

MICHIGAN MINERAL PRODUCERS 1978

TWELFTH
ANNUAL
DIRECTORY

MICHIGAN BRICK INC.

1979

DEPARTMENT OF NATURAL RESOURCES

GEOLOGICAL SURVEY DIVISION

COVER ILLUSTRATIONS

Mr. Donald E. Raymond of the Geological Survey Division Staff created the covers of this directory. This year the Michigan Brick, Inc., plant at Corunna is featured. The front cover shows part of the brick making plant site. The back cover depicts one of the bricks produced in the plant.

A short description of the brick manufacturing process is included in this booklet. The section covering clay and shale also lists the other producers of this commodity. A map showing the extent of the State's clay and shale resources follows the list of producers.

MICHIGAN MINERAL PRODUCERS

1978

GEOLOGICAL SURVEY DIVISION

ANNUAL DIRECTORY 12



By

Milton A. Gere, Jr.

STATE OF MICHIGAN
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DEPARTMENT OF NATURAL RESOURCES
Howard A. Tanner, *Director*
GEOLOGICAL SURVEY DIVISION
Arthur E. Slaughter, *Chief*
and *State Geologist*

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E. M. Laitala, Hancock, 1961
(Mrs.) Joan L. Wolfe, Belmont, 1973
Harry H. Whiteley, Rogers City, 1961
Carl T. Johnson, Cadillac, 1963
Charles G. Younglove, Allen Park, 1972
Dr. Jacob Hoefer, East Lansing, 1979
John M. Robertson, *Executive Assistant*

. . . the State Geological Survey shall make an annual report to the Governor, setting forth in detail the mineral statistics for the year; with the progress and development . . . mining and smelting industries.

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PREFACE

This edition, "Michigan Mineral Producers, 1978", is the twelfth annual directory of Michigan's Metallic and Nonmetallic mineral commodity producers. Included are the names and addresses of the producers, the locations of their operations as of the end of 1978, mineral commodity production and values for 1977, state owned gravel pit locations, and miscellaneous information. Listings are on a commodity basis by operator as well as cross referenced by county. Numerous location maps and historical production and value charts accompany the various commodity material.

Much of the material in this directory is based upon the 1977 annual canvass of the mineral producers by the U.S. Bureau of Mines (U.S.B.M.). Name and location updates were obtained from the U.S. Mine Safety and Health Administration (MSHA), either directly or via the U.S.B.M. Some information on new operations and locations was supplied by the Michigan Department of Transportation (MDOT).

The writer wishes to thank the many mineral producers for their cooperation in submitting the U.S. Bureau of Mines canvass forms and answering inquiries for information pertaining to their operations. Thanks are given to the U.S.B.M. for canvassing the mineral producers and providing the data collected. Special thanks are once again given to the U.S.B.M. State Liaison Office - Michigan, which was closed because of a program change at the end of September, 1979. The Liaison Office, through the former Michigan Liaison Officer, Mr. Edward C. Peterson, and the former Liaison Program Assistant, Ms. Esther A. Middlewood, provided much extra help in the early stages of completing this directory.

The Lansing and Marquette offices of the U.S. Mine Safety and Health Administration are to be thanked for updates on producer names and locations. The Michigan Department of Transportation's Testing and Research Division is to be thanked for additional update information too. The various updates supplied by these agencies help to keep the directory more accurate.

The writer is also indebted to the following persons from the Geological Survey Division and wishes to express his thanks: 1) Authors of previous editions for ideas and formats passed on; 2) Mr. Donald E. Raymond for designing the covers and updating the various maps and charts; 3) Mr. Harry O. Sorensen, Unit Supervisor and Mr. William A. Walden, Sub-unit Supervisor, both of the Mining and Economic Geology Unit, for their helpful suggestions; 4) Mrs. Lois A. Padgett, of the Mining and Economic Geology Unit, for typing the manuscript; and, 5) Various other personnel for their suggestions.

It is hoped that this edition will be useful to those persons interested in Michigan's vast resources of Minerals. Suggestions for additions, deletions, changes, or other improvements for future editions will be gratefully received.

Lansing, Michigan
December, 1979

Milton A. Gere, Jr., Geologist
Mining and Economic Geology Unit
Geological Survey Division

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INTRODUCTION

The diversity of Michigan's mineral commodity production includes 16 categories of metallic and nonmetallic minerals in addition to petroleum and natural gas. Nearly all 83 counties had some nonmetallic mineral production, and four counties produced metallic minerals in 1978. During the year there were 523 producers with over 771 metallic and non-metallic mineral operations around the State.

Employment in Michigan's mining industry exceeded 12,200 people in 1977, according to statistics from the Michigan Employment Security Commission. This employment figure does not include the large number of owner-operators involved in the mineral industry, nor does it include some processing phases, nor those people involved with the production of petroleum and natural gas. All of these people combined, produced slightly over 1½ billion dollars worth of materials in Michigan during 1977. The Office of Economic Development of the Michigan Department of Commerce rated Michigan's 1977 Gross State Product at \$84.68 billion. They estimated the amount attributed to mining to be \$0.72 billion, as compared to that for manufacturing being \$34.98 billion.

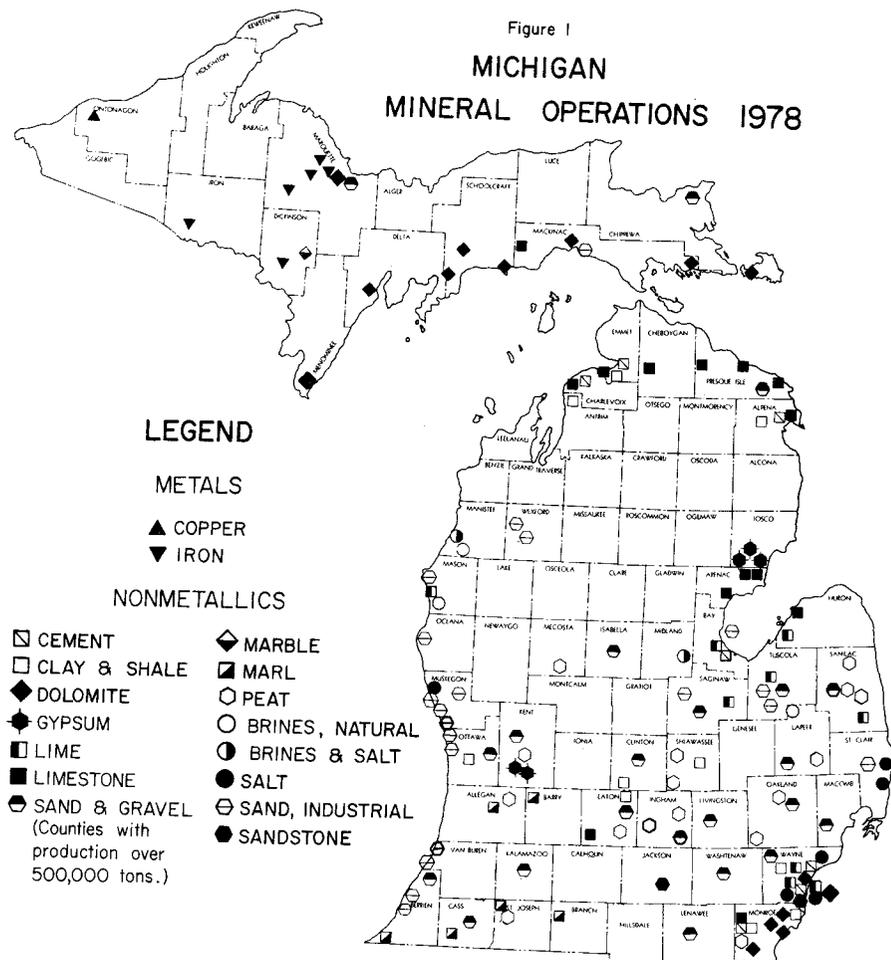
Michigan's mineral commodity production value during 1977 consisted of \$418,666,958 worth of metallic minerals, \$612,434,743 worth of nonmetallic minerals, and fuels valued at \$506,964,719, totaling \$1,538,066,420. The above categories represent 27.2%, 39.8%, and 32.9% of the total value, respectively.

