NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

**United States Department of the Interior**
National Park Service

# National Register of Historic Places Continuation Sheet

Section number _____ Page _____

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 93001453 Date Listed: 1/10/94

Soo Line Locomotive 2719 | Eau Claire | WI
Property Name | County | State

N/A
Multiple Name

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This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

Signature of the Keeper — Date of Action: 10/26/94

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Amended Items in Nomination:

Boundary Description:

The second sentence of the Verbal Boundary Description is revised to read: Boundaries of the nominated property are determined by the chain-link fence that surrounds the resource, enclosing an area approximately 120′ x 40′ centered on the locomotive.

This information was confirmed with James Draeger of the WI SHPO.

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DISTRIBUTION:
National Register property file
Nominating Authority (without nomination attachment)

PS Form 10-900
(Rev. 8/86)
Wisconsin Word Processor Format (1331D)
Approved 3/87

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 of eligibility for individual properties or districts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets. (Form 10-900a). Type all entries. Use letter quality printer in 12 pitch, using an 85 space line and a 10 space left margin. Use only archival paper (20 pound, acid free paper with a 2% alkaline reserve.

1. Name of Property
historic name Soo Line Locomotive 2719
other names/site number N/A

2 Location:
Street & number: Carson Park N/A Not for Publication
city, town: Eau Claire N/A vicinity
state: Wisconsin code WI county Eau Claire code 35 zip code 54703

3 Classification

| Ownership of property | Category of Property | No. of Resources within Property | |
|---|---|---|---|
| | | contributing | noncontributing |
| ___private | ___building(s) | _____ | ____ buildings |
| _X_public-local | ___district | _____ | ____ sites |
| ___public-State | ___site | __1__ | _____structures |
| ___public - Federal | __1__structure | _____ | _____objects |
| | ___object | __1__ | __0__Total |

Name of related multiple property listing:
N/A

No. of contributing resources previously listed in the National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation ct of 1966, 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. ___See continuation sheet.

17 NOV 1993

Signature of certifying official — Date

State Historic Preservation Officer-WI

State or Federal agency and bureau

In my opinion, the property ___meets ___does not meet the National Register criteria. ___See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

✓ entered in the National Register. ___See continuation sheet — Beth Boland — 1/10/94

___determined eligible for the National Register. ___See continuation sheet

___determined not eligible for the National Register.

___removed from the National Register.

___other, (explain:)_____

Signature of the Keeper — Date

6. Functions or Use

| Historic Functions (enter categories from instructions) | Current Functions (enter categories from instructions) |
|---|---|
| TRANSPORTATION/rail-related | VACANT/not in use |
| | |
| | |
| | |

7. Description

| Architectural Classification (enter categories from instructions) | Materials (enter categories from instructions) |
|---|---|
| | foundation N/A |
| Other: steam locomotive | walls N/A |
| | |
| | roof N/A |
| | other metal |
| | wood |

Describe present and historic physical appearance.

x See continuation sheet

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties: _____nationally _____statewide __x__locally

Applicable National Register Criteria ____A ____B __X__C ____D

Criteria Considerations (Exceptions) ____A __x__B ____C ____D ____E ____F ____G

| Areas of Significance (enter categories from instructions) | Period of Significance | Significant Dates |
|---|---|---|
| Engineering | 1923 | N/A |

Cultural Affiliation
N/A

Significant Person
N/A

Architectural/Builder
American Locomotive Company, builder

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

__x__See continuation sheet

9. Major Bibliographical References

Previous documentation on file (NPS): ___x___ See continuation sheet

___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
Specify repository:
_____

10. Geographical Data

Acreage of property less than one

UTM References

| | Zone | Easting | Northing | | Zone | Easting | Northing |
|---|---|---|---|---|---|---|---|
| A | 1/5 | 6/1/6/9/9/9 | 4/9/6/2/3/4/0 | B | / | / / / / / | / / / / / / |
| C | / | / / / / / | / / / / / / | D | / | / / / / / | / / / / / / |

Verbal Boundary Description

The locomotive permanently located on a 100' of track within a rectangular chain link fence at Carson Park, Eau Claire, Wisconsin. Boundaries of the nominated property are determined by the chain-link fence which surrounds the resource.

