

PLAINTIFF'S
EXHIBIT

ON-51

OGLEBAY NORTON COMPANY
FACILITIES SERVICES PRODUCTS 1965

FE0003155

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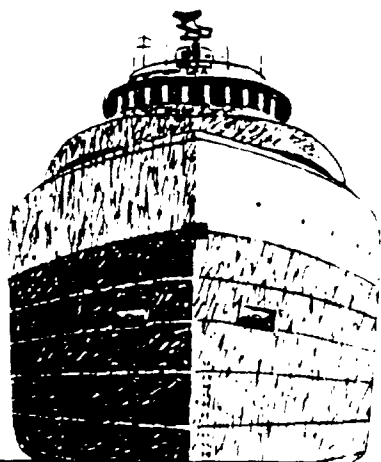
SUBSIDIARIES

CABIN CREEK COAL SALES COMPANY • 139 East Fourth Street • Cincinnati, Ohio 45202 • 381-6590
TOLEDO OVERSEAS TERMINALS CO. • Box 306, Presque Isle, Station "A" • Toledo, Ohio 43605 • 726-2605

This 1965 Sales Book provides information on the facilities, product line and services which go to make up Oglebay Norton. The forward portion of the book is primarily descriptive of our operational activities and what is new in the way of current developments. The second section contains specific statistical data in quick reference form. We have tried to make this as complete as possible, but additional information will be made available immediately, on request.

OGLEBAY NORTON COMPANY

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VESSELS

The Fleet The Columbia Transportation Division operates a versatile fleet of 19 vessels on the Great Lakes to satisfy the requirements of our customers. Ore and coal are carried extensively by our bulk fleet of eight vessels. Oversized and heavy lift shipments, such as fabricated steel sections, can be transported in any of our four crane vessels. Other commodities handled are pig iron, scrap, steel, and ferro alloys. Our six self-unloaders are the workhorses in the fleet, carrying such bulk cargoes as coal, limestone, salt and sand. Rounding out the Columbia fleet is a crane-conveyor vessel having the self-loading ability of a crane vessel combined with the long boom discharge of a self-unloader. In addition to self-propelled vessels, two tug-barge units are operated by The Pringle Barge Line.

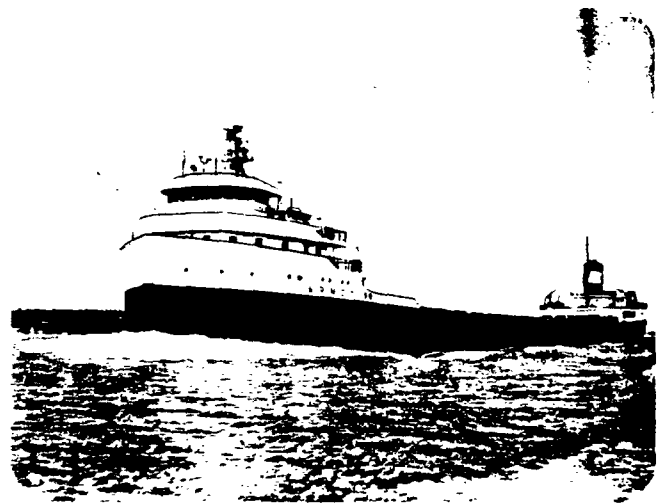
Record Year The ability of our diversified fleet to accommodate a wide variety of customer requirements for cargo handling resulted in a record-breaking movement of almost 16,000,000 tons in 1964.

Important New Conversion *New Self-Unloader.* The former bulk vessel *Joseph H. Frantz* has been newly converted to a self-unloader, thereby extending the versatility and service of the fleet. (See No. 3 opposite page.) The *Frantz* has a 250-foot boom, with a 274° swing, that is hydraulically actuated. Unloading equipment consists principally of two 54" hold belt conveyors, two 60" cross belt conveyors, one 60" incline belt conveyor and a 60" boom belt conveyor. A new electrical control room forward supplies needed power control devices. The *Frantz* has also been repowered with a 4,000 horsepower diesel engine replacing steam propulsion equipment. Other extensive improvements include diesel generators, complete rewiring and an 800 horsepower motor-driven bow thruster. This is the fourth self-unloader vessel to be so equipped. The *Robert C. Norton*, a crane-conveyor vessel, has also been equipped with a bow thruster. The bow thruster produces considerable maneuverability in restricted waters, a fact particularly important to the above types of vessels.

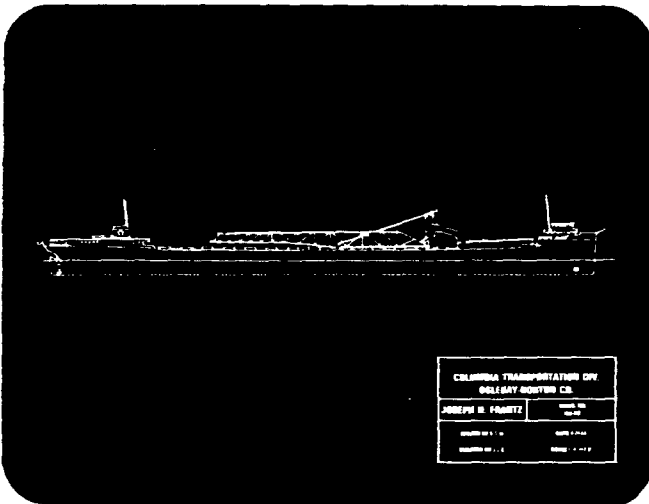
1. Scheduling is a service that is vital to Columbia customers. More than vessels is involved here. Handling of coal cargoes means precise matching of rail cars or unit trains to meet the carrying vessels and thus avoid demurrage charges. We also match deliveries with customer inventory levels. Columbia service helps customers find waterfront locations for cargo discharge and advises on the best and most economical methods of land transportation to or from waterfront facilities. **2. Bulk Vessels** work from early spring to late fall carrying ore and coal. This is the ARMCO which can be unloaded in about ten hours. Then makes a return trip in approximately two days. **3. Self-Unloaders** can discharge cargo wherever there is sufficient draft and adequate mooring facilities. This illustration shows the *Joseph H. Frantz*, newly converted, whose long boom can build stockpiles back from the water with even distribution. Degradation of materials handled is kept to an absolute minimum by a carefully designed conveyor-discharge system. **4. Crane Vessels** carry a wide variety of cargoes because they can load or unload from rail cars, barges, trucks or dockside stockpiles. Clam shell buckets, slings, hooks and electro-magnets on the heavy cranes make these vessels unusually versatile. Fabricated steel sections or long structural steel, along with pig iron, scrap or any bulk commodity, can be handled quickly and easily through wide hatch openings.



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COAL

Operating Coal Properties The coal properties of Oglebay Norton Company are located in both the states of Ohio and West Virginia. Production at the West Virginia mines consists of steam, domestic, and metallurgical coals. Metallurgical coal is produced at our Brule Mine (Pocahontas No. 3 Seam), and also at our Shamrock Mines (Eagle, Powellton and No. 2 Gas Seams). The Ohio coal is marketed to utilities and industry. Total coal produced and distributed by Oglebay Norton Company is in excess of five million tons per year. Modern mining techniques, preparation plants, and inspection by qualified personnel insure quality coals for all of our customers. In addition to our own production, we are the sales representative for other mining companies engaged in producing steam and domestic coals.

Facilities for Volume Shipments All of the mines of Oglebay Norton Company as well as other mines represented by us are equipped to handle volume shipments to customers requiring this type of service. New storage and loading facilities at Norton and Saginaw mines have recently been completed and are now in operation. Equipment at all preparation plants includes automatic conveyors, storage facilities, and other corollary equipment required in loading volume shipments.

New Coal Reserves A planned program of acquisitions of coal properties insures adequate and long-lasting reserves for our customers. In line with this program, additional mineral leases on several thousand acres of coal bearing land were recently acquired for our Norton Mine.

Petrographic Analysis This analysis is offered by Oglebay Norton Company to users of metallurgical coals. Microscopic examination indicates the performance of an individual coal or a blend, including selection of coals for blending without running carbonization tests.

1. Combustion consultants' and metallurgists' services are available to users of Oglebay Norton coals. These trained personnel help you select the right coal for your requirements. 2. Oglebay Norton Company has added new and larger storage facilities and loading equipment to its Norton and Saginaw (Ohio) mines, to take advantage of unit train loading rates and other economies for its customers. Coal moves directly from the mine by conveyor, through the preparation plant to a concrete pad. Conveyor belts located in a tunnel immediately beneath the pad convey coal to the tipples where unit train cars are loaded. 3. Ceredo is one of the two modern central preparation plants that processes Shamrock Metallurgical Coal. Ceredo is located on the Ohio River and ships prepared coal by rail, or barge, whichever is more economical and convenient for the customer. The other plant, Shamrock, is located near the Kanawha River and offers both rail and barge transportation. 4. Here is a microscopic view of a petrographic slide, used in determining how individual coals or blends will perform in a coke oven. Guesswork is eliminated; time is saved because coke oven tests are unnecessary.



