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NPS Form 10-900
(Rev. 10-90)

OMB No. 1024-0018

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INTERAGENCY RESOURCES D
NATIONAL PARK SERVICE

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 How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. 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. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Twin City Rapid Transit Company Steam Power Plant
other names/site number Southeast Steam Plant

2. Location

street & number 12-20 Sixth Avenue Southeast not for publication N/A
city or town Minneapolis vicinity N/A
state Minnesota code MN county Hennepin code 053
zip code 55414

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, 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 ___ nationally ___ statewide X locally. (___ See continuation sheet for additional comments.)

Signature of certifying official Date 10/18/94

Ian R. Stewart
Deputy State Historic Preservation Officer, Minnesota Historical Society
State or Federal agency and bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria. (___ See continuation sheet for additional comments.)

Signature of commenting or other official Date

State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

V	entered in the National Register ___ See continuation sheet.	Edson H. Beall	11.25-94
____	determined eligible for the National Register ___ See continuation sheet.		
____	determined not eligible for the National Register		
____	removed from the National Register		
____	other (explain): _____	Entered in the National Register	
		Signature of Keeper	Date of Action

5. Classification

Ownership of Property (Check as many boxes as apply)

___ private
___ public-local
_X_ public-State
___ public-Federal

Category of Property (Check only one box)

___ building(s)
___ district
___ site
_X_ structure
___ object

Number of Resources within Property

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Number of contributing resources previously listed in the National Register 0

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.)

N/A

6. Function or Use

Historic Functions (Enter categories from instructions)
Cat: INDUSTRY/PROCESSING/EXTRACTION Sub: energy facility

Current Functions (Enter categories from instructions)
Cat: INDUSTRY/PROCESSING/EXTRACTION Sub: energy facility

7. Description

Architectural Classification (Enter categories from instructions)
Late Victorian: Renaissance Revival

Materials (Enter categories from instructions)
foundation STONE; CONCRETE
roof ASPHALT
walls BRICK; STONE (limestone)
other

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

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.

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

____ D Property has yielded, or is likely to yield information important in prehistory or history.

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

____ A owned by a religious institution or used for religious purposes.

____ B removed from its original location.

____ C a birthplace or a grave.

____ D a cemetery.

____ E a reconstructed building, object,or structure.

____ F a commemorative property.

____ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)
TRANSPORTATION

Period of Significance 1903-1944

Significant Dates 1903

Significant Person (Complete if Criterion B is marked above)

Cultural Affiliation N/A

Architect/Builder Architects/Engineers: Sargent and Lundy
Structural Engineers: Shankland, E.C. and R.M.
Contractor: Wunder, John

Narrative Statement of Significance (Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

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 # _____

Primary Location of Additional Data
_X_ State Historic Preservation Office
___ Other State agency
___ Federal agency
___ Local government
___ University
___ Other
Name of repository: Minnesota Historical Society

10. Geographical Data

Acreage of Property Approx. 2 acres

UTM References (Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	15	480360	4980630	3	__	_____	_____
2	__	_____	_____	4	__	_____	_____

___ See continuation sheet.

Verbal Boundary Description (Describe the boundaries of the property on a continuation sheet.)

Boundary Justification (Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Deanne Zibell Weber and Jeffrey A. Hess
organization Hess Roise
street & number 405 Cedar Avenue South, Suite 200
city or town Minneapolis state MN zip code 55454
telephone (612) 338-1987
date February 1994

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A USGS map (7.5 or 15 minute series) indicating the property's location.
A sketch map for historic districts and properties having large acreage or numerous resources.

Photographs

Representative black and white photographs of the property.

Additional items (Check with the SHPO or FPO for any additional items)

Property Owner

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

name _____

street & number _____ telephone _____

city or town _____ state ____ zip code _____

Description

The Twin City Rapid Transit Company Steam Power Plant is located on the north shore of the Mississippi River, about one-half mile upstream (west) of the Minneapolis campus of the University of Minnesota. The plant nestles at the base of a bluff on a narrow flat at the river's edge. Access to the top of the bluff is by way of a paved road that winds around the plant's east and north sides to connect with the foot of Sixth Avenue Southeast. When the plant first went into operation in 1903, it generated electrical power for the metropolitan street car system. At present, it produces steam heat for the University of Minnesota, which has owned the structure since 1976.

Although the Steam Power Plant has received several additions and remodelings since 1903, its original materials, massing, and detailing are still plainly evident. Rising from concrete foundations keyed into sandstone bedrock, the initial structure was a simple rectangular block, measuring 155 feet north-south, 255 feet east-west, and 68 feet in height (excluding two tall chimneys). Walls were masonry -- red brick on the east, north, and west sides, and a combination of red brick and gray limestone on the south side. Although the walls were technically bearing walls, they carried little but their own weight. Most of the plant's heavy equipment was supported by an interior steel frame.[1]

For the most part, architectural detailing is confined to the structure's south side, overlooking the river. Stylistically, this facade belongs to the Second Renaissance Revival, which was much in vogue for large public structures during the early twentieth century. As architectural historian John J.-G. Blumenson has noted, the Second Renaissance Revival commonly organized a facade "into distinct horizontal divisions by

