PLAINTIFF'S EXHIBIT
ON-78

OGLEBAY NORTON COMPANY

VESSELS
INDUSTRIAL QUARTZ SAND
HOT TOPS
IRON ORE
COAL
CASTINGS
DOCKS
RAW MATERIALS



FE004088

OGLEBAY NORTON COMPANY

1972

Executive Office

1200 Hanna Building • Cleveland, Ohio 44115 • (216) 861-3300 • Cable Address: ONCO-CLEVE

Whom to contact

COLUMBIA TRANSPORTATION DIVISION • R. D. Thompson, Senior Vice President
FERRO ENGINEERING DIVISION • W. R. Herron, Vice President and General Manager
CENTRAL SILICA COMPANY • A. F. Harrison, President
IRON ORE & RAW MATERIALS • A. B. Rathbone, Vice President-Ore Sales
COAL • W. A. Orr, Director of Coal Mining
T & B FOUNDRY COMPANY • F. P. Gill, President
DOCKS: SAGINAW & BAY CITY • R. D. Thompson, Senior Vice President
TOLEDO OVERSEAS TERMINALS CO. • C. J. Howley, Jr., Vice President

Branch Offices

VIRGINIA, MINNESOTA 55792 • P. O. Box 1064 • (218) 741-5222
ST. CLAIRSVILLE, OHIO 43950 • P. O. Box 156 • (614) 695-1134

Subsidiaries

CANADIAN FERRO HOT TOPS LIMITED • 347 Arvin Avenue • Stoney Creek, Ontario, Canada • (416) 662-8381
CENTRAL SILICA COMPANY • 806 Market Street • Zanesville, Ohio 43701 • (614) 452-2775
T & B FOUNDRY COMPANY • 2469 East 71st Street • Cleveland, Ohio 44104 • (216) 391-4200
TOLEDO OVERSEAS TERMINALS CO. • 3319 St. Lawrence Drive • Toledo, Ohio 43605 • (419) 726-2605

INDEX

Vessels 1
Bulk Vessels 2, 3
Self-Unloaders 4, 5
Crane Vessel 6, 7
Crane-Conveyor Vessel 8, 9
Information and Charter Rates 10
Industrial Quartz Sand 11
Silica Sand 12
Silica Sand Specifications 13
Ground Sand Specifications 14
Hot Tops 15
C & D Ferroboard Quickline Hot Tops 16, 17
C & D Ferroboard Panels 18, 19
C & D Exothermic Panels 20
C & D Exothermic Thin Wall Panels 21
C & D Covers and Covering Compounds 22, 23
Iron Ore 25
Eveleth Taconite Pellets & Analysis 26, 27
Silver Bay Taconite Pellets & Analysis 28, 29
Rates 31
Imported Iron Ore Freight Rates 32
Base Prices — Lake Superior Iron Ores 33
Shipping Rates — Lake Superior Iron Ore 34, 35
All-Rail Rates — To Consuming Districts 36
Coal 37
Steam Coal — Norton #3 Mine 38, 39
Steam Coal — Saginaw Mine 40, 41
Steam Coal — Rice #1 Mine 42, 43
Steam Coal — Rice #2 Mine 44, 45
Steam Coal — Sapphire Mine 46, 47
Metallurgical Coal — Laxare Mine 48
Barge Coal Loading Facility — Ceredo Dock 49
Lake Forwarding 50
Castings 51
Quality Gray and Ductile Iron Castings 52-54
Docks 55
Toledo Overseas Terminals CO. 56
Saginaw Dock 57
Bay City Seaway Terminal 58
Western Navigation Co. 59
Distance to Principal Ports 60
Raw Materials 61
Fluorspar Briquettes — ONCO Brand 62
Fluorspar 64-67
Celestite (Strontium Sulphate) 68
Degasifying Agents 69
Phosphate Rock 70
Facilities, Services and Products 72

FE004091

OGLEBAY NORTON COMPANY

Cleveland based, Oglebay Norton supplies products and services to basic industries throughout the nation's industrial center and beyond.

Presented briefly in these pages, and organized for quick reference, are our diverse but related activities. Service data, specifications, and basic descriptions define our operations. They include 18 vessels and four docks on the Great Lakes; mines and processing facilities for iron ore, coal, quartz sand, fluorspar, and the sale of other raw materials; gray and ductile iron castings, and hot-topping products for the steel industry.

The commitment of Oglebay Norton in meeting customers' requirements is supported by a highly qualified organization, extensive and modern facilities, 118 years of experience, and the dedication of more than 2,000 employees.

VESSELS

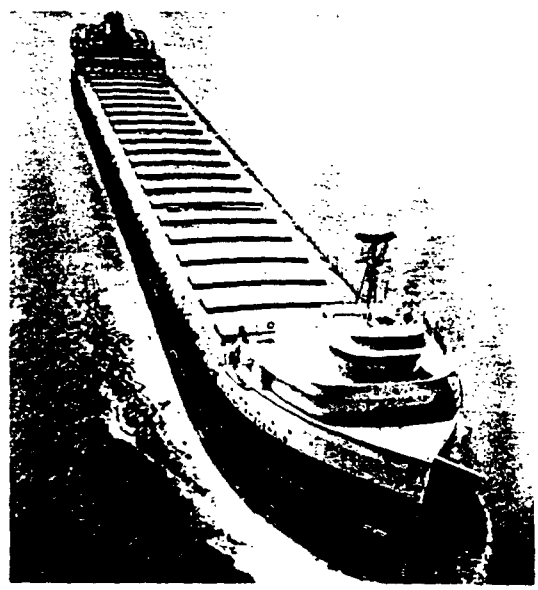
7 Bulk Freighters
9 Self-Unloaders
1 Crane Vessel
1 Crane-Conveyor

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 18 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.

Combined Trip Capacity 250,000 Gross Tons



Bulk Vessels
Fast, Large Capacity



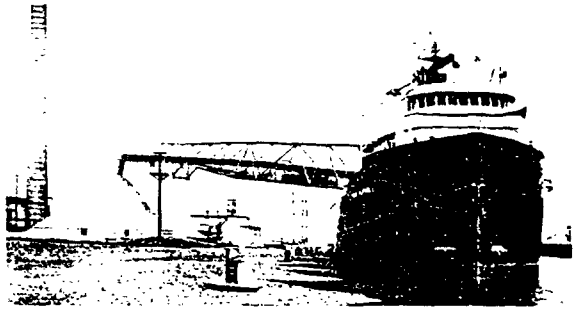
Cargo Record Holder, the Edmund Fitzgerald.

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	16,400	621	60	35	4	18	Triple Expansion	2500 IHP	15.5	13.5
James Davidson	13,400	600	60	32	6	33	Triple Expansion	2300 IHP	11.2	10.7
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.

FE004095

Efficient, Versatile



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. Compart-ments	Boom Length (Ft.)	Distance Stem to Boom Rota-tion Pin (Ft.)	Maximum Boom Rota-tion
Frank Purnell	15,000	12,900	621	60	35	4	250	94	240°
Joseph H. Frantz	13,600	14,800	618	62	32	6	250	181	270°
G. A. Tomlinson	11,500	11,300	557	58	31	5	240	80	180°
J. R. Sensibar	11,300	11,200	612	56	31	6	256	154	270°

Sylvania	11,100	10,400	572	54	30	6	230	84	180°
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°

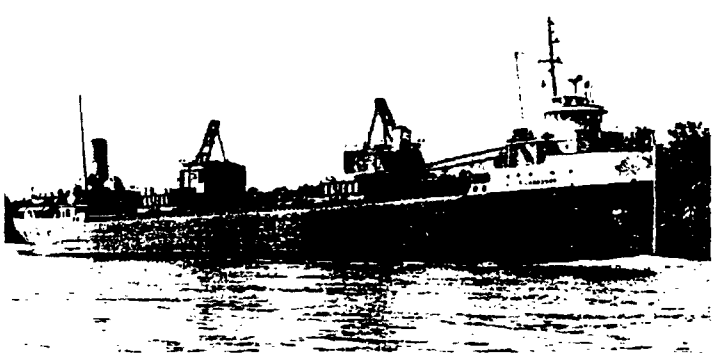
VESSEL	Boom Belt Width (Inches)	Boom Belt Speed (Ft. Per Min.)	Unloading† Rate (N.T. Per Hr.)	Tunnel Belt Width (Inches)	Type Engine	Horse-power	Speed* (Miles Per Hour) Light	Loaded
Frank Purnell	60	650	5000	54	Triple Expansion	2500 IHP	15.5	13.5
Joseph H. Frantz	60	900	4000	54	Non Reversing Marine Diesel	4000 BHP	15.0	14.0
G. A. Tomlinson	54	620	3200	42	Triple Expansion	1750 IHP	13.5	12.5
J. R. Sensibar	60	660	2600	48	Non Reversing Marine Diesel	3200 BHP	15.5	14.5
Sylvania	54	610	3200	42	Triple Expansion	1750 IHP	13.5	12.5
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.

FE004097

Crane Vessel

Equipped to Handle Wide Range of Cargoes



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

VESSEL	Capacity (G.T.)	Length (Ft.) Over-All	Beam (Ft.)	Depth (Ft.)	No. Com-partments	Boom Length (Ft.)
W. C. Richardson	7200	440	52	28	4	75

	Hatches (Dimension in Ft.)						Speed* (MPH)	
VESSEL	No. 1	No. 2	No. 3	No. 4	Type Engine	Horsepower	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

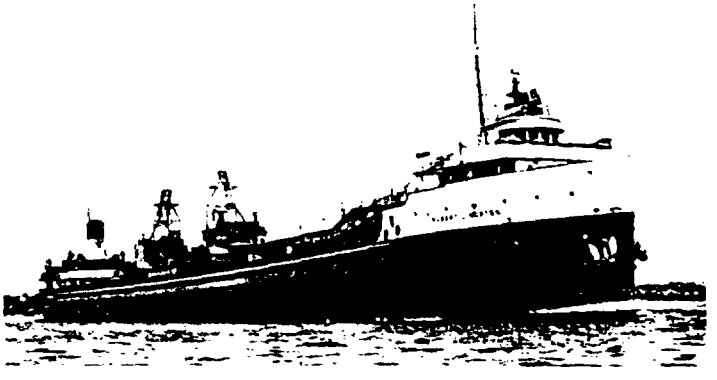
*Approximate, actual speed will vary with weather and ballast conditions.