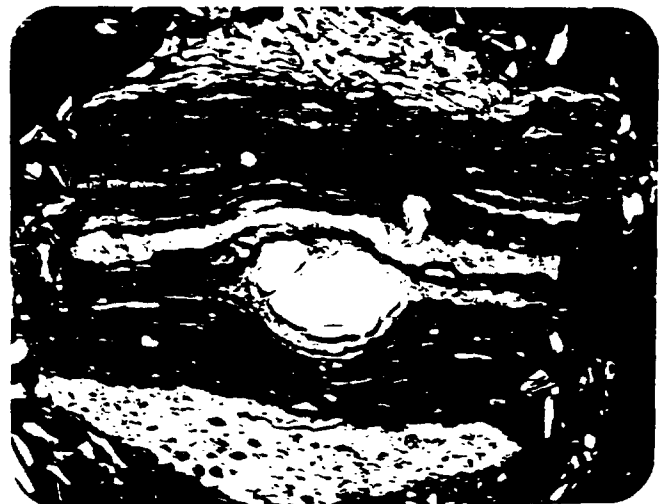
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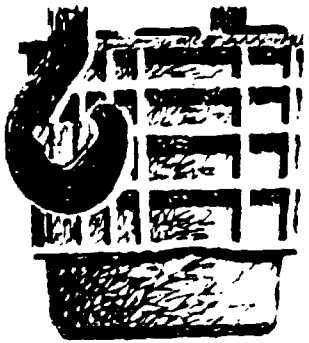
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HOT TOPS

This is Ferro Our Ferro Engineering Division, with modern production facilities in Chicago and Cleveland, is engaged in the design and manufacture of reusable C & D Hot Tops, both Regular and Low Volume; Hot Top Covers; Covering Compounds; and Automated Hot Top preparation lines. This group of products of course makes a significant contribution to the production of sound ingots. The reservoir of molten steel maintained by Ferro hot tops compensates for shrinkage and eliminates pipe cavities. The Ferro organization is composed of highly trained engineers, metallurgists and men experienced in steel plant operations which results in products properly engineered to meet customer requirements. Dependability, resulting from thorough research, is a basic part of each Ferro product. Our Chicago plant has been expanded substantially to provide better service to our customers in this territory. Production has been accelerated and inventory capacity increased. Customer service doesn't stop here. The installation of a new, high speed tape-teletype service processes all customer orders from the Cleveland office to any of Ferro's plants with increased speed and accuracy.

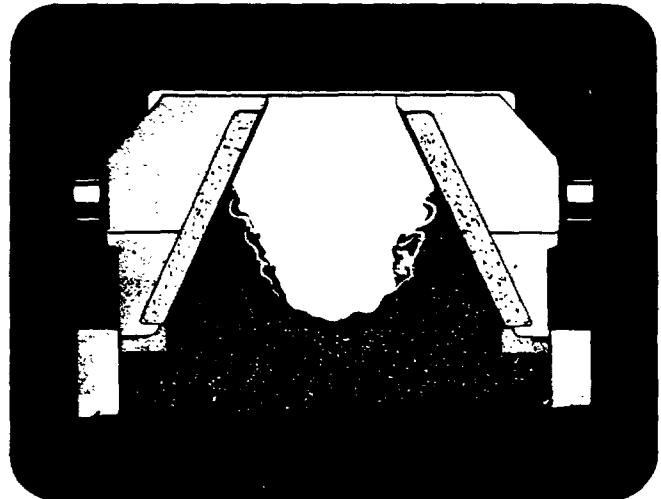
Brand New Hot Top Liner A new development of the Ferro Engineering Division is a Panel Insert-Stepped Ring Combination, designed to be used with C & D Low Volume Hot Tops as an alternate to the wet veneer practice, and act as a protecting veneer for the lightweight, porous insulating firebrick with which these hot tops are lined. The Ferro Panel Inserts are assembled on a flexible corrugated board backing to make an accurate, flat assembly which can be stacked one on another on pallets, then banded into a package for ease of shipping and storage in steel plants.

New One-Use Hot Tops Successful The relatively new X-O Panel, developed recently by Ferro, has met with widespread acceptance. X-O Panels incorporate exothermic materials, sized and made to customer requirements for both slab and billet molds.

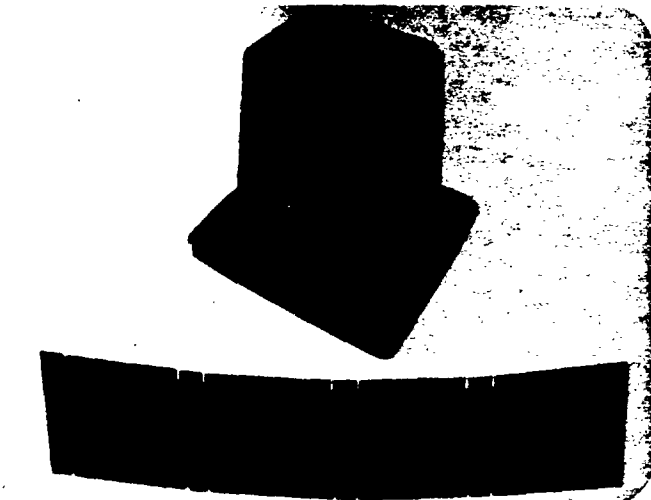
1. Important in the economy of using C & D Hot Tops is the Ferro Engineering Service. The men from Ferro are highly trained service engineers who are on short call and will carefully and constantly inspect hot tops and watch inventories in a customer's plant. Ferro Engineering and Production Departments are geared to design and supervise all Hot Top manufacturing to the customer's needs. Ferro Engineering Service is supplied at no cost. 2. C & D Low Volume Hot Tops reduce the volume of metal required in the sink head. The result is increased yields of sound steel of 3% or more as compared to conventional hot tops. The efficiency of Low Volume Hot Tops is achieved through the use of refractory linings with a very high thermal insulating quality. This permits constructing a smaller hot top resulting in a smaller sink head that produces less scrap and more saleable steel per melt. 3. Each new Panel Insert is folded or wrapped into a multisided hollow shape, which fits accurately inside the insulating firebrick lining and the Stepped Ring of the C & D Low Volume Hot Top and protects it against the molten steel. No drying is required which permits very rapid turnaround of the hot tops. During the time the ingots are solidifying, the Panel Inserts disintegrate, greatly facilitating the removal of the hot tops from the ingots. 4. Automated C & D Hot Top lines markedly reduce the cost of preparing Low Volume Hot Tops for re-use. Machines automatically mix and deposit the Hot Top Veneer in the hot top. Drying sections are included in the conveyor line, and the only hand operation is setting the bottom rings. Labor costs are cut and fewer hot tops are required as the processing is much more rapid, leaving only a small number of hot tops idle at any one time.



1. Photo. Courtesy Copperweld Steel Company



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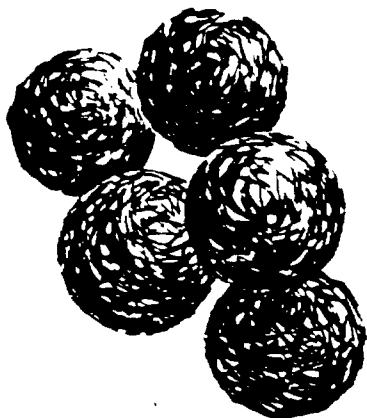


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Photo. Courtesy Bethlehem Steel Company



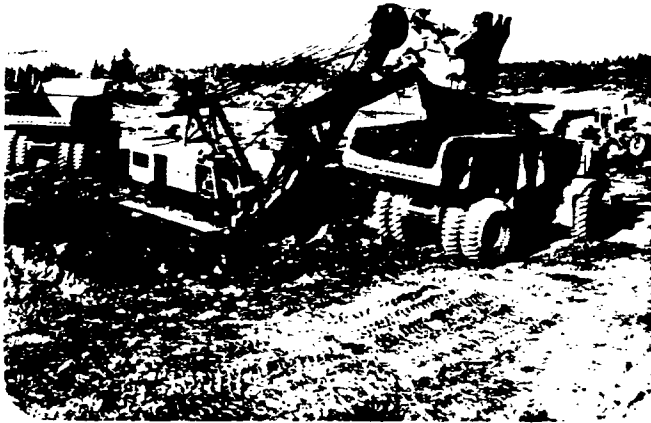
IRON ORE

Taconite Plant Under Construction The Eveleth Taconite Company, managed by Oglebay Norton Company, commenced construction in 1964 of its new taconite processing plant south of Eveleth, Minnesota. Development work on the Thunderbird Mine, which will supply the iron bearing material to the plant, is also under way. The plant, which is scheduled for completion late in 1965, will have an initial annual capacity of about 1,600,000 gross tons and has been designed to permit further expansion to approximately 3,200,000 gross tons of pellet production annually. The taconite reserves are sufficient to assure a minimum operation of 50 years at the expanded capacity. In addition to the operation and management of the Eveleth Taconite Company, Oglebay Norton as part owner will offer for sale its portion of the production of Eveleth Taconite Pellets.

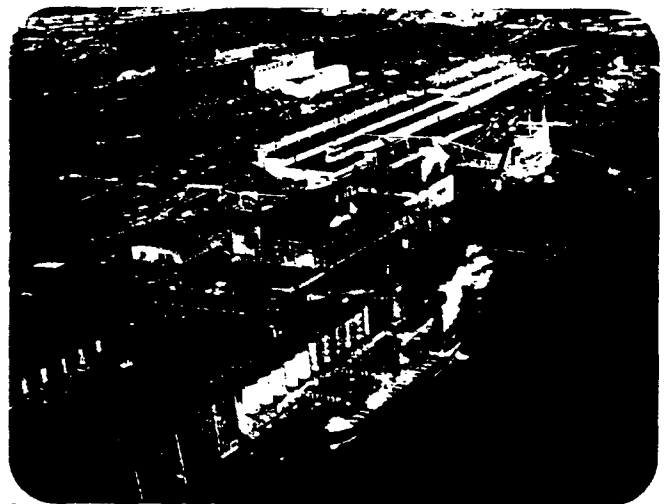
Ores Already Available In addition to ores from the above property, Oglebay Norton is sales agent for Silver Bay Taconite Pellets and Tennessee Sinter. Tennessee Sinter may be used in blast furnaces and electric or open hearth furnaces. The fines are an excellent source of iron oxide for burned dolomite and cement manufacturing.

New Australian Mineral Explorations An Australian company, Australian Geophysical Pty. Limited, was recently registered in Sydney, Australia, to carry out large scale mineral explorations in certain areas of Australia. Oglebay Norton Company is one of six mining companies which are financing this joint venture for mineral explorations.

