

Caboose shortages during 1946 caused DM&IR to lease cabooses from EJ&E. Still requiring cabooses DM&IR purchased nine EJ&E cabooses; 5, 88, 96, 101, 120, 123, 144, 145, 155 in December 1948 and placed them in service. It took until February 21, 1950, for all of them to be repainted and renumbered as DM&IR C-90 to C-98. Built to EJ&E designs, they took on their own appearance. Carbodies and underframes were identical, but cupola roofs and letterboards were different from car to car. DM&IR C-91 at Mitchell, May 11, 1960 (Bruce Meyer)



DM&IR installed plywood sheathing to 12 cabooses and "DuroPly" sheathing to six cabooses between 1964 and 1970. DM&IR C-91 received "DuroPly" sheathing and is at Virginia sporting new paint, Scotchlite monograms and lettering on July 27, 1969. C-91 was the only former EJ&E caboose that was sheathed. It was sold to Hyman Michaels scrap yard on May 22, 1975. (Owen Leander)

February 21, 1950. Cars required additional repairs which were approved on AFE 6498 for $4,050 on March 28, 1949. This included the installation of conductor's table and chair, folding table, small water tank, seat cushions and backs, dry hopper toilet and ventilator, marker brackets and Aladdin lamps. The nine wandered the rails while waiting to be painted with one being used out of Mitchell Yard at Hibbing in March and April, 1949.

BUILDING MORE CABOOSES

Still faced with a continuing caboose shortage, the construction of two new wood cabooses was approved on AFE 6951 on March 30, 1950. The Mechanical Department was instructed to submit a report on the possibility of constructing the caboose bodies on existing merchandise underframes. Two Harbors was completing the rebuild of six refrigerator

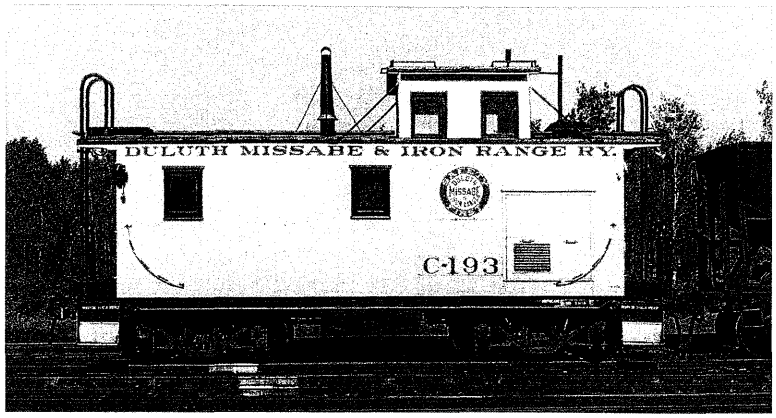
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cars with new underframes, ends and application of AB brakes, and notified management that once work was completed that an assembly line would be established for fabrication of the new caboose. Because of the difficulties and excessive man-hours involved in reworking underframes on suitable merchandise cars it was decide to build new underframes.

Cabooses C-192 and C-193 were approved for construction based on the 1947 approved design. Caboose C-153 had burned on the Missabe Division and was still awaiting repairs and it was recommended that this underframe and one new one be used. After inspection of C-153, it was decided to fabricate two complete underframes. If secondhand trucks were used it was estimated that each could be built for between $7,000 and $7,600. Secondhand trucks from box cars 5312 and 5334 were used. Radios and electric lighting were removed from C-186 and C-161 and used on C-192 and C-193. Management wanted the cabooses completed by May 1, 1951, in time for the 1951 season. This was insufficient time to complete engineering drawings and it was requested that caboose C-191 and a Class G-2 caboose be spotted at Two Harbors to be used a samples for checking dimensions while the cars were constructed. Cars were placed in service during July 1951. It is unclear if cars were plywood sheathed when built or if plywood sheathing was applied at a later date.

FIRST EXTENDED-VISION CABOOSES

After C-192 and C-193 were completed management made the decision to buy instead of build. International Car Co. of Kenton, Ohio, had designed a new cupola caboose with the cupola extending over the side sheets of the car. This new "extended-vision" caboose offered the advantages of a bay-window caboose but was safer by placing the crew members at a higher vantage point which allowed better inspection of trains and kept them away from possible shifted loads on flat cars and gondolas.

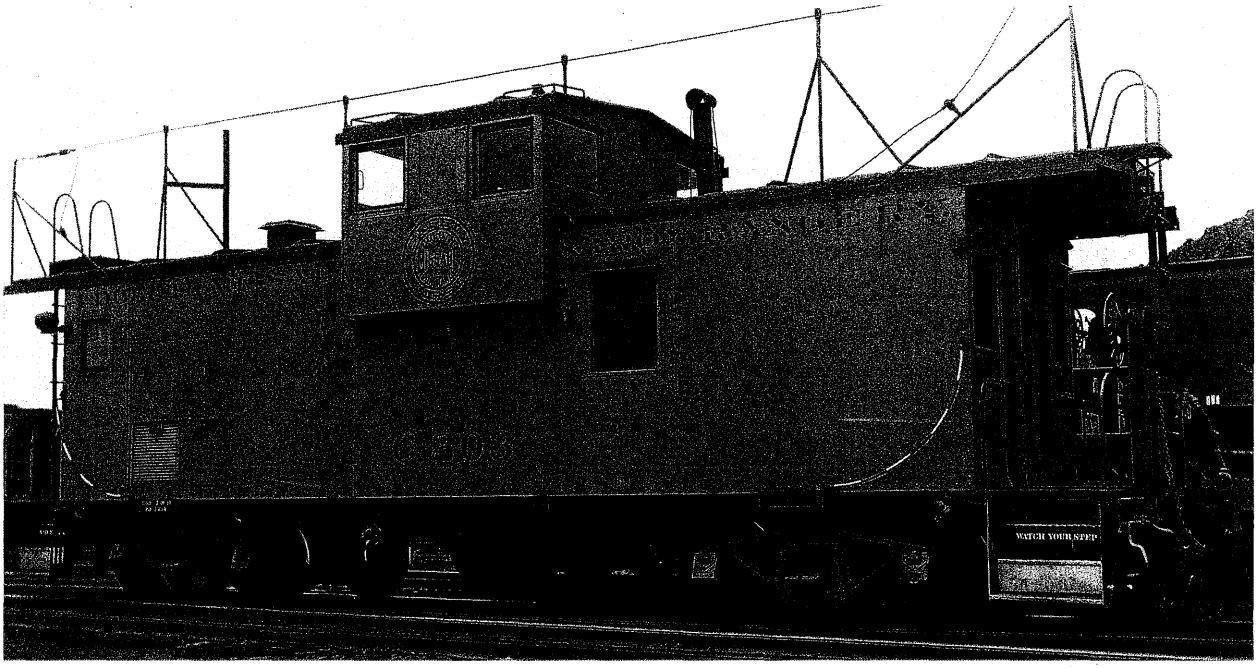


The caboose shortage during World War II caused DM&IR to form a caboose committee in 1947 to develop a new wooden caboose design. One prototype car C-191 was rebuilt from fire damaged C-18 in April 1947. Finally in 1950 shop time was available and two additional 1947-design cabooses C-192 and C-193 were constructed at Two Harbors. It is unclear if cars were plywood sheathed when built. C-193 at Steelton, June, 1972. (Ted Schnepf collection)

The demonstrator caboose completed by International Car was of all riveted construction; subsequent cars for other railroads would be all welded with a few minor exceptions. DM&IR placed an order with International Car on AFE 7073 September 17, 1951, to purchase twenty extended-vision cabooses for $291,421.76. Numbered C-200 through C-219, this included the riveted demonstrator caboose numbered as C-200. All of the cars were of riveted construction, but the rivet pattern on C-200 was different then the C-201 thru C-219.

Cars were delivered painted yellow with black lettering and roofs, 9-inch reporting marks on side and cupola ends, and a DM&IR stencil type safety-first monogram centered below the cupola windows. These were the first new-built extended vision cabooses in North America and the design would go on to become the most common caboose in North America. Cars were delivered with cupola roof-mounted marker lights. These marker lights began to be removed in late 1969 and replaced with red marker lights installed underneath the peak of the roof on each end. They were delivered dur-

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By 1950 most railroads had started to replace their aging wood caboose fleets with steel cars. DM&IR decided in 1951 to place an order for 20 riveted steel cabooses C-200 through C-219 with International Car Co. International had developed an "extended vision" caboose that had a cupola that extended over the edges of the carbody allowing a high and wide vantage point for crew members to observe their trains. The first car, C-200, originally built as a demonstrator caboose, differed from the others by having a different rivet pattern. Not delivered with radio equipment, DM&IR quickly installed radios after delivery as shown by C-203 at Proctor, July 27, 1957. (Bob's Photo collection)



Delivered with DM&IR stencil monogram on cupola it has been painted over in this view of C-201 at Duluth, July 7, 1963. The riveted extended vision caboose would be unique to DM&IR with all others built for other railroads being of welded construction. (D. Repetsky, John C. La Rue, Jr. collection)

ing 1952 and placed in service in numeric order; 5 in April, 10 in May, 5 in June, one in July.

On February 27, 1952, instructions were issued to remove radios and Witte engines from 15 wooden cabooses in the poorest condition. These were: Missabe Division-assigned C-43, C-44, C-129, C-163, C-168, C-172 and C-175, and Iron Range Division-assigned C-38, C-52, C-56, C-57, C-58, C-132, C-135, and C-136. Radios were then installed in the C-200 to C-214 once delivered. Cabooses C-215 to C-219 received brand-new radios once delivered.

Cost savings on DM&IR became a driving factor in the 1960s with the declining ore business. When wood sheathing on cabooses deteriorated beyond economical repair it would be replaced by plywood sheathing. From 1964 until 1970 cabooses C-39, C-44, C-58, C-135, C-136, C-138, C-143, C-144, C180, C191, C-192, and C-193 were rebuilt with plywood sheathing. Cabooses C-15, C-38, C-43, C-50,

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1960s standard extended vision caboose paint job is depicted by C-212 at Keenan, September 10, 1978 with maroon roof, lettering and early "Scotchlite" monogram and no red hash stripes on the side of the carbody. (R.F. Kucaba)

C-56 and C-91 were rebuilt with "Duroply" sheathing which looked much like plywood. The economic downturn during 1962 caused 21 cabooses to be placed in dead storage at the end of the 1962 shipping season and not to be used during 1963. Changes in environmental laws in Wisconsin forced cabooses C-44 and C-180 to be equipped with retention toilets by 1974, allowing them to be used on transfer runs on the Interstate Branch.



Extended vision caboose C-218 is in fresh paint at Duluth, on July 7, 1963. (D. Repetsky, John C. La Rue, Jr. collection)

T-BIRD AND MINNTAC BAY-WINDOW CABOOSES

Development of taconite created the need for specialized equipment to handle this new product. Taconite pellet and crude taconite ore cars were rebuilt from older 70-ton ore cars. Class Q covered hoppers were acquired to transport bentonite clay. Eveleth Taconite at Forbes, required DM&IR to operate crude taconite trains from the T-Bird North loadout in late 1965 and later the T-Bird South loadout in 1976. Both loadouts could accommodate ore cars but cupola-equipped cabooses would not fit through these facilities.

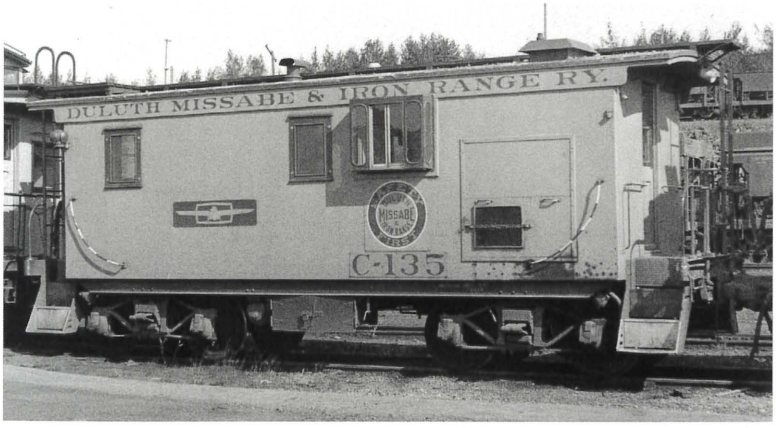
Operations of the T-Bird crude trains required a caboose at each end of the train because there was no loop track at the loadout and DM&IR wanted to avoid switching the cabooses at the loadout. Cabooses C-190 and C-191 were chosen to be rebuilt for T-bird crude taconite service on AFE 9924 June 30, 1965. A third caboose was considered for rebuilding to allow out-of-service time but R.H. Seitz, chief mechanical officer, indicated that it would be considered at a later date. Cupolas were removed, smokestack was shortened and roof access ladders on ends were cut down to roof level, creating a low-profile caboose that would fit in the loadout. A locomotive-style winterized window was installed on the side of the carbody below the original cupola location allowing crews a side view of their train. New locomotive-type revolving seats were installed inside next to the winterized windows. Rebuilding was completed September 30, 1965.

DM&IR Management Services Department in 1964 was looking at ways to improve loading time at Minntac. It indicated having bay window cabooses on Minntac pellet trains would help the loading process at an annual cost savings of $9,950. Frank King, industrial engineer for DM&IR, submitted project MS-

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The crude taconite loadouts at T-Bird North and South required non-cupola cabooses to clear loading equipment. Three wood cabooses were modified for this service, two, C-190 and C-191, in 1965 and after C-190 was wrecked in 1967, C-135 was rebuilt in 1967. All were identical and equipped with a winterized window to replace the cupola. C-191 is seen at Rainy Jct. Yard Virginia, July 27, 1969. It was sold June 20, 1977, to Lake Superior Railroad Museum on June 15, 1982 for fund-raising purposes. (Owen Leander)



The T-Bird logo was unique to the three wood rebuilt cabooses and to the first two rebuilt groups of T-Bird ore service cars. C-135 Virginia, July 27, 1969. (Owen Leander, John C. La Rue, Jr. collection)



C-209 Keenan, June 20, 1977. Note access doors and exhaust stack for Witte engine and standard marker lights in the right corner and. (R.F. Kucaba)

One of two Minntac service extended-vision cabooses rebuilt in 1967 with side windows was C-210 at Virginia, on July 4, 1971. Before rebuilding was complete the plan to use them in Minntac service was eliminated and both cabooses were placed in regular service. (Owen Leander, John C. La Rue, Jr. collection)



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Above: The opening of T-Bird South loadout for crude taconite on July 21, 1976, caused four cabooses, C-204, C-205, C-218, C-219, to be rebuilt in February 1976 for T-Bird mine service. Unlike earlier side-window conversions, DM&IR purchased bay-window kits from International Car to modify the extended-vision cabooses. C-218 at Keenan, September 10, 1978.



Right: Winter always found DM&IR with excess equipment available for lease. C-205 is at Dolton, Illinois, on lease to Louisville & Nashville R.R. on January 3, 1978. (Two photos, R.F. Kucaba)

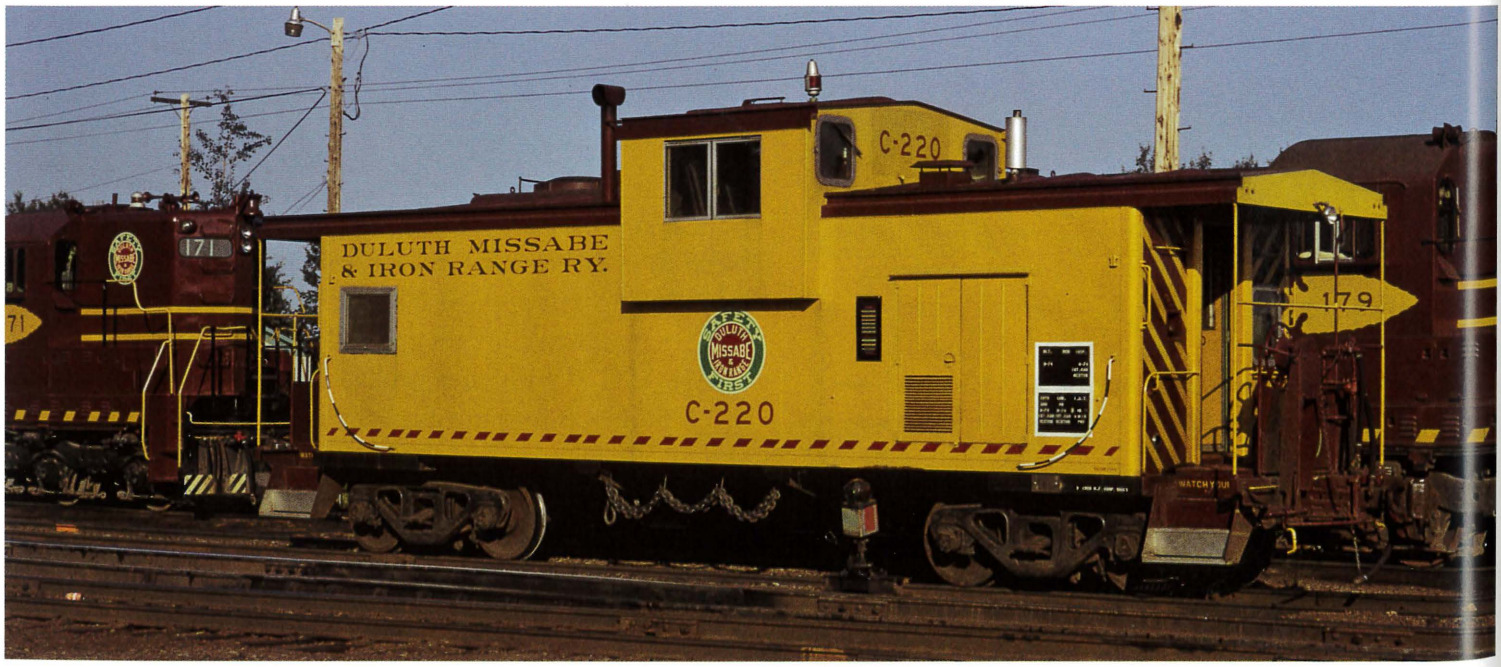
1110 to cancel this rebuilding on August 15, 1967, but it was tabled because rebuilding had already begun. Three cabooses were chosen to be rebuilt in 1967; C-135 for T-Bird service and C-209, C-210 for Minntac service. T-Bird service caboose C-190 was wrecked in June 1967, retired on July 25, 1967, and C-135 was rebuilt as its replacement. All three were rebuilt in late 1967 to identical specifications as C-190 and C-191. C-135 was a wood caboose, but C-209 and C-210 were originally built as steel extended-vision cabooses in 1952. By 1969, C-135 and C-191 had received a maroon placard with "T-Bird" logo in yellow. By the mid-1970s this logo had been removed. It is unknown if C-209 or C-210 were ever used on Minntac pellet trains as assigned cabooses.

Eveleth Taconite started to expand operations again in 1975 and on July 21, 1976, the first crude taconite train was loaded at the new T-Bird South loadout. Having two loadouts, South and North, required DM&IR to rebuild four additional cabooses for this service. AFE 10834 was approved on January 9, 1975, for extended0vision cabooses, C-204, C-205, C-218, C-219 with all completed on February 6, 1976. Rebuilding involved the same modifications as previous T-bird service caboose with the exception of the side windows. DM&IR had taken notice of other carrier's bay-window cabooses and ordered bay-window conversion kits from International Car Co. Rebuilt cabooses retained their riveted carbodies and were repainted with the road number placed at bottom of the bay window and a small "Arrowhead" logo above the number. Once

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International Car supplied DM&IR with the second order of extended-vision cabooses C-220 through C-239 in 1974. Light on cupola roof was used as a locator much like beacons on locomotives. Each end had four small red marker lights, two in each corner until FRA standards mandated effective July 1, 1978. that it be located on center rear of cabooses and be a larger size. C-233 Keenan, June 20, 1977 (R.F. Kucaba)



DM&IR C-220 at Rainy Jct. Yard in Virginia, on July 28, 1975. Note that the two red marker lights are in each corner of the roof above the end platform. Light centered on rear was used by crews to inspect track and passing trains. (R.F. Kucaba)

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Overhead view of C-223 at Saunders, Wisconson, May 27, 1983. (D.P. Holbrook)

these four cabooses were completed, bay windows were assigned as follows: two to T-Bird North trains, one for T-Bird South, one spare and two in general service. C-135 and C-191 would eventually be removed from T-Bird service and placed in general caboose service and be retired in 1982. Remaining bay windows were retired in the 1990s.

NEWER EXTENDED-VISION CABOOSES

October 29, 1973 found the DM&IR owning 59 cabooses. Twenty of these were newer extended-vision cabooses built in 1952, with the remaining 39 being of wood construction and ranging in age from 1884 to 1951, many in deteriorated condition. Accounting records from September 21, 1973, indicate 53 cabooses assigned.

Desiring to retire most of the remaining wood cabooses, the DM&IR ordered a total of 20 extended-vision cabooses from International Car Co. in 1973. Cabooses C-220 through C-223 were purchased under a separate AFE 10820 of August 3, 1973 for $158,400. This was approved on November 7, 1973. These four cars were purchased separately by using the funds from the settlement on 55 ore cars destroyed on the CNW. Tax laws allowed funds to be converted into similar property within two years of destruction and avoid tax on the financial gain.

Cabooses C-224 through C-239 were purchased under AFE 10821 of Oct 21, 1973. This was approved on November 7, 1973. Purchase of C-220 through C-239 allowed the retirement of 24 wooden cabooses.

