PULPWOOD AND WOODCHIP MARKETS

IN

CHICAGO AND NORTH WESTERN TERRITORY

RESOURCE DEVELOPMENT DEPARTMENT
CHICAGO AND NORTH WESTERN RAILWAY COMPANY

PULPWOOD AND WOODCHIP MARKETS

IN

CHICAGO AND NORTH WESTERN

TERRITORY

Chicago and North Western Railway Company
Chicago, Illinois

CHICAGO AND NORTH WESTERN RAILWAY COMPANY
400 WEST MADISON STREET, CHICAGO 60606

R. C. STUBBS
ACTING VICE PRESIDENT — TRAFFIC

To All Pulpwood Shippers:

The volume of wood consumed annually by pulpmills in the Lake States Region would fill a train of railroad cars reaching over 1,400 MILES from end to end.

This vast market represents the fruits of up to one half million acres of timberland, and over one million man hours of labor in the pulpwood alone. Countless man hours are added to this in the transportation and manufacture of pulpwood into pulp and paper.

Pulpwood Markets in Chicago and North Western Territory is a guide for the growing number of large and small pulpwood producers who supply the basic raw material for the fastest growing segment of our nation's wood based industry. You will find listed here, by states, all of the major pulpwood markets in the territory served by the Chicago and North Western Railway. These mills represent ten percent of the nation's pulp and paper making capacity.

For the men of this industry money grows on trees! It is our purpose to encourage the production of pulpwood as a "cash crop" to help meet the growing demands of America's booming pulp and paper industry. When your pulpwood moves into markets listed in this directory we'll haul it fast and economically the year 'round - regardless of weather.

We invite your careful study of this brochure and your inquiries for further information will be handled promptly by specialists in our Resource Development Department.

Sincerely,

R C Stubbs

CONTENTS

FOREWORD

The forest economy of the Lake States is based primarily on the growing and harvesting of pulpwood as the basic raw material for the woodpulp mills of the region. While the region is becoming increasingly self-sufficient in its wood supply, Western and Canadian forests continue to be important sources of wood fiber for a few of these mills. There is also a small out-flow of wood from the region to pulp and roofing felt mills in neighboring states. In 1963 the total production and imports of pulpwood was about four million cords, representing a value of over $75 million at the mill.

The Chicago and North Western Railway Company, recognizing the need for current marketing information in this industry, in 1958 published a directory of wood using pulpmills in the region. This brochure was designed primarily as a guide for the wood producers and suppliers of these mills. In the intervening period the wood consumption of the region has increased nearly 25 percent, there have been changes in the species used by many mills, and woodchips have become a growing factor in the market. Inevitably, there have been many changes in mill personnel responsible for traffic and wood procurement.

The revised edition of "Pulpwood Marketing in Chicago and North Western Territory" provides a current list of major pulpwood and woodchip markets in the Lake States, we well as Illinois and Iowa. This brochure has been expanded to cover additional marketing and transportation information of interest to pulpwood shippers.

MAJOR PULPWOOD PRODUCING REGIONS

The Lake States

Commercial forest land in Wisconsin, Michigan and Minnesota covers over 53 million acres, or 43 1/2 percent of the total land area. Eighty percent of the forest land supports growing or mature timber.

The major forest types are the northern conifers and the hardwoods. The northern conifers are white pine, red(Norway) pine, jack pine, balsam fir, spruce and tamarack. Twenty-seven percent of the commercial forest land in the Lake States is stocked with northern conifers.

The hardwoods are becoming more important. Some pulpmills are changing their pulping processes so as to use a greater proportion of these readily available species. Aspen (popple) is by far the most important of the hardwoods in the production of pulpwood, covering 34 percent of the total commercial forest land. More aspen is produced in the Lake States than any other single kind of pulpwood. Other hardwoods are usually grouped together under the term "miscellaneous hardwoods."

Over 90 percent of the pulpwood requirements of the Lake States is obtained from within the region. The following table shows the growth of this important industry for the period from 1958 to 1963:

Pulpwood and Woodchip Production and Imports
Lake States
(in standard cords, unpeeled)

Year	Wisconsin	Michigan	Minnesota	Other*	Total
1958	827,834	899,645	902,977	489,153	3,114,199
1960	1,051.726	1,237,158	1,048,303	428,435	3,711,365
1963	1,302,073	1,297,015	1,063,254	461,789	4,092,378

* Includes Western United States and Canada.

Fourteen percent of the commercial forest land is in Federal ownership or trusteeship and is managed principally by the U.S.Forest Service and the Indian Service.

Nearly 26 percent of the timberland is owned by states, counties or municipalities. Each of the states has a forestry division in the Department of Conservation. The state foresters, and in some cases county foresters, manage the state and county-owned lands.

About 60 percent of the commercial forests are in private ownership. Forest management assistance is given by the state forestry divisions, extension foresters and industrial foresters. The American Forest Products Industries, Inc. through state committees and with the cooperation of the state forestry departments, sponsors the Tree Farm Program through which private lands under good forest management can be certified as Tree Farms in recognition of their achievements.

Considering Tree Farms, industrial lands, and publicly owned lands, nearly 45 percent of the commercial forest area is under management.

Pulpwood production in the Lake States region has been increasing in the last few years. Young forests are coming into production. Pulpmills are managing their lands for continuous crops. They are shifting to the utilization of more hardwoods, which are available locally. Some pulpmills able to utilize hardwoods are using waste products from other wood manufacturing plants. These factors are expected to increase the amount of wood produced in the Lake States.

Rocky Mountains

Wisconsin pulpmills receive 21 percent of their pine requirements and forty-six percent of their woodchip requirements from the Rocky Mountain region. Shipments of pine pulpwood originate in the Black Hills of South Dakota, Wyoming and Montana. These same states shipped pine and spruce woodchips into Wisconsin. The movement of woodchips from these areas is increasing with additional sources now producing chips for Wisconsin mills in Idaho and Colorado.

The Black Hills is a relatively new pulpwood producing area with a potential which is unsurpassed by any other similar area in the central United States. The Black Hills, with 1.5 million acres of commercial timberland has an allowable annual cut in excess of 200,000 cords. About 25 percent of the available supply is currently being used.

The primary species in the Black Hills is ponderosa pine, having pulping characteristics and yield similar to jack pine. Black Hills spruce is a variety of white spruce found in the Lake States and has similar pulping characteristics. While limited in quantity, this spruce could provide an annual cut in excess of 5,000 cords per year.

Black Hills pine is being used regularly in the Lake States area. The Black Hills have an advantage over the more distant regions because of the relatively gentle operating terrain, mild climate allowing for year-round operations, and the single line rail haul which is available to most of the markets in the Lake States. The Chicago and North Western serves the Black Hills and gives a direct route to the major pulpwood markets.

The U.S.Forest Service owns most of the pulpwood timber in the Rocky Mountain Region. The region produced nearly 114,000 cords of wood in 1956, and has been an important supplement to the Lake States supply of pulpwood. Production has declined in the past decade due to the development of more economical sources. A great supply of unused wood is available. If Canada should extend restrictions on pulpwood exports, the Rocky Mountain Region could furnish the Lake States mills with the additional supplies they need.

The Prairie Region

Pulpwood production in the Prairie Region is increasing in importance. Consisting principally of Illinois, Iowa, southern Wisconsin and southern Minnesota, the region has a potential that has been largely unrecognized. Nine percent of the land area of Iowa and Illinois, or 6,443,000 acres, is commercial forest land and carries a volume of over 65 million cords of timber. Several pulpmills in Iowa and Illinois are using native hardwoods, most of the wood produced locally.

