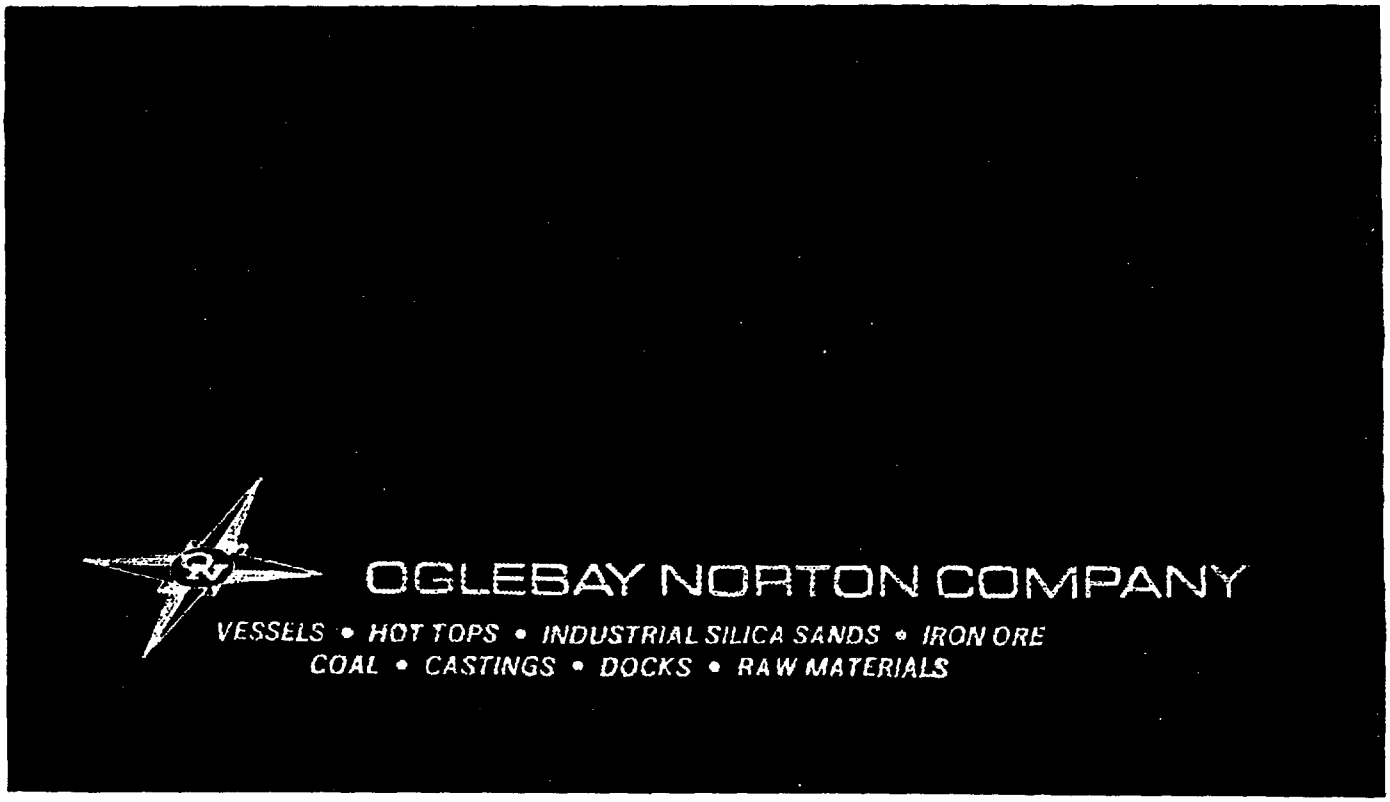
PLAINTIFF'S EXHIBIT
ON-77



OGLEBAY NORTON COMPANY

CUSTOMER SERVICE DATA AND SPECIFICATIONS

1970

EXECUTIVE OFFICE

1200 Hanna Building • Cleveland, Ohio 44115 • 861-3300 • Cable Address: ONCO-CLEVE

WHOM TO CONTACT

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FERRO ENGINEERING DIVISION • R. D. Thompson, Vice President-General Manager
CENTRAL SILICA COMPANY • A. F. Harrison, President
IRON ORE & RAW MATERIALS • A. B. Rathbone, Vice President-Ore Sales
COAL • P. G. Sullivan, Director of Coal Sales
T&B FOUNDRY COMPANY • F. P. Gill, President
DOCKS: SAGINAW & BAY CITY • A. B. Cozzens, Vice President-Vessel Operations
TOLEDO OVERSEAS TERMINALS CO. • C. J. Howley, Jr., Vice President-Toledo Overseas Terminals Co.
POCHTECA, S.A. de C.V. (Mexico) • Benjamin P. Cooper, Administrator

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SUBSIDIARIES

CANADIAN FERRO HOT TOPS LIMITED • 347 Arvin Avenue • Stoney Creek, Ontario, Canada • 662-8381
CENTRAL SILICA COMPANY • 806 Market Street • Zanesville, Ohio 43701 • 452-2775
POCHTECA, S.A. de C.V. • Apartado Postal 41-586 • Mexico 10, D. F. • 570-26-47 • Cable Address: Pochsa
SILLOC LIMITED • 1200 Hanna Building • Cleveland, Ohio 44115 • 861-3300
T&B FOUNDRY COMPANY • 2469 East 71st Street • Cleveland, Ohio 44104 • 391-4200
TOLEDO OVERSEAS TERMINALS CO. • Box 306, Presque Isle, Station "A" • Toledo, Ohio 43605 • 726-2605

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FE004019



The Industrial Worlds of Oglebay Norton — Oglebay Norton's many operations serve some of the world's largest and most important industries. Each of our separate, but related activities, is directed at the same objective — to supply our customers with highest quality products, the efficient services of an experienced, well-qualified staff and the advantages of extensive, modern facilities.

During the past 116 years, Oglebay Norton has earned a reputation for meeting customers' requirements. Maintaining this reputation is the motivating factor behind all our activities and the responsibility of each of more than 2,000 Oglebay Norton employees.

Most Diversified Great Lakes Fleet

6 Bulk Freighters

7 Self-Unloaders

2 Crane Vessels

1 Crane-Conveyor

Combined Trip Capacity 217,000 Gross Tons

Efficient, low cost water transportation adaptable to meet customer requirements is the hallmark of our Columbia Transportation Division. We are able to furnish a full range of 16 carriers to solve most Great Lakes shippers' materials handling problems. Specially designed vessels feature loading and self-unloading capabilities which offer customers the additional advantage of transporting materials from docks not so equipped.

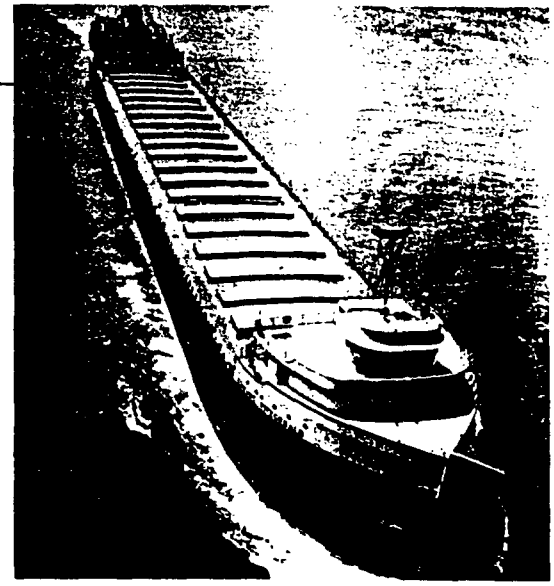
Shippers with limited storage areas or tight schedules depend on our reliability in routing and coordinating schedules with rail, barge and truck transportation. Experienced dispatchers follow each customer's cargo and timely reports are made on the status of the vessel en route. This precise scheduling of cargoes results in further savings to the customer.

The fleet is constantly being updated with new equipment and innovations necessary to provide the industry's highest levels of efficiency and dependability. For example, new bow thrusters were recently installed on two bulk vessels. In 1969, Columbia vessels carried in excess of 18 million tons.

FE004021

Fast, Large-Capacity Bulk Vessels

Our modern fleet includes the largest capacity bulk vessel on the Great Lakes. During 1969, the Edmund Fitzgerald set the all-time, single-trip cargo record of 30,690 net tons and still holds the season record set in 1968 of 1,212,550 gross tons of iron ore moving through the locks at Sault Ste. Marie. Other vessels have various capacities as shown below. The fleet provides fast service throughout the Great Lakes area for shipments of iron ore, coal and other bulk commodities.



Cargo Record Holder, the Edmund Fitzgerald.

FE004022

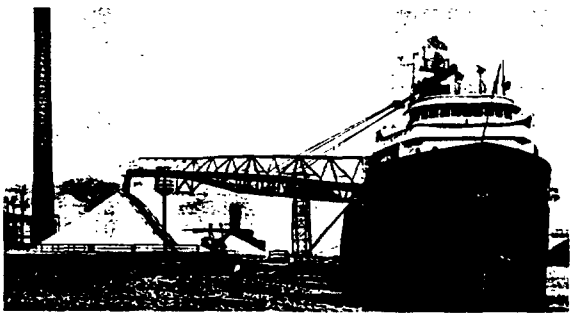
VESSEL	Capacity (G.T.)	Length Over-All (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Compart-ments	No. Hatches	Type Engine	Horse-power	Speed* (Miles Per Hour) Light	Loaded
Edmund Fitzgerald	26,600	729	75	39	3	21	Cross Compound Steam Turbine	7500 SHP	17.5	16.7
Middletown	25,500	730	75	39	4	19	Cross Compound Steam 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.Clare Miller	10,900	545	55	31	4	17	Triple Expansion	1760 IHP	11.2	10.7

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

FE004023

Self-Unloaders are efficient, versatile

Fast, efficient unloading is provided with long, maneuverable self-unloading booms that can deposit bulk materials in storage piles away from the dock front. The acquisition of the Frank Purnell, a 14,600 ton self-unloader discharging cargo at about 5,000 tons per hour, significantly increases our self-unloader fleet efficiency and customer service. Our self-unloaders perform well under various conditions and are used primarily to serve utilities, construction industries and other receivers of waterborne bulk cargo.



The Frank Purnell unloads limestone at a customer's plant.

