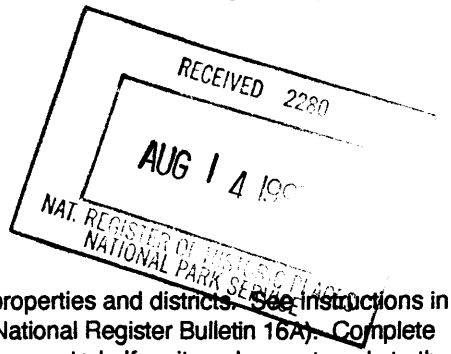
NPS Form 10-900
(January 1992)

OMB No. 10024-0018

1141



United States Department of 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 an 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 Plummer Mine Headframe

other names/site number n/a

2. Location

street & number End of dirt road 1/4 mi west of junction of Plummer Mine Road and State Trunk Highway 77 N/A not for publication

city or town Town of Pence N/A vicinity

state Wisconsin code WI county Iron code 051 zip code 54534

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 ___ nationally X statewide ____ locally. (____See continuation sheet for additional comments.)

Aug 6, 1997

Signature of certifying official/Title Date

STATE HISTORIC PRESERVATION OFFICER- WI

State or Federal agency and bureau

Plummer Mine Headframe
Name of Property

Iron / Wisconsin
County and State

In my opinion, the property ___meets ___does not meet the National Register criteria.
(___See continuation sheet for additional comments.)

Signature of certifying official/Title

Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

✓ entered in the National Register.
___See continuation sheet.

___determined eligible for the National Register.
___See continuation sheet.

___determined not eligible for the National Register.
___See continuation sheet.

___removed from the National Register.

___other, (explain:)

Signature of the Keeper: Beth Boland

Date of Action: 9/24/97

Plummer Mine Headframe
Name of Property

Iron / Wisconsin
County and State

5. Classification

Ownership of Property within Property
(check as many boxes as apply)

___ private
_X_ public-local
___ public-state
___ public-federal

Category of Property
(Check only one box)

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

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

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

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

n/a

Number of contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions
(Enter categories from instructions)

INDUSTRY/EXTRACTION: extractive facility

Current Functions
(Enter categories from instructions)

RECREATION AND CULTURE: outdoor recreation

7. Description

Architectural Classification
(Enter categories from instructions)

OTHER: Mine headframe

Materials
(Enter categories from instructions)

foundation Concrete
walls N/A
roof N/A
other METAL

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

Plummer Mine Headframe
Name of Property

Iron / Wisconsin
County and State

8. Statement of Significance

Applicable National Register Criteria

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

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

__**B** Property is associated with the lives of persons significant in our past.

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

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

Criteria Considerations

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

__**A** owned by a religious institution or used for religious purposes.

__**B** removed from its original location.

__**C** a birthplace or grave.

__**D** a cemetery.

__**E** a reconstructed building, object, or structure.

__**F** a commemorative property.

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

Areas of Significance

(Enter categories from instructions)

INDUSTRY
ENGINEERING

Period of Significance

1908-1932

Significant Dates

N/A

Significant Person

(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

N/A

Architect/Builder

Unknown

Narrative Statement of Significance

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

Plummer Mine Headframe
Name of Property

Iron / Wisconsin
County and State

9. Major Bibliographic References

Bibliography

(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
X Other
Name of repository:
Iron County Historical Society

10. Geographical Data

Acreage of Property 12.57 acres.

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

1.	/1/5/	/7/0/8/1/5/0/	/5/1/4/2/6/0/0/	3.	/ / /	/ / / / / / /	/ / / / / / / /
	Zone	Easting	Northing		Zone	Easting	Northing
2.	/ / /	/ / / / / / /	/ / / / / / / /	4.	/ / /	/ / / / / / /	/ / / / / / / /
	Zone	Easting	Northing		Zone	Easting	Northing

__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 Della G. Rucker
organization Rucker Historical Research date March 5, 1996
street & number P.O. Box 204 telephone 414/432-7044
city or town Green Bay state WI zip code 54305-0204

Plummer Mine Headframe
Name of Property

Iron / Wisconsin
County and State

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 SHPO or FPO.)

name Town of Pence, Iron County. Town Chairperson: Earl Brackett
street & number 1021 State Highway 77 telephone 715/561-2966
city or town Pence state WI zip code 54550

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects, (1024-0018), Washington, DC 20503.

I. Introduction

The Plummer Mine Headframe is a riveted steel truss structure approximately 80 feet tall. The headframe's east- and west-facing sides[1] form a right triangle shape, with a hypotenuse at approximately a 60 degree angle; the north-facing side follows this angle and terminates at its lower end several feet above the former mine shaft's location. The structure's general triangular form is truncated at the upper angle and is surmounted by two large sheave wheels within a boxlike rectangular frame. With the exception of one remnant wooden beam located on the east-facing side, the entire structure consists of steel I-beams and smaller braces, most of the few wooden parts having been previously removed or decayed. The headframe is the only structure remaining of a moderate sized iron mining complex which operated briefly during the early 20th century. It is adjoined by a small ore stockpile to the east and by ruined foundations of mining complex buildings to the south.

Built in ca. 1908, the Plummer Mine Headframe is located in Section 6 in the Town of Pence. It faces an access road that roughly parallels Highway 77; the structure is less than one-quarter mile from the northerly juncture of Plummer Road and Highway 77. The headframe and stockpile are located in a small clearing surrounded by second-growth woods, and is located between two unincorporated communities: Pence to the northeast and Iron Belt to the southwest. Although the structure has undergone some minor alterations, primarily due to scavenging attempts and the decay of its minor wooden members, the Plummer Mine Headframe is substantially intact and displays an exceptional level of integrity.

II. Physical Context

The Plummer Mine Headframe is located about four miles southwest of Hurley, the Iron County seat and the county's largest community. The headframe is approximately one and one-half mile southwest of the unincorporated community of Pence, and approximately one and one-half mile northeast of the unincorporated community of Iron Belt. These communities are linked by Highway 77, which also passes the Plummer property. Historically, the Plummer was one of several area mines which employed residents of these communities during the early 1900s. All of these mine sites, including the Plummer, are located on the Gogebic Iron Range, which stretches from Mellen to the west and south, at a distance of approximately 20 miles from the Plummer headframe, to Wakefield in Michigan's Upper Peninsula, also at a distance of approximately 20 miles from the headframe. The Plummer mine was one of the westernmost on the Gogebic Range, in an area that was in later years regarded as not profitable for mining.

The headframe itself is located in a small clearing which, while easily accessible from Plummer road, is not readily visible from Highway 77 due to a screen of trees and brush. The headframe has no adjoining structures or objects, with the exception of a remnant ore stockpile located approximately 150 feet to its east. The

[1] The headframe faces directly toward Plummer Road, which runs parallel to the Gogebic Range formation. As a result, the headframe's north face is oriented approximately to the north-northeast. In the interest of simplicity, directional references will refer to the closest cardinal direction, with the understanding that the actual compass direction differs slightly in the manner described.

mining structures, homes. and other buildings which were located around the mine, as well as the trestle and rail tracks, were removed or demolished after the mine's final closing in 1932. A smokestack from the mine's engine house was demolished in the late 1940s.[2] Although some concrete and stone foundations remain from these buildings, they are located in the woods to the south of the structure and are not visible from the headframe.