Ninety-six percent of the forest lands are privately owned. State farm foresters and industrial foresters give advice and other assistance to the owners. Farmers see the potential of their timberlands and are making pulpwood readily available wherever there is a market

Canada

Six percent of the pulpwood received at Lake States mills in 1962 was imported from Ontario, Manitoba, Saskatchewan and Alberta, Canada. Records show that the Canadian provinces furnished more than 20 percent of the pulpwood consumed in the Lake States less than ten years ago.

The marked reduction in Canadian imports is a result of a lesser dependence on spruce by many mills. Some of the spruce production has also been shifted to Minnesota forests.

The forests of this region are essentially the same as the northern conifer forests of the Lake States Region. Spruce makes up nearly 80 percent of the exports.

Most of the wood produced in Canada originates on government-owned(Crown) lands, and is harvested under prescribed cutting practices. The Onterio government has established a policy of reducing exports of Crown wood each year. The plan adopted has been extended beyond the original time limitations, but it is expected to eventually prohibit all exports of Crown wood from Onterio.

FOREST REGIONS & PULPWOOD MARKETS IN CHICAGO & NORTH WESTERN TERRITORY

LEGEND

- C. & N. W. RY.
- CONNECTING LINES
- LOCATION OF PULP MILLS
- NORTHERN CONIFEROUS FORESTS
- HARDWOOD FORESTS
- ROCKY MOUNTAIN FORESTS

MANITOBA
ONTARIO
WINNIPEG
CN
CP
NORTH DAKOTA
MINNESOTA
LAKE SUPERIOR
GN
NP
MSP&SSM
GREAT FALLS
FARGO
DULUTH SUPERIOR
ONTONAGON
MICHIGAN
ASHLAND
MONTANA
CMSP&P
ABERDEEN
MINNEAPOLIS
ST PAUL
WISCONSIN
WATERTOWN
WAUSAU
EAU CLAIRE
HURON
MANKATO
BELLE FOURCHE
PIERRE
BROOKINGS
C&NW
GREEN BAY
WINONA
RAPID CITY
SIOUX FALLS
MADISON
SOUTH DAKOTA
MASON CITY
IDAHO
LANDER
CASPER
CHADRON
SIOUX CITY
FT DODGE
DUBUQUE
ROCKFORD
SAC CITY
LAKE MICHIGAN
DAKOTA JCT
NORFOLK
CHICAGO
WYOMING
UP
CEDAR RAPIDS
CLINTON
FREMONT
NEBRASKA
COUNCIL BLUFFS
ROCK ISLAND
OMAHA
DES MOINES
MARSHALLTOWN
IOWA
LINCOLN
PEORIA
OTTUMWA
UTAH
COLORADO
SUPERIOR
DENVER
MISSOURI
ILLINOIS

MARKETING PULPWOOD

Pulpwood may be defined as logs cut from green trees, generally varying in diameter from four to twelve inches at the small end, used as the basic raw material of the pulp and paper industry. The length of pulpwood logs varies in different regions of the country, but 100 inches has been adopted as standard by most pulpmills in the Lake States (Michigan, Minnesota and Wisconsin.)

Over four million cords of pulpwood are marketed annually in Chicago and North Western territory. A variety of pulping methods permits the use of most commercial timber species found in the region. Species and specifications for pulpwood and woodchips vary and are determined largely by the process and wood handling methods for each individual pulpmill.

It is the function of pulpwood marketing to move the desired species and condition of wood to the pulpmills at the lowest possible cost; to provide stumpage returns to the landowner; to provide a means of livelihood for the logger; to yield reasonable returns to capital, management and carriers; and to find and develop new markets.

The first step in marketing pulpwood is to have a definite commitment for the wood to be sold. This may be a formal contract, an informal letter or even a verbal agreement. The informal approach usually works out in practice when responsible parties are involved. The uncertainties in pulpwood production, such as weather and equipment breakdowns, make this approach desirable to both parties. The buyer protects himself by obtaining wood from many sources and the producer is protected in the event he is unable to deliver.

While the need for a contract is fundamental, it is sometimes overlooked. In this case the producer may find himself without an outlet for his efforts, or he may have to dispose of his wood at reduced prices.

There are certain general requirements for pulpwood which apply regardless of the species or condition specified by individual buyers. It is important for a pulpwood producer to maintain good standards in the preparation of his wood in order to operate in this competitive market.

Pulpwood must be reasonably straight and free from excessive crook or protruding knots. Pulpwood must also be reasonably free from sap and heart rot. It should not be cut under-length or undersize, according to specifications. All these defects reduce the solid wood content in a given volume of wood, thus reducing the yield of pulp which the manufacturer obtains. Deductions in scale are usually made by mills when wood does not meet specifications. Poor wood is costly to the producer as well as to the mill.

Buying practices vary with the individual mill. Some purchase wood direct from the producer while others may purchase from dealers who in turn contract with the producers. Dealers may also take on the role of a producer for at least a part of their requirements.

For the party who has wood to market it becomes a matter of determining the policy of the mill using the type of wood he has to offer. This may be accomplished by contacting the wood purchasing agent listed in the directory of pulpmills. The seller will then be advised on the mill policy. It is often the case that the seller will be directed to a possible market for his wood in the event the mill is unable to make a direct purchase.

The fact that most pulpmills make their commitments for wood well in advance of delivery, usually on an annual basis, makes it difficult to market wood without some thought to timing. The response from the buyer is also governed by the need for, and quantity of wood which the seller has to offer. The success which the seller has is dependent on the demand for wood at the time. It should be pointed out that many pulpmills have more wood offered them than they are able to use. This does not eliminate the opportunity for a new producer to enter the market, since there is always a certain amount of turnover in the industry.

Where the wood of more than one producer is gathered prior to shipment, this accumulation may be considered another phase of marketing. In a hot logging operation, within trucking distance of the mill, this step is omitted. However, where the wood is to be moved any great distance it is necessary that it be accumulated in sufficient quantity to permit efficient handling and shipping. Whether transportation is by truck or rail it is necessary to have a sufficient volume of prepared wood available so that the equipment may be loaded and on its way with a minimum of delay. Equipment is expensive and no one can afford to let it stand idle. In the case of rail shipments sufficient wood must be on hand to load the number of cars requested within the allotted free time. This is normally 48 hours, with Saturday, Sunday and holidays as free time. Loading extending beyond the free time is assessed a demurrage charge.

Team tracks where the small producer may load and ship his wood are available in many areas. Handling of small shipments of wood from a number of widely scattered shipping points represents relatively inefficient use of rail equipment, which is reflected in the cost of transportation. Some larger shippers are able to take advantage of multiple carload rates, materially reducing their freight costs. A cooperative effort by small producers could also enable them to take advantage of multiple carload rates if they were able to pool their shipments from a single origin to a single destination.

The concentration yard is another system for accumulating wood, enabling shippers to take advantage of multiple carload rates. A concentration yard may be operated by a dealer or it may be company operated. If the yard is being supplied by a number of producers their wood may be measured when delivered to the yard. This provides the small producer

with a local market located a considerable distance from the pulpmill. This relieves the small operator of the responsibility of loading cars and permits the yard operator to use efficient loading equipment for handling large volumes of wood. It is usually necessary to store some wood on the ground, but it may be loaded direct from the truck to rail car during times of shipment. Additional overhead costs are incurred in operation of the concentration yard, but this may be compensated for by increased efficiency and reduced freight costs.

A concentration yard will vary in size, depending on the volume of wood available within economical trucking distance to the shipping point. Railroad company owned land along a side track is often available under an accumulation license where large amounts of wood are to be stored for rail shipment.

Concentration yards are widely used in the south and west and on a more limited basis in the Lake States. A large number of loading points, handling relatively small annual volumes of wood hamper rail efficiency in many areas. Properly located concentration yards would help relieve this problem.

Fig. 1 Pulpwood concentration yard.

MARKETING WOODCHIPS.