CRANE STATISTICS

The Steamer Richardson is equipped with two fast-revolving, traveling diesel electric cranes utilizing 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.

FE004099

Crane and Self-Unloader Capabilities



Multi-Purpose Vessel, the Robert C. Norton.

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.

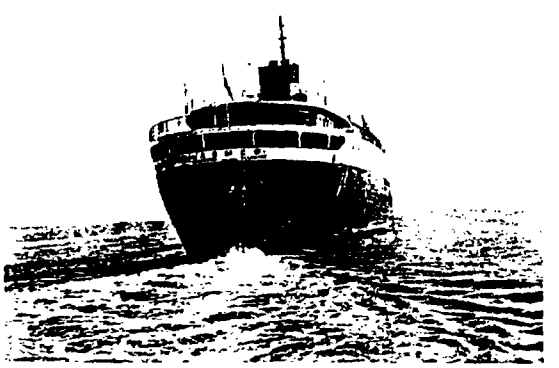
Telephone For Information and Charter Rates

Office Hours:
8:45 A.M. to 5:00 P.M. Monday-Friday*
..... (216) 861-3300
8:45 A.M. to 11:00 A.M. Saturday, Sunday
and Holidays* ..... (216) 861-3310
TWX Area Code 216—574-9666

Whom to Contact

Name	Home Telephone Number
F. A. Castle	(216) 338-3028
R. F. Kirby	(216) 871-7828
C. A. Rindfleisch	(216) 235-3784
H. M. Sisunik, Jr.	(216) 777-7883

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



INDUSTRIAL QUARTZ SAND



FE004103

Silica Sand

High purity silica sand for glass, ceramic, foundry, and other consumers.

The Central Silica Company, a subsidiary of Ogle-bay 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.



Heavy-duty shovel loading crude silica sandstone.

Silica Sand Specifications
Central Silica Co., Millwood Sand Co.

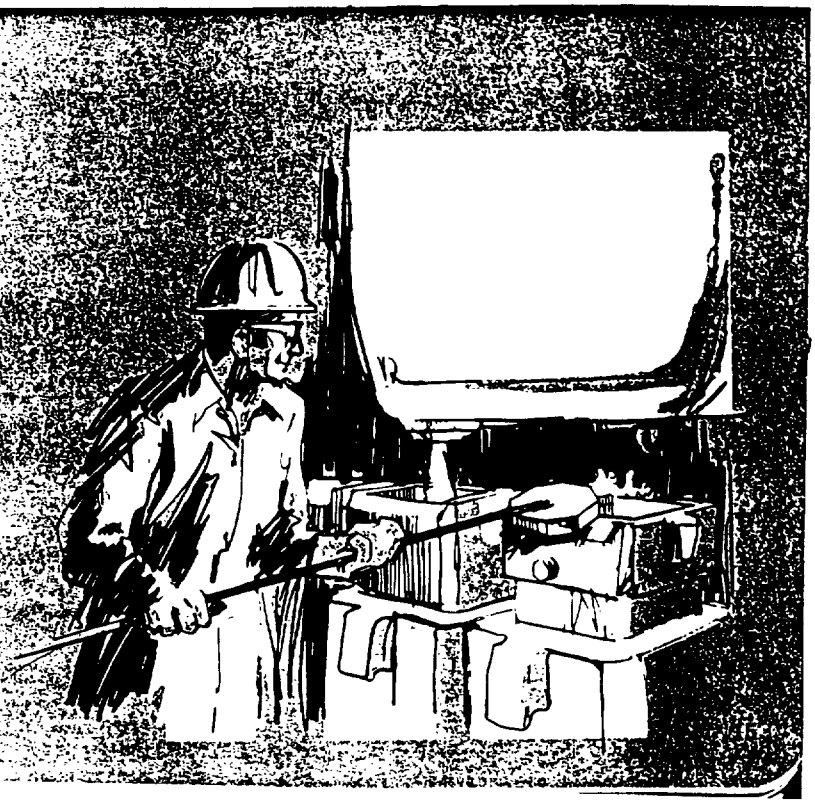
	#7 Dry Steel	#7 Dry Glass	#3 Dry Glass	#3 Dry Steel	#2 Dry Steel	#1 Dry Steel	#1 Dry Special	100 Mesh
% on 20 mesh	.1	.1						
% on 30 mesh	4.0	4.0	1.2	2.0	2.0	1.5	1.5	1.0
% on 40 mesh	33.0	33.0	10.0	10.0	9.0	8.0	7.0	3.5
% on 50 mesh	51.0	51.0	29.5	28.5	26.5	24.0	22.0	10.5
% on 70 mesh	9.2	9.2	30.5	28.0	25.5	24.5	23.0	18.5
% 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
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	

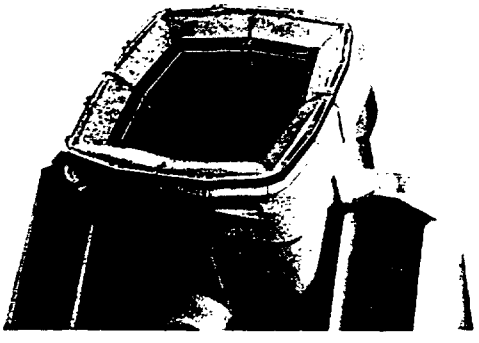
HOT TOPS

- C & D Brick Lined Hot Tops
- C & D Ferroboard Quickline Hot Tops
- C & D Ferroboard Panels
- C & D Exothermic Panels
- C & D Panel Insert - Stepped Ring Combinations
- C & D Covers
- C & D Covering Compounds



FE004107

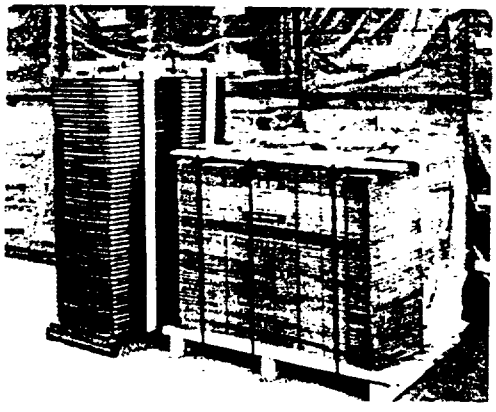
C & D Ferroboard Quickline Hot Tops
BEU Molds



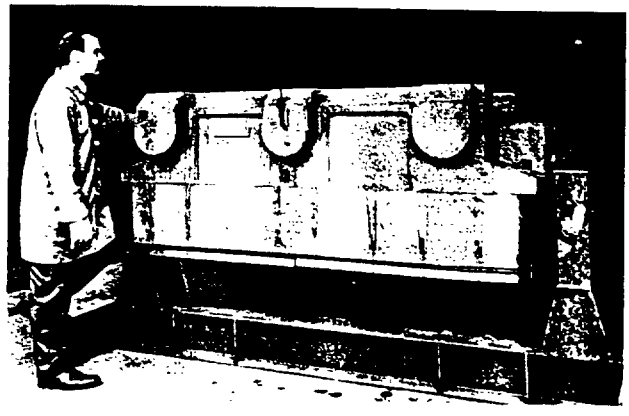
Quickline Hot Top ready to be set on mold and poured.

For Big-End-Up Molds

C & D one-use Quickline Hot Tops provide a dry brickless hot topping system economically. Any mold can be fitted. They are shipped flat and stored in the hot top preparation area. Ferroboard is a lightweight, heavy-duty insulating, refractory board.



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



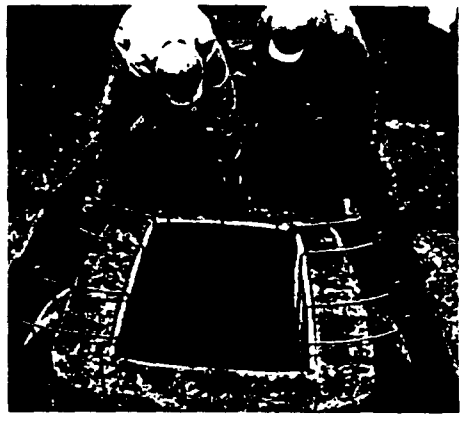
We design Quickline Hot Tops in any size or shape.

FE004109

C & D Ferroboard Panels
BED Molds

For Big-End-Down Molds

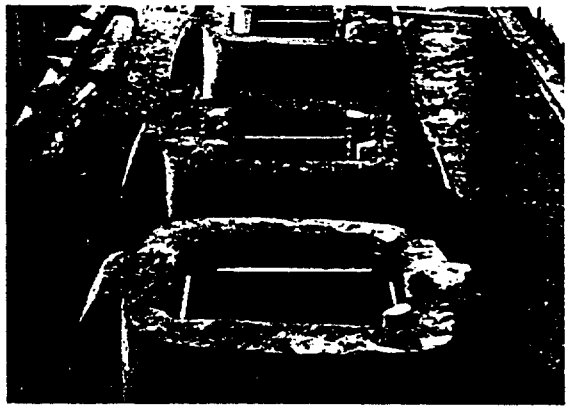
C & D Ferroboard individual panels are simple, economical and preengineered to any mold specification. They are quickly hung at, or near, the mold top. These lightweight panels with strong wire reinforcement do not require any special handling. Ferroboard panels leave only a narrow shoulder where the sinkhead and ingot body join, thus minimizing any apparent junction in the rolled steel.