III General features

In general, the headframe demonstrates exceptional integrity. The upper portions of the structure tend to be entirely intact, while the lower portions show some minor evidence of scavenging, wood decay and other alterations. Although the structure functioned as a whole, when viewed from the east or west it divides visually into two parts: the lower half of the structure, which consists of rectangular trusses arranged two-over-two and contains the tipple; and the upper portion, which consists of trapezoidal, lightly-braced trusses surmounted by short horizontal I-beams, which support the sheave wheels structure.

The headframe is oriented along a roughly north-south axis, with the inclined side of the structure pointing north. It is constructed almost exclusively of steel I-beams and bars of varying widths; many of the horizontal components consist of two closely-spaced parallel bars joined by a series of short parallel rungs. The structure stands on 14 I-beam posts, two at the rear or south and two rows of six each in the midsection; these rest below the surface on concrete pilings. The east, west and south sides of the structure stand vertically, while the north side is inclined at an approximately 60 degree angle. The north side of the structure does not terminate in concrete pilings as described; instead, it terminates several feet above a depression in the ground about 15 feet in diameter. This depression marks the entry to the mine shaft, which was also inclined at a 60 degree angle. The shaft, like many mines of its period had three compartments, from east to west[3] . The easternmost compartment contained elevator-like passenger cars, known as cages; the middle compartment served for timbers and other large mining equipment; the smaller compartment on the western end contained a series of ladders for use in emergencies. During use, the headframe's inclined face would have been tied to the shaft's collar, which is no longer extant. Due to safety concerns, the mine shaft was filled in 1980.[4]

The headframe is crowned by two spoked wheels, both about six feet in diameter; these are evenly spaced and aligned parallel with the headframe's north-south orientation. The sheave wheels functioned like pulleys providing leverage to raise and lower miners, ore and equipment on cables which ran from the engine house to the south over the sheave wheels and into the mine shaft. The sheave wheels are visually intact, although presumably immobile due to disuse. The lines of the sides of the headframe extend above the wheels' axes a distance of about eight feet and terminate in four horizontal I-beams, creating a boxlike frame structure surrounding the wheels. Each side of this frame is braced with a single, thin diagonal brace, with the exception of the top, which has two crossing braces, and the north-facing side, which has none.

2 Undated photograph in "Plummer" file, collection of the Iron County Historical Society.

3 Photograph in "Plummer" file, collection of the Iron County Historical Society.

4 "Range Mining Symbol Set for Demolition." Iron County Miner, 07 Jan 1981.

This frame is surmounted by a three-sided rectangular structure consisting of three horizontal I-beams. The southernmost beam of this structure extends beyond the headframe and may have provided a brace for the cables, which no longer exist.

The 12 legs in the midsection of the headframe's base also support the tipple, or the chute that funneled ore from the carts coming out of the mine into the railroad cars waiting under the rear of the headframe. The tipple consists of six diagonal I-beams, set at a 45 degree angle and extending toward the rear of the structure, each of which is braced by a king post truss and a modified queen post truss underneath the diagonal. These I-beams supported an inclined wood floor, when in use; this planking has either been removed or disintegrated since the mine's closing. The ore carts, commonly called skips, traveled on rails which extend up the incline past the tipple's highest point. Three large. solid steel triangles with rounded corners are suspended from the tracks over the tipple and mark the point where the skips were overturned into the tipple.

IV:East/West Sides:

Although differing in some details, the two trapezoidal sides of the headframe are in most respects mirror images of each other. As previously described, the lower portion of each side consists of four rectangular bays arranged in a two-over-two pattern, with the lower two being about two-thirds the height of the upper two. Each side's upper front bay,adjoining the inclined side of the headframe, provides a frame for the tipple, which has been previously described. All four upper bays have two slender diagonal cross-braces and one similar brace bisecting the bay horizontally; these are joined at the center with a rectangular steel plate. On the west side of the structure, the bay adjoining the tipple supports a narrow suspended stairway, which begins near the base of the tipple, continues along the inclined face of the structure, and terminates next to the sheave wheels. There is a small landing adjoining the northwest corner of the structure near the tipple. The platform floor and all but the uppermost rungs of the stairway are missing; these were also wood and were removed or decayed. This stairway does not appear in the earliest known photograph of the headframe, dated 1908; it may have been added during one of the mine's two periods of use.

The lower bays on each side have different bracing systems, reflecting their differing purposes. The upper beam of the bay below the tipple on the east side has a square timber bolted to its outer side; this timber may have been part of the tipple structure, although its purpose is not clear. It is the only timber remaining on the structure, and, although substantially intact, it is bowed and splintered.

The lower bays adjoining the north-facing side under the tipple have substantial steel bars arranged in diagonal cross-braces. There appears to have been one pair of cross-braces on each of the six sets of I-beam posts supporting the tipple, but the braces on the third set from the east are missing. The reason for this variance is not clear, but there is no obvious sign of its removal. Three of the five pairs of braces, which are the most accessible from the ground of the headframe's smaller members, have experienced some vandalism, as portions of the braces have apparently been cut off. The overriding structure, however, appear to be undamaged, and none of the braces that have been damaged has lost more than one of its four legs. The lower rear bays on both sides have no cross-bracing; rail cars passed through these bays on a set of tracks underneath the head

frame for immediate loading. Both of these bays, however, have two curved corner braces at their upper rear corners. These curved braces are repeated on each on the adjoining interior posts, where they frame a set of three plate-metal chutes that funneled ore from the tipple into the rail cars.

The upper three trapezoidal sections on each side have progressively simpler cross-bracing from the lower to the upper, reflecting the lesser stresses on these upper reaches. The lowest of these bays each have two diagonal cross-braces and a bisecting horizontal brace, but one of the lower legs, which one would expect to link the center of the bracing system to the bay's lower front corner, is missing from both sides. Because both are missing at a height which would not be easily reached by scavengers, and because these chords adjoin the triangular stops that overturned the skips into the tipple, it is assumed that these braces were designed and built in this manner. Each of the four upper bays has a simple pair of light diagonal cross-braces, and the upper chords are surmounted by the I-beams supporting the sheave wheels, as described previously.

V. South-facing (rear) side:
The south-facing side of the headframe tapers slightly from its base to the sheave wheels, and stands perpendicular or nearly perpendicular to the earth. The rear of the structure backs up closely against the surrounding woods, and is thus difficult to view or photograph. This side has five bays, arranged vertically. The lower two bays, roughly corresponding to the lower portions of the east and west sides, each have two diagonal cross-braces and a horizontal bisecting brace; each of these braces consists of two parallel bars joined by a series of flat rectangular crossbars. The lower of these two sections is slightly taller than its counterparts on the east and west sides, but the upper is correspondingly shorter, so that its upper beam adjoins that of the upper bays of both sides. The middle chord of this side has no cross-bracing, apparently dues to its proximity to the tipple; the top one-quarter of its height, however, consists of two elaborate sets of Pratt-style trusses linking two pairs of narrow horizontal beams. The upper two chords are braced in the same manner as the lowest two, with the exception of lacking the horizontal bisecting brace. All of the braces across the south-facing side of the headframe consist of the ladder-like structures described above.