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[1] This description of original construction is based on the following sources: photocopies of completion photographs, dated 1904-1906, provided by the plant's designer, Sargent and Lundy of Chicago, Illinois; a set of architectural plans stored in the steam plant, prepared by Sargent and Lundy, 1902-1904; Howard S. Knowlton, "Mechanical Features of the Twin City Rapid Transit Company's New Power Plant," Engineering Record 50 (10 December 1904): 692-698.

pronounced belt or stringcourses," with the various divisions often differing in materials, finish, and window treatment.[2]

The steam plant's south facade displays three horizontal bands. On the bottom is rock-faced ashlar limestone, capped by a bush-hammered stringcourse. This section of the wall contains twelve rectangular window openings and two doorways, one near each end. The middle, and widest, band is red brick. Surmounted by a denticulated brick stringcourse, it contains fourteen tall, round-headed window openings, accented by rowlock arches and oversized limestone keystones. The upper, and narrowest band, also is red brick. It displays twelve small, rectangular window openings beneath a corbelled cornice.

The plant's south facade still closely resembles its original construction. The most noticeable alteration is concrete-block infill in one arched window opening. A new red-brick parapet also crowns the original corbelled cornice -- an addition that probably occurred in the early 1980s, when the university completely rebuilt the roof.[3]

Other facades have been more extensively altered, but since most of the work occurred during the plant's period of significance (i.e., prior to 1944), the alterations are, for most part, valid expressions of the structure's historic character. Between 1905-1906, the plant's west facade received a one-story, concrete, flat-roofed, water-filtration plant, and between 1910-1912, the original brick smokestacks were replaced by four cylindrical, 281-foot-high, steel chimneys. Before 1916, the east facade was enlarged by a one-story, flat-roofed, brick shop addition, measuring approximately 130 feet north-south by 50 feet east-west. Also by 1916, the plant's east side contained a 330-foot-long, steel-girder railroad trestle and a series of open, concrete, coal bunkers, extending to the east about 220 feet. The trestle connected with an oversized, vehicle doorway at the south end of the plant's east facade, while the coal-storage facility

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[2] John J.-G. Blumenson, Identifying American Architecture (Nashville, TN: American Association for State and Local History, 1978), 41.

[3] See Helmick and Lutz, "Demolition Work -- Exist. Conveyor Floor and Building Roof," 1981, Drawing No. 663-14, Engineering Drawings for Southeast Steam Plant, 50 Shops Building, University of Minnesota.

abutted the north half of the shop addition. In 1932, an additional open, concrete coal bin was erected near the east end of the trestle. On the plant's north side, the first major alteration occurred in 1917, when an open concrete coal bin covered almost the entire length of the lower facade. At an undetermined date, most of this bin was demolished. The plant's north side presently contains pollution-control equipment housed in metal-clad cylindrical and rectangular forms.[4]

On the interior, the Steam Power Plant is longitudinally divided by an east-west, brick, fire wall into a boiler-room section on the north and a slightly smaller power-generating section on the south. Each section has a basement level and a main operating level, with the boiler room floors at a slightly higher elevation than the corresponding floors of the power-generating section. Both operating areas have an open interior plan -- rendered all the more open by the removal of most of the historic equipment. Although the boiler-room section once contained as many as 24 boilers, only four remain, two dating from the 1930s, and two from the 1940s. None of the major historic generating equipment survives. The Turbodyne steam-turbine generator currently on the generating floor was installed about 1980.[5]

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[4] On the additions, see J.S. Mahan, [Plan of] Twin City Rapid Transit Co. Central Power House, Minneapolis, Minn. (Chicago: Electrical Inspection Bureau, 1916), Russell L. Olson Papers, Minnesota Historical Society, St. Paul; Sargent and Lundy, "Plan of No. 5 Coal Storage Bin at Steam Station," 1917, Drawing No. 1-3414A, Engineering Drawings for Southeast Steam Plant, 50 Shops Building, University of Minnesota; Sargent and Lundy, "Coal Bunker 1932 Installation Plans," 1932, Drawings No. B9-B12, Engineering Drawings for Southeast Steam Plant, 50 Shops Building, University of Minnesota; Building Permits for Twin City Rapid Transit Company, No. B64612, 8 September 1905; No. B89782, 29 September 1910; No. B97414, 8 April 1912, Minneapolis Department of Inspections.

[5] Information on surviving equipment was obtained by the authors during an interview with the plant's manager, William Higdon, on 30 November 1993.

Summary of Significance

Under National Register Criterion A, in the area of transportation, the Twin City Rapid Transit Company Steam Power Plant in Minneapolis, Minnesota, is locally significant within the historical context of "Minneapolis Transportation." The applicable statewide historical context is "Urban Centers, 1870-1940."[6] Built in 1903, the Steam Power Plant served as the workhorse of the Twin City Rapid Transit Company power system, enabling the street railway company to operate as the major means of public transportation in Minneapolis and adjacent communities for four decades. The period of significance for the building is 1903 to 1944. The opening date marks the plant's date of construction; the closing date marks the 50-year cutoff period for significance.