The State's many Great Lakes ports play an important role in the interstate and international trade of mineral products. Some mineral commodities produced in Michigan are shipped out before being processed and some produced elsewhere are shipped in for processing, thus even more diversity is added to the State's total involvement with minerals. The U.S.B.M. has estimated in the past that the processing of raw minerals in Michigan results in products valued at about ten times the value of the State's extracted minerals themselves.

An additional demand for some of Michigan's minerals is created by rock and mineral collectors. Some of these minerals may not be the same as those sought after by industry, and their dollar value may be low, but a growing number of people are interested in their natural beauty and strive to collect them.

Anyone interested in Michigan's mineral commodities and various aspects of the geology of the State are invited to contact the Geological Survey Division offices. Many files of maps, well logs, and other materials of public record are available for office use. A list of the Units within the Division, and the Region and Field offices is located inside the back cover of this directory.

Figure 1
**MICHIGAN
MINERAL OPERATIONS 1978**



BRICK - A MODERN BUILDING PRODUCT

This edition of the Directory is featuring brick, a product made from one of Michigan's most widespread mineral commodities, clay and shale. Michigan Brick, Inc., is Michigan's only brick producer. Views of the plant and its product are featured on the covers of this booklet.

Apparently there were about 200 brick, tile and pottery plants in Michigan around the turn-of-the-century. In 1911 there were still 138 plants, and by 1949 the number was down to 15 plants. Now there is only one brick plant, one tile plant, and one flower pot plant left in the State. Also, five operations produce clay or shale for use in cement manufacturing.

Michigan Brick, Inc., is located at Corunna, in Shiawassee County. This company is the outgrowth of a brick plant started at Corunna in 1907. Somewhere over the years the production switched to tile and then back to bricks. Besides the Corunna, Michigan plant, Michigan Brick, Inc., has plants at Mansfield, Ohio; Sanford, Kentucky; Mineral Wells, and San Antonio, Texas. The parent company is Canada Brick, Ltd., of Toronto, Ontario, Canada.

The brick plant at Corunna underwent major changes and additions in the past three years and now has a production capacity of about 100 million bricks a year. Pennsylvanian age shale, with some sandstone, is mined from a quarry on the plant property and is trucked to the crusher. A new, automated, grinding plant crushes the rock, and stockpiles the ground material inside a large building. When raw material is needed, a scraper and conveyor system automatically moves the needed material into the two manufacturing buildings.

One of the two manufacturing buildings was built in the last ten or so years and had the latest equipment in it. The second manufacturing building was added three years ago and is even more modern and uses only about one-half of the fuel, per brick, as the older one. The newest plant is fully automated and requires no hand labor. The raw material enters the building on a conveyor belt where it is dumped into a mixing machine. Water and various additives are mixed with the clay to form a fairly stiff, dough-like material. This material is then extruded onto a conveyor belt in the general length and width shape of the final brick, but in an 8 or 10 foot long "blank". The blank moves along to another machine which, like a giant cheese slicer, cuts the "blank" into many bricks of equal thickness. Another machine stacks the green (raw clay) bricks in alternating layers on a specially shaped car. When the car is full it is moved to one of two holding rooms. The holding rooms help keep the green brick from drying too fast on the surface or undergoing temperature shock while waiting to enter one of the two dryers and kilns.

When the bricks enter the dryer they start on a nearly two day continuous trip through a tunnel of increasing temperature which dries the green brick completely. The brick car moves along and enters the natural gas fired kiln for another 40 plus hours. Here the bricks are raised in temperature until they reach 1950 degrees Fahrenheit. They are then slowly cooled until they are nearly room temperature as they leave the kiln tunnel. Each new kiln fires about 100,000 bricks a day, 365 days a year. The finished bricks are then moved to another area where machines stack the brick into 300 to 500 brick "cubes", strap them, and place them in a line for shipping.

The Corunna plant produces three sizes of building brick as well as their new, popular thin brick. The regular brick is made in 8 inch long face brick for building houses, etc., as well as the 10 inch king size and 12 inch utility size,

Brick - continued

both used for large buildings. The thin brick is only one-half inch thick, but when applied to a wall it looks like regular brick. This is popular for both inside and outside applications.

Brick from the Corunna plant is marketed in Michigan as well as parts of Ohio, Indiana, Illinois, and Southern Ontario. The distance to market is the controlling factor which keeps brick in a somewhat limited sales area. Bricks, like many other nonmetallic mineral commodities and products, are heavy and there comes a point at which shipping can cost as much as the product itself.

Instead of being considered the last of a formerly widespread industry, the modern brick plant at Corunna should be called the first in what could be a renewed industry in Michigan. The State's widespread resources of clay and shale may deserve more interest from industry in the future. A map showing the areas of clay and shale is included under the clay and shale commodity heading in this directory.

The writer is indebted to Mr. Ed Joy, Plant Manager of Michigan Brick, Inc., for guiding several of the Survey's staff through the modern brick operation and explaining the sequence of processes to us. His assistance in providing photographs and literature and reviewing this material is also appreciated.

Some miscellaneous facts about bricks from the Masonry Institute of Michigan.

Bricks have been used for about 10,000 years.

The Roman Coliseum was built of bricks in 70 A.D. and stood 158 feet high.

The first bricks to be brought to the U.S. came from Europe as ship ballast.

The first bricks made in the U.S. were manufactured at Jamestown, Virginia in 1612.

It is estimated that between 250 and 300 million bricks are used in Michigan each year.

The first U.S. patent on a brickmaking machine was issued in 1800. The first machines could make about 25,000 bricks per day. Now, some machines can make up to 300,000 per day.

Energy usage - it takes 1/12 pound of coal to produce 1 pound of brick, a finished product, while it takes 1 pound of coal to produce one pound of steel ingot, an unfinished product.

A brick wall, with insulation, is supposed to be the most heat efficient wall due to the mass factor. When combined with a glass outer wall, the brick-glass wall becomes an important part of a passive solar heating system.

HEALTH AND SAFETY FOR MINE, MILL AND ASSOCIATED WORKERS

A new feature in this edition is the inclusion of a designation of which agency, Federal or State, that has health and safety inspection responsibility over the various mining operations. The designation, F for Federal and S for State, is placed near the beginning of the company listings where they are all inspected by the same agency. Where companies are inspected by more than one agency, the designation is placed next to the company name. Some companies have functions which come under partial jurisdiction of both agencies, thus both designations are used.

These designations were placed in this edition of the directory at the request of the State and Federal agencies in charge of the inspections. While the Geological Survey Division of the Michigan Department of Natural Resources is not connected in any manner with these inspection agencies, it is hoped that this Directory will be a convenient manner for the Michigan Mineral Producers to recall which agency has inspection responsibility.

A local agreement for the State of Michigan for mine related health and safety inspections was approved by representatives of the North Central District Manager, Mine Safety and Health Administration (MSHA), the U.S. Department of Labor and Michigan Occupational Safety and Health Administration (MIOSHA), Michigan Department of Labor. In general, MSHA is to be considered as having inspection responsibility over all mining related worker health and safety, unless otherwise designated as being under MIOSHA.

MSHA inspection is handled by two offices in Michigan. The Lansing office takes care of most of the Lower Peninsula, while the Marquette office handles the Upper Peninsula and eight of the most northern counties of the Lower Peninsula. See the accompanying map.

MIOSHA has its main office in Lansing which is in charge of all of their state-wide programs.

If in doubt as to which agency has jurisdiction, one of the following officials should be contacted for clarification.

MSHA-Thomas E. Anderson, Supervisory Metal and Nonmetal Mine Inspector, MSHA/U.S. Department of Labor, 300 E. Michigan Ave., Room 305, Lansing, Michigan 48933 - Telephone 517/372-1910, extension 692 (Starting March 1, 1980, - 517/377-1751).