Some pulpmills purchase wood in chip form. These chips are identical to the chips produced in the mill from pulpwood, being the form required to charge the digesters in a chemical pulpmill. In this case the chips are produced at a point remotely located from the mill and they are usually manufactured from sawmill slabs and edgings and veneer mill waste. The source of these chips is material that was formerly disposed of by burning.

Purchased chips used by pulpmills are required to be bark free and must fall within certain size specifications. They are every bit as good as chips produced by the pulpmill and make an important contribution to the conservation of our timber resources. Inasmuch as chips are a quality product they are no longer considered waste material, but rather a further utilization of the timber consumed by sawmill and veneer plants.

Purchased chips represent about five percent of the total wood volume consumed by pulpmills in the Lake States. This figure does not indicate their relative importance since only a few of the region's mills purchase chips. To these few mills they have become an important source of fiber.

The lumber industry in the Lake States is relatively small compared to the south and the west. Therefore, there is only a limited supply of purchased chips available. Some woodchips are produced in the Rocky Mountain region and this represents a limited source for mills that can use softwood chips. Because of the limited sources, the use of purchased chips in the Lake States has not grown as rapidly as in other regions. With few reservations the demand for woodchips exceeds the supply in this region. This has put most sawmill operators into the chipping business if their mills are large enough to justify the cost of the necessary equipment. Some smaller mills may have debarkers so that they can market clean slabs and edgings. The impact of this development possibly has had a greater influence on the sawmill industry than on the pulpwood producing industry.

In contrast to the cord, which is a volumetric measurement for pulpwood, woodchips are usually purchased on a bone dry weight basis. A unit is generally 2400 pounds of dry fiber. At 50 percent moisture this unit represents 4800 pounds of green chips. The unit is intended to approximate the fiber yield from a standard cord of peeled pulpwood. Some chip users purchase on a green ton basis.

Unless there is a significant increase in the average size of sawmills in the Lake States, it is likely that future demands for woodchips will have to come from remote chipping of pulpwood. This development must wait for further improvement in equipment design and handling methods to become economical. A few remote chipping plants are now in operation in the south. These plants are designed to take advantage of the economies of tree length logging.

DIRECTORY OF

PULPWOOD AND WOODCHIP MARKETS

WISCONSIN

NAME AND LOCATION	PULPWOOD PROCUREMENT Purchasing	Transportation	SPECIES AND CONDITIONS[1]/ Roundwood	Chips	SOURCES	RAILROADS
1. Badger Paper Mills, Inc. Peshtigo, Wisconsin	A.O.Adrian Director of Purchases	F.J.Royer Traf.Manager	Aspen-HP Balsam-R,HP Spruce-R,HP	Aspen Balsam Spruce	Manitoba Michigan Minnesota So.Dakota Wisconsin	C&NW
2. Charmin Paper Pdts.Co. 800 Hoberg Street Green Bay, Wisconsin (Subsidiary of Proctor & Gamble) Mills at Green Bay, Wisconsin	J.H.Horan Purchasing Agent	F.H.Strecken-bach Traf.Manager	Aspen-HP	Not Used	Michigan Minnesota Wisconsin	C&NW, GB&W, MILW.
Charmin Paper Pdts. Cheboygan, Michigan	Roland Lahaie Buyer		Aspen-HP	Not Used	Michigan	D&M, NYC,
3. Combined Locks Paper Co. Combined Locks, Wisc.	F.S.Ziemann Director Materials Management		Aspen-R,HP,MP Balsam-R Spruce-R.	Not Used	Michigan Minnesota Wisconsin	C&NW

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

WISCONSIN (continued)

	NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROADS
		Purchasing	Transportation	Roundwood	Chips		
4.	Consolidated Papers, Inc. Wisconsin Rapids, Wisc.	E.B.Hurst, Manager of Timberlands	J.W.Kachel Traf.Manager	Aspen-R,MP Balsam-R,HP Dense Hard- woods-R,HP Hemlock-R,HP Spruce-R,HP Tamarack-R,HP	Not Used	Michigan Minnesota Ontario Wisconsin	
	Mills at:						
	Wisconsin Rapids, Wisc.						C&NW, SOO GB&W, MILW.
	Stevens Point, Wisc.						GB&W, SOO
	Appleton, Wisc.						C&NW, MILW, SOO
	Biron, Wisc.						GB&W

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

WISCONSIN (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROADS
	Purchasing	Transportation	Roundwood	Chips		
5. Cornell Paperboard Products Company Division of St.Regis Paper Company, Cornell, Wisconsin	H.E.Falbe Purchasing Agent	J.T.Williams, Traf.Manager Cornell Paperboard Pdts.Co. 1514 E.Thomas Ave.Milwaukee, Wisconsin	Aspen-R,HP	Not Used	Wisconsin	C&NW
6. Falls Paper & Power Co. Oconto Falls,Wisc. (Subsidiary of Scott Paper Company)	H.L.Woodin Pulpwood Buyer	Chas.T.Hill Traf.Manager Wisc.Mills Scott Paper Co. Marinette,Wis.	Aspen-R,HP Balsam-R Jack Pine-R Hemlock-R Spruce-R	Hemlock Dense Hardwds.	Manitoba Michigan Minnesota Saskatchewan Wisconsin	C&NW
7. Green Bay Packaging,Inc. P O Box 1107 Green Bay,Wisconsin	J.R.Wright Mgr.of Oprs. Mill Divn. A.G.Sedlacek Wood Buyer	R.VanderHeyden Traf.Manager	Dense Hardwds-R,HP,MP	Dense Hardwds.	Michigan Wisconsin	C&NW, GB&W, MILW.
8. Kansas City Star Co. Flambeau Paper Div. Park Falls,Wisconsin	W.P.Yost Dir. of Wood Procurement	Art Panke	Balsam-R Hemlock-R Spruce-R White Birch-R	Not Used	Michigan Wisconsin	SOO LINE

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

WISCONSIN (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION [1]/		SOURCES	RAILROADS
	Purchasing	Transportation	Roundwood	Chips		
9. Kimberly-Clark Corp. Neenah, Wisconsin Mills at: Kimberly, Wisconsin Niagra, Wisconsin Munising, Michigan	Regional Foresters: N.J.McKenna, James Bldg., Two Harbors, Minnesota L.A.Hillberg Box 717 Crandon, Wis. L.E.George 405 Norway St. Norway, Mich. R.J.Griewe, Champion, Mich. R.E.McCraney Newberry, Mich.	John C.Borg Traf.Mgr.	Aspen-R,HP Balsam-R,HP Spruce-R,HP	Not Used	Michigan Minnesota Wisconsin	 C&NW C&NW LS&I

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

WISCONSIN (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROAD
	Purchasing	Transportation	Roundwood	Chips		
10. Marathon-A Division of American Can Menasha, Wisconsin	R.E.Burke Manager- Woodlands. Asa Allhiser, Coordinator Rothschild, Wisconsin Don Lambrecht Area Supt. Menominee, Michigan Norman J.Peryam Area Supt. Amasa, Mich. E.J.Anderson Area Supt. Rothschild, Wisconsin	S.L.Porto District Trans.Mgr.	Aspen-R,HP,MP Dense Hrdwds- R,HP,MP Hemlock-R,HP, MP Soft Hrdwds-R, HP,MP Spruce-R,HP,MP	Spruce Dense Hard- woods Soft Hard- woods Hemlock Aspen	Manitoba Michigan Minnesota Ontario Saskat- chewan Wisconsin	
Mills At: Green Bay,Wisconsin						C&NW, GB&W, MILW.
Rothschild,Wisconsin						C&NW, MILW.