Boundary Justification

The boundary as defined by the chain-link fences includes the engine and tender that comprise steam locomotive 2719, its track, and the land currently occupied by the resource.

11. Form Prepared By

name/title Rebecca Sample Bernstein

organization for the City of Eau Claire date May 1, 1992

street & number 309 Norris Court telephone 608 251-4615

city or town Madison state WI zip code 53703

## Description

Soo Line Locomotive 2719 is a 4-6-2 Pacific built in 1923 by the American Locomotive Company in Schenectady, New York. It was constructed for the Minneapolis, St. Paul & Sault Ste. Marie Railroad (Soo Line), which classified it as H-23. 2719 has a 4-6-2 wheel alignment. The numbers represent the sequence of pilot, driving, and trailing wheel arrangement.

The diameter of the drive wheels (drivers) is 75 inches. The total weight of the engine and tender light (empty) is 319,900 pounds. The engine alone weighs 281,080 pounds. Total engine and tender weight (full) is 497,080 pounds, with a tractive effort (hauling power) of 36,833 pounds. Its coal-fired boiler generates a pressure of 200 pounds per square inch. The boiler is equipped with 203 2" diameter boiler tubes through which the hot gasses pass. The boiler also has 32 flues with 5 3/8" diameter tubes. Locomotive 2719 has two steel and cast iron 25 x 26 cylinders (diameter x stroke in inches). Pistons 14" in diameter are actuated by Walschaert valve gears which allows steam to enter and exit the cylinders. The tender has a capacity of 12,000 gallons of water and a coal capacity of 17 1/2 tons.[1] The locomotive was re-equipped with a larger tender (at an unknown date) At the same time, the cab was equipped with an automatic stoker.[2]

The cab retains almost all of its original instruments and controls. These include valves, gauges, brakes, throttle, and whistle and bell cords.[3] It also retains the firebox, windows on each side of the front wall of the cab for the engineer and fireman, and seats of wood and leather construction. There are two sets of sliding windows in the cab which is open at the back with no doors. Alterations include a replaced cab board above a window and a more modern cast disk driver which replaced the original spoke center driver. The tender is not original to this locomotive

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[1]Diagram of Steam Locomotive 2719, housed at Iconograpy Archives, State Historical Society of Wisconsin, 618 State Street, Madison, Wisconsin.

[2]David Peterson, Eau Claire, Wisconsin, conversation with the author.

[3]Some delicate instruments have been removed and placed in storage in the building adjacent to the locomotive to protect them from vandals.

The locomotive is painted in a black and silver color scheme. The body of the engine was repainted in September, 1990 by the Chippewa Valley Railroad Association. The white "SOO" logo/motif was masked, not repainted, and is original to the engine.[4]

The engine and tender were moved to Carson Park between February 8 and February 13, 1960 following their donation to the City of Eau Claire by the Soo Line Railroad.[5] Overlooking the city of Eau Claire and the Chippewa River, Carson Park is a forested pleasure park on a peninsula surrounded by Half Moon Lake. The engine and tender rest on a length of track adjacent to the main road through the park. The location is historically important to the Eau Claire lumber industry, which caused the development of the region and both necessitated and was fueled by the development of the Soo Line Railroad. The Soo Line and engine 2719 are intimately associated with the northwoods region. The wooded hilltop setting is not dissimilar in feeling to the terrain historically traveled by 2719. Consequently, the placement of 2719 at Carson Park does not adversely affect its integrity of location, feeling, association or setting. The engineering integrity and that of materials, workmanship and design have not been altered.