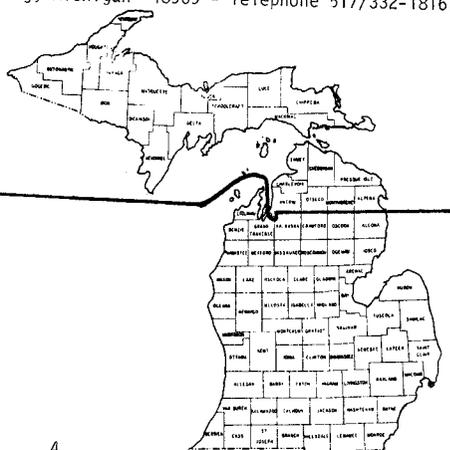
MSHA-William Carlson, Supervisory Mining Engineer, MSHA/U.S. Department of Labor, 309 S. Front Street, Marquette, Michigan 49855 - Telephone 906/228-6805.

MIOSHA-William H. Sebring, Deputy Director, MIOSHA Enforcement Administration, Michigan Department of Labor, Bureau of Safety and Regulation, State Secondary Complex, 7150 Harris Drive, Box 30015, Lansing, Michigan 48909 - Telephone 517/332-1816.

MSHA areas

MSHA Marquette office area

MSHA Lansing office area



MINERAL PRODUCTION STATISTICS

Background

Michigan mineral production statistics have been officially kept for 101 years. Act 9 of Public Acts of 1877, as amended, was entitled "An act to authorize the appointment of a commissioner of mineral statistics..." Among the duties listed is the following, known as Sec. 5, "Said commissioner is hereby authorized to demand, and it shall be the duty of all corporations or individuals engaged in mining to make such reports under oath, as to product and other matters as shall be required by him on blanks to be furnished by said commissioner for that purpose".

The Commissioner of Mineral Statistics office was abolished and the duties transferred to the Board of Geological Survey by Act 7 of P.A. 1911, as amended. Then Act 17 of P.A. 1921, as amended, transferred the duties of the Board of Geological Survey to the Department of Conservation wherein the Geological Survey Division was formed. Act 380 of P.A. 1965, as amended, known as the Executive Organization Act, changed the name of the Department of Conservation to the Department of Natural Resources (DNR). Thus, the original "commissioner" duties now lie within the DNR.

For the last number of years the Geological Survey Division, DNR, has had a memorandum of understanding with the U.S. Bureau of Mines in which the U.S.B.M. gives the Geological Survey Division copies of the mineral production data which it gathers during its annual canvass of the mineral industry. It is now from this canvass that the state receives most of its mineral production and value data. Copper and iron ore data is collected separately by the Geological Survey Division for tax purposes. Petroleum and natural gas figures are reported directly, and indirectly, to the Geological Survey Division's Production Proration Unit for proration and statistical purposes.

The publication of Michigan mineral statistics is done in several ways. A very brief summary sheet of production and value data is printed in the Annual Directory, such as this publication, but the data is for the year previous to the Directory listing. Also in the directory are a number of historical production and value charts for various commodities and all commodities combined.

A detailed booklet containing yearly mineral statistical data, mineral commodity and industry information is entitled "The Mineral Industry of Michigan". This is a preprint from the annual "U.S. Bureau of Mines Minerals Yearbook". Under a memorandum of understanding between the Geological Survey Division and the U.S. Bureau of Mines, the Geological Survey Division attaches a cover and preface to this "U.S.B.M. Minerals Yearbook" chapter and offers it as the Geological Survey Division's "Annual Statistical Summary" for the minerals industry.

Yearly statistics for Michigan's petroleum and natural gas exploration and production are published as another Geological Survey Division Annual Statistical Summary entitled "Michigan's Oil and Gas Fields". This booklet is compiled by the Petroleum Geology Unit of the Geological Survey Division and is available for \$2.00 per copy.

An additional U.S.B.M. publication which also includes some statistical data is "Minerals in the Economy of Michigan". This annual booklet was first published in 1978.

A yearly release of statistical data for iron is produced by the Geological Survey Division as a three page specialty. The title is "General Statistics Covering Production of Michigan Iron Mines". Historical production of iron through 1974 is reported in the Geological Survey Division's Circular 12, "One Thousand Million Tons", by R. C. Reed, 1975, which is sold for 50 cents per copy.

Geological Survey Division publications are available from the following address: Michigan DNR, Information Services Center, Box 30028, Lansing, MI 48909. The Center is located on the 7th floor of the Stevens T. Mason Building and is open for over-the-counter sales. Sales within Michigan are subject to 4% sales tax. Payment must accompany all mail orders and should be payable to the "State of Michigan".

MINERAL PRODUCTION STATISTICS (Cont'd.)

Information about U.S. Bureau of Mines publications is available from the U.S. Bureau of Mines, Branch of Publications Distribution, 4800 Forbes Avenue, Pittsburgh, PA 15213.

Current Production Data

As of the end of 1978 there were 523 metallic and nonmetallic mineral commodity producers with at least 771 operations in Michigan. We assume more than the 771 operations existed because numerous sand and gravel operators use portable equipment and operate out of several locations in a year's time. Not all of these locations get reported to us. Table 1 lists the number of producers and operations by commodity.

TABLE 1 NUMBER OF PRODUCERS AND OPERATIONS BY COMMODITY - 1978

Commodity Produced	Number of Producers	Number of Operations or Pits
Copper	1	1
Iron	3 (1-closed 7/78)	6 (1-closed 7/78)
Clay and Shale	8	9
Gypsum	5	9 (quarries + separate mills)
Marl	6	7
Natural Brines	4	5
Peat	14	17
Salt	8	9
Sand and Gravel		
Construction	414	622+
Industrial	15	27
Stone		
Limestone and Dolomite	25	35
Miscellaneous Stone	1	1
Sandstone	3	4
Cement	8	8
Lime	6	9
Sulfur	2 (refineries)	2
Total	523	771+

The 1977 Production and Value is shown by Table 2. Our figures and those of the U.S. Bureau of Mines may not be the same due to using different categories and criteria.

Historical mineral value information for the years 1910 to 1977 is illustrated by Figure 2. Fuels, Metallic Minerals, Nonmetallic Minerals, and Total values are shown. The 1977 mineral commodity value and rank for each county is included in Table 3. Since the county ranking is based upon dollar values, those counties producing crude oil and natural gas may not have their true production values shown.

The county values for crude oil and natural gas are based upon average values per barrel and thousand cubic feet (M.C.F.), respectively, multiplied by the production figures published in "Michigan's Oil and Gas Fields, 1977". The oil values shown may differ from actual values because crude oil prices depend upon whether the well is classified as "old oil", "new oil", "stripper oil", and "sweet" or "sour" oil. The gas values may differ because the price paid for gas at the wellhead depends upon individual contract agreements and the B.T.U. content of the gas. Thus, counties with large quantities of oil and gas production may in reality have a higher or lower mineral production value and ranking than shown here.

The map in Figure 3 shows 1977 county mineral production value as to category of Fuels, Metallic Minerals, and Nonmetallic Minerals. As mentioned in the Introduction, the 1977 value of Fuels was \$506,964,719, Metallic Minerals \$418,666,958, Nonmetallic Minerals \$612,434,743, and the total value was \$1,538,066,420.