1. Mining equipment is now at work removing the overburden from the ore body at the new Eveleth Taconite Company's Thunderbird Mine at Eveleth, Minnesota. Construction of processing plant buildings is well under way. 2. The owners of Reserve Mining Company have appointed Oglebay Norton Company the sales agent in the Western Hemisphere for the marketing of Silver Bay Pellets produced by the Reserve Mining Company at Silver Bay, Minnesota. 3. Here is the architect's rendering of the modern taconite plant, now under construction at Eveleth, Minnesota, and expected to be in operation in 1965.



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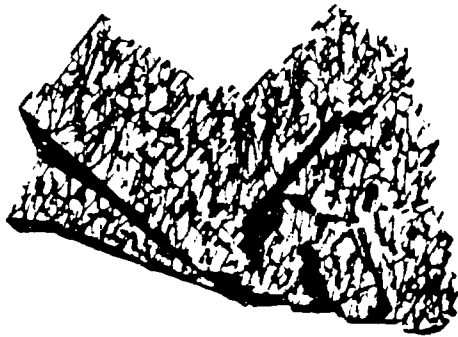


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Photo. Courtesy Reserve Mining Company



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RAW MATERIALS

Essential Factor in Industry Oglebay Norton is sales agent for a wide range of basic raw materials used in the steel, chemical, ceramic and glass industries . . . including fluorspar, spiegeleisen, phosphate rock, rimming agents and celestite. Prompt deliveries are assured for all commodities, on either a spot or contract sale basis.

Pelletized Metallurgical Fluorspar Oglebay Norton is the exclusive sales agent to the steel industry for Minerva Fluorspar Pellets, produced by The Minerva Company, Eldorado, Illinois. Pelletized fluorspar, which supplements ONMEX Brand Gravel Fluorspar, is a high quality product exemplified by exacting uniformity, a factor which helps to eliminate one more variable in the minds of quality conscious steel producers. The pellets are available in any size from $\frac{3}{8}$ " through $\frac{7}{8}$ " in $\frac{1}{8}$ " increments. Three grades are offered with total calcium fluoride content of 82%, 90% and 94%. Pellets are clean and dry, with trace of fines. Flexible shipping requirements are being met through the use of bulk transportation or packaging in bags or pallet boxes. Deliveries are made by truck or rail. The pellets are strong enough to withstand transportation and severe weather conditions. They can be handled and stored in the same way and with the same equipment as gravel fluorspar.

Ceramic Fluorspar ONCO Brand Fluorspar, produced for us by Reynolds Mining Corporation at Eagle Pass, Texas, is available to ceramic and glass manufacturers. ONCO Brand is guaranteed to contain a minimum of 97% calcium fluoride, with shipments averaging 97.5%. ONCO Fluorspar is low in iron ; lead, zinc and sulphur analyze trace to nil. Samples and detailed analysis are furnished on request.

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1. Ogilvy Norton maintains a substantial stockpile of ON-MEX 10 and Gravel Fluorspar in Cleveland which is of prime interest to steel mills in the immediate area. This service allows customers to maintain their own inventory at their plants and still enjoy quick delivery from our stockpile.
2. ONCO Brand Ceramic Fluorspar is produced by Reynolds Mining at its Elgin Pass, Texas, plant. Because this is an American company, on the United States side of the border, the quality is consistent and fast shipments are made directly over American railroads. Large stockpiles of crude ore are maintained on the American side of the border, thereby providing continuous processing and adequate inventory of finished product.

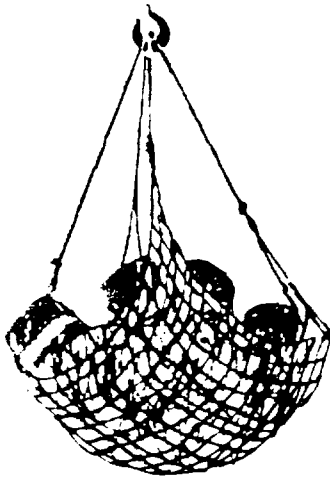


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Photo Courtesy Reynolds Mining



DOCKS

Vital Links in Lake Shipping Oglebay Norton operates three docks and is a partner in a fourth—Western Navigation Company at South Chicago. Two of the docks, Toledo Overseas Terminals and Bay City Seaway Terminal, handle general cargo, export-import. The Saginaw Dock handles scrap iron, pig iron and steel—also serves the Central Michigan automobile industry. Oglebay Norton's Toledo Overseas Terminals is adjacent to the only Foreign Free Trade Zone on the Great Lakes. Cargoes are handled swiftly and surely by the Toledo Port Authority's giant lift crane, located at the site. Western Navigation Company's dock at South Chicago is an important transfer point between the Mississippi River, the Great Lakes and the St. Lawrence Seaway.

New, Improved Facilities At Toledo Overseas Terminals, covered storage has been increased from 54,000 square feet to 83,000 square feet. Large capital expenditures have been made to improve the Bay City dock. New steel sheet piling has been extended to 1,000 feet. A new clear span metal warehouse has been built, adding 18,200 square feet to the already existing 23,000 square feet under roof. A depth of 24 feet is now available for vessels calling at the Bay City dock. All dock apron and working areas are completely hard surfaced with blacktop. Also new is a 100 ton crawler-type crane at Western Navigation dock in South Chicago, adding to the existing 25 and 50 ton cranes—to expedite loading and unloading.

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1. The Bay City Seaway Terminal is located at the mouth of the Saginaw River. It serves Northern and Central Michigan. Commodities handled here include beans, dry milk and chemicals. In addition to other efficient facilities, three paved warehouses with a total of 41,000 square feet are available. Overseas traffic to the Orient, Europe, South America and Mediterranean countries is continuously serviced. 2. Toledo Overseas Terminal has undergone continued expansion as traffic increased at this port. Automobiles, machinery, foodstuffs, finished and semi-finished goods are handled here. 3. Saginaw Dock's channel depth has been increased from 20 feet to 22 feet, permitting vessels to carry more cargo. Facilities include 24 acres of open storage, three diesel barges and a switch engine. 4. Western Navigation Company, in South Chicago has 25 acres of open storage, and is located on the Calumet River. Covered storage is provided in a dockside steel and concrete transit building. It services river barges, lake vessels and rail cars handling bulk cargo of all descriptions.



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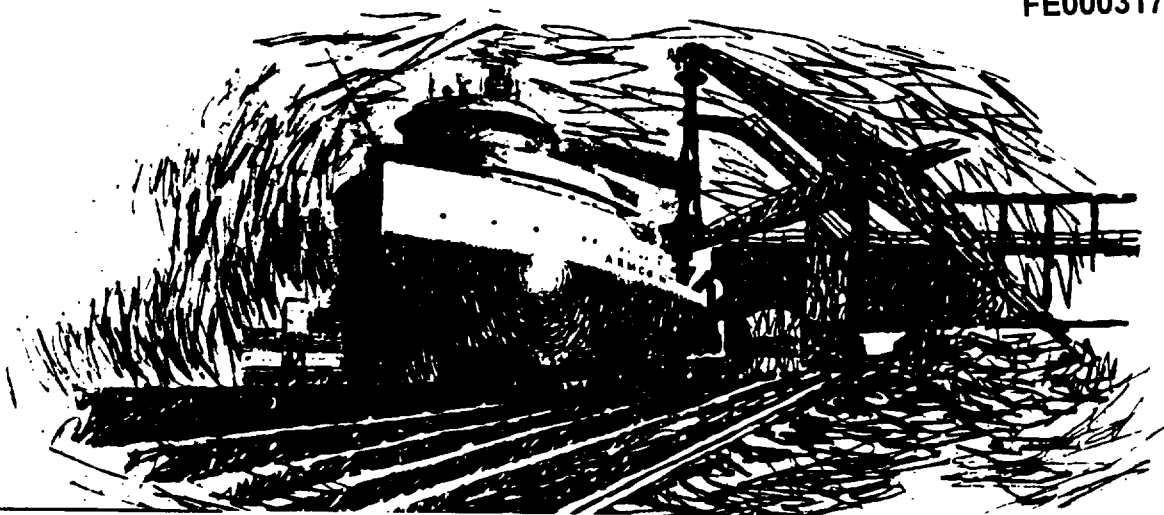
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VESSELS

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BULK VESSELS

VESSEL	Capacity (G.T.)	Over-All Length (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Compartment- ments	No. Hatches	Type Engine	Horsepower	Speed Miles Per Hour *	
									Light	Loaded
Edmund Fitzgerald	26,600	729	75	39	3	21	Cross Compound Steam Turbine	7500 SHP	17.5	16.7
Middletown	25,500	730	75	39	4	19	Cross Compound Steam Turbine	7700 SHP	18.5	17.5
Armco	20,100	647	70	36	4	19	Cross Compound Steam Turbine	7000 SHP	17.0	16.0
Reserve	20,200	647	70	36	4	19	Cross Compound Steam Turbine	7000 SHP	17.0	16.0
Ashland	16,000	621	60	35	4	18	Triple Expansion	2500 IHP	15.5	13.5
J. H. Hillman, Jr.	16,000	621	60	35	4	18	Triple Expansion	2500 IHP	15.5	13.5
J. Clare Miller	10,900	545	55	31	4	17	Triple Expansion	1760 IHP	11.2	10.7
Howard M. Hanna, Jr.	9,900	524	54	30	4	15	Triple Expansion	1800 IHP	11.2	10.7

*Approximate, actual speed will vary with weather and ballast conditions.