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[4]David Peterson, Eau Claire, Wisconsin, telephone conversation with the author.

[5]"Old 2719", pp. 8-9; letter from G.A. MacNamara, Soo Line president, to D.G. Weiford, City Manager, Eau Claire dated 14 April, 1959.

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**Statement of Significance**

Soo Line Engine 2719, constructed by the Schenectady Works of the American Locomotive Company in 1923, is significant under Criterion C with statewide significance as a representative example of railroad engineering. It is one of only eight 4-6-2 Pacifics remaining in Wisconsin; the Soo Line originally had sixty such locomotives. #2719 pulled passenger trains, as did most of the Pacifics nationally. It had a productive life of thirty-two years, logging approximately four million miles. The period of significance is 1923, the year of construction.

## Historical Background

The Railroad

The Soo Line began as the Minneapolis, Sault Ste. Marie & Atlantic Railway which was incorporated in September of 1883. Construction of the road began in April, 1884, at Cameron, Wisconsin. A total of forty-six miles, east to Bruce, and west to Turtle Lake, was completed that year. By 1887, the line reached Sault Ste. Marie, and the line used Chicago & Northwestern (C&NW) track between Minneapolis and Turtle Lake. Unlike other heavily subsidized railroad companies, the Minneapolis, Sault Ste. Marie & Atlantic was not a land grant railroad. The new route east from Minneapolis-St. Paul was sought after by millers of the upper mid-west who had been subject to the high rates of the Chicago rail lines. The Canadian Pacific Railway, the Duluth, South Shore and Atlantic Railroad, and the Minneapolis, Sault Ste. Marie & Atlantic completed the International Bridge at Sault Saint Marie in December, 1887. At this point, the northwest had an all-rail route to the east without passing through Chicago.[6]

After 1868 mergers were frequent.[7] The Minneapolis, Sault Ste. Marie & Atlantic Railway consolidated with the Minneapolis & Pacific Railway, the Minneapolis & St. Croix Railway, and the Aberdeen, Bismark & North Western Railway to form the Minneapolis, Saint Paul, and Sault Ste. Marie Railway Company (Soo Line) in 1888. The company then held 737 miles of road. After consolidation, the company grew rapidly, adding over 700 miles by 1912. In 1909, the Soo Line leased the Wisconsin Central, which added another 1,000 miles between Chicago, Minneapolis-St. Paul, Duluth, and Ashland, as well as through the important industrial area of the Fox River in Wisconsin. Additional railroads were purchased between 1888 and 1915 - the Rice Lake, Dallas & Menomonie; the Bismark, Washburn & Great Falls; the Wisconsin & Northern, the Fairmount and Veblen; and the Minnesota Northwestern Electric Railway. Following financial troubles and eventual bankruptcy at the end of the Great Depression, a new corporation dubbed The Minneapolis, St. Paul and Sault Ste. Marie Railroad Company emerged in 1944. The trade name "Soo Line Railroad" was officially adopted in 1950 for all but legal

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[6]Leslie V. Suprey, Steam Trains of the Soo. (Fortuna, California: Soo Publishers, 1012 Holly Lane, 1962.) pp.10-11.

[7]Barbara Wyatt, Cultural Resource Management in Wisconsin: Vol. 2 (Historic Preservation Division, State Historical Society of Wisconsin, 1986) Transportation, pp. 6-1 - 6-2.

documents. In January, 1961, the Soo Line was consolidated with the Wisconsin Central Railroad and the Duluth, South Shore & Atlantic Railroad (which had been partially and wholly owned, respectively, by the Canadian Pacific Railway) keeping the moniker Soo Line Railroad.[8]

Soo Line passenger service blossomed between 1900 and the Great Depression. Due to this success the Pacific locomotives were ordered from the American Locomotive Company. The Pacifics were popular nationally for passenger service, as they could achieve and maintain the high speeds necessary for successful passenger routes. The drive wheel diameter on a Pacific is seventy-five inches, compared with forty-eight inches on a typical freight engine. The drive wheel with a larger diameter would cover more track with one revolution than one with a smaller diameter. The smaller diameter drive wheel could produce the higher hauling strength needed for the heavily loaded freight trains.