TABLE 2

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

GEOLOGICAL SURVEY DIVISION

Based Upon U.S.B.M. & Company Data

MINERAL COMMODITY	UNIT	-1977-		PERCENT CHANGE from 1976 in QUANTITY/VALUE	U.S.B.M. RANK IN VALUE FOR U.S. (PRELIM)
		QUANTITY	\$/VALUE		
Iron Ore	Long Tons(2240#)	12,015,708	357,565,245	-23.41 -16.15	2
Cement	Short Tons(2000#)	5,815,974	176,701,142	+ 9.09 +10.73	P. 4 M. 7
Petroleum(5)	Barrels(42 gal.)	32,964,503	360,994,743	+ 8.36 + 9.513	10
Sand & Gravel	Short Tons	46,989,467	97,947,811	- 0.70 +23.80	4
Natural Brines(1)	Short Tons	1,267,042	138,711,535	+ 6.21 +11.75	*
Copper	Pounds	85,960,551	59,115,071	- 1.12 - 0.65	6
Salt	Short Tons	3,946,957	78,864,146	- 5.79 - 1.06	3
Lime	Short Tons	1,347,190	42,015,241	- 7.47 + 5.87	5
Stone(2)	Short Tons	40,499,740	84,989,842	- 2.22 + 3.42	8
Natural Gas	Th. Cubic Ft. (M.C.F.)	133,215,209	145,969,976	+10.79 +21.386	N.A.
Gypsum (crude)	Short Tons	1,924,030	10,769,174	+ 4.74 + 4.10	1
Clay & Shale(3)	Short Tons	2,007,391	5,125,835	+ 3.78 + 8.11	Com. 6 All 11
Nat. Gas Liquids(5)	Gallons	(in with oil & gas)			
Peat	Short Tons	290,855	4,753,529	- 3.08 +27.99	1 In Stone
Marl	Short Tons	28,778	63,213	-47.22 -42.45	
Miscellaneous(4)	-----		2,842,945	--- +26.92	
SUB TOTAL			\$1,566,429,448		
Minus (stone used in manufacturing of lime and cement in Michigan and processed sandstone included in sand and gravel figures)			-28,363,028		
TOTAL value of Michigan production 1977			\$1,538,066,420		

- (1) Bromine, Magnesium compounds, Calcium-Magnesium chloride, and Iodine.
*U.S. Rank 1977 as above 2,1,1,2.
- (2) Does include 17,404,055 short tons of limestone and dolomite used in the manufacture of cement and lime. See other notes.
- (3) Tile, brick, pottery, clay used for cement, lightweight aggregate, and miscellaneous.
- (4) Sulfur, natural mineral pigments, silver.
- (5) Natural Gas Liquids was figured into Oil and Natural Gas production and values by the Production Proration Unit. They no longer differentiate the three.

The U.S. Bureau of Mines ranked Michigan in 11th place for mineral production value in 1977.

	\$ Value	% of Total
Metallic Minerals	418,666,958	27.22
Nonmetallic minerals(raw)	640,797,771(minus process material)	39.82
Fuels	506,964,719	32.96

N.A.- Not Available, P.- Portland Cement, M.-Masonry Cement, Com.-Common Clay and Shale

FIGURE 2 VALUE OF MINERALS MINED IN MICHIGAN
1910-1977

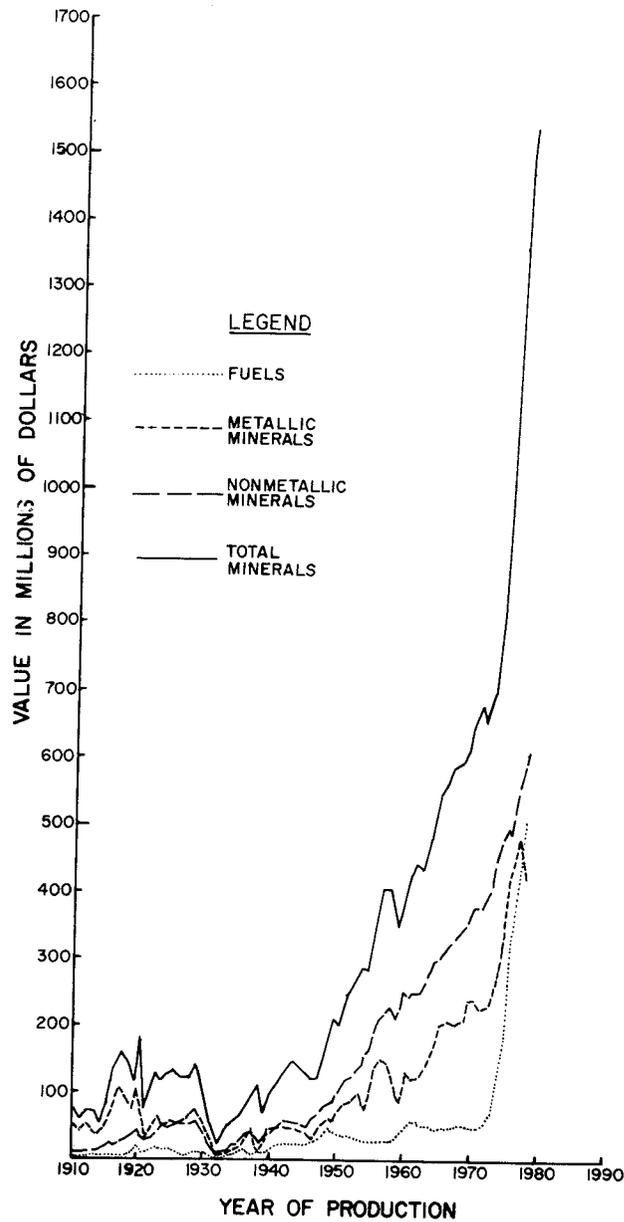
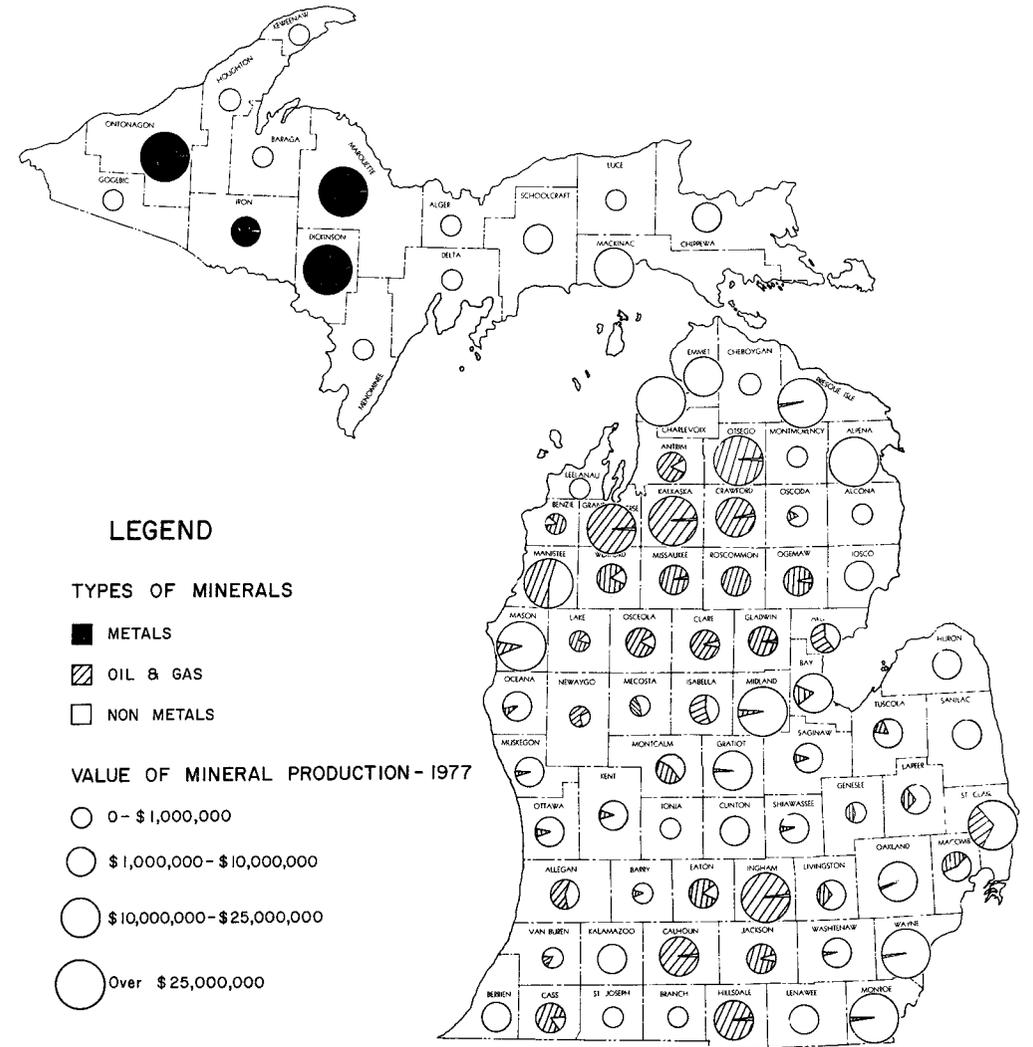


FIGURE 3 MINERAL VALUE DISTRIBUTION BY COUNTY 1977



METALLIC MINERALS

Michigan's 1978 metallic mineral mining operations produced iron ore and copper with some silver as a byproduct. The seven metallic mineral mines are located in four counties in the western half of the Upper Peninsula of the State. During 1977, over \$418.7 million worth of metallic minerals were produced.