Prior to 1978, DM&IR used portable electric markers on cabooses C-200 to C-219. Cabooses C-220 to C-239 were equipped with four permanent electric markers mounted in the platform roof corners. FRA mandated effective July 1, 1978, under Part 22, Title 49 of Code of Federal Regulations that all freight trains shall have highly visible markers during periods of darkness or whenever weather conditions restrict clear visibility and will be located centered under the roof eave. Permanent rear end marker

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C-226 at Keenan in May 1980. The 20 extended-vision cabooses C-220 to C-239 were built in 1974 to replace the majority of the remaining wooden cabooses. (D.P. Holbrook collection)

lights began to be installed on 39 steel cabooses C-200 through C-239 in February 1979 and all were completed by October 15, 1980.

On April 9, 1990, on AFE 12290 the decision was made to retire 34 of the remaining 39 cabooses becuse of the successful implementation of end-of-train (EOT) device operation on the DM&IR. The only ongoing need was for two T-Bird crude cabooses (no cupola), one to service the Louisiana-Pacific waferboard plant near Two Harbors, and two spares. The five retained cabooses were: C-210, C-218, C-222, C-224 and C-227. C-205 was retired April 9, 1990, but retained as a warming facility. Cabooses C-205 and C227 were sold to Northshore Mining on July 3, 2000. Caboose C-222 was the last car on roster and was sold to Duluth Port Authority for use with their Schnable flat car.

CABOOSE ASSIGNMENTS SEPTEMBER 1973

Proctor Pool
Proctor Hill & Transfer service – two Commercial and three ore service cabooses
Minntac unit trains – two cabooses
Taconite Jct. ore trains – one caboose
Fraser ore trains – two cabooses
Eveleth taconite unit trains – one caboose
Rainy Jct. ore trains – one caboose
Biwabik ore trains – two cabooses
Coleraine Local – one caboose
Rainy Jct. Local – one caboose
Steelton Ore transfers – three cabooses

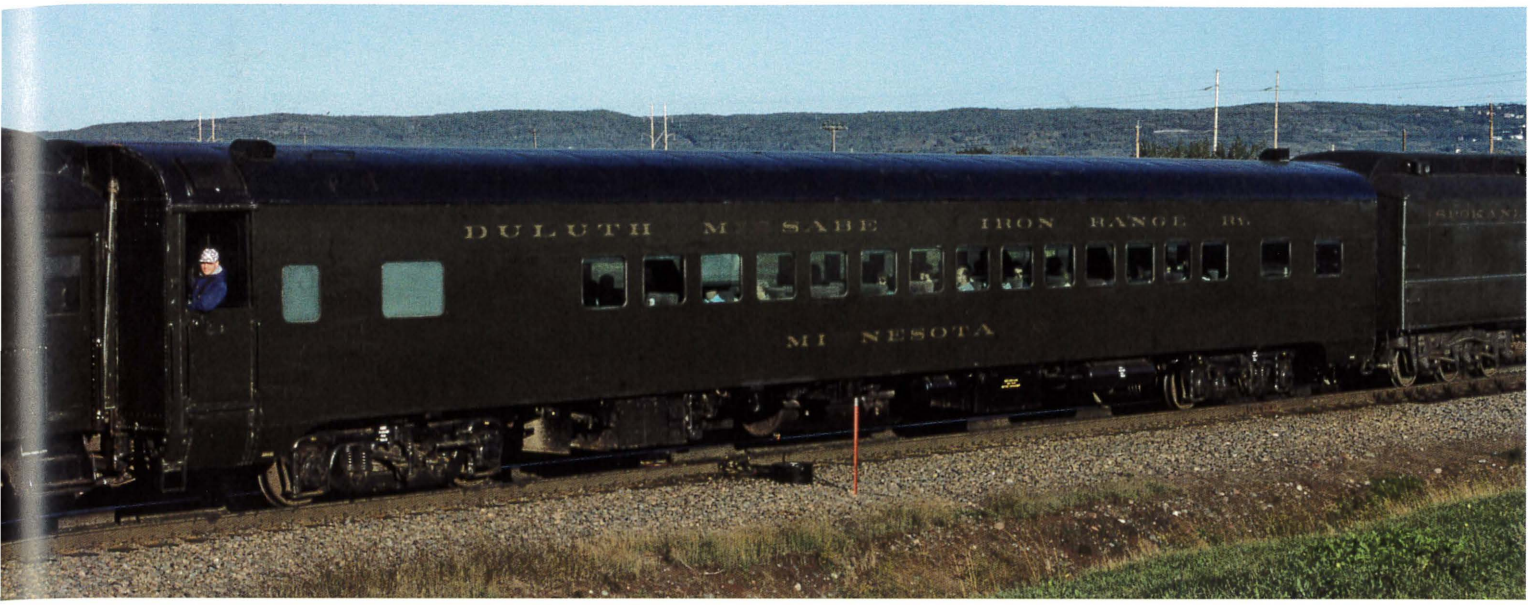
Rainy Jct. Pool
Rainy Jct. Yard – two commercial service, two T-Bird crude and five mine run cabooses
Minntac Pellet service – three cabooses

Two Harbors Pool
Minntac unit trains – three cabooses
Rainy Jct. ore trains – one caboose
Virginia Local – two cabooses
Wales Branch local – one caboose.

Endion Pool
Ely Local – two cabooses
Endion Yard & Transfer – one caboose

Biwabik Pool – one commercial service and three for mine run cabooses
Taconite Pool – three mine-run cabooses
Mitchell Pool – one commercial service and three mine run cabooses
Steelton Pool – one commercial service caboose

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All passenger cars used by DM&IR were conveyed from D&IR and DM&N except for one. Coach *Minnesota II,* former NP 517, was purchased from BN on June, 6, 1975. The car was donated to Lake Superior Museum of Transportation on July 31, 1998, Superior, Wisconsin. (D.P. Holbrook)

Duluth, Missabe & Iron Range Passenger Cars

Kind	Truck	Name/ No	Cl	O.L	Builder	Built	Notes
Coach	4-axle	***Minnesota II***		85′	Pullman	1946	Purchased from BN 06/06/75 former NP 517. Donated to LSMT 7/31/98

DM&IR PASSENGER CARS

After the merger of D&IR and DM&N, DM&IR continued to operate passenger service until July 15, 1961, with all remaining D&IR/DM&N cars repainted DM&IR but not renumbered. Once passenger service was discontinued the remaining passenger cars were retired or placed in MofW service. Retained for management and customer service purposes were combination car W24, coach W-33, and business car *Northland.*

From time to time these three cars were not sufficient to support the needs of management and a decision was made in 1974 to purchase a coach for the business car fleet. Purchased from Northern Pacific was coach 517 that was originally built by Pullman in 1946. Car was 85 feet long, with a seating capacity of 62, two washrooms, and a lounge area, and rode on two 8-foot 6-inch GSC 2-axle trucks. On arrival on DM&IR the car was reconditioned and named *Minnesota II.* As needed, this car was added to the business car consists and the annual American Institute of Mining Engineers special. DM&IR General Manager D.B. Shank was instrumental in forming the Lake Superior Museum of Transportation and felt that, as needed, this car could be used for fund-raising activities for the new museum.

When *Minnesota II* was purchased it was intended to name two additional cars. Car W-24 would become the "Missabe II" and car W-33 would become the "Vermillion II." This naming never took place. ■

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Mine Tags at Lake Superior Museum of Transportation. (D. Schauer)

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CHAPTER FIVE

OPERATIONS

Coal mines in the eastern U.S. established about 1900 a method of placing a cardstock "tag" on coal hoppers to "tag" the shipper and allow movement from the mine before car was waybilled, a destination supplied, or a customer identified. Norfolk & Western was an early user of this process. Tags were removed at major yards when cars were weighed, kept in order by a yard clerk or weighmaster, and then given to clerical staff to make out waybills. During this same time period, mines on the Mesabi and Vermillion Ranges adopted much the same practice.

MINE TAGS

Beginning in 1900, steel ore cars were delivered with a "bad order card" holder mounted on the right end of the side sill adjacent to the grab irons. Mounted higher on the left-hand bottom corner of the side sheet, specified on Pressed Steel Car drawings of 50-ton steel ore cars, was a "ore card holder" slightly larger than the bad order card holder. All D&IR cars would have one high and one low holder. Beginning in 1913, DM&N 50-ton steel ore cars had the smaller bad order card holder replaced with the larger "ore card holder" and moved to the right hand corner of the side sheet. Ore card holders were universally used for both "ore cards," later called "mine tags" and bad order cards. DM&IR would retain the DM&N practice until the final ore cars were ordered.

Internal Oliver Iron Mining documents indicate that cardstock mine waybills were called "Mine Tags" or "Sample Tags" and placed in the "Mine Tag" holders by mine loading personal. Two tags were used. One was placed on the ore car and the other tag was placed in the "can" holding the sample of ore. While the car was in transit from mine to docks, the sample would be analyzed for chemical content. Some tags had additional lines at the bottom identified as sample number, waybill number or lot number to allow the mining companies to identify the loads. In some cases a grease pencil was used and the track number written on the bottom of the tag. Tags were used to allow cars to be picked up and moved before the revenue



Mine Tags at Lake Superior Museum of Transportation. (D. Schauer)

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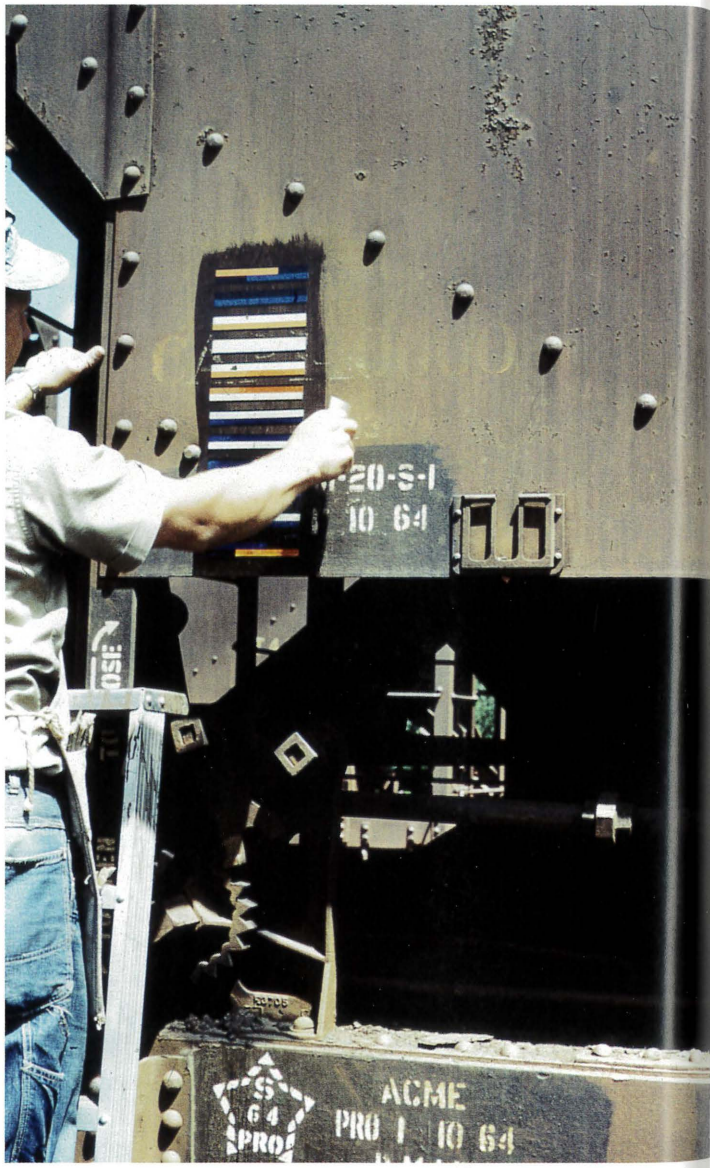
waybills were made out. This kept the flow of cars moving without delaying them for billing. On arrival at Proctor and Two Harbors, tags allowed for easy identification of which mine had loaded which cars and this information was combined with car weights after weighing to produce revenue billing. This method was used by all other mining companies on the iron range. DM&IR limestone dock personnel also used tags for coal unloaded at the docks to indicate the coal company name for the coal being shipped.

Computers would gradually put an end to the mine tag practice. Hanna Mining by 1975, and U.S. Steel by 1977 had discontinued using the tags, but Cleveland Cliffs was still using them in 1980.

ACI – AUTOMATIC CAR IDENTIFICATION

As computers became useful to the railroad industry, many progressive uses were found for their application. The process of checking trains and recording car numbers by hand had become antiquated. During 1962, a study was commissioned to develop a system to scan and track freight cars on the DM&IR. An optical scanning system was jointly developed with Sylvania Electronic Division of General Telephone and Electronics (GTE) and the Association of American Railroads (AAR). Initially called Kartrak, the system became known as Automatic Car Identification (ACI)

Test labels were applied to 25 of the 70-ton ore cars. The ACI labels were developed by Minnesota Mining and Manufacturing Co. (3M). Each label element was 6-inches wide and 1-inch high and the panel consisted of 13 of these elements. The labels were attached to an ACI plate which was 10½-inch wide by 22-inches tall. They contained a start element and the ten digits 0 through 9. Each label element had two positions that contained the color, orange, blue or white in the first position and orange, blue or black in the second position. This allowed for 13 color combina-

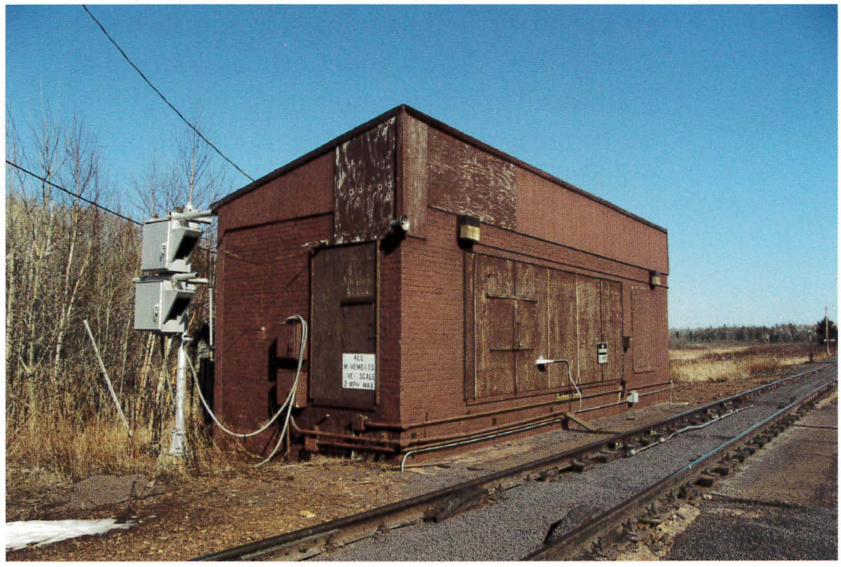


Car shop employee installing ACI plate on ore car in 1964. Note the "ore card holder" to the right of the 10-64 date, used for "ore cards" to identify the mine and type of iron ore once car was loaded. "Ore cards" also were called "mine tags" and "sample tags". Starting in 1900 with the first steel ore cars, D&IR and DM&N equipped the cars with a "ore card holder" in the left corner of the car body (facing the car) and a smaller "bad order card holder" in the right corner of the side sill. Starting in 1913 with the delivery of DM&N Class U9 50-ton ore cars 14500–15499, the smaller bad order card holder was replaced by the larger "ore card holder," with both located on the corners of the side sheets. (MRHS collection)

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Above: ACI reader at the Proctor, Minnesota, scales in 1965. (D.P. Holbrook collection)



Right: Starting in 1962, DM&IR became the first road to install Automatic Car Identification (ACI) which had been developed in conjunction with the Association of American Railroads and Sylvania Electronics Division of General Telephone and Electronics. This development was driven by the computerization of railroad records and the need for a suitable system that could track car movements. DM&IR was chosen for the initial installation because of the controlled environment with ore cars moving, for the most part, only over DM&IR trackage. Pictured is the scalehouse at Highlands just outside Two Harbors, Minnesota, with ACI reader on the left. (D. Schauer)

tions and permited the coding of 12 individual pieces of information.

The ACI label information was: car initial and number, light weight, and a variable information field. The label was scanned by the trackside scanner developed by Sylvania which scanned the train at speeds up to 80 mph. The scanner was a simple hooded steel box mounted on a post at about 15 degrees from vertical to eliminate reflections and sunlight.

During 1964 the installation of the ACI system at key points in Proctor Yard was begun. The DM&IR was the first American railroad with ACI when installation of three scanners at Adolph, Proctor Scales and South Proctor, was completed during late October 1964. By 1968 there were a total of four ACI scanners on DM&IR. The Culver ACI scanner identified and entered into the computer system the car numbers in train order. This scanner was located on the west side of track. Scanning at this point provided verification of manual data

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entered at the Operations Center at Iron Junction, Minnesota, and also supplied car numbers for pellet movements. Errors detected by computer edit were sent to the Operations Center IBM 1050 computer for resolution.

Proctor Scales ACI scanner was located with two scanners, one on each scale track to verify inbound trains and interface weigh-in-motion scale weights with cars read by the ACI reader. These scanners were located on the east side of the track. In conjunction with the Culver ACI scanner, this allowed verification of both ACI labels on either side of a car in case of a no-read or misread of the ACI label. South Proctor ACI scanner identified and entered into the system the car numbers in train order for hill trains destined for the docks at Duluth. Computer response at the Duluth docks displaying disposition for each car controlled proper cargo loading in boats. The Adolph ACI scanner provided a record of northward empty car movement to yield better car turnaround time by mine loading point, and also recorded movement of ore loads and empties between Proctor and Steelton.

During its first year of operation in 1965, the new ACI system, with associated automatic weighing, contributed materially to the efficient movement of iron ore. The system reduced labor requirements, provided more timely car identification information, and enabled faster weighing. This was the first such equipment to be installed for daily operations on any railroad. A number of tests were conducted in cooperation with the AAR Research Center.

AFE 9739-1 was approved on May 15, 1964, for the application of ACI labels to 9,000 70-ton ore cars and 88 Class road switcher diesel locomotives. As of January 6, 1965, ACI labels had been applied to 8,858 70-ton ore cars and 48 locomotives. The balance were applied prior to the start of the ore-shipping season. Dirt-repellent material developed by 3M Company had by this time been applied to about 90 per cent of the labels.

By May 20, 1965, ACI was working satisfactorily, but the wet condition of ore at some washing plants was causing the ore to run over car sides, partially obliterating the labels. Labels were being cleaned by car inspectors at Coleraine, but not at other locations. 3M was contacted and they began applying a test solution to prevent buildup on the labels to avoid having to install washers for the labels. Application of dirt-repellent material to ACI labels had been completed by September 22, 1965, on approximately 7,700 ore cars.

Approximately 8,250 of the 9,180 cars bearing ACI labels had been treated with dirt-repellent material by November 3, 1965. In addition, a new type of label, designed to have improved dirt repellent characteristics, had been applied to 100 70-ton ore cars for test purposes.

Continued refinement of the ACI system during 1966 and installation of a SPADAR weighing and programing unit at Proctor ore scales further improved system accuracy and reliability, permitting cars to be weighed at approximately twice the previous rate. Additional scanners were installed at Highland and Allen Junction.

National application of ACI was begun in 1967 with a number of major railroads installing the necessary scanners for test and evaluation purposes. The first two scanners outside of the DM&IR installations were installed in 1966.

During the winter shopping program of 1968-69 the DM&IR started application of new ACI plates to the entire roster. The new ACI plate was a formed U-channel that was offset from the car side by one inch to prevent obliteration of the label when fine ores washed over the sides of the car.