VESSEL	Cargo D. Wt. Capacity (G.T.)	Coal Capacity (N.T.)	Length Over-All (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Compartments	Boom Length (Ft.)	Distance Stem to Boom Rotation Pin (Ft.)	Maximum Boom Rotation
Frank Purnell	14,600	12,900	621	60	35	4	250	94	240°
Joseph H. Frantz	13,600	14,800	618	62	32	6	250	181	270°

FE004024

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°
Wyandotte	8,350	6,300	415	56	30	3	218	85	90°
Huron	8,120	6,300	415	56	30	3	150	85	90°

VESSEL	Boom Belt Width (Inches)	Boom Belt Speed (Ft. Per Min.)	Unloading† Rate (N.T. Per Hr.)	Tunnel Belt Width (Inches)	Type Engine	Horse-power	Speed* (Miles Per Hour) Light	Loaded
Frank Purnell	60	650	5000	54	Triple Expansion	2500 IHP	15.5	13.5
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
Wyandotte	48	600	1200	42" Buckets	Triple Expansion	1775 IHP	13.5	12.5
Huron	48	600	1200	42" Buckets	Triple Expansion	1775 IHP	13.5	12.5

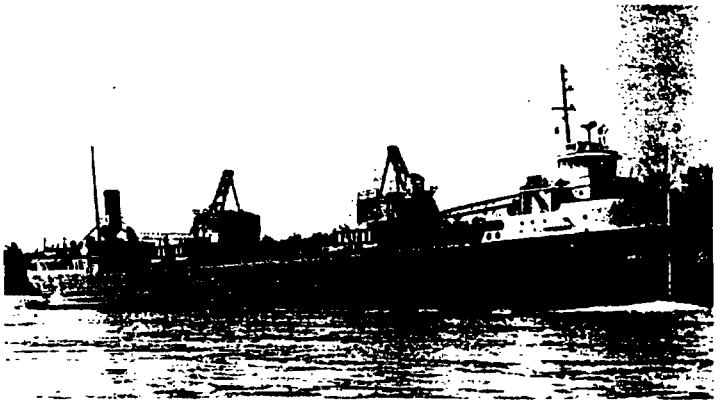
*Approximate, actual speed will vary with weather and ballast conditions.

†The unloading rates are for slack coal.

FE004025

Crane Vessels - loading and unloading capabilities

The movement of pig iron, scrap iron and steel, steel, and fabricated products is handled easily by our crane-equipped vessels without aid from dockside loading or unloading facilities. Each vessel is equipped with two cranes which operate independently and can, if necessary, be used in tandem for heavy lifts. Large hatch openings simplify efficient loading, unloading and stowage of cargo.



The W. C. Richardson, a 7,200 G. T. Crane Vessel.

FE004026

VESSEL	Capacity (G.T.)	Length (Ft.) Over-All	Beam (Ft.)	Depth (Ft.)	No. Compartments	Boom Length (Ft.)
W. C. Richardson	7200	440	52	28	4	75
O. S. McFarland	5800	380	50	28	3	65

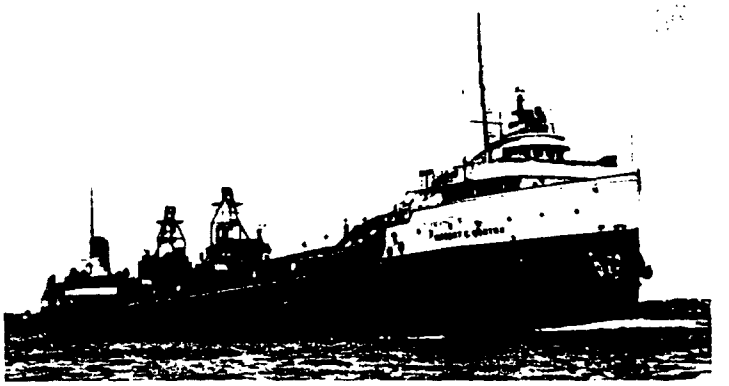
VESSEL	Hatches (Dimension in Ft.)				Type Engine	Horsepower	Speed* (MPH)	
	No. 1	No. 2	No. 3	No. 4			Light	Loaded
W. C. Richardson	52 x 34	64 x 34	64 x 34	58 x 34	Triple Expansion	1467 IHP	12.5	11.5
O. S. McFarland	48 x 32	78 x 32	48 x 32	—	Triple Expansion	1200 IHP	12.0	11.0

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

CRANE STATISTICS The Steamer Richardson is equipped with two fast-revolving, traveling diesel electric cranes. The Steamer O. S. McFarland is equipped with two fast-revolving, stationary steam cranes. All cranes utilize 77-inch electro magnets, 3- to 4-yard clam shell buckets, slings and other tackle for such cargoes as pig iron, scrap iron and steel, steel, limestone, sand, potash, ferro alloys, etc.

The Great Lakes' only Crane-Conveyor Vessel offers remarkable versatility

The Steamer Robert C. Norton is the most versatile vessel operating on the Great Lakes. Equipped with a bow thruster, two traveling cranes and a 200-foot conveyor boom, the Norton functions equally well as a crane vessel or self-unloader. Extremely large hatch openings offer easy access for unwieldy cargoes. This vessel is able to unload directly to dock or cars with ship's cranes or to dock by use of its belt conveying system.



Multi-Purpose Vessel, the Robert C. Norton.

FE004028

VESSEL	Capacity (G.T.)	Length Over-All (Ft.)	Beam (Ft.)	Depth (Ft.)	No. Compartments	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.) No. 1	No. 2	No. 3	No. 4	Type Engine	Horsepower	Speed* (Miles Per Hour) 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 rate is for slack coal.

CRANE STATISTICS 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 for handling pig iron, scrap iron and steel, steel, coal, coke, gravel, sand, slag, and other cargoes.

FE004029

For Further Information and Charter Rates:

Office Hours: 8:30 A.M. to 5:15 P.M. Monday through Friday* 861-3300

8:30 A.M. to 11:00 A.M. Saturday, Sunday and Holidays* 861-3310

TWX Area Code 216—574-9666

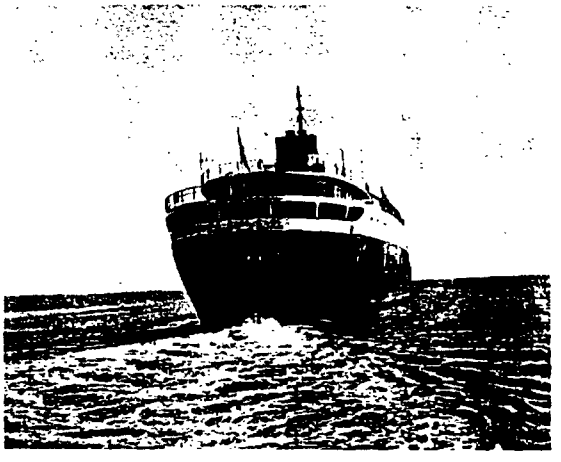
Whom to contact

Bulk and Self-Unloader Vessels

Name	Home Telephone Number
F. A. Castle	449-2216
R. F. Kirby	871-7828
C. A. Rindfleisch	235-3784

Crane Vessels

Name	Home Telephone Number
J. W. Lamb	371-1330
H. M. Sisunik, Jr.	777-7883



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

FE004030

Ferro Engineering Division's Full Line of C & D Hot Tops

C & D Ferroboard Quickline Hot Tops

C & D Ferroboard Side Boards

C & D Exothermic X-O Panels

C & D Panel Insert-Stepped Ring Combinations

C & D Covers and Covering Compounds

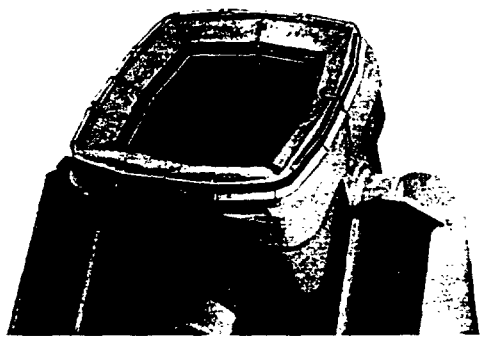
We will hot top any steel ingot, regardless of its geometric proportions. Our Ferro Engineering Division produces a basic line of superior hot topping products that can be custom fitted to any mold, and new and improved products are under constant development at our new Cleveland research facility. That's why all our products are the finest in their field.

Furthermore, we cover all major steelmaking districts with thoroughly trained sales-service engineers, including resident representatives in key areas: Philadelphia, Pittsburgh, Buffalo, Cleveland, Detroit and Chicago. These men are experts at determining hot topping needs and fulfilling them.

The Division operates four modern plants — two in Cleveland, one in Chicago and one in Hamilton, Ontario — plus renting warehouse/distribution space in Pittsburgh and Detroit. Shipments are via rail or truck.

FE004031

C & D Ferroboard Quickline Hot Tops



Quickline Hot Top ready to be set on mold and poured.

For Big-End-Up Molds C & D one-use Quickline Hot Tops provide the ultimate simplicity and economy in brickless hot topping. These high quality liners and rings are a dry system of hot topping. Casting life is good due to the snug fit of this efficient insulating material. C & D Quickline Hot Tops are tailored to fit any mold.

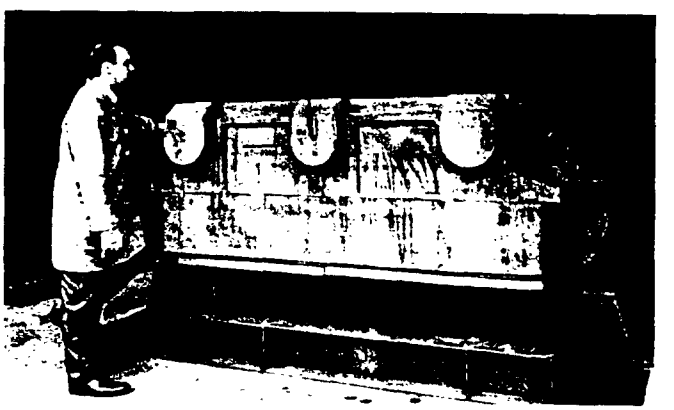
Store Easily at Point of Use Quickline Hot Tops are aptly named. They are specially designed to be shipped flat and stored right in the hot top preparation area. It takes only a matter of seconds for one man to fold and insert a liner, then clip on a C & D ring. Quickline reduces the storage area needed for adequate working inventory.

Low Cost, High Efficiency Ferroboard is a lightweight, heavy-duty insulating, refractory board. Our research and engineered material is extremely easy to handle. Ferroboard contains myriad minute insulating air spaces, has minimum moisture absorption and boiling characteristics. Wire reinforcement helps prevent breakage.

FE004032



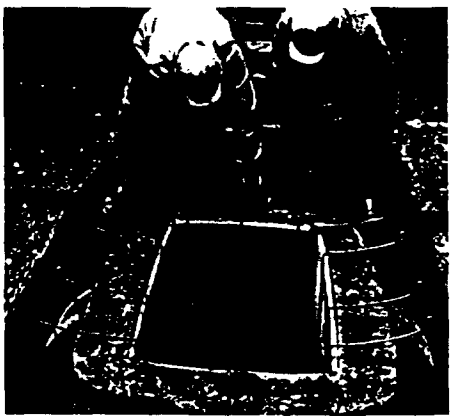
Ferroboard liners and rings for 100 ingots store in 25 square feet.



We design Quickline Hot Tops in any size or shape.

FE004033

C & D Ferroboard Side Boards increase yields in big-end-down molds



Side Boards installed in slab ingot mold.