The variety of metallic minerals mined in the State was greater in the past, and may expand in the future. Before 1900 there were several gold mines and at least one short-lived manganese mine. As mineral exploration activity continues, it is possible that more deposits of metallic minerals will be found within the State.

COPPER

The White Pine mine, operated by the White Pine Division of the Copper Range Company, was the sole producer of Copper in Michigan again in 1978. Low copper prices for the past several years have forced the company to reduce production and operate with a smaller staff than normal. In 1977 they produced nearly 86 million pounds of copper along with almost 447 thousand ounces of associated silver.

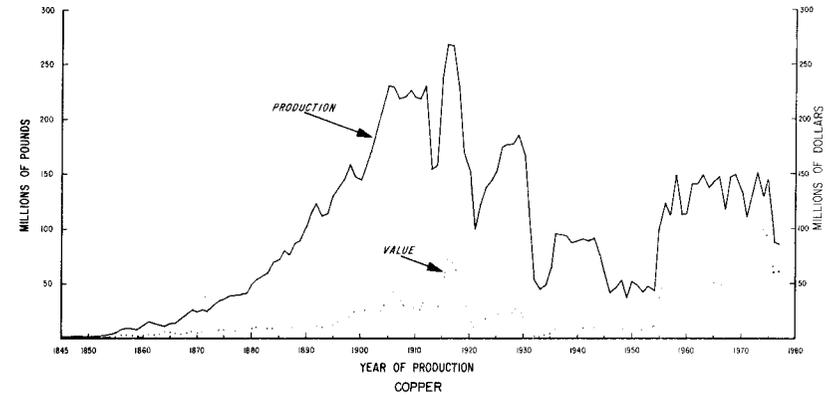
The low grade copper ore produced at White Pine is mostly chalcocite (copper sulfide) with some native copper and a little native silver. These metallic minerals are deposited in a combination of shale, siltstone, and sandstone. The rock formation is named the Nonesuch Shale and is of Upper Keweenaw (Precambrian) age.

Copper was first mined in Michigan by prehistoric Indians. Some of their early diggings are reportedly still visible in parts of the "Copper Country" today. While their mining methods were crude by present standards, they mined enough native copper to supply their needs. Indian artifacts made of copper from the Upper Peninsula have been found in many states, and are believed to have been widely traded.

Modern day copper mining began in 1845. Many of the "new" mines were actually found by people who located some of the old Indian dug pits and started to mine next to them. A large number of mines were started, about one hundred and ten between 1845 and 1925, but few of them were financial successes. Elusive, discontinuous ore bodies along with fluctuating market prices for copper, and many inexperienced early miners all contributed to the high number of mining failures. However, the state did lead the nation in copper production for many years.

Michigan remains a vast storehouse of copper mineralization. The copper resources of Michigan have been the object of a recent study by Dr. John T. Wilband of the Department of Geology, Michigan State University, East Lansing. His 1978 report, entitled, "The Copper Resources of Northern Michigan", was done under contract for the U.S. Bureau of Mines for their Minerals Availability System (MAS) Program. The report contains a copper reserves figure arrived at by combining "data believed to be, a) Reliable and conservative, b) Speculative, c) Highly Speculative". The total reported reserves figure is 19.5 billion pounds of copper. The amount ever mined of this large reserves figure would depend upon the price of copper and the type of mining method used. As the price of copper rises, lower grade mineralized rock becomes economical to mine, so more can be removed. The type of mining procedure used determines how much rock needs to be left behind as support structures when underground mining is done. Thus, as least two variables exist in determining how much copper will ever be recovered.

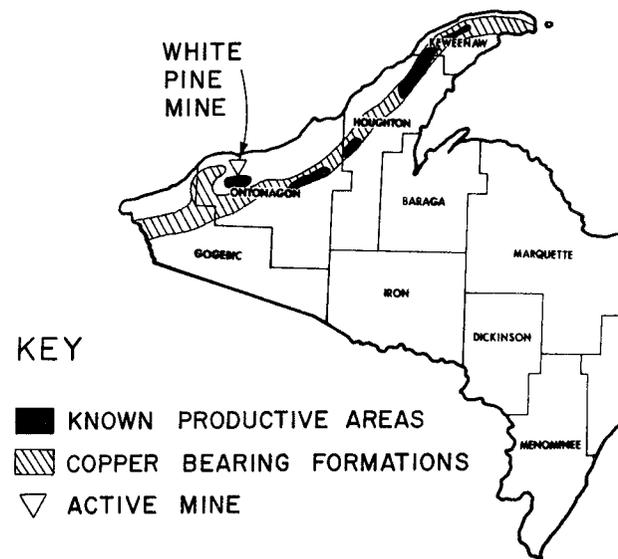
Figure 4 PRODUCTION AND VALUE OF MICHIGAN COPPER 1845-1977



COPPER MINES			
Name of Operation	Map No.	Ore Type	Location
White Pine Division of Copper Range Co. P. O. Box 100 White Pine, Michigan 49971	(1)	Copper sulfide, native copper, native silver	White Pine Mine White Pine, Mich. in Sec. 4, T50N, R42W, ONTONAGON COUNTY

Figure 5

MICHIGAN COPPER RESOURCES



IRON ORE

Six iron ore mines operated in Michigan during the first half of 1978. The Sherwood mine and the Mather mine were worked as underground mines, while the Groveland, Tilden, Empire, and Republic mines were operated as large open pit mines. The Sherwood mine was closed in July, and ended the iron mining in the Iron River-Crystal Falls area of Iron County. The Groveland mine, in Dickinson County, and the other four mines in Marquette County continued production as usual. These same six mines produced slightly over 12 million long tons (2240 pounds) of ore valued at over \$357.5 million in 1977. Production was lower than in 1976 due to a strike by the miners.

The closing of the Sherwood mine ended Michigan's long history of producing direct shipping iron ore. All of the iron ore now being produced is sent through an ore improvement or concentrating process. Most of the ore mined is low grade, 30 to 40 percent iron, and becomes upgraded pellets containing over 60 percent iron. The iron and steel manufacturing industry has adapted to the use of pelletized ore. Now little market remains in the Great Lakes area for the lower grade natural ore.

When natural ore was no longer shipped, other changes had to take place too. For many years the iron mines were taxed on the value of their shipments, based upon ore of 51.5 percent iron content, referred to in the industry as "Old Range Non-Bessemer" ore. The law has now been revised and the actual iron content of the iron ore pellets is the basis for the taxation of the shipments.