VI North-facing (front) side:
The most visible side of the headframe is dominated by two sets of rail tracks, the lower portions of which are suspended over the mine shaft as previously described. The lower reaches of the rails have been removed, but the I-beams that supported them still indicate their position. Each pair of tracks has a corresponding pair of guide rails, which have also been truncated. The upper portion of the incline, from immediately above the tipple to the sheave wheels, is mounted on the southern posts of the sides' upper three bays, as described previously, but the lower section of the incline is suspended from the lower bays on two sets of horizontal braces.

VII Conclusion:
Although the Plummer Mine Headframe has undergone the decay of some of its minor members and has been subject to limited scavenging, the structure is overwhelmingly intact and maintains an exceptional level of integrity. The few alterations that have occurred have not detracted from the viewer's ability to understand the structure and its use, and have not diminished its historic significance or its visual impact.

I. Introduction:

The Plummer Mine Headframe is eligible for the National Register of Historic Places as a result of its local significance under National Register Criterion A due to its association with the history and development of the Gogebic Range iron mining industry. The Plummer Mine Headframe is also eligible for the National Register of Historic Places due to its statewide significance under Criterion C as the last extant mining headframe in Wisconsin, as well as for its local significance under Criterion C an excellent early example of period developments in mining technology. Beyond its functional purposes, a headframe marks the location of a shaft mine, indicating a given mine's location and relative importance and providing the definitive visual symbol of a mining district's economic base and identity. The Plummer Headframe has been documented as the last remaining headframe of any type in Wisconsin, and as such continues to serve as the region's, as well as the state's, most immediate visual symbol of its mining heritage. The Plummer Headframe's design reflects a shaft mining method used for a limited time period on the Gogebic Range, while its construction represents an early stage in the development of steel headframe construction . Located on Wisconsin's most historically productive iron mining range, the Plummer headframe is an important surviving link with a historic Wisconsin industry and the source of the region's development and embodies significant developments in mining technology.

II. Historical Background:

Prior to the development of commercial iron ore mining in the region beginning in the late 1880s, the Gogebic Iron Range area was nearly uninhabited. Approximately 80 miles long and less than 1/4 mile wide, this geologically-defined area (sometimes known in Wisconsin as the Penokee Range) stretches from Lake Gogebic in Michigan's Upper Peninsula to Lake Namekagon, about 20 miles south of Ashland, Wisconsin. The productive portion of the range, however, was commonly understood to consist of a 20-mile section, extending from the Castile Mine one and one-half miles east of Wakefield, Michigan, to the Atlantic Mine immediately sound of the Plummer site.[5] This range's unusual dimensions stem from the orientation of the iron-bearing rock formations, which are inclined approximately 60 degrees from horizontal. Although the larger geographic portion of the range lies on the Wisconsin side of the border, the vast majority of ore recovered over its 85-year mining history came from the Michigan section of the formation. Gogebic ores differ from those of many other major U.S. iron mining regions in that they usually consist of soft hematites, a type of ore that is high in iron content and often the consistency of sand or coarse gravel. In the case of the Gogebic Range, the ores boasted an average of 61% iron content, near average for hematites but higher than most commercially-mined ores today.[6] These ore characteristics determined the economic desirability of the Range, as well as the technologies employed; both sets of variables fluctuated considerably over time and between mining locations. During its productive lifetime the Gogebic Range shipped over 325 million tons, ranking it third overall in iron ore production from the Lake Superior Mining Region. This region also includes the Cuyuna, Vermilion and Mesabi Ranges in Minnesota; the Marquette range lying primarily in Michigan's Upper Peninsula, and several smaller ranges in Minnesota and Ontario.

5 "The Gogebic Range," Proceedings of the Lake Superior Mining Institute (Lake Superior Mining Institute: Ishpeming, Mich.), 1910, p. 10.

6 *ibid*, p. 11.

Although explorers reported finding evidence of iron ore as early as the 1847,[7] the Gogebic Range attracted little commercial attention until the 1880s. As national demand for iron increased in the last quarter of the 19th century, due to improvements in steel refining technology and swelling demand for steel consumer goods, hematite became a highly desirable type of ore. Hematite's high iron content made smelting easier, and made it possible to ship such ores directly from mines to steel mills without expensive concentrating and beneficiation. Following explorations on both sides of the Wisconsin-Michigan border, the first commercial mining on the Gogebic Range began near modern Bessemer, Michigan in 1884. The first Wisconsin mine, known as the Germania and located within the modern Hurley city limits, made its first shipments to the new ore docks in Ashland in 1885. By this time, seven mines were operating on the Michigan side of the Gogebic Range,[8] and by 1887 over 40 named mines were in operation on the Wisconsin side of the range. Most of these operations consisted of shallow hand-drilled shafts under independent ownership.[9] Few of these mines survived the collapse of the highly speculative ore market in 1887, and most were either acquired by eastern steel companies or allowed to disappear.

The years between 1890 and 1910 saw steady growth in Gogebic Range mining under the ownership of large steel producers, including such giants as Oglebay-Norton, U.S. Steel and Republic Steel. Thanks to the investment capability and expanded markets available to these companies, technology and methodology advanced swiftly, spurred on by concurrent national improvements in locomotion, construction materials and mining technology. Following continued growth and consolidation during the 1920s, almost all of the Gogebic Range's mines halted production during the early years of the Great Depression, resulting in massive layoffs in Iron County's largest employers. Although most of the large mines rebounded during and immediately following World War II, and reached peak production between 1946 and 1956, by 1960 it was widely realized that Gogebic Range mining would not continue for long.[10] The last two Wisconsin Gogebic Range mines, the Montreal and the Cary, closed in 1962 and 1964, ending 82 years of mining on the Range.

The decline of mining on the Gogebic Range did not result from the exhaustion of the area's ores, although individuals mines often closed when insufficient ore could be found at that site. Instead, the fate of the Gogebic Range mines stemmed from developments in mining methods and processing technologies, which made it possible to profitably mine places that had previously been unexploitable. Gogebic Range iron ores tend to lie in irregular, isolated bodies located several hundred to several thousand feet under the surface. Unlike the Vermilion and Mesabi Ranges in Minnesota, strip-mining was never a feasible option for most Gogebic Range mines. The area's geography resulted instead in deep shaft mines, of which the Plummer mine was a typical example. Gogebic shaft mines ranged from several hundred to over 4,000 feet deep,

7 Catherine Techtmann, Rooted in Resources, (New Past Press: Friendship, Wisc) 1993, p. 22.

8 Lake Superior Iron Ores, (Lake Superior Iron Ore Association: Cleveland, Ohio), 1938, p. 19.

9 Techtmann, *ibid*,. p.23.

10 Paul Lusigian, "Industry: Iron and Copper Mining." Barbara Wyatt, Ed., Cultural Resources Management in Wisconsin, Vol. 2.,(State Historical Society of Wisconsin: Madison, Wisc.), 1986. p. 4-4.

depending on the location of the ore bodies and the extent of the mining activity pursued. Deep-shaft mines require sophisticated drilling, hauling, transport and ventilation equipment and thus are highly capital-intensive, a factor which also contributed to the historic trend toward consolidation of ownership. For most successful Gogebic Range mines, however, the added costs of extraction were offset by the high iron content of the ores recovered, which could be more efficiently shipped to and smelted by early steel mills than ores with lower iron contents.

