[11] A horn gap consists of two horn shaped metal rods separated by a smaller air gap that serves as a lightning arrester. A horn gap usually consists of porcelain insulators that serve to dissipate lightning charges into the ground.

liberal dimensions and carefully placed to insure good general illumination;" they also functioned to assist air circulation inside the building.[12]

The Thompson Falls Power Company fed power into the substation through electrical connectors on the façade of the operations office portion of the building. The operations office contained the switchboard for the motor-generator sets and also functioned as a ticket office and waiting room since most substations also served as railroad stations. The extended bay overlooked the track, which enabled the substation operator to "keep in touch with train movements and perform other duties besides those pertinent only to substation operations." Substations were manned on a 24-hour basis with operators in more remote locations residing in houses near the station. The operators controlled the voltage to the lines feeding electricity to the locomotives, started and stopped the motor-generator sets, and recorded power usage. Originally, locomotives required a minimum of 1,800 volts for power, but that amount increased to 3,200 volts in the 1950s. Milwaukee Road locomotives were supplied with current by more than one substation at a time to ensure continuity of operation. The utility companies supplied the power at about $.0054 per kilowatt hour. Spur tracks from the main line entered the motor-generator room of each substation to allow heavy equipment to be unloaded from railcars with a 10-ton crane positioned inside the building (the crane is still present in the Primrose Substation).[13]

In 1948, the Milwaukee Road hired electrical engineer Laurence Wiley to institute low cost changes to the railroad's Rocky Mountain and Coast divisions (Washington State). In 1950, he devised a method to automate some of the substations and operate them using remote control. Implementing Wiley's idea fell to Milwaukee Road engineer Earl Barnes who developed the means to achieve the remote control operations. Tarkio, about 40 miles west of the Primrose Substation, and within the Rocky Mountain Division, received the first remote control system. With three substations controllable from one location, the set-up allowed the Tarkio operator to control operations at both the Drexel and Primrose stations.[14]

By the late 1960s, the railroad's electrification system required costly upgrades. The trolley wires that carried the electrical current to the locomotives were in good condition, but most of the 40,000 wood poles that carried the wires required replacement. In addition, most of the electric locomotives needed to be replaced. The Milwaukee Road estimated the cost of the upgrade to the system at around $39 million. After considerable debate among the railroad's board members, they decided to scrap the electrified system as too costly and purchased additional diesel locomotives. Milwaukee Road maintenance crews began removing the wires in 1973. The section including the Primrose Substation ceased electric operations in 1974. The railroad sold most of the substation to salvagers, who demolished the buildings. In Montana, only four of the railroad's 13 Montana substations escaped the wrecking ball: at Loweth west of

[12] Holley, *Ibid*, 159, 302; Michael Sol, "Under the Wire," unpublished manuscript located at the Research Center of the Montana Historical Society, Helena, Montana; Philip C. Johnson, "Fortieth Year of the Milwaukee Road Rocky Mountain Electrification," Unpublished manuscript at the Research Center of the Montana Historical Society, p.42; Richard Steinheimer, *The Electric Way Across the Mountains: Stories of the Milwaukee Road Electrification*, Tiburon, CA: Carbarn Press, 1980), 12; A. Smith, "Substations of the Chicago, Milwaukee & St. Paul Railway Electrification;" *General Electric Review, Special Edition: Milwaukee Road Electrification*, (November 1916), 973, 975.

[13] Smith, *Ibid*, 975, 979; Holley, *The Milwaukee Electrics*, 157, 159, 168.

[14] Holley, *Ibid*, 162-163; Johnson, "Fortieth Year of the Milwaukee Road," p. 42.