Figure 6

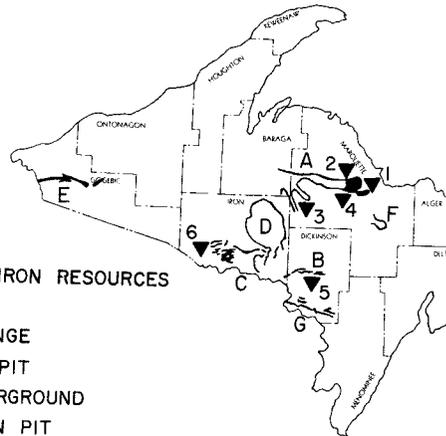
MICHIGAN IRON RESOURCES

KEY

— AREAS OF KNOWN IRON RESOURCES

▼ ACTIVE MINES

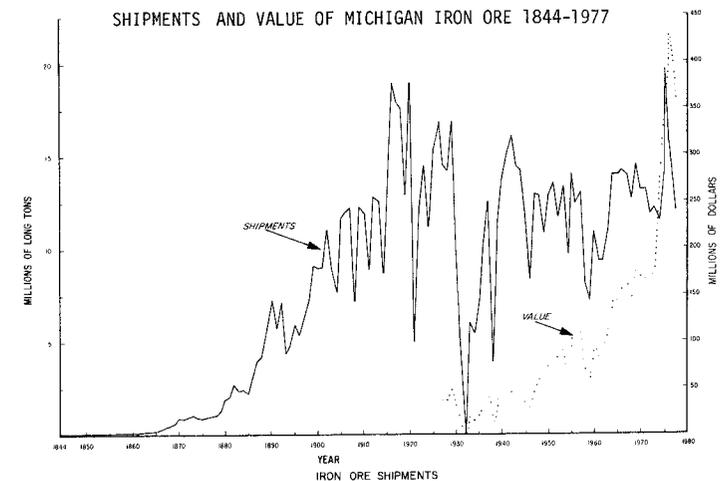
- A. MARQUETTE RANGE
 - 1. EMPIRE- OPEN PIT
 - 2. MATHER- UNDERGROUND
 - 3. REPUBLIC- OPEN PIT
 - 4. TILDEN- OPEN PIT
- B. FELCH DISTRICT
 - 5. GROVELAND- OPEN PIT
- C. IRON RIVER CRYSTAL FALLS DISTRICT
 - 6. SHERWOOD- UNDERGROUND (CLOSED 7/78)
- D. AMASA OVAL DISTRICT- INACTIVE
- E. GOGEBIC RANGE- INACTIVE
- F. GWINN DISTRICT- INACTIVE
- G. IRON MOUNTAIN RANGE- INACTIVE



IRON MINING COMPANIES F

Operator	Map No.	Range/District & Ore Type	Mine Name/Type & Location
Cleveland-Cliffs Iron Co. (Operator for Empire Mining Company) 504 Spruce St. Ishpeming, Michigan 49849	(1)	MARQUETTE Magnetite	Empire-Open pit 1 Mi. NW of Palmer, in Secs. 19, 20, 25, 30 T47N, R26W <u>MARQUETTE COUNTY</u>
Cleveland-Cliffs Iron Co. (Operator for the Negaunee Mine Company) 504 Spruce St. Ishpeming, Michigan 49849	(2)	MARQUETTE Hematite Closed 7/79	Mather-Underground Ishpeming-Negaunee in Secs. 1 & 2 T47N, R27W <u>MARQUETTE COUNTY</u>
Cleveland-Cliffs Iron Co. (Operator for the Marquette Mining Company) 504 Spruce St. Ishpeming, Michigan 49849	(3)	MARQUETTE Hematite	Republic-Open pit 1 Mi. S of Republic in Sec. 7 & 18, T46N, R29W <u>MARQUETTE COUNTY</u>
Cleveland-Cliffs Iron Co. (Operator for Tilden Mining Company) 504 Spruce St. Ishpeming, Michigan 49849	(4)	MARQUETTE Hematite Magnetite Martite	Tilden-Open pit 3 Mi. S of Ishpeming in Sec. 26, T47N, R27W <u>MARQUETTE COUNTY</u>
Hanna Mining Co. Groveland Mine Star Route 1 Box 131 Iron Mountain, Michigan 49801	(5)	FELCH Magnetite Hematite	Groveland-Open pit 3 Mi. E of Randville in Sec. 31, T42N, R29W <u>DICKINSON COUNTY</u>
Inland Steel Co. Sherwood Mine P. O. Box 232 Iron River, Michigan 49935	(6)	IRON RIVER- CRYSTAL FALLS Hematite Closed 7/78	Sherwood-Underground ½ Mi. N of Iron River in Secs. 23 & 24, T43N, R35W <u>IRON COUNTY</u>

Figure 7



NONMETALLIC MINERALS

Nonmetallic minerals are an important part of Michigan's mineral industry and over 612 million dollars worth of them were produced in 1977. The 1978 list of these commodities includes sand and gravel, natural brines, salt, stone, gypsum, clay and shale, peat, marl, and some sulfur. Two additional items for the list are cement and lime. While both of these are processed materials, they have historically been included with the raw nonmetallic minerals.

Extraction of nonmetallic minerals usually takes place in all 83 of Michigan's counties. The wide variety of commodities in this category and their various occurrences make this possible. Thus, nonmetallic minerals affect part of the economy of the entire state.

CEMENT

Cement, like lime, is a manufactured mineral product which has been included with nonmetallic mineral production over the years. Simply, Portland cement is made by combining five parts of limestone and one part of shale or clay. The mixture is ground to a powder and passed through a rotary kiln which is fired to a temperature of about 1500°C. In the kiln the materials roll up into gray, ball shaped masses which emerge as hardened clinkers. The clinkers are then ground to a powder and ground gypsum is combined with it to form what we know as Portland cement. Additional ingredients are added to form various other types of cement for specific uses, such as masonry cement, etc.

Michigan's seven cement plants operate in three different ways in respect to their raw materials: Four plants are located adjacent to their limestone quarries; two receive all of their raw materials from pits and quarries in other locations, some from Canada; one purchases partially processed material (clinker), from other producers and completes the processing at its facility.

During 1977, over 5.81 million tons of cement valued at over \$176 million were produced in Michigan.

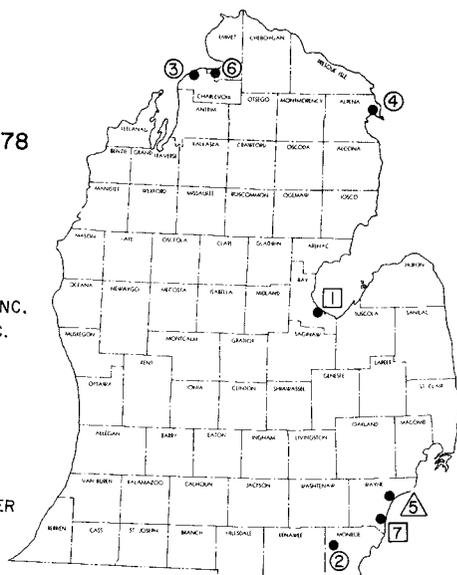
Figure 8

CEMENT PLANTS 1978

- 1 AETNA CEMENT CORP.
- 2 DUNDEE CEMENT CO.
- 3 MEDUSA CEMENT CO.
- 4 NATIONAL GYPSUM CO.
- 5 PEERLESS CEMENT CO.
- 6 PENN-DIXIE INDUSTRIES, INC.
- 7 WYANDOTTE CEMENT, INC.