This economic balance was upset by the advent of mechanized earth-moving equipment, which made it possible to efficiently mine the wide, shallow ore beds of the Minnesota ranges and was increasingly employed following its first use on the Vermilion Range in 1888.[11] During the early 1900s, the development of on-site benefication plants allowed the Minnesota mines to remove silicates and other impurities from ores with lower iron contents, resulting in ores whose iron contents were high enough to support the additional processing and shipping. With the exception of one Upper Peninsula mine, neither strip-mining nor benefication plants made an appearance on the Gogebic Range (the Plymouth Mine near Wakefield was able to be strip-mined because of a local geographic anomaly[12]). Thus, as technologies evolved, the economic disadvantages of deep-shaft mining began to outweigh the advantages of high-quality ores, and the steel corporations tended increasingly to find it more cost-effective to support large-scale strip mining and benefication of ores with lower iron contents. Although the Plummer mine was closed because of its own meager yields, it was a typical example of the general shaft mining methods that defined the Gogebic Range.

Although the Wisconsin portions of the Gogebic and, to a lesser extent, the Marquette Iron Ranges produced the majority of the state's historic iron production, Wisconsin's iron mining industry never approached the scope and impact of that of Michigan and Minnesota. In 1900, Wisconsin contributed 2.9% of the Superior Iron Mining Region's total production; this number declined to 2% by 1940.[13]

III. Historical Background: Mining Methods / Technology:

In any mining endeavor, the techniques used are chosen from a repertoire of methods and designs that fit different mines' particular physical circumstances. The earliest Gogebic Range mines consisted of relatively shallow, well-like shafts sunk directly into the ore-bearing formation, accessed via ladders and mined with simple winch-like structures driven by animals.[14] As mining technology improved following the speculative collapse of 1887, existing mines were frequently deepened and larger structures for hauling became necessary. Headframes have long been used in shaft mines of any considerable depth, and the early Gogebic headframes were presumably based on examples seen in the eastern U.S. and Europe. These early structures usually stood two to four stories high, and consisted of a pyramid-shaped frame made of square-hewn timbers.

---

11 Lake Superior Iron Ores, *op. cit.* 1938, p 22.

12 *ibid*, p. 186.

13 Lake Superior Iron Ores, (Lake Superior Iron Ore Association: Cleveland, Ohio), 1952, p. 275

14 John Barlow Martin, Call it North Country (Alfred A. Knopf: New York)1945, p.98.

The truncated peaks of these pyramids were usually surmounted by one or two spoked wheels, commonly referred to as "sheave wheels." Over each sheave wheel ran a cable, which originated at the power source, usually a steam engine, at a distance to the mine's rear. The cable ran over the top of the sheave wheel and down through the middle of the structure into the shaft. The end of the cable in the shaft was connected to a skip, which carried the mined ore to the surface. Miners in these early operations entered and exited the mine shaft via a series of ladders along one side of the shaft, or rode on the skips returning to the surface. Once in the mine, the miners would walk to the stope,or the area of ore where mining was taking place, through a series of horizontal tunnels known as drifts.

Since the ores in Gogebic Range mines tended to be soft and susceptible to cave-ins, the walls of the raises and stopes were supported by an elaborate bracing of huge timbers, which repeatedly snapped under the overlying weight and had to be quickly replaced. Methods of ore extraction varied depending on a mine's geology and the level of technology available, but most soft-ore mines worked from the ceilings of the stopes, slicing off the mud into railed pushcarts or mule-pulled cars. The spaces created within the stopes were supported by systems of natural rock columns and timbers.

By 1910, problems with this method were become apparent, especially in the Upper Peninsula, where subsidence of the surface around mine shafts was threatening to destroy the area's industry. Because of the softness of the ore and the materials in which it was found, as well as the gridlike faulting underlying the Gogebic Range area, the removal of large amounts of material from a mine often caused large sections of land above it to subside. creating dangerous sinkholes and similar hazards. To combat this threat, mining engineers began to configure new shafts to take advantage of the Range's 60 degree slope. Since the exact slope of the iron formation and the location of potential ore bodies could be determined for any location by measuring its magnetic abnormalities, new shafts were sunk parallel to the formation and located in the footwall, the layer of rock immediately underneath the iron-bearing formation. From this inclined shaft, drifts extended to the location of the potential iron bodies, and mining proceeded in essentially the same manner as previously described.[15] The Plummer mine, which was begun between 1907 and 1912, is an inclined shaft mine, as is evidenced by the shape of the headframe. An inclined shaft mine required both a longer underground shaft and alterations to the configuration of the headframe, since the cables could no longer be suspended from the sheave wheels directly over the shaft. Headframes associated with inclined shaft mines are usually shaped like a right triangle when viewed from the side, the hypotenuse of the triangle terminating at the shaft's opening. Since the slope of the formation and varied slightly, each headframe had a slightly different angle and proportions.

Many inclined-shaft headframes had two or three sheave wheels, indicating two or three cables leading to compartments within the mine shaft. Generally one cable would be connected to a "cage," an elevator-like device in which miners rode between the mines levels and the surface. A skip for carrying ore might hang beneath the cage, or in another compartment, while a chute for timbers or an emergency escape ladderway might occupy the third compartment. The cages and skips ran on inclined rails both in the shaft and on the

15 Lake Superior Iron Ores, 1938, p. 43.

face of the headframe, and the cables ran over the sheave wheels and to a steam or, by 1920, electric engine at a distance to the rear of the structure. Gogebic Range headframes from this period appear to have been primarily constructed of timbers, which were still plentiful but becoming less available. Steel headframes, however, also began to appear during this time, and appear to have been particularly likely when older wood headframes were being replaced or when a mine was expected to have a long productive life. Such high expectations appear to account for the all-steel Plummer headframe, which is one of the earliest documented in the Lake Superior region.

By the 1920s, however, it became clear that inclined shafts had not completely solved the problem of subsidence. Mines begun in the 1920s tended to employ a vertical shaft, which was sunk into solid granite at a distance from the subsidence-prone mining area and connected by long raises, made possible by the replacement of mule carts with mechanized conveyance. Although these headframes also had a general right-triangle shape, they were much taller and larger that the previous inclined shaft headframes; many of the new structures incorporated ore processing plants and miners' facilities into their structures and were often partially or completely enclosed. By the World War II era, the few new shafts being sunk in the Lake Superior region were designed with a shallow incline originating over a mile from the actual mining.

Most headframes incorporated a tipple, a simple device that overturned the skips coming out of the mine into railroad cars on the ground or small railed cars on an adjoining rail trestle. Ore could then be transported directly to Ashland, where it would be shipped to lower Great Lakes ports such as Cleveland and Gary, or it would be placed in a stockpile on the mine's adjacent land. Stockpiling is a typical mining practice in areas where or at times when the available transportation cannot keep up with production. For the Gogebic Range, stockpiling was especially critical: most mines operated at highest capacity during the winter, when shipping at the Ashland docks were closed.