Discussion of Significance

The roots of the Twin City Rapid Transit Company stretch back to the 1870s, when Minneapolis was establishing itself as an industrial center. Sensing profit, land developers pressed for a transportation system to link the downtown business district near St. Anthony Falls to the outer, residential areas of the city. Inadequate capital and engineering caused a number of streetcar companies to fail before lawyer and entrepreneur Thomas Lowry became interested in increasing the marketability of his outlying residential real estate. In 1875, Lowry reorganized and refinanced the original investors of the Minneapolis Street Railway Company, an organization which had gone bankrupt during the Panic of 1873. The newly invigorated company secured a franchise from the City of Minneapolis and began laying track on both sides of the Mississippi River from the University of Minnesota to the St. Paul and Pacific Railroad Depot at

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[6] For information on the local historical context, see Thomas R. Zahn and Associates, "Preservation Plan for the City of Minneapolis," prepared for the City of Minneapolis, 1990-1991, on file at the Minneapolis Heritage Preservation Commission, City Hall. For information on the statewide context, see "Preserving Minnesota," c. 1990, State Historic Preservation Office, Minnesota Historical Society, St. Paul, Minnesota.

Washington Avenue and Fourth Avenue North. The horse-drawn cars accepted their first passengers on 2 September 1875.[7]

The Minneapolis Street Railway Company encountered severe financial difficulties during its first decade of operation. The five-cent fare mandated by the city's franchise agreement did not generate enough revenue to make the company profitable, so that Lowry himself accrued large debts in expanding and improving the system.[8] But Lowry had to become creative to bankroll the most significant technological improvement: electrification. The company had already purchased the necessary equipment to convert from obsolete horse cars to cable cars when the first electric streetcars were introduced on the East Coast in the late 1880s. The Minneapolis Street Railway Company subsequently agreed to install "experimental" electric streetcar lines on some routes; all of the lines were fully electric by 1892. Lowry, who had since obtained controlling interest in both the Minneapolis and St. Paul street railway companies, could not afford to finance these improvements without large loans. In order to secure financial backing from Eastern creditors, he was forced to merge the two franchises to form the Twin City Rapid Transit Company (TCRT).[9]

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[7] Information about the early years of streetcar transportation in Minneapolis is conflicting at best; it appears that the first attempts at public transit were made soon after the close of the Civil War, but were abandoned soon thereafter. Russell L. Olson's book The Electric Railways of Minnesota (Hopkins, MN: Minnesota Transportation Museum, 1976), the best source for Twin City Rapid Transit Company history, lists six different accounts of early streetcar history (p. 12). For slightly different stories, see C.G. Goodrich, "Minneapolis Street Railway Company, History 1873-1909," series of 26 full-page newspaper advertisements in the Minneapolis Journal, 4 January-2 February 1909; David A. Lanegran and Ernest R. Sandeen, The Lake District of Minneapolis: A History of the Calhoun-Isles Community (St. Paul: Living Historical Museum, 1979), 19-23; and E.N. Tuckey, "An Historical Account of the Street Railways," c. 1898, 15-16, Manuscripts Collection of the Minnesota Historical Society, St. Paul.

[8] Lanegran and Sandeen, 22.

[9] Though sources list conflicting dates, Lowry assumed financial and managerial control of the Minneapolis Street Railway Company by 1878, and the Twin City Rapid Transit Company was incorporated in New Jersey on 3 June 1891. See Goodrich Lowry, Streetcar Man: Tom Lowry and the Twin City Rapid Transit Company (Minneapolis: Lerner Publications, 1979), 49, 110, 115; Olson, 14; "Evolution of an Urban Transit System," Minneapolis Journal, 26 November 1903,

Electrification not only required money -- it also demanded power.[10] In 1890, TCRT constructed an addition to their office/car house building located at Third Avenue North and Second Street North in Minneapolis to provide the first electricity to the lines. An auxiliary power plant was added to their station at 31st Street and Nicollet Avenue to serve the southern routes; a powerhouse in St. Paul furnished electricity to the St. Paul lines and to the interurban lines, including the popular recent addition between Lake Harriet in Minneapolis and Lake Como in St. Paul.

But these small steam stations were not enough to sustain the booming company, whose ridership was growing at the rate of 5.5 million passengers per year during the last decade of the nineteenth century.[11] Lowry had contemplated using waterpower to generate low-cost electricity for the street railway as early as 1890, when he joined with New York financier Henry Villard to advocate a dam on the Mississippi River, four miles downstream from St. Anthony Falls near Meeker Island.[12] About the same time the Meeker Island site was deemed unsuitable, engineer William De la Barre and wheat mogul Charles A. Pillsbury announced plans for their own waterpower development close to St. Anthony Falls. Their project became the Lower Falls Dam and Power Plant, the largest hydroelectric facility yet built in Minnesota with an

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Transportation Section, 11; Moody's Transportation Manual (New York: Moody's Investors Service, 1954); and Goodrich, "The Man Whose Faith Never Faltered," Minneapolis Journal, 20 January 1909.

[10] The following information is from Olson, 100-103.

[11] U.S. Department of Interior, Census Office, Report on Transportation Business in the U.S. at the Eleventh Census, 1890, vol. 14, pt. 1 (Washington, D.C.: Government Printing Office, 1895), 784; and U.S. Department of Commerce and Labor, Bureau of the Census, Special Reports: Street and Electric Railways 1902 (Washington, D.C.: Government Printing Office, 1905), 362.