In September 1971, the Federal Railroad Administration (FRA) had the Transportation Systems Center (TSC) evaluate ACI on a national level to recommend possible actions to improve the system. By this date, 92 percent of the American freight car fleet was

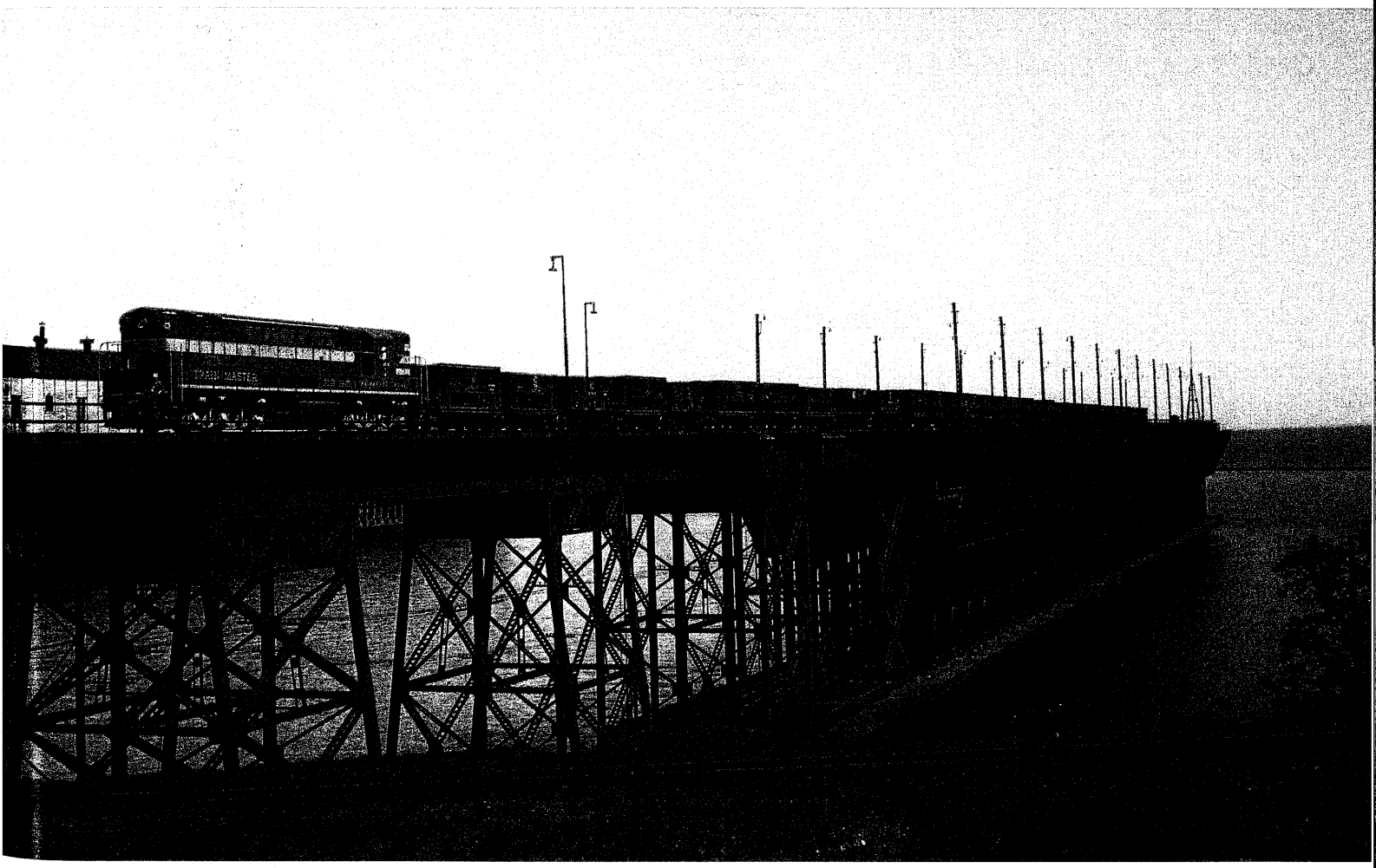
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labeled and 98 percent of all Canadian freight cars. ACI had been installed on 26 railroads and 145 scanners were in place. Many railroads were reluctant to install the ACI scanners because benefits were difficult to measure. The DM&IR participated in accuracy tests from April to July 1969 on 1,500 cars which showed in excess of 99 percent accuracy. Another test involving 9,000 car scans during the same period also showed 99 percent accuracy.

When ACI was initially developed it was revolutionary; however, technology was advancing quickly. Cameras for checking freight car reporting marks from yard offices and remote locations and the installation of computer car-reporting systems on many railroads became commonplace. ACI continued to be plagued by cars with dirty ACI labels and no labels. Each railroad developed their own system for car reporting and tracking and by 1978 ACI was offically phased out.

Automatic Equipment Identification (AEI) tags became commonplace on the national freight car fleet in 1992. Much like ACI, these passive transponders on the freight cars were read by trackside scanners. These AEI tags are now, in 2014, the preferred way of keeping track of equipment. Canadian National discontinued using the former DM&IR ACI readers in June 2007.

THE MINES, MILLS AND FACTORIES



D&IR ore docks at Two Harbors in July 1953 with FM Trainmaster demonstrator TM-4 pulling empty 50- and 70-ton cars down to the yard to assembly into a northbound empty train. (Bob's Photo collection)

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DM&IR Iron Ore Traffic: 1955 to 1965

Ore Tonnage Shipments to	1955		1956		1957		1958		1959	
	U.S. Steel	Independent	U.S. Steel	Independent	U.S. Steel	Independent	U.S. Steel	Independent	U.S. Steel	Independent
Duluth Docks	16,359,553	862,607	11,823,479	773,851	16,136,881	971,947	7,952,893	587,463	7,614,870	636,926
Two Harbors Docks	14,653,868	2,507,119	12,447,652	1,807,618	15,749,566	1,399,030	11,318,625	486,777	8,356,637	800,906
Duluth Docks from GN, NP & SOO	2,112	170,187		102,670		336,413		168,132		58,891
Two Harbors Docks from GN, NP & SOO										
Total to DM&IR Docks	31,005,533	3,539,913	24,271,131	2,684,139	31,886,447	2,707,390	19,271,518	1,242,372	15,971,507	1,496,723
To NP Docks, Superior	8,326	123,263	1,252	346,966		471,300	78,994	797,274	19,505	918,040
To GN Docks, Superior	115,356	3,097,214	114,956	2,105,326	90,157	2,362,774	463,305	1,559,188	195,332	1,656,260
To AS&W Division, Steelton, MN	1,186,963		2,070,223		502,390		454,973		480,945	2,968
To other Duluth industries		160,035		148,824		164,445	3,053	171,021	2,043	125,570
All-Rail ore to Eastern Furnaces			244,865	120,205	1,088	146,212	95,488		151,102	15,058
All-Rail ore - Miscellaneous	795	75,820	3,042	6,245	4,107	65,393	4,060	16,031	3,027	7,337
Granite City (All-Rail)										
Grand Total All Ore	32,316,973	6,996,245	26,705,469	5,411,705	32,484,189	5,917,514	20,371,391	3,785,886	16,823,461	4,221,956
Flue Dust over docks		30,294		11,025						
Grand Total All Ore & Flue Dust	32,316,973	7,026,539	26,705,469	5,422,730		Note 1				

DM&IR Coal & Limestone Docks

Received-Tonnage	1955		1956		1957		1958		1959	1960	1961	1962	1963	1964	1965
	Duluth	T.H.	Duluth	T.H.	Duluth	T.H.	Duluth	T.H.	Duluth	Duluth	Duluth	Duluth	Duluth	Duluth	Duluth
Coal - Coal Docks - DMIR Company Use	100,383	98,504	83,749	105,547	152,327	156,878	None	None	None	21,810	None		Note 2	Note 3	Note 3
Coal - Coal Docks for AS&W			397,748												
Coal - Limestone Docks	924,279		532,606		883,174		455,032		357,435	484,836	382,612	384,362	Note 2		
Limestone - Limestone Dock	497,633		452,283		504,230		362,249		385,000	381,389	261,112	79,300	Note 2		
Scrap Iron & Steel - Limestone Dock	53,002		45,686		19,055		22,217		26,000	35,323	8,948		Note 2		
Ferro-Manganese - Limestone Dock	3,650		6,278		6,697		3,180		7,500	4,100	5,642		Note 2		
Steel Products - Limestone Dock	22,623		20,387		24,766		18,516		14,310	23,532			Note 2		
Cement Clinker - Limestone Dock					22,449		45,329		75,271				Note 2		
Iron Ore - Limestone Dock - Note 1	11,299								6,091	14,764		6,846	Note 2		
Grand Total Receipts	1,612,869	98,504	1,538,737	105,547	1,612,698	156,878	906,523		871,607	965,754	658,314	470,548	Note 2		
Shipments - Tonnage															
Steel Products	78,099		13,531		89,441		59,989		3,733	67,479	5,019	None	Note 2		

Merchandise Traffic - Number of cars

	1955		1956		1957		1958		1959	1960	1961	1962	1963	1964	1965
Coal	40,258		32,581		41,445		21,369		18,892	27,135	15,894	20,153	14,259	19,306	22,181
Pulpwood	10,639		10,979		10,931		10,459		10,903	10,666	9,900	10,436	10,824	10,130	7,408
Rock	4,067		7.095		3,617		2,032		814	3,510	3,097	1,642	898	n/a	n/a
Sand & Gravel	1,765		1,119		18		45		67	209	720	647	339	n/a	n/a
Crude iron ore										70,830	54,919	37,647	57,584	68,339	52,691
All other	96,327		88,073		86,071		63,194		70,188	35,735	31,249	30,782	30,626	37,092	54,123
Total Cars Misc. Traffic	153,056		139,847		142,082		97,099		100,864	148,085	115,779	101,307	114,530	125,706	136,403

T.H. = Two Harbors

Note 1 - Iron ore from Venezuela shipped to OIM Virginia, Minnesota for further processing before steel mill use.

Note 2 - Limestone dock Duluth not operated in 1963. Approximately 560,000 tons of coal, stone and bulk commodities handled by Hallett, Duluth Dock and Transport and Interlake Iron docks for movement to AS&W and UAC Plants.

Note 3 - Duluth Coal & Limestone Dock closed 1964. Previous traffic handled by other docks in Duluth.

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1960		1961	1962	1963	1964		1965	
U.S. Steel	Independent	All Ore	All Ore	All Ore	U.S. Steel	Independent	U.S. Steel	Independent
10,676,065	1,167,556	3,526,345	3,996,256	13,166,016	14,060,036	400,133	15,282,000	339,000
14,090,873	1,348,838	11,764,208	10,547,370	Note 2	Note 2	Note 2	Note 2	Note 2
	341,366	254,897	212,031	127,126		218,286		145,000
		7,756	24,305					
24,766,938	2,857,760	15,553,206	14,689,962	13,293,142	14,060,036	618,419	15,282,000	484,000
139,555	542,012	275,628	479,670	507,647		481,119	92,000	551,000
140,487	1,901,238	2,272,142	2,664,553	2,128,941		2,385,090		2,306,000
683,876		562,601	574,992	631,942	849,095		685,000	
628	65,635							
90,172	138,533							
5,576	14,325			2,956				
				100,424	100,602		100,000	
25,827,232	5,519,503	18,663,577	18,409,177	16,665,052	15,009,733	3,484,628	16,159,000	3,341,000

1. Not included in 1957 totals are 20,174 tons of Anaconda MT ore. 14,746 tons over Duluth Docks and 5,428 tons over Two Harbors Docks

2. Two Harbors dock shut down at end of 1962 shipping season. All ore shipments in 1963, 1964, 1965, used Duluth ore docks. Two Harbors docks reopened May 1966.

Ore Docks Two Harbors

	Built	Retired	Wood/Steel	Number of Pockets	Storage Capacity Tons	Length of Dock
Dock 1	1884/1888/1899	1911	Wood	162(224)	16,000 (40,400)	1,076 (1,376)
Dock 1 (2nd)	1912	In Service	Steel	224	56,000	1,376
Dock 2	1885/1889/1898	1915	Wood	141(208)	18,000 (41,600)	1,006 (1,280)
Dock 2 (2nd)	1916	In Service	Steel	228	68,400	1,400
Dock 3	1893	1917	Wood	90(170)	16,000 (34,000)	540 (1,054)
Dock 4	1892/1893	1917	Wood	168	36,960	1,042
Dock 5	1895	1923	Wood	168	33,600	1,042
Dock 6	1909/1916/1924	Not in use	Steel	148	37,000	920

Two Harbors Dock 1, 312 feet of single pockets and 1,076 feet of double pockets.
When multiple built dates are shown, the first is the built date and other years are dates dock was rebuilt and/or lengthened

Ore Docks Duluth

	Built	Retired	Wood/ Steel	Number of Pockets	Capacity Tons	Length of Dock
Dock 1	1893	1913	Wood	384	57,600	2,236
Dock 2	1896	1915	Wood	384	69,120	2,336
Dock 3	1900	1919	Wood	384	80,640	2,304
Dock 4	1906	1927	Wood	384	119,274	2,304
Dock 5	1914	In service	Steel	384	115,200	2,304
Dock 6	1918	Out of service	Steel	384	153,600	2,304

Dock 1 was dormant from 1905 until 1913 when it was torn down.
Dock 4 was dormant from 1927 until 1929 when it was torn down.

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Ore docks were constructed on Lake Superior at Two Harbors, Minnesota, by D&IR and (shown) at Duluth, Minnesota, circa 1912 by DM&N. Left to right, Dock 1 is being dismantled and Docks 2, 3 and 4 are in service. Note the mix of wood and steel ore cars. (University of Minnesota Duluth, Kathryn A. Martin Library Archives and Special Collections)

NATURAL ORE MINING

The main reason for the D&IR, DM&N and DM&IR to be in business was iron ore, also called "natural ore." It occurred in narrow strips of great vertical depth with some in pools and basins. It was covered in various depths by glacial sand, gravel, boulders and dirt, called overburden. Much of the mining on the Vermillion Range was underground with most of the Mesabi Range being open-pit mining. The ore varied from hard with many large lumps to fine as sand. Some of this ore was loaded directly from mining shovels into ore cars without further processing called "direct-shipping" ore. As mining developed some of the ore deposits had increasing amounts of detrimental material that made it necessary to wash or separate this waste material. Processed iron ore was loaded at "pockets."

By the mid-1950s more and more ore was imbedded in hard taconite and other rocky material which required crushing before shipping. Crushers were built at multiple mines across the range with the output defined as coarse or fine ore. Loading pockets at these plants had coarse and fine pockets, depending on the size of the ore being loaded. Washed fine ore had a tendency to leak out the bottom of ore cars. Most fine loading pockets were equipped with platforms to allow mining employees to place hay into the car to create a seal at the bottom of the cars to prevent leakage. During the late 1950s and early 1960s tree bark was also used,

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The 647-foot boat *J.L. Mauthe* built in 1952 and operated by Interlake Steamship Co. of Cleveland, Ohio, is being loaded with iron ore at DM&IR Dock 5 in Duluth. In the foreground are two tracks of DM&IR Class Q triple hoppers that had just been loaded with coal at the DM&IR Duluth limestone docks. (Wes Harkins)

but was not as effective.

Many smaller open pit operations loaded direct-shipping ore into trucks in the late 1950s and 1960s, with the ore then dumped directly from trucks into ore cars. On arrival at steel mills, coarse ore was charged directly in the blast furnace, but fines required sintering to create larger pieces to charge. Processing could involve crushing, screening, jigging, heavy media, washing or a combination of these which were developed to process ore. Ore processed with these techniques was called "beneficiated ore" and grew from 12 percent of total ore mined in 1929 to over 27 percent in 1952.

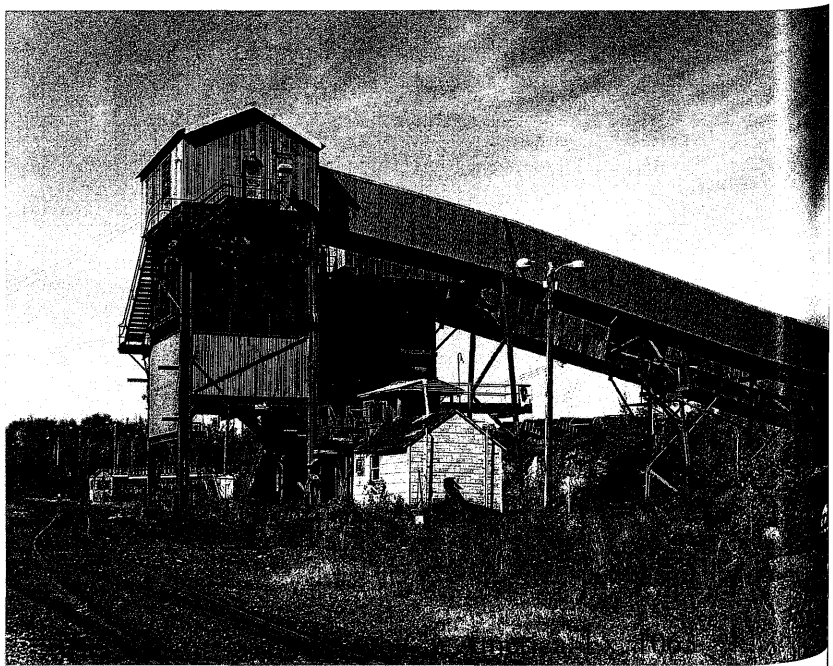
The Trout Lake washing plant built by Oliver Iron Mining in 1909 at Coleraine, Minnesota, was the first. By 1917 there were more than 15 washing plants operating on the Mesabi Range west of Hibbing. In 1924 this amounted to only 12 percent of all the ore shipped, but by 1925 28 percent was being processed. The year 1957 would see 78 beneficiation plants of various types operating on the Mesabi and Vermillion iron ranges.

Natural ore was primarily shipped to Duluth and Two Harbors docks for loading into Great Lakes boats. Ore was also shipped to AS&W steel mill at Steelton, interchanged to

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The Vermillion iron range ore was located deeper below ground and the majority of mines were operated as underground workings. Here we see the Pioneer B shaft and powerhouse at Ely, Minnesota, about 1915. Ore cars from right to left: a Class D 3450–3899 built by Pressed Steel Car Co. in 1930, three Class E 10500–11249 built by Standard Steel Car Co. in 1910, one more Class D 3450–3899 followed by two Class D 11400–11499 built by American Car & Foundry in 1910. Note in the far left background the D&IR skeleton log flats loaded with mining timbers. (University of Minnesota Duluth, Kathryn A. Martin Library Archives and Special Collections)

Besides direct-shipping iron ore being loaded in the open pit mines, many mines had loading pockets such as the Stephens Mine, Aurora, Minnesota, seen here on September 17, 1989. Ore was moved from the pits to the loading pockets by truck, rail haulage and conveyors and further processed by washing and beneficiation. Barely visible behind the pocket is a loading platform that was used for haying the cars. Washed iron ore leaked out the bottom of ore cars and in an attempt to plug the leakage hay would be placed in the bottom of the ore cars to seal up the bottom doors. (S.D. Lorenz)



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Open-pit mining is depicted at Mt. Iron, Minnesota, May 13, 1943. Direct-shipping ore was scooped direct from the ground and loaded into ore cars without further processing. (University of Minnesota Duluth, Kathryn A. Martin Library Archives and Special Collections S3021)



Much of the Mesabi iron range ores were located close to the surface and had high enough iron content to be considered "direct-shipping" ore. Direct-shipping ores could be loaded directly from the ground into ore cars as shown at the Hull-Rust mine in Hibbing, Minnesota, about 1940. Oliver Mining Co. was the mining arm of U.S. Steel. Beginning in 1952 it became Oliver Iron Mining Division of U.S. Steel Corp. or OIM. OIM operated their own fleet of locomotives, steam and diesel, air dumps, flat cars and support equipment for pit operations. OIM 707, an 0-10-0, is spotting DM&IR 50-ton ore cars that, once loaded, will be moved to the DM&IR Hull-Rust yard to be assembled into a road train. (University of Minnesota Duluth, Kathryn A. Martin Library Archives and Special Collections)

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Washed iron ore in later years had large amounts of water once loaded, creating a jelly-like consistence once loaded. DM&IR 26390 is at Proctor on July 21, 1974. These loads were very difficult to unload (R.F. Kucaba)

NP, Soo and GN for mixing purposes, all-rail to Granite City Steel, and during ore shortages and winter season, all-rail to eastern steel mills. Vermillion iron range ore was used by Zenith Furnace, later Interlake Iron at West Duluth for processing into pig iron.

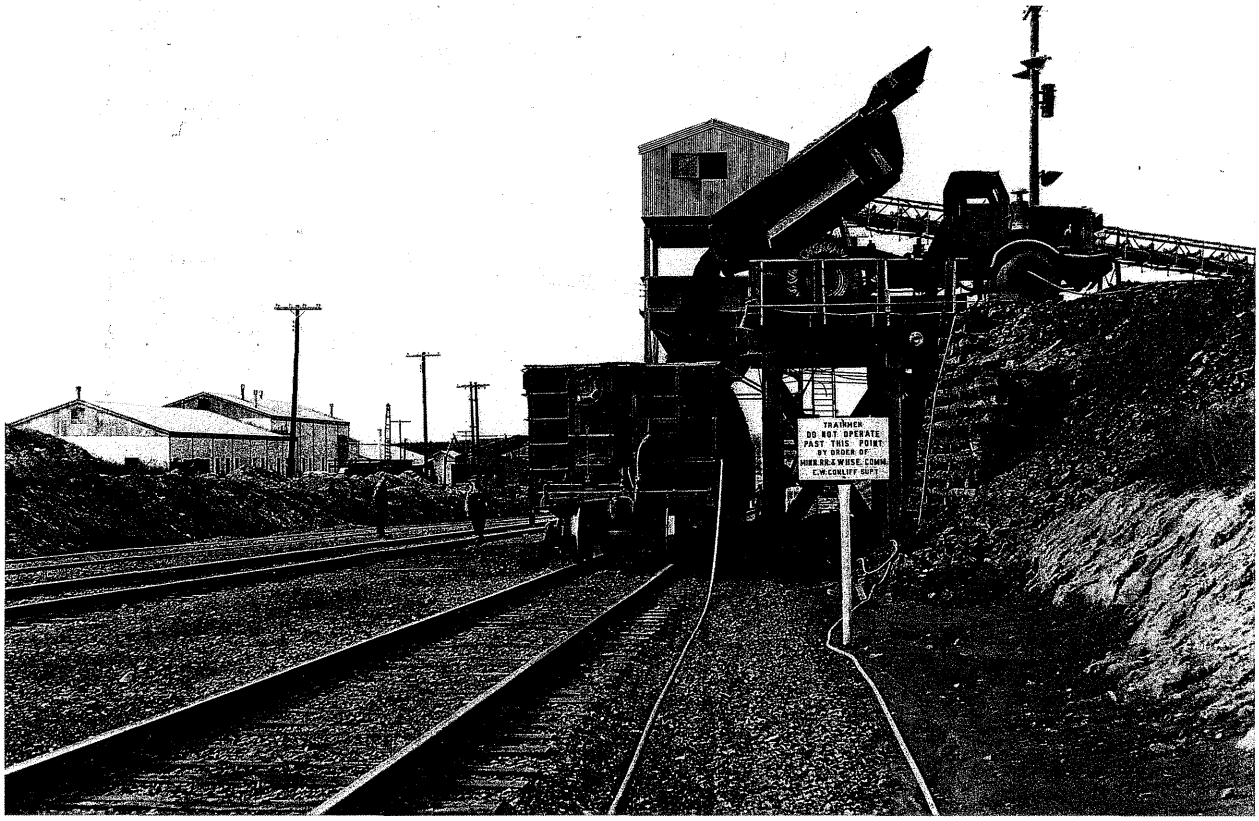
As mining developed and blast furnace demands changed, much mixing of iron ore began to take place. Three- to five-car cuts of ore were sampled for chemical grade and shipped as a group. These blocks of cars would arrive at Proctor or Two Harbors and then be switched out based on blast furnace's requests. Once the correct number and order of cars was created it would be brought from Proctor to Duluth or direct from the yard at Two Harbors, dumped on the ore docks and loaded into lake boats.