Ferroboard Panels installed in slab ingot mold.



Ferroboard Panel being clipped to billet ingot molds.

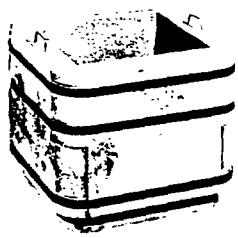


8-piece Panel set in small big-end-down billet molds.

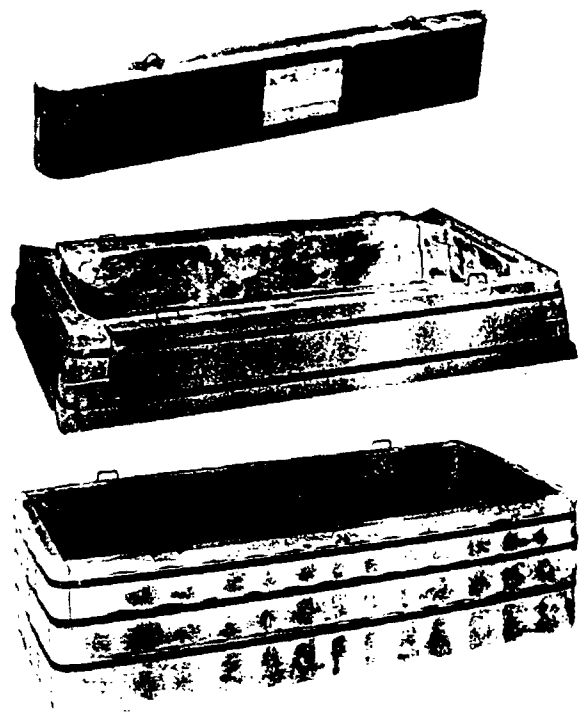
Flat Sinkhead Cavity

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

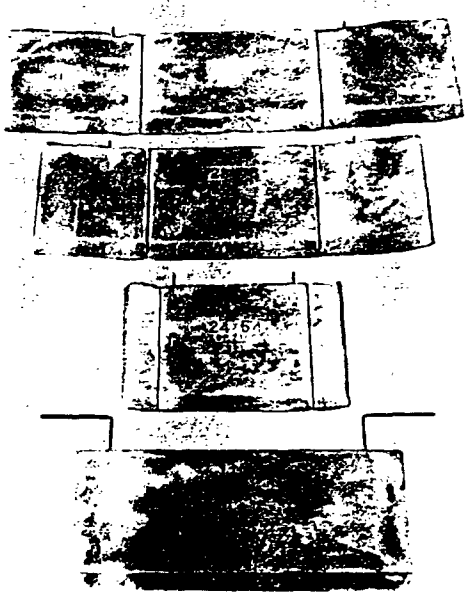
C & D Exothermic Panels



One-use individual panels, with exothermic material molded in, are shaped for big-end-up or big-end-down ingot molds. All sizes and shapes and designs including corrugated. C & D exothermic panel efficiency produces superior ingot yields. Shipped assembled with steel straps for instant use or flat for convenient storage.



C & D Exothermic Thin Wall Panels



One-use, individual, exothermic panels are also furnished in a thin wall design. These panels leave only a narrow shoulder where the sinkhead and ingot body join, thus minimizing any apparent junction in the rolled steel.

C & D Covers and Covering Compounds



Each C & D Hot Top Cover is custom designed to insure peak control over sinkhead cooling. The box is shaped and sized to the individual sinkhead opening. The molten steel disintegrates the outer container and ignites a measured amount of exothermic powder, adding heat to the sinkhead. The cover also contains a steel separator which bridges the sinkhead cavity, and an insulator above to trap heat inside.

The various C & D Covering Compounds are formulated to provide a broad range of exothermic performance. Each variety is carefully regulated to specification and bagged by weight to provide full control.

FE004115


Ferro sales engineers serve all steelmaking areas of the United States and Canada. Each man has practical mill experience and is backed by the industry's most experienced engineers and technical specialists. Ferro products are available promptly from plants and warehouses throughout North America.
FERRO
ENGINEERING
FULL LINE HOT TOPPING SERVICE

IRON ORE

Eveleth Taconite Pellets

Silver Bay Taconite Pellets



FE004117

Pellets

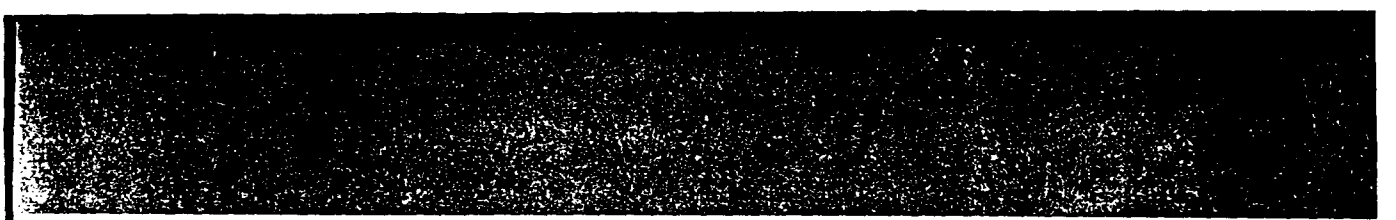
Eveleth Pellets Yield Premium Burden

OPERATING COMPANY: Eveleth Taconite Company
OWNED BY: Ford Motor Company and
Oglebay Norton Company
LOCATION: Eveleth, Minnesota
SHIPPING POINT: Rail: Fairlane, Minnesota
Vessel: DM & IR Dock,
Duluth, Minnesota
CAPACITY: 2,000,000 G.T. Annually

OGLEBAY NORTON COMPANY, MANAGING AGENT



Fairlane Plant—Eveleth Taconite Company



Expected Analysis 1972	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	L.O.I.	Moisture
Natural	64.00%	.015	5.50	.12	.33	.39	.35	.003	—	2.00
Dried at 212°F	65.30%	.015	5.61	.12	.34	.40	.36	.003	—	—

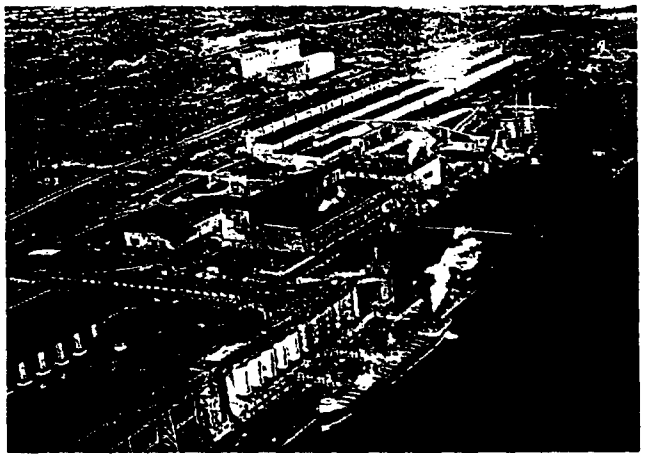
FE004119

Pellets

Prime Quality Silver Bay Pellets

OPERATING COMPANY: Reserve Mining Company
OWNED BY: Armco Steel Corporation and
Republic Steel Corporation
LOCATION: Silver Bay, Minnesota
SHIPPING POINT: Vessel: Silver Bay, Minnesota
CAPACITY: 10,500,000 G.T. Annually

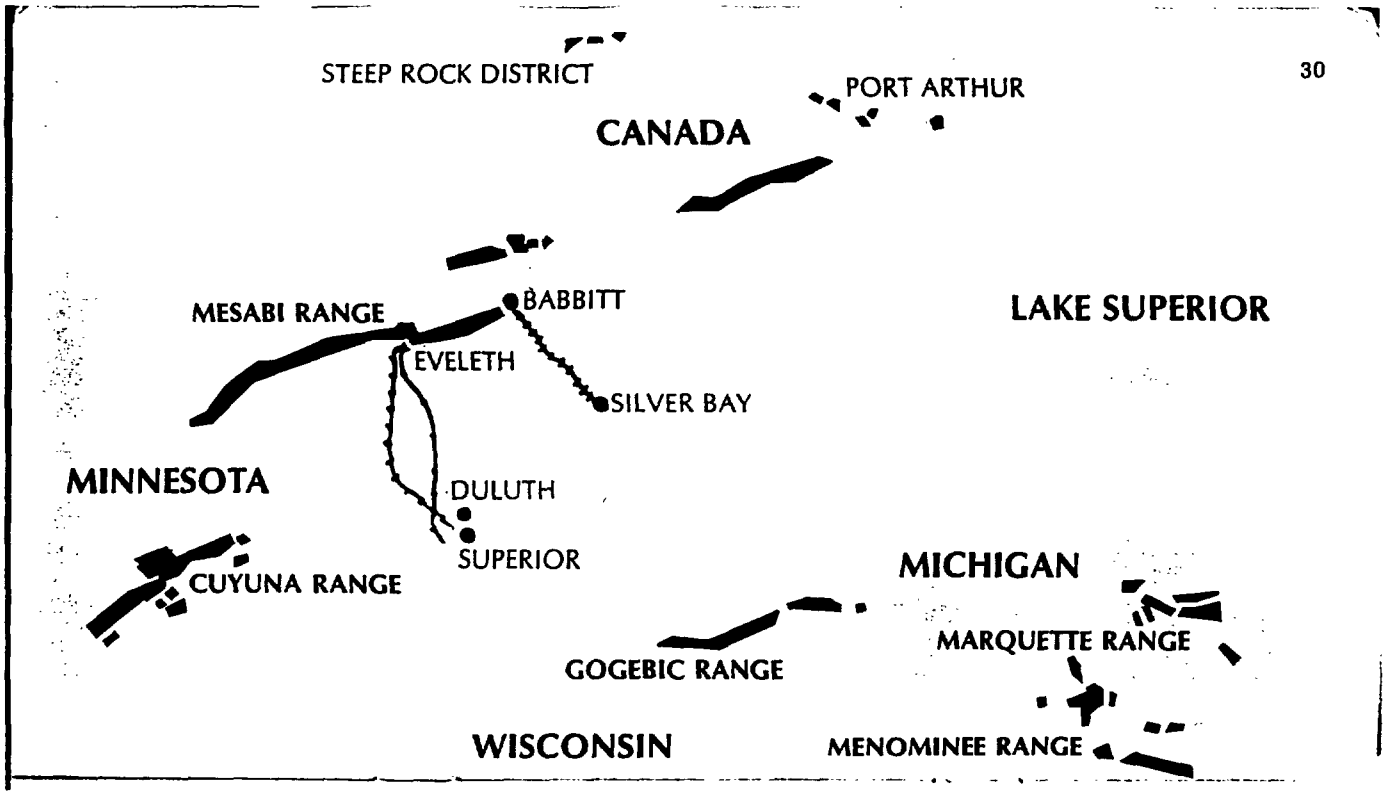
OGLEBAY NORTON COMPANY, SALES AGENT
FOR ARMCO AND REPUBLIC



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

Expected Analysis 1972	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magn.	Sul.	L.O.I.	Moisture
Natural	60.625%	.025	8.58	.22	.46	.44	.47	.003	—	3.00
Dried at 212°F	62.50%	.026	8.85	.23	.47	.45	.48	.003	—	—