VI. Historical Background: Landscape Impact

Despite Wisconsin's relatively minor role in national iron production, the iron mining industry had a profound effect on the Gogebic Range area's landscape and development. Perhaps most significantly, the iron mines contributed to the denudement of the landscape, which had been almost completely virgin forest when the Germania opened in 1885. Mines used timber prodigiously, for everything from fuel to construction to framing drifts and stopes. The infant timbering industry that had begun to develop in extreme northern Wisconsin prior to commercial mining became briefly the area's second major industry, as local demand for mining timbers and other uses steadily consumed the area's resources. By 1925, almost all of the most desirable timber had vanished from the landscape, resulting in the difficult-to-sell and often highly flammable terrain known as the Cutover.[16] The increasing use of steel and concrete in mining construction resulted in part from the increasing scarcity of timbers adequate for headframes and framing drifts.

Mines also added features to the landscape. Evidence of early test pits are common in northern Iron County,

16 Techtmann, *op. cit.*, p. 19-20.

and remnant tailing piles can be found in several places, ranging from a few feet in height, as seen at the Plummer site, to steep-sided hills several hundred feet high, such as those near the former Montreal mine. Due to the complexity of mining operations and the extensive power sources they required, mining sites, or "locations," as they were commonly termed, presented a highly industrial appearance, with machine shops, boiler houses, power plants and large engines occupying specialized buildings in the shadow of the headframe. Freight and passenger rail proliferated during the first two decades on the twentieth century, leaving a network of rail right-of-ways that often indicate otherwise long-vanished mining sites.

However, much of the physical evidence of the iron mining industry's impact on the Gogebic Range is no longer extant. With the exception of the Plummer headframe, none of these structures still exist. The last, belonging to the nearby Montreal mine, was demolished and its materials sold for scrap in 1964, a fate which it shared with most other area headframes of all eras.[17] Most mining structures, including steel and wood headframes and most buildings, were recycled or reused in some manner; one account states that the buildings surrounding the Plummer headframe were moved to the nearby settlement of Pence.[18] With the exception of a few support structures, notably those of the Montreal mine (see below), very few structures directly associated with mining remain in the Wisconsin section of the Gogebic Range.

VI. Historical Background: Societal Impact

As the most extensive, the most labor-intensive and the longest-lived industry in Iron County, iron mining profoundly impacted the area's settlement characteristics and development. The iron mines literally created Hurley, the county's largest city and its county seat; it exploded from little more than a plat in 1884 into a thriving commercial center within one year.[19] Hurley housed the early speculative mine stock exchange, served as the distribution center for the area's tiny settlements, and developed its reputation as an entertainment center for the region as a result of the mining industry's demands and successes. Other area communities also derived their characteristics from the mining industry; one notable example is the Ogle-bay-Norton Mining Company's planned residential development at Montreal (NRHP 1980), although communities such as Pence and Iron Belt also trace their location and development to nearby mines of the same name.

The mining industry also significantly determined the ethnic characteristics of the area. Among the earliest to settle in this area were second and third-generation Cornish miners from the driftless area of south Wisconsin, where their predecessors had settled to work in pre-Civil War lead mines. These experienced miners frequently took supervisory positions in Gogebic Range mines, while a large influx of more recent immigrants from Italy, Finland, and other nations tended to fill the more laborious roles. Northern Iron County is, as a result, one of few rural areas in Wisconsin with a sizable population claiming Italian descent, and many of the former mining communities still demonstrate ethnic characteristics, including vernacular

17 Techtmann, *op.cit.*, p. 28.

18 Echoes (Private publication: possibly Hurley, Wisc.) ca. 1936, p. 3.

19 Techtmann, *op.cit.*, p. 52.

architectural methods, that were perpetuated by the first miners' descendants.

V. Historical Background: Plummer Mine

Although there is some evidence of exploratory digging on the Plummer site as early as the 1880s, the mine was not formally considered opened until its first commercial shipment in 1912. According to the accounts of several regional mining organizations, the mine was officially known as the Plumer Mine; in local accounts, however, the mine is commonly referred to as the Plummer. The reason for this variation is not clear, but it is evident early in the mine's existence.

The Plumer property was leased from Northern Chief Mining Company in 1905 by the Oliver Iron Mining Company, a Cleveland-based subsidiary of U.S. Steel.[20] Following several years of testing and exploration, the steel headframe was erected in ca. 1908.[21] The mine shipped 47,578 tons in 1912 and 51,053 tons in 1913;[22] the Oliver Co. abruptly closed the facility in February of that year, apparently as a result of the mine's unexpected, disappointing production.[23] The lease on the property was acquired in 1917 by the Republic Iron and Steel Company, which officially opened it in 1921 and shipped 14,434 tons in 1922 and 19,462 tons in 1923.[24] The mine closed again in 1924, and a final shipment of 39,802 tons from the property's stockpiles took place in 1932.[25] The site was acquired by the Oglebay-Norton Mining Company, the parent company of the Montreal Mining Company, in 1943[26] and was held until 1993 as a low-grade ore reserve.

The Plummer Mine's shipments totaled 172, 329 tons over its brief active lifetime. By comparison, the mammoth Cary Mine shipped nearly four times that amount in the single year of 1955, and mined over 18 million tons in its 62-year history; the Montreal mines shipped nearly 46 million between 1886 and 1962 out of several shafts.[27] Even the Germania, which closed in 1912, shipped 470,269 tons over its lifetime -- nearly three times that of the Plummer. By 1928, several years after its close, the Plummer was officially ranked thirty-third in total historic production out of 48 documented Gogebic Range mines.[28]

During its Republic Steel era, the Plummer mine employed approximately 125 people, most of whom lived in Pence and Iron Belt.[29] The mine did provide housing for some employees, particularly for its captain and

20 Oscar Olsen papers, Michigan Historical Collections, Bentley Library, University of Michigan.

21 Photograph from Otto Erspamer Collection, Iron County Historical Society.

22 Lake Superior Iron Ores, 1938, p. 194.

23 Montreal River Miner, February 13, 1913.

24 Echoes, *op.cit.*, p. 3.

25 Lake Superior Iron Ores, 1938, p. 192-195; Montreal River Miner, April 8, 1932.

26 Lake Superior Iron Ores, 1952, p. 58.

27 Techtmann, p. 24.

28 H.R. Aldrich, Geology of the Gogebic Range, Wisconsin Survey Bulletin No.71,(Madison, Wisc) 1929, p.36.

29 Echoes, *op.cit.*, p. 3; Photographs from Otto Erspamer Collection, Iron County Historical Society.

other managers, who tended to be drawn from other communities.[30] The mine shaft was also deepened during this period from 1330 feet to 2368 feet, encompassing 23 levels of drifts and stopes. A 1922 Sanborn fire insurance map indicates the complexity of this operation within a year of the mine's reopening: the diagram shows 12 named buildings on the site, including a dry house, boiler house and hoisting engine building.[31] These buildings were removed between 1932 and 1935; some were reputed to have been moved to Pence.[32] The boiler house's smokestack, the last remaining mine structure other than the headframe, was demolished by the Montreal Mining Company in the late 1940s, as previously mentioned. The property remained unused until 1995, when it became a public recreational site.