Lennep in Meagher County, the Gold Creek substation in Powell County, the Ravenna station between Missoula and Drummond, and the Primrose substation ten miles west of Missoula.[15]

The Milwaukee Road held the honor as the third and last transcontinental railroad to cross Montana. Established primarily to haul freight, the Milwaukee Road faced declining revenues throughout much of its history in Montana, twice declaring bankruptcy, once in 1925 and again in 1938. Competition from the Northern Pacific and Great Northern railroads along with cyclical drought and two economic depressions prevented the Milwaukee Road from becoming the cash cow the board of directors envisioned in 1909. After a short boom during the Second World War, the railroad again found itself in dire economic trouble, finally abandoning its lines in Montana in 1980.[16]

Primrose Substation

Located in Section 31 of Township 14 North, Range 20 West, the land where Primrose Substation sits was originally claimed by the Northern Pacific Railway as part of its 44 million acre Congressional land grant in July 1864. The property subsequently sold to Joseph and Maria Martel by 1900. The Martels sold it to Patrick and Louise Lavoie on the last day of December 1901. The Lavoie's in turn sold a strip of Right-of-Way to the Chicago, Milwaukee, & St. Paul Railway Company in March 1907 and then sold 1.4 acres to the railroad for the substation in August 1915.[17]

The Milwaukee Road established Primrose as a station in 1914 and named it for the plant, which grew profusely in the area. Officially designated Substation No. 10, the Primrose Substation was designed by Milwaukee Road Railroad architects and followed a standard design utilized in Montana, Idaho, and Washington. A railroad contractor built the substation out of brick according to the standardized design in 1915. The Primrose Substation features the flat-roof architectural design embodied by 11 of the 13 substations in Montana. Operation of the substation began in 1916. The station housed two motor-generator sets and employed three men, each working an 8-hour shift. The men lived on-site with their families. In addition to the substation, the Primrose Substation complex included a water tank, pump house, operator's car body, shed, two residences, an outhouse, tower, coal and oil house, stone house, ice house, garage, and a two-story section house. The railroad tracks, ties, ballast, and other appurtenances associated with the railroad were removed in the 1980s.[18]

[15] Holley, *The Milwaukee Electrics*, 168; McCarter, *Guide to the Milwaukee Road,* 55; Johnson, "Fortieth Year of the Milwaukee Road," p. 5; Zimmerman, *The Milwaukee Road Under Wire*, 61-62..

[16] McCarter, *Guide to the Milwaukee Road*, 23, 25, 27-28, 71; Derleth, *The Milwaukee Road*, 190-191; Zimmerman, *The Milwaukee Road Under Wire*, 12.

[17] Malone et al, *Montana*, 173; Deed Book 22, p. 585, Clerk and Recorders Office, Missoula County Courthouse, Missoula, Montana; Ibid, book 37, p. 410; Ibid, book 49, p. 283; Ibid, book 77, pp. 344-345.

[18] Holley, *The Milwaukee Electrics*, 303; Roberta Carkeek Cheney, *Names on the Face of Montana: The Story of Montana's Place Names*, (Missoula: Mountain Press Publishing Company, 1990), 216; Chicago, Milwaukee & St. Paul Railway, Primrose Station Plat (13 September 1915), Montana Department of Transportation, Helena, Montana.

In 1951, the railroad automated some of its substations, including Primrose. Remote operation occurred from the Tarkio Substation about 40 miles to the west. The Primrose Substation remained in operation until 1974, when the Milwaukee Road ceased electrical operations and concentrated on diesel locomotives. The railroad itself declared bankruptcy in 1980 and ceased operations in Montana. The substation was sold to a private individual. The current owner purchased the building in 2013.

Architectural Significance

The Milwaukee Road Railroad Substation No. 10 gains significance for its association with industrial architecture, a style that played a minor role in architectural history. Its relegation as a minor-player may result from the necessity that the analysis includes both the manufacturing process as well the building product. Betsy Hunter Bradley who authored *The Works: The Industrial Architecture of the United States,* recognizes the important role factories played in design and technology and the development of modern architecture from 1840 to 1940. Every design facet of the factory relates to the associated industrial use and process and the application of these relationships. An understanding of industrial architecture relies not only on functional factors but also in the appreciation for the aesthetic ideals of engineers and their emphasis on efficiency and processes.[19]

Le Corbusier recognized the *esprit nouveau* in factories and silos in the 1920s. Le Corbusier articulated the attitude and feeling advanced by the machine age and the functionality embodied in the design of factories, silos, liners, planes and cars in *Vers une Architecture.* American industrial factories often display the beginnings of contemporary high-tech style.[20]