These are dry in-the-mold hot tops. Like Quickline Hot Tops, they are simple, economical and preengineered to any mold specifications.

Fast Installation C & D Ferroboard Side Boards are individual panels. They are usually hung at or near the mold top from wire loops and held fast to the side by clips. In molds where the side-to-end ratio is more than 2 to 1, only two sides need be lined; otherwise, four boards are needed or, in the case of billet ingots, an eight-piece hot top may be used. They are lightweight with tough wire reinforcement and do not require any special handling.

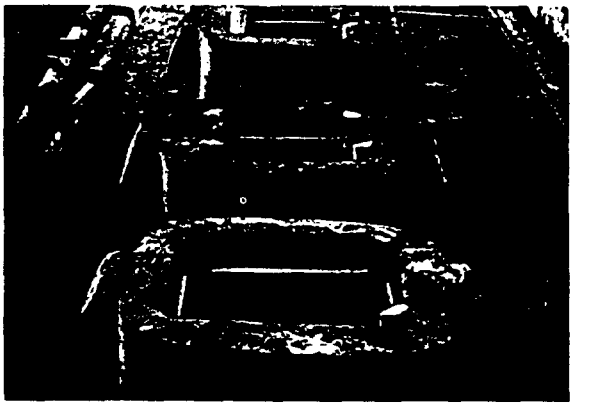
Minimum Sinkhead Shoulder Extra-thin Ferroboard leaves only a very narrow shoulder where the sinkhead and ingot body are joined, thus minimizing any apparent junction in the rolled steel. Ferroboard's resistance to burnout and boiling helps it perform effectively in hot molds, with little risk of floating boards and piped ingots.

FE004034

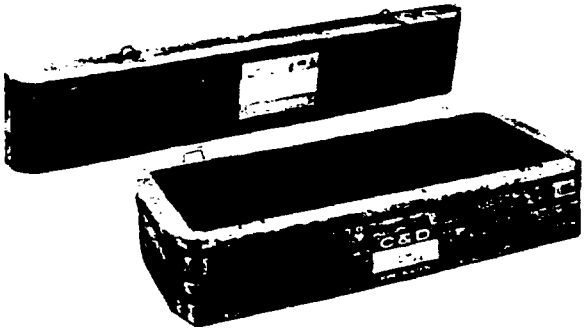
Flat Sinkhead Cavity Ferroboard produces flat sinkhead cavities when used with a high quality exothermic covering such as C & D covers and compounds. This produces a pipe-free ingot and minimum segregation.



Ferroboard being clipped to billet ingot molds.

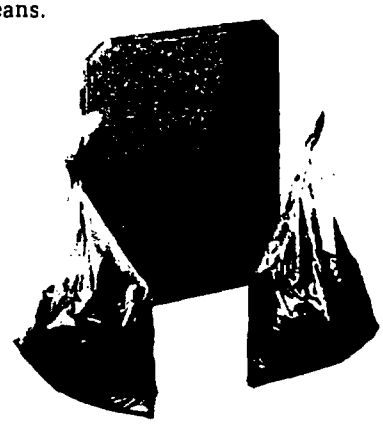


8-piece Side Board set in small big-end-down billet molds.



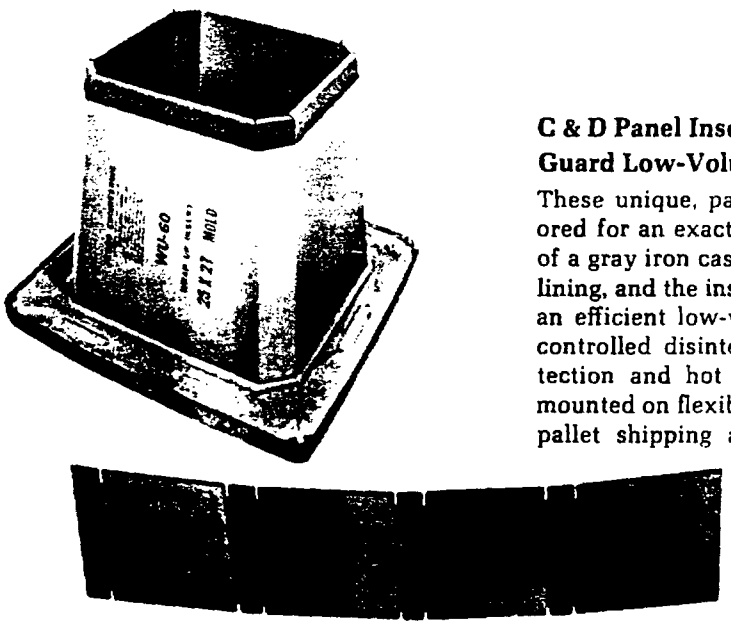
C & D X-O Panels: One-Use Exothermic Hot Tops

These quality hot tops consist of individual panels with exothermic material molded in. They are shaped for big-end-up or big-end-down ingot molds, and their outstanding efficiency provides superior ingot yields. X-O panels are shipped flat for convenient storage or assembled with steel straps for instant use. Unassembled panels are simply hung in place in the molds, and are held there by various means.



C & D Hot Top Covers and Covering Compounds For Greater Yields

Each patented C & D Hot Top Cover is custom designed, insulated and chemically formulated to provide peak control over sinkhead cooling on individual customer's specific ingots. The molten steel disintegrates the outer container and ignites a measured amount of exothermic powder, which keeps the metal hot and forms a thermal top crust. The cover also contains a steel separator which bridges the sinkhead and an insulator traps heat inside. C&D covers are delivered ready to use. They can be stored easily and applied quickly. We also produce several highly exothermic loose covering compounds which form a good crust insulation. This material is bagged in specified portions.



C & D Panel Insert-Stepped Ring Combinations Guard Low-Volume Hot Top Linings

These unique, patented wrap-up panel inserts are tailored for an exact fit in the hot top. The system consists of a gray iron casing, combined with insulating firebrick lining, and the insert fitting into the stepped ring to form an efficient low-volume hot top. C & D inserts feature controlled disintegration so linings get maximum protection and hot tops are easily removed. Panels are mounted on flexible corrugated board which permits flat pallet shipping and quick, accurate assembly at the point of use. This product does not utilize wet veneer in any way.

Quality Silica Sands for Industrial Uses

The Central Silica Company, a subsidiary of Oglebay Norton Company, offers high purity silica sand to glass, ceramic, foundry, and other consumers. Sand is available from two plants, the Central Plant at Glass Rock, Ohio, and the Millwood Division Plant at Howard, Ohio. Ground sand is also produced at both of these locations. Shipment to consumers is by rail or truck.

The Ayers Mineral Division of the Central Silica Company, offers some forty-five grades of naturally bonded, molding sands from its Lexington, Tennessee Plant. These are carefully blended to meet the exacting requirements of the foundry industry.

Industrial Silica Sands
Central Silica Co., Millwood Sand Co.

	#7 Dry Steel	#7 Dry Glass	#3 Dry Glass	#3 Dry Steel	#2 Dry Steel	#1 Dry Steel	#1 Dry Special	100 Mesh
% on 20 mesh	.1	.1						
% on 30 mesh	4.0	4.0	1.2	2.0	2.0	1.5	1.5	1.0
% on 40 mesh	33.0	33.0	10.0	10.0	9.0	8.0	7.0	3.5
% on 50 mesh	51.0	51.0	29.5	28.5	26.5	24.0	22.0	10.5
% on 70 mesh	9.2	9.2	30.5	28.0	25.5	24.5	23.0	16.5
% on 100 mesh	2.0	2.0	20.0	21.0	21.5	22.0	22.5	19.0
% on 140 mesh	.5	.5	7.0	8.0	10.0	12.5	14.5	18.0
% on 200 mesh	.2	.2	1.5	2.0	4.0	5.5	6.5	17.0
% on 270 mesh			.2	.3	1.0	1.5	2.0	10.0
% on Pan			.1	.2	.5	.5	1.0	2.5

FE004038

Grain Fineness (AFS)	38	38	54	55	60	65	70	97
SiO_2	99.00	99.40	99.60			99.25		98.61
Fe_2O_3	.18	.038	.018			.09		.27
Al_2O_3	.60	.35	.27			.40		.56
TiO_2	.03	.025	.028			.055		.21
L. O. I.	.17	.15	.10			.15		.34

Ground Sand Specifications

	Central Ground Sand				Millwood Ground Sand				
	140 Mesh Flint	200 Mesh Flint	200 Fine Grind	325 Mesh Flint	120 Mesh Flour	140 Mesh Flour	200 Mesh Flour	200 Mesh Flint	325 Mesh Flint
% thru 100 mesh	99.8	99.9	99.9+	99.9+	95.0	99.7	99.9	99.9	99.9
% thru 140 mesh	99.0	99.3	99.7	99.9	84.0	97.5	98.8	99.3	99.9
% thru 200 mesh	95.5	98.0	99.0	99.8	72.0	92.5	96.0	98.0	99.9
% thru 325 mesh	80.0	85.0	92.0	96.5	52.5	74.0	80.0	85.0	98.5
Chemical Analysis									
		SiO_2	99.60			99.00		99.40	
		Fe_2O_3	.018			.18		.038	
		Al_2O_3	.27			.60		.35	
		TiO_2	.028			.03		.025	
		L. O. I.	.10			.17		.15	