LEGEND

- PLANT & QUARRY
- △ PROCESS PURCHASED RAW MATERIALS
- PROCESS PURCHASED CLINKER



CEMENT COMPANIES

Name of Operation	Map No.	Plant Location
Aetna Cement Corp. P.O. Box #80 Essexville, Michigan 48732	F (1)	3 Mi. NE of Bay City at Essexville, NE¼ Sec. 14, T14N, R5E; Clinker imported from Ontario. <u>BAY COUNTY</u>
Dundee Cement Co. P. O. Box 122 Dundee, Michigan 48131	F (2)	2 Mi. N of Dundee, Sec. 6, T6S, R7E, plant and quarry <u>MONROE COUNTY</u>
Medusa Cement Co. Div. of Medusa Corp. Plant address: Charlevoix, Michigan 49720 Office address: Box 5668 Cleveland, Ohio 44101	F & S (3)	2 Mi. W of Charlevoix plant and quarry Sec. 28, T34N, R8W <u>CHARLEVOIX COUNTY</u>
National Gypsum Co. Cement Division Plant address: Alpena, Michigan 49707 Office address: 17515 W. Nine Mile Rd. Honeywell Center 12th Fl. Southfield, Michigan 48075	F & S (4)	1.5 Mi. NE of Alpena, in Sec.24 T31N, R8E, plant and quarry. <u>ALPENA COUNTY</u>
Peerless Cement Co. Division Amcord Inc. 9333 Dearborn Street Detroit, Michigan 48209	F & S (5)	Forman Avenue Plant - Ext. Sec. 28, T2S, R11E; raw materials obtained from Ford Motor Co. clay pit and Rogers City area. <u>WAYNE COUNTY</u>
Penn-Dixie Industries, Inc. Plant #10 Plant address: Petoskey, Michigan 49770 Office address: 1111 South Main St. Kokomo, Indiana 46901	F & S (6)	3.5 Mi. W of Petoskey, plant and quarry. Sec. 3, T34N, R6W. <u>EMMET COUNTY</u>
Wyandotte Cement Inc. 3509 Biddle Avenue P. O. Box 420 Wyandotte, Michigan 48192	F (7)	Wyandotte, Mich. Process purchased clinker. <u>WAYNE COUNTY</u>

CLAY AND SHALE

Clay and/or Shale are mined by five companies in Michigan for use as an ingredient in making cement. Three other operators mine clay and/or shale for manufacturing drain tile, sewer pipe and flue linings, bricks and flower pots. Years ago there were many more producers of brick and drain tile, etc. However, changes in technology, building style, rising prices of firing fuel and transportation, have all contributed to a decline in the industry. See Brick story on page 2

Michigan has vast resources of clay and shale which could be utilized if new economic uses are discovered for it. The accompanying map shows the known Michigan clay areas, shale outcrops, and present mine locations.

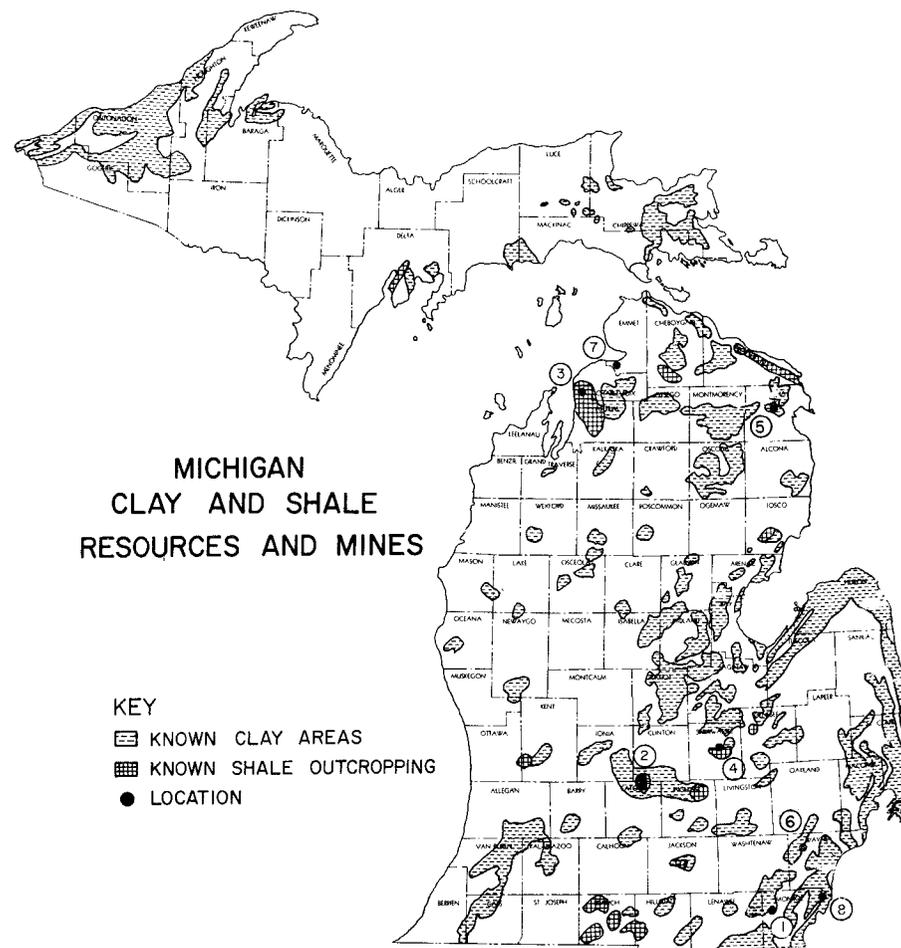
CLAY AND SHALE COMPANIES

Operation Name & Address	Map No.	Product	Location
Dundee Cement Co. P. O. Box 122 Dundee, Michigan 48131	(1) F	Cement	Sec. 6, T6S, R7E, (clay overburden over limestone) <u>MONROE COUNTY</u>
Grand Ledge Clay Products Co. P.O. Box 66 (on W. Jefferson) Grand Ledge, Michigan 48837	(2) F & S	Drain tile, sewer pipe, flue linings	Shale pits at SE $\frac{1}{4}$ Sec. 3, T4N, R4W EATON COUNTY and NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 34, T5N, R4W <u>CLINTON COUNTY</u>
Medusa Cement Co. Division of Medusa Corp. Plant Address: P.O. BOX 367 Charlevoix, Michigan 49720 Office Address: Box 5668 Cleveland, Ohio 44101	(3) F	Cement	Shale pit, SW $\frac{1}{4}$ Sec. 24, T32N, R8W <u>ANTRIM COUNTY</u>
Michigan Brick, Inc. 3820 Serr Road Corunna, Michigan 48817	(4) F & S	Brick	Shale pit, $\frac{1}{2}$ Mi. E of Corunna, Sec. 22, 23, T7N, R3E <u>SHIAWASSEE COUNTY</u>
National Gypsum Co. Cement Division Plant Address: Ford Ave. Alpena, Michigan 49707 Office Address: 17515 W. Nine Mile Road Honeywell Center-12th Floor Southfield, Michigan 48075	(5) F	Cement	Paxton Shale Quarry, 8 Mi. W. of Alpena, (on Hwy. M-32), NE $\frac{1}{4}$ Sec. 30, T31N, R7E <u>ALPENA COUNTY</u>
Peerless Cement Division of Amcord, Inc. 9333 Dearborn St. Detroit, Michigan 48209	(6) F	Cement	Ford Motor Co. Clay pit NW $\frac{1}{4}$ Ext. Sec. 36, T2S, R10E <u>WAYNE COUNTY</u>
Penn-Dixie Industries, Inc. Plant Address: 3700 Charlevoix Rd. Petoskey, Michigan 49770 Office Address: 1111 S. Main St. Kokomo, Indiana 46901	(7) F	Cement	Shale pit, Sec. 8, T34N, R6W <u>EMMET COUNTY</u>

CLAY AND SHALE CONTINUED

Operation Name and Address	Map No.	Product	Location
Ritter & Sons, F. W., Co., Inc. 12670 N. Dixie Hwy. South Rockwood, Michigan 48179	(8) F & S	Flower pots	Clay pit, 1 Mi. S of South Rockwood, NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 16, T5S, R10E <u>MONROE COUNTY</u>

Figure 9 CLAY AND SHALE RESOURCES AND MINES 1978



GYPSUM

The mineral Gypsum ($\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$), along with some Anhydrite (CaSO_4), occurs in some sedimentary rocks. Thick beds of gypsum are mined in both Kent and Iosco counties. Some of the reported uses of gypsum from Michigan are: 1) manufacturing plaster wall board; 2) an important ingredient in Portland cement; 3) agricultural uses (soil treatment, etc.); and 4) decorative stone.

The majority of the gypsum mined in Michigan is used for the manufacture of construction materials, thus the rate of mining is tied in with the economy of the building industry. Figure 11 illustrates the many fluctuations in the production and value of gypsum produced in Michigan between 1868 and 1977.