SELF-UNLOADERS

VESSEL	Cargo D. Wt. Capacity (G.T.)	Coal Capacity (N.T.)	Over-All Length (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Compartment- ments	Boom Length (Ft.)	Distance Stem to Boom Rotation Pin (Ft.)	Maximum Boom Rotation
Joseph H. Frantz	13,600	14,800	618	62	32	6	256	181	270°
J. R. Sensibar	11,300	11,200	612	56	31	6	256	154	270°
Crispin Oglebay	10,600	10,200	557	58	31	6	240	86	180°
W. W. Holloway	10,300	10,200	552	56	31	5	240	85	200°
Robert J. Paisley	6,000	6,000	414	48	28	4	170	121	220°
Ben E. Tate	5,700	5,900	376	50	28	4	166	124	200°

VESSEL	Boom Belt Width (Inches)	Boom Belt Speed (Ft. Per Min.)	Unloading† Rate (N.T. Per Hr.)	Tunnel Belt Width (Inches)	Type Engine	Horsepower	Speed * (Miles Per Hour)	
							Light	Loaded
Joseph H. Frantz	60	900	4000	54	Non Reversing Marine Diesel	4000 BHP	15.0	14.0
J. R. Sensibar	60	660	2600	48	Non Reversing Marine Diesel	3200 BHP	15.5	14.5
Crispin Oglebay	60	530	2200	48	Triple Expansion	1878 IHP	13.0	12.0
W. W. Holloway	54	700	3500	42	Non Reversing Marine Diesel	2250 BHP	14.0	13.0
Robert J. Paisley	54	450	1200	Scraper	Triple Expansion	1480 IHP	12.0	11.0
Ben E. Tate	54	450	1200	Scraper	Triple Expansion	1170 IHP	12.0	11.0

*Approximate, actual speed will vary with weather and ballast conditions.

†The unloading capacities are for slack coal.

CRANE-EQUIPPED VESSELS

VESSEL	Capacity (G. T.)	Over-All Length (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Com- partments	Boom Length (Ft.)
W. C. Richardson	7200	440	52	28	4	75
Buckeye	6800	428	51	28	3	75
O. S. McFarland	5800	380	50	28	3	65
G. G. Post	5400	366	48	28	3	65

VESSEL	Hatches (Dimension in Ft.)				Type Engine	Horsepower	Speed * (Miles Per Hr.)	
	No. 1	No. 2	No. 3	No. 4			Light	Loaded
W. C. Richardson	52 x 34	64 x 34	64 x 34	58 x 34	Triple Expansion	1467 IHP	12.5	11.5
Buckeye	62 x 32	83 x 32	62 x 32	---	Triple Expansion	1500 IHP	12.0	11.0
O. S. McFarland	48 x 32	78 x 32	48 x 32	---	Triple Expansion	1200 IHP	12.0	11.0
G. G. Post	48 x 28	80 x 28	48 x 28	---	Triple Expansion	1200 IHP	11.7	10.5

*Approximate, actual speed will vary with weather and ballast conditions.

The Steamer Richardson is equipped with two fast revolving, traveling Diesel electric cranes.

The Steamers Buckeye, O. S. McFarland and G. G. Post are each equipped with two fast revolving, stationary steam cranes. The cranes on all of these vessels operate interchangeably, 77-inch electro magnets, 3- to 4-yard clam shell buckets, as well as slings and other tackle, thus having flexibility to load and unload cargoes of Pig Iron, Scrap Iron and Steel, Steel, Limestone, Sand, Ferro Alloys, etc.

CRANE-CONVEYOR VESSEL

VESSEL	Capacity (G.T.)	Over-All Length (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Com- partments	Crane Boom Length (Ft.)	Conveyor Boom Length (Ft.)	Distance Stem To Boom Rotation Pin (Ft.)	Maximum Boom Rotation
Robert C. Norton	8,600	524	54	30	4	85	200	71	110° Port 81° Star.

VESSEL	Boom Belt Width (Inches)	Boom Belt Speed (Ft. Per Min.)	Unloading Rate† (N.T. Per Hr.)	Hatches (Dimensions in Ft.)				Type Engine	Horsepower	Speed * (Miles Per Hour)	
				No. 1	No. 2	No. 3	No. 4			Light	Loaded
Robert C. Norton	42	550	1200	79 x 34	62 x 34	68 x 34	85 x 34	Triple Expansion	1760 IHP	12.5	11.5

*Approximate, actual speed will vary with weather and ballast conditions.

†The unloading capacity is for slack coal.

Equipped with two fast revolving, traveling Diesel electric cranes and a 200-foot self-unloader boom. Cranes operate interchangeably, 77-inch electro magnets, 9-yard clam shell buckets, as well as slings and other tackle. (Functions equally well as a self-unloader or crane vessel, handling Pig Iron, Scrap Iron and Steel, Coal, Coke, Gravel, Sand, Slag, and other cargoes.)

TUGS

TUG	Over-All Length (Ft.)	Beam (Ft.)	Depth (Ft.)	Type Engine	Horsepower
S. M. Dean	110	27	13.6	Reversing Marine Diesel	1600 BHP

SELF-UNLOADING BARGES

BARGE	Capacity (N.T.)	Over-All Length (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Com- partments	Boom Length (Ft.)	Maximum Boom Rotation	Boom Belt Width (Inches)	Boom Belt Speed (Ft. Per Min.)	Unloading Rate (N.T. Per Hr.)†
Maida	5,500	375	46	26	3	141	246°	54	600	1,800 Tons
Constitution	5,500	452	44	26	1	130	246°	48	600	1,200 Tons

† The unloading capacities are for slack coal.

For further information and charter rates:

Phone 861-3300 Monday through Friday*
861-3310 Saturday, Sunday and Holidays*

TWX Area Code 216—574-9666

Office Hours: 8:30 A.M. to 5:15 P.M. Monday through Friday
8:30 A.M. to 11:00 A.M. Saturday, Sunday and
Holidays

Whom to contact:

Bulk and Self-Unloader Vessels

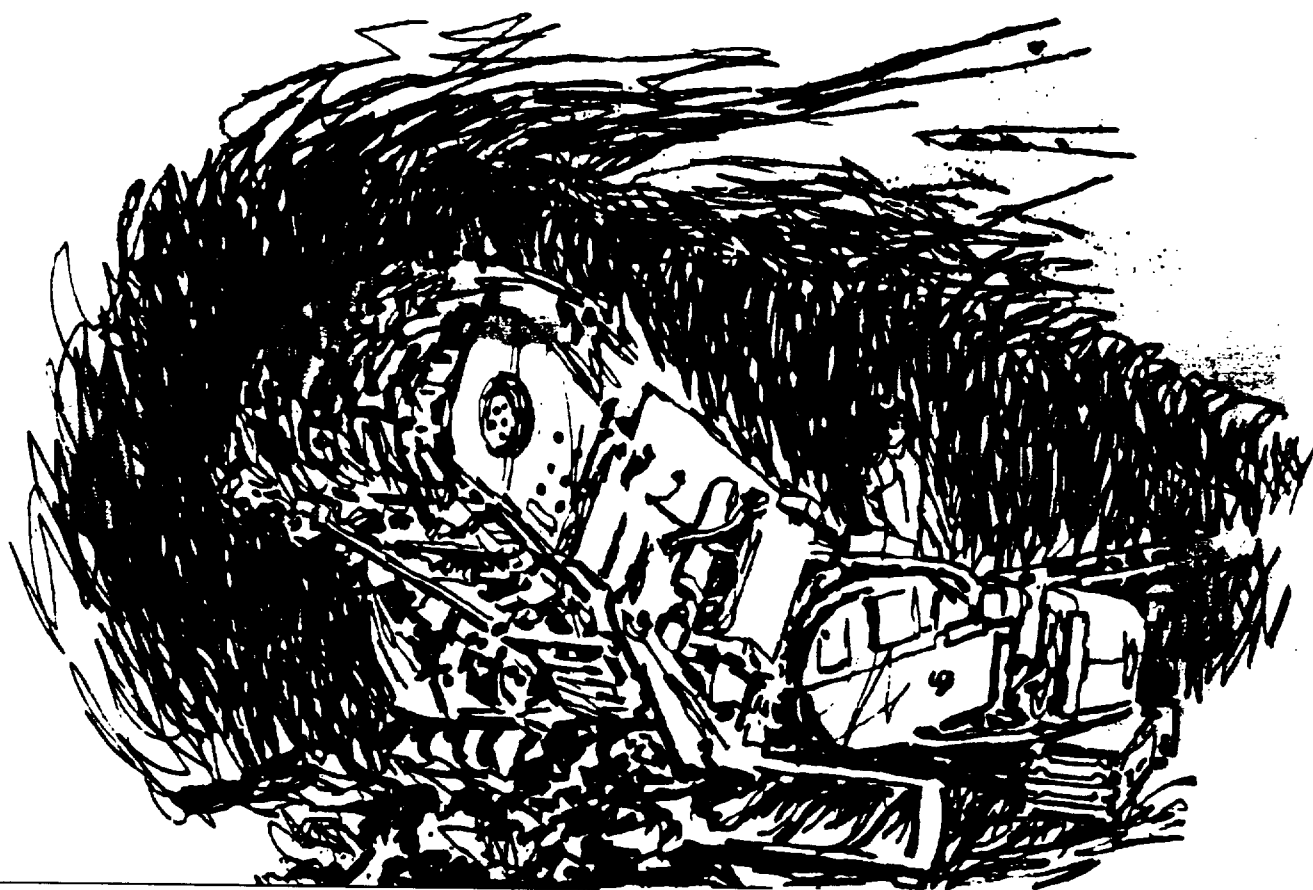
Name	Home Telephone Number
L. E. Fisher, Jr.	932-5693
R. F. Kirby	871-7828
A. E. Miller	777-6149
F. A. Castle	449-2216

Crane Vessel

Name	Home Telephone Number
J. W. Lamb	371-1330
H. M. Sisunik, Jr.	333-3487

*After office hours, the appropriate dispatcher may be reached by calling his home telephone number.

COAL



FE0003175

POCAHONTAS NO. 3 SEAM

low volatile—by-product coal

Name of Mine Brule (Deep) Railroad N. & W.
 Shipping Point Otsego, West Virginia County Wyoming
 District No. 7 Daily Production 2,200 N.T.
 Seam Pocahontas No. 3
 Preparation Equipment Belknap Washery, Vibrator and Shaker Screens, Thermal Coal Dryers,
 Loading Booms, Deister Tables
 Operating Company Oglebay Norton Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Slack	3.03	17.24	74.08	5.65	.62	14,289	14,812	2,800	103	9

Brule-Pocahontas is well known as a superior quality coal, excellent for by-product and metallurgical application. Ample reserves assure a constant supply for many years.