Major shipping years were from 1942 until an all-time high of 49,317,625 tons in 1953. Af-



Loadouts ranged from huge washing plants to very simple wood-constructed dumping platforms shown here at the Sellers Mine in June 1939. The location where cars were loaded was called a pocket. A simple pull-behind scraper was used to drag ore up into the body and then shove it out over the opening in the platform, and a hydraulic cylinder would operate the dump mechanism. The Class E8 ore car in the foreground was one of 800 D&IR 11500–12299 built by Standard Steel Car Co. in 1913. Renumbered to DM&IR 41500–42299 with DM&IR merger, it displays the short-lived, 1937-1942, DM&IR monogram without the Safety First slogan. (University of Minnesota Duluth, Kathryn A. Martin Library Archives and Special Collections, S2386, Box 27 Folder 5)

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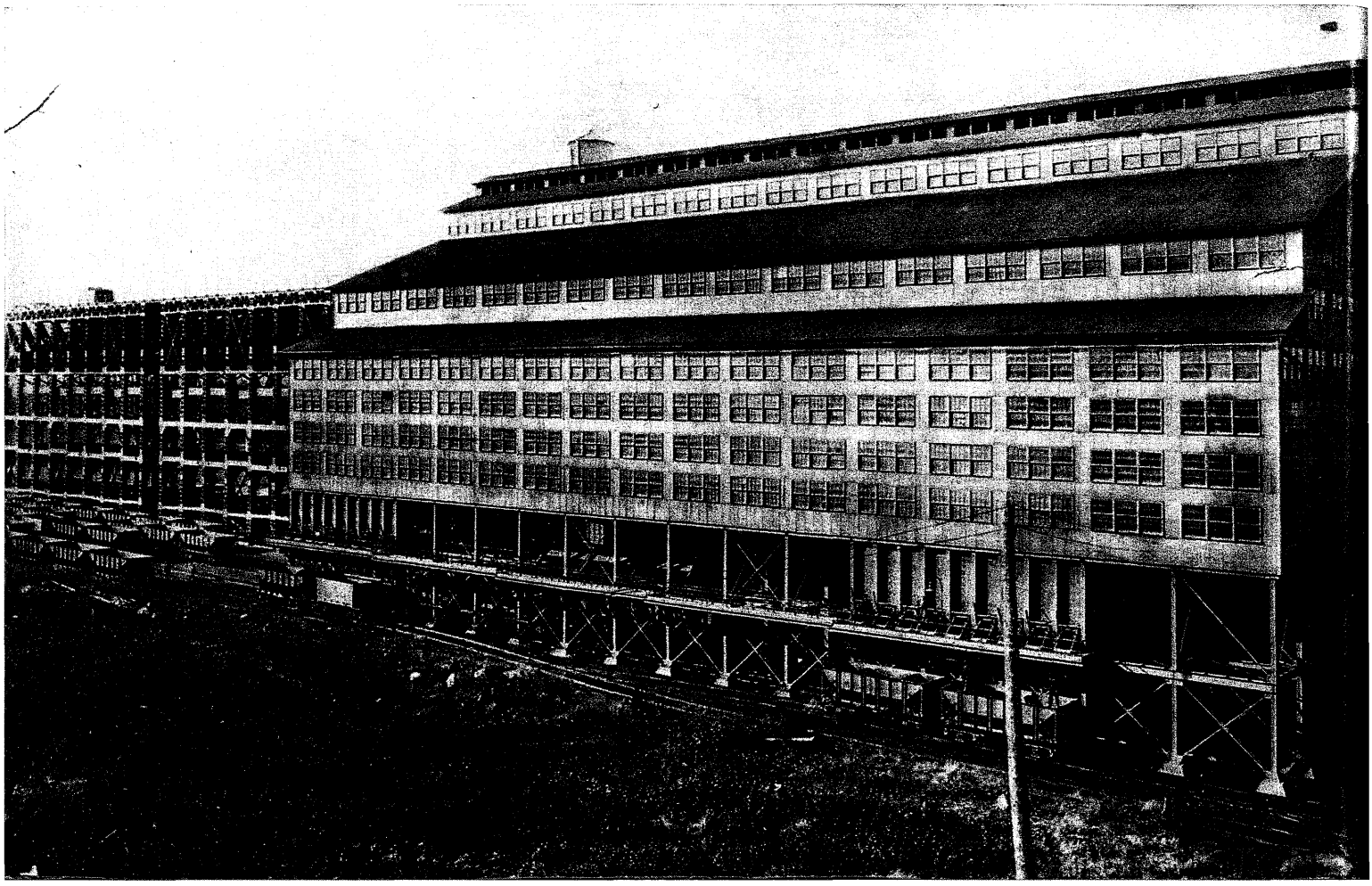
Truck haulage was used at many open pits and if the ore needed no additional processing it was dumped directly from the truck into ore cars. Shown is Euclid Truck #82 operated by Snyder Mining at the Whiteside Mine in Buhl, Minnesota. Note the flexible hosing running alongside the track attached to the air hose on the end of the car. Gravity dropping of cars to loading pockets was used at most mines with brakes being applied by either handbrakes or by air, as shown here, supplied by a stationary air compressor and flexible hose. (University of Minnesota Duluth Kathryn A. Martin Library Archives and Special Collections S3742, Box 15 Folder 44 D. Barclay photo)

ter the Korean War, natural ore was in competition with imported ore from Brazil, Venezuela, and Canada. Imported ore was 2,754,216 tons in 1946 and grew to 23,443,220 tons in 1955, a growth from 4 percent to 21.8 percent of total iron ore mined. The Vermillion Range closed in 1967 with the closing of the Pioneer Mine at Ely, Minnesota, and Mesabi Range deposits were being depleted. From 1961 to 1965 DM&IR averaged 18 million tons of ore shipped each year. Lower grade taconite began to be processed into pellets that became preferred by blast furnace operators. Gradually as taconite was developed tonnages shipped began to rise and by 1969 23 million tons were shipped.

Natural ore shipments continued to decline through the 1970s as additional taconite plants were brought on-line.

The last natural ore shipments from the giant Hull-Rust pit were made by Rhude and Fryberger during 1983. The last shipments from the Canisteo District (far west end of Mesabi Range) were made in 1986. The Trout Lake washing plant was dismantled starting in 1975. The U.S. Steel Sherman Mine ran until 1981, with the last shipments being made from a reprocessing dump in 1986. The large Rouchleau plant, at Virginia, Minnesota, discontinued operations in the early 1970s. Other Eastern District ore continued to be processed by Pittsburg Pacific's Julia plant until 1986. The Stephens and Donora plants near Aurora were purchased by LTV Steel in the 1980s with shipping of natural ore discontinued in 1991.

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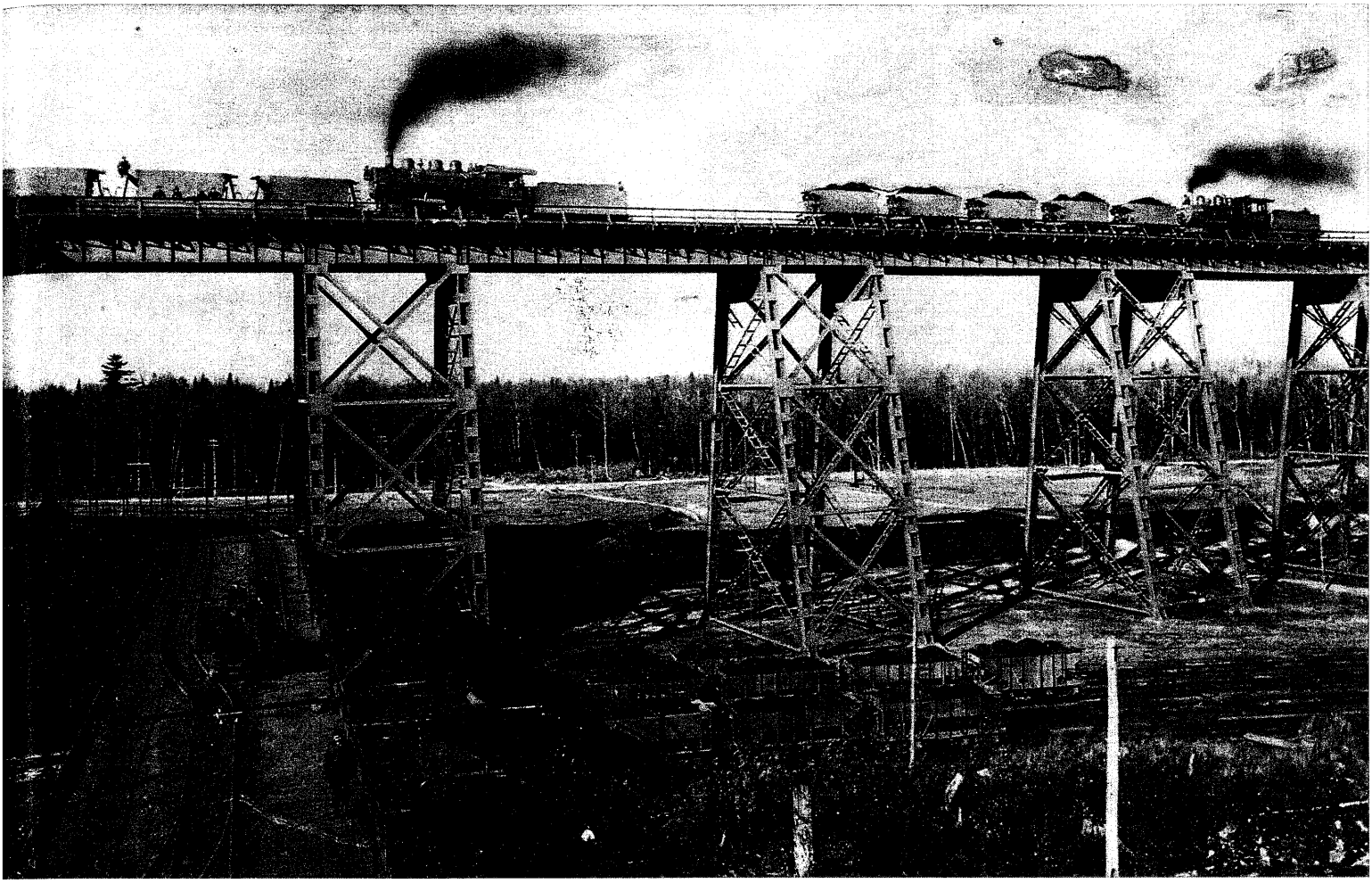
The west end of the Mesabi iron range had large amounts of impurities imbedded in the ore. Processing involved large washing plants to remove the impurities. Pictured in 1918 the largest of these plants, the U.S. Steel Trout Lake washing plant at Coleraine was constructed in 1909 and dismantled starting in 1975. (University of Minnesota)

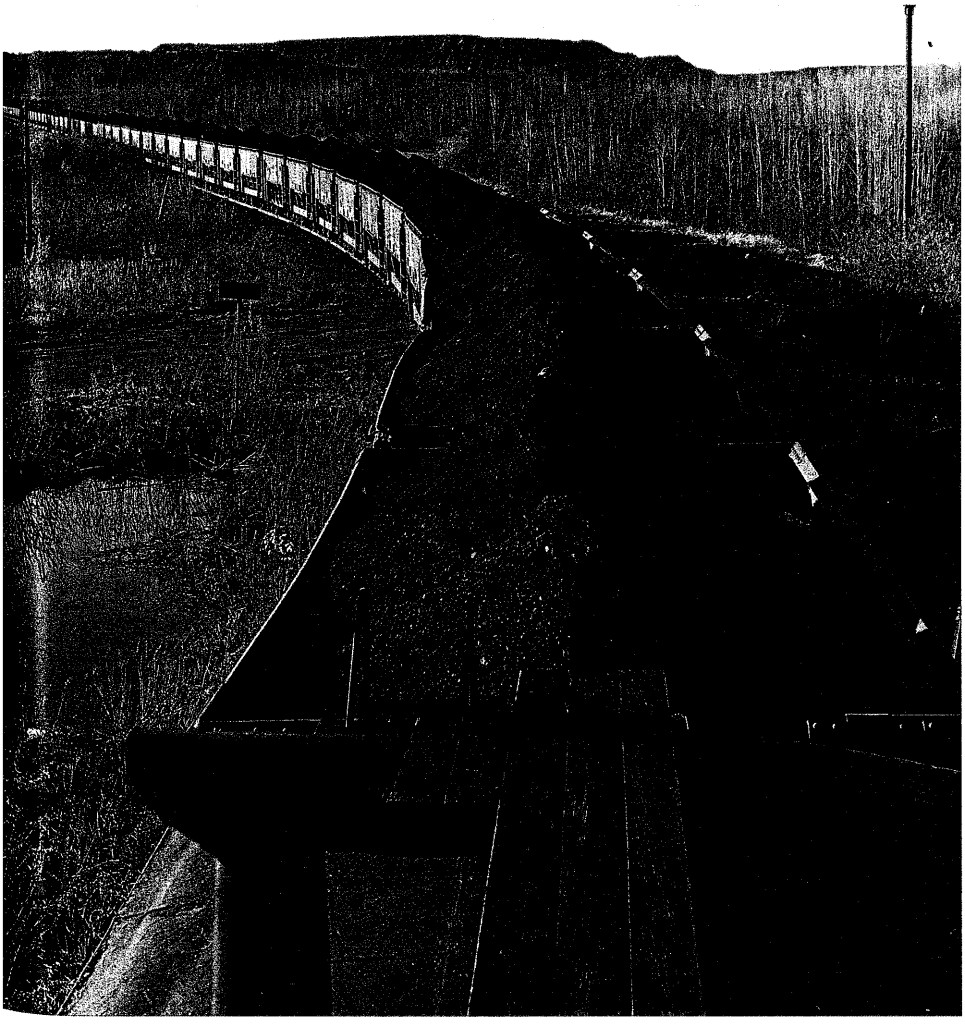
The end of the natural ore shipments from Mesabi Range mines was completed when the Auburn Mine at Virginia shipped its last ore on September 21, 2002. Red ore was no more.

OLIVER IRON MINING - MINNESOTA ORE OPERATIONS

Oliver Iron Mining Company became the Oliver Iron Mining Division of United States Steel (USS) in 1953. Oliver Iron Mining Division became USS Minnesota Ore Operations in 1963. The internal name for Minnesota Ore Operations was MOO, but was rarely used outside of the Administration building in Mountain Iron. In the field, the mines and plants were referred to individually, i.e. Plummer, Sherman, Sentry, Julia, Minntac, etc. Oliver used rail haulage of ore from pits to processing plants at Hull-Rust at Hibbing, Monroe Group at Chisholm, Sherman Group at Chisholm, Rouchleau Group at Virginia, Trout Lake Washer and associated mines at Coleraine, Pilotac at Mt. Iron and the Minntac taconite plant at Mt. Iron. Haulage was handled by, 0-4-0, 0-6-0 and 0-8-0 type steam engines, which were replaced beginning in the 1940s with diesels from Alco, Baldwin, GE, Whitcomb and EMD. Direct shipping ores were loaded directly into DM&IR ore cars but ore requiring further processing was loaded into 20-, 30- and 40-yard air-dump cars for movement to the processing plant. DM&IR provided ore car spotting and pulling at all the plants except Sherman, where OIM did the spotting and pulling of DM&IR ore cars.

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Moving ore from the load-outs to assembly yards was accomplished by mine runs. East of Mitchell, Minnesota, on May 11, 1960, we see a mine run moving loads of ore to the assembly yard at Wilpen, Minnesota, where it would be picked up by a road crew out of Proctor. (Bruce Meyer)

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TACONITE PLANTS

Until 1950, natural ore was plentiful and easy to mine. Two world wars and increasing competition from other sources around the world caused mining companies to look for other competitive ways of producing ore for consumption. Taconite was a plentiful low-grade rock, but low in iron content. U.S. Steel began testing taconite processing methods with the experimental Pilotac plant near Mountain Iron, Minnesota, during 1953. Pilotac was constructed for the concentration of low grade taconite. Initially 2 million tons of 25 percent to 30 percent iron-bearing taconite was processed into 500,000 tons of concentrate. The concentrate was shipped in DM&IR ore cars to the Extaca plant at Virginia, Minnesota, for agglomeration into egg-shaped nodules and sintered for movement to docks at Duluth and Two Harbors. Twelve years would elapse before large-scale production would be started and it would take three tons of crude taconite to produce one ton of pellets. Unlike natural ore, taconite was an extremely hard rock and required blasting before it could be hauled to the processing plants.

Tax laws in Minnesota, until 1964, taxed the mining companies with an "ad valorem" tax that taxed unmined natural ore. Taconite would fall under this law, and an intensive lobbying effort caused the Taconite Amendment"to be passed on November 3, 1964, shifting the law to a production-based tax. Investment in large-scale taconite plants was now possible.

Because taconite is handled on a year-round basis land storage facilities were built at Duluth in 1966 (Lakehead storage facility) and Two Harbors in 1977. These facilities allowed the stacking of ore pellets on the ground during the winter months when the Great Lakes were frozen over. These pellets were then reclaimed and shipped during the shipping season.

Besides the on-line taconite plants, the DM&IR during the 1970s received all-rail taconite trains loaded in DM&IR ore cars from Erie Mining during the winter months for movement to Bethlehem Steel plants at Burns Harbor, Indiana, and Johnstown, Pennsylvania. Prior to completion of Reserve Mining's own harbor facilities, taconite pellets were shipped by Reserve from Silver Bay, Minnesota to DM&IR Two Harbors ore docks.

MINNTAC

U.S. Steel constructed their taconite pellet plant, called Minntac, at Mt. Iron, Minnesota, in 1966 and 1967. The first train of taconite pellets departed Minntac for the DM&IR Duluth ore docks on October 25, 1967. By 1976, two trains per day were being operated from Two Harbors to Minntac and return, and one train from Proctor to Minntac and return. In 1978, after two expansion projects, Minntac produced 18.5 million tons of taconite pellets.

When an extra train was required it normally operated out of Proctor. Crude haulage of taconite at Minntac was accomplished by rail haulage in air-dump cars using a variety of EMD SW7, SW9, TR6, SW1200, SW1500 and Alco RS2, RS3, engines. After natural ore played out, Minntac became the largest shipper on DM&IR. Operating 24/7, during winter months pellets were stockpiled at Two Harbors for shipment in the spring. Pellets were also shipped all-rail to various other U.S. Steel mills.

During 1976, Minntac received 14 MP-15DC engines from EMD and several hundred new Difco 50-yard side-dump cars. All were built for the expanding pit operations hauling crude taconite from pit to crusher. Minntac continued to operate their EMD switcher fleet and a small number of RS3 Alco locomotives until rail haulage of taconite at Minntac was discontinued in late 1999.

Beginning in the 1980s Minntac shipped pellets all-rail to Ohio, Pennsylvania, and the Chicago area during the winter months and Birmingham, Alabama, on a year-round basis. The longest of these all-rail moves would begin in 1994 when pellets moved all-rail to Geneva Steel in Geneva, Utah via a DMIR-WC-SP routing.