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

WISCONSIN (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROAD
	Purchasing	Transportation	Roundwood	Chips		
11. Mosinee Paper Mills, Inc. Mosinee, Wisconsin	F.N.Fixmer, Manager-Forest Oprs. T.F.Michal Dist.Forest Manager Solon Springs, Wisconsin R.L.Cross, Dist.Forester Rt.2, Woodruff, Wisconsin	E.Emerson Traf.Manager	Jack Pine-R Other Pine-R West.Pine-R Hemlock-R Dense Hardwoods-R	Not Used	Michigan Minnesota So.Dakota Wisconsin	MILW.
12. Nekoosa-Edwards Paper Company Port Edwards, Wis. Mills at: Port Edwards, Wisc. Nekoosa, Wisc.	R.A.Petry, Woodlands Manager, Port Edwards, Wisconsin E.C.Hendrickson, District Forester, Minoqua, Wisc. J.J.Moran Dist.Forester Ashland, Wisc.	D.G.Kettner Traf.Manager	Jack Pine-R, HP, MP Western Pine-R Aspen-R, MP, HP Dense Hardwds-R, MP, HP	Dense Hardwds Hemlock Pine West.Pine	Colorado Michigan Minnesota Montana So.Dakota Wisconsin	C&NW, MILW. SOO. C&NW, MILW., SOO

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITIONS[1]/		SOURCES	RAILROAD
	Purchasing	Transportation	Roundwood	Chips		
13. Owens-Illinois Glass Co Forest Products Div. Tomahawk, Wisconsin	M.P.Burgy Woodlands Manager, Tomahawk, Wisconsin	F.L.Conger Traf.Manager Toledo, Ohio	Aspen -R Soft Hrdwds-R Dense Hrdwds-R Hardwood Cones	Not Used	Michigan Wisconsin	MT&W, MILW
14. Peavy Paper Mills, Inc. Ladysmith, Wisconsin	N.D.Boss Pulpwood Buyer, Ladysmith, Wisconsin	E.Hoffman, Traf.Manager	Aspen-R	Not Used	Wisconsin	SOO
15. Rhinelander Paper Div. St.Regis Paper Co. Rhinelander, Wisconsin	Donald Trembath, Wdlds,Mgr. Rhinelander, Wisconsin	R.Everts Traf.Manager	Aspen-HP Spruce-R,P. Tamarack-R,HP	Not Used	Michigan Minnesota Saskat-chewan Wisconsin	C&NW, SOO
16. Scott Paper Company Marinette, Wisconsin	T.L.Christen-sen, Pur.Agt. Marinette, Wis.	Chas.T.Hill Traf.Manager Wisc.Mills Marinette, Wis.	Aspen-HP Balsam-R,HP Spruce-R.	Not Used	Manitoba Michigan Saskat-chewan Wisconsin	C&NW, MILW.

1/ Condition: R-Rough MP-Machine Peeled HP-Hand Peeled

WISCONSIN (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION 1/		SOURCES	RAILROAD
	Purchasing	Transportation	Roundwood	Chips		
17. Sterling Pulp & Paper Co. Eau Claire, Wisconsin	J.W. Landino Pulpwood Procurement Officer	J.A. Stewart Traf. Manager	Aspen-HP Balsam-HP Spruce-HP	Not Used	Alberta Manitoba Ontario Saskatchewan Wisconsin	C&NW, MILW., SOO
18. Thilmany Pulp & Paper Company Kaukauna, Wisconsin	Ken Kiffe Mgr. Pulpwood Procurement	H.G. Whitman Traf. Manager	Jack Pine-R West. Pine-R	Spruce West. Pine Hemlock	Idaho Michigan Minnesota Montana So. Dakota Wisconsin Wyoming	C&NW
19. Tomahawk Pulp Company Tomahawk, Wisconsin	C.J. Bronsted Manager		Aspen-HP,MP Balsam-HP Spruce-HP,MP	Not Used	Saskatchewan Wisconsin	MT&W, MILW.
20. Wausau Paper Mills Company Brokaw, Wisconsin	N.E. Revie Woodlands Mgr. Brokaw, Wisc.	E. Kutchera Traf. Manager	Aspen-HP,MP Balsam-HP,MP Spruce-HP,MP	Not Used	Manitoba Michigan Saskatchewan Wisconsin	MILW.

1/ Condition: R-Rough MP-Machine Peeled HP-Hand Peeled

MICHIGAN

	NAME AND LOCATION	PULPWOOD PROCUREMENT Purchasing	Transportation	SPECIES AND CONDITION[1]/ Roundwood	Chips	SOURCES	RAILROADS
1.	Abitibi Corporation Alpena, Michigan	J.C.Lamy Woods Mgr.	Wm.E.Kidd Asst.Traf.Mgr.	Aspen-R Balsam-R Spruce-R Hemlock-R Pine-R Misc.Hdwds-R	Not Used	Michigan	D&M
2.	Celotex Corporation L'Anse,Michigan	L.Sandberg Mgr-Forest. Div. L'Anse,Mich. M.O.Olson Dist.Forest- er L'Anse,Mich.	P.D.Walsh Traf.Mgr. 120 S.LaSalle St.,Chicago, Ill. 60603	Aspen-R	Not Used	Michigan	DSS&A
3.	Huss Ontonagon Pulp & Paper Co. Ontonagon,Michigan	Jack Reynolds Woods.Mgr. Ontonagon, Michigan		Aspen-R Dense Hdwds-R	Not Used	Michigan	MILW.
4.	Manistique Pulp & Paper Co. Manistique,Michigan	F.S.Hoholik President & Gen.Mgr.	F.J.Kasun	Balsam-R Spruce -R	Not Used	Michigan	AnnArbor, M&LS, SOO

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

MICHIGAN (continued)

	NAME AND LOCATION	PULPWOOD PROCUREMENT Purchasing	Transportation	SPECIES AND CONDITION[1]/ Roundwood	Chips	SOURCES	RAILROADS
5.	Mead Corporation Escanaba Division Escanaba, Michigan	P.B.Kreger Wood Buyer- Dist.Forest- er	H.J.Vanlerberghe Traf.Manager	Aspen-HP,MP Balsam-R Spruce-R	Not Used	Michigan	CNW, E&LS, MILW.
6.	Menasha Corporation Paperboard Division Otsego, Michigan	J.B.Watters Wood Buyer Otsego, Mich. John Hansen Forester Otsego, Mich.		Aspen-R Soft Hdwds-R Dense Hdwds-R	Not Used	Michigan	NYC
7.	Munising Paper Co. Munising, Michigan	Refer to Kimberly- Clark of Wisconsin					LS&I
8.	Packaging Corp. of America American Box Board Division Filer City, Michigan	A.F.Koller Woodlands Manager	W.B.Glaske Traf.Manager Grand Rapids, Michigan	Aspen-R Jack Pine-R Red Pine-R Dense Hardwds-R	Not Used	Michigan	C&O

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

MICHIGAN(continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROADS
	Purchasing	Transportation	Roundwood	Chips		
9. Scott Paper Company Detroit Division 9125 W.Jefferson Av. Detroit,Michigan	C.G.Allen Head of Woods Dept. Detroit,Mich.	J.R.Hulbert Traf.Manager	Aspen-HP,MP Balsam-HP,MP Spruce-HP,MP Soft Hard- wds-HP,MP Dense Hard- wds-HP,MP	Plan to use some chips this year	Michigan New Bruns- wick Ontario Quebec P.E.Island	MC,D&T
10. S.D.Warren Company 2400 Lakeshore Drive Muskegon,Michigan	J.N.Fields Woods Manager		Aspen-HP,MP Jack Pine-R Other Pine-R	Not used	Michigan	C&O