FE004121


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

FE004122



IRON ORE RAIL AND VESSEL RATES

Imported Iron Ore — Freight Rates (All rates gross tons unless noted)
Rates in effect as of January 1, 1972 (Ex Parte 267-B Level)

	FROM:			
	Baltimore, Maryland	Philadelphia, Pennsylvania	Hampton Roads, Virginia	Fairless, Pennsylvania
Bethlehem, Pa.	$3.92	$2.76		
Buffalo, N. Y.	5.45	5.45		
Chicago District	8.43	8.43	$8.43	$8.43
Cleveland, Ohio	5.79	5.79	7.94	
Detroit District	6.80	6.80	6.80	
Donora, Pa.	4.92	4.92		4.92
Fairless, Pa.	3.92	2.45		
Johnstown, Pa.	4.76	4.76		4.76
Middletown, O.	6.07	6.07	6.07	
Pittsburgh District	5.10	5.10	7.64	5.10
Sault Ste. Marie, Ont.	11.51	11.51	11.05	
Sparrows Point, Md.	2.43	3.91		
Weirton & Wheeling, W. Va.	5.36	5.36		
Youngstown District	5.45	5.45	7.94	5.45

BASE PRICES Lake Superior Iron Ores **Per Gross Ton of 51.50% Iron Natural 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

1971

OLD RANGE		MESABI	
Bessemer	$11.57	Bessemer	$11.32
Non-Bessemer	11.42	Non-Bessemer	11.17
Coarse Ore		$ .80 premium	
Fines		.45 allowance	

PELLETS

Per Natural Iron Unit	
1962-1969	$.252
1970	.266
1971	.280

FE004125

Shipping Rates—Lake Superior Iron Ore

Cost per gross ton for transporting iron ore from point of origin to point of consumption.
Rates in effect as of January 1, 1972 (Ex Parte 267-B Level)

Range	Loading Port	Single Car Rail Rate	Car to Hold of Vessel	Vessel Movement	Vessel Rate	LAKE ERIE PORTS TO:	Single Car Rate (5) Prior Rail Haul	Single Car Rate (5) No Prior Rail Haul
Cuyuna	Duluth, Superior			Lower Lake		Valleys District, Canton & Massillon	$2.86	$2.94
Mesabi	Duluth, Superior	$1.83(1)	$0.26	Ports	$2.25	Midland, Steubenville, Weirton & Neville Island	3.27	3.35
Vermilion	Two Harbors					Pittsburgh and Wheeling Districts	3.75	3.81
Steep Rock	Thunder Bay	(4) Can.		Lower Lake Ports	2.22	Monessen, Pa.	3.91	3.99
						Johnstown, Pa.	4.12	4.21
Eastern Marquette				Lower Lake		TOLEDO TO: Hamilton &		
Western Marquette	Marquette	.93(2)		Ports	2.02	Middletown, Ohio	3.07(6)	3.16(6)
						Ashland, Ky. and Portsmouth, Ohio	4.01(7)	4.07(7)

Marquette	Escanaba	1.70(3)	0.25	Lake Erie Ports	1.69		
Menominee				Lake Mich. Ports	1.35	CHICAGO TO: Granite City, Ill.	3.60

Dock Handling Charges — At Lower Lake Ports

(A) Hold to Rail of Vessel	$0.30
(B) Rail of Vessel to Car	.35
(C) Rail of Vessel to Stockpile	.72
(D) Stockpile to Car	.46
(E) Storage per Month	.02½

(1) $1.81 Volume Rate — Thunderbird via Fairlane, dumping included to Duluth & Superior.

(2) Dumping charge included. Pellet rate is $0.87 G.T.

(3) Pellet line haul $0.95 and pellet dumping is included.

(4) $1.67 G.T. to $2.27 G.T. — Varies with volume shipped and dumping charge included.

(5) Rate Reduction of between $0.26 and $0.28 on 10,000 G.T. trainloads.

(6) From Cleveland and Lorain — Rates are $4.01 G.T. and $4.07 G.T.

(7) From Ashtabula rates are $4.42 G.T. and $4.49 G.T.

FE004127

All-Rail Rates—To Consuming Districts

Rates in effect as of January 1, 1972 (Ex Parte 267-B Level)

From Mesabi and Vermilion Ranges To:

Valleys District	$12.68
Cleveland, Lorain, Canton and Massillon	12.68
Pittsburgh and Wheeling District	13.25
Johnstown, Pa.	13.54
Chicago, Ill.	5.41(B)

From Marquette, Gogebic, and Menominee Ranges To:

Cleveland, Lorain, Valleys District, Canton and Massillon	10.05
Pittsburgh District	10.86
Weirton and Wheeling District	10.47
Johnstown, Pa.	11.17
Chicago District	5.41(A)

From Fillmore County, Minn., To:

Chicago District	3.84(A)
Granite City	4.44(A)

From Gogebic To:

Granite City, Ill.	$ 5.41(A)
East St. Louis, Ill.	5.41(C)

From Negaunee, Mich., To:

Hamilton and Welland, Ont., Canada	10.01

From Marquette Range To:

Detroit, Mich.	5.48(C)
Mingo Jct., Ohio	7.95(D)

From Negaunee, Mich., To:

Sault Ste. Marie, Ont., Canada	4.82

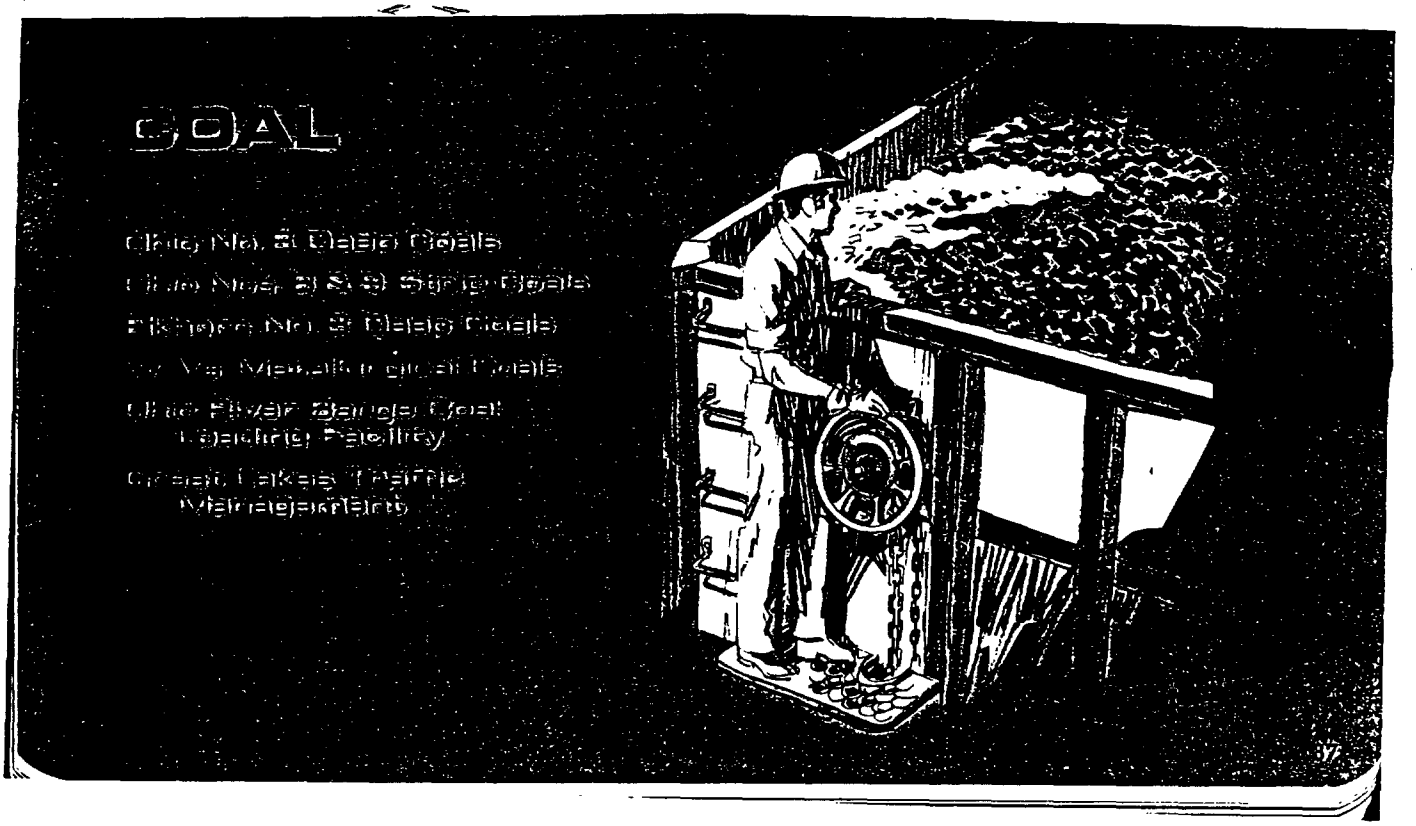
From Mesabi Range To:

Duluth, Minn.	2.08

From Cuyuna, Marquette, and Menominee Ranges To:

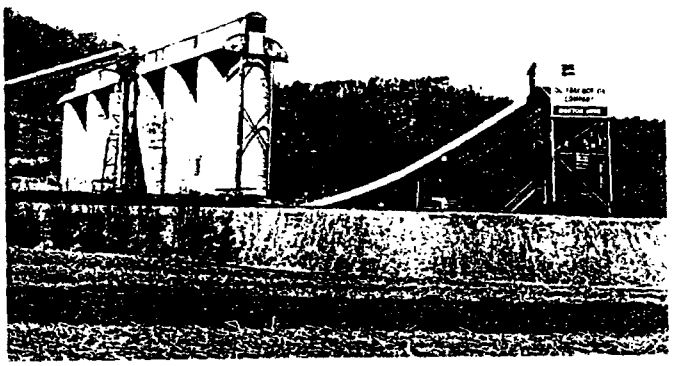
Granite City and East St. Louis, Ill.	5.41(A)

(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 6,000 ton minimum shipments, based on annual tonnage.
(C) Rate applicable only in lots of 25 or more cars on one B/L; single car rate is higher.
(D) Rate applicable only in lots of 6,000 ton minimum shipments from Eagle Mills and Republic Mines, Mich.



FE004129

Steam Coal – Norton #3 Mine
Ohio No. 8 Seam



Norton features fast unit-train loading.

Ohio No. 8 Seam

Steam Coal

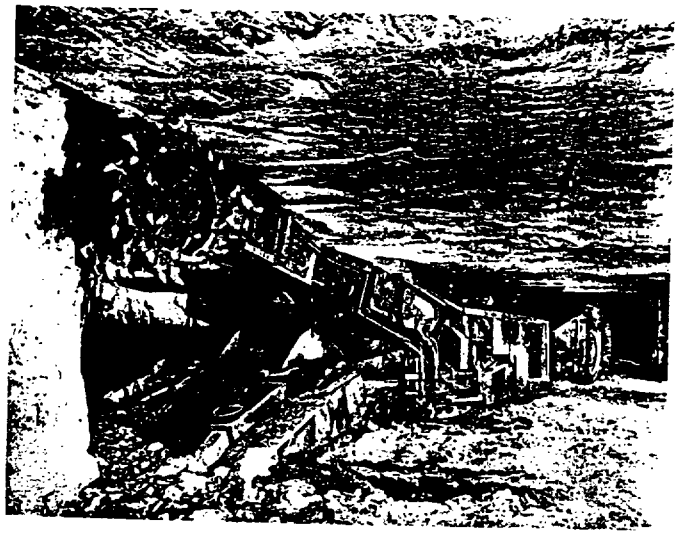
Name of Mine ..... Norton No. 3 (Deep)
Shipping Point ..... Onco, Ohio
District ..... No. 4
Seam ..... Pittsburgh, Ohio No. 8
Railroad ..... P/C
County ..... Belmont
Daily Production ..... 5,000 N.T.
Preparation Equipment ..... Davis Heavy Media Washery, Stoker Dryer and Slack Dryer, Crusher, Vibrator and Shaker Screens, Storage Bins, Loading Facilities, Loading Booms, Freeze Proofing, Oil Treating
Owned & Operated By ..... 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.

FE004131

Steam Coal – Saginaw Mine
Ohio No. 8 Seam



Saginaw is automated from mine face to carloading.

Ohio No. 8 Seam

Steam Coal

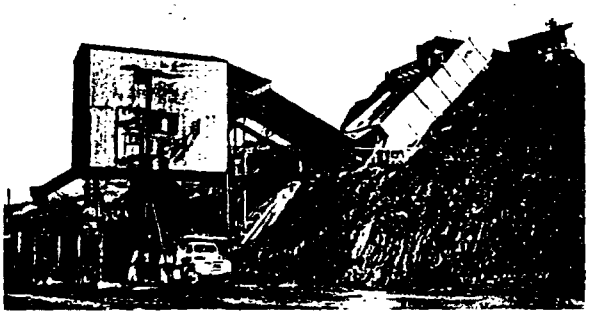
Name of Mine ..... Saginaw (Deep)
Shipping Point ..... St. Clairsville, Ohio
District ..... No. 4
Seam ..... Pittsburgh, Ohio No. 8
Railroad ..... N. & W.
County ..... Belmont
Daily Production ..... 4,000 N.T.
Preparation Equipment ..... Davis Heavy Media Washery, Stoker Dryer and Slack Dryer, Crusher,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

FE004133

Steam Coal – Rice #1 Mine
Ohio No. 9 Seam



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
Owned & Operated By ..... R. & F. Coal Company
Sales Agent ..... 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
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

FE004135

Steam Coal—Rice #2 Mine
Ohio Nos. 8 & 9 Seams



Dragline removing overburden at Rice #2.

FE004136

Ohio Nos. 8 & 9 Seams

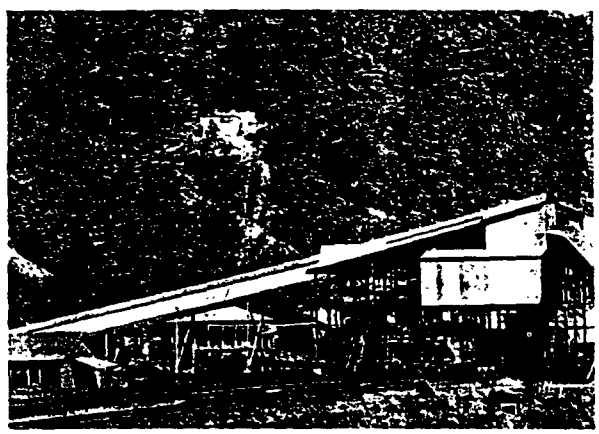
Steam Coal

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

FE004137

Steam Coal– Sapphire Mine
Elkhorn No. 3 Seam



Sapphire employs ample storage and loading facilities.

Elkhorn No. 3 Seam

Steam 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
Owned & Operated By ..... Elkhorn & Jellico Coal Company
Sales Agent ..... 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
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

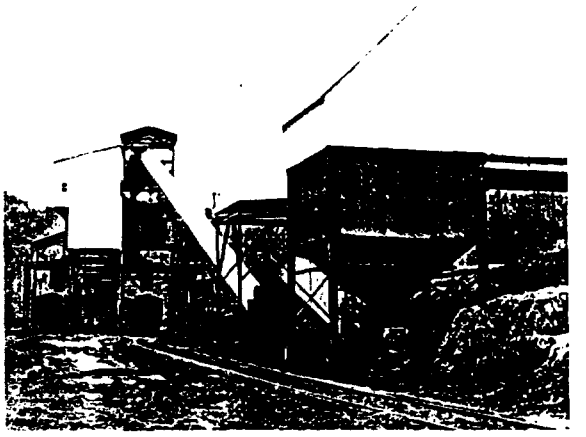
FE004139

Metallurgical Coal

Laxare Mine

Cedar Grove Seam

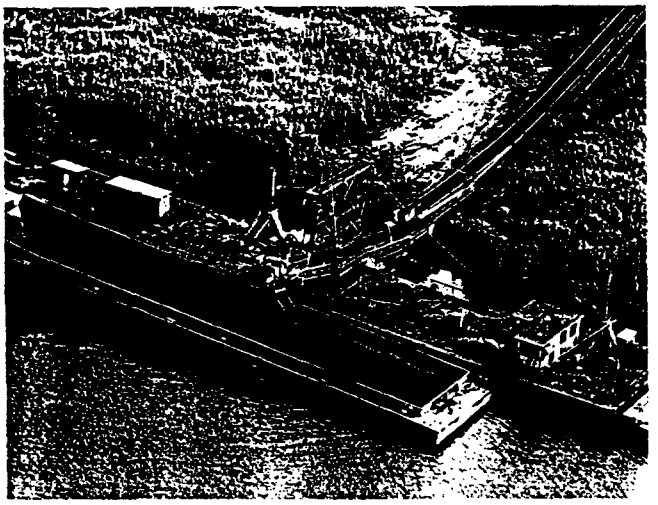
Name of Mine	Laxare
Shipping Point	Peytona, W. Va.
District	No. 8
Seam	Cedar Grove
Railroad	C & O
County	Boone
Daily Production	2,000 N.T.
Preparation Equipment	Heavy Media Washery
Operating Company	Laxare, Inc.
Sales Agent	Oglebay Norton Company



Coal-Washing Facility — Laxare.

Barge Coal Loading Facility

Ceredo Dock—On The Ohio River



Barge Loading Dock — Ceredo.