Minntac began experimenting with making

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U.S. Steel would build their first full-size taconite plant on the Mesabi iron range in 1967, with the first train of taconite pellets loaded on October 25, 1967. SD18s 176 and 174 are departing the plant with the first train. The pine tree atop the first car was a traditional indication of the opening of a new mine on the iron range. The last shipment when a mine closed had a vertically mounted broom to indicate a clean sweep. (Basgen photo, D.P. Holbrook collection)

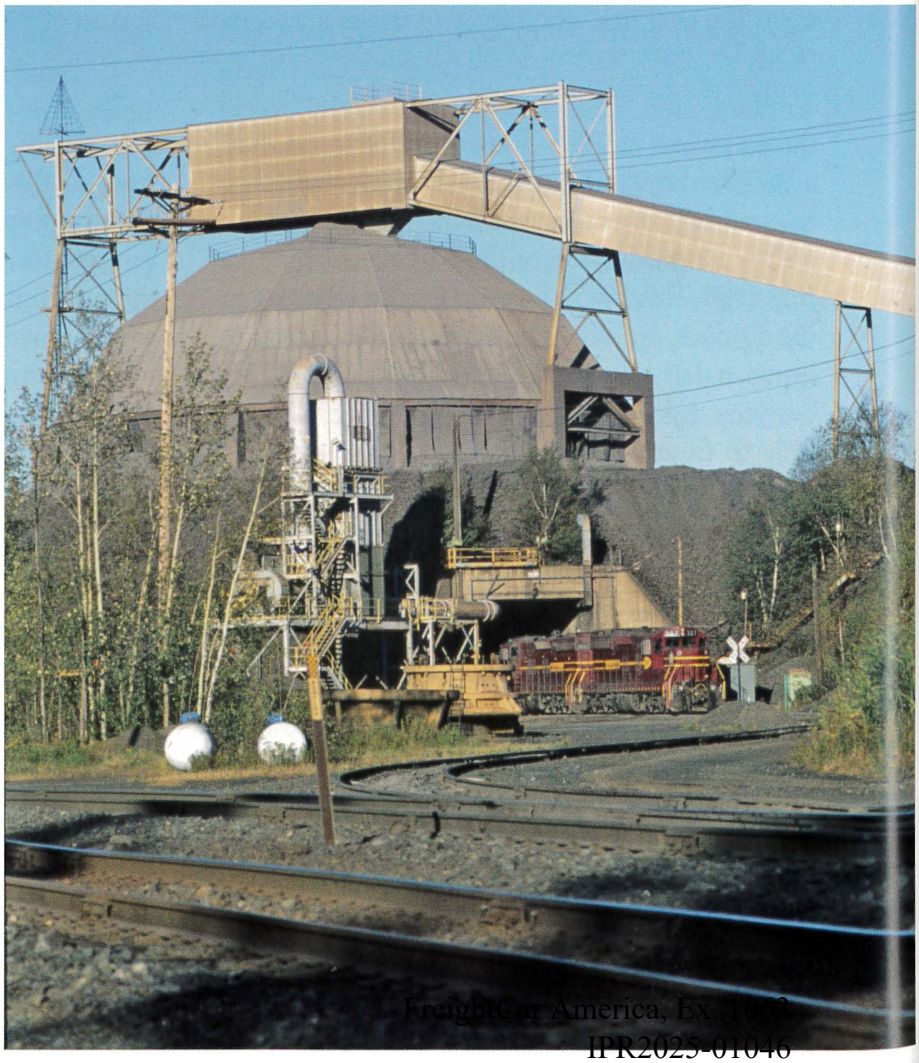
fluxed pellets in 1985. Fluxed pellets contained a 50/50 mixture of dolomite and limestone that assisted blast furnace operators in making steel. Full-scale production of fluxed pellets began in July 1988. This 50/50 mix was loaded adjacent to the Duluth ore docks and brought to Minntac in twice daily 50- to 55-car trains using ore cars between April and October. Fluxstone, susceptible to freezing in ore cars, was hauled to the plant in two 35-car trains using air dumps between November and March.

EVELETH TACONITE CO.

Eveleth Taconite Co. was incorporated by a consortium of Ford Motor Co. and Oglebay Norton & Co. in 1964 and 1965. On December 10, 1965, Eveleth Taconite Co. began operations of the Fairlane Pellet plant at Forbes, Minnesota and the T-Bird mine at Eveleth, Minnesota. The first shipment of crude ore from T-Bird was made on November 1st and the first shipment of pellets was loaded on December 16 and 17. It was no coincidence that the pellet plant, Fairlane, and the mine T-Bird were named for automobiles manufactured by Ford Motor Co. In 1976, the T-Bird South mine was added and the old T-Bird mine renamed T-Bird North. During 1976 the Thunderbird (T-Bird) north and south mines produced 8,015,386 tons of crude taconite and the Fairlane pellet plant produced 2,010,846 tons of taconite pellets. Crude taconite was rail hauled by the DM&IR in 85-car trains from both the T-Bird North Mine located between Shelton Junction and Rainy Junction yard and the T-Bird South Mine located at Spruce to the Fairlane Pellet Plant at Forbes. The first pit blast at T-Bird South was on April 29, 1976, and the initial crude taconite was processed on

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Taconite plants were large industrial complexes that required crushing, grinding, kilns and huge amounts of property to construct. Shown is Eveleth Taconite Fairlane Pellet Plant at Forbes, MN on October 25, 1990, constructed in 1964 and 1965. Ford Motor Co. was one of the owners so it was not a coincidence when automobile monikers were used, with the pellet plant was named "Fairlane" and the crude taconite mine loadout "T-Bird." To the far left of the photo are the taconite pellet train loadout silos. (S.D. Lorenz)



T-Bird North loading pocket on September 28, 2001. Crude taconite would be moved from open pits to crusher and then via the conveyor moved into the dome silo. Below the silo was a concrete-lined tunnel with a loading chute. Crude taconite was shipped via rail from T-Bird North and T-Bird South loading pockets to the Fairlane pellet plant located at Forbes, MN. Standard cupola cabooses would not clear loading chutes, requiring DM&IR to specially equip a number of cabooses with side or bay-windows for use on T-Bird trains. (D.P. Holbrook)

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Inland Steel Minorca Pellet Plant at Virginia, Minnesota, October 1990. Limestone in center of photo is used for making "fluxed" pellets. The taconite pellet loading pocket is in the right center of photo. (E.M. DeRouin photo)

May 13th. The first regular T-Bird train was operated from T-Bird South to the Fairlane plant on July 13, 1976.

Beginning in 1974 development and construction was begun to expand Eveleth Taconite operations. The expansion was owned 40 percent by Armco Steel Corp., 23.5 percent by Steel Co. of Canada, 16 percent by Dominion Foundries and Steel Ltd. and 20.5 percent by Oglebay Norton. Construction was completed in 1977 and annual production increased to six million tons. All-time high pellet production of 508 million tons was reached in 1981 but would decline to 2.8 million tons in 1985 after Dominion Foundry sold off its share in 1983. The T-Bird South mine would close in October 1992 after crude taconite in this area played out. The majority of Eveleth Taconite pellets were handled by DM&IR trains operating from Proctor to Forbes and return and shipped through the port of Duluth. The economic downturn in the steel industry caused the plant to be shut down in 2003 with the final pellet train departing on May 15th. However, after the CN takeover the plant would reopen under new ownership.

MINORCA

On October 17, 1974, ground was broken on the Inland Steel Co.'s property north of Virginia, Minnesota, for the Minorca Taconite plant which when completed in 1977 had an annual capacity of 2,600,000 tons of pellets. Once completed, DM&IR trains operated from Two Harbors to Minorca and return. Six miles of this trip was over DW&P trackage rights from Shelton Junction to Minorca Junction. The first train of 112 cars was loaded at Minorca on June 9, 1977.

Minorca began making fluxed pellets on August 30, 1987. Pellet trains destined for loading at Minorca would have a 40- to 48-ore car

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Mesabi Range Mines Serviced By GN/DMIR, 1951

Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
Aad	1904	1928	1,026,890	Eveleth	DMIR	INACTIVE-UG-TH	Hjalmer Jacobson	
Adriatic	1906	1918	1,167,731	Mesaba	DMIR	INACTIVE-UG-TH	OIM	
Agnew	1902	1967	7,022,665	Hibbing	GN	UG-ALL	CCI	
Agenw #2	1951	1974	4,918,050	Hibbing	GN	OP-ALL	Hanna	
Ajax	1899	1953	357,624	Biwabik	DMIR	INACTIVE-OP-DUL	Skubic Brothers	
Albany	1903	1965	15,474,906	Hibbing	DMIR/GN	OP-TH/DUL/ALL	PM	S(P)-WP(P)
Alberta	1907	1913	138,361	Virginia	DMIR	INACTIVE-DUL	OIM	
Alexander	1905	1910	233,351	Keewatin	GN	INACTIVE-OP-ALL	PM	
Alexandria	1917	1955	5,231,418	Hibbing	GN	INACTIVE-UG-ALL	Hanna/OIM	
Alice	1928	1957	1,097,144	Eveleth	DMIR	OP-DUL	W. S. Moore	
Allan	1913	1914	74,946	Calumet	DMIR	INACTIVE-UG-DUL	PM	
Alpena East	1900	1968	12,162,435	Virginia	DMIR	INACTIVE-OP-DUL	Hanna	
Alpena West	1955	1960	104,567	Virginia	DMIR	NOT OPEN YET-OP-DUL		
Alworth	1950	1957	10,005,109	Chisholm	DMIR	OP-TH/DUL	OIM	S(P)
Alworth Land	1948	1978	1,780,757	Hibbing	DMIR	OP-TH/DUL	CCI	
Arcturus	1917	1981	14,329,337	Marble	DMIR	OP-DUL	OIM	
Argonne	1941	1959	4,033,450	Nashwauk	GN	OP-ALL	Hanna	WP
Arne	1965	1969	558,838	Aurora	DMIR	OP-TH	Pittsburgh Pacific	
Aromac	1942	1958	1,394,195	Keewatin	GN	INACTIVE-OP-ALL	Butler Brothers	WP
Atkins	1943	1954	3,202,814	Kinney	GN	OP-ALL	CCI	
Auburn	1894	1997	8,083,513	Virginia	DMIR	OP-TH/DUL	OIM	
Bangor	1910	1918	1,274,669	Biwabik	DMIR	INACTIVE-UG-TH	OIM	
Barbara	1942	1943	473,075	Calumet	GN	INACTIVE-OP-ALL	Hanna	WP-HD
Belgrade	1908	1923	2,101,406	Biwabik	DMIR	INACTIVE-UG-TH	PM	
Bennett	1913	1963	20,360,734	Keewatin	GN	UG/OP-ALL	PM	WP(P)
Bennett Annex	1951	1964	1,406,297	Keewatin	GN	UG/OP-ALL	PM	
Billings	1919	1925	576,514	Fraser	GN	INACTIVE-UG-ALL	Hanna	
Bingham	1940	1970	3,808,238	Taconite		INACTIVE-OP		
Biwabik	1893	1955	24,484,116	Biwabik	DMIR	OP-TH/DUL	PM	
Boeing	1922	1962	4,878,794	Hibbing	GN	INACTIVE-UG/OP	CCI	
Bradford	1902	1957	492,324	Hibbing	GN	INACTIVE-OP-ALL	Pacific Isle Mining	
Bray	1909	1962	6,485,313	Keewatin	GN	OP-ALL	Hanna	C-S-WP(P)
Bruce	1927	1950	1,837,545	Chisholm	GN	INACTIVE-UG-ALL	J&L	
Bruce Annex	1929	1937	97,243	Chisholm	GN	INACTIVE-UG	International Harvester	
Brunt	1905	1964	1,960,446	Mt. Iron	DMIR	INACTIVE-OP-DUL	Hanna	
Buckeye	1943	1957	5,977,317	Coleraine	GN	OP-ALL	Hanna	HD-WP
Burns	1918	1952	747,347	Eveleth	DMIR	INACTIVE-OP-DUL	OIM	
Burt	1895	1951	16,118,075	Hibbing	DMIR/GN	OP-DUL/TH/ALL	OIM	
Campbell A	1932	1934	70,493	Hibbing	GN	INACTIVE-OP/UG-ALL	PM	
Campbell D	1955	1964	316,092	Hibbing	GN	INACTIVE-OP/UG-ALL	PM	
Canisteo	1907	1984	40,601,825	Coleraine	DMIR/GN	OP-DUL/ALL	CCI	WP
Canton	1893	1954	7,573,411	Biwabik	DMIR	OP-DUL/TH	OIM	
Carlz #2	1952	1957	1,683,279	Keewatin	GN	OPENING	Hanna	
Carmi	1952	1977	3,013,594	Hibbing	DMIR	OP-DUL	PM	
Carol	1937	1948	1,679,744	Nashwauk	GN	OP-ALL	Hanna	WP
Carson Lake	1919	1923	5,156	Leetonia	GN	OP-DUL	PM	
Cass	1903	1955	453,201	Biwabik	DMIR	INACTIVE-UG-TH	PM	
Cavour	1911	1916	177,964	Kinney	GN	INACTIVE-UG-ALL	W. S. Moore	
Chataco	1937	1960	648,702	Chisholm	GN	INACTIVE-OP-ALL	Pacific Isle Mining	HD-WP
Chester	1915	1972	1,348,543	Chisholm	DMIR	INACTIVE-UG-DUL	OIM	
Chisholm	1901	1967	9,022,013	Chisholm	DMIR	INACTIVE-UG-DUL	OIM	
Clark	1900	1925	7,030,357	Chisholm	DMIR	INACTIVE-UG-DUL	OIM	
Cloquet Annex	1943	1953	49,975	Eveleth	DMIR	INACTIVE		
Columbia	1901	1974	9,305,627	Virginia	DMIR/GN	OP-DUL/ALL(WP)	J&L	C(P)-S(P)-WP(P)
Commodore	1893	1960	8,081,382	Franklin	DMIR	OP-DUL/ALL(WP)	E. W. Coons	

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Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
Coons	1940	1970	616,255	Virginia	DMIR	INACTIVE-OP-DUL	OIM	
Corsica	1901	1967	14,372,047	McKinley	DMIR	OP-TH/DUL	PM	C-WP(P)
Croxton-Syme	1902	1958	1,600,879	Chisholm	DMIR/GN	OP-DUL/ALL	Hedman Mining	WP(P)
Culver	1920	1979	3,233,305	Buhl		INACTIVE		
Cyprus	1903	1957	1,973,400	Hibbing	GN	OP-ALL(WP)	Pacific Isle Mining	S-WP
Dale	1911	1969	3,636,619	Hibbing	GN	OP-ALL(WP)	Pacific Isle Mining	WP
Danube	1919	1977	8,868,681	Bovey Coleraine	GN	OP-ALL(WP)	PM	J-WP
Day	1898	1976	9,560,645	Hibbing	DMIR/GN	OP-DUL/TH-ALL	OIM	
Deacon	1914	1919	348,912	Kinney	DMIR	INACTIVE-UG-DUL	OIM	
Dean	1915	1966	5,454,904	Kinney	GN	INACTIVE-OP/UG-ALL	Inland Steel	
Delware #1	1913	1976	8,921,974	Marble	DMIR	OP-DUL	OIM	
Delware #2	1942	1978	8,396,512	Marble	DMIR	OP-DUL	OIM	WP
Diamond	1907	1984	13,959,345	Taconite	DMIR	INACTIVE	OIM	
Dormer	1927	1968	2,064,754	Kinney	DMIR	INACTIVE-OP-DUL	OIM	
Douglas	1942	1977	5,842,079	Chisholm	DMIR/GN	OP-DUL/ALL	Hanna	WP(P)
Draper	1919	1950	304,054	Calumet	GN	INACTIVE-ALL	Hanna	WP
Draper Annex	1943	1947	2,065,157	Calumet	GN	INACTIVE-OP-ALL	Hanna	WP
Drew-Syme	1930	1957	355,017	Chisholm	DMIR/GN	OP-DUL/ALL	Hedman Mining	HD(P)-WP
Duluth	1893	1951	2,370,763	Biwabik	DMIR	OP-DUL/TH	OIM	
Duncan	1914	1970	6,610,392	Chisholm	DMIR/GN	OP-DUL/ALL	Hanna	WP(P)
Dunwoody	1917	1977	16,981,625	Chisholm	DMIR	OP-DUL	OIM	WP(P)
Eaton	1913	1913	3,548	Buhl	DMIR	INACTIVE-UG-DUL	PM	
Elba	1898	1926	3,481,872	Gilbert	DMIR	INACTIVE-UG-TH	OIM	
Elbern	1948	1960	1,257,473	Chisholm	GN	OP-ALL	Yaley-Young Mining	
Elizabeth	1910	1918	100,990	Chisholm	GN	INACTIVE-UG-ALL	Elizabeth Mining Co.	
Embarrass	1944	1977	18,624,258	Biwabik	DMIR	OP-DU/TH	PM	C
Emmett	1897	1956	539,314	McKinley	DMIR	OP-TH	Hedman Mining Co.	
Enterprise	1952	1961	6,912,744	Virginia		OPENING	Hanna	
Fay	1911	1924	1,266,676	Virginia	GN	INACTIVE-UG-ALL	OIM	
Fayal	1895	1965	37,055,594	Eveleth	DMIR	OP/UG-TH/DUL	OIM	
Fayal #1	1895	1948	7,435,924	Eveleth	DMIR	INACTIVE-UG-DUL/TH	OIM	
Fletcher	1927	1984	2,282,483	Bovey Coleraine		INACTIVE		
Forest	1904	1910	248,924	Keewatin	GN	INACTIVE-OP-ALL	Harrison Mining Co.	
Forster	1949	1979	17,200,190	Chisholm	DMIR/GN	OP-DLU/TH/ALL	OIM	S(P)-C(P)
Forsyth	1948	1956	301,245	Kinney	DMIR/GN	OP-DUL/ALL	W.S. Moore	
Fowler	1907	1922	926,196	Aurora	DMIR	INACTIVE-UG-TH	CCI	
Franklin	1893	1919	1,909,203	Franklin	DMIR	INACTIVE-UG-TH	Republic Steel Co.	
Frantz	1904	1928	744,475	Buhl	GN	INACTIVE-OP-ALL	Hanna	
Fraser	1928	1978	30,147,361	Fraser	DMIR/GN	OP/UG-DUL/TH/ALL	OIM	C(P)-WP(P)
Galbraith	1941	1955	4,755,794	Nashwauk	GN	OP-ALL	Hanna	C(P)-WP(P)
Galbraith Annex	1951	1952	153,294	Nashwauk	GN	OP-ALL	Hanna	
Genoa Fee	1896	1951	1,170,752	Gilbert	DMIR	OP-DUL/TH	E. W. Coons Co.	
Genoa-Sparta	1896	1956	10,081,500	Gilbert	DMIR	OP-DUL/TH	E. W. Coons Co.	
Gilbert	1907	1981	23,433,787	Gilbert	DMIR	OP-DUL/TH	OIM	C
Gilbert Sliver	1954	1957	77,130	Gilbert	DMIR	OP-DUL/TH	W.S. Moore	
Glen	1902	1957	13,575,115	Chisholm	DMIR	OP-DUL/TH	OIM	
Godfrey	1926	1963	12,227,759	Chisholm Hibbing	DMIR	OP/UG-DUL/TH	OIM	
Gordon	1952	1965	3,772,669	Keewatin	GN		Hanna	
Grace	1912	1919	608,491	Hibbing	GN	INACTIVE-UG-ALL	PM	
Graham	1913	1957	1,823,951	Mesaba	DMIR	INACTIVE-OP-DH	J&L	WP(P)
Grant	1902	1958	10,893,481	Buhl	GN	OP-ALL	J&L	S-C-HD-WP
Greenway	1940	1944	868,449	Grand Rapids	GN	OP-ALL	J&L	HD-WP(P) 4
Great Western	1951	1969	6,715,615	Virginia	DMIR	OP-DUL	OIM	
Gross Marble	1942	1976	8,383,055	Marble	DMIR	OP-DUL	OIM	
Halobe	1930	1959	4,139,727	Nashwauk	GN	OP-ALL	Hanna	HD