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

MINNESOTA

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROADS
	Purchasing	Transportation	Roundwood	Chips		
1. Blandin Paper Company Grand Rapids, Minnesota	M.J.Salisbury Woodlands Mgr. Grand Rapids, Minnesota	M.J.Salisbury	Aspen-R. Balsam-R. Spruce-R	Not Used	Manitoba Minnesota	GN
2. Hennepin Paper Company Little Falls, Minnesota	C.H.Rauach Vice Pres.- Mill Manager		Balsam-R, HP Spruce-R	Not Used	Minnesota	NP
3. Mando Division Boise Cascade Corp. International Falls, Minn.	G.B.Amidon, Vice Pres- Woodlands. F.T.Frederick- son, Forestry Supvr. H.J.Kerry Timber Buyer E.A.Longstaff Timber Buyer Fort Frances, Ontario R.C.MacDonell Timber Buyer Kenera, Ontario	F.E.Hufford Traf.Manager	Aspen-R Balsam-R Spruce-R Jack Pine-R	Not Used	Manitoba Minnesota Ontario Saskat- chewan	MD&W NP

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

MINNESOTA (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT Purchasing	Transportation	SPECIES AND CONDITION[1]/ Roundwood	Chips	SOURCES	RAILROADS
4. Northwest Paper Co. Cloquet, Minnesota	E.H.Nelson Chf. Pulpwood Buyer	F.E.Schueppert Traf.Manager	Aspen-HP Balsam-R,HP Jack Pine-R,HP Spruce-R,HP	Not Used	Manitoba Minnesota	D&NE, GN, MILW, NP
5. St. Regis Paper Co. Sartell, Minnesota	E.J.Gorman Woodlands Manager, Blackduck, Minnesota	Milan White Office Manager	Balsam-R Spruce-R	Not Used	Minnesota	NP
6. Superwood Corp. 14th Avenue West and Waterfront Duluth, Minnesota	J. R. Brosius Purchasing Agent, Duluth, Minn.	K.V.Hafner Vice Pres.of Sales and Traffic	Aspen-R Jack Pine-R	Use some chips	Minnesota Wisconsin	CNW, DM&IR, DSS&A, DWP and GN, MILW, NP and SOO
7. Wood Conversion Co. Cloquet, Minnesota	H.S.Olson Manager Wood Pdts.	W.B.Brown Traf.Manager	Aspen-R Jack Pine-R	Not Used	Minnesota	D&NE, GN MILW, NP

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

ILLINOIS

	NAME AND LOCATION	PULPWOOD PROCUREMENT Purchasing	Transportation	SPECIES AND CONDITION[1]/ Roundwood	Chips	SOURCES	RAILROADS
1.	Barrett Division Allied Chemical Corp. Peoria, Illinois	C.W.Stokes Pur.Agent		Aspen-R. Soft Hdwds-R.	Not Used	Illinois Wisconsin	CNW, CB&Q, C&IM, CRIP, GM&O, IC, IT, PENNA. M&STL, TPW
2.	Bird & Son, Inc. 1472 W.76th St. Chicago, Ill. 60620	H.W.Altman Pur.Agent, Western Div. Chicago, Ill.			Chips Only. Soft Hdwds. Dense Hdwds. Other Pine	Iowa Illinois Indiana	CNW, CB&Q, IC, NYC, CRIP, C&IM
3.	Certain-teed Products Corp. 17th and Broadway East St. Louis, Ill.	E.J.Hynes Pur.Agent East St. Louis, Ill.		Soft Hdwds-R.	Not Used	Indiana Missouri	CNW, B&O, C&EI, CB&Q CRIP, ES&LJ IC, IT, L&N, Man., MP, MKT, NYC, PENNA., NYC&StL, SL&B, SL&O StLSF, SLSW SOU, WAB, TRRA

1/ Condition: R - Rough HP - Hand Peeled MP - Machine Peeled

ILLINOIS (continued)

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROADS
	Purchasing	Transportation	Roundwood	Chips		
4. Flintkote Company Mt.Carmel, Ill.	F.Calabrese Plant Supt. R.R#3 Mt. Carmel,Ill.	G.A.Homeier Traf.Mgr. Chgo.Heights, Ill.	Soft Hdwds-R.	Not Used	Indiana Iowa	NYC,SQU
5. The Ruberoid Co. Joliet, Illinois	K.T.Peterson Pur.Agent Joliet, Ill.		Soft Hdwds-R	Soft Hdwds	Illinois	EJ&E

1/ Condition: R-Rough HP-Hand Peeled MP-Machine Peeled

IOWA

NAME AND LOCATION	PULPWOOD PROCUREMENT		SPECIES AND CONDITION[1]/		SOURCES	RAILROADS
	Purchasing	Transportation	Roundwood	Chips		
1. Barrett Division Allied Chemical Corp. Dubuque, Iowa	G.D."Jerry" Marshall, Plant For- ester, 130 S.Hill Dubuque,Ia.		Aspen-R Soft Hdwds-R Dense Hdwds -R	Aspen Soft Hdwds. Dense Hdwds.	Illinois Iowa Minnesota Wisconsin	CB&Q,CGW IC,MILW.
2. Consolidated Packaging Corporation Crandon Mill Division Box 155 Fort Madison,Iowa	Carl A. Langenbach, Woodlands Mgr Box 155 Fort Madison, Iowa		Soft Hdwds-R. Dense Hdwds-R.	Dense Hdwds.	Illinois Iowa Missouri	AT&SF, CB&Q

1/ Condition: R-Rough HP -Hand Peeled MP-Machine Peeled

TRANSPORTATION OF PULPWOOD

Pulpwood is a bulk commodity that must be moved to market economically. Railroads can do this consistently for both long and short distances. They provide year-round transportation that is not subject to seasonal load limits, sudden thaws, or other climatic factors.

The central United States and Canada are accessible to a network of railroads which haul material into major marketing areas. Relatively low transportation costs and dependable service make the railroads essential partners of the pulp and paper industry.

The economy of rail transportation is due in part to the heavy loads carried in a rail car. Loaded weights on a rail car are several times greater than those which can be carried in the size trucks commonly used for hauling pulpwood on the highways. Even the heaviest highway equipment that may legally be used will carry less than one-half the load of a rail car .

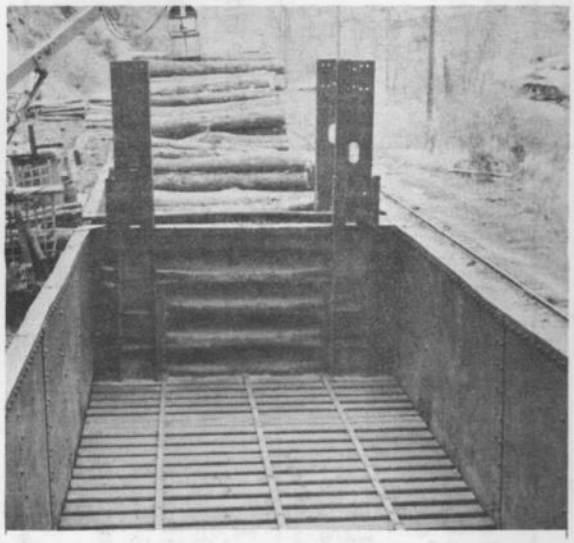

Fig. 2 Interior view of North Western's special pulpwood car showing construction of end-racks and self-cleaning floor.

The Chicago & North Western Railway has been engaged in an intensive program of updating their pulpwood car fleet to provide better and safer service for the pulpwood industry. In addition to reconditioning our fleet of standard pulpwood gondolas, a large number of cars have been modified specifically for pulpwood service.

A major feature of the North Western's special pulpwood car is the permanent end-rack. This eliminates the necessity for the shipper to build a temporary bulkhead of pulpwood sticks. A more stable load is possible with the steel end-racks and the safe loading height is extended to 9 1/2 feet, effectively increasing the safe loading capacity to over 22 cords.