Name of Dock	Ceredo
Railroads Serving Dock	C & O — N & W Rwys.
Shipment	Barge via Ohio River
Location	Ceredo, Wayne Co., W. Va.
Daily Cap. River Loading	24,000 Tons
Type Dust Treatment	Oil Spray
Owned & Operated By	Oglebay Norton Company

Lake Forwarding

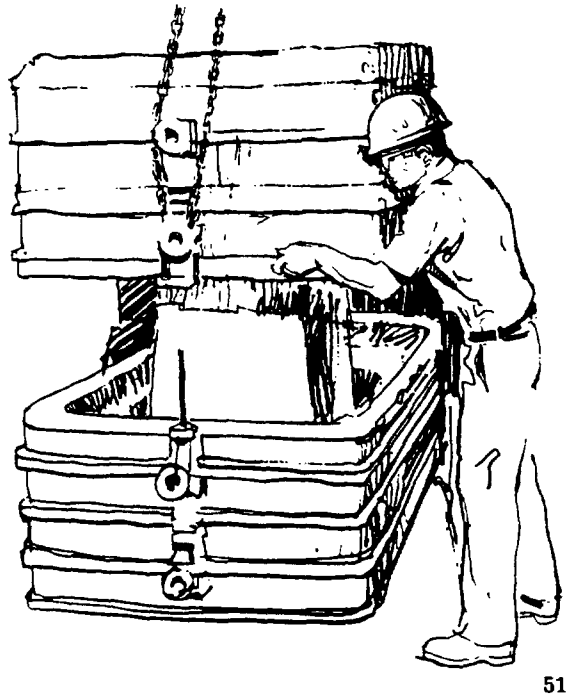
Highly Specialized Traffic Management

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.

CASTINGS

Machine Tool
Dies, Jigs and Fixtures
Machinery, Flywheels and Gears



51

FE004143

New equipment and techniques are used to produce chemically bonded sand cores and molds for the production of superior castings.



Quality Gray and Ductile Iron 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 offers a wide range of high-tensile iron, semi-steel, and ductile iron castings. Beginning with a base 35,000 psi. tensile strength

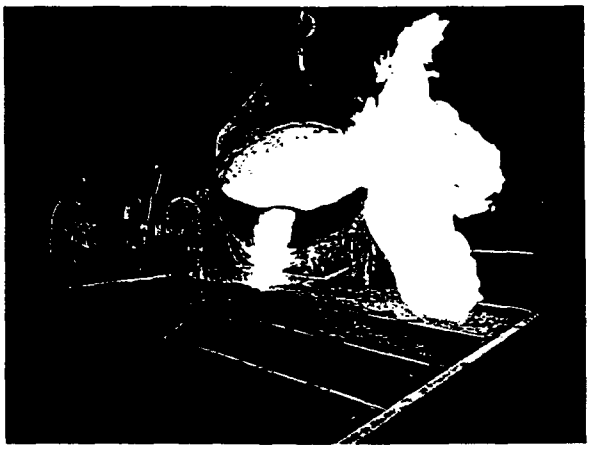
iron, and the addition of alloys, tensiles up to 55,000 psi. can be achieved, along with heat resistant and non-corrosive semi-steel iron. Ductile iron with tensile strength up to 100,000 psi., or up to 18% elongation, is also available.

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.



Melting and pollution control equipment.

FE004145



Large mold being poured off.

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. Molding facilities are now all no-bake, which assures close tolerances on all castings and gives dimensional stability heretofore impossible.

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

FE004146


DOCKS
Toledo, Ohio
Saginaw, Michigan
Bay City, Michigan
South Chicago, Illinois
55

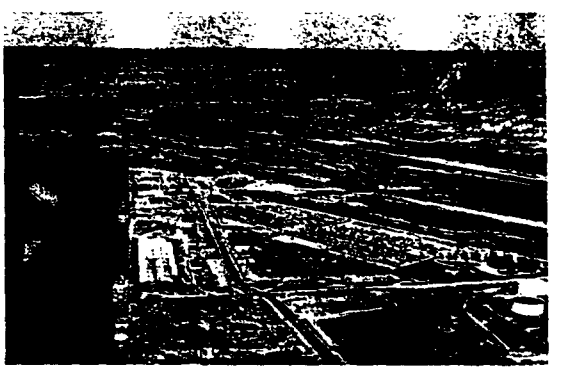
FE004147

Import/Export Center Of The Great Lakes

Toledo Overseas Terminals CO.

Data

Dock Length, Steel Bulkheading ..... 3,500 ft.
Depth Alongside Dock ..... 27 ft.
Number of Berths 7
Number of Warehouses 2
Covered Storage ..... 160,000 sq. ft.
Open Storage ..... 34 Acres
Dock Surface ..... Blacktop
One Traveling Heavy-Lift Crane ... 110-Ton Capacity
One Traveling Heavy-Lift Crane .... 72-Ton Capacity
Four Traveling Gantries ..... 25-Ton Capacity
Railroad ..... C&O
(Direct connection via Belt Line with six (6) mainline railroads.)
Turnpikes I-75, I-280
(Located within two and one-half miles (2½) of I-75 and I-280 linking Toledo with Detroit and the Ohio Turnpike.)
Operating Company . Toledo Overseas Terminals CO.
Wholly Owned By ..... Oglebay Norton Company



Toledo Overseas Terminals' tug-free facility at the mouth of the Maumee River.

Adjoins Foreign Free Trade Center offering 63,000 square feet of duty-free, tax-free covered storage and an additional 200,000 square feet of covered storage space.
Mailing Address ..... 3319 St. Lawrence Drive
Toledo, Ohio 43605
Telephone ..... (419) 726-2605
Cable ..... TOTCO

Contact Capt. W. R. Fulshaw, Terminal Superintendent, in Toledo for schedule, rates and other information.

FE004148

Open Storage Scrap Dock

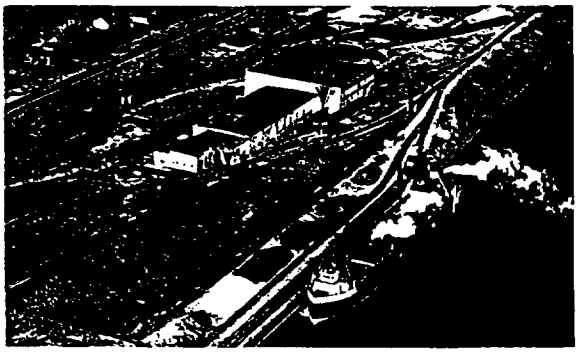
Saginaw Dock

Data

Dock Length ..... 2,355 ft.
Depth Alongside Dock ..... 22 ft.
Steel Bulkheading ..... 550 ft.
Number of Warehouses 1
Three Diesel Electric
Locomotive Cranes ..... 40-Ton Capacity
Open Storage ..... 24 Acres
Railroads ..... C&O, GTW, Penn Central
Highways ..... U. S. Rts. 10, 23, I-75
Dock Surface ..... Gravel
Telephone ..... (517) 755-0495
Mailing Address ..... P. O. Box 1471
Saginaw, Michigan 48605
Owned & Operated By ... Oglebay Norton Company

Contact Dock Traffic Manager for rates and other information.

Saginaw Dock's excellent open storage facilities.



FE004149

Modern Dock, Warehouse and Terminal Facility

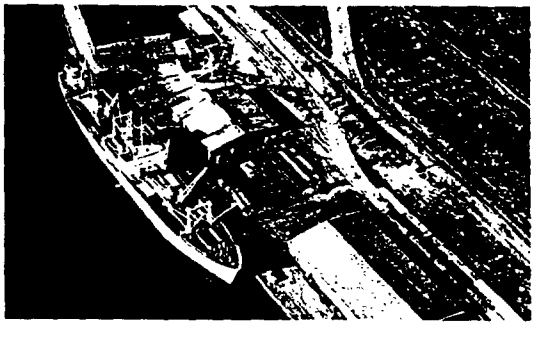
Bay City Seaway Terminal

Data

Dock Length	1,100 ft.
Depth Alongside Dock	24 ft.
Steel Bulkheading	1,000 ft.
Number of Warehouses	3
Covered Storage	41,200 sq. ft.
Open Storage	Some Available
Railroads	C&O, D&M, Penn Central
Highways	U. S. Rts. 10, 23, 25, I-75
Dock Surface	Blacktop
Telephone	(517) 684-3738
Mailing Address	Box "N" Bay City, Michigan 48706
Owned & Operated By	Oglebay Norton Company

Contact Dock Superintendent for schedules, rates and other information.

Bay City Seaway Terminal serves the Orient, Europe, South America and the Mediterranean with high speed handling of bulk and general cargo.



Storage Dock at South Chicago
Gateway To The Mississippi
Western Navigation Company



Western Navigation Company's dock located on the Calumet River three miles from Lake Michigan.

Data

Number of Warehouses 1
Covered Storage ..... 11,200 sq. ft.
Open Storage ..... 25 Acres
Railroads ..... P/C, I.H.B.
Steel Bulkheading ..... 1,000 ft.
Dock Surface ..... Slag
Telephone ..... (312) 321-0150
Mailing Address ..... 1 E. Wacker Dr.
Chicago, Ill. 60601
Operating Company .. Western Navigation Company

Contact Dock Operations Manager for rates and other information.