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Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
Hanna-A	1909	1955	2,178,549	Mt. Iron	GN	OP-ALL	W. S. Moore Co.	
Harold	1910	1939	5,004,816	Hibbing	GN	INACTIVE-UG-ALL	PM	
Harrison	1914	1968	6,543,730	Cooley	GN	OP-ALL	Hanna	C-HD
Harrison Annex	1923	1952	267,566	Nashwauk	GN	INACTIVE-OP		
Hartley	1907	1978	8,031,087	Fraser	DMIR	OP-DUL/TH	OIM	C(P)-S(P)
Hartley-Burt	1910	1969	18,667,249	Fraser	DMIR	OP/UG-DUL/TH	OIM	C(P)-S(P)
Hawkins	1902	1968	25,224,621	Nashwauk	GN	OP-ALL	CCI	WP
Hector	1893	1953	568,280	Biwabik	DMIR	INACTIVE-UG-TH	Inter-State Iron Co.	
Helen	1924	1943	179,775	Cooley	GN	INACTIVE-OP-ALL	Hanna	
Helmer	1913	1950	1,376,507	Kinney	DMIR	INACTIVE-OP-DUL	PM	
Higgins #1	1914	1957	7,082,454	Biwabik	DMIR	INACTIVE-OP-TH	OIM	
Higgins #2	1904	1976	2,850,086	Franklin	DMIR	INACTIVE-UG-DUL	OIM	
Hill Annex	1917	1979	63,682,773	Marble Calumet	GN	OP-ALL	J&L	C(P)-S(P)-HD-WP
Hill Annex	1910	1976	15,376,668	Calumet	GN	OP-APP		
Hill-Trumbull	1910	1969	218,537	Marble	GN	OP-ALL	CCI	HD-WP
Hoadley	1906	1951	3,249,447	Nashwauk	GN	INACTIVE-OP-ALL	Hanna	J-WP
Hobart	1906	1969	1,433,041	Gilbert	GN	INACTIVE-UG-ALL	J&L	
Holland	1905	1957	420,139	Biwabik	DMIR	INACTIVE-UG-TH	Holland Mining	
Homan-Cliffs	1907	1970	24,732,085	Taconite	DMIR/GN	OP-DUL/ALL	CCI	HD-WP
Hudson	1910	1918	1,299,587	Aurora	DMIR	INACTIVE-OP-TH	PM	
Hull-Nelson	1901	1978	18,693,538	Eveleth	DMIR	OP-DUL/TH	OIM	
Hull-Rust(Hull)	1896	1983	122,252,529	Hibbing	DMIR/GN	OP-DUL/TH/ALL	OIM	
Hull-Rust(Rust)	1896	1983	88,889,991	Hibbing	DMIR/GN			
Humphrey	1909	1978	8,934,089	Chisholm Fraser	DMIR/GN	OP-DUL/TH/ALL	OIM	C(P)-S(P)
Impro A	1945	1950	5,613,946	Hibbing	DMIR/GN	OP-DUL/TH/ALL	OIM	C(P)-S(P)
Impro B Reserve	1944	1950	529,309	Hibbing	DMIR/GN	OP-DUL/TH/ALL	Hanna	C-S
Iron Chief	1942	1979	5,351,645	Buhl	GN	OP-ALL	OIM	
Iroquois	1903	1964	4,070,908	Mt. Iron	GN	INACTIVE-UG/OG-ALL	Inland Steel	
Itasca	1915	1965	1,242,611	Buhl	GN	INACTIVE-OP/UG-ALL	Inland Steel	
Jean	1916	1919	116,259	Eveleth	DMIR	INACTIVE-OP-TH	PM	
Jennings	1906	1909	213,317	Kinney	DMIR	INACTIVE-OP-TH	Hanna	
Jennison	1951	1953	866,368	Coleraine		OP-?	Hanna	
Jessie #1	1951	1962	1,391,649	Grand Rapids		OP-?	Jessie H. Mining	
Jordan	1902	1910	945,644	Chisholm	GN	INACTIVE-?-ALL	Hanna	
Judd	1913	1942	1,440,779	Bovey Coleraine	DMIR/GN	INACTIVE-OP-DUL/ALL	OIM	J-WP
Judson	1951	1961	1,459,952	Buhl		OPENING-OP	W. S. Moore Co.	
Julia	1895	1955	2,427,320	Franklin	DMIR/GN	OP-DUL/ALL	E. W. Coons Co.	WP(P)
Kerr	1916	1957	10,343,261	Hibbing	DMIR/GN	OP-DUL/ALL	Pacific Isle Mining	HD-WP 5
Kevin	1916	1968	9,496,664	Cooley	GN	OP-ALL	Hanna	
King	1952	1984	7,609,237	Coleraine	DMIR	OP-DUL/TH	OIM	7
Kinney	1903	1937	6,793,776	Kinney	GN	INACTIVE-OP-ALL	E. W. Coons Co.	
Kinney Scotch	1914	1936	55,634	Kinney		INACTIVE		
Knox	1909	1986	53,511	Aurora	DMIR	OP-TH	W. S. Moore Co.	
Knox Ext	1951	1985	1,090,142	Aurora	DMIR	OP-DUL/TH		
Kosmerl	1951	1978	7,057,874	Buhl		OPENING	OIM	
La Rue	1903	1943	7,786,598	Nashwauk	GN	INACTIVE-UG-ALL	Butler Brothers Co.	WP
Labelle	1902	1920	714,209	Gilbert	DMIR	INACTIVE-UG-TH	PM	
Lamberton	1917	1970	1,618,067	Hibbing	GN	OP-ALL	Pacific Isle Mining Co.	HD-WP
Lamberton Annex	1922	1970	28,557	Hibbing	GN	INACTIVE-OP-ALL	Pacific Isle Mining Co.	
Langdon	1929	1940	1,409,118	Cooley	GN	INACTIVE-OP-ALL	Hanna	J-WP
Langdon & Warren	1916	1956	137,885	Hibbing	GN	INACTIVE-UG-ALL	Hanna	
Larkin	1906	1948	264,948	Franklin	DMIR	OP-TH	Pacific Isle Mining Co.	WP 6
Laura	1902	1962	4,486,373	Hibbing	DMIR/GN	INACTIVE-UG-DUL/ALL	OIM	
Leach	1943	1961	1,288,603	Keewatin	GN	INACTIVE-OP-ALL		
Leetonia	1902	1938	299,440	Hibbing	GN	INACTIVE-OP-ALL	PM	
Leetonia	1902	1959	8,686,880	Hibbing	GN	INACTIVE-UG-ALL	J&L	

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Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
Leonard	1903	1974	14,537,490	Chisholm	DMIR/GN	OP-DUL/ALL	OIM	
Leonard-Burt	1909	1974	6,925,913	Chisholm	DMIR	OP-DUL/TH	OIM	
Leonidas	1908	1980	23,961,466	Leonidas	DMIR	OP/UG-DUL/TH	OIM	WP(P)
Lincoln	1902	1973	8,415,859	Franklin	DMIR	INACTIVE-G-DUL	J&L	
Lind-Greenway	1940	1976	7,240,646	Grand Rapids	GN	UNDER DEVELOPMENT	J&L	
Lone Jack	1895	1962	7,742,224	Franklin	DMIR	OP-DUL/TH	OIM	S-C
Longyear	1902	1963	10,525,262	Hibbing	DMIR/GN	OP-DUL/ALL	J&L	C-S-WP
Mace #1	1910	1921	1,109,620	Keewatin	GN	INACTIVE-UG-ALL	Mace Iron Mining	
Mace #2	1916	1959	2,116,036	Nashwauk	GN	INACTIVE-OP-ALL	Hanna	WP
Mackillican	1953	1956	666,561	Nashwauk	GN	OP-ALL	CCI	
Maderia	1910	1917	196,421	Hibbing	GN	INACTIVE-UG-ALL	PM	
Madrid	1912	1922	218,919	Virginia	DMIR	INACTIVE-UG-DUL	OIM	WP(P)
Mahoning	1895	1973	108,818,262	Hibbing	DMIR/GN	OP-DUL/TH/ALL	PM	
Mahoning Grp 3	1952	1973	6,264,591	Hibbing	DMIR/GN	OP-DUL/TH/ALL		
Mahoning Grp 4	1949	1970	14,673,015	Hibbing	DMIR/GN	OP-DUL/TH/ALL	PM	
Mahoning Grp 6	1951	1960	147,007	Hibbing	DMIR/GN	OP-DUL/TH/ALL	PM	
Majorca	1912	1943	1,840,566	Calumet	GN	INACTIVE-OP-ALL	Hanna	J-WP
Malta & Malta Annex	1899	1937	1,417,824	Gilbert	DMIR/GN	INACTIVE/OP/UG-DUL/ALL	Malta Mining Co.	
Margaret	1918	1957	1,577,366	Buhl	DMIR/BN	OP-DUL/ALL	W. S. Moore Co.	WP
Mariska	1907	1963	1,445,596	Gilbert	DMIR	INACTIVE-UG-TH	W. S. Moore Co.	WP(P)
Mary Ellen	1924	1962	4,574,973	Biwabik	DMIR	OP-DUL/TH/ALL	Stanley Mining Co.	HD
Mayas	1906	1938	243,198	Mesaba	DMIR	INACTIVE-OP-TH	PM	
Mcewen	1905	1974	1,464,202	Franklin	DMIR	INACTIVE-UG-DUL/TH	OIM	
Mckinley	1907	1986	14,754,464	Biwabik	DMIR	INACTIVE-OP/UG-TH	OIM	
Meadow	1910	1963	898,239	Aurora	DMIR	INACTIVE-UG-TH	CCI	
Mesabi Chief	1913	1968	11,371,785	Keewatin	GN	OP-ALL	Hanna	C-S-WP(P)
Midget	1917	1955	152,529	Hibbing	DMIR/GN	OP-DUL/ALL	Pacific Isle Mining Co.	8
Midway	1915	1950	616,388	Kinney	DMIR	OP-DUL	OIM	
Midway #1 & #2	1953	1960	104,527	Kinney	DMIR	OP-DUL/ALL	OIM	
Miller-Mohawk	1905	1953	8,802,149	Aurora	DMIR	INACTIVE-OP-TH	PM	9
Minnewas	1893	9166	13,364,440	Virginia	DMIR	OP/UG-DUL/TH	E. A. Young	
Minorca	1902	1953	1,526,126	Franklin	DMIR/GN	OP-DUL/ALL	Pacific Isle Mining Co.	
Missabe Mountain	1893	1976	784,159,050	Franklin	DMIR/GN	OP-DUL/TH/ALL	Pacific Isle Mining Co.	10
Mississippi	1910	1930	2,779,878	Keewatin	GN	INACTIVE-UG-ALL	Hanna	
Mississippi #1	1942	1968	3,721,104	Keewatin	GN	INACTIVE-OP-ALL	Hanna	
Mississippi #2	1933	1955	1,047,625	Keewatin	GN	UG-ALL	Hanna	
Mississippi #3	1944	1965	3,740,578	Keewatin	GN	OP-ALL	Hanna	
Monica	1909	1915	469,723	Biwabik	DMIR	INACTIVE-UG-TH	Republic Iron & Steel	
Monroe-Tener	1905	1981	40,397,553	Chisholm	DMIR/GN	OP-DUL/ALL	OIM	
Moose	1926	1967	21,612,119	Franklin	DMIR	OP-DUL/TH/ALL	OIM	
Morris	1903	1965	46,088,908	Hibbing	DMIR/GN	OP/UG-DUL/TH/ALL	OIM	
Morrison	1926	1984	15,864,760	Coleraine	DMIR	OP-DUL	OIM	WP
Morrow	1913	1938	44,474	Eveleth	DMIR	INACTIVE-OP/UG-TH	W. S. Moore Co.	
Morrow Extension	1927	1929	37,649	Eveleth	DMIR	INACTIVE-OP-TH	OIM	
Morton	1912	1967	6,473,506	Hibbing	GN	OP-ALL	Hanna	
Mott	1949	1951	1,193,486	Mt. Iron	DMIR	INACTIVE-OP-DUL/TH	OIM	
Mountain Iron	1892	1956	48,664,453	Mt. Iron	DMIR	OP-DUL/TH(WP)	OIM	C-S-WP(P)
Myers	1905	1918	1,610,155	Chisholm	DMIR	INACTIVE-UG-DUL	OIM	
Nassau Mine	1907	1963	263,448	Hibbing	DMIR/GN	INACTIVE-UG-DUL/ALL	J&L	
Neville	1961	1966	380,122	Chisholm	DMIR		Hanna	
Neville R	1947	1978	1,036,392	Chisholm	DMIR		Pittsburgh Pacific	
Nordine	1951	1956	248,425	Hibbing	DMIR/GN	OP-DUL/ALL	Pacific Isle Mining	
Norman	1894	1963	7,339,064	Franklin	DMIR	OP-DUL/TH	W. S. Moore	
North Eddy	1915	1958	715,445	Hibbing	GN	INACTIVE-OP-ALL	Hanna	
North Harrison	1915	1960	8,370,887	Nashwauk	GN	OP-ALL	Hanna	HD
N Harrison Annex	1925	1943	686,047	Nashwauk	GN	INACTIVE-OP-ALL	Hanna	HD-WP

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Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
North Shiras	1951	1956	196,664	Buhl		OPENED 1951-UG	Pacific Isle Mining	
North Star	1910	1970	4,386,517	Taconite				
North Uno	1910	1947	1,275,665	Hibbing	GN	INACTIVE-OP-ALL	Pacific Isle Mining	WP(P)
North Uno	1910	1963	2,339,491	Hibbing	GN	OP-ALL	Pacific Isle Mining	
Ohio	1895	1942	7,995,789	Franklin	DMIR	OP-DUL/TH	OIM	S(P)
Olson	1945	1968	5,647,942	Cooley	GN	OP-ALL	Hanna	HD
Onondaga	1907	1913	228,127	Franklin	GN	INACTIVE-UG-ALL	Malta Mining Co.	
Ordean	1916	1919	965,914	Virginia	DMIR	INACTIVE-OP-DUL	OIM	
Orwell	1929	1985	14,717,751	Taconite	DMIR	INACTIVE-OP-DUL		
Pacific	1937	1958	479,299	Aurora	DMIR	INACTIVE-OP-DUL	W. S. Moore Co.	
Palmer	1918	1921	908,390	Chisholm	DMIR	INACTIVE-OP-DUL	OIM	
Park Lots #1 & #3	1899	1917	278,718	Eveleth	DMIR	INACTIVE-UG-TH	OIM	
Patrick-Ann	1917	1968	14,147,388	Cooley	GN	OP-ALL	Hanna	C-HD(P)
Patrick Annex	1935	9168	2,353,287	Cooley	GN	OP-ALL	Hanna	HD
Pearce	1902	1960	466,817	Chisholm	GN	INACTIVE-UG-ALL	Meriden Iron Co.	
Penobscot	1897	1968	20,433,935	Hibbing	DMIR/GN	OP-DUL/TH/ALL	OIM	
Perkins	1909	1919	627,092	Aurora	DMIR	INACTIVE-OP-TH	W. S. Moore Co.	
Perkins Annex	1941	1975	149,181	Aurora	DMIR	INACTIVE-OP-TH	W. S. Moore Co.	
Perry	1949	1957	3,068,013	Keewatin	GN	OP-ALL	Hanna	
Petit	1902	1969	5,209,583	Gilbert	DMIR	OP/UG-DUL	J&L	
Pierce Group	1942	1977	32,216,577	Hibbing	DMIR/GN	OP-DUL/ALL		
Pillsbury	1898	1969	8,156,752	Hibbing	DMIR	OP-DUL/TH	OIM	
Pillsbury-Brown	1951	1978	216,776	Hibbing	DMIR/GN	OP-DUL/ALL	Pittsburgh Pacific	
Pilot	1919	1955	307,012	Mt. Iron	GN	OP-ALL	W. S. Moore Co.	
Pilot Annex	1951	1956	577,732	Mt. Iron	GN	OPENING	W. S. Moore Co.	
Plummer	1954	1966	19,477,150	Taconite	DMIR	NOT OPEN	OIM	
Pool	1903	1941	3,949,983	Hibbing	DMIR	INACTIVE-OP-DUL	PM	
Prindle	1914	1960	3,852,442	Virginia	DMIR/GN	OP-DUL/ALL	W. S. Moore Co.	HD-WP
Quinn	1914	1965	2,334,629	Nashwauk	GN	OP-ALL	Hanna	HD-WP
Rana	1915	1987	2,605,512	Kinney	DMIR	OP-DUL/TH		
Reed	1940	1941	38,617	Virginia	DMIR	INACTIVE-OP-DUL	E. W. Coons	
Rouchleau	1920	1976	52,003,748	Virginia	DMIR	OP-DUL/TH	OIM	C-S
Rouchleau Annex	1977	1986	150,366	Virginia	DMIR	OP-DUL/TH	OIM	
Roy	1944	1954	54,327	Hibbing	GN	OP-ALL	Republic Steel	
Ruddy	1911	1955	361,163	Biwabik	DMIR	INACTIVE-UG-TH	OIM	
Russell	1942	1964	3,602,011	Keewatin	GN	OP-ALL	PM	
Rust Reserve	1930	1942	357,109	Duluth	DMIR	OP-DUL	OIM	
St. Clair	1903	1978	3,906,740	Chisholm	DMIR	OP-DUL/TH	OIM	C(P)-S(P)-WP(P)
St. James	1916	1963	5,796,976	Aurora	DMIR	OP-TH	O/N	
St. Paul	1906	1964	6,825,641	Keewatin	GN	OP/UG-ALL	Republic Steel Co.	
St. Paul-Day	1923	1957	2,526,141	Keewatin	GN	OP-ALL	Republic Steel Co.	
Sally	1913	1970	3,770,829	Coleraine	DMIR/GN	INACTIVE-OP-DUL/ALL	Charleson Iron Mining Co.	
Sargent	1919	1968	9,919,437	Keewatin	GN	UG-ALL	CCI	
Sauntry	1899	1986	42,831,526	Virginia	DMIR/GN	INACTIVE-OP-DUL/TH/ALL	OIM	
Schley	1910	1969	6,214,704	Gilbert	DMIR	OP/UG-DUL	J&L	
Scott	1943	1943	35,316	Calumet	GN	OP-ALL	Hanna	
Scranton	1904	1960	24,137,096	Hibbing	DMIR/GN	OP-DUL/ALL	PM	C-S
Section 17	1912	1913	20,849	Buhl		INACTIVE-UG-?	OIM	
Section 18	1948	1955	4,103,215	Keewatin	GN	OP-ALL	Hanna	
Security	1961	1965	218,411	Eveleth	DMIR	NOT OPEN-OP-DUL	Rhude & Fryberger	
Sellers	1895	1979	91,146,628	Hibbing	DMIR/GN	OP-DUL/TH/ALL	OIM	C(P)-S(P)-WP(P)
Seville	1909	1953	271,008	Kinney	DMIR	OP-DUL/TH/ALL	Rhude & Fryberger	
Shada	1909	1957	1,585,273	Nashwauk	GN	INACTIVE-OP-ALL	Clement K. Quinn	11
Sharon	1901	1985	13,806,420	Buhl	GN	INACTIVE-UG-ALL	OIM	
Shaw	1917	1978	8,416,627	Franklin	DMIR	OP-DUL/TH/ALL	OIM	C-S
Shenango	1904	1978	17,453,926	Chisholm	DMIR/GN	OP/UG-DUL/ALL	Snyder Mining Co.	

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Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
Sherman	1948	1980	32,897,376	Chisholm	DMIR	OP-DUL/TH/ALL	OIM	
Shiras	1914	1960	1,100,121	Buhl	GN	INACTIVE-OP-ALL	Hanna	
Sidney	1937	1960	3,839,657	Virginia	DMIR	OP-TH	E. W. Coons Co.	
Siphon	1907	1929	358,388	Mesaba	DMIR	INACTIVE-OP-TH	Hjalmer Jacobson	
Sliver	1908	1981	2,782,756	Virginia	DMIR	INACTIVE-OP-DUL	OIM	
Sliver	1909	1917	174,814	Virginia	DMIR	INACTIVE-OP-DUL	Hanna	
Smith	1917	1951	984,236	Hibbing	GN	OP-ALL	Pacific Isle Mining Co.	HD(P)-WP(P) 12
Snively	1950	1955	2,966,370	Mt. Iron	DMIR	OP-DUL	OIM	
Snyder	1935	1959	650,259	Cooley	GN	OP-ALL	Hanna	J-WP
South Agnew	1920	1975	13,124,080	Hibbing	GN	OP-ALL	Hanna	
South Eddy	1915	1966	3,960,456	Hibbing	GN	OP-ALL	Hanna	
South Longyear	1943	1976	3,407,462	Hibbing	GN	OP-ALL	J&L	C-D-WP
South Rust	1945	1964	10,449,915	Hibbing	DMIR/GN	OP-DUL/ALL	OIM	C(P)-S(P)-WP(P)
South Stevenson	1948	1965	343,837	Hibbing	GN	OP-ALL	Republic Steel Co.	
South Tener	1928	1981	915,344	Chisholm		OP	Snyder Mining Co.	
South Uno (Gn)	1911	1970	3,407,164	Hibbing	GN	INACTIVE-OP-ALL	Pacific Isle Mining	
South Uno (Np)	1911	1941	1,720,824	Hibbing	GN	OP-ALL	Pacific Isle Mining	12
Sparta	1897	1906	1,244,197	Gilbert	DMIR	INACTIVE-UG-TH	OIM	
Spruce	1895	1965	79,439,561	Eveleth	DMIR	OP/UG-DUL/TH	OIM	Mostly crushed
Stein	1940	1957	3,075,953	Keewatin	GN	OP-ALL	Hanna	WP
Stephens	1903	1991	51,429,490	Aurora	DMIR	INACTIVE-OP-TH	OIM	
Stevenson	1900	1957	15,425,654	Hibbing	GN	OP/UG-ALL	Republic Steel Corp	
Stevenson	1900	1912	1,317,118	Hibbing	GN	INACTIVE-OP-ALL	Corrigan McKinney Steel	
Stevenson Reserve	1944	1966	170,021	Hibbing	GN			
Stubler	1953	1957	153,464	Buhl		NOT OPEN-OP	W. S. Moore Co.	
Sullivan	1915	1948	313,249	Virginia	DMIR	INACTIVE-OP-DUL	Zontelli Bros. & Leach	
Sullivan #2	1947	1951	246,162	Cooley	GN	OP-ALL	J&L	13
Susquehanna	1906	1976	33,057,078	Hibbing	GN	OP-ALL	Republic Steel Corp	WP(P)
Sweeney	1920	1923	1,414,707	Hibbing	DMIR	INACTIVE-OP-DUL	PM	
Syracuse	1966	1968	145,554	Aurora	DMIR	OP-DUL/TH	Pittsburgh Pacific	
Thorne	1915	1948	460,448	Buhl	GN	INACTIVE-UG-ALL	Hanna	
Tioga	1916	1922	441,285	Chisholm	DMIR	INACTIVE-UG-DUL	Shenango Furnace Co.	
Tioga #2	1955	1961	3,742,671	Grand Rapids	GN	NOT OPEN YET-OP-ALL		
Troy	1903	1962	2,091,584	Eveleth	DMIR	OP-DUL	Rhude & Fryberger	
Trumbull	1910	1978	13,779,608	Marble	GN	OP-ALL	CCI	
Twin City	1942	1986	12,037,937	Chisholm	DMIR	ACTIVE-OP-DUL/TH	OIM	
Union	1900	1957	4,093,817	Franklin	DMIR	INACTIVE-OP-TH	OIM	
Utica	1902	1950	7,250,989	Hibbing	GN	OP/UG-ALL	PM	
Vernon	1924	1926	17,929	Cooley	GN	INACTIVE-OP-ALL	Hanna	
Victoria	1906	1957	713,931	Franklin	DMIR	INACTIVE-OP-TH	OIM	
Virginia	1910	1950	2,902,816	Eveleth	DMIR	INACTIVE-OP-DUL	Skubic Brothers	HM
Virginia Extension	1944	1950	1,401,775	Eveleth	DMIR	INACTIVE-OP-DUL	Snyder Mining Co.	
Vivian	1913	1947	363,611	Mesaba	DMIR	INACTIVE-OP-TH	E. W. Coons	
Wabigon	1925	1983	6,222,393	Buhl	GN	OP-ALL	Hanna	WP
Wabigon #2	1918	1977	1,846,190	Buhl	GN	INACTIVE-OP-ALL	Hanna	
Wacootah	1906	1964	8,816,741	Mt. Iron	DMIR/GN	OP-DUL/ALL	Pacific Isle Mining Co.	WP
Wade	1918	1968	3,615,479	Kinney	GN	INACTIVE-UG/OP-ALL	PM	
Walker	1909	1981	19,474,220	Bovey Coleraine	DMIR	OP-DUL	OIM	WP
Walker Ext	1955	1981	934,003	Bovey Coleraine		OP	CCI	
Walker-Hill #4	1941	1981	4,646,629	Marble	DMIR	OP-DUL	OIM	
Walker-Hill #5	1952	9178	1,349,997	Marble	DMIR			
Walker-Hill #6	1953	1969	1,911,163	Marble	DMIR			
Wanless	1914	1971	3,247,629	Buhl	DMIR	OP-DUL	CCI	
Warren	1917	1957	2,945,783	Hibbing	GN	INACTIVE-OP-ALL	PM	
Webb	1905	1964	18,099,205	Hibbing	DMIR/GN	OP/UG-DUL/ALL	Snyder Mining Co.	WP(P)
Weed	1915	1918	320,575	Aurora	DMIR	INACTIVE-UG-TH	OIM	