Another feature of the North Western's end-rack pulpwood car is the self-cleaning floor constructed of steel decking that is spaced to permit most of the small debris which usually accumulates to fall through to the ground. This floor is more durable than the wooden floors, commonly used in the past, thus eliminating the safety hazard of missing floor planks.

Pulpwood should be loaded on rail cars in such a way that it will not shift in transit and protrude beyond the edge of the car, or fall off and scatter wood along the right-of-way. Loading rules require that shipments of peeled pulpwood be secured with wire in a fashion shown in Figure 5. It is also required that shipments of rough pulpwood originating from points in South Dakota, Wyoming and Nebraska, on the Chicago and North Western Railway be secured with wire. The pulpwood shipper should consult his local freight agent for the proper loading regulations for his area.

Where there is any appreciable taper in the log to be loaded it is possible to secure a better load if the butts of some of the logs are alternated with the small ends. A car that is evenly loaded will usually scale better at the mill.

Fig. 3 End-rack pulpwood gondola.

In all cases, except where a car with a permanent end-rack is used, it is necessary to build a temporary bulkhead by placing pulpwood bolts vertically at the ends of the car. These sticks should be as nearly uniform in size as possible so that they will be held firmly in place by the ensuing load. The entire end of the car should be filled so that the sticks cannot tip to one side and protrude beyond the end of the car. This might cause them to catch on a passing train or some stationary object in close clearance.

It is possible to extend the height of the temporary bulkhead to permit greater loading of the car by first loading a few rows of pulpwood in the bottom of the car in normal fashion. The end stakes can then rest on these bolts and subsequent loading will hold them firmly in place. It will then be possible to take advantage of the maximum loading height of 9 1/2 feet. Maximum loading of cars results in the most favorable costs to both the shipper and the receiving pulpmill. It also makes the best use of available rail equipment so that fewer cars are required to move an equivalent volume of pulpwood.

Fig. 4 Properly loaded and wired car of peeled pulpwood.

CARLOAD FREIGHT RATES ON PULPWOOD

To Stations On The

CHICAGO AND NORTH WESTERN RAILWAY COMPANY

From Points In

WISCONSIN AND UPPER MICHIGAN

This is not a Tariff and rates shown herein are subject to change without notice. This information has been prepared as a guide only. For actual rates consult appropriate Tariffs.

The rates listed herein are representative of points published in various tariffs of the Chicago and North Western Railway, based on a single line haul. Rates from intermediate points may be considered similar to the rate from the next point beyond.

PULPWOOD FREIGHT RATES

DESTINATION / ORIGIN	Cornell, Wis.		Eau Clair, Wis.		Rothschild, Wis.		Rhinelander, Wis.	
	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B
Bayfield, Wis.	12.25	10.45	12.25	10.45	13.25(1) 15.25	13.05	10.75(1) 11.25	9.65
Cable, Wis.	10.75	9.15	10.75	9.15	13.25	----	12.25	10.45
Spooner, Wis.	9.75	8.35	9.25	7.95(4)	13.25	----	12.25	10.45
Solon Springs, Wis.	10.75	9.15	10.75	9.15	15.25	----	12.25	----
Loretta, Wis.	10.75	9.15	10.75	9.15	12.25	----	16.25	13.85
Couderay, Wis.	9.75	8.35	9.75	8.35	12.25	----	15.25	13.05
Black River Falls	9.75	8.35	8.25	7.45	9.75	8.35	12.25	10.45
Wyeville, Wis.	10.75	9.15	9.25	7.95	10.75	9.15	13.25	11.35
Hurley, Wis.	13.25	11.35	13.25	11.35	12.25	10.35	8.75	7.45
Monico, Wis.	15.25	13.05	12.25	10.45	8.75	7.45	5.25	---
Laona, Wis.	17.25	14.75	15.25	---	11.25	9.65	11.25	9.65
Antigo, Wis.	12.25	10.45	12.25	10.45	6.75	----	7.75	7.45
Gillette, Wis.	15.25	13.05	13.25	11.35	9.75	8.35	11.25	9.65
Woodruff, Wis.	16.25	13.85	15.25	13.05	9.25	7.95	5.50	---
Eagle River, Wis.	16.25	13.85	15.25	13.05	9.25	8.35	6.75	---
Marinesco, Mich.	15.5	13.3	15.5	13.3	12.25	10.35	10.0	8.6
Watersmeet, Mich.	16.5	14.1	16.5	14.1	10.75	9.15	9.0	7.7
Crystal Falls, Mich.	18.5	15.8	17.5	15.0	12.25	10.35	11.5	9.9
Iron Mountain, Mich.	18.5	15.8	18.5	15.8	13.25	11.35	11.5	9.9
Felch, Mich.	19.5	16.7	18.5	15.8	15.25	13.05	13.5	11.6
Ishpeming, Mich.	19.5	16.7	19.5	16.7	16.25	13.85	16.5	14.1
Carney, Mich.	18.5	15.8	17.5	15.0	15.25	13.05	13.5	11.6

(A) Single car rates and minimums. Minimum weight - peeled poplar 55,000 lbs. Other peeled wood 60,000 lbs. Other than peeled 70,000 lbs.

(B) Applies only on lots of ten or more cars. Same minimum weights as single car rates.

(1) Single car rates and minimums - peeled 80,000 lbs. Other than peeled 95,000 lbs. Rate only applies on ex-lake traffic.

PULPWOOD FREIGHT RATES

DESTINATION / ORIGIN	Wisconsin Rapids, Wis.		Port Edwards, Wis.		Nekoosa, Wis.		Marinette, Wis.	
	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B
Bayfield, Wis.	13.25(1) 15.25	13.05	13.25(1) 15.25	13.05	13.25(1) 15.25	13.05	16.25	13.85
Cable, Wis.	13.25	13.05	15.25	13.05	15.25	13.05	16.25	13.85
Spooner, Wis.	12.25	10.45	12.25	10.45	12.25	10.45	18.25	15.55
Solon Springs, Wis.	12.25	- - - -	12.25	- - - -	12.25	- - - -	18.25	15.55
Loretta, Wis.	10.75	9.15	10.75	9.15	10.75	- - - -	19.25	16.45
Couderay, Wis.	10.75	10.45	10.75	- - -	10.75	- - - -	18.25	15.55
Black River Falls	9.25	7.95	9.25	7.95	9.25	7.95	15.25	13.05
Wyeville, Wis.	10.25	8.75	10.25	8.75	10.25	8.75	16.25	13.85
Hurley, Wis.	12.25	- - -	12.25	- - -	12.25	- - -	13.25	11.35
Monico, Wis.	11.25	9.65	11.25	9.65	11.25	9.65	12.25	10.45
Laona, Wis.	12.25	- - -	12.25	- - -	12.25	- - -	9.75	8.35
Antigo, Wis.	10.25	8.75	10.75	9.15	10.75	9.15	11.25	9.65
Gillette, Wis.	12.25	10.45	12.25	10.45	12.25	10.45	6.75	- - -
Woodruff, Wis.	10.25	- - - -	10.25	- - - -	10.25	- - - -	13.25	11.35
Eagle River, Wis.	12.25	10.45	12.25	10.45	12.25	10.45	12.25	10.45
Marinesco, Mich.	15.5	13.3	15.5	13.3	15.5	13.3	12.5	10.7
Watersmeet, Mich.	12.5	10.7	12.5	10.7	13.5	11.6	11.0	9.4
Crystal Falls, Mich.	16.5	14.1	16.5	14.1	16.5	14.1	9.5	8.2
Iron Mountain, Mich.	16.5	14.1	16.5	14.1	16.5	14.1	8.5	7.7
Felch, Mich.	17.5	15.0	17.5	15.0	17.5	15.0	7.0	- - -
Ishpeming, Mich.	18.5	15.8	18.5	15.8	18.5	15.8	9.0	7.7
Carney, Mich.	15.5	13.3	15.5	13.3	15.5	13.3	7.0	- - -

(A) Single car rates and minimums. Minimum weight - peeled poplar 55,000 lbs. Other peeled wood 60,000 lbs. Other than peeled 70,000 lbs.