SHAMROCK METALLURGICAL COALS

Shamrock Coal is produced from our eleven West Virginia mines located in Raleigh and Kanawha Counties. Coal is produced from the Dorothy, No. 2 Gas, Powellton and Eagle Seams, all known for their good coking qualities.

Shamrock Metallurgical Coals are high volatile coals with low ash and sulphur content. Fluidity and contraction are excellent.

All Shamrock Coals are processed through the Shamrock and Ceredo preparation plants. Modern preparation equipment and methods assure uniform quality of Shamrock Coals. We are always researching to improve the quality of Shamrock Metallurgical Coals, including constant Petrographic studies of all coals.

OHIO NO. 8 SEAM

domestic and steam coal

Name of Mine Norton No. 3 (Deep) Railroad P.R.R.
 Shipping Point Onco, Ohio County Belmont
 District No. 4 Daily Production 4,000 N.T.
 Seam Pittsburgh, Ohio No. 8
 Preparation Equipment Davis Heavy Media Washery, Stoker Dryer and Slack Dryer, Crusher, Vibrator
 and Shaker Screens, Loading Booms, Freeze Proofing, Oil Treating
 Operating Company Oglebay Norton Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
5" x 2" Egg	3.77	39.92	49.11	7.20	3.65	13,165	13,615	2,230	57	5
2" x 1 1/4" Nut	3.67	38.92	50.18	7.23	3.52	13,165	13,595	2,215	57	5
1 1/4" x 3/8"										
3/4" x 3/8" Stoker	3.60	39.52	49.33	7.55	3.72	13,125	13,515	2,205	57	5
1" x 3/8"										
3/4" x 3/8" Mod. Stoker	3.65	39.30	49.34	7.71	3.67	13,025	13,485	2,190	57	5
3/8" x 0" Slack	4.00	39.85	45.48	10.67	3.83	12,515	13,215	2,170	57	5

All 2", 1 1/4", 1", 3/4" nut and slack can be modified to suit problems of various burning equipment installations.

OHIO NO. 8 SEAM

domestic and steam coal

Name of Mine Saginaw (Deep) Railroad NKP
 Shipping Point St. Clairsville, Ohio County Belmont
 District No. 4 Daily Production 4,000 N.T.
 Seam Pittsburgh, Ohio No. 8
 Preparation Equipment Davis Heavy Media Washery, Stoker Dryer and Slack Dryer, Crusher, Vibrator
 and Shaker Screens, Loading Booms, Freeze Proofing, Oil Treating
 Operating Company Oglebay Norton Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
5" x 2" Egg	3.77	39.02	50.01	7.20	3.57	13,150	13,610	2,210	57	5½
2" x 1¼" Nut	3.66	38.96	50.15	7.23	3.46	13,160	13,590	2,205	57	5½
1¼" x ¾"										
¾" x ¾" Stoker	3.62	39.50	49.33	7.55	3.82	13,150	13,510	2,180	57	5½
1¼" x ¾"										
1" x ¾" Mod. Stoker	3.79	38.30	50.30	7.61	3.76	13,010	13,455	2,170	57	5½
¾" x 0" Slack	4.15	40.00	45.38	10.47	3.83	12,450	13,242	2,110	57	5½

All 2", 1¼", 1", ¾" nut and slack can be modified to suit problems of various burning equipment installations.

OHIO NO. 8 & 9 SEAMS

steam coal

Name of Mine Carol No. 3 (Strip) Railroad B. & O.
 Shipping Point Salesville, Ohio County Guernsey
 District No. 4 Daily Production 1,400 N.T.
 Seam Ohio No. 8 & 9
 Preparation Equipment Picking Table, Crusher
 Operating Company R. & F. Coal Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Mine Run	5.15	37.82	47.10	9.93	3.26	12,075	12,865	2,325	53	4½
2" Crushed	5.15	37.82	47.10	9.93	3.26	12,075	12,865	2,325	53	4½
1¼" Crushed	5.15	37.82	47.10	9.93	3.26	12,075	12,865	2,325	53	4½

steam coal

Name of Mine Dale No. 2 (Strip) Railroad NKP.
 Shipping Point Jewett, Ohio County Harrison
 District No. 4 Daily Production 1,200 N.T.
 Seam Ohio No. 8 & 9
 Preparation Equipment Picking Table, Crusher
 Operating Company R. & F. Coal Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Mine Run	5.15	37.82	47.10	9.93	2.96	12,075	12,865	2,325	53	4½
2" Crushed	5.15	37.82	47.10	9.93	2.96	12,075	12,865	2,325	53	4½
1¼" Crushed	5.15	37.82	47.10	9.93	2.96	12,075	12,865	2,325	53	4½

OHIO NO. 9 SEAM

steam coal

Name of Mine Rice No. 1 (Strip) Railroad B. & O.
 Shipping Point Flushing, Ohio County Belmont
 District No. 4 Daily Production 1,000 N.T.
 Seam Ohio No. 9
 Preparation Equipment Picking Table, Crusher
 Operating Company R. & F. Coal Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Mine Run	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
2" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
1¼" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½

OHIO NO. 9 SEAM

steam coal

Name of Mine Rice No. 2 (Strip)
 Shipping Point Speidel, Ohio
 District No. 4
 Seam Ohio No. 9
 Preparation Equipment Picking Table, Crusher
 Operating Company R. & F. Coal Company

Railroad B. & O.
 County Belmont
 Daily Production 2,000 N.T.

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grindability	Coke Button
Mine Run	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
2" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
1¼" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½

DOMESTIC COALS

Oglebay Norton and its wholly owned subsidiary, the Cabin Creek Coal Sales Company, offer a broad line of top quality domestic coals. These coals have a high b.t.u. and a low sulphur and ash content.

Domestic coals include Blue Star, Black Gold, Blue Crescent, Blue Beacon, Saginaw and Norton. In addition to these coals, we are exclusive sales agent for Star Sapphire, Hi-Lo and Black Gold domestic coals.

LAKE FORWARDING

This service is offered by Oglebay Norton to Great Lakes coal users. It includes complete traffic management from mine to your plant or waterside distribution point. Mine shipments via rail are scheduled to Great Lakes loading facilities. Cars are marshalled quickly, and accurately timed to meet vessel availability. Deliveries to your destinations are prompt.

PREPARATION PLANTS

Name of Plant Ceredo Central Cleaning Plant
 Shipment C&O Rwy., N&W RR. and Ohio River
 Location Ceredo, Wayne Co., W. Va.
 Designer of Plant McNally-Pgh. Mfg. Co.
 Washing Equipment McNally Norton Jigs & Rheo.
 Drying Equipment C.M.I. Centrifugal and McNally—Pulso Thermal
 Daily Cap. Cleaned Coal (2 shifts) 10,000 Tons
 Type Dust Treatment Oil Spray
 Sizes Washed All Sizes and Fines

Name of Plant Shamrock No. 1 Preparation Plant
 Shipment C&O Rwy. and Kanawha River
 Location Kayford, Kanawha Co., W. Va.
 Designer of Plant McNally-Pgh. Mfg. Co.
 Washing Equipment McNally Norton Jigs & Rheo.
 Drying Equipment C.M.I. Centrifugal Driers
 Daily Cap. Cleaned Coal (2 shifts) 7,000 Tons
 Type Dust Treatment Oil Spray
 Sizes Washed All Sizes and Fines

HOT TOPS



HOT TOPS

IRON ORE

RAW MATERIALS

DOCKS

FE0003179

LOW VOLUME HOT TOPS

C & D Low Volume, Full Floating and Adjustable Hot Tops reduce the volume of metal required in the sink head to produce high ingot quality. This feature makes possible increased yields of sound steel of 3% or more, as compared to conventional hot tops.

This saving is accomplished through the use of refractory linings of very high thermal efficiency. The resultant lower heat loss reduces sink head scrap with corresponding increase in saleable steel from every melt.



AUTOMATED HANDLING SYSTEMS

Low Volume Hot Tops are prepared automatically and efficiently with C & D Automated Hot Top Preparation Lines. These are engineered conveyor systems integrated with veneer mixing and applying machinery, drying sections, and transfer stations.

C & D Preparation Lines speed hot top handling and require a minimum of manpower. Coating and drying are uniform. Hot tops are rapidly prepared and put back into production.



Photo Courtesy Copperweld Steel Company

HOT TOP COVERS AND HOT TOP COVERING COMPOUND

C & D Hot Top Covers are scientifically designed to control sink head cooling. Exothermic and insulating materials are packaged in exacting proportions for the specific ingot with which the cover is used. This measured covering increases ingot yields at least 1½% by reducing sink head volume requirements.

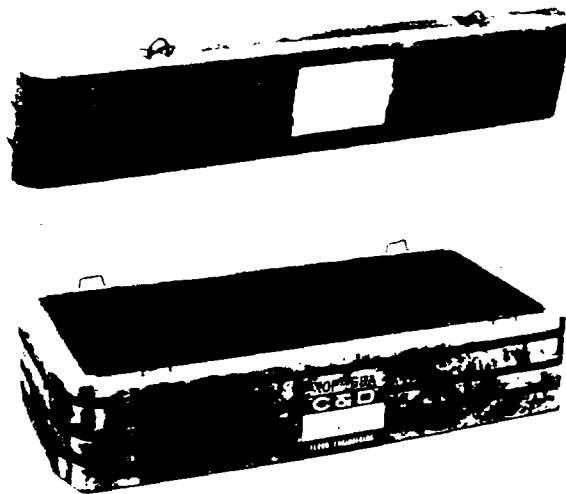
The patented C & D covers provide a systematic covering practice in which exothermic materials are not wasted, ingot yield is greater and inventories are simplified.

Also available are bagged exothermic covering compounds in several different grades.