By 1930, passenger patronage began to drop. The Depression and competition from private automobiles were felt sharply by the Soo Line. The Soo attempted to reduce passenger fares, but were not allowed to by the Interstate Commerce Commission. A number of schedule re-arrangements and car remodelings were made in an effort to revive the passenger trade. The Soo Line continued to provide quality passenger service until the late 1960s and the arrival of Amtrak and nationalized passenger service.[9]

The Soo Line purchased their first diesel locomotives in 1938, and three more in 1939. It was not, however, until a decade passed that diesel was used for passenger service.[10] By 1955, dieselization was complete, and steam engines ran only for rail-fan excursions.[11] #2719 was officially retired in 1955, but was

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[8]Suprey, p. 12.

[9]Patrick Dorin, The Soo Line (Seattle, Washington: Superior Publishing Co. 1979), pp. 70-97.

[10]Dorin, p. 44.

[11]"Railroad Now Completely Dieselized" The Soo-Liner. Published by the Minneapolis, St. Paul and Sault Ste. Marie Railroad. Vol. 6, No. 1, January-February-March, 1955, p. 3.

revived for a trip from Minneapolis to Ladysmith on June 21, 1959, and thus made the last run of any Soo Line steam locomotive.[12]

The Locomotive Company

The American Locomotive Company was the nation's largest manufacturer of railroad steam locomotives. Starting in Schenectady, New York, as the Schenectady Locomotive Engine Manufactory, in 1848, it produced the fifteen ton "Lightning". "Lightning", having 84" drivers, was designed for unprecedented high speeds. Unfortunately, the "Lighting" was too advanced and ruined the road bed.[13]

The company grew by acquiring a number of independent locomotive builders, such as Brooks in Dunkirk, New York, Rojers in Paterson, New Jersey, and several others. After reorganization as the Schenectady Locomotive Works and financial troubles crowned by the panic of 1857, the company correctly speculated that any locomotives they made would be purchased by the United States Government as the Civil War started. Later, the company produced the "Jupiter #60" which was the first locomotive to travel the Central Pacific and Union Pacific Railroads when they met at Promontory Point, Utah, in 1869. This solidified the company's future despite setbacks encountered later.[14]

Albert J. Pitkin, who had previously worked for Baldwin Locomotives and Rhode Island Locomotive Works was hired by Schenectady in the 1880s. He designed the cross-compound engine which saved coal and water by the use of a cylinder system. By the turn-of-the-century, the company (by this time using the name American Locomotive Company [ALCO]) was producing 417 locomotives a year. In 1917, the newly formed Forbes magazine listed ALCO as number 61 of the top 100 businesses in the country. After a streamlining effort in the 1920s, ALCO began production

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[12]The Soo Liner Vol.11, No. 2, April-May-June, 1960 (Minneapolis, Minnesota: published by the Soo Line Railroad) pp. 8-9; Dorin, p. 27.

[13]The Bulletin. National Railway Historical Society. 1972, Vol. 37, No. 5, p. 26; O.M. Kerr, Illustrated Treasury of the American Locomotive Company. (New York: W.W. Norton & Company, 1990), p. 8.