(B) Applies only on lots of ten or more cars. Same minimum weights as single car rates.

(1) Single car rates and minimums - peeled 80,000 lbs. Other than peeled 95,000 lbs. Rate only applies on ex-lake traffic.

PULPWOOD FREIGHT RATES

DESTINATION / ORIGIN	Peshtigo, Wis.		Oconto Falls, Wis.		Green Bay, Wis.		Kaukauna, Wis.	
	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B
Bayfield, Wis.	16.25	13.85	16.25	13.85	16.25	13.85	15.25(1) 16.25	13.85
Cable, Wis.	17.25	14.75	17.25	14.75	15.25	13.05	15.25	14.75
Spooner, Wis.	18.25	15.55	18.25	15.55	15.25	13.05	15.25	14.75
Solon Springs, Wis.	19.25	16.45	17.25	16.45	15.25	13.05	15.25	- - - -
Loretta, Wis.	19.25	16.45	19.25	16.45	15.25	- - - -	15.25	- - - -
Couderay, Wis.	18.25	15.55	18.25	15.55	15.25	- - - -	15.25	- - - -
Black River Falls	13.25	11.35	13.25	11.35	12.25	10.45	12.25	10.45
Wyeville, Wis.	15.25	13.05	15.25	13.05	13.25	11.35	13.25	11.35
Hurley, Wis.	13.25	11.35	13.25	11.35	13.25	11.35	13.25	11.35
Monico, Wis.	12.25	10.45	12.25	10.45	10.75	9.15	10.75	9.15
Laona, Wis.	9.75	8.35	9.75	8.35	9.75	8.25	10.75	9.15
Antigo, Wis.	10.75	9.15	10.75	9.15	9.75	8.35	9.75	8.35
Gillette, Wis.	6.75	- - - -	6.75	- - - -	6.75	- - - -	8.25	7.45
Woodruff, Wis.	12.25	10.45	12.25	10.45	12.25	10.45	12.25	10.45
Eagle River, Wis.	12.25	10.45	12.25	10.45	11.25	9.65	12.25	10.45
Marinesco, Mich.	12.5	10.7	13.5	11.6	13.05	11.6	13.05	11.6
Watersmeet, Mich.	12.5	10.7	12.5	10.7	12.5	10.7	12.5	10.7
Crystal Falls, Mich.	10.5	9.0	15.5	13.3	11.5	9.9	12.5	10.7
Iron Mountain, Mich.	9.5	8.2	10.5	9.0	11.0	9.4	11.5	9.9
Felch, Mich.	10.0	8.6	11.0	9.4	11.5	9.9	12.5	10.7
Ishpeming, Mich.	11.5	9.9	12.5	10.7	12.5	10.7	13.5	11.6
Carney, Mich.	7.0	- - - -	9.0	7.7	9.5	8.2	10.5	9.0

(A) Single car rates and minimums. Minimum weight - peeled poplar 55,000 lbs. Other peeled wood 60,000 lbs. Other than peeled 70,000 lbs.

(B) Applies only on lots of ten or more cars. Same minimum weights as single car rates.

(1) Single car rates and minimums - peeled 80,000 lbs. Other than peeled 95,000 lbs. Rate only applies on ex-lake traffic.

PULPWOOD FREIGHT RATES

DESTINATION / ORIGIN	Combined Locks, Wis.		Kimberly, Wis.		Appleton, Wis.		Menominee, Mich.(c)	
	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B	Col. A	Col. B
Bayfield, Wis.	16.25	13.85	16.25	13.85	16.85	13.85	16.5	- - - -
Cable, Wis.	15.25	14.75	15.25	14.75	15.25	13.85	16.5	- - - -
Spooner, Wis.	15.25	14.75	15.25	14.75	15.25	14.75	16.5	- - - -
Solon Springs, Wis.	15.25	- - - -	15.25	- - - -	15.25	- - - -	18.5	- - - -
Loretta, Wis.	15.25	- - - -	15.25	- - - -	15.25	- - - -	19.5	- - - -
Couderay, Wis.	15.25	- - - -	15.25	- - - -	15.25	- - - -	18.5	- - - -
Black River Falls	12.25	10.45	12.25	10.45	12.25	10.45	15.5	- - - -
Wyeville, Wis.	13.25	11.35	13.25	11.35	13.25	11.35	16.5	
Hurley, Wis.	13.25	11.35	13.25	11.35	13.25	11.35	13.5	
Monico, Wis.	10.75	9.15	10.75	9.15	10.75	9.15	12.5	
Laona, Wis.	10.75	9.15	10.75	9.15	10.75	9.15	10.0	
Antigo, Wis.	9.75	8.35	9.75	8.35	9.75	8.35	11.5	
Gillette, Wis.	8.75	7.45	8.75	7.45	8.75	7.35	7.0	
Woodruff, Wis.	12.25	10.45	12.25	10.45	12.25	10.45	13.5	
Eagle River, Wis.	12.25	10.45	12.25	10.45	11.25	9.65	12.5	
Marinesco, Mich.	13.05	11.60	13.05	11.60	13.05	11.60	12.5	
Watersmeet, Mich.	12.5	10.7	12.5	10.7	12.5	10.7	11.5	
Crystal Falls, Mich.	12.5	10.7	12.5	10.7	12.5	10.7	10.0	8.6
Iron Mountain, Mich.	12.5	10.7	12.5	10.7	11.5	9.9	9.0	7.7
Felch, Mich.	12.5	10.7	12.5	10.7	12.5	10.7	10.0	8.6
Ishpeming, Mich.	13.5	11.6	13.5	11.6	13.5	11.6	11.0	9.4
Carney, Mich.	11.0	9.4	11.0	9.4	11.0	9.4	7.0	- - - -

(A) Single car rates and minimums. Minimum weight - peeled poplar 55,000 lbs. Other peeled wood 60,000 lbs. Other than peeled 70,000 lbs.

(B) Applies only on lots of ten or more cars. Same minimum weights as single car rates.

Rates on pulpwood originating in the Lake States are quoted in cents per hundred pounds, and are normally based on a mileage scale. Joint line rates are generally higher for an equivalent mileage, depending on the number of carriers involved. Typical freight rates for a single line haul from points in Wisconsin and Upper Michigan are shown in tables on page 31 through page 34.

Only in a few instances are cars of pulpwood actually weighed in order to determine the freight charges applied to the car. The Western Weighing and Inspection Bureau has established agreed weights on pulpwood to eliminate the cost of weighing. These weights were determined by weighing a large number of cars, and represent the average weight that might be expected. Freight charges are determined by multiplying the agreed weight for the particular species and condition by the mill scale in cords.

These weights are shown in the following table:

Agreed Weights

Pulpwood, 100 inch, originating in Wisconsin, Upper Peninsula of Michigan, and Minnesota.