[12] Meeker Island, now submerged, was located just north of the present Lake Street Bridge. It was part of a dam-building controversy between Minneapolis and St. Paul which lasted more than fifty years. See Raymond H. Merritt, Creativity, Conflict, and Controversy: A History of the St. Paul District U.S. Army Corps of Engineers (Washington, D.C.: Government Printing Office, 1979), 140-42. Unless otherwise noted, the information from the rest of the paragraph is from Lucille M. Kane, The Falls of St. Anthony: The Waterfall That Built Minneapolis (St. Paul: Minnesota Historical Society, 1966, reprint 1987), 153-54.

installed capacity of 7000 kilowatts (10,000 horsepower).[13] In 1896, TCRT signed a 40-year, sliding-scale lease for the power produced by the dam.[14] In 1897, when the Lower Dam Power Plant commenced operation, the streetcar company's three functioning steam plants were remodeled as substations, which converted the hydropower plant's alternating current (AC) into direct current (DC) used by the streetcars.

The Lower Dam was barely up and running when service problems began to plague the street railway company. One difficulty was the inability to correctly forecast the continually skyrocketing demand for electricity at the end of the nineteenth century and the resulting power shortages. The Lower Dam Power Plant, which had been hailed as "one of the greatest engineering feats of the present century," was simply not equipped to handle the ever-increasing load.[15] Moreover, unreliable water levels caused unpredictable interruptions in power, and the company admitted that "the power generated by the Tenth Avenue Dam is not, at all times, sufficient." Newspaper editorials were more critical, pointing to service interruptions and infrequent streetcars along busy routes despite the company's profitable year.[16]

Twin City Rapid Transit contemplated three possibilities to meet the need for improved additional power: (1) erect another dam and hydropower plant on the Mississippi; (2) improve the efficiency of the DC distribution system; or (3) add more steam plants.[17] The company realized that the most feasible and far-sighted of these plans was the construction of an additional steam plant,

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[13] Jeffrey A. Hess, "Hydroelectric Generating Facilities in Minnesota, 1881-1928," Multiple Property Documentation Form prepared for the State Historic Preservation Office, Minnesota Historical Society, St. Paul, October 1989.

[14] The lease provided for variable production, so for the first 6000 horsepower, the charge was $23 per year; for the next 3000 horsepower, the charge was an additional $10; and for any amount over 9000 horsepower, the power was free. See Kane, 154.

[15] Charles Pillsbury, quoted in Kane, 154.

[16] "Need of More Power," Minneapolis Journal, 22 January 1902, 7; "A Prosperous Street Railway," Minneapolis Journal, 9 April 1902, 4.

[17] "Need of More Power."

and obtained land from the St. Anthony Falls Water Power Company, the owner of the Lower Dam Power Plant. TCRT announced the new plant in early 1902 as part of a $1 million expansion that also included new cars, enlarged car houses, tunnel construction for the power wires, and substation construction. The earliest plans called for a facility with 3000 horsepower -- about one-third the capacity of the Lower Dam Power Plant. TCRT Vice President C.G. Goodrich indicated that work on the plant "would be pushed as rapidly as possible, the company having decided to take no more chances of trouble with the water supply."[18]

In December 1902, contractor John Wunder of Minneapolis began construction on the building, though on a scale much larger than preliminary plans had indicated.[19] Instead of a small plant, housing a total of 3000 horsepower as originally announced, the company built a 255- by 155-foot brick facility to hold three 3500 kilowatt generator units and 18 boilers, with room for 2 more generating units and 6 additional boilers. Ultimately, the Steam Power Plant was slated to have a rated capacity of 35,000 kilowatts.[20] The facility, named the Twin City Rapid Transit Company Steam Power Plant, was completed in December 1903.

For the design of the Steam Power Plant, TCRT secured the architectural and engineering services of the firm of Sargent and Lundy along with structural engineers Edward C. and Ralph M. Shankland, all of Chicago. Frederick Sargent and Ayres Lundy, who were the overall architects for the project, became partners in 1890, after Sargent had served as consulting engineer for the Edison Company in Boston. The firm became Chicago Edison's main consultant and designed their Harrison Street (1892) and Fisk Street (1903) power stations. The latter was projected to be the

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[18] "Big Plans for Street Cars," Minneapolis Journal, 24 January 1902, 1.

[19] "Greatest Power Plant in the Northwest," Minneapolis Journal, 8 August 1903, 11; Building Permits for the Twin City Rapid Transit Company, No. B53154, 30 September 1902; and B56091, 1 August 1903, Minneapolis Department of Inspections.