[14]Kerr, p. 8; The Bulletin. Vol. 37, No. 5, p. 26.

of its first diesel-electric locomotives in 1926. They produced their last steam locomotive in 1948 for the Pittsburgh and Lake Erie Railroad.[15]

In the late 1940s, the company converted its production to diesel-electric locomotives and became known as Alco Products, Inc. Later it became Alco Engines as a subsidiary of the White Motor Corporation. Early in 1977 the company was sold to General Electric Company Ltd. of England and is now known as Alco Power, Inc, located in Auburn, New York.[16]

Soo Line Pacific type locomotives

Locomotive 2719 is a class H-23 steam locomotive, built by the Schenectady works of Alco. It was one of a series of Pacifics ordered by the Soo Line in 1909, 1914, and 1923. Classing was done by the railroad, not the builder, to differentiate locomotive types within a numbered series. The series number identified a particular type of locomotive wheel arrangement (700s and 2700s were all 4-6-2 Pacifics). The railroad numbered the locomotive 2719, while the builder's number is 64314.[17]

The Soo and the Wisconsin Central owned eight different sub-classes of Pacifics. Four of the sub-classes, H, H-1, H-2, and H-3 were given 700 numbers (from 700 to 737), while the other four, H-20, H-21, H-22, H-23 were given 2700 numbers (from 2700 to 2723). In general, the 700 series were all Soo Line locomotives, and the 2700 series was designated for the Wisconsin Central. An exception, however, was the H-23 class of the 2700 series (2718 to 2723), which were owned by the Soo Line. Engine 2719 is one of these exceptions.[18]

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[15]Kerr, pp. 10-14.

[16]The Bulletin. 1977, Vol. 42, No. 4, p. 41.

[17]Conrad, J. David Steam Locomotive Directory of North America. (Polo, Illinois: Transportation Trails, 1988.) p. 155.

[18]Patrick Dorin, The Soo Line (Seattle, Washington: Superior Publishing Co. 1979), p. 32; "Power on the Soo Line and Effort to Improve Efficiency" The Soo-Liner. Published by the Minneapolis, St. Paul and Sault Ste. Marie Railroad. Vol. 1, No. 1, May 1950, p.8.

2719 has a 4-6-2 wheel alignment. The numbers represent the sequence of pilot, driving, and trailing wheel arrangement, a common approach to railroad technology call the Whyte system. The reason why 4-6-2 engines are called "Pacifics" is unclear. The name arose because 1) they were made in 1901 by Baldwin Locomotives for New Zealand Railways on an island in the Pacific, or 2) because another large group was made in 1903 by American Locomotive Company for the Missouri Pacific or 3) because it was an improvement over the 4-4-2 type called Atlantic.[19]

Soo Line Pacifics pulled passenger trains throughout the Soo Line system. The major line was between Chicago and Minneapolis/St. Paul. The Soo also served northern Wisconsin, and the Upper Peninsula of Michigan. Over its active service of thirty-two years, locomotive 2719 pulled many different trains on all routes of the Soo.

There are fifty-seven Pacifics still in existence in the United States. They are in a wide variety of classifications and were owned by twenty-seven different railroad companies. These locomotives represent a lost era of transportation and have survived in numbers not reflective of their once great prominence. Of sixty Pacifics once functioning on the Soo system, only eight survive.

Seven Soo and Wisconsin Central Pacific Locomotives have been donated for exhibit at local parks. Of the 700 series, engine 730 is in Gladstone, Michigan; 735 is in Minot, North Dakota; and 736 is in Appleton, Wisconsin. They are all class H-3 locomotives. Class H-21 engine 2713 and Class H-22 engine 2714 are in Stevens Point and Fond du Lac, Wisconsin, respectively. Of the Class H-23 2700 series that was owned by the Soo, only two remain, this resource and engine 2718 at the railroad museum in Green Bay Wisconsin. All other Soo Line and Wisconsin Central Pacifics were cut into scrap metal.[20]

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[19]Gordon Chappell, Steam over Scranton: The Locomotives of Steamtown. (Special History Study, Steamtown National Historic Site, United States Department of the Interior, National Park Service, 1991), p. 37.