At the turn of the twentieth century, many American architects, including Albert Kahn, welcomed the possibilities associated with the industrial expansion. His design innovations in the automobile industry in association with modernized building materials, such as steel and reinforced concrete, allowed Kahn, in addition to other architects, to grow the size of interior spaces. Flexibility provided by larger interior spaces allowed for innovative ways to organize the production process. The new-found importance of interior space resulted in a much more equal footing regarding interior design and function compared to architectural styles of the exteriors. The inclusion in industrial buildings of large windows, determined by the grid of the concrete or brick frame, came to play an important role. In fact, multi-paned, metal framed windows, such as those found in the Primrose Substation, became a dominant feature of the buildings.[21]

Kahn often stated that architecture is 90 percent business and ten percent art, a sentiment echoed by Henry Ford who cared more for the function of a building and its ability to provide efficient

[19] Betsy Hunter Bradley, *The Works: Industrial Architecture of the United States* (New York: Oxford University Press, 1999).

[20] Rob MacDonald, "The Works: the Industrial Architecture of the United States by Betsy Hunter Bradley. Oxford UP, 1999," book review as appears in *American Studies Today Online*: http://www.americansc.org.uk/Reviews/Works.htm.

[21] Louis Bergeron and Maria Teresa Maiullari-Pontois, "The Factory Architecture of Albert Kahn," in *Industry, Architecture, and Engineering: American Ingenuity 1750-1950*, available at http://www.architectureweek.com/2000/1101/culture_1-1.html

solutions to the requirement of mass production than the architectural style.[22] The same principles drove all of industrial architectural design during the early twentieth century are quite evident in the Primrose Substation, where although the building stands as a beautiful example of the style of the architecture, the original intent of the Milwaukee Road architects was to provide a functional building capable of addressing their issues related to the railroad.

The Primrose Substation represents the load-bearing masonry associated with industrial buildings common in the U.S. around the turn of the twentieth century. Pilasters and arched opening are typical of the age. Although the Primrose Substation lacks the arched openings, the intended results are the same. As discussed by Bradley:

> Brick bearing walls were made skeletal in form, as much like a framed system as possible, through the concentration of loads on thick piers, or pilasters. Brick walls of pilasters and thinner panel walls are articulated in various ways. Arcaded forms, in which two or more stories are linked visually by arched spandrels that joined soaring pilasters, exuded structural strength and had an inherent ornamental quality. When both vertical pilasters and horizontal spandrels and stringcourses were emphasized, facades appeared as articulated grids and often featured a lively interplay of elements…The gridded articulation of the facades of industrial loft buildings remained a dominant theme even as interior steel framing reduced the structural role of the brick exterior…Indeed, architects and engineers found it difficult to move away from facade schemes developed for the brick pilaster-articulated and gridded wall.[23]

As the twentieth century emerged, the industrial aesthetic began to shift, and masonry bearing walls gave way to framed structural systems. Framed buildings, especially those that used concrete and steel systems, proved more economical to build. They allowed large, open, interior space, and curtain walls of steel framed windows to permit copious amounts of natural light.

[22] Ibid.

[23] Bradley, pp. 230-231.

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Previous documentation on file (NPS):

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

Primary location of additional data:

_X_ State Historic Preservation Office
____ Other State agency
____ Federal agency
____ Local government
____ University
____ Other
Name of repository: _____

Historic Resources Survey Number (if assigned): _____

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10. Geographical Data

Acreage of Property 2.0

Use either the UTM system or latitude/longitude coordinates

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

1.	Latitude: 46.927976	Longitude: -114.167655
2.	Latitude:	Longitude:
3.	Latitude:	Longitude:
4.	Latitude:	Longitude:

Or

UTM References

Datum (indicated on USGS map):

[ ] NAD 1927 or [X] NAD 1983

1. Zone: 11	Easting:	715614	Northing: 5201055
2. Zone:	Easting:		Northing:
3. Zone:	Easting:		Northing:
4. Zone:	Easting :		Northing:

Verbal Boundary Description (Describe the boundaries of the property.)