FE004039

High Quality Iron Ores

Eveleth Taconite Pellets

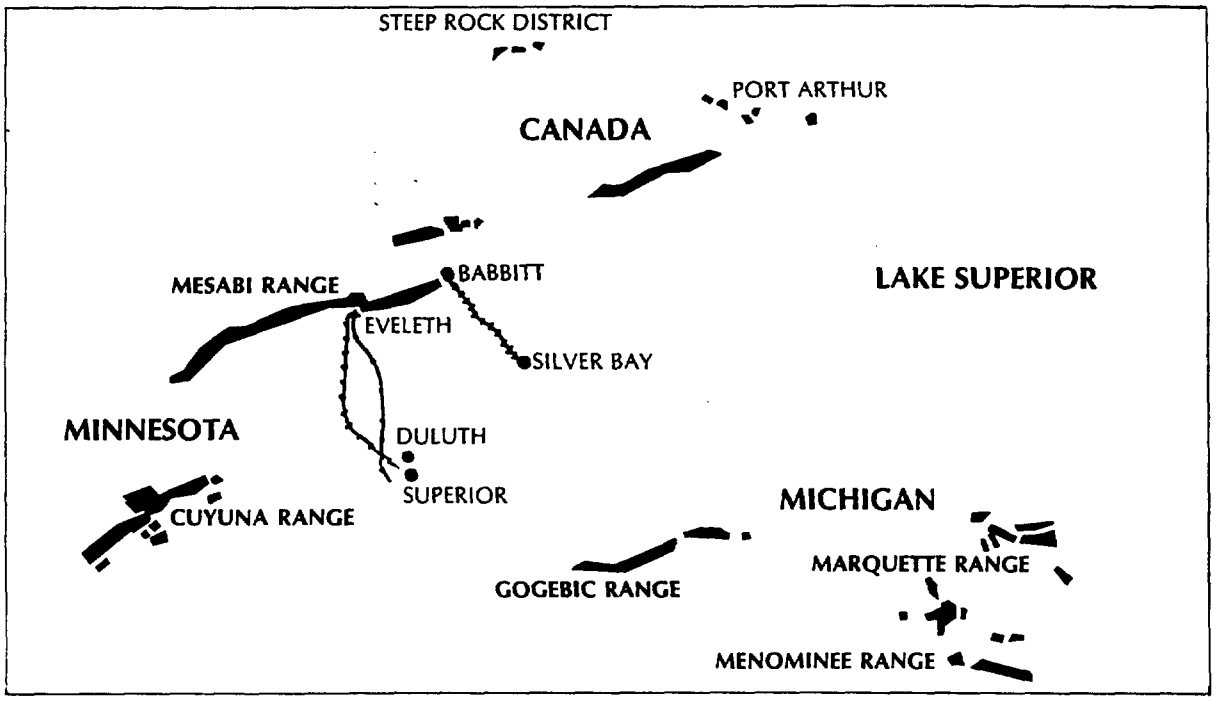
Silver Bay Taconite Pellets

Tennessee Sinter Ore

Oglebay Norton offers steel producers a choice of high grade iron ores with production facilities and reserves to supply customers' requirements for quality raw materials. Modern, automated mines produce a steady, abundant supply of these ores in several types and grades. The latest processing machinery and techniques are utilized to assure accurate sizing and physical properties. Shipments are made on schedule via best available rail, river barge, ocean or Great Lakes carriers.

Oglebay Norton also offers valuable advisory services, backed by knowledge gained through more than a hundred years' experience in iron ore production and sales. Our qualified representatives frequently aid customers in determining the best combination of ore and grade for specific production objectives.

FE004040


STEEP ROCK DISTRICT
PORT ARTHUR
CANADA
MESABI RANGE
BABBITT
LAKE SUPERIOR
EVELETH
SILVER BAY
MINNESOTA
DULUTH
SUPERIOR
MICHIGAN
CUYUNA RANGE
GOGEBIC RANGE
MARQUETTE RANGE
MENOMINEE RANGE

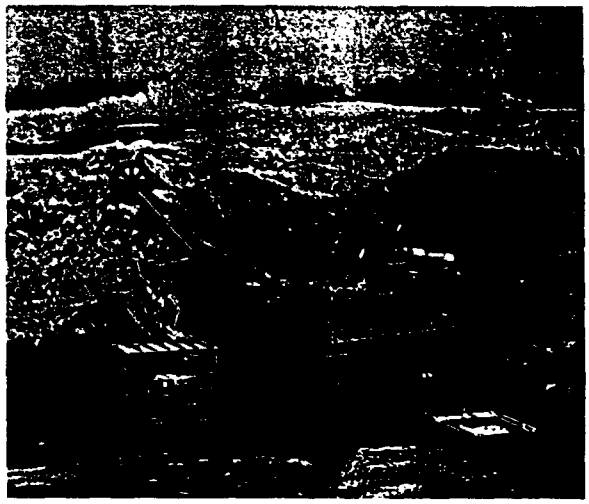
FE004041

Eveleth Taconite Pellets Yield Premium Burden

Top quality Eveleth Grate-Kiln pellets yield premium, structurally-uniform blast furnace burdens and withstand rough handling with minimal degradation.

The pellets are produced at the Eveleth Taconite Company's Fairlane Plant on the Mesabi Range. As part owners of this firm, we offer for sale our share of the total annual production. Plant design capacity is 1.6 million tons. Output in 1969 exceeded 1.8 million.

Trainload quantities go to Duluth for lake routing or storage. The entire dock area is asphalt coated to prevent contamination and features high-speed handling equipment.



Open-pit mining of crude taconite at Thunderbird Mine.

FE004042

Eveleth Taconite Company
Eveleth Taconite Pellets — Mesabi Range **Loading Port: Duluth, Minn.**

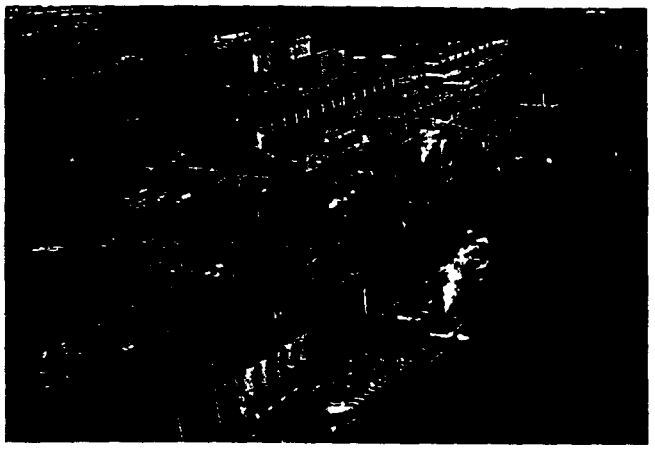
Expected Analysis 1970	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	L.O.I.	Moisture
Natural	63.60%	.014	5.70	.14	.32	.33	.29	.003	—	2.25
Dried at 212°F	65.06%	.014	5.83	.14	.33	.33	.30	.003	—	—

FE004043

Prime Quality Silver Bay Pellets

Silver Bay Pellets are a quality product of Reserve Mining Company, one of the world's largest producers of pelletized iron ore. The Silver Bay plant has a yearly production capability of over 10 million tons. Adjacent to the production facility is a multimillion-dollar research complex where the pellets' physical and structural qualities undergo constant investigation for product improvement.

Oglebay Norton is the exclusive sales agent of this product for Armco Steel Corp., and Republic Steel Corp., in the U. S. and Canada. All shipments are via lake carrier.



Reserve Mining Company's plant and dock facilities at Silver Bay, Minnesota.

FE004044

Reserve Mining Company
Silver Bay Pellets — Mesabi Range **Loading Port: Silver Bay, Minn.**

Expected Analysis 1970	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	L.O.I.	Moisture
Natural	60.35%	.026	8.63	.25	.44	.43	.55	.003	—	3.38
Dried at 212°F	62.46%	.027	8.93	.26	.46	.45	.57	.003	—	—

FE004045

Tennessee Sinter Contains High Iron, Low Silica

This ore can be used equally well in blast furnaces and electric or open hearth furnaces. The fines are an excellent source of iron oxide for making cement and burned dolomite. Both large and small orders are shipped quickly year-around by rail or nearby barge service.



Coarse screened Tennessee sinter.

Cities Service Company

Tennessee Sinter **F.O.B. Copperhill, Tenn.**

Expected Analysis 1970	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	L.O.I.	Moisture
Dried At 212°F	69.00%	.004	1.40	.05	.40	.70	.50	.07	—	—

FE004046

BASE PRICES **Per Gross Ton of 51.50% Iron Natural**

Lake Superior Iron Ores **F.O.B. Rail of Vessel Lower Lake Ports**

	OLD RANGE		MESABI			OLD RANGE		MESABI	
Year	Bessemer	Non-Bessemer	Bessemer	Non-Bessemer	Year	Bessemer	Non-Bessemer	Bessemer	Non-Bessemer
1940-1944	$ 4.75	$ 4.60	$ 4.60	$ 4.45	1952	$ 9.45	$ 9.30	$ 9.20	$ 9.05
1945	4.95	4.80	4.70	4.55	1953	10.10	9.95	9.85	9.70
1946	5.45	5.30	5.20	5.05		10.30	10.15	10.05	9.90
1947	5.95	5.80	5.70	5.55	1954	10.30	10.15	10.05	9.90
1948	6.60	6.45	6.35	6.20	1955	10.40	10.25	10.25	10.10
1949	7.60	7.45	7.35	7.20	1956	11.25	11.10	11.00	10.85
1950	8.10	7.95	7.85	7.70	1957-1961	11.85	11.70	11.60	11.45
1951	8.70	8.55	8.45	8.30	1962-1963	11.05	10.90	10.80	10.65
					1964-1969	10.95	10.80	10.70	10.55

1970

OLD RANGE		MESABI	
Bessemer	$11.20	Bessemer	$10.95
Non-Bessemer	11.05	Non-Bessemer	10.80
Coarse Ore		$ .80 premium	
Fines		.45 allowance	

Other Classifications	
Open Hearth Lump	$12.60
Iron Ore Pellets	.266 per natural iron unit

FE004047

Lake Superior Iron Ore Rates

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

Rates in effect January 1, 1970 (X-262 Level)

Range	Loading Port	*Rail Rate	Car to Hold of Vessel	Vessel Movement	Vessel Rate	Point of Consumption	Single Car Rate (6) Prior Rail Haul	Single Car Rate (6) No Prior Rail Haul
Cuyuna	Duluth, Superior					LAKE ERIE PORTS TO:		
				Lower Lake		Valleys District, Canton & Massillon	$2.37	$2.43
Mesabi	Duluth, Superior	1.54 (1)	.22	Ports	2.05	Midland, Steubenville, Weirton & Neville Island	2.71	2.77
Vermilion	Two Harbors					Pittsburgh and Wheeling Districts	3.10	3.15
						Monessen, Pa.	3.24	3.30
Steep Rock	Port Arthur	(5) (Can.)		Lower Lake Ports	2.02	Johnstown, Pa.	3.41	3.48
						Virginia District	4.55	4.61
Eastern Marquette		.74 (2)		Lower Lake		TOLEDO TO:		
Western Marquette	Marquette	.84 (2)	.19 (3)	Ports	1.84	Jackson, Hamilton & Middletown, Ohio	2.54	2.61
						Ashland, Ky. and Portsmouth, Ohio	3.32	3.37

FE004048

Marquette	Escanaba	1.43 (4)	.21 (4)	Lake Erie Ports	1.54	CLEVELAND TO: Jackson, Ohio	3.04	3.10
Menominee				Lake Mich. Ports	1.23	Ashland, Ky., Hamilton and Portsmouth, Ohio	3.32	3.37
						CHICAGO TO: Granite City, Ill.	2.98	3.04

Dock Handling Charges — At Lower Lake Ports

(A) Hold to Rail of Vessel	$0.28
(B) Rail of Vessel to Stockpile	.59
(C) Stockpile to Car	.38
(D) Storage per Month	.01¾
(E) Rail of Vessel to Car	.29

(1) $1.72 Volume Rate — Thunderbird via Fairlane, dumping included to Duluth & Superior.

(2) Restricted.

(3) Pellet handling charge $0.13.

(4) Groveland Mine to Escanaba pellet line haul $0.95 and pellet dumping is included.

(5) Freight Rate varies depending on volume shipped annually.

(6) Multiple Car Rate Reduction of $0.22 G.T. on 10,000 G.T. T/L.

*Rail Rate is subject to refund of $0.05 per gross ton when ore moves beyond Lower Lake Ports via rail.