[20]Wallace W. Abbey, The Little Jewel: Soo Line Railroad Companyand the Locomotives that make it go. (Pueblo, Colorado: Pinon Productions, 1984) p. 61; List of Steam Locomotives in the United States. (Denver: Centennial Rail, Ltd., 1986).

## Engineering

Steam Locomotive Engineering Historic Overview

Locomotive transportation began in the late 1820s with the development of a small wood-fired steam engine in Great Britain. As the industrial revolution swept Great Britain, Europe and the United States, the steam locomotive powered the movement of the new industrialists and their machine-made products. Early steam locomotives were inexpensive, practical machines, particularly in the United States. Simple designs and cheap materials, especially cast iron, kept costs low. Even known improvements on steam engine designs were not always incorporated into new, more complex designs because locomotive manufacturers were skeptical that their clients wouldn't see, and therefore wouldn't appreciate and pay for, them. The basic 1829 design has been continually refined, but never radically altered.[21]

In the United States in the 1830s, the original heavy boilers were reduced in weight by using thinner iron sheets and more power was achieved by using higher steam pressure. American builders developed a new flexible running gear consisting of the truck, equalizing lever, and bar frame which resulted in a light smooth-riding 4-2-0 wheel arrangement (two pairs of leading truck wheels, one pair of drive wheels, no trailing truck) and soon distinguished American Locomotives from British ones. The suspension of the lead truck guides the engine around curves which reduces wear on the main wheels (drivers).[22]

The light 4-2-0, however, was surpassed by the 4-4-0 in 1837, because an additional pair of drivers provided the necessary increased traction to keep the engine on the rails. Engineering improvements using the 4-4-0 wheel arrangement during the 1840s included lengthening the boiler and consequently the locomotive's wheel base. The awkward 1840s 4-4-0 locomotive was improved upon in the 1850s with the addition of the spread truck, level cylinders, wagon-top boiler and link motion. The resulting engine had a graceful, balanced design, which was soon ornamented with non-essential decoration. In the late 1850s,

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[21]John H. White. American Locomotives; An Engineering History 1830-1880. 1968, p. 443-445.

[22]Ibid; conversation with Dave Paterson.

steam was created by burning coal rather than wood.[23]

In the 1860s, steel became the building material of choice and coal-fired engines became the norm. New wheel arrangements, the 2-6-0 and the 2-8-0, were introduced although not generally adopted. During the 1870s and 1880s, the 4-4-0 was put to use on passenger-only trains since it was no longer deemed powerful enough to haul freight trains. By the 1890s, however, steam locomotives with new wheel arrangements accommodating larger boilers and fireboxes for more power and speed were preferred to the 4-4-0 on passenger lines as well.[24]

As passenger locomotives evolved, they retained the four-wheel lead truck which provided security rounding curves. The newly-introduced trailing truck added another segment to the locomotive design (from a 4-4-0 to a 4-4-2, for instance) and accommodated a larger, heavier firebox. The 4-4-2 (Atlantic type) was designed for high speed passenger service in 1895. It was an improvement on both the 2-4-2 (Columbia type) and the 4-4-0. The 4-6-2 (Pacific type) was one step advanced from the Atlantic with three pairs of large drive wheels instead of two, smaller ones, a larger boiler and firebox, and a resulting increase in steam capacity and a greater tractive force. Engines with smaller diameter drivers were used for slower freight trains which needed power rather than speed. In addition, the firebox and cab were relocated from above the drivers to above the trailing truck. Powerful speed soon made the 4-6-2 the industry standard for passenger train locomotives, as evidenced by the large number constructed in the early decades of the 1900s and by the ubiquitous implementation on passenger trains nationwide.[25]

The 4-6-2 was first built by G.E. Strong in 1856 and used on the Lehigh Valley Railroad. It was not used again until Baldwin Locomotive Works constructed a series of locomotives in 1901 for use in New Zealand, and then in 1903 by the American Locomotive Company for use by the Missouri Pacific. The 4-6-2 was used

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[23]Ibid.