	Schedule weights per cord of 128 cubic feet.	
	Wisc. & Mich.	Minnesota
Ash, Rough	4,400	--
Balsam, Rough	4,700	4,400
Balsam, Peeled (Other than machine peeled)	3,400	3,200
Birch, Rough	4,600	4,700
Birch, Peeled (Other than machine peeled)	3,500	--
Birch, 50 in., Peeled (Other than machine peeled)	4,200	--
Hardwood, Mixed, Rough	4,700	--
Hardwood, Peeled (Other than machine peeled)	3,500	--
Hemlock, Rough	4,500	--
Hemlock, Peeled (Other than machine peeled)	3,400	--
Pine, Rough	4,400	4,300
Pine, Peeled (Other than machine peeled)	3,100	3,100
Poplar, Rough	4,100	4,300
Poplar, Peeled (Other than machine peeled)	3,000	3,000
Poplar, 55 in., Peeled (Other than machine peeled)	3,700	--
Poplar, 100 in., Machine Peeled	4,500	--
Spruce, Rough	4,300	4,100
Spruce, Peeled (Other than machine peeled)	3,100	3,100
Tamarack, Rough	4,000	--

Pulpwood originating in the Rocky Mountain Region moves under rates established on a per cord basis. The carload minimum varies from 21 to 25 cords, depending on the size of the car furnished by the railroad, as specified in the tariff.

While single line rates are generally most favorable, it is sometimes necessary to route shipments over more than one rail line because of the source of wood. Typical routing for shipments originating at points located beyond Chicago and North Western territory are as follows:

RAIL ROUTINGS FROM CONNECTING LINES TO POINTS ON THE CHICAGO AND NORTH WESTERN RAILWAY.

FROM:	ROUTING:
Canadian Pacific Ry.Co. (Western Canada)	CP-Emerson, Man., Noyes, Minn., Soo Line-Superior, Wisc., C&NW
	CP-North Portal, Sask., Portal, N.D., Soo Line-Superior, Wis., C&NW.
Canadian National Rys. (Western Canada)	CN-Fort Francis, Ont., DW&P-Superior, Wisc., C&NW
Union Pacific R.R. (Wyo., Colo., Mont., Idaho)	UP-Omaha, Nebr., C&NW
Denver & Rio Grande Western RR Co. (Colorado)	D&RGW-Pueblo, Colo., MP-Omaha, Nebr., C&NW
Chicago, Milwaukee, St.Paul & Pacific R.R. Co. (Montana)	CMStP&P-Minneapolis, Minnesota Transfer, or St.Paul, Minn., C&NW
Great Northern Ry Co. (Montana)	GN-Minneapolis, Minn. Transfer, or St.Paul, Minn., C&NW
(Minnesota)	GN-Superior, Wisc., C&NW
Northern Pacific Ry.Co. (Montana)	NP-Minneapolis, Minnesota Transfer, or St.Paul, Minn., C&NW
(Minnesota)	NP-Superior, Wisc., C&NW
Duluth, Winnipeg & Pacific Ry. (Minnesota)	DWP-Superior, Wisc., C&NW
Duluth, Missabe and Iron Range Ry.Co. (Minnesota)	DM&IR-South Itasca, Wis., C&NW

TRANSPORTATION OF WOODCHIPS

The greatest percentage of woodchips in North Western territory are moved in box cars. Because of the bulky nature of the chips it is necessary to use the largest capacity cars available in order to obtain an economic load. For this reason, 50 foot, wide door, box cars are used . These cars have an average capacity of 4800 cubic feet. The net weight of chips carried in a car of this type ranges from 105,000 to 120,000 lbs. depending on the compaction, density of the wood and the moisture content.

Box cars offer a number of advantages over open-top cars in the transportation of chips. Perhaps the most important is that they prevent loss and contamination of the chips. The closed car also prevents the chips from picking up additional moisture from rain and snow. Unloading of chips from a box car is little affected by sub-zero weather, whereas freezing of chips in open-top cars employing bottom-unloading can cause serious problems.

Box cars are loaded with relative ease, using pneumatic loading systems. Essentially, automated loading of a car may be accomplished in about two hours. Improved unloading systems require about the same time. Cars may be unloaded by tractors with hydraulic buckets or by specially developed pneumatic diggers.

Fig. 5 Unloading box car of woodchips.

Open-top cars are presently used by two pulpmills in Chicago and North Western territory. Their use permits a simplified loading system since the car may be loaded from the top. Gravity or pressure loading systems may be used, although gravity loading usually results in poor compaction of the chips. The cubic capacity of a standard gondola is insufficient to permit the car to be loaded to an economical weight and it is necessary to modify existing cars by extending the sides in order to increase capacity to a reasonable volume.

Gondolas for use in woodchip service are usually of the hopper or bottom-dump type to permit unloading of chips into a pit where they can be conveyed into the pulpmill system or into storage. This type of car is generally satisfactory from the unloading standpoint in warmer climates, however freezing of chips creates serious unloading problems in northern climates during extended sub-freezing weather.

Another problem encountered in the use of open-top woodchip cars is the loss of chips. On longer distances this can often exceed a ton of green chips. This represents an economic loss in raw material and can create a serious fire hazard on the railroad right-of-way.

The Chicago and North Western Railway developed an experimental open-top woodchip car with the objective of solving some of the special problems involved in the use of this type of equipment.

This experimental car, M&STL 30501, was constructed from a basic drop-bottom gondola of the type used by the railroad to haul ballast. The sides of the car were extended to provide additional capacity. Internal knee braces were used to give support to the sides since horizontal supports often interfere with loading and unloading of chips.

The top of the car consisted of a partially closed roof. This was designed to reduce blow-off and contamination from snow, rain and other foreign matter. The opening, running lengthwise to the car, was necessary to permit top loading. So constructed, this experimental car had a capacity of 4680 cubic feet. With pressure loading systems it was possible to obtain loads with a net weight of over 105,000 pounds on several test loadings. Some modification of the loading system could possibly have resulted in even greater loading, giving the car a capacity equal to a 50 ft. box car.

In practice the drop-bottom proved faster unloading as compared to the hopper type car. However, under normal weather conditions both types could be unloaded at a faster rate than the chips could be carried away. It was determined that the problem of partially frozen chips could not be entirely solved when using bottom-unloading cars and excessive mechanical vibration as well as manpower were required to complete the process during the winter months.

Experience with this experimental car, as well as hopper bottom cars with built-up sides, indicates that a box car is the most satisfactory

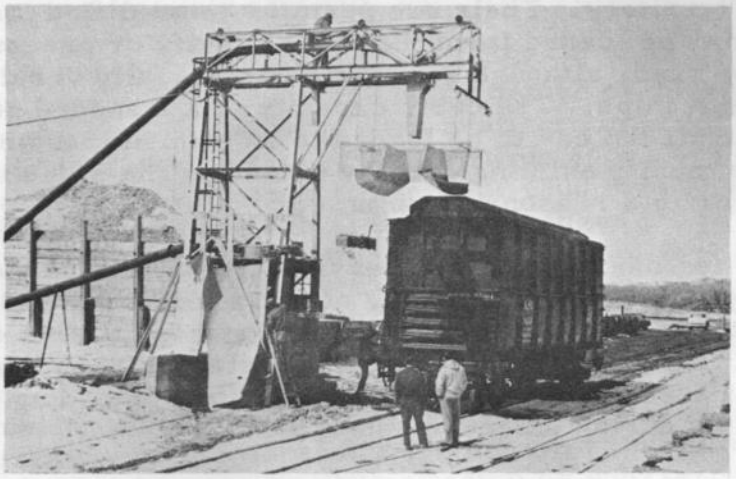

Fig. 6 North Western's experimental open-top woodchip car.

type of equipment for transporting woodchips under present circumstances. Some modification of the standard box car design could possibly effect some improvement in the ease of loading and unloading. A universally acceptable chip car design will require additional research.

Woodchip rates are established on a point to point basis. Each rate represents a special case, subject to negotiation, and no attempt will be made to cover them here. In many cases woodchips move under carload rates with no minimum weight specified. In a few instances, where woodchips are shipped in open-top cars, weight is used as the basis for the rates. In this case it is usually necessary to provide special equipment. Inquiries concerning rates on woodchips should be directed to the nearest railroad traffic representative.

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