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Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive / Type - Ships To:	(Last) Operator	Notes
Weggum	1915	1976	6,150,390	Hibbing	GN	OP-ALL	Hanna	C-D-WP
Wheeling	1931	1956	517,641	Mt. Iron	GN	INACTIVE-OP-ALL	Wheeling Steel Corp.	
White Iron	1909	1915	252,427	Chisholm	GN	INACTIVE-OP/UG-ALL	White Iron Lake Iron Co.	
Whiteside	1911	1979	5,051,295	Buhl	DMIR	OP-DUL	Snyder Mining Co.	
Whitney	1948	1983	2,835,176	Hibbing	DMIR	OP-DUL	Hanna	
Williams	1895	1955	530,723	Biwabik	DMIR	INACTIVE-UG/OP-DUL/TH	Hanna	
Wills	1902	1918	64,522	McKinley	DMIR	INACTIVE-UG-TH	Republic Iron & Steel	
Wisstar	1918	1960	179,778	McKinley	DMIR	INACTIVE-OP-TH	W. S. Moore	
Woodbridge	1912	1969	2,064,816	Buhl	DMIR	OP-DUL	CCI	
Wyman	1949	1957	1,401,656	Keewatin	GN	OP-ALL	Hanna	WP
Wyoming	1943	1986	2,648,287	Franklin	DMIR	INACTIVE-OP-DUL/TH	OIM	
Yates	1904	1909	679,038	Kinney	GN	INACTIVE-OP/UG-ALL	Hanna	
Yawkey	1907	1963	363,452	Franklin	DMIR	OP-TH	W. S. Moore Co.	
York	1911	1954	3,434,537	Nashwauk	GN	OP-ALL	Pacific Isle Mining Co.	WP

Vermillion Iron Range Mines Serviced By DMIR, 1951

Name	Natural Ore Shipped		Tons	Location	Railroad	Active-Inactive - Type - Ships To:	Operator	Notes
Armstrong Bay	1923	1923	4,748	Tower	DMIR	INACTIVE-UG-TH	OIM	
Chandler North	1891	1942	9,504,759	Ely	DMIR	INACTIVE-UG/OP-TH	Evergreen Mines	J(P)-WP(P)
Chandler South	1888	1957	2,396,154	Ely	DMIR	INACTIVE-UG/OP-TH	Evergreen Mines	J(P)-WP(P)
Consolidated Vermilion And Extension	1916	1920	22,893	Tower	DMIR	INACTIVE-UG-TH	Consolidated Vermilion & Extension Co.	
Mccomber	1917	1919	8,386	Tower	DMIR	INACTIVE-UG	Mutual Iron Mining Co.	
Pioneer	1888	1967	41,112,587	Ely	DMIR	UG-TH	OIM	14
Savoy	1899	1941	1,866,378	Ely	DMIR	INACTIVE-UG-TH	Evergreen Mines	
Section 30	1910	1923	1,457,295	Fall Lake	DMIR	INACTIVE-UG/OP-TH	Section Thirty Mining	
Sibley	1899	1954	9,808,202	Ely	DMIR	UG-TH	OIM	
Soudan	1894	1963	16,010,044	Tower	DMIR	UG-TH	OIM	C 15
Zenith	1892	1964	21,561,128	Ely	DMIR	UG-TH	PM	C-S

Early Taconite Operations

Name	Location	Railroad	Details	Operator
Argo (East Missabe)	Argo	DMIR	OP-TH	Reserve Mining
Erie Pilot Plant	Aurora	DMIR	OP-DUL/TH	PM

Taconite Plants, DMIR

Name	Natural Ore Shipped		Location	Railroad	Details	Operator	Notes
Extaca Plant	1951		Virginia	DMIR	NOD/SIN-DUL/TH	OIM	
Pilotac Mine	1952	1966	Mt. Iron	DMIR	OP-GRINDING	OIM	
Pilotac Plant	1952		Mt. Iron	DMIR	CONCENTRATE	OIM	1
Minntac	1967	Current	Mt. Iron	DMIR	OP-PELLETS	U.S. Steel Corp.	
Eveleth Taconite	1965	Current	Forbes	DMIR	OP-PELLETS	Oglebay Norton Co.	
Minorca	1977	Current	Virginia	DMIR	OP-PELLETS	Inland Steel Mining Co.	

Taconite Plants, GN/BN

Name	Natural Ore Shipped		Location	Railroad	Details	Operator	Notes
Hibbing Taconite	1976	Current	Hibbing	GN/BN	OP-PELLETS	Pickands Mather & Co.	
Butler Brothers	1967	1985	Nashwauk	GN/BN	OP-PELLETS	M.A. Hanna Co.	
National Taconite	1967	Current	Keewatin	GN/BN	OP-PELLETS	M.A. Hanna Co.	

Processing Plants, DMIR/GN

Charleson Concentrator Plant				DMIR	JIGGING-DUL	Charleson Iron Mining	2
Harrison And Patrick Concentration Plants				GN	JIGGING-ALL	Hanna	3

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Notes

TONNAGE SHOWN IS GRAND TOTAL AMOUNT SHIPPED DURING YEARS OF OPERATION UP TO AND INCLUDING 1986

Note 1 Ships to Extaca at Virginia, MN
Note 2 Treats stockpile ore from Missabe Mountain and Minnewas Mines
Note 3 Treats Harrison and Patrick Tailings basins
Note 4 Being developed for operation again in 1954
Note 5 HD and Washing at North Uno plant
Note 6 Low grade ore being treated at Coons Pacific plant
Note 7 Crude ore hauled by rail haulage to Trout Lake concentrating plant
Note 8 Treatment by washing and high density at North Uno plant
Note 9 Operated as Miller mine 1905-1927, Mohawk mine 1906-1923 and Miller-Mohawk 1950 onward
Note 10 Low grade ores treated at Coons Pacific plant
Note 11 Operated as Shada Mine No 1 and Shada Mine No 2 during various years
Note 12 Low grade ores treated at North Uno plant
Note 13 Crude ore trucked, stockpiled and then washed at Hill Annex Concentrator
Note 14 Lump ore produced by screening
Note 15 Entire production is "lump grade" iron ore

ABBREVIATIONS

C Crushed
D Dried
HD High density
HM Heavy Media
J Jigged
S Screened
WP Washing Plant
UG Underground
OP Open Pit
ALL Allouez, WI
DUL DMIR Duluth Dock
TH DMIR Two Harbors Dock
NOD Nodules
SIN Sinter
OIM Oliver Iron Mining
PM Pickands Mather & Co.
CCI Cliffs Iron Co.
Hanna M.A. Hanna
J&L Jones & Laughlin Steel Corp.
O/N Oglrbay Norton & Co..

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block using mini-quads of fluxstone added to the head end of trains at Proctor. These would be set out at Minorca and the crew would pic up the previous day's empty fluxstone cars, add them to head end of their train and proceed to load a train of pellets for Proctor and eventual dumping at Duluth ore docks. Not equipped to handle air dumps Minorca received all their fluxstone during April to November and stockpiled on the ground what was needed for operations during the winter months. During 2001 Minorca-loaded pellet trains were shifted from Duluth ore docks to Two Harbors docks.

OTHER INDUSTRIES

MINNESOTA STEEL AT STEELTON

Completed in 1916, the Minnesota Steel Co. of U.S. Steel was located at Steelton, Minnesota on 1,832 acres 10 miles south of Duluth. Minnesota Steel Co. was leased to the USS subsidiary American Steel & Wire in 1932. U.S. Steel appears to have used the AS&W subsidiary as a place for troubled properties. It had the distinction of being the most northerly operated steel mill in the central western states. The plant was built with two blast furnaces and ten open-hearth furnaces for making steel. The first shipments of coal from boats and Duluth docks took place in August 1915. A 96-oven coke battery was located at the plant with the wire mill opening on July 5, 1922. It was reported in 1917 that it took 650,000 tons of iron ore, 500,000 tons of limestone (and 600,000 tons of coal to make 360,000 tons of coke) to make 500,000 tons of steel ingots that were equal to 360,000 tons of finished steel.

During 1931, the Great Depression caused both blast furnaces and half the open-hearth furnaces to be shut down. The Great Depression further impacted the mill when the southern blast furnace was torn down.

World War II brought about the need for increased steel production. The federal government's Defense Plant Corporation (DPC) dismantled and transported the Illinois Steel Co., Joliet, Illinois, blast furnace in 1942 and used it to re-established the second blast furnace at Steelton. The war took its toll on the furnaces and in 1949 both blast furnaces were demolished and replaced by two higher ca-

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Minnesota Steel Co. constructed this large steel mill in 1916. It was leased to American Steel & Wire (AS&W), a U.S. Steel subsidiary in 1932. This aerial view was taken in the early 1950s and shows in the foreground the large ore bridge cranes straddling the limestone, coal and iron ore storage piles. Much of the barbed wire, steel fence posts and nails used in the western U.S. were manufactured here. Transportation of raw materials and finished products contributed greatly to DM&IR's bottom line. (University of Minnesota Duluth, Kathryn A. Martin Library Archives and Special Collections, S2386, Box 30 Folder 7)

pacity furnaces.

Inbound traffic was delivered by DM&IR. Iron ore came down from the iron range shipping points and was delivered from Proctor, 11 miles away, down Steelton Hill on transfer runs. Coal and limestone were unloaded from lake boats in Duluth and brought to Steelton by the Missabe Junction Hauler in both open hoppers and ore cars. A large material-handling yard was used to stockpile coal and limestone for use during the winter season when Lake Superior was frozen. A six-track iron ore thawing shed allowed ore to be shipped year-round.

DM&IR provided switching service for the raw material yard, blast furnace highline, thawing house and the four rolling mills. The remaining interplant switching was done by AS&W's own fleet of 0-6-0, 0-8-0 and 0-4-0T steam locomotives, which were later

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replaced by Baldwin VO-660s, VO-1000s, EMD SW-900s and a few smaller Atlas, Porter, and Plymouth 20- to 35-ton type engines. AS&W also had a fleet of flat cars, gondolas, ore cars, hopper cars and a few box cars for interplant traffic.

Outbound traffic consisted of billets, bars, steel fence posts, wire, woven wire fencing, nails and, after 1955, welded steel mats for highway construction. Some of the billets were shipped back to Duluth docks and loaded in lake boats. Beginning in the 1960s the coke plant shipped outbound coke to other U.S. Steel plants by rail. Most of this was shipped via DM&IR to Itasca, Wisconsin, for interchange to the C&NW. AS&W shipped 6,577 carloads of steel by rail in 1955. Also shipped in 1955 were 89,441 tons of steel products to Duluth for loading on lake boats. The AS&W plant began shipping 50 percent of their finished product in 1961 by truck, further reducing the shipping of finished product by rail.

Throughout its history AS&W received limestone and coal and shipped steel billets over the DM&IR limestone dock located just east of the Duluth ore docks. This movement was discontinued during mid-1963 when docks became obsolete. After the limestone dock closed, coal and limestone moved over the Duluth Dock & Transport docks and later, Hallett Docks 5 and 6. The cranes at the DM&IR-owned limestone docks were removed in April 1972.

During 1964, U.S. Steel merged seven operating divisions, this plant being renamed U.S. Steel, Duluth Works. The plant was the sole producer of steel wool and fence posts with the primary activity being wire fabrication.

The AS&W hot side was closed on November 13, 1971, and the finishing mills closed on October 1, 1973. A total of 9,022 loads of coke were anticipated in 1979 with DM&IR assigning 99 hopper cars to this service. Remaining carloads were handled in foreign ownership hoppers. The coke plant was shut down in May 1979 with final shipments of coke taking place during late 1979.

ATLAS CEMENT AT STEELTON

Atlas Cement Co. constructed a cement plant adjacent to Minnesota Steel in 1918 to use the slag by-product from the steel company to make Portland cement. Initial capacity was 4,000 barrels of cement per day. Bagged and bulk cement was loaded in box cars. One cement company reported that bulk cement shipments nationwide increased from 15,485 barrels in 1912 to 180,258 barrels in 1914. Atlas Cement had entered the cement market at a most opportune time. U.S. Steel acquired both Atlas Cement and Universal Cement Co. in 1930 and merged them into Universal Atlas Cement Co. (UAC) in 1930.

By the 1930s a number of car builders had developed covered hoppers for bulk shipment of dry bulk commodities. Between 1941 and 1956 the DM&IR acquired 40 70-ton covered hoppers to modernize bulk shipping of cement. Once the DM&IR was dieselized the UAC high-line trestle, where limestone, slag, flue dust and sand was unloaded, was restricted to SW9s until the fall of 1963. This restriction kept four SW9s on the roster until the high-line was rebuilt and SD9s were allowed on the high-line trestle.

During 1956, UAC began to ship cement in an interplant switch move from the plant to an unloading location inside the wye for transfer to truck. Facilities were completed in June 1961 for loading of trucks at UAC without the interplant move. This immediately resulted in a heavy diversion of cement traffic from rail to truck. UAC had shipped 34,600 tons of cement in 6,795 cars in 1955.

An annual gross profit statement from March 1968 indicated the following movement of cement on DM&IR. From UAC at Steelton: 49 cars to Hibbing (Panama location), 14 to Ely and 14 to Aurora. Outbound to foreign carriers: 1,432 to NP at Pokegama, 937 to GN at Saunders, 50 to Soo at Saunders, 102 to Soo at Ambridge and 433 to CNW at South Itasca. Cement received from foreign

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Photographed from Ely's peak in late 1950's is the Universal Atlas Cement (UAC) plant in the foreground and in the background is American Steel & Wire (AS&W) steel mill at Steelton, Minnesota. Both of these U.S. Steel-owned operations contributed a significant amount of traffic to DM&IR's bottom line. UAC received limestone and coal from DM&IR Duluth limestone dock. Outbound shipments of bagged cement were made in box cars, and bulk cement moved in box cars and covered hoppers. Opened in 1918 the plant was closed on January 1, 1976. (D.P. Holbrook collection)

carriers: 12 from Soo at Saunders to UAC, 13 from NP at Missabe Jct. to Hibbing, 13 from NP at Endion to Aurora, Minnesota, and 15 from NP at Missabe Jct. to Minntac.

The UAC plant was closed on January 1, 1976.

LIMESTONE

Besides hauling limestone for AS&W and UAC, changes in the processing of taconite created a new need for limestone in 1988. Steel companies began to want a specialty type of taconite pellet and one of these was a "fluxed" pellet containing a small amount of a 50/50 mix of limestone and dolomite called "fluxstone." The fluxstone mixture in the pellets combined chemically with unwanted impurities at the blast furnace and carried them from the blast furnace as slag. Initially all the dolomite and limestone was unloaded at Hallett Dock 5 adjacent to DM&IR Dock 6 in Duluth. Mixing of the two was accomplished by alternating end-loader bucket loads from the piles of each material. Fluxstone had a tendency to freeze in the winter which caused the need to use side-dump cars during the winter months but allowed use of ore cars for summer shipments. During July 1995 both Minntac and Minorca approached DM&IR about handling it directly through their Lakehead Storage Area. This was ac-

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Next to the ore docks in Duluth was the limestone dock shown in the foreground and the company coal docks in the far background. Steel billets shipped from American Steel & Wire at Steelton are being loaded into the 414-foot long boat *Clifford F. Hood* built in 1902 and operated by American Steel & Wire Division of U.S. Steel during the mid-1950s. Behind it is the 580-foot long boat *Eugene J. Buffington,* built in 1909 and operated by the Pittsburgh Steamship Division of U.S. Steel, unloading a load of limestone. The bottom left foreground shows limestone loaded in ore cars on the center track and the rear track is spotted with Class Q triple hoppers for coal or limestone loading. (Wes Harkins)

complished by installing an unloading hopper on the south side of Dock 5 that lake boats could self-unload the aggregates which were transferred to the storage area by conveyor. DM&IR did not win the contract for handling the fluxstone for Minorca until 2001. Quickly, fluxstone, with almost 1.5 million tons handled each year, became second only to pellets in tonnage hauled by the Missabe.

LOGGING

Logging railroads spread across Northeastern Minnesota from 1886 through 1916. Most of these railroads used 20-ton capacity 20-foot skeleton log flat cars. D&IR connected with a number of private logging railroads including: Duluth & Northern Minnesota (Knife River, Britton and York), N.B. Shank Co.(Biwabik),

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Duluth & Northeastern (Hornby), Tower Lumber Co. (Murray), and Swallow & Hopkins (Ely). Many of these railroads had their own mills, but D&NM interchanged a significant part of their logs with D&IR at Knife River. A large number of finishing mills were located in Duluth, including: Scott-Graff, Red Cliff, Virginia and Rainy Lake, Mitchell & McClure (later Alger-Smith).

The importance of logging is represented in the following D&IR statistics.

Logs handled in regular freight trains:

Dec. 1901 – 397 empties and 623 loads

Feb. 1902 – 1264 empties and 895 loads

Mar. 1902 – 1292 empties and 1246 loads

Logs handled on log trains

Dec. 1901 – 6525 empties and 6277 loads

Feb. 1902 – 9712 empties and 9349 loads

Mar. 1902 – 9030 empties and 8690 loads.

The logging industry in Minnesota reached its peak in 1905.

During 1910 Duluth's six large sawmills cut almost 1.5 million board feet of lumber. By 1915, this number had fallen below 100 million board feet and in 1925, with the closing of the Scott-Graff mill, the lumber logging and milling era was all but over.



Loading logs on D&IR skeleton log flats with a McGiffert loader. Photo circa 1910. (D.P. Holbrook collection)

Sister road DM&N also hauled lumber from the vast timberland of Northern Minnesota. During the winter season from December 1 to April 30, 1904 lumber car loads amounted to: 5,626 of logs, 2,581 of mining timbers, 3,188 of pulpwood, 119 of cordwood, 18 of ship knees, 345 of ties and 161 of posts and pilings.

Much of the mining timbers shipped by mining companies were used by the same company at their underground mines.

PULPWOOD

Old-growth timber harvesting began to decline and by 1925 the last of the big sawmills were closing down. A secondary source of lumber business was found in hauling pulp-

Logs Shipped on D&IR
November 1901 through April 30, 1902

Location	Company	Board Feet
Knife River	Alger Smith	43,875,000
Britton	Scott Graff & Co	10,583,000
Drummond	Scott Graff & Co	785,000
Mile 37	Scott Graff & Co	5,890,000
York	Scott Graff & Co	11,054,000
Mile 39	Mitchel McClure	15,319,000
Highland	Red Cliff Co.	18,125,000
Cloquet River	LeSure Co.	13,000,000
Mile 61	LeSure Co.	1,800,000
Rivers	LeSure Co	2,100,000
Highland	Duncan Brewer Co.	6,675,000
Mile 82	Duncan Brewer Co.	24,000
Mile 86	Duncan Brewer Co.	300,000
Mile 88	Duncan Brewer Co.	3,627,000
Mile 90	Duncan Brewer Co.	55,000
Colby	Duncan Brewer Co.	169,000
Mile 44	Duluth Log Co.	211,000
Mile 63	Morgan Co.	587,000
Bassett	J. O'Brian	273,000
Biwabik	Alger Smith Co.	169,000
Various Points	Lunz's Mill	18,000
Various Points	Nolan Bros. Lumber	1,882,000
Murray	Tower Lumber	13,063,000
Total		137,884,000

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wood. Pulpwood was initially obtained from hemlock and spruce which later included poplar and aspen-type trees. The wood fiber from these trees was made into the pulp, called "wood pulp," used in paper manufacturing. All of these were fast-growing trees. World War II brought about a rapid growth in the need for paper products, especially cardboard cartons to replace wood containers. The decline of sawed logs and sawmills also saw the creation of paper plants in northern Wisconsin and Minnesota that required the pulpwood.