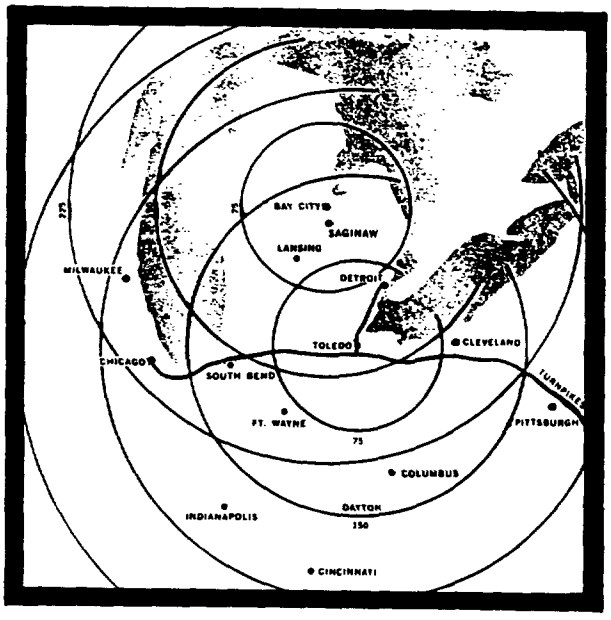
Distance to Principal Ports

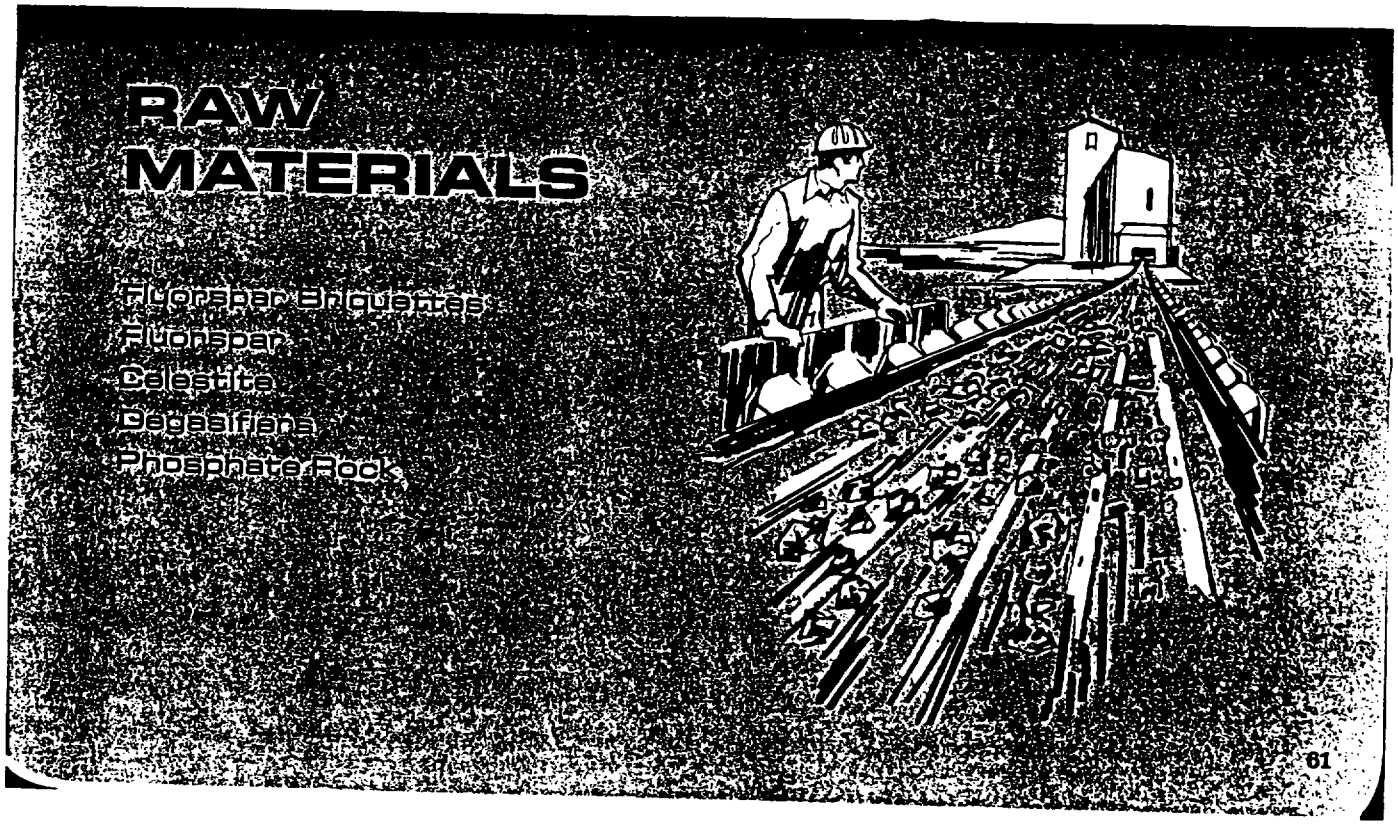
These are all water distances, only. For total distance add land mileage. In most cases the total distance traveled will be less via Toledo, Bay City, or Saginaw. All water transportation from these three ports provides additional savings.

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




RAW MATERIALS
Fluorspar Briquettes
Fluorspar
Celestite
Pegasitrana
Phosphate Rock
61

FE004153

Fluorspar Briquettes

ONCO Brand



Storage Silo — ONCO Briquetting Plant.

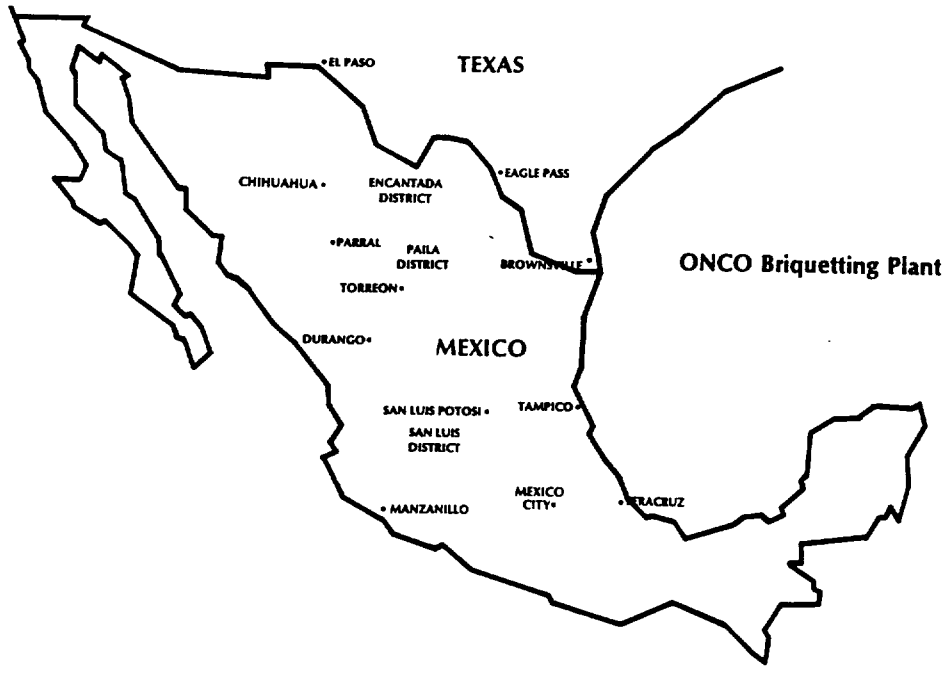
Owned & Operated By ... Oglebay Norton Company
Location ..... Brownsville, Texas
Shipping Point: Rail, Barge, Ocean Vessel, Lake Vessel } Brownsville, Texas
Capacity ..... 35,000 N.T. Annually
Packaging ..... Bulk

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

*Also Available 80 or 60 Effective Units.

Size

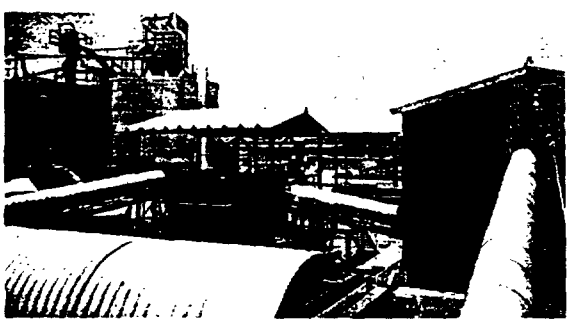
Briquettes approximately 2 inches by 1⅜ inches by ⅝ inch.



ONCO Briquetting Plant

FE004155

Ceramic Fluorspar—Parspar Brand



Modern facilities for storage and handling.

Owned & Operated By ..... Asarco Mexicana, S. A.
Location ..... Parral, Chihuahua, Mexico
Shipping Point: Rail: via ..... El Paso, Texas
Eagle Pass, Texas
Brownsville, Texas
Capacity ..... 80,000 N.T. Annually
Packaging ..... Bulk

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

OGLEBAY NORTON COMPANY, DISTRIBUTOR

Ceramic Fluorspar—ONCO Brand

Owned & Operated By . Reynolds Mining Corporation
Location ..... Eagle Pass, Texas
Shipping Point: Rail ..... Eagle Pass, Texas
Capacity ..... 100,000 N.T. Annually
Packaging ..... Bulk, Bags, Pallets



Reynolds Mining Corp. plant at Eagle Pass, Texas.

Typical Chemical Analysis

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

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

OGLEBAY NORTON COMPANY, DISTRIBUTOR

FE004157

Ceramic Fluorspar

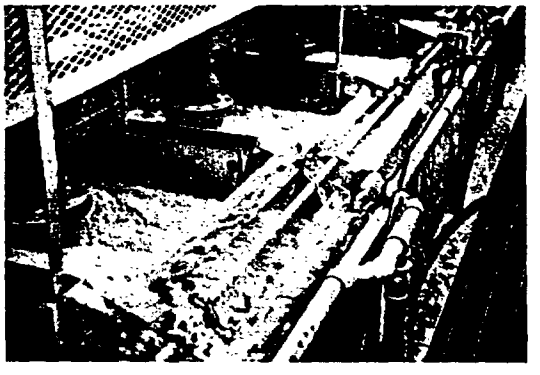
Illinois Brand

Owned & Operated By ..... The Minerva Company
Location ..... Eldorado, Illinois
Shipping Point: Rail, Truck — Junction, Illinois
Shipping Point: Barge — Cave-In-Rock, Illinois
Capacity ..... 75,000 N.T. Annually
Packaging ..... Bulk, Bags, Pallets

OGLEBAY NORTON COMPANY, DISTRIBUTOR

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

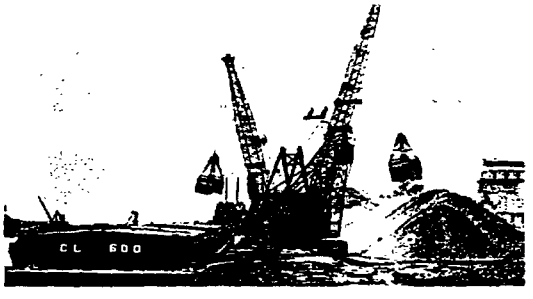


Flotation concentration of fluorspar.