The Milwaukee Road Railroad Substation is located in the NE¼ NE¼ SE¼ of Section 31, T14N, R20W, C.O.S. 1762, Parcel 1, Remainder in SW4. The property is bounded on the south by the abandoned Milwaukee Road Railroad grade (which now functions as an access road), on the east by Primrose Drive, the north by a gravel access road and on the east by a driveway.

Boundary Justification (Explain why the boundaries were selected.)

Boundaries for the Milwaukee Road Railroad Substation are drawn to encompass the building and the immediate grounds surrounding it, excluding the abandoned railroad grade (24MO0713).

11. Form Prepared By

name/title: Jon Axline/Private consultant
organization:
street & number: 448 Parriman Street
city or town: Helena state: MT zip code: 59602
e-mail talosian@aol.com
telephone: (406) 422-2111
date: February 18, 2014

Property Owner:
(Complete this item at the request of the SHPO or FPO.)

name Alton Helm

street & number 1000 South Russell Street telephone

city or town Missoula state MT zip code 59801

Additional Documentation

Submit the following items with the completed form:

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

Photographs

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

Photo Log

Name of Property:

City or Vicinity:

County: State:

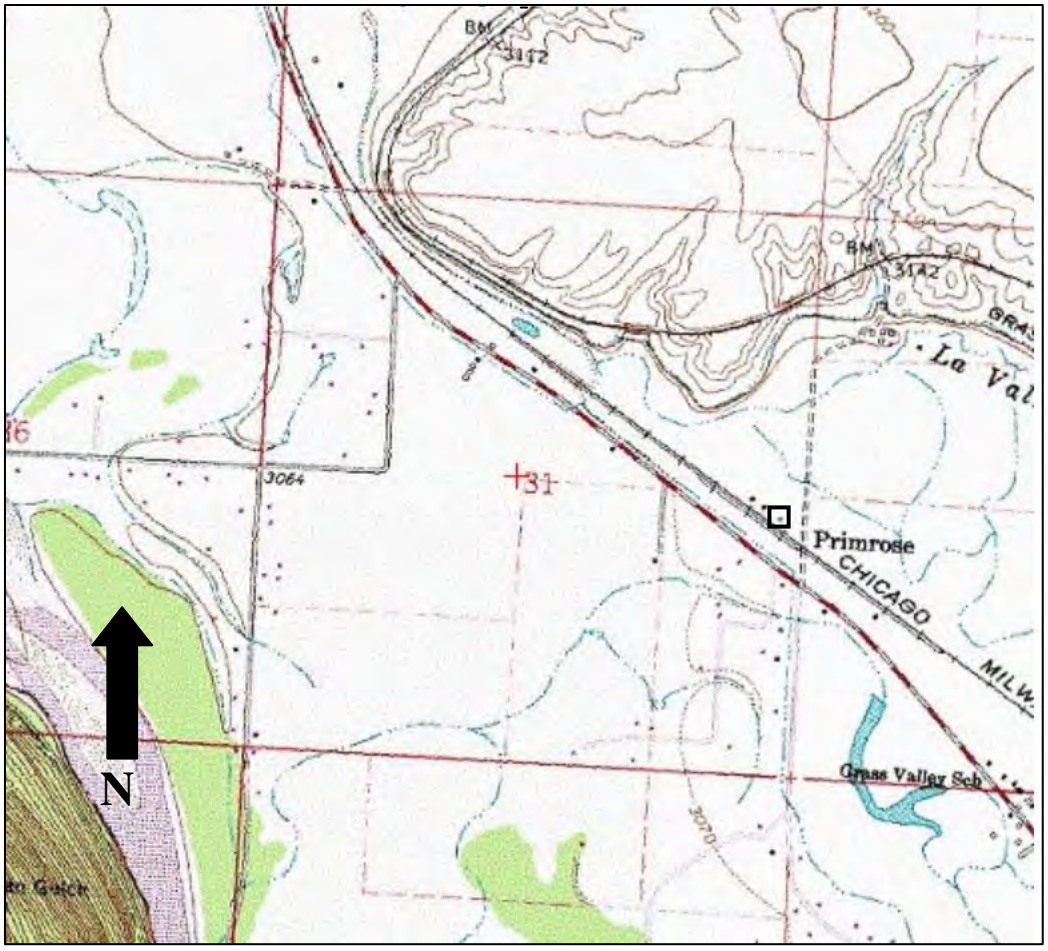
Photographer:

Date Photographed:

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

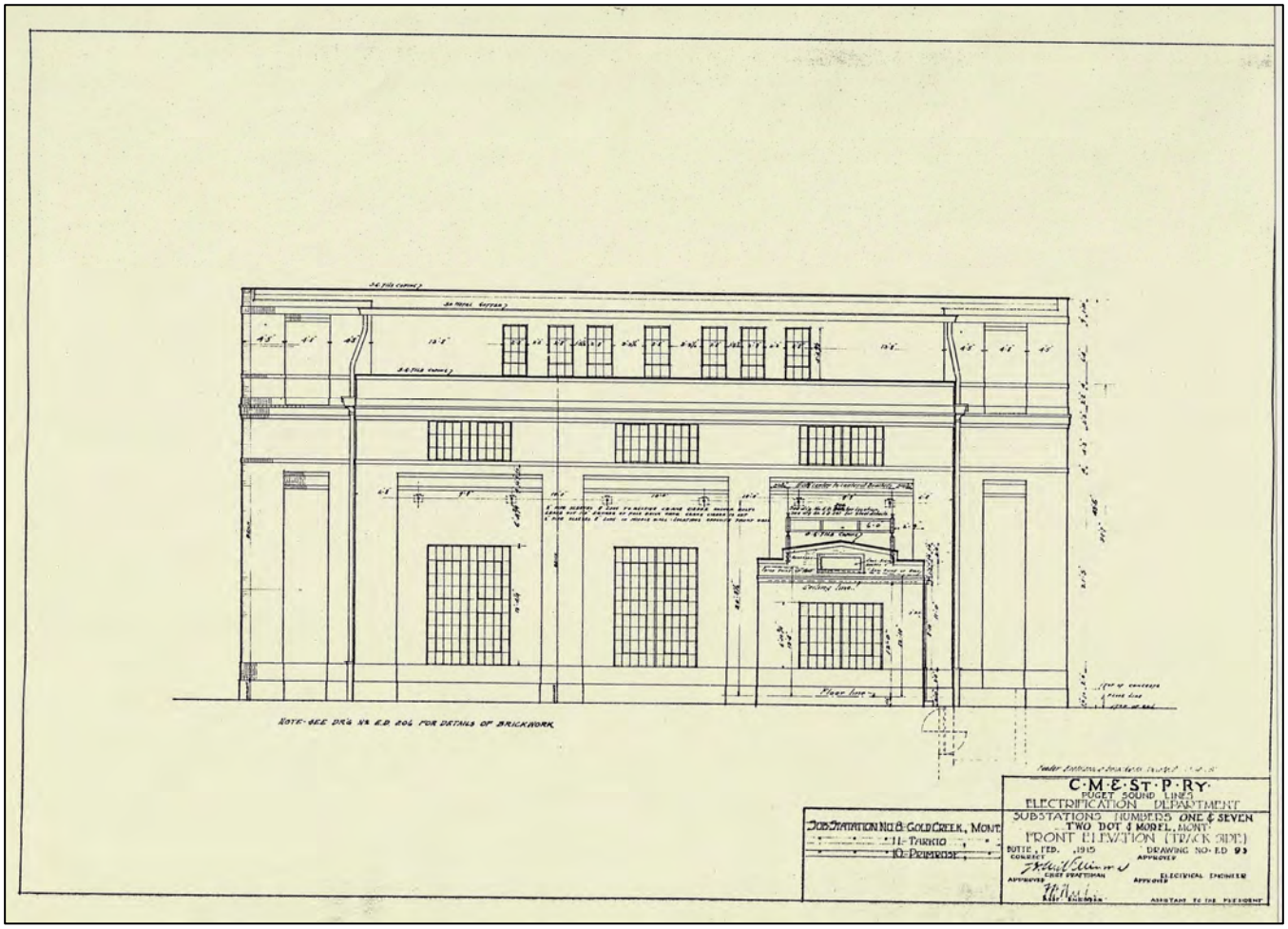
1 of ___.