FE004049

All-Rail Freight Rates to Consuming Districts

Rates in effect as of January 1, 1970

From Mesabi and Vermilion Ranges To: (X-262 Level)

Valleys District	$10.68
Cleveland, Lorain, Canton and Massillon	10.68
Pittsburgh and Wheeling District	11.16
Johnstown, Pa.	11.41
Chicago, Ill.	4.56(C)

From Marquette, Gogebic, and Menominee Ranges To:

Cleveland, Lorain, Valleys District, Canton and Massillon	8.46
Pittsburgh District	9.15
Weirton and Wheeling District	8.82
Johnstown, Pa.	9.41
Chicago District	4.56(A)

From Fillmore County, Minn., To:

Chicago District	3.24(A)
Granite City	3.46(B)

From Gogebic To:

Granite City, Ill.	$ 4.01(B)
East St. Louis, Ill.	4.56(A)

From Negaunee, Mich., To:

Hamilton and Welland, Ont., Canada	8.43

From Marquette Range To:

Detroit, Mich.	4.18(D)
Mingo Jct., Ohio	6.70(E)

From Negaunee, Mich., To:

Sault Ste. Marie, Ont., Canada	4.06

From Mesabi Range To:

Duluth, Minn.	1.75

From Cuyuna, Marquette, and Menominee Ranges To:

Granite City and East St. Louis, Ill.	4.56(A)

(A) Rate applicable only in lots of 20 or more cars on one B/L; single car rate is higher.
(B) Rate applicable only in lots of 40 or more cars on one B/L, based on annual tonnage.
(C) Rate applicable only in lots of 6,000 ton minimum shipments, based on annual tonnage.
(D) Rate applicable only in lots of 30 or more cars on one B/L; single car rate is higher.
(E) Rate applicable only in lots of 6,000 ton minimum shipments from Eagle Mills and Republic Mines, Mich.

Imported Iron Ore — Freight Rates (All rates gross tons unless noted)

Rates in effect as of January 1, 1970 (X-262 Level)

	FROM:				
	Baltimore, Maryland	Philadelphia, Pennsylvania	Hampton Roads, Virginia	Fairless, Pennsylvania	Gulf Ports
Bethlehem, Pa.	$3.30	$2.32			
Birmingham District					$2.48 N.T.
Buffalo, N. Y.	4.59	4.59			
Chicago District	7.10	7.10	$7.10	$7.10	7.10
Cleveland, Ohio	4.88	4.88	6.69		
Detroit District	5.73	5.73	5.73		
Donora, Pa.	4.14	4.14		4.14	
Fairless, Pa.	3.30	2.07			
Johnstown, Pa.	4.01	4.01		4.01	
Lone Star, Tex.					4.28
Lyle, Tenn.					4.59
Middletown, O.	5.11	5.11	5.11		
Minnequa, Colo.					7.10
Pittsburgh District	4.29	4.29	6.43	4.29	
Rockwood, Tenn.					4.59
Sault Ste. Marie, Ont.	9.70	9.70	9.31		
Sparrows Point, Md.	2.05	3.29			
Weirton & Wheeling, W. Va.	4.52	4.52			
Youngstown District	4.59	4.59	6.69	4.59	

FE004051

Custom-Tailored Bituminous Coals

W. Va. Metallurgical Coals

Ohio No. 8 Deep Coals

Ohio No. 8 & 9 Strip Coals

Elkhorn No. 3 Deep Coals

8 Domestic Coals
plus

Ohio River Coal Forwarding

Great Lakes Traffic Management

Oglebay Norton supplies coals that are top-of-their-grade and custom blended or sized for the user's precise requirements. Our facilities were the industry's first to be completely mechanized from mine face to carloading. High capacity continuous mining machinery, modern preparation plants, ample storage buildings and rapid loading equipment keep orders filled as promised, with a ready supply on hand for emergencies. Reserves are ample for meeting customers' requirements.

At Ceredo, West Virginia, we own and operate one of the most efficient coal transfer terminals on the Ohio River. Our Great Lakes Forwarding Team provides remarkably efficient coordination of rail and vessel movements. Oglebay Norton also acts as independent forwarding agent and/or sales representative for several coal producers.

Our trained sales engineers provide customers with valuable advisory services, and our fuel engineering department offers in-plant assistance to achieve maximum coal burning efficiency.

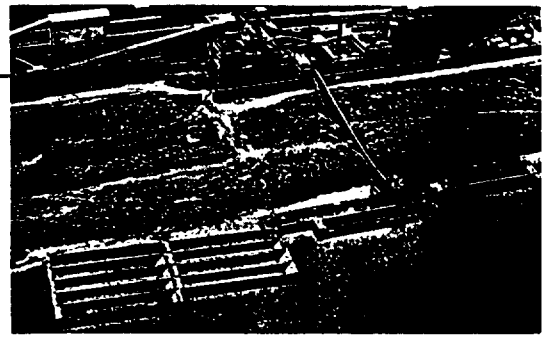
FE004052

Efficient Coal Forwarding Facility on the Ohio River

Ceredo, W. Va., is strategically located on the Ohio at a point where all industries on the river system can be reached more economically by water than by rail. And that's where our modern coal transfer facility loads rail-to-barge at the rate of 24,000 tons daily. An efficient coal thawing service is also available to speed up winter loading.

Lake Forwarding — Highly Specialized Traffic Management

Oglebay Norton offers the services of its skilled traffic coordinators to Great Lakes coal users, including complete traffic management from mine to plant or waterside distribution point. Rail cars are marshalled and timed to meet vessel availability. Efficient scheduling and follow-up is a highly technical job involving complicated logistics, and it takes years to learn. Our full-time traffic specialists know from day-to-day which are the best means to get cargoes shipped economically and on time.



Oglebay Norton's modern transfer terminal at Ceredo, W. Va.

River Forwarding Facility

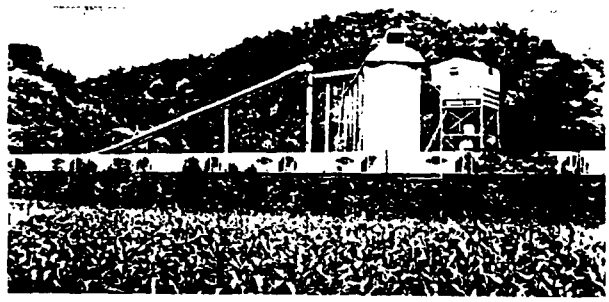
Name of Plant ..... Ceredo
Shipment .. C&O Rwy., N&W RR. and Ohio River
Location ..... Ceredo, Wayne Co., W. Va.
Designer of Plant ..... McNally-Pgh. Mfg. Co.
Daily Cap. River Loading ..... 24,000 Tons
Type Dust Treatment ..... Oil Spray

FE004053

Norton #3 Mine - Ohio No. 8 Seam

Domestic and Steam Coal

This mine, located in Belmont County, Ohio, is fully mechanized from mine face to carloading. Daily production is 5,000 net tons. Giant, 13,200-ton storage silos with rapid-refill equipment assure a ready coal supply at all times. As many as one hundred 100-ton rail cars can be loaded in four hours. And, this coal's superb combustion characteristics are complemented with modern facilities for preparation and drying.



Norton features fast unit-train loading.

FE004054

Ohio No. 8 Seam

Domestic and Steam Coal

Name of Mine ..... Norton No. 3 (Deep)
Shipping Point ..... Onco, Ohio
District ..... No. 4
Seam ..... Pittsburgh, Ohio No. 8

Railroad ..... P/C
County ..... Belmont
Daily Production ..... 5,000 N.T.

Preparation Equipment ..... Davis Heavy Media Washery, Stoker Dryer and Slack Dryer, Crusher, Vibrator and Shaker Screens, Storage Bins, Loading Facilities, 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 1¼" Nut	3.67	38.92	50.18	7.23	3.52	13,165	13,595	2,215	57	5
1¼" x ⅜" ¾" x ⅜" Stoker	3.60	39.52	49.33	7.55	3.72	13,125	13,515	2,205	57	5
1" x ⅜" ¾" x ⅜" Mod. Stoker	3.65	39.30	49.34	7.71	3.67	13,025	13,485	2,190	57	5
⅜" x 0" Slack	4.00	39.85	45.48	10.67	3.83	12,515	13,215	2,170	57	5

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

FE004055

Saginaw Mine - Ohio No. 8 Seam

Domestic and Steam Coal

Saginaw provides top-quality coal which is carefully processed for industrial use through the most up-to-date preparation and drying equipment. Like Norton, Saginaw is fully mechanized, with storage and loading facilities for fast service to both industrial and unit train users. The mine produces 4,000 net tons per day.



Saginaw is automated from mine face to carloading.

Ohio No. 8 Seam

Domestic and Steam Coal

Name of Mine ..... Saginaw (Deep)
Shipping Point ..... St. Clairsville, Ohio
District ..... No. 4
Seam ..... Pittsburgh, Ohio No. 8

Railroad ..... N. & W.
County ..... Belmont
Daily Production ..... 4,000 N.T.

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 ⅜"										
¾" x ⅜" Stoker	3.62	39.50	49.33	7.55	3.82	13,150	13,510	2,180	57	5½
1¼" x ⅜"										
1" x ⅜" Mod. Stoker	3.79	38.30	50.30	7.61	3.76	13,010	13,455	2,170	57	5½
⅜" x 0" Slack	4.15	40.00	45.38	10.47	3.83	12,450	13,242	2,110	57	5½

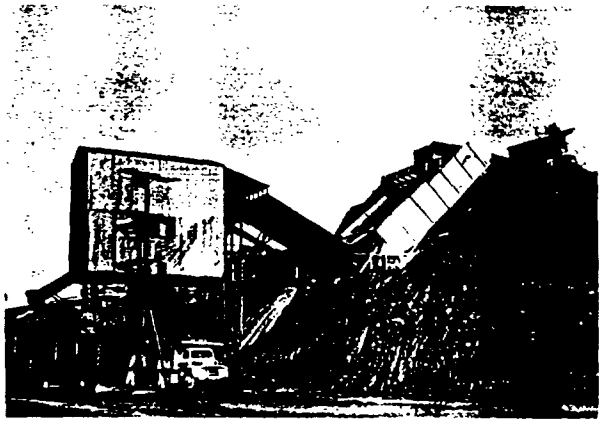
All 2", 1¼", 1", ¾" nut and slack can be modified to suit problems of various burning equipment installations.

FE004057

Rice #1 - Ohio No. 9 Seam

Steam Coal

Oglebay Norton is exclusive sales agent for economical steam coal mined by R. & F. Coal Company in Belmont County, Ohio. Rice #1 has a daily net production capability of 3,000 tons. Coal is crushed to specifications and shipped raw via B&O Railroad at Flushing, Ohio. Extra heavy users can obtain joint shipments from Rice #1 and nearby Rice #2.



Steam coal shipped by rail or truck.