Initially pulpwood was loaded at almost every station and on old logging spurs. To streamline the operation DM&IR began to develop log landings at towns that allowed multiple pulpwood cutters to pile their pulpwood on the ground adjacent to the sidings and if needed, store it on DM&IR-owned land until cars were available for loading.

The Wales Branch, constructed in 1917, was built into the rich timberland north of Two Harbors from a junction at Wales with the main line, 18 miles to Whyte. During 1947-48 a 32-mile extension was built from Whyte to Forest Center. The logging village at Forest Center was operated by Tomahawk Timber Co. which had secured timber rights on 150,000 acres of timber in the Superior National Forest during the 1940s. Log landings were located at Jordan, Whyte, Jaycee, Isabella, Sawbill Landing and Forest Center to allow loading of the pulpwood. Much of the pulpwood loaded here was sent to pa-

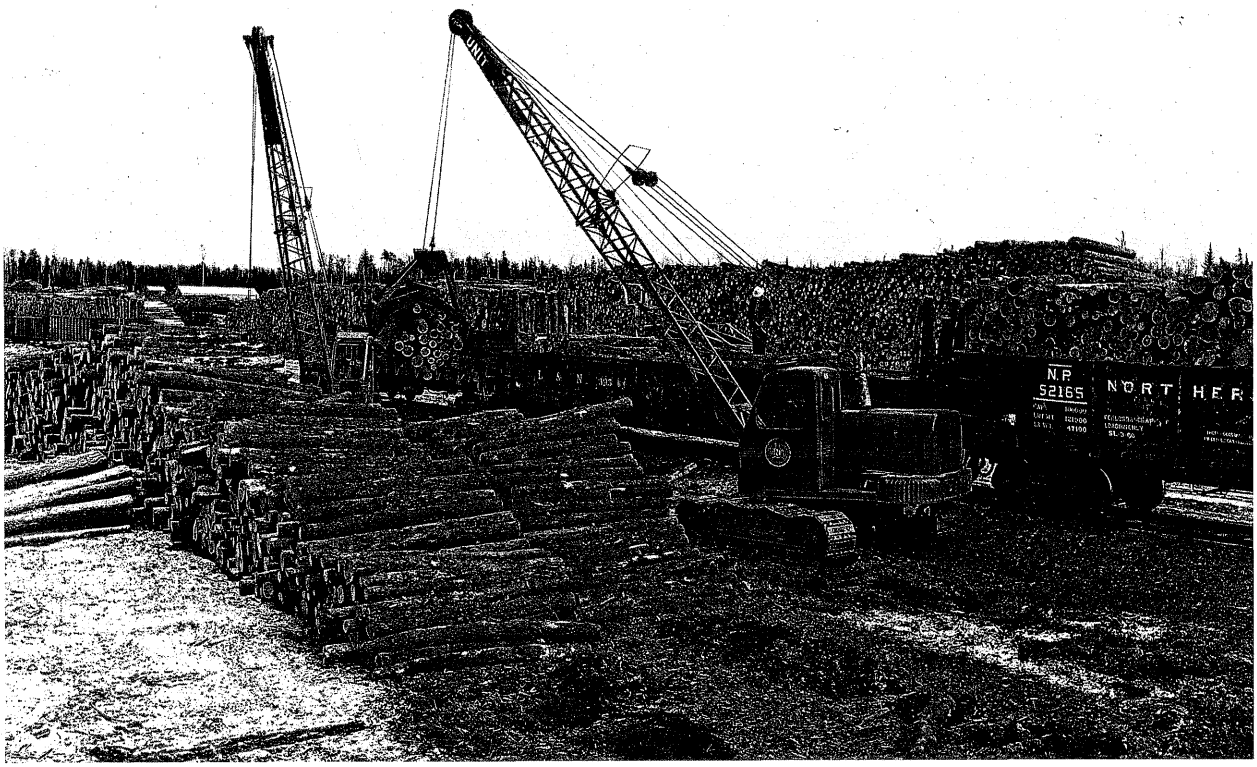
Logs Shipped on DM&N shipped in 1903 up to April 1, 1903

From	To	By	Cars	Board Feet
Hogan	Alborn	Northern Lumber Co.	3245	18,544,410
Grand Lake	Adolph	Books Scanlon Lbr. Co.	52	279,964
Hatch	Adolph	Brook Scanlon Lbr. Co.	26	127,400
Adolph	Duluth	Merrill Ring Lbr. Co.	34	174,927
N.Clarke	Duluth	Alger-Smith Lbr. Co	15	62,055
Sparta	Duluth	John O'Brien & Co.	109	559,745
Pine	Duluth	D.B. Barber	34	160,100
Le Suer	Duluth	Le Suer Lumber Co	80	395,584
Hatch	Duluth	J.W. Fee	2	9,345
B.S. Road	Duluth	Duluth Log Co.	5	27,727
Saginaw	Duluth	John O'Brien & Co.	107	630,018
Morrell	Duluth	Union Match Co.	41	198,827
B.S. Road	Duluth	Price Lumber Co.	2	10,636
Filian	Duluth	Duluth Log Co.	5	24,664
Pine	Duluth	John O'Brien & Co.	8	38,609
B.S. Road	Duluth	John O'Brien & Co.	2	9,391
Payne	Duluth	Alger-Smith & Co.	5	26,409
Alborn	Duluth	Duluth Log Co.	9	42,045
Alborn	Adolph	Brooks Scanlon Lbr.Co.	15	70,409

Mining Timbers shipped on DM&N in 1903 up until April 1, 1903

From	To	By	Cars	Board Feet
Maxwell	Eveleth	Minnesota Iron Co.	454	1,816,000
Maxwell	Hibbing	Minnesota Iron Co.	39	156,000
Matthews	Hibbing	Minnesota Iron Co.	263	1,052,000
Morrell	Virginia	Interstate Iron Co.	40	166,865
Morrell	Hibbing	Minnesota Iron Co.	1015	4,060,000
Morrell	Eveleth	Minnesota Iron Co.	796	2,824,000
Morrell	Mt. Iron	Oliver Iron Mining Co.	2	8,000
Eveleth	Parmelee	Fayall Mine	15	60,000
Eveleth	Hibbing	Minnesota Iron Co.	172	688,000
Eveleth	Virginia	Republic Iron & Steel	11	44,000
Le Suer	Biwabik	Pitt Mine	6	28,000
Morrell	Parmelee	Fayal Mine	63	252,000
Iron Jct.	Virginia	Interstate Iron Co.	7	31,030
Jones	Eveleth	Troy Mine	50	250,000
Jones	Parmelee	Minnesota Iron Co.	3	10,000
Zim	Virginia	Interstate Iron Co.	3	12,000
Wolf	Virginia	Interstate Iron Co.	1	4,000
Virginia	Eveleth	Minnesota Iron Co	6	24,000
Payne	Eveleth	Minnesota Iron Co.	7	28,000
TOTAL			6649	32,926,180

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Second to iron ore in tonnage, lumber and later pulpwood would remain a staple of DM&IR operations until the late 1980s. The Wales Branch north and east of Two Harbors was built specifically to tap the timber resources. Located at the end of the branch was Sawbill Landing, shown in 1961. (Basgen photo)

per plants in Northern Wisconsin including Wausau, Rhinelander, Tomahawk, Nekoosa and Wisconsin Rapids. Pulpwood was also loaded at almost every town across the iron ranges. Pulpwood was shipped to St. Regis Paper at Sartell, Minnesota, Blandin Paper at Grand Rapids and via interchange to D&NE at Saginaw, Minnesota to the large Northwest Paper mill at Cloquet, Minnesota.

Shipments off the Wales Branch started to decline in 1965 with the shut-down of the Tomahawk Timber sawmill at Forest Center. Congress sealed the fate of the Wales Branch in 1978 with the establishment of the Boundary Waters Canoe Area Wilderness which would control future logging in this area. The Wales Branch was pulled up to Norshor Junction, the connection with Reserve Mining, in June 1983 ending most of the pulpwood shipments off the branch. Pulpwood shipments began to decline on the rest of the system during the 1970s and by the late 1980s most shipments were being made locally by truck.

BENTONITE

Development of the taconite industry in Minnesota was spurred along by the continued reduction of available natural ore. As the natural ore reserves began to be depleted geologists and mining companies began to look for an alternative ore.

The first attempt at mining taconite was in 1870 by Peter Mitchell near Babbitt, Minnesota. Numerous attempts, some successful, were used to process taconite into a high iron content product, but because of the huge supply of natural ore, taconite was only a small player. This all changed in 1951.

Prior to 1951, many attempts at beneficiation of taconite were attempted. Most were failures because once the impurities in taconite

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were removed, only a high-iron content dust was left over. A binder was needed that could be added to the taconite to create a shippable product that blast furnaces could use. E.W. Davis, "The Father of Taconite," had experimented with the processing of taconite at the University of Minnesota Mines Experiment Station beginning in 1918. The continued breakage of the "pellets" was solved by Percy L. Steffensen of Bethlehem Steel. Mr. Steffensen found that by adding small amounts of bentonite clay to a balling drum feed succeeded in making the taconite balls tougher. It is unclear why adding 15 to 20 pounds, per ton of taconite concentrate, would make the balls able to withstand rougher treatment without breakage. Another benefit of the bentonite and taconite mixture was that damp balls could be heated to a high temperature quickly without exploding or breaking apart.

Bentonite clay is found in the following areas in the western United States: Bell Fourche, South Dakota, and Colony, Wyoming area, Upton and Osabe, Wyoming area about 50 miles directly south, Kacyee and Casper, Wymong area, Lovell, Greybull and Worland, Wyoming area and two different areas in Montana near Malta and Vananda.

Strip mine development of some of these areas began as early as 1950. Besides being used for taconite processing, bentonite is also used for: oil well drilling mud, cosmetics, kitty litter, and a binding agent in foundry sand molds and as a binder for animal feed pellets. Bentonite is named for the one-time Fort Benton, now Benton, geological stratum located in the eastern Wyoming Rock Creek area. Montana bentonite has higher silica content and this would play a significant part in later taconite pellet production.

The development of taconite reserves on the Iron Range went hand in hand with the need for a continuous supply of bentonite clay. Seizing this opportunity, Hallett Minerals was organized during the spring of 1964 to mine, market and process bentonite clay. At that time, Reserve Mining and Erie Mining were producing pellets and both Eveleth Taconite and Minntac taconite plants were under development. The need for processed bentonite was at hand.

From 1964 to 1965 Hallett Minerals acquired almost 6,000 acres—about 9 square miles—in an area two to five miles south of Vananda, Montana. Initial estimates showed enough bentonite was available for about 10 years. Besides developing the strip mine, Hallett installed a field dryer and railroad siding on the Milwaukee Road main line at Vananda. The bentonite was strip mined and then processed in the field dryer to reduce the moisture content from 28 percent to as low as 15 percent. Once this was done the bentonite was screened to about 1-inch size and then loaded into railroad hoppers cars.

During December 1964, R.N. McGiffert of Hallett Dock Co. inquired with the DM&IR about leasing property near Burnett, Minnesota, for use as a possible construction site for a bentonite processing plant. This inquiry was forwarded to the DM&IR Engineering Department so that lease costs could be developed for the land involved.

Construction of a processing plant at Burnett, with an annual capacity of 150,000 tons of finished bentonite, was begun in 1965. Burnett is located 25 miles north of Duluth on County Highway 7 alongside the DM&IR Proctor-to-Virginia, Minnesota main line. The site for the processing plant was chosen for its central location to proposed and under-construction taconite plants.

At the July 19, 1967, DM&IR operations meeting held at Gilbert, Minnesota., R.J. Hoch, DM&IR manager of sales, reported that: "An attempt is being made to establish a rate on semi-processed clay from Wyoming and Montana for the Hallett Minerals Co. proposed plant at Burnett, Minnesota. Complications have arisen due to the fact that origin carriers (MILW) refuse to establish a rate lower than the one already existing for a move to Chicago."

At the September 22, 1965, DM&IR op-

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Hallett Minerals bentonite processing plant at Burnett, Minnesota late 1967. (MRHS collection)

erations meeting held at the Wolvin Building in Duluth, J.P. Keeney DM&IR manager of pricing, reported that: "Arrangements have been completed with the Milwaukee Road for establishment of a $6.50 per ton rate (predicated on the movement of 100,000 tons annually in multiples of 10 cars) on semi-processed clay from Montana to the Hallett Minerals Co. plant at Burnett. DM&IR division of this rate will be 10 percent and cars will be received at Duluth. Rates for movement of clay from Burnett to taconite companies have not been established."

At the December 29, 1965. meeting at the Wolvin Building, R.J. Hoch was reporting on clay and bentonite movements: "Tonnages continue to increase due to increased plant capacity at both Reserve and Erie Mining companies. The Eveleth Taconite Co. will receive 850 tons of bentonite in 1965; their annual consumption of bentonite will be 17,500 tons when the pellet production rate reaches the 1.6 million ton-per-year level. Estimated tonnage for the Hallett Minerals Co. bentonite processing plant at Burnett is 100,000 tons of crude clay inbound and 80,000 tons of processed bentonite outbound to taconite plants on the range."

At the August 1, 1966, operations meeting at Gilbert, Mr. J. P. Keeney manager of sales reported that: "Hallett Minerals Co. expects to be in production by September 1; outbound rates are being established. Another major construction firm is interested in locating a bentonite processing plant on the Great Northern line near Hibbing. Our Traffic and Law Departments protested in Minneapolis a motor carrier application by William Yonkovich for handling in motor service material that had a prior rail movement. GN has been working with the motor carrier. This movement, however, would be restricted to a 20-mile radius of Chisholm. The reason for GN support of the motor application appears to tie in with the establishment of this new bentonite plant." To this author's knowledge this proposed plant near Hibbing was never constructed.

The first shipment of unprocessed bentonite from Vananda, to Burnett was made in late February 1967. Bentonite was loaded into MILW 91000, 95000, 96000 series hopper cars at Vananda and interchanged to the DM&IR at Rice's Point for movement to Burnett. The first shipment of processed bentonite was made from Burnett on March 16, 1967, and delivered by DM&IR to Reserve Mining Co. railroad at Norshor Jct. for final movement to the Silver Bay, Minnesota taconite plant.

The processing of the bentonite at the Burnett plant consisted of the following: the unprocessed screened bentonite arrived in open hoppers and was bottom dumped out of the hoppers via an under-track unloader. Once dumped, a conveyor took the bentonite to a covered, 6,000-ton, storage area. The bentonite was then reclaimed with a Michigan 125 front-end loader and fed to a bucket elevator that lifted it to a 160-ton capacity surge bin. From here the bentonite was fed through a Raymond 6669 roller mill that ground and flash-dried the material at the rate of 25 tons per hour. The bentonite was now a very fine powder with the moisture content reduced from 15 to 5 percent. The finished product was then either bagged for truck shipment, or placed in one of two concrete silos having

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a capacity of 2,000 tons each. From the silos the bentonite powder was loaded directly into covered hoppers. To provide quality control an on-site lab was staffed by two men who tested the incoming crude bentonite. Much like taking samples of iron ore before shipping, the bentonite had eight samples per carload taken when loaded at Vananda to allow for consistent quality control of the finished product.

Taconite development on the iron range went hand in hand with the amount of bentonite handled by DM&IR. In 1963, bentonite movements on DM&IR were 176,000 tons to Erie, Reserve and Eveleth Taconite, who produced 15,896,835 tons of pellets. By 1974, this movement totaled 453,000 tons to Erie, Reserve, Minntac, and Eveleth, who produced 36,052,976 tons of pellets. Of the 453,000 tons of bentonite handled in 1974, 92,044 tons, a little more than 20 percent originated at Burnett.

A Milwaukee Road traffic study in December 1975 for the calendar year 1974, showed 2,137 open-hopper carloads of bentonite being shipped from Vananda, Montana to Duluth for interchange with the DM&IR. During the same period, the Burnett plant shipped a total of 1,104 covered hopper loads of processed bentonite.

According to Bill McGiffert, who was the general manager of the Burnett plant when it opened, it was cheaper to ship unprocessed bentonite in open hoppers to Burnett for final processing. Railroad rates were much more expensive when shipping finished products than unfinished. Unprocessed bentonite was considered unfinished product and thus was cheaper to ship from Montana to Burnett. Hallett Minerals felt that they would be able to compete with other shippers of bentonite from South Dakota and Wyoming because of the cheaper railroad rates, Hallett's higher degree of quality control, and a consistent and controlled covered hopper fleet supplied by the DM&IR. This was one of the main reasons for building the plant at Burnett.

Hallett found a good customer in Reserve Mining. Almost 80 percent of the output at Burnett in 1974 — 879 carloads — was shipped to Reserve. Bill said that Reserve found a good fit for the bentonite out of Burnett and it "worked well with their process." The remaining taconite plants received very small amounts of Burnett bentonite. "Cub" Kubis, who worked at the plant from its initial construction in 1964 until its demise in 1986, recalled that Burnett shipped bentonite by rail to the Minntac, National, Butler and Eveleth taconite plants. He also said bentonite was trucked to Inland (Minorca). Trucks were also used to ship bagged bentonite to various locations in Wisconsin.

The remaining 20 percent of the output for 1974 was 89 carloads for Erie Mining, eight carloads for Minntac, 70 carloads for Eveleth Taconite and 138 carloads for Bruce Lake/ Atikokan, Ontario plants. Bill said, "Even with the higher quality product, the other taconite plants chose to use Burnett bentonite to fill in only when they encountered a shortage and needed a quick delivery," Throughout the entire plant's history, Reserve Mining remained the largest customer.

R.C. Anderson, retired engineer in the taconite industry, recalled; "The quality of (Burnett) bentonite was on the low end of things, which resulted in higher usage. Price kept them going until the amount used became a factor. One of the first things I worked on (Eveleth Taconite at Fairlane) was to get the best bentonite quality even at a higher price because we were under pressure to keep the silica content down on finished pellets. Bentonite is 60 percent silica. The more bentonite you use, the worse the pellet metallurgical quality is."

Beside the rail shipments to Burnett, Hallett also was handling bulk shipment of bentonite over Hallett Dock 6. On September 2, 1968 the steamer *E.B.Barber* of the Algoma Central fleet took on a cargo of 9,959 net tons of crude bentonite shipped from Vananda destined to Wabush Mines at Pointe Noire, Quebec. Loading was complete on September 4, 1968.

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During 1974 Hallett Minerals undertook a study to move the plant from Burnett to the Hallett Dock 6 location. Bill McGiffert said one of the reasons for considering the move was expansion of capacity and the ability to reuse the coke oven bins, at the adjacent Zenith Furnace property, as feed bins for the bentonite processing. However, the cleanup necessary at the old Zenith Furnace property negated the cost savings and expanded production opportunities, and did not take place.

Also during 1974, Hallett, with the need for additional bentonite, proceeded with further exploration in northern Montana. North of Glasgow, in Valley County, a drilling and test site was established and operated by Brazil Creek Bentonite. Bill said that "good quality bentonite was found at this location" but only a small amount was shipped to Burnett during 1975. These shipments were loaded in Burlington Northern open hoppers and shipped from Malta, ontana via Minot and Grand Forks to Duluth.

Hallett Minerals continued to operate the plant until 1981, at which time the plant was sold to Federal Bentonite. At that time, production at the plant was basically what it was during 1974, about 1,100 carloads per year. Hallett's decision to sell the plant proved to be a good one. In 1986, Reserve Mining declared bankruptcy and the plant was shuttered. The loss of this customer caused Federal Bentonite to close their plant in September 1986.

The tracks over County 7 at Burnett have been paved over and like many mines on "The Range," the processing plant has faded into history.

COAL

Coal was a major commodity transported by the DM&IR and predecessor roads. Prior to 1907 it was handled over various coal company docks at Duluth and Two Harbors. DM&N contracted in 1907 with Barnett & Record Co. to build an 1,800-foot long by 604-foot wide coal dock with three vessel-unloading towers at Duluth. After the dock was completed all "corporate" i.e. U.S. Steel, Oliver Iron Mining and DM&N coal was received over these docks. D&IR had a similar coal dock at Two Harbors, providing the same service for corporate coal.

Besides locomotive and company coal for stations, it had a number of major consumers including coal yards, lumber yards, power plants at Two Harbors, Proctor, Virginia and mining companies. It was also handled to a number of smaller communities' power plants and shipped via D&NE at Saginaw, Minnesota to Northwest Paper at Cloquet, Minnesota.

Once U.S. Steel built the large American Steel and Wire plant at Steelton, coal was hauled from Duluth docks to the plant for steel and coking purposes. After World War II the DM&IR and DW&P alternated hauling coal each year from the Duluth docks to Virginia Water and Light public utilities at Virginia, Minnesota. DM&IR hauled the coal on odd-numbered years and DW&P on even-numbered years, beginning each October.

DMIR announced on December 29, 1965, that the 50/50 sharing of coal movement to Virginia, Minnesota with DWP had been arranged to begin on April 1, 1966. This traffic had averaged about 65,000 tons annually in 1960. Coal was also hauled to Hibbing, Minnesota's public utilities power plant. During 1960 this averaged about 58,000 ton annually, divided equally between GN and DM&IR. Virginia Water and Light discontinued inbound rail shipments of coal on July 24, 1999, when the plant started using coal trucked from docks at Duluth.

Taconite plants used large amounts of electricity and the construction of Erie Mining's taconite plant in 1949 taxed the electrical power grid of the iron range. Additional taconite plants being considered in the early 1950s brought with them the need for a new power plant centrally located on the iron range. Beginning with the May 10, 1953, arrival of

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