Although the exact reason for the headframe's continued existence is not clear, several factors appear to indicate high expectations of and acute disappointment in the mine's production, which may account for its continued existence. As previously noted, the existing headframe was one of the first steel headframes on the Gogebic Range, and was a relatively early example of inclined shaft production. During the 1910 annual meeting of the Lake Superior Mining Institute, the Plummer was a featured stop on a tour of area mines; it was described as an "exploration shaft," and was the only non-established mine of the seven toured.[33] During this time period, production at neighboring mines may have also lent credence to beliefs in the Plummer's potential. The two mines immediately to the southwest of the Plummer, the Atlantic and the Iron Belt, shipped 80,583 tons and 66,627 tons respectively in 1910 -- numbers which did not match the Cary mine's 205,674 tons for that year, but which were near the median amount for Gogebic Range mines.[34] Over its lifetime, the Iron Belt mine produced nearly 1.3 million tons, while the Atlantic mine approached two million tons; neither reached one-half of the Plummer mine's total depth. Interestingly, both of these modestly successful mines were closed by 1913.[35]

A late 1920s report on the geologic merits of the western Gogebic Range clearly illustrates the shortcomings of the Plummer mine. In a description of exploratory drilling in the Plummer's section, the author adds that "the most extensive of these explorations was but recently concluded... the Plumer shaft was sunk to a depth of about 2000 feet and drifting and crosscutting total many thousands of feet....Oxidation was apparently good but the silica remained high and the ore bodies were lean."[36] Another passage provides insight into the scope of the Plummer's disappointment, stating that "the experience of the Plumer mine... in which efforts to find ores were not generously rewarded, also has created the feeling of distrust in these western

30 Ruth Stevens Scheeberger, letter dated Oct. 18, 1995. In possession of Iron County Development Zone Council.

31 Sanborn Fire Insurance Map, Plumer Mine, 1922. Collection of the Iron County Historical Society.

32 Echoes, *op. cit.*, p. 3.

33 Proceedings of the Lake Superior Mining Institute, 1910, *op. cit.* p.25.

34 Lake Superior Iron Ores, 1938, p. 192-195.

35 *ibid*, pp 181 and 184.

36 H.R. Aldrich, Geology of the Gogebic Range, Wisconsin Survey Bulletin No.71 (Madison, Wisc)1929, p. 188.

lands."[37] Thus it appears that, despite the high expectations which led to the headframe's advanced design and construction, the mine's production clearly did not approach acceptable levels.

VI Significance: Industry

The Plummer Mine Headframe is the only extant mine headframe of any type in Wisconsin, and is believed to be the only headframe left on the Gogebic Range.[38] As previously noted, headframes were necessary production tools for shaft mines, regardless of the materials being mined or the geologic characteristics of the substrata. In its simplest form, a headframe's height provides necessary additional leverage for hauling heavy loads from the depths; the structure usually also incorporates a means of transferring loads to surface transport systems. Without a headframe, deep-shaft mining was historically impossible, and the development of larger, more sophisticated headframes progressed in concert with the development of deeper shaft mines. As a result, the Plummer headframe is the state's sole remaining example of an essential element of the state's historic shaft mining operations.

In addition to the purposes for which they were designed, headframes historically served as significant visual landmarks and the distinguishing markers of individual mines, as well as of the industry as a whole. Due to their pronounced heights, distinctive appearances and readily identifiable characteristics, headframes dominated the skylines of mining districts, particularly in areas where strip mining was not introduced. On the cutover Gogebic Range, historic photographs indicate that many headframes could be seen easily at a distances of more than a mile; a headframe the size of the Plummer was more than twice as tall as any tree or building in its vicinity. Because the design and dimensions of a headframe depend both on the mining methods and on the characteristics of the location's geography, Gogebic Range mines could be identified from a distance by a person familiar with the area's headframes. A given mine's relative age, depth, productivity and anticipated lifespan could also be inferred from its headframe, especially when considering its height, shape and method of construction. Taken together, the Gogebic Range's headframes announced the Range's economic and industrial basis, proclaiming an identity that contrasted vividly with the surrounding territory. The Gogebic Range in general, and northern Iron County in particular, is at present heavily wooded and decidedly non-industrial in overall appearance; as a result the Plummer headframe is the only remaining element of the Range's former visual character, and the only structure to directly indicate the nature and scope of Gogebic iron mining.

Context: Wisconsin Gogebic Range Mining-Related Resources:

Although the Plummer headframe is not the only extant structure associated with Wisconsin Gogebic Range mining, it is the only structure directly used in mining that continues to demonstrate adequate integrity. The most notable mining-related structures in the area belonged to the Montreal Mining Company and are located

37 *ibid*, p. 43.

38 Several sources have made this claim, including: (1)1989 NRHP nomination prepared for the site by the staff of the Division of Historic Preservation of the State Historical Society of Wisconsin (SHSW project files); (2) Dr. Thomas J. Evans, University of Wisconsin Extension mineral resources specialist, letter dated August 23, 1994 (SHSW project files).

less than two miles northeast of the Plummer headframe. The buildings at this site stood at the base of the Montreal Mine Shaft No. 5, which was surmounted by a 164-foot steel headframe built approximately 15 years after the Plummer's construction. This headframe was demolished in 1964 ; there is no remaining visual evidence of its existence The extant structures associated with the Montreal site include the following:

•The mine's engine house, which powered the sheave wheels' cables, is located a short distance west of the shaft location. As the source of extractive power, the engine house was clearly essential to the mine's production, but there is little left of this building to indicate its historic purpose. Only the building's steel skeleton exists, surrounded by bricks and other rubble.

•The mine dry house is located next to and due south of the shaft's former location. A dry house was a feature of almost every industrial-era mine, and provided shower and locker facilities for the miners. Although important for employee health, drys were not directly involved in the mine's extractive purpose, and were clearly considered as a support facility. The Montreal dry house has been unoccupied and unmaintained for over 30 years, and its integrity is believed to be considerably compromised.

•The mine machine shop stands at a distance west of the shaft location. This building, a gabled barnlike structure with stone walls, has relatively good integrity, but was only peripherally involved with the mine's production, as indicated by its distance from the center of activity. It was used for the repair and fabrication of mining equipment; like the dry, it provided a necessary support service that nevertheless was not directly involved in extraction.

In addition to these elements of the Montreal mine's industrial plant, many of the peripheral improvements made by this mine for the benefit of its employees exist and provide considerable insight into this mine's employee policies and social environment. The Hamilton Club, a recreational club for miners and their families, stands near the machine shop previously mentioned, while a former public clinic located along the highway to the north of the Hamilton Club currently serves as the city hall. The most well-known aspect of the mine's legacy, however, consists of a planned community known as the Montreal Mining Location Historic District (NRHP 1980). Despite their value and interest, however, none of these social and residential elements contributes significantly to the understanding of the actual work of Gogebic Range mining.