[20] "New Power Installation of the Twin City Rapid Transit Co.," Street Railway Review 14 (20 July 1904): 442.

largest steam turbine station in the world after completion, with 100,000 kilowatts of available power.[21]

Designed at about the same time, the Fisk Street Stations and the Twin City Rapid Transit Company Steam Power Plant incorporated a number of similar innovations in coal-handling and illumination.[22] To bring as much natural light into the TCRT plant as possible, Sargent and Lundy's design included skylights over the engine room and light shafts over the coal bunkers. The coal bunker arrangement was described as "a radical change from the usual scheme of overhead bunkers, which shut off all light from the firing room."[23] This arrangement also enabled the designers to eliminate tie rods inside the bunkers, which had a tendency to deteriorate rapidly and obstruct the passage of coal.[24] Unfortunately, these innovative features no longer survive. Over the course of the plant's operation, all of the original boilers and most of the interior, coal-handling apparatus were removed, while roof rebuilding in the early 1980s apparently claimed the boiler-room light shafts.

Despite its large appearance, Sargent and Lundy designed a compact facility to minimize the area required to generate electricity. The process of transforming coal to power started near the northeastern corner of the building, away from the river. Coal was delivered by railcar and dumped into 2800-ton

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[21] Sargent was one of the first to advocate the use of the steam turbine in electric powerhouses, greatly reducing the cost of production. See "Frederick Sargent", New York Times, 27 July 1919, 22; "Sargent, Frederick," Dictionary of American Biography (New York: Charles Scribner's Sons, 1937), 359; The Sargent and Lundy Story (Chicago: The Company, 1967; revised and reprinted 1987); Forrest McDonald, Insull (Chicago: University of Chicago Press), passim; and Harold L. Platt, The Electric City: Energy and the Growth of the Chicago Area, 1880-1930 (Chicago: University of Chicago Press, 1991), passim. For information on the Shanklands, see Frank A. Randall, History of Chicago Building (Urbana: University of Illinois Press, 1949), 23; and Carl W. Condit, Chicago 1910-29: Building Planning, and Urban Technology (Chicago: University of Chicago Press, 1973), passim. For information on the Fisk Street Station, see J.C. Thorpe, "A 100,000-Kilowatt Steam-Turbine Station," Power 26 (December 1906): 715-728.

[22] For a discussion of Sargent's design innovations, see Thorpe, 727.

[23] "New Power Installation of the Twin City Rapid Transit Co.," 445.

[24] Knowlton, 692.

capacity bunkers. Coal crushers and conveyors, working at a rate of 75 tons an hour, then delivered the coal to the boilers, performing at 200 lbs. pressure and 120 degrees Fahrenheit superheat. The resulting steam energy powered three Allis-Chalmers vertical cross-compound condensing engines direct connected to General Electric flywheel generators. The three-phase, alternating current was generated at 2300 volts and 35 cycles, but was stepped up to 13,200 volts for delivery to the substations.[25]

The Steam Power Plant's 35-cycle frequency was unusual for the early twentieth-century electrical industry, since most power plants of the period generated electricity at either 25 cycles (for street railway systems) or 60 cycles (for general electrical distribution). The anomaly originated in the design of the Lower Dam Power Plant. During the early years of street railway electrification, 35-cycle engines were thought to be more suitable for transportation purposes, and thus the Lower Dam was installed with this frequency. Since the steam plant would be operated in multiple with the Lower Dam and serve as the main distributor of power for the whole system, it was necessary for the two plants to function at the same frequency. In 1916, the Steam Power Plant was the only large powerhouse in the country to use 35-cycle generation.[26]

The Steam Power Plant delivered its first electricity in December 1903, and for a while, it functioned as an auxiliary source of power to supplement the Lower Dam Power Plant when water at the dam was low. This was the role for which the steam plant had been originally outfitted. As one early description noted, "The Twin City Rapid Transit company [sic] will be ready to fall back on its big, new steam power station at the Tenth Avenue S bridge,

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[25] Contemporary descriptions of the plant are given in "Evolution of an Urban Transit System"; "New Power Installation of the Twin City Rapid Transit Co.," Street Railway Review 14 (20 July 1904): 441-51; Knowlton; "Steam Power Station, Twin City Rapid Transit Company, Minneapolis Minn.," Proceedings of the American Institutes of Electrical Engineers 26 (February 1907): 3-12; and "The Steam Power Station of the Twin City Rapid Transit Company, Minneapolis," Street Railway Journal 30 (27 July 1907): 122-27.

[26] Thomas Wilson, "Twin-City Power Plants," Power 44 (5 September 1916): 332-39.

whenever emergency or unusual business demands it." Other articles also indicated the plant would "reinforce" the Lower Dam or function as a supplemental source of energy.[27]

Instead of remaining an auxiliary power source, however, the steam plant soon was generating the bulk of the system's electricity. The shift occurred shortly after a 1905 fire at the Lower Dam Power Plant knocked out power to streetcars in both Minneapolis and St. Paul, interrupting the legislative session and forcing the University of Minnesota to reschedule many final exams. The newspaper reported that "the big new steam powerhouse near by was not connected so as to take the entire load."[28]

Repairs on the Lower Dam Power Plant and the failure of this "auxiliary" system persuaded the Company to reconfigure its power distribution arrangement; later that same year, newspaper and journals were referring to the steam plant as the "main powerhouse."[29] In the three years following the fire, load records indicate that the power plant supplied about half of the net kilowatt hours produced systemwide.[30] By 1909, TCRT Vice President Goodrich formally declared a complete reversal of the plant's original role: "This Central Power Plant generates by steam most of the power used by the Company and is in continuous operation, being supplemented only by the water power plant at

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[27] See "Putting in Engines," Minneapolis Journal, 30 November 1903, 7. Other descriptions echo these comments: C.G. Goodrich, then TCRT's general manager, referred to the plant as the "new auxiliary power-house" in "River Power Restored," Minneapolis Journal, 13 May 1902, 7; see also "Greatest Power Plant in the Northwest" and "Evolution of an Urban Transit System."