See Continuation Sheets



Location of the Milwaukee Road Railroad Substation No. 10. Found on the *Missoula West*, Montana 7.5' USGS Quadrangle Map, 1979.

Aerial view showing Milwaukee Road Substation No. 10 (Primrose). Substation located on right side of photograph.



Standardized architectural drawing for Milwaukee Road Railroad substations.

Photograph Log

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Dick Dorn
Date of Photograph: June 1974
Location of original negative: Unknown
Description and view of camera: Historic photo of substation, 1974. View to northwest.
Photograph: 0001
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0001

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Façade Overview. View to the north-northwest.
Photograph: 0002
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0002

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: East and north elevations. View to the southwest.
Photograph: 0003
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0003

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: North and west elevations. View to the southeast.
Photograph: 0004
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0004

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: West elevation. View to the south southeast.
Photograph: 0005
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0005

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Façade and west elevation. View to the east-northeast.
Photograph: 0006
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0006

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Façade (south elevation). View to the northeast.
Photograph: 0007
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0007

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Façade and east elevation. View to the north-north.
Photograph: 0008
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0008

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of substation operator's office. View to the north northeast.
Photograph: 0009
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0009

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of substation designation and catenary support. View to northeast.
Photograph: 0010
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0010

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of entry to operator's office. View to west northwest.
Photograph: 0011
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0011

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: North and east elevations. View to southwest.
Photograph: 0012
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0012

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: North and west elevations. View to east-southeast.
Photograph: 0013
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0013

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: West elevation. View to the southeast.
Photograph: 0014
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0014

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of bay entry on west elevation. View to southeast.
Photograph: 0015
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0015

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of brick water table. View to northeast.
Photograph: 0016
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0016

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Ventilation pit on east elevation. View to the northwest.
Photograph: 0017
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0017

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of lightning arrestors. View to southeast.
Photograph: 0018
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0018

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of interior crane. View to the east.
Photograph: 0019
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0019

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of interior steel partition door. View to north.
Photograph: 0020
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0020

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Interior of operator's office door. View to southeast.
Photograph: 0021
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0021

Name: Milwaukee Road Substation No. 10 (24MO01648)
County and State: Missoula County, Montana
Photographer: Jon Axline
Date of Photograph: February 2014
Location of original negative: Montana Department of Transportation. Helena, Montana.
Description and view of camera: Detail of operator's office window with muntins. View to southwest.
Photograph: 0022
MT_MissoulaCounty_MilwaukeeRoadSubstationNo10_0022

Photo 0001. Historic photo of Substation No. 10, 1974. View to northwest.

Photo 0002. Façade overview. View to north-northwest.

Photo 0003. East and north elevations. View to the southwest.

Photo 0004. North and west elevations. View to the southeast.

Photo 0005. West elevation. View to the south southeast.

Photo 0006. Façade and west elevation. View to the east-northeast.

Photo 0007. Façade (south elevation). View to the northeast.

Photo 0008. Façade and east elevation. View to the north-north.

Photo 0009. Detail of substation operator's office. View to the north northeast.

Photo 0010. Detail of substation designation and catenary support. View to northeast.

Photo 0011. Detail of entry to operator's office. View to west northwest.

Photo 0012. North and east elevations. View to southwest.

Photo 0013. North and west elevations. View to east-southeast.