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

Metallurgical Fluorspar—ONMEX Brand



Barge delivery of fluorspar at customer's plant.

Onmex is a natural-ore fluorspar from Mexico. 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.

Shipping Point: Rail, Barge, Lake Vessel, Ocean Vessel ..... Brownsville, Texas

Packaging ..... Bulk

OGLEBAY NORTON COMPANY, DISTRIBUTOR

Physical Analysis

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

Chemical Analysis

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

FE004159

Celestite (Strontium Sulphate)

This material is used in the manufacture of pyrotechnics and electrolytic zinc, as well as special grades of glass. It is a natural gravel imported from Mexico.

Shipping Point: Rail: via ..... El Paso, Texas
Eagle Pass, Texas
Brownsville, Texas
Packaging ..... Bulk, Bags, Palletized,
Custom Ground

Approximate Analysis

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

OGLEBAY NORTON COMPANY, DISTRIBUTOR

Degasifying Agents

Rim-Blox

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 Sales Representatives.

To assure handling ease and accurate measuring, Rim-Blox comes 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.

FE004161

Phosphate Rock—Tennessee or Florida Brand

	Florida Pebble	Tennessee Lump
Owned & Operated By	Mobil Chemical Company	M. C. West, Inc.
Location	Nichols, Florida	Columbia, Tennessee
Shipping Point	Nichols, Florida	Columbia, Tennessee
Packaging	Bulk	Bulk

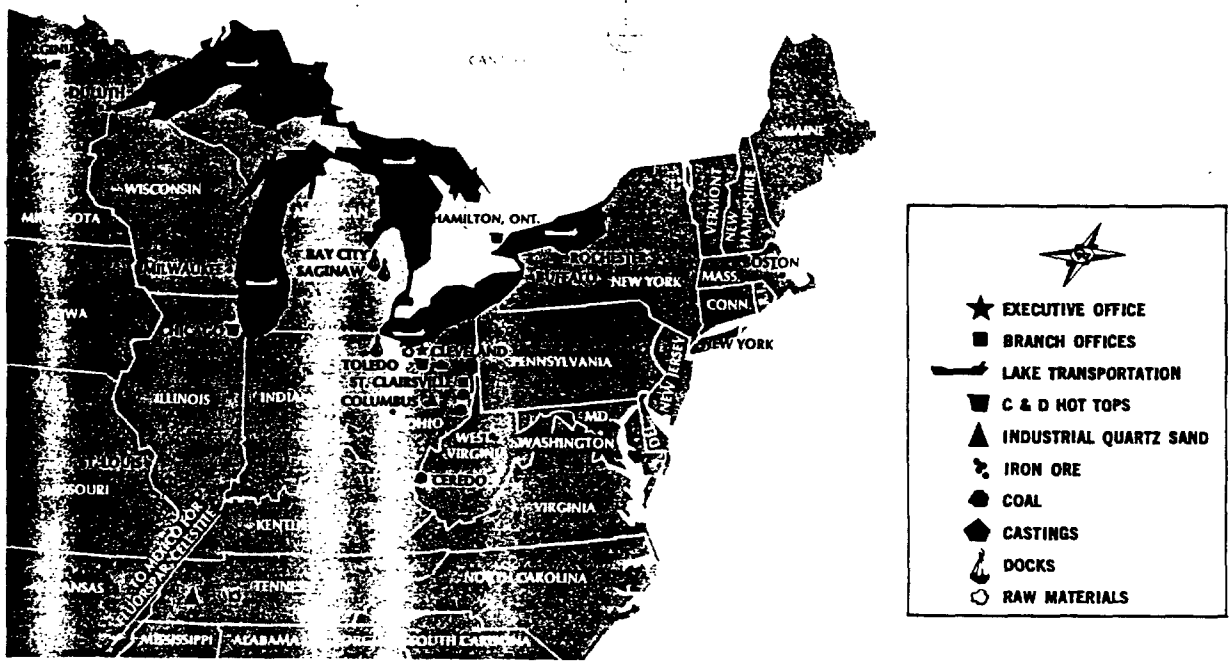
OGLEBAY NORTON COMPANY, DISTRIBUTOR

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


WISCONSIN
MILWAUKEE
BAY CITY
SAGINAW
HAMILTON, ONT.
NEW YORK
VERMONT
NEW HAMPSHIRE
MAINE
MASS.
CONN.
NEW YORK
TOLEDO
ST. CLAIRSVILLE
COLUMBUS
PENNSYLVANIA
ILLINOIS
INDIA
WEST VIRGINIA
WASHINGTON
CEREDO
VIRGINIA
KENTUCKY
TENNESSEE
NORTH CAROLINA
MISSISSIPPI
ALABAMA
SOUTH CAROLINA
EXECUTIVE OFFICE
BRANCH OFFICES
LAKE TRANSPORTATION
C & D HOT TOPS
INDUSTRIAL QUARTZ SAND
IRON ORE
COAL
CASTINGS
DOCKS
RAW MATERIALS

FE004163

FACILITIES, SERVICES AND PRODUCTS

EXECUTIVE OFFICE:
1200 Hanna Building, Cleveland, Ohio

BRANCH OFFICES:
Virginia, Minnesota;
St. Clairsville, Ohio

LAKE TRANSPORTATION:
Columbia Transportation Division, Cleveland, Ohio
(Fleet of 18 vessels)

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

INDUSTRIAL QUARTZ SAND:
The Central Silica Company, Zanesville, Ohio;
Millwood Sand Division, Howard, Ohio;
Ayers Mineral Division, Lexington, Tennessee

IRON ORE:
Eveleth Taconite Company, Eveleth, Minnesota;
Reserve Mining Company, Silver Bay, Minnesota

COAL:
Saginaw Mine, St. Clairsville, Ohio;
Norton Mine, Jacobsburg, Ohio;
Steam Coal from Ohio and Kentucky;
Metallurgical Coal from West Virginia

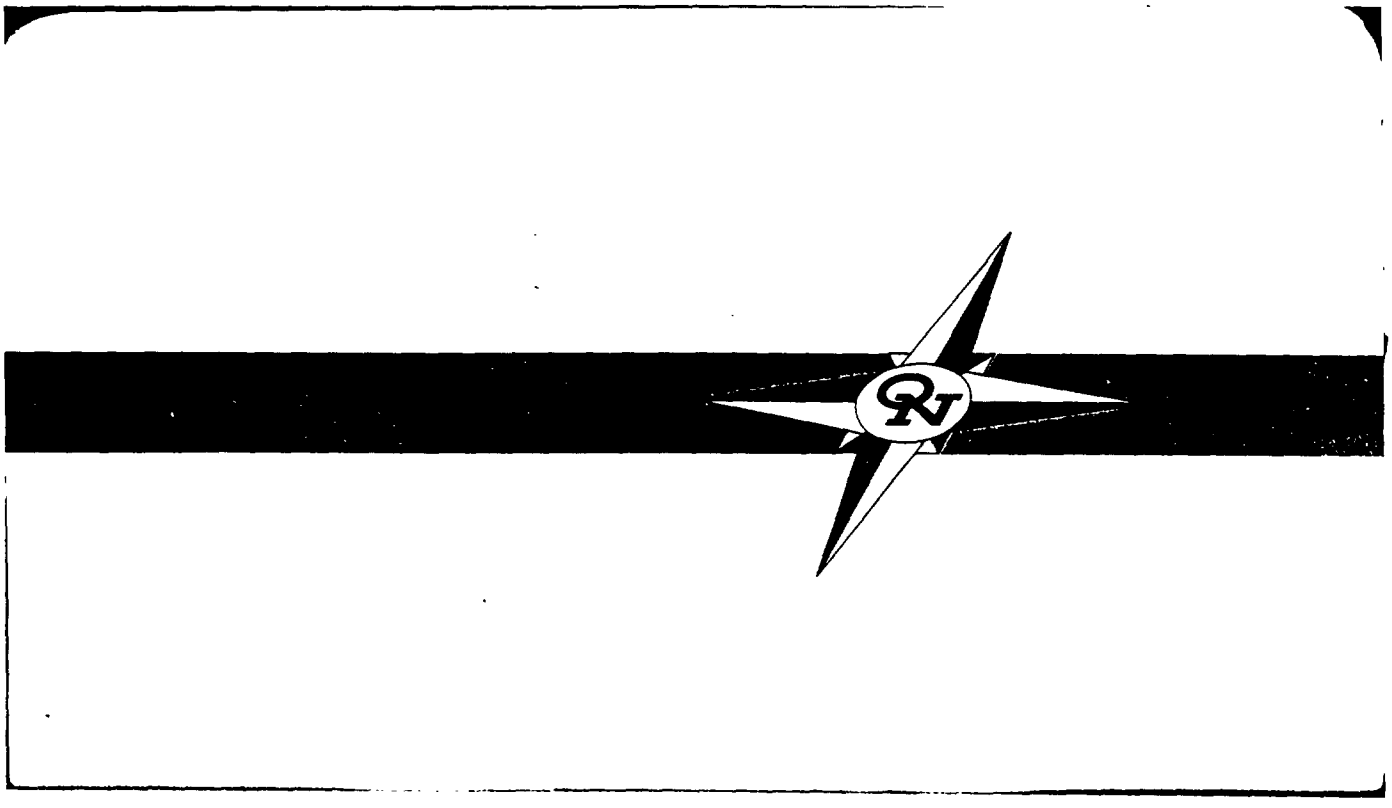
CASTINGS:
T&B Foundry Company, Cleveland, Ohio

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 from Cleveland, Ohio;
Phosphate Rock from Tennessee or Florida;
Manufacturing Facilities: Fluorspar Briquetting Plant, Brownsville, Texas

FE004164

NOTES



FE004166