Ohio No. 9 Seam

Steam Coal

Name of Mine ..... Rice No. 1 (Strip)
Shipping Point ..... Flushing, Ohio
District ..... No. 4
Seam ..... Ohio No. 9
Railroad ..... B. & O.
County ..... Belmont
Daily Production ..... 3,000 N.T.
Preparation Equipment ..... Picking Table, Crusher
Operating Company ..... R. & F. Coal Company

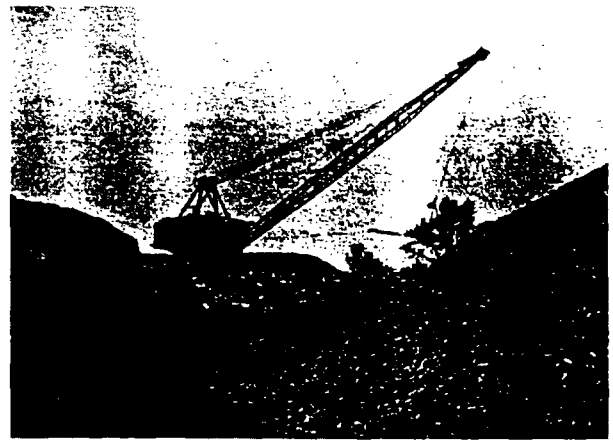
Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Mine Run	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
2" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
1¼" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185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

FE004059

Rice #2 - Ohio No. 8 & 9 Seams

Steam Coal

This strip mine's net output is also 3,000 tons each day. Coal is crushed to desired sizes and shipped raw. Fast loading facilities are utilized, and the coal moves from Speidel, Ohio, via B&O Railroad. Shipments may be combined with those from Rice #1. Rice #2 is also operated by R. & F. Coal Company, Belmont County, Ohio.



Dragline removing overburden at Rice #2.

FE004060

Ohio No. 8 & 9 Seams
Steam Coal

Name of Mine ..... Rice No. 2 (Strip)
Shipping Point ..... Speidel, Ohio
District ..... No. 4
Seam ..... Ohio No. 8 & 9
Railroad ..... B. & O.
County ..... Belmont
Daily Production ..... 3,000 N.T.
Preparation Equipment ..... Picking Table, Crusher
Operating Company ..... R. & F. Coal Company

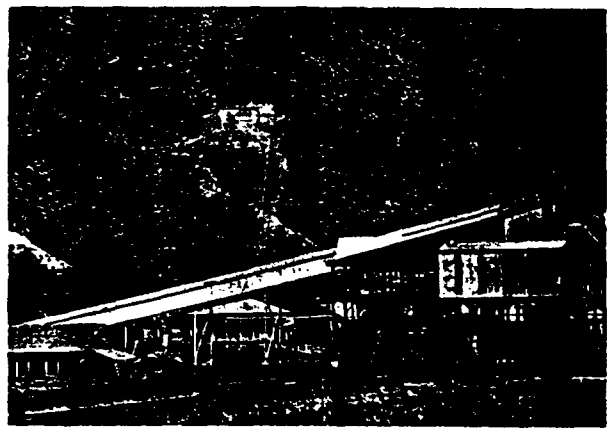
Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Mine Run	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
2" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185	2,325	53	4½
1¼" Crushed	5.15	37.82	47.10	9.93	2.96	12,380	13,185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

FE004061

Sapphire Mine - Elkhorn No. 3 Seam

Custom-Sized, High-Volatile Coals for Steam & Domestic Use

From Sapphire, Kentucky, we offer highest quality industrial and domestic coals . . . custom-sized to perfection for any user's requirements. Elkhorn No. 3 provides an extremely favorable ratio of B.T.U. output to ash and sulphur residue. The coal is processed through an automated preparation plant constructed in 1968 — a plant employing the most modern coal-processing and handling equipment.



Sapphire employs ample storage and loading facilities.

FE004062

Elkhorn No. 3 Steam

High-Volatile – Steam-Domestic Coal

Name of Mine ..... Sapphire (Deep)
Shipping Point ..... Sapphire, Kentucky
District ..... No. 8
Seam ..... No. 3 Elkhorn
Railroad ..... L.&N.
County ..... Letcher
Daily Production ..... 2,000 N.T.
Preparation Equipment ..... Jeffrey Baum Jig, Vibrator and Shaker Screens, Loading Boom, CMI Coal Dryers, McNally-Pgh. Heavy Media Cycloid Washer
Operating Company ..... Elkhorn & Jellico Coal Company

Proximate Analysis:	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.T.U. As Received	B.T.U. Dry	Fusion	Grind-ability	Coke Button
Stoker	3.20	38.68	53.91	4.21	1.30	14,076	14,541	2,400	50	6
Modified	3.48	37.55	54.33	4.64	1.35	13,985	14,489	2,400	50	6

FE004063

High BTU Domestic Coals

Oglebay Norton offers six top-quality domestic coals famous for high BTU with low ash and low sulphur content: Blue Star, Blue Crescent, Blue Beacon, Star Sapphire, Hi-Lo, and Black Gold.

Laxare High-Volatile Metallurgical Coals

These West Virginia coals provide exceptional high fluidity and high contraction with minimum ash and sulphur. Highest quality is maintained consistently with the latest preparation equipment and careful petrographic studies. Research analysts constantly evaluate new mixtures and techniques to develop improved coals for complex, changing metallurgical methods.

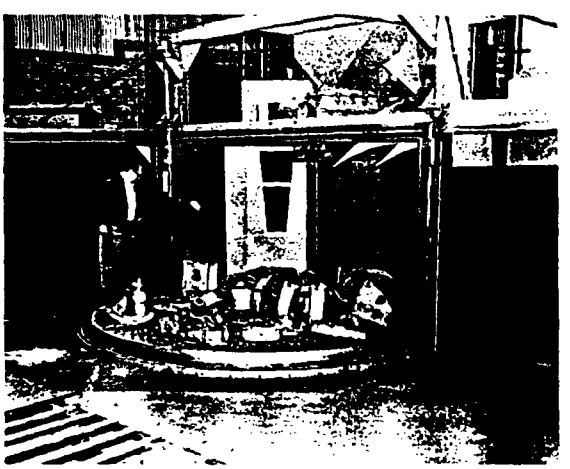
Laxare coals offered by Oglebay Norton are produced by Laxare Incorporated in West Virginia's Raleigh, Boone and Kanawha Counties.

FE004064

High-grade Machine Tool Castings

T&B Foundry Company has an excellent reputation in the manufacture of high-grade machine tool castings for machinery builders. A subsidiary of Oglebay-Norton, T&B Foundry Company offers a wide range of high-tensile iron and semi-steel castings. Beginning with a base 40,000 psi. tensile strength iron, and the addition of alloys, tensiles up to 55,000 psi. can be achieved, along with heat resistant and non-corrosive semi-steel iron.

This facility produces castings in the range from 100# to 12,000#, with a minimum wall thickness of ⅜". With a cupola melting capacity of 16 tons per hour, daily production normally runs between 60 and 75 tons of iron poured, with a potential of 100 tons.



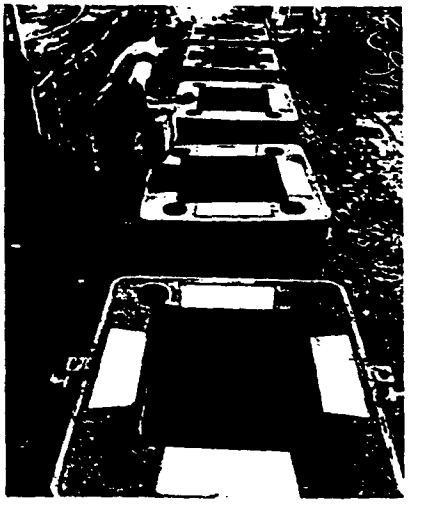
Large 12' diameter rotablast removes foreign particles from customer's castings.

FE004065

Excellent pattern storage facilities of 700,000 cubic feet are provided for the protection of patterns in a fireproof building with a sprinkler system.

With an organization of 150 employees, this subsidiary is classified as a jobbing, semi-production type foundry for medium and heavy loose pattern work. The company also has roll-over molding machines for cope and drag work. And, excellent core room facilities assure close tolerances on highly cored castings through the use of the latest types of chemically set core sand.

With supervision of long experience and a central location, quality and service are assured. Constant improvement in methods and equipment, coupled with a steady and studied expansion program guarantees that this foundry will remain a prime source for quality semi-steel castings.



Highly skilled journeyman assembling cores in molds.

FE004066

Modern Docks In Key Areas

Toledo, Ohio

Saginaw, Michigan

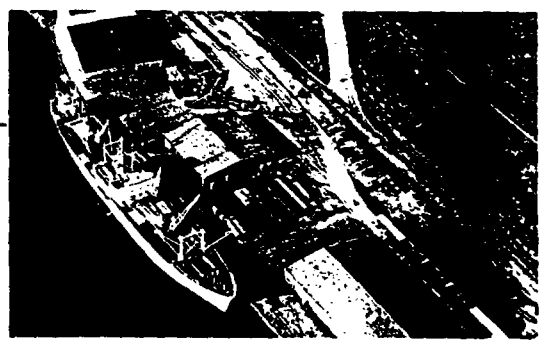
Bay City, Michigan

South Chicago, Illinois

Four efficient, well-equipped docks in the heart of industrial America provide domestic and foreign shippers and receivers with adequate vessel berthing, competent materials handling, and easy access to ample storage areas and warehouses. Lake and ocean-going vessels can safely pick up and discharge all types of bulk and general cargo with minimum maneuvering. Toledo and Bay City are contiguous to the only Foreign Free Trade Zones on the Great Lakes.

FE004067

Bay City Seaway Terminal Modern Dock, Warehouse and Terminal Facility



Bay City Seaway Terminal serves the Orient, Europe, South America and the Mediterranean.

This dock offers extensive under-roof storage and high-speed handling of most bulk and general cargo. It is ideally located below all bridges at the mouth of the Saginaw River and vessels can customarily dock and undock without the aid of tugs. Commodities handled consist of such materials as chemicals, machinery, wire, beans and other types of general cargo. The dock area connects with three railroads and U. S. Routes 10, 23, 25 and I-75.

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, Penn Central
Dock Surface	Blacktop
Telephone	684-3738
Mailing Address	Box "N" Bay City, Michigan 48706

Contact Dock Superintendent for schedules, rates and other information.

FE004068

Saginaw Dock -
The Lakes' Best Outside Scrap Storage Dock



Saginaw Dock's excellent open storage facilities.

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, Penn Central

Saginaw Dock has one of the most efficient lay-outs and equipment for the storage or transfer of commodities on the entire Great Lakes and is the only dock of its type between Detroit and lower Lake Michigan. Equipment includes three 40-ton diesel electric locomotive cranes equipped with either buckets or magnets, yard switch engine, and both track and truck scales. Handles pig iron, scrap steel and other types of commodities for domestic and foreign shipments. Located 16 miles upstream from Saginaw Bay, with three major rail outlets and easy access to U. S. Routes 10, 23 and I-75.