[28] "Mad Multitudes Had to Hoof It," Minneapolis Journal, 19 January 1905, 1.

[29] "Blinding Lights are Dangerous," Minneapolis Journal, 21 November 1905, 7.

[30] For load records, see "The Steam Power Station of the Twin City Rapid Transit Company, Minneapolis," Street Railway Journal 30 (27 July 1907): 122; "Power Generating System and Records of the Twin City Rapid Transit Company," Electric Railway Journal 33 (5 June 1909): 1026.

the lower dam and the latest water power development at the Upper Dam on Hennepin Island."[31]

TCRT had planned to expand the Steam Power Plant almost from the very beginning. As Goodrich wrote in an advertisement some years later, "In deciding to build and equip this power plant, the Company's engineers carefully considered and agreed upon a plan for a complete and comprehensive steam power generating plant . . . which would provide ample power for any possible immediate demands of the cars then operated as well as ample space in which to grow."[32] A fourth engine, identical to the first three, was ordered in 1904 and installed in April 1906.[33] The power now available from the steam plant prompted the addition of new lines and the expansion of existing routes, including the Lake Minnetonka line, and the Minnehaha Falls-Fort Snelling line, both completed in 1905.[34] A third interurban line, the Selby-Lake crosstown route, was added in 1906. The company also expanded "suburban" service when it purchased routes to Robbinsdale and St. Louis Park.[35] The plant itself also grew; capacity was nearly doubled to 24,000 kilowatts with the addition of two steam turbine engines and six boilers in 1907. To accommodate the extra energy that was produced, the existing smokestacks were replaced by four larger stacks between 1910 and 1912.[36]

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[31] C.G. Goodrich, "Power Houses," Minneapolis Journal, 22 January 1909. The Hennepin Island Power Plant was built in 1908 and functioned only when surplus water was available; Hess, E5, E7. The plant's entire output was leased by TCRT until 1954.

[32] Goodrich, "Power Houses."

[33] Olson, 105.

[34] The "Old Motor Line" was a steam-engine-run train which previously ran out to Excelsior, etc. but new track had to be laid to accommodate the electric streetcars. See Goodrich, "The Old Motor Line," Minneapolis Journal, 9 and 10 January 1909.

[35] Goodrich, "12 Years' Growth and Development," Minneapolis Journal, 18 January 1909.

[36] A filter plant was also added in 1906 to remove impurities from the water; it is no longer functioning. See "The Steam Power Station of the Twin City Rapid Transit Company," 124-25; and Building Permit Nos. B64612, B89782 and B97414, located at the Department of Building Inspections, City of Minneapolis.

Technological advances and engine difficulties prompted the complete replacement of all four reciprocating (piston) engines during the 1910s. Despite the fact that their design for the Fisk Street Station in Chicago employed only steam turbines, Sargent and Lundy designed the TCRT plant for the largest reciprocating engines then available. Steam turbine technology was in its infancy when the TCRT plant was designed, and grew by leaps and bounds only after the Fisk Street Station steam turbines proved to be more efficient than reciprocating engines. Replacement also became necessary because the superheated boilers used in connection with reciprocating engines (as in the TCRT plant) were prone to numerous problems. In a letter describing superheated steam in a number of large electric power plants, Frederick Sargent wrote, "The engines in this plant [i.e., TCRT] have given a great deal of trouble on account of superheat. The valves have cut badly, warped and cracked, steam chests have warped and cracked and cylinders have cut and scored. The engines are now gradually being replaced by steam turbines."[37] Between 1911 and 1917, the company installed turbines ranging in capacity from 14,000 to 20,000 kilowatts apiece, giving the steam plant a total capacity of 74,000 kilowatts.[38]

The 1920s were the golden years for the Twin City Rapid Transit Company. Ridership reached a peak in 1922 with 226 million passengers.[39] To meet the Steam Power Plant's annual coal requirement of 165,000 tons, TCRT bought its own coal mine in Illinois.[40] Including lines to Stillwater, White Bear Lake, and

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[37] Frederick Sargent to Captain John R. Edwards, U.S.N, 16 September 1910, in archives of Sargent and Lundy, Chicago, Illinois, 3.

[38] Olson, 106. By 1916, the Steam Power Plant had 28 boilers producing steam for the generators. See F.W. Cappelen, Report on the Value of the Properties of the Minneapolis Street Railway Company As of January 1, 1916, vol. 1 (Minneapolis: Syndicate Printing Co., 1916), 643.

[39] Lowry, 156.

[40] Olson, 112.