As the only extant example of a headframe in this region, the Plummer Headframe plays a particularly important role in the understanding of the area's iron mining heritage. As has been demonstrated, it is also the only extant structure in the region of any type that demonstrates considerable integrity and was directly associated with iron mining. The few mining-related structures that exist on the Wisconsin Gogebic range lack sufficient integrity or do not directly represent the work of iron ore extraction. Although many of these related resources have considerable historic value, the Plummer headframe is clearly the only extant structure directly associated with the iron mining industry.

Context: Non-Gogebic Mining Resources in Wisconsin:

As previously stated,the Plummer headframe is considered the only extant headframe in all of Wisconsin, as well as on the Gogebic Range. Although mining has never been Wisconsin's leading industry, mining operations have played an important role in the state's development,particularly in certain areas:

•**Lead / Zinc Mining District.** Between the 1820s and the Civil War, lead mining was essential to the development and settlement of southwestern Wisconsin, the lead mining district lying primarily in Grant, Lafayette, Iowa and Green counties; portions of this region also experienced a period of industrial zinc mining in the late 19th and early 20th centuries.[39] Although this area's heritage is still represented by several historic resources, including Cornish miners' residences such as Pendarvis in Mineral Point (NRHP 1971), few resources directly associated with lead mining exist.
The St. John Mine in Potosi (NRHP 1979) exemplifies prehistoric and early historic lead mining efforts, which relied on natural fissures in the earth to bring the lead ore to or near the surface. In Iowa County, the Town of Wyoming Shot Tower (NRHP 1973) also represents an important element in the lead mining industry, and was used to process crudely smelted lead into round shot. It should be noted, however, that both of these resources clearly represent preindustrial technologies that were long obsolete by the advent of Gogebic Range iron mining. In addition, only the shot tower may be properly termed a structure; the St. John Mine has no historic above-ground features. The former Merry Christmas Mine in Mineral Point, does represent an industrial-era operation, but this site as well has no surviving above-ground mining structures. Despite their significant associations with Wisconsin's mining heritage, understanding of the Plummer headframe's significance is not advanced by comparison to these resources, which do not represent the industrial nature of late 19th and early 20th century mining.

•**Other Wisconsin Iron Mining Districts:** Limited iron mining took place in several locations in Wisconsin, but there are no known historic mining resources in these districts.[40] Both the Baraboo and Mayville districts engaged in limited iron ore mining during approximately the same time period as the Gogebic Range; these mines' production was limited by low demand for their lower-quality ores and overabundant ground water. All mines in these districts were closed by 1930; the most successful shipped between 30,000 and just over 2 million tons over their lifetimes.[41] A small portion of the Menominee Range, which lies predominately in the Upper Peninsula, also extended into northern Florence County, where several deep-shaft mines produced approximately 3% of that range's lifetime iron production. Mining in this area also essentially ended during the 1930s. Like many of the Plummer Headframe's Gogebic counterparts, most of the Florence County, Baraboo area and Mayville mine structures were apparently demolished or removed.

As a result, the Plummer Headframe may be considered as having no direct counterparts in Wisconsin. The few extant mining-related structures in the state represent significantly different industries and

[39]Robert Fay et.al., "Industry: Lead and Zinc Mining." Barbara Wyatt, Ed., Cultural Resources Management in Wisconsin, Vol. 2.,(State Historical Society of Wisconsin: Madison, Wisc.), 1986. pp. 3-1, 3-9.

[40]Lusigian, *op.cit.*, pp. 4-1, 4-2, 4-7.

[41] *ibid*, p. 4-2

technological periods, and may only be compared to the Plummer Headframe on a limited basis.

VII: Significance: Engineering

In addition to its significance as a unique and highly significant artifact of the Gogebic Range's iron mining industry and Wisconsin's mining activity, the Plummer Headframe is also significant under National Register of Historic Places criterion C as an example of an important technological development in the engineering of deep shaft mine structures. The Plummer mine was one of the earliest mines to sink an inclined shaft mine in the manner that has been discussed above; it was also one of the first mines on the Gogebic Range with a headframe made entirely of steel. As mentioned above, the earliest known photograph of the Plummer headframe is labeled as having been taken in 1908,[42] the image shows a group of miners standing in front of the headframe. The structure, however, does not have the inclined face that leads into the shaft; it also lacks the stairway at the northwest corner. Both of these features do appear in a photograph dated 1921, which appears to indicate that the headframe was under construction but nearly completed at the time of the 1908 photograph.[43]

All known historic photographs of the Plummer headframe indicate that it was from the first an almost exclusively steel structure; the use of wood on the structure appears to have been limited to the lining of the tipple's chute and the treads of the staircase and landing on the northwest corner. This use of steel was clearly a new development on the Gogebic Range; even most new inclined-shaft mines, such as the nearby Iron Belt mine, were still surmounted with wood headframes at this time.[44] A few steel headframes were being constructed between 1908 and 1910, including the Montreal shaft No. 4 headframe built in 1910, but the majority of headframes known to have been constructed during this time period were still made of wood. The Lake Superior Mining Institute clearly viewed the use of steel for headframe construction as an important new development that they wished to encourage; a paper from their 1910 annual meeting discussed in great detail the advantages of steel for headframe construction. Steel, the author argues, is the ideal material for such uses: it allows for a stronger, more stable, fireproof headframe whose members take up less space than an equivalent timber, which allows for greater use of the headframe to house other features. such as ventilation systems and ore processing facilities.[45] The same issue contains a detailed description and measured drawings of the steel headframe at the Montreal No. 4 shaft , which had just been constructed. The structure shown and described is slightly larger than and essentially identical in design, function and proportion to the Plummer Headframe The implication is clearly given that steel headframes of this design represent an important innovation and are offered as an example that future headframes should emulate.[46]

One advantage that wooden headframes had, however, was that they could be disassembled and the parts

42 Photograph from Otto Erspamer Collection, Iron County Historical Society.

43 Photograph from Otto Erspamer Collection, Iron County Historical Society.

44 Iron County Diamond Jubilee Edition.(Iron County Board of Supervisors:Iron County, Wisconsin),1968, n.p.

45 R.B. Woodworth et al., "Underground Steel Construction - Particularly Mine Shafts." Proceedings of the Lake Superior Mining Institute, *op. cit.*, 1910, p. 56-57.

46 Frank B. Goodman, "Steel Head Frame No. 4 Shaft, Montreal Mine." *op. cit.*, p. 209-213.

reused much more easily than a steel headframe. As a result, exploratory mine shafts and mines that were not expected to be long-range producers continued to be served by wooden headframes as late as 1930. The Plummer Headframe, interestingly, was constructed of steel while it was still considered an "exploration," apparently indicating the expected permanence of the Plummer's operation

As has been discussed, inclined shafts sunk into the formations's footwall represent a brief but important step in the evolution of Gogebic Range mining technology. Designed to offset the subsidence problems associated with vertical shafts sunk directly into the ore-bearing formation, inclined footwall shafts represented the first of several innovations in shaft placement intended to combat subsidence. The earliest known inclined shafts on this range date from 1908 to 1910, making the Plummer mine among the earliest to choose this method. By 1915, however, successful mines such as the Newport in Gogebic County, Michigan, were again facing severesubsidence, which, while occurring at a distance from the shaft over the mined area, were still threatening both above-ground and underground operations.[47] Several innovations followed: as inclined footwall shafts associated with subsidence were closed and their above-ground structures often dismantled, new shafts were sunk vertically or at a more shallow angle commencing at a distance from the mined area.