Dock Surface ..... Gravel
Telephone 755-0495
Mailing Address ..... P. O. Box 1471
Saginaw, Michigan 48605

Contact Dock Traffic Manager for rates and other information.

FE004069

Western Navigation Company
Dock at South Chicago - Gateway to the Mississippi

Western Navigation Company operates a large storage dock in South Chicago—interchange point for Great Lakes-Mississippi River traffic. This operation doubles as a local terminal as well as a transfer facility for barges, vessels, rail and truck. It is conveniently located on the Calumet River three miles from Lake Michigan and connects with the Mississippi through the Cal-Sag Canal. Bulk cargoes such as coal, sulphur, salt, iron ore, pig iron and scrap are among the commodities regularly handled here.



Western Navigation Company's dock.

Data

Number of Warehouses 1
Covered Storage ..... 11,200 sq. ft.
Open Storage ..... 25 acres
Railroads ..... P/C, 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.

FE004070

Toledo Overseas Terminals
Import/Export Center of the Great Lakes



Toledo Overseas Terminals

Data

Dock Length, Steel Bulk Heading ..... 2,000 ft.
Depth alongside dock ..... 27 ft.
Two Traveling Heavy Lift Cranes .. 110-ton capacity
Four Traveling Gantries ..... 25-ton capacity
Covered Storage ..... 115,000 sq. ft.
Open Storage ..... 18 acres
Railroad ..... C. & O.

This spacious, recently updated terminal supplies tug-free berthing for four large ships at the Toledo harbor entrance below all bridges and power lines — adjoining one of the two Foreign Free Trade Centers on the Great Lakes. Cranes up to 110-ton capacity quickly move cargoes of heavy machinery, automobiles, foodstuffs, various other package and bulk goods. The dock is virtually a hub for nine mainline railroads through the C&O switching yard. Interstate Routes 75 and 280 link Toledo with Detroit and the Ohio Turnpike.

Dock Surface ..... Blacktop
Telephone 726-2605
Mailing Address ..... Station "A", Box 308
Presque Isle
Toledo, Ohio 43605

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

FE004071

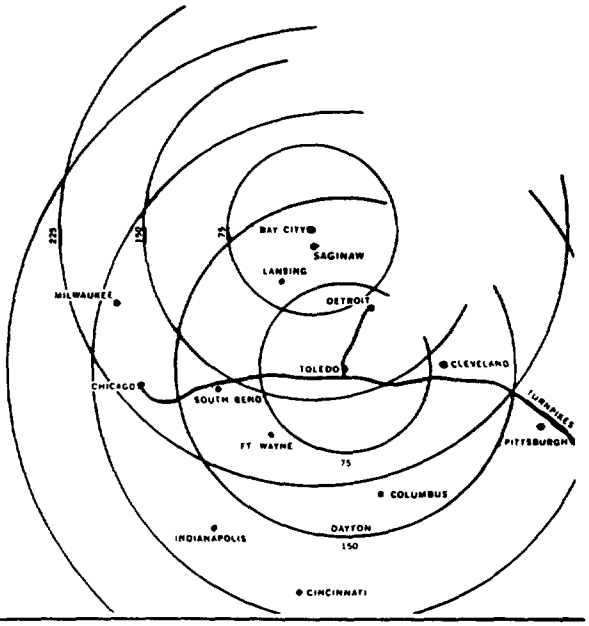
Distance to Principal Ports

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.

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.



FE004072

High Quality Basic Raw Materials

Fluorspar

Fluorspar Briquettes

Spiegeleisen

Celestite

Phosphate Rock

Degasifiers

An important raw material is fluorspar or fluorite used as flux in metallurgy, ceramics and glass-making. We supply this vital mineral in various types and grades, including ONCO fluorspar briquettes, which are especially attractive for BOF use. Fluorspar is produced from mines in Mexico and Illinois and is processed under rigid standards to assure desired uniformity and physical properties.

Determining the proper fluorspar or other raw material for particular production requirements is our specialty. Our sales representatives are hand-picked and carefully trained. Frequently, they have boosted customers' manufacturing output by determining the best combination of raw material and package form.

We deal on long-term contracts or single orders and quickly provide guaranteed rates and routing. Shipments go via any specified available transportation . . . either bulk or in special containers to comply with order requirements.

FE004073

ONCO Fluorspar Briquettes

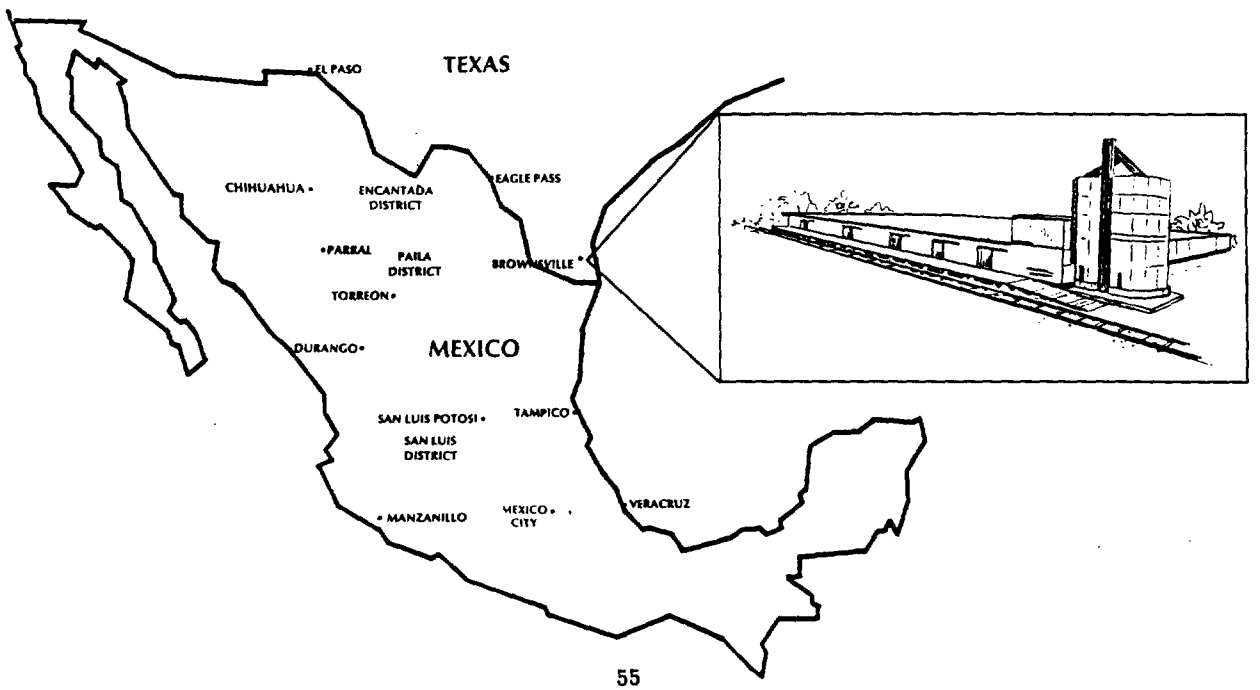
Early in 1970, Oglebay Norton Company brought on stream a new facility in Brownsville, Texas, to briquette fluorspar. This plant will utilize high-purity fluorspar concentrates from Mexico and convert them into a form which is both chemically and physically in great demand by the steel industry, particularly operators of basic oxygen vessels. These briquettes offer the utmost in uniformity of product and are particularly well adapted to the computerized operation of steel furnaces. The plant is located immediately adjacent to the Port of Brownsville Docks and the briquettes may be moved directly from plant to barge, eliminating outside storage. Rail shipments may also be made directly from our own siding. Currently the plant is engineered to produce approximately 20,000 tons annually based on single-shift operation.

Chemical Analysis	**Average & Typical**
Calcium Fluoride	75-78%
Silica	1.5-2%
Calcium Carbonate	18-22%
Effective Units	70% Minimum

Size

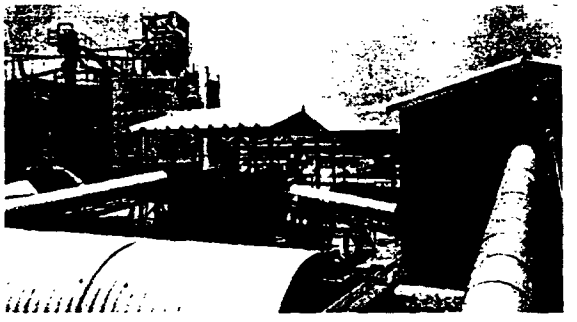
Briquettes approximately 2 inches by 1⅜ inches by ⅝ inch.

FE004074


TEXAS
EL PASO
CHIHUAHUA
ENCANTADA DISTRICT
EAGLE PASS
PARRAL
PAILA DISTRICT
BROWNSVILLE
TORREON
DURANGO
MEXICO
SAN LUIS POTOSI
SAN LUIS DISTRICT
TAMPICO
MANZANILLO
MEXICO CITY
VERACRUZ

Parspar Quality Ceramic Fluorspar

Parspar ceramic fluorspar is chemically and physically homogeneous. Calcium fluoride content is well above the 97% guaranteed minimum, with the overall average about 97.5%. This product is low in iron. Sulphur, zinc and lead analyze trace to nil. Samples and a complete analysis are available upon request.



Modern facilities for storage and handling.

The producer of Parspar fluorspar is Asarco Mexicana, S. A., Parral, Mexico. Shipments are made in bulk via rail through Eagle Pass or El Paso, Texas.

Typical Chemical Analysis

Calcium Fluoride	97.50%
Silica	1.00
Calcium Carbonate	1.00
Iron Oxide	.05%-Max.
Undetermined	.60%
Moisture	Trace
Guaranteed Calcium Fluoride	97.00%-Min.

Typical Physical Analysis

Thru 100 Mesh	99.90%
Thru 200 Mesh	99.62
Thru 325 Mesh	86.80

FE004076

ONCO Brand
97% Ceramic Fluorspar

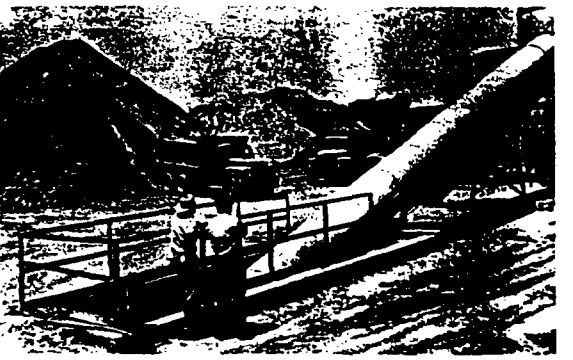
Exacting chemical and physical analyses have proved ONCO fluorspar remarkably uniform. Calcium fluoride content averages 97.5%, with 97% guaranteed. Minimum iron is present. Lead, zinc and sulphur analyze trace to nil. ONCO fluorspar is a product of Reynolds Mining Corp., and has long been used in production of the world's highest grade glass and metals. Ask for samples and a detailed analysis.