Lake Minnetonka, the company had a force of 1021 streetcars, operating on 530 miles of track.[41]

The dual effects of depression and drought in the 1930s triggered a financial decline from which TCRT would never recover. The drought rendered the company's hydropower plants nearly useless except for a couple of months in the spring; the resulting strain on the steam plant prompted the company to replace a number of boilers and rebuild almost all of their engines. In 1936 and 1937, the worst two years of the drought, the steam plant's production averaged 75% of the net kilowatt hours generated.[42]

Wartime restrictions on automobiles briefly reversed the downturn in traffic during the Depression, so that the number of passengers nearly doubled from 104,313,619 in 1940 to 201,527,022 in 1946.[43] The end of the drought also meant that the contribution of the hydropower plants rose dramatically within this time frame.[44] Twin City Rapid Transit had expected enough post-war travel to warrant refinancing their mortgage in 1944 to purchase a new 15,000 kilowatt turbine-generator unit. But the lofty projections did not hold up, and the number of passengers dropped steadily after 1946.[45]

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[41] Stephen A. Kieffer, Transit and the Twins (Minneapolis: Twin City Rapid Transit Company, 1958), 35; "Twin City Rapid Transit Company, Minneapolis-St. Paul" (Minneapolis: [The Company], 1927), 10-12.

[42] Olson, 106. Statistics for 1936 through 1943 are from yearly summary tables entitled "Twin City Rapid Transit Company, Monthly Power Statistics," located at the Southeast Steam Plant.

[43] Kieffer, 53.

[44] In the years between 1941 and 1944, the steam plant averaged 42.3% of the load, while the Lower Dam Plant and the Hennepin Island Plant produced 31.3% and 26.4%, respectively; see "Twin City Rapid Transit Company, Monthly Power Statistics."

[45] The new generator replaced two small 5000 KW units installed in 1907 that were no longer functioning; see W.C. Gilman and Company, "Report on Twin City Rapid Transit Company," c. 1944, in possession of Russell L. Olson, Minneapolis. For passenger statistics, see Twin City Rapid Transit Company, Annual Report of the Twin City Rapid Transit Company and Subsidiary Companies, 1949 (N.p., 1950), 1, 3.

In 1949, New York financier Charles Green, angry about the lack of dividends and the direction of the company, assumed control of TCRT and gutted the company by cutting unprofitable routes, retiring old streetcars, and laying off nearly 800 people.[46] Another power struggle, as well as a federal investigation into Green's reputed underworld connections, led to new management once again in 1950. The new officers decided that a full-scale conversion to buses was the only way the company would become profitable.[47] Within four years, the transformation was complete; in celebration, company management set fire to the last streetcars that ran on the tracks.[48]

With the changeover to buses, Twin City Rapid Transit Company no longer needed its power facilities. The firm gave up leases to the Lower Dam and Hennepin Island power plants, and then sold their unnecessary steam plant to Northern States Power Company (NSP) in 1953 for $1.3 million. NSP took over the plant in 1954, renamed it the Southeast Steam Plant, and immediately rebuilt some of the engines, converting two from coal-fired to oil-fired and standardizing the frequency from 35 cycles to 60 cycles.[49]

NSP operated the facility until oil prices jumped in the 1970s. In 1976, NSP sold the plant to the University of Minnesota, which wanted to provide steam heat to its buildings. The University removed much of the early equipment, converted the remaining oil burners back to coal, and installed a new steam turbine in preparation for an electrical co-generating project sponsored by the U.S. Department of Energy that was scheduled to begin in

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[46] Tom Mega, "Mass Transportation in Minneapolis/St. Paul," in A Guide to the Industrial Archeology of the Twin Cities, ed. Nicholas Westbrook (St. Paul: Society for Industrial Archeology, 1983), 100; Kieffer, 45.

[47] On Green's unsavory business dealings, see Gordon Schendel, "How Mobsters Grabbed a City's Transit Line," Collier's 128 (29 September 1951): 30-31, 72-74, 76, 78.

[48] Monroe P. Killy, Twin Cities Tour, Cine'o Corp., 1955, videocassette, located in the Audio-Visual Collection, Minnesota Historical Society, St. Paul.

[49] See Kane, 174; Building Permit No. N25303; Herbert W.E. Meyer, Builders--Of Northern States Power (Minneapolis: The Company, 1957), 95; Scott Anfinson, "Twin City Rapid Transit Steam Plant," TMs, 10 August 1992, prepared for the State Historic Preservation Office, Minnesota Historical Society, St. Paul, [2].

1983.[50] However, the new turbine proved incompatible with the overall system and electrical generation was abandoned in the late 1980s. At present, the plant is purely a steam-heating facility.[51]

For almost a century, the four smokestacks of the Twin City Rapid Transit Company Steam Power Plant have towered over the Mississippi riverfront near downtown Minneapolis. During this period, the riverfront has gradually changed from an industrial zone intent on only its own production to a recreational area concerned with the preservation and interpretation of its historic resources. As one of the most prominent industrial artifact's of the city's transportation history, the steam power plant makes a vital contribution to the modern landscape.

[50] Ann Ingebrigtson, "Southeast Steam Plant Comes to Life Again," Southeast, October 1982, 8.

[51] Anfinson.