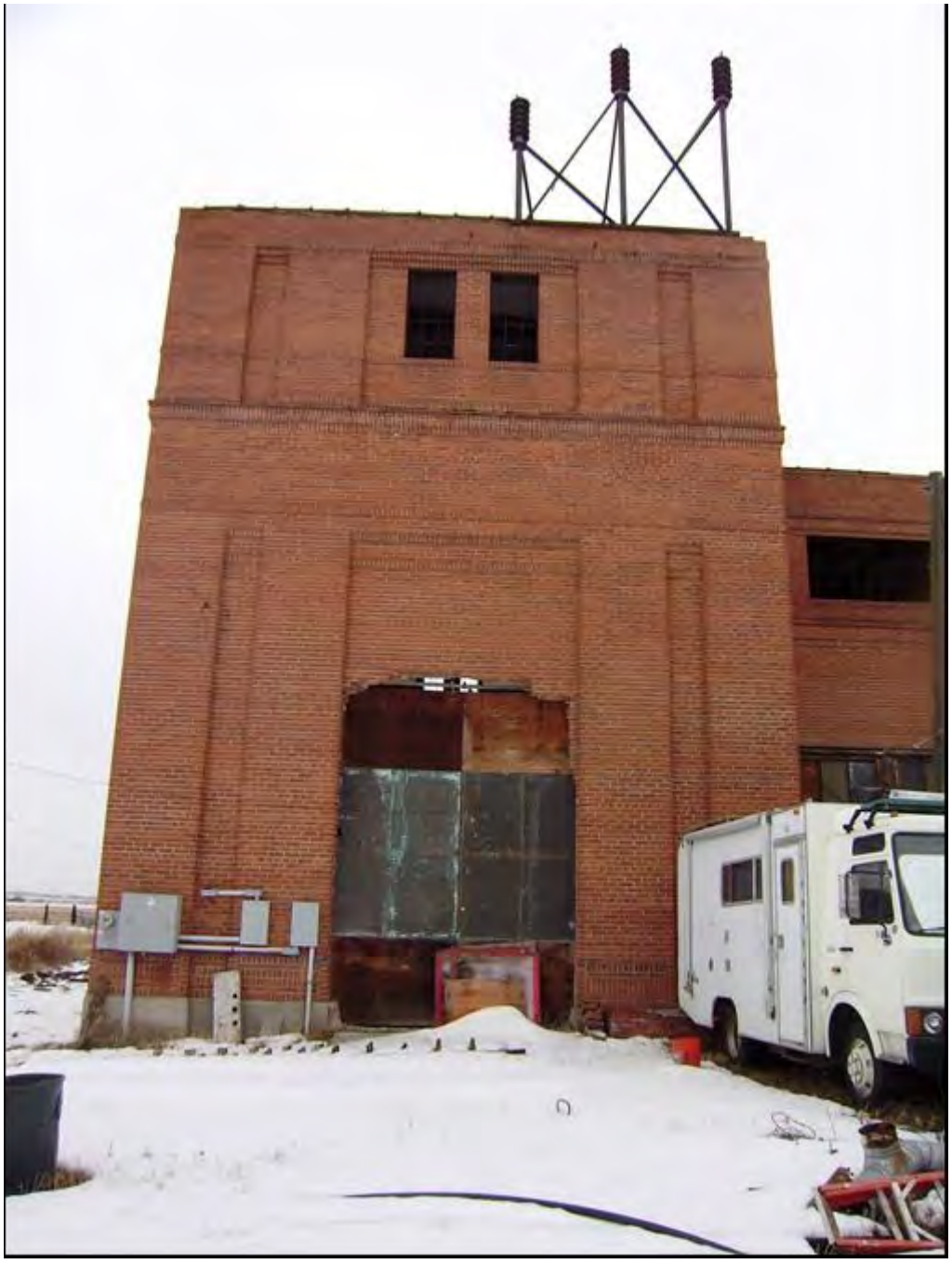


Photo 0014. West elevation. View to the southeast.

Photo 0015. Detail of bay entry on west elevation. View to southeast.

Photo 0016. Detail of brick water table. View to northeast.

Photo 0017. Detail of ventilation pit. View to north.

Photo 0018. Detail of lightning arrestors. View to southeast.

Photo 0019. Detail of interior crane. View to the east.

Photo 0020. Detail of interior steel partition door. View to north.

Photo 0021. Interior of operator's office door. View to southeast.

Photo 0022. Detail of operator's office window with muntins. View to southwest.