[24]Ibid.

[25]Roy V. Wright, editor. Locomotive Cyclopedia of American Practice. New York, New York: Simmons-Boardman Publishing Corporation. 1947, p. 103; Dave Paterson, conversation with author.

extensively in passenger and fast freight service due to its powerful, high speed capabilities. Although ubsequently, additional wheel arrangements were developed beyond the 4-6-2, starting with the 4-6-4 (Hudson type), and going as far a the 2-10-0 (Decapod) and 2-10-4 (Texas type), the 4-6-2 remained popular for decades, as evidenced by its continued construction from 1901 through the 1930s.[26]

Other engineering aspects of 2719 are unrelated to its wheel arrangement, other than its ability to carry larger steam-creating engines, boiler, and firebox because of its increased width. The boiler/steam engine combination is what powered the locomotive. The basic design of the locomotive was developed in Great Britain in the early decades of the nineteenth century and was well established by 1830. The boiler design had a separate firebox and smokebox. Small diameter tubes passed through the boiler shell connecting the fire- and smokeboxes. Early fireboxes were deep and narrow to accommodate an ample supply of wood.[27]

American boiler plates were about half as thick as British plates, even though they could accommodate a higher boiler pressure. Although larger boilers would have complement the power-driving cylinders, and provided increased speed, any extra weight of locomotives was restricted by the weak tracks oaf early American railroads, and boilers remained at a maximum diameter of 48 inches. Until 1850, there were two primary types of boilers used in the United States - the Stephenson boiler, favored because of its simplicity, and the Bury boiler, favored for its generous steam room. In about 1850, the wagon-top boiler combining best aspects of both, was introduced and became the favorite.[28]

Early boilers were constructed of fault-ridden wrought iron, but in the 1860s and 70s, the new steel alloy was quickly utilized for steam boilers. It was not, however, until the new material was perfected and reduced in price, that it was universally accepted for use in boilers. Boiler tubes were constructed of copper or iron until about 1900 when steel was generally used. Reheating ("superheating") steam was recognized as an advantageous over regular steam as

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[26]Ibid.

[27]White, pp. 93-100.

[28]Ibid.

early as the 1830s and 40s, but was not perfected and widely used until about 1910. Superheating reduced total fuel and water supplies needed and raised steam temperature, creating more horsepower.[29]

These engineering technologies were utilized until the demise of steam-powered locomotives and the industry's total conversion to deisel power.

2719 Engineering

2719 was coal fired and originally fuel was hand-shoveled by the fireman into the firebox. The locomotive was re-equipped with a larger tender (at an unknown date) which supplied more fuel to facilitate hauling more cars at longer distances. The tender came from a 4-8-2 locomotive after the 4-8-2 received a new larger tender. At the same time, the cab was equipped with an automatic stoker.[30] While the coal box in the first tender sloped toward the cab so that coal was always available to the fireman, the coal box in the larger tender slopes down on three sides to the center of the tender to an auger (larger horizontal screw) which carries the coal under the floor boards of the cab to the automatic stoker. The automatic stoker blows the coal into the firebox to burn.[31]

The total weight of the engine and tender light (empty) is 319,900 pounds. The engine alone weighs 281,080 pounds. The tender light is 81,000 pounds. In working order, the engine weighs 281,080 pounds and the tender weighs 216,000 pounds when on the line. The locomotive is heavier when on the road because of the additional weight of the water and coal necessary to make the steam to propel the engine.[32]

The diameter of the drive wheels (drivers) is 75 inches. The drivers (three pairs of wheels in the center of the engine) are powered by the driving rod which goes to the center driver from the pistons and the main rod which connects the

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[29]Ibid.

[30]David Peterson, Eau Claire, Wisconsin, conversation with the author.

[31]David Peterson, Eau Claire, Wisconsin, conversation with the author.