Bulk or Packaged

Bulk shipments are made in covered hopper cars. 100-pound, 4-ply paper bags go via boxcar, palletized on request. Shipping point is Eagle Pass, Texas.

Typical Chemical Analysis

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



Crude ore stockpile at Eagle Pass, Texas.

Typical Physical Analysis

Thru 48 Mesh	100%
Thru 65 Mesh	90
Thru 100 Mesh	80
Thru 150 Mesh	70
Thru 200 Mesh	60
Thru 325 Mesh	40

FE004077

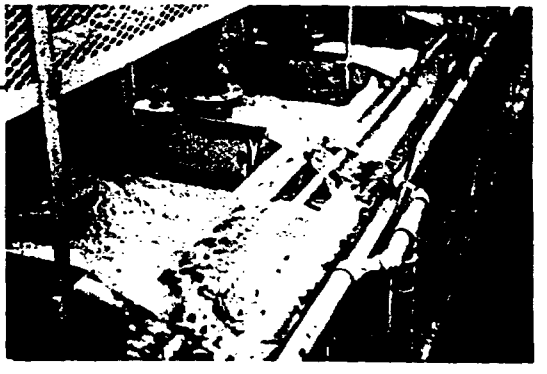
Multi-Grade Illinois Ceramic Fluorspar

Illinois Brand fluorspar is ideal for glass and ceramic producers who can utilize the economies of a lower calcium fluoride content. Chemical and physical grades are available for any production requirements.

Bulk or Packaged

Rail and truck shipments are made from the mines in Southern Illinois in bulk quantities or 100-pound bags. Palletized upon request.

Typical Chemical Analysis	No. 1 Ceramic	No. 2 Ceramic
Calcium Fluoride	96.18%	91.49%
Silica	1.22	4.78
Calcium Carbonate	2.12	2.89
Iron Oxide	0.10	0.25
Barite	0.17	0.12
Undetermined	0.28	0.42
Guaranteed Calcium Fluoride	95.00	90.00



Flotation concentration of fluorspar.

Typical Physical Analysis

	Fine	Reg.	Coarse
+ 65 Mesh	—	—	6%
− 65 Mesh	—	100%	94
−100 Mesh	100%	98	78
−200 Mesh	96	94	51
−325 Mesh	86	74	40

FE004078

Onmex Brand Natural Metallurgical Fluorspar

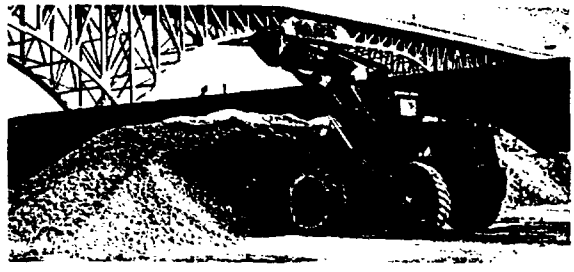
Onmex is a natural-ore fluorspar. Therefore, it contains no flotation concentrates or limestone additions. It is uncontaminated by lead, zinc or other sulphides. All materials are mined, crushed and screened to specifications. Onmex is guaranteed 70% effective units of CaF_2 — Bidtel method.

Shipping Points Via Any Type Carrier

Onmex fluorspar is shipped from Brownsville, Texas and Tampico, Mexico via rail, barge, and ocean or lake vessels.

Physical Analysis

2 Inch Maximum ..... 1/16 Inch Minimum
Minimum of Fines



Raw materials stockpiled at key points in U. S. to provide fast delivery.

Chemical Analysis

Effective Calcium Fluoride Units (Bidtel Method)	Guaranteed 70%
Silica	3-6
Total Calcium Fluoride	78-88
Sulphur, Lead, Zinc	Nil

FE004079

Spiegeleisen (Mirror Iron)

Oglebay Norton is a distributor of Horse Head Brand spiegeleisen produced by New Jersey Zinc Company. We supply this alloy in three manganese content ranges. Spiegeleisen is cast in ten-pound pigs and will be packaged and shipped according to customers' instructions.

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%.

FE004080

Celestite (Strontium Sulphate)

This material is used in the manufacture of pyrotechnics and electrolytic zinc, as well as special grades of glass. It is produced by Yeso Sayro, S. A., and is imported from Mexico via El Paso, Eagle Pass or Brownsville, Texas. It can be shipped in bulk or custom ground and packaged to suit users' requirements.

Approximate Analysis

Strontium Sulphate	90%	Minimum
Barium Sulphate	2	Approx.
Calcium Sulphate	3	Approx.
Sodium Sulphate	Nil	

FE004081

Rim-Blox Degasifying Agents

Rim-Blox are mold additives used to degasify rimmed steels. They are produced from a variety of formulas matched to the properties of high and low-carbon alloys. The manufacturer is Rossborough Supply Company, Cleveland, Ohio. We are the sales representatives.

To assure handling ease and accurate measuring, Rim-Blox come in coated 1-oz. and 4-oz. briquettes, plus 4-, 8- and 16-oz. polyethylene bags. Both types are shipped by truck from Cleveland in 50-pound palletized cartons and 375 or 500-pound fibre drums.

FE004082

Phosphate Rock for Blast Furnace Use

Oglebay Norton supplies two grades of washed and screened phosphate rock for blast furnace production. Shipments come by rail from Tennessee or Florida.

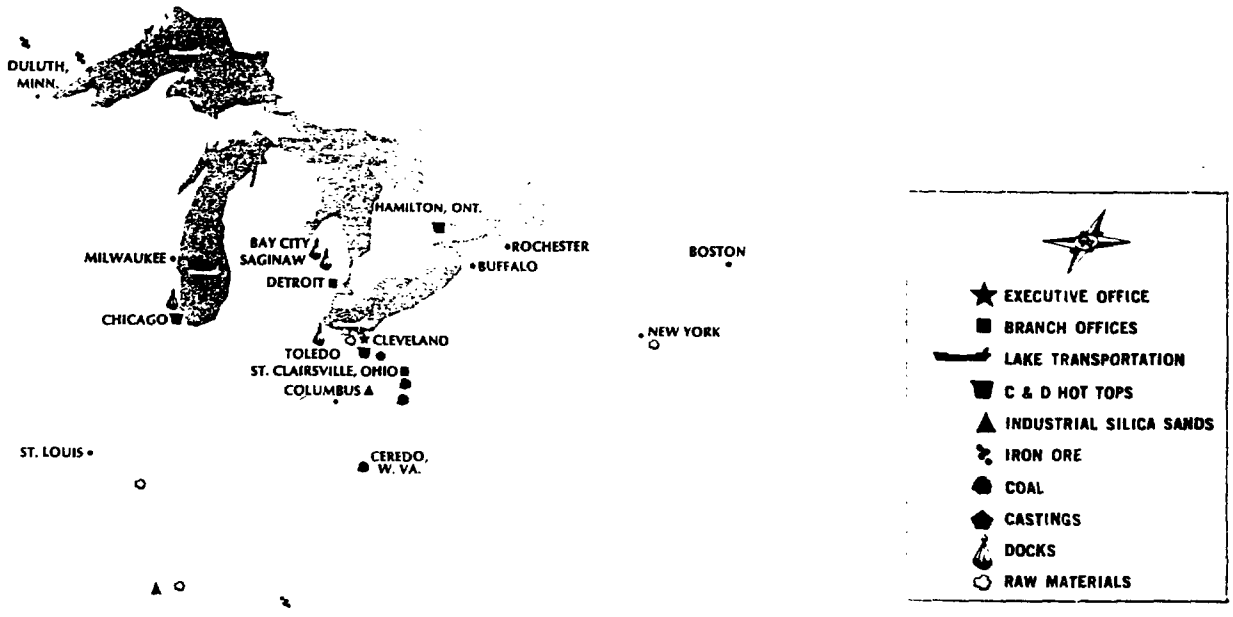
Chemical Analysis —Typical

	Tennessee Lump	Florida Pebble
Phosphoric Acid	22-26%	30.00%
Iron Oxide	3- 5	3.33
Silica	30	—
Alumina	1- 3	1.21

Physical Analysis — Typical

	Tennessee Lump	Florida Pebble
+2½"	0.0%	0.0%
−2½" +¼"	80.0	36.1
−¼" + 6 mesh	14.0	58.9
−6 mesh	6.0	3.8

FE004083


DULUTH, MINN.
HAMILTON, ONT.
MILWAUKEE
BAY CITY
SAGINAW
ROCHESTER
BUFFALO
BOSTON
DETROIT
CHICAGO
CLEVELAND
NEW YORK
TOLEDO
ST. CLAIRSVILLE, OHIO
COLUMBUS
ST. LOUIS
CEREDO, W. VA.
EXECUTIVE OFFICE
BRANCH OFFICES
LAKE TRANSPORTATION
C & D HOT TOPS
INDUSTRIAL SILICA SANDS
IRON ORE
COAL
CASTINGS
DOCKS
RAW MATERIALS

Facilities, Services and Products

EXECUTIVE OFFICE:
1200 Hanna Building, Cleveland, Ohio

BRANCH OFFICES:
Detroit, Michigan; St. Clairsville, Ohio

LAKE TRANSPORTATION:
Columbia Transportation Division, Cleveland, Ohio (Fleet of 16 vessels); Silloc Limited, Cleveland, Ohio; Fairport Machine Shop, Fairport, Ohio.

C & D HOT TOPS:
Ferro Engineering Division (Plants No. 1 & No. 2), Cleveland, Ohio; (Plant No. 3), Chicago, Illinois; (Plant No. 4), Hamilton, Ontario, Canada.

INDUSTRIAL SILICA SANDS:
The Central Silica Co., Zanesville, Ohio; Millwood Sand Div., Howard, Ohio; Ayers Mineral Div., Lexington, Tennessee.

IRON ORE:
Eveleth Taconite Company, Eveleth, Minnesota; Reserve Mining Company, Silver Bay, Minnesota; Tennessee Corporation, Copperhill, Tennessee.

COAL:
Saginaw Mine, St. Clairsville, Ohio; Norton Mine, Jacobsburg, Ohio.

CASTINGS:
T&B Foundry Co., Cleveland, Ohio

DOCKS:
Bay City Seaway Terminal, Bay City, Michigan; Saginaw Dock, Saginaw, Michigan; Toledo Overseas Terminals Co., Toledo, Ohio; Western Navigation Company, Chicago, Illinois.

RAW MATERIALS:
Fluorspar from Mexico, Texas and Illinois; Celestite from Mexico; Rim-Blox, Cleveland, Ohio (sales agent for Rossborough Supply Company); Spiegeleisen, Pennsylvania (distributor for New Jersey Zinc Co.); Pochteca, S.A. de C.V., Mexico 10, D. F.

FE004085



NOTES