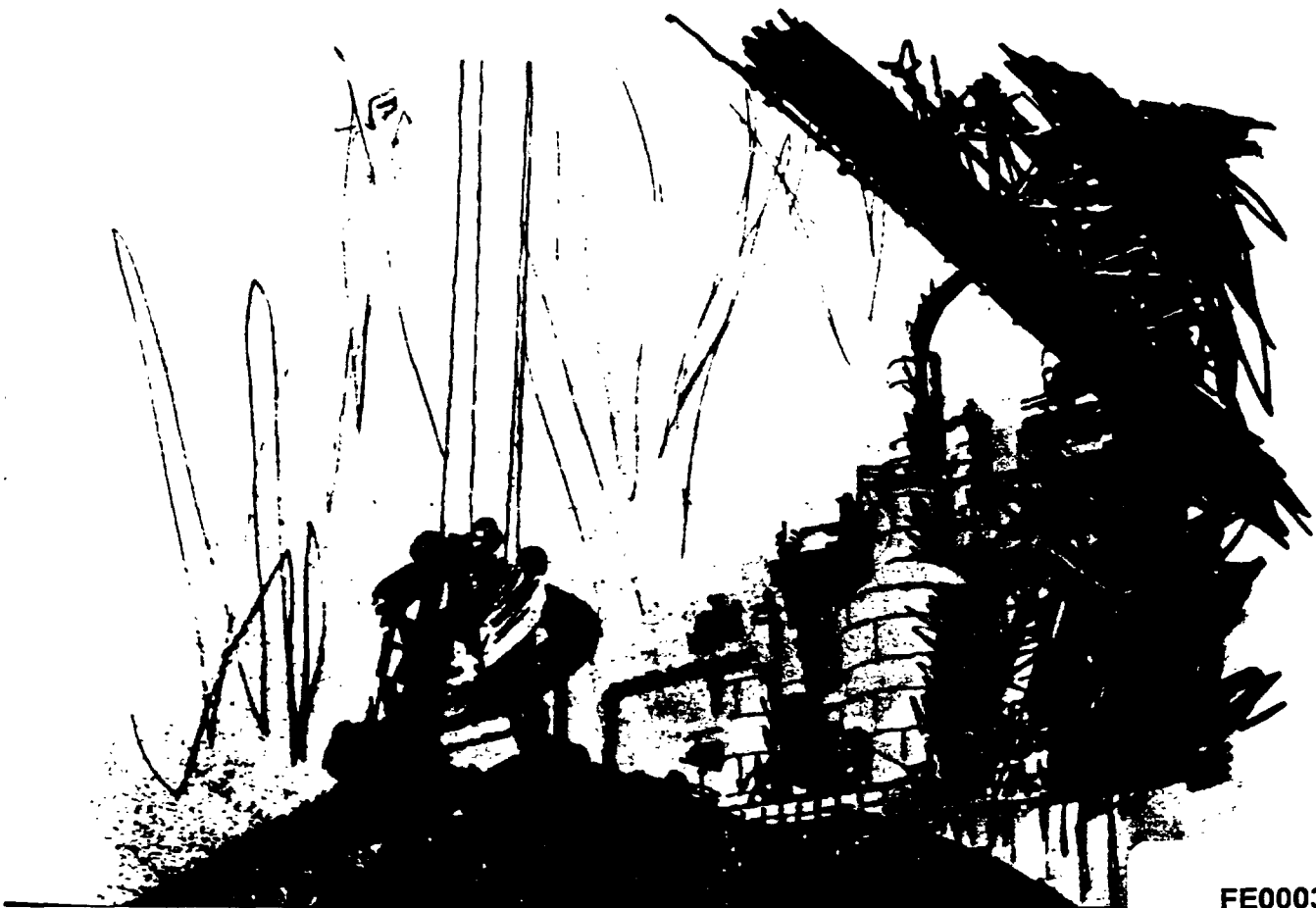


SINGLE USE HOT TOPS

C & D X-O Panels are one-use exothermic hot tops. Fabricated of individual panels, X-O Panels are designed for the specific ingot mold on which they will be used. X-O Panels can be shipped flat, and are assembled and banded with steel strapping or hung in the molds in the customer's plant. They are also shipped set up and ready for installation.



IRON ORE



IRON ORE

RAW MATERIALS

DOCKS

FE0003181

IRON ORES

Reserve Mining Company

Silver Bay Pellets—Mesabi Range

Loading Port: Silver Bay, Minn.

Expected Analysis 1965	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	Loss By Ignition	Moisture
Natural	60.30%	.022	8.50	.25	.43	.55	.57	.003	—	3.50
Dried At 212°F	62.49%	.023	8.81	.26	.45	.57	.59	.003	—	—

Eveleth Taconite Company

Eveleth Taconite Pellets—Mesabi Range

Loading Port: Duluth, Minn.

Expected Analysis 1965	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	Loss By Ignition	Moisture
Natural	64.80%	.016	5.18	.13	.21	.31	.26	.01	—	1.25
Dried At 212°F	65.60%	.016	5.25	.13	.21	.31	.26	.01	—	—

Tennessee Corporation

Sinter—Sized 8" x Down or 3/8" x Down

F.O.B. Copperhill, Tenn.

Expected Analysis 1965	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	Loss By Ignition	Moisture
Dried At 212°F	69.00%	.004	1.40	.05	.40	.70	.50	.07	—	—

LAKE SUPERIOR IRON ORE RATES

Cost per gross ton for transporting iron ore from point of origin to point of consumption.

Rates in effect as of January 1, 1965 (including X-223)

Range	Loading Port	Rail Rate	Car to Hold of Vessel	Vessel Movement	Vessel Rate	Point of Consumption	Line Haul Rate
Cuyuna	Duluth, Superior					LAKE ERIE PORTS TO:	
Mesabi	Duluth, Superior	1.28	.19	Lower Lake Ports	1.90	Valleys District, Canton & Massillon	\$2.08
Vermilion	Two Harbors					Midland, Steubenville, Weirton & Neville Island	2.39
Gogebic	Ashland	.82 * 1.25				Pittsburgh and Wheeling Districts	2.73
	Escanaba	1.37 * 2.00	.19	Lake Erie Ports Lake Mich. Ports	1.43 1.14	Monessen, Pa.	2.86
						Johnstown, Pa.	3.02
Steep Rock	Port Arthur	1.74 ** (Can.)	.23 (Can.)	Lower Lake Ports	1.78 1/8	Virginia District	4.04
Eastern and Western Marquette	Marquette	.72	.17 ***	Lower Lake Ports	1.71	TOLEDO TO:	
						Jackson, Hamilton & Middletown, Ohio	2.24
						Ashland, Ky. and Portsmouth, Ohio	2.93 *
Marquette				Lake Erie Ports	1.43	CLEVELAND TO:	
						Jackson, Ohio	2.68
						Ashland, Ky., Hamilton and Portsmouth, Ohio	2.93
Menominee	Escanaba	1.25 *****	.19 *****	Lake Mich. Ports	1.14	CHICAGO TO:	
						Granite City, Ill.	2.63

Dock Handling Charges—At Lower Lake Ports

(A) Hold to Rail of Vessel	\$0.28
(B) Rail of Vessel to Stockpile	.49
(C) Stockpile to Car	.31
(D) Storage per Month	.01 1/4
(E) Rail of Vessel to Car	.22

- * Restricted
- ** Maximum Rate
- *** Pellet handling charge \$0.12
- **** Groveland mine to Escanaba Pellet line haul \$.92 Pellet dumping \$0.12.

ALL-RAIL FREIGHT RATES TO CONSUMING DISTRICTS

Rates in effect as of January 1, 1965

From Mesabi and Vermilion Ranges To: (X-223 Level)

Valleys District	\$ 9.78
Cleveland, Lorain, Canton and Massillon	9.78
Pittsburgh and Wheeling District	10.23
Johnstown, Pa.	10.46
Chicago District	4.98 *

From Marquette, Gogebic, and Menominee Ranges To:

Cleveland, Lorain, Valleys District, Canton and Massillon	7.68
Pittsburgh District	8.33
Weirton and Wheeling District	8.02
Johnstown, Pa.	8.58
Chicago District	4.00 *

From Fillmore County, Minn., To:

Chicago District	2.81 *
Granite City	3.00 **

*Rate applicable only in lots of 20 or more cars on one B/L, single car rate is higher.

**Rate applicable only in lots of 40 or more cars on one B/L, based on annual tonnage of 300,000 tons.

From Cuyuna To:

Granite City and East St. Louis, Ill.	4.66
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From Negaunee, Mich., To:

Hamilton and Welland, Ont., Canada	7.65
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From Marquette Range To:

Detroit, Mich.	5.94
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From Negaunee, Mich., To:

Sault Ste. Marie, Ont., Canada	3.55
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From Cuyuna, Mesabi, and Vermilion Ranges To:

Duluth, Minn.	1.47
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From Gogebic, Cuyuna, Marquette, and Menominee Ranges To:

Granite City and East St. Louis, Ill.	4.00 *
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Canadian—freight rates

From Jamestown, Ont., to Michipicoten, Ont. (Combined rail and dock charge)	\$0.575
From Michipicoten Range to Sault Ste. Marie, Ont.	\$ 2.05

RAW MATERIALS

DOCKS

BASE PRICES**Lake Superior Iron Ores****51.50% Iron Natural****f.o.b. Rail of Vessel Lower Lake Ports**

Year	OLD RANGE		MESABI	
	Bessemer	Non-Bessemer	Bessemer	Non-Bessemer
1940-1944	\$ 4.75	\$ 4.60	\$ 4.60	\$ 4.45
1945	4.95	4.80	4.70	4.55
1946	5.45	5.30	5.20	5.05
1947	5.95	5.80	5.70	5.55
1948	6.60	6.45	6.35	6.20
1949	7.60	7.45	7.35	7.20
1950	8.10	7.95	7.85	7.70
1951	8.70	8.55	8.45	8.30
1952	9.45	9.30	9.20	9.05
1953	10.10	9.95	9.85	9.70
	10.30	10.15	10.05	9.90
1954	10.30	10.15	10.05	9.90
1955	10.40	10.25	10.25	10.10
1956	11.25	11.10	11.00	10.85
1957-1961	11.85	11.70	11.60	11.45
1962-1964	11.05	10.90	10.80	10.65