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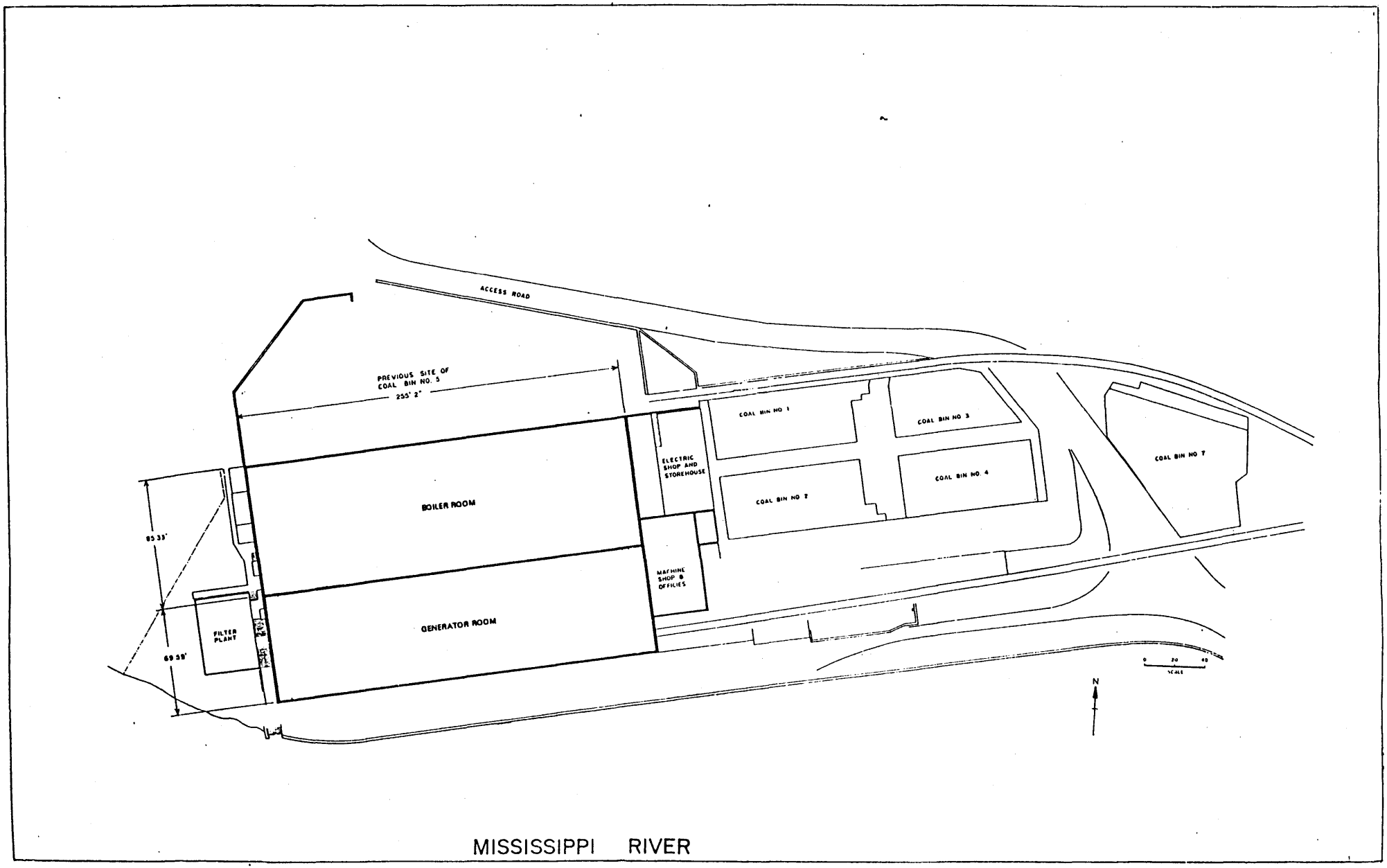
Verbal Boundary Description

Beginning at a point where the southeasterly right-of-way line of Sixth Avenue Southeast intersects with the southerly right-of-way line of the Burlington Northern Railway; thence proceeding easterly and southeasterly along said southerly right-of way line of the Burlington Northern Railway until the point of intersection with the east boundary line of the Northeast 1/4 of Section 23, Township 29 North, Range 24 West; thence turning due south and proceeding southward on a straight line along said east boundary line of Northeast 1/4 of Section 23 for a distance of 120 feet; thence turning at a right angle due west and proceeding westward on a straight line for a distance of 480 feet; thence turning at a right angle due south and proceeding southward in a straight line for a distance of 15 feet; thence turning at a right angle due west and proceeding westward on a straight line until the point of intersection with the Harbor Line per Corps of Engineers Map of Mississippi River; then progressing along said harbor line in an northwesterly direction until the point of intersection with the southeasterly right-of-way line of Sixth Avenue Southeast; thence proceeding northeasterly along said southeasterly right-of-way line Of Sixth Avenue Southeast until returning to the point of origin. The entire parcel is located in Lot 14, Auditor's Subdivision No. 44, City of Minneapolis.

Boundary Justification

The boundary encloses the historic resource known as the Twin City Rapid Transit Company Steam Power Plant.



SITE PLAN OF TWIN CITY RAPID TRANSIT COMPANY STEAM POWER PLANT

(Source: Engineering Drawings, 50 Shops Building, University of Minnesota, 1977)