The shape of any headframe is determined by the depth, angle, and size of the shaft, and as inclined footwall shafts became abandoned in favor of other methods, headframe designs also changed significantly. With deeper shafts, headframes became as much as two times the height of the Plummer, and other aspects of the operations such as auxiliary power sources and drys were often relocated into the headframe, which was frequently enclosed in sheet metal. Although these headframes usually maintained the right triangle shape introduced with inclined shaft footwall headframes, the angle of the incline changed to reflect the shallower slopes; vertical shaft mines often placed the vertical side of the headframe over the shaft and ran the cables vertically on the interior of that face. As has been discussed, there are very few mining resources of any type remaining on the Gogebic Range; none of those identified above was associated with an inclined shaft footwall mine. The Montreal No. 5 shaft, which apparently replaced the inclined No. 4 shaft, was designed according to one of the later methods.

The Plummer Headframe may thus be considered significant as an excellent early example of two important technological innovations that played an important role in the development of Gogebic Range mining. The Plummer is one of the earliest known steel headframes constructed in the Lake Superior Mining District, and it was associated with one of the earliest Gogebic Range inclined footwall shafts, representing an early attempt to engineer shafts to combat the Range's characteristic subsidence. As a result, the Plummer is the only remaining structure on the Range to represent these two important technological developments and thus lends considerable insight to the understanding of the development of Gogebic mining technology.

47 Proceedings of the Lake Superior Mining Institute, *op cit.*, 1939,p. 181.

Archeological Significance:
No known archeological resources relating to prehistoric or early historic habitation have been discovered on this site. The property on which the headframe stands does include several early-20th century foundation ruins, on which stood several buildings associated with the mine's operation. It is possible that archeological resources pertaining to the mine's operation may be found at the site, despite the limited nature of its production, as the site has been little disturbed in the past 60 years.

Major Bibliographical References:

Aldrich, Henry Ray. Geology of the Gogebic Iron Range of Wisconsin. State of Wisconsin (Madison, Wisconsin) 1929.

Handbook of Mining in the Lake Superior District: Lake Superior Meeting August 1920. American Institute of Mining and Metallurgical Engineers. [Duluth, Minnesota].

Iron County Diamond Jubilee Edition. Iron County Board of Supervisors (Iron County, Wisconsin): 1968.

Lake Superior Iron Ores. Lake Superior Iron Ore Association. (Cleveland, Ohio): 1938.

Lake Superior Iron Ores , Second Edition Lake Superior Iron Ore Association. (Cleveland, Ohio): 1952.

Preservation of Iron County's Historic Iron Mining District Architecture: Historic Preservation Fund Subgrant Report. 1995.

Proceedings of the Lake Superior Mining Institute (Lake Superior Mining Institute: Ishpeming, Michigan) 1910, 1939.

Sanborn Fire Insurance Company map, Plumer Mine, 1922. In the possession of the Iron County Historical Society, also see the collection of the State Historical Society of Wisconsin.

Techtmann, Catherine. Rooted in Resources: Iron County, Wisconsin 1883-1993. New Past Press, Inc. (Friendship, Wisconsin): 1993.

Wyatt, Barbara, Ed. Cultural Resources Management in Wisconsin, Vol. 2. State Historical Society of Wisconsin, Madison, Wisc.: 1986.

Boundary Description:

The nominated property is defined as follows:

All that part of the Southeast Quarter of the Northwest Quarter and the Southeast Quarter of the Northeast Quarter of Section 6, Town 45 North of Range 2 East, Town of Pence, Iron County, more particularly described as:

Commencing at the one quarter corner common to Section 1 and Section 6, Town 45 North of Range 2 East, proceeding thence east along the east-west one-quarter line a distance of 1119.01 feet to the center west 1/16 corner, thence continuing east along said east-west one-quarter line a distance of 140 feet, to the Point of Beginning of this description:

Thence continuing east along said east-west one-quarter line a distance of 738.87 feet, thence exactly 30 degrees west of North a distance of 1049.28 feet, to a point on the southerly right of way of Plumer [sic] Road, thence southerly along said right of way a distance of 642.78 feet, thence exactly 30 degrees east of South 639.20 feet to the Point of Beginning. Containing 12.57 acres.

Boundary Justification:

The above boundaries incorporate the entire property historically associated with the Plummer Mine's operation. The above boundaries are delineated in the Certified Survey commissioned by the Town of Pence in conjunction with the Town's acquisition of the property.

Photo #1 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southeast.

Photo #2 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southeast.

Photo #3 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northwest.

Photo #4 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northwest.

Photo #5 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southwest.

Photo #6 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southwest.

Photo #7 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southwest; detail of rear of base.

Photo #8 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southwest; detail of center of base.

Photo #9 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking southwest; detail of front portion of base.

Photo #10 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northeast.

Photo #11 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northeast.

Photo #12 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northeast; detail of rear of base.

Photo #13 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northeast; detail of front portion of base.

Photo #14 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northeast; detail of tipple structure.

Photo #15 of 15
PLUMMER MINE HEADFRAME
Town of Pence; Iron County, WI
Photo by D.G. Rucker, November 30, 1995
Negative at State Historical Society of Wisconsin
View looking northeast; remnant stockpile.

1927 SANBORN
HURLEY

PLUMMER MINE HEADFRAME
TOWN OF PENCE
IRON COUNTY
WISCONSIN

1925 Plummer
on 1913

REPUBLIC IRON & STEEL CO., PLUMER MINE

NIGHT WATCHMAN, HARDINGE BROS CLOCK, 3 STATIONS
HOURLY ROUNDS. HEAT STEAM LIGHTS ELECTRIC POWER
STEAM FUEL COAL 3-2" HYDS SUPPLIED BY 4 MOBILES
No 5 STEAM PUMP DRAINING FROM MINE SUMP ONE
HOSE CART WITH 300' 2" HOSE

1922

PUMP HO
ENGINE No 5
SINGLE STROKE
STEAM

4"W PIPE

2" HYD

SHAFT
INCLINE

TIPPLE
FRAME
TRESTLE 36'
ORE PILE

R R SIDING
R R SIDING

STEEL TRESTLE
30' HIGH

HOSE
HOSE CART WITH
300' HOSE

DRY HO

COKE SHED
CHARGE SHOP
IRON PIPE

BL.SM.
MACHINE SHOP
ELEC MOT.

OIL HO

OFFICE
SUPPLY HO

LABORATORY

Pond

20,000 GAL MT ELEVD
(IRON BUILT & ICED)

Y
CEMENT-FLOOR
STEEL TRUSS ROOF
BRICK
BOILER HO.

W
HOISTING ENG & CABLE DRUM
AIR COMPRESSOR

ELECTRIC TRANSFORMERS

R R SIDING

Scale of Feet.
50 100 150