1965

OLD RANGE		(as of 2-1-65)	MESABI
Bessemer	\$10.95	Bessemer	\$10.70
Non-Bessemer	10.80	Non-Bessemer	10.55
		Coarse	11.35
		Fines	10.10
Other Classifications:			
Open Hearth Lump	\$12.60 - 13.15		
High Phos.	10.55		
Iron Ore Pellets	.252 per natural iron unit		

IMPORTED IRON ORE—FREIGHT RATES

Rates in effect as of January 1, 1965

TO:	FROM:			
	Baltimore, Maryland	Philadelphia, Pennsylvania	Hampton Roads, Virginia	Fairless, Pennsylvania
Bethlehem, Pa.	\$2.86	\$2.09		
Buffalo, N. Y.	4.03	4.03		
Chicago District	6.40	6.40	\$6.40	
Cleveland, O.	4.30	4.30	6.01	
Dearborn, Mich.				
Ecorse, Mich.	5.11	5.11	5.11	
River Rouge, Mich.				
Fairless, Pa.	2.86	1.76		
Middletown, O.	4.52	4.52	4.52	
Pittsburgh District	3.76	3.76	5.77	\$3.76
Sault Ste. Marie, Ont.	8.85	8.85	8.48	
Sparrows Point, Md.	1.74	2.85		
Weirton & Wheeling, West Va.	3.96	3.96		
Youngstown District	4.03	4.03	6.01	4.03
Johnstown, Pa.	3.50	3.50		3.50
Donora, Pa.	3.62	3.62		3.62

ARK/

RAW MATERIALS



RAW MATERIALS

DOCKS

FE0003185

ONMEX FLUORSPAR-METALLURGICAL GRADE

Onmex metallurgical fluorspar is a natural ore free of flotation concentrates or limestone additions. The fluorspar is crushed and screened to required physical specifications. Onmex is not contaminated by lead, zinc, or other sulphides. It is guaranteed 72.5% effective units of CaF_2 with shipments averaging 74-75% effective.

Chemical Analysis:

Effective Calcium Fluoride Units	Guaranteed 72.5%
Silica	5.0
Total Calcium Fluoride	80-85

Sulphur, Lead, Zinc Nil

Physical Analysis:

1½ inch Maximum ⅜ inch Minimum
Minimum of Fines

SHIPPING POINT

Shipments are made from Brownsville, Texas, Tampico, Mexico, or from stockpiles in Cleveland, Ohio. Transportation is via rail, truck, barge, lake vessel, or ocean vessel.

MINERVA FLUORSPAR PELLETS

These pellets are designed for use in all steelmaking furnaces where complete control of sizing and chemistry is necessary. The material can be sized from a minimum of ⅜" to a maximum of ⅞", and at any ⅛" interval in between.

Minerva pellets may be stored outside, or under cover, and can be handled with the same equipment used on metallurgical grade gravel fluorspar. Tumble tests and solubility tests have shown them to be strong, durable, and not affected by weather.

SHIPPING POINT

Minerva pellets can be bagged, palletized, boxed, or shipped in bulk in any type of railroad car or dump truck. Pallet and box specifications and pricing are available upon request.

Rail and truck shipments are made from Rosiclare and Junction, Illinois—whichever is cheaper. Barge shipments are made from Cave-In-Rock, Illinois—a short distance from the plant.

Chemical Analysis:

	Grade #1 Average & Typical	Grade #2 Average & Typical	Grade #3 Average & Typical
CaF_2	94.00%	91.50%	85.00%
SiO_2	2.20	3.09	6.00
CaCO_3	3.30	4.85	8.28
BaSO_4	0.10	0.12	0.14
R_2O_3	0.40	0.44	0.51

ONCO BRAND CERAMIC FLUORSPAR

ONCO Fluorspar, which is produced by Reynolds Mining Corporation, is an extremely uniform product, both chemically and physically. It is guaranteed to contain a minimum of 97% calcium fluoride and shipments average 97.5%. ONCO Fluorspar is low in iron; lead, zinc and sulphur analyze trace to nil. We will gladly furnish samples as well as a detailed analysis upon request.

Typical Chemical Analysis

Calcium Fluoride	97.68%
Silica	.57
Calcium Carbonate	1.46
Moisture	.00

Typical Physical Analysis

On 48 Mesh	0%
On 65 Mesh	0.4
On 100 Mesh	3.2
On 150 Mesh	10.8
On 200 Mesh	22.0
On 325 Mesh	44.0

SHIPPING POINT

Shipments are made from Eagle Pass, Texas in boxcars or covered hopper cars. ONCO Brand Fluorspar is available in bulk or packed in 100 pound four-ply paper bags—palletized on specifications.

FLUORSPAR TRANSPORTATION

via barge

From: Port of Brownsville, Texas To: Chicago, Ill. area • Pittsburgh, Pa. area • St. Louis, Mo. area • Cincinnati, Ohio area

transfer docks at:

Joppa, Ill. • Cincinnati, Ohio • Braddock, Pa. • Monaca, Pa. • for Rail Beyond

via truck

From: Cleveland Stockpile To: All Points

via barge—lake vessel

From: Port of Brownsville, Texas

To: Port of Chicago for Transfer to a Crane Vessel or Self-Unloader for delivery to other Great Lakes Ports.

via ocean vessel

From: Tampico, Tamps., Mexico

To: Eastern Seaboard of U. S. for Rail Beyond, Great Lakes Ports—Via St. Lawrence Seaway.

via all rail*

(All rates in effect as of January 1, 1965)

From: Texas—Mexican Border Points

To:	Including X-223	Minimum
St. Louis, Mo.	\$12.00	130,000 #
Chicago, Ill.	12.63	130,000 #
Kansas City, Mo.	12.00	130,000 #
Detroit, Mich.	18.90	120,000 #
Cleveland, Ohio	22.12	60,000 #
Pittsburgh, Pa.	15.20	120,000 #
Buffalo, N. Y.	22.12	60,000 #
Hamilton, Ohio	16.20	120,000 #
Baltimore, Md.	24.48	60,000 #
Philadelphia, Pa.	15.20	120,000 #

From: Junction, Illinois

To:	Including X-223	Minimum
St. Louis, Mo.	\$ 5.44	40,000 #
Chicago, Ill.	7.70	120,000 #
Detroit, Mich.	**7.00	120,000 #
Cleveland, Ohio	**7.00	120,000 #
Pittsburgh, Pa.	11.08	100,000 #
Buffalo, N. Y.	11.91	100,000 #
Hamilton, Ohio	8.62	100,000 #

*All rates in net tons.

**Rate is subject to aggregate

M/W of 300 N.T. on ONE B/L. M/W 120,000 # per car.

DOCKS

FE0003187

13

SPIEGELEISEN

Oglebay Norton distributes New Jersey Zinc Company's Horse Head brand Spiegeleisen. Three grades are available with varying manganese content in both 10-pound and 35-pound pigs. The method of packaging and shipping is highly flexible and may be easily adapted to a customer's handling problems.

Domestic—Horse Head Brand representative analysis

*Manganese	19.00%—21.00%
Iron	71.00 — 75.50
Combined Carbon	4.25 — 5.00
Graphitic Carbon	.15 — .35
Silicon	1.00 — 3.00
Phosphorus	.05 — .08
Sulphur	.01 — .03

*Also available with the following ranges of manganese content: 16%—19% • 21%—23% • 23%—25%.

CELESTITE

Imported from Mexico, celestite (strontium sulphate) is used for the manufacture of pyrotechnics, production of electrolytic zinc, and for conversion to strontium carbonate. Celestite is available either as direct shipping ore, or custom ground and bagged.

approximate analysis

SrSO ₄	90% Minimum
BaSO ₄	2 Approx.
CaSO ₄	3 Approx.
NaSO ₄	Nil

RIM-BLOX

We are sales agent for Rim-Blox, produced by the Rossborough Supply Company, Cleveland, Ohio. Rim-Blox, a degasifying ingot mold addition for rimmed steels, is pressed into 1 oz. and 4 oz. coated briquettes for easy handling and accurate measurement. It is also packed loose in 4 oz., 8 oz., and 16 oz., polyethylene bags. Several compositions are available for both low carbon and high carbon steels. The mold additions are packed in lots of 375 pounds and 500 pounds in fibre drums, and also in cartons of 50 pounds each, palletized. Shipment is direct from Cleveland by truck.

FERRO-PHOSPHORUS

Produced by the Virginia-Carolina Chemical Corporation, this is available as 24% ferro-phosphorus with silicon specifications being less than 1.00% or between 1.00% and 2.00%. V-C ferro-phosphorus is sized to customer specification and is shipped in containers or bulk.

PHOSPHATE ROCK LUMP

This is a lump phosphate from the Tennessee area. The rock is sorted, washed and sized minus 4 inch to plus 1/4 inch, so that it is well adapted for blast furnace feed. Shipments are made by rail from Tennessee.

phosphate rock—from Tennessee approximate analysis (dry basis)

Screen Size	— 4" + 1/4"
Phosphoric Acid	27.40%
Calcium Oxide	43.39%
Magnesium Oxide	.20%
Potassium Oxide	.41%
Sodium Oxide	.20%
Sulphur Tri Oxide	—
Sulphur	.28%
Carbon Dioxide	1.62%
Fluorine	3.24%
Iron Oxide	6.10%
Alumina	1.48%
Insoluble Matter	16.21%
Organic Matter and Moisture	.85%
Undetermined	.066%

guaranteed analysis

25% phosphoric acid, equivalent to approximately 54.6% bone phosphate of lime, or 10.91% phosphorus.