[32]Diagram of Steam Locomotive 2719.

three drivers on each side of the locomotive. The wheels of the lead truck (two pair in front of the drivers) and the trailing truck (a single pair behind the drivers) are not powered. The weight on the drivers is 172,400 pounds, with a tractive effort of 36,833 pounds. Power of a locomotive is described as tractive power and indicates the amount of power transferred to the rail by the drive wheels.[33]

A steam locomotive derives its movement from two steam engines, one on each side of the locomotive. Steam is emitted to one side or the other of a piston within a cylinder and allowed to expand as it cools. As the steam expands, it moves the piston, the motion of which is transmitted to the drive rods. On locomotive 2719 the boiler pressure is 200 pounds per square inch. Locomotive 2719 has two steel and cast iron 25 x 26 cylinders (diameter x stroke in inches). Pistons 14" in diameter are actuated by Walschaert valve gears which allows steam to enter and exit the cylinders.

Steam is created within the boiler. Fuel is fed into the firebox where the fuel burns and creates gases which are further burned in flues which pass from the firebox through the length of the boiler to the smokebox, then up the stack as exhaust. This boiler is equipped with 203 2" diameter boiler tubes through which the hot gasses pass. Steam generated in the boiler pass from the boiler proper through the throttle to superheater tubes which pass through superheater flues, then to the cylinders. 2719 has 32 3/8" superheater flues.

The tender on 2719 has a capacity of 12,000 gallons of water and a coal capacity of 17 1/2 tons.[34]

The Soo Line maintained their locomotives for as long as possible. Rather than buying new engines, the company used replacement parts manufactured at larger railroad center roundhouses such as Stevens Point, Wisconsin and Gladstone, Michigan.[35] Consequently, 2719 may have replacement parts that are not detailed

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[33]Diagram of Steam Locomotive 2719.

[34]Diagram of Steam Locomotive 2719.

[35]Dorin, p. 67; Donald Buckmeister, Gladstone, Michigan, telephone conversation with the author.

here, but which would not affect the integrity of the engine and which were standard for locomotives throughout the Soo system. A more modern cast disk driver has replaced the original spoke center driver. These changes are indicative of the length of time the locomotive was used, and do not affect the overall engineering significance of the locomotive.

Statement of Significance

Soo Line Steam Locomotive is significant for its engineering which provided fast comfortable passenger service as rail travel increased and passenger cars became heavier after 1900. The 4-6-2 wheel arrangement increased effeciency in making curves by removing stress on the drivers and placing it on the lead truck and increased speed by adding tractive power with the addition of two drivers. The large 75" diameter drive wheels covered more track per revolution than the earlier smaller diameter drivers. And finally, the superheated boiler system reduced fuel and water requirements while increasing horsepower because of greater steam temperature. The 4-6-2 was the most advanced passenger engine of its period, quickly becoming the industry standard. Its popularity is evidenced by the large number constructed by a wide variety of locomotive works and the ubiquitous nationwide use of the 4-6-2. These engineering advancements contributed to expeditious movement of passengers between Chicago and Minneapolis, and throughout the Soo system. Soo Line Steam Locomotive 2719 embodies the distinctive characteristics of this advanced engineering in its 4-6-2 wheel arrangement, its 75" diameter drive wheels, and its superheated boiler system. The period of significance is 1923, the year of construction.

Criteria Consideration B

Soo Line Locomotive 2719 is an exception to Criteria Consideration B because its significant engineering qualities, namely its wheel arrangement, wheel diameter, speed potential, and superheated boiler, are not affected by being moved away from a rail line location.

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**Photographs**

1. Soo Line Locomotive 2719
Carson Park
Eau Claire, Eau Claire County, Wisconsin
October, 1991
View from the Northeast showing the locomotive and context.

2. Soo Line Locomotive 2719
Carson Park
Eau Claire, Eau Claire County Wisconsin
October, 1991
View from the Northeast showing the locomotive engine detail.