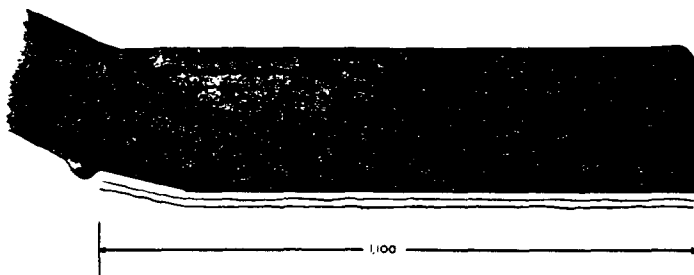
DOCKS

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DOCKS

BAY CITY SEAWAY TERMINAL



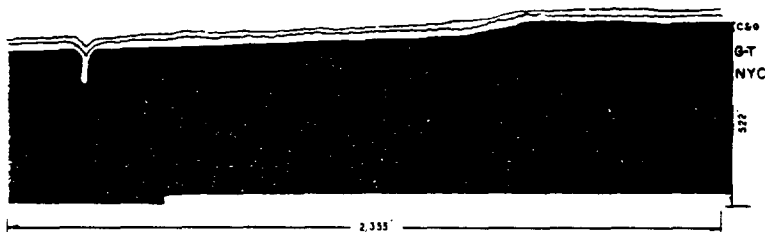
Located on Saginaw Bay at the mouth of the Saginaw River in Bay City, below all bridges. The dock is close to U. S. Routes 10, 23, 25, and I-75. Handles all types of foreign and domestic cargoes.

DATA

Dock Length 1,100 ft.
Depth alongside dock 24 ft.
Steel Bulk Heading 1,000 ft.
Number of Warehouses 3
Covered Storage 41,200 sq. ft.
Open Storage Some Available
Railroads C&O, D&M, NYC
Dock Surface Blacktop
Telephone 684-3738
Mailing Address Box "N"
Bay City, Michigan 48709

Contact Dock Superintendent for schedules, rates and other information.

SAGINAW DOCK



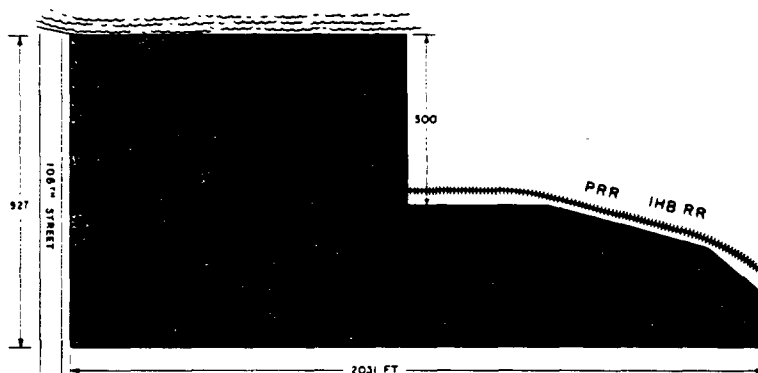
Located 13 miles south of Saginaw Bay on the Saginaw River. The dock handles pig iron for Michigan foundries and scrap iron and steel for domestic and export trade in addition to the handling of all other commodities. It is located close to U. S. Routes 10, 23, and I-75.

DATA

Dock Length 2,355 ft.
Depth alongside dock 22 ft.
Steel Bulk Heading 550 ft.
Number of Warehouses 1
Open Storage 24 acres
Railroads C&O, GTW, NYC
Dock Surface Gravel
Telephone 755-0495
Mailing Address P.O. Box 606
Saginaw, Michigan 48606

Contact Dock Traffic Manager for rates and other information.

WESTERN NAVIGATION COMPANY



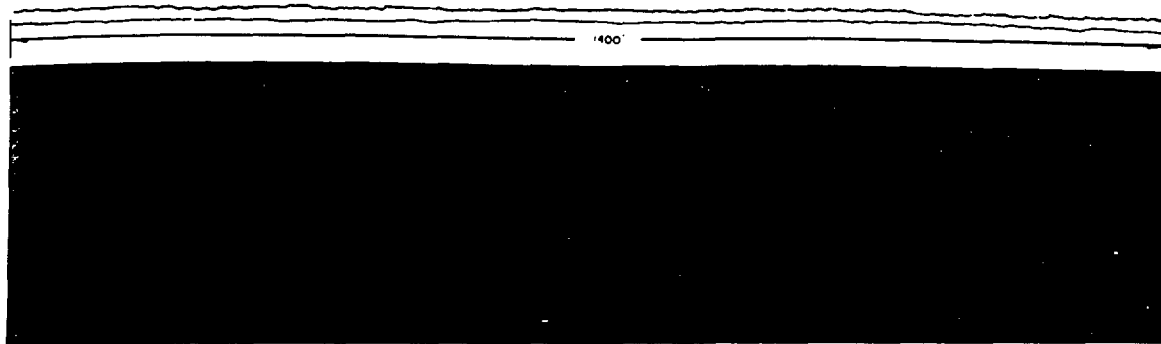
Located 3 miles from Lake Michigan on the Calumet River in South Chicago, with water connections to the Mississippi via Cal-Sag Canal. Available as a transfer point for river barges and vessels, and terminal for Chicago area. It is equipped to handle all types of bulk cargoes such as: Coal, iron ore, sulphur, scrap, and pig iron. The dock is jointly owned by Oglebay Norton Co. along with two other companies.

DATA

Number of Warehouses 1
Covered Storage 11,200 sq. ft.
Open Storage 25 acres
Railroads P.R.R., I.H.B.
Steel Bulk Heading 1,000 ft.
Dock Surface Slag
Telephone 321-0150
Mailing Address 1 E. Wacker Dr.
Chicago, Ill. 60601

Contact Dock Operations Manager for rates and other information.

ROADWAY



TOLEDO OVERSEAS TERMINALS

Located on Lake Erie at the mouth of the Maumee River, below all bridges, approximately 10 miles north of Toledo. The dock is adjacent to Interstate Routes 75 and 280, a super highway connecting Detroit, Toledo and the Ohio Turnpike. The dock is equipped with heavy lift cranes to handle seaway import and export package and bulk cargo, and lake bulk cargoes. Direct connections to nine mainline railroads are available through C & O switching facilities in Toledo.

DATA

Dock Length, Steel Bulk Heading	1,400 ft.
Depth alongside dock	27 ft.
Traveling heavy lift crane	110-ton capacity
Covered Storage	83,000 sq. ft.
Open Storage	10 acres
Railroads	C & O
Dock Surface	Blacktop
Telephone	726-2605
Mailing Address	Station "A", Box 306 Presque Isle Toledo, Ohio 43605

Cable: TOTCO
Contact Terminal Superintendent in Toledo for schedules, rates and other information.

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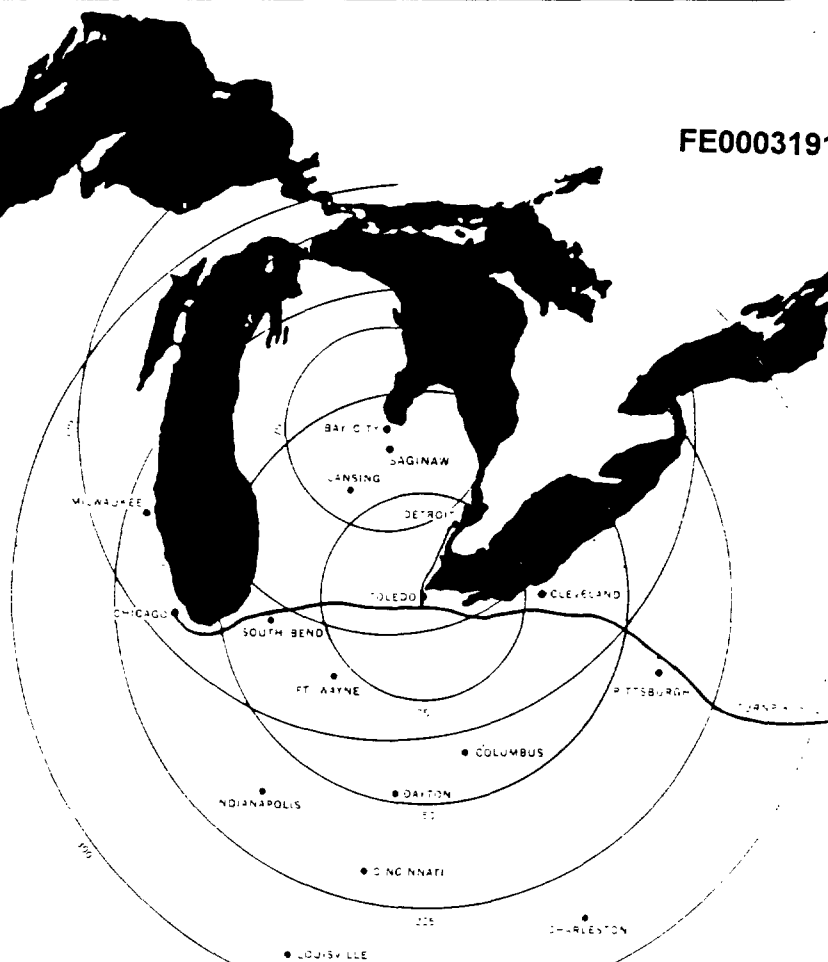
These are all water distances, only. For total distance add land mileage. In most cases the total distance traveled will be less via Toledo, Bay City, or Saginaw. All water transportation from these three ports provides additional savings.

DISTANCE TO PRINCIPAL PORTS

Figures are nautical miles

	TOLEDO	SAGINAW BAY CITY	NEW YORK CITY
Antwerp . . .	3,652	3,894	3,479
Bombay . . .	8,697	8,939	8,183
Buenos Aires . . .	6,977	7,219	5,871
Genoa . . .	4,562	4,804	4,071
Hamburg . . .	3,718	3,960	3,747
Helsinki . . .	4,430	4,672	4,514
Istanbul . . .	5,513	5,755	4,999
Liverpool . . .	3,277	3,519	3,211
Singapore . . .	10,664	10,906	10,150
Stockholm . . .	4,308	4,550	4,392

Source: U. S. Navy Hydrographic Office.







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