Michigan is a leading producer of gypsum. The state has been in first or second place for the value of gypsum produced in the U.S. for most of the years since 1930. First place was maintained again in 1977 for both the quantity and value of gypsum produced, 1,924,030 short tons valued at \$10,769,174.

The 1976 U.S. Bureau of Mines list of the nation's ten largest producing gypsum mines included two from Michigan. These two Iosco County mines are operated by the National Gypsum Company and the U.S. Gypsum Company. They were ranked, respectively, as the first and third largest producers in the entire United States.

The map in Figure 10 indicates the approximate locations of the two underground mines in Kent County, and the three open pit operations in Iosco County.

The names and addresses for the gypsum companies along with their mine and mill locations are listed below.

GYPSUM COMPANIES

Name of Operation and Office Address	Map No.	Mine or Quarry Location	Mill Location
Georgia-Pacific Corp. 900 SW Fifth Ave. Portland, Oregon 97204	(1) F & S	SE of Grand Rapids in NW $\frac{1}{4}$ Sec. 24, T6N, R11W 3900 E. Paris Kentwood, Michigan 49508 <u>KENT COUNTY</u>	SW Grand Rapids 2228 Butterworth Rd. S W Grand Rapids, Michigan 49504 <u>KENT COUNTY</u>
Gold Bond Building Products Division of National Gypsum Co. 325 Delaware Ave. Buffalo, New York 14202	(2) F	8 Mi. W of Tawas City Sec. 26, 34, 35, T22N R6E. (open pit mine) 235 National City Rd. National City, Michigan 48748 <u>IOSCO COUNTY</u>	2 Mi. S of National City Sec. 16, T21N, R6E <u>IOSCO COUNTY</u>
Grand Rapids Gypsum Co. 201 Monroe Ave. NW Grand Rapids, Michigan 49502	(3) F & S	SW side of Grand Rapids in Sec. 34, T7N, R12W <u>KENT COUNTY</u>	At mine
Michigan Gypsum Co. 2840 Bay Rd. Saginaw, Michigan 48601	(4) F	4 Mi. SW of National City in Sec. 31, T21N, R6E 3425 Britt Rd. P. O. Box 152 Whittemore, Michigan 48770 <u>IOSCO COUNTY</u>	2 Mi. S of National City Sec. 16, T21N, R6E <u>IOSCO COUNTY</u>
United States Gypsum Co. 101 S. Wacker Dr. Chicago, Illinois 60606	(5) F & S	W of Alabaster Sec. 22, 26, 27, 28 T21N, R7E (open pit mine) Rt. #2, Tawas City Michigan 48763 <u>IOSCO COUNTY</u>	2 Division St. River Rouge, Michigan 48218 <u>WAYNE COUNTY</u>

Figure 10

MICHIGAN GYPSUM MINES - 1978

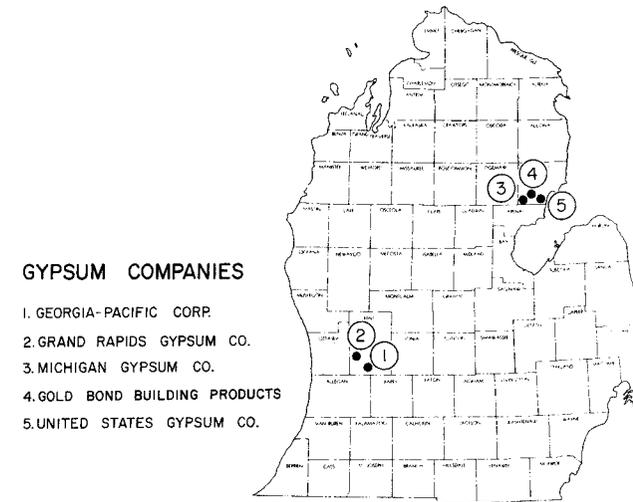
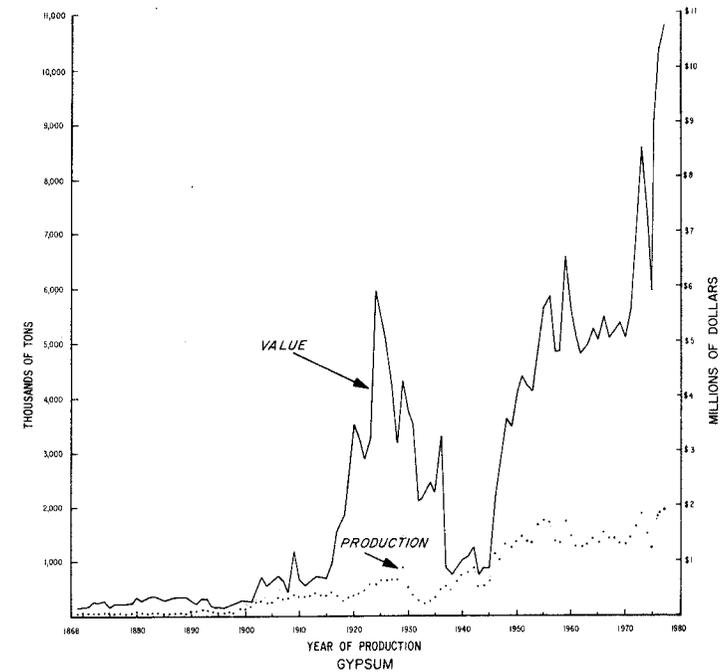


Figure 11

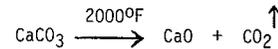
PRODUCTION AND VALUE OF MICHIGAN GYPSUM 1868 - 1977



LIME

Lime is a mineral product which is produced by heating limestone (CaCO₃) or dolomite (CaCO₃ · Mg CO₃) in a limekiln. In this process, carbon dioxide gas (CO₂) is given off, and quicklime is the end product with the formula of CaO or CaO·MgO, depending upon which material is treated in the first place.

Various books show slightly different versions of the lime making process. The temperature used depends upon the material started with, and may range from about 1800°F to 2400°F. The following is a schematic diagram of the reaction which takes place while converting high calcium limestone to quicklime and carbon dioxide.



This diagram is adapted from the chapter on Lime by R.S. Boynton and K.A. Gutschick in "Industrial Minerals and Rocks", 4th edition, edited by S.J. Lafond, and published by the Society of Mining Engineers of the American Institute of Mining Engineers in 1975.

The U.S. Bureau of Mines ranked Michigan in fifth place among all of the lime producing states for both the quantity and the value of lime produced in 1977. They also placed the BASF Wyandotte lime plant as 8th out of the top ten lime producing plants in the country. These top ratings are quite a distinction because in 1977 there were 161 lime plants operating in 41 states.

The four largest lime producing operations in Michigan reported that in 1977 they made lime which was sold for the following uses: 1) chemical and industrial uses; 2) steel making (basic oxygen converters and electrical furnaces); 3) water purification and softening; 4) sewage and industrial waste treatment (including neutralization of waste acids); and 5) paper and pulp making (as bleach and filler). In past years, two other reported uses were the processing of: 1) alkalies (ammonium, potassium, and sodium compounds); and 2) food and food products.

Five of the nine lime producing operations in Michigan are owned by two sugar manufacturing companies. These two companies convert sugar beets to sugar, and use lime and CO₂ in the processing. Thus, they make their own lime and CO₂ on the site of their sugar refineries.

The locations of Michigan's lime producers are shown on the map containing both lime and marl producers. The reader will note that the limekilns process limestone and/or dolomite which is sometimes transported many miles from where it is mined.

LIME PRODUCING COMPANIES

Name of Operation	Map No.	Limekiln Location	Reported products and uses (see above)
BASF Wyandotte Corp. 1609 Biddle Ave. Wyandotte, Michigan 48192	S (1)	Wyandotte <u>WAYNE COUNTY</u>	1
Detroit Lime Co. 9300 Dix Ave. Detroit, Michigan 48209	F (2)	River Rouge <u>WAYNE COUNTY</u>	2, 3, 8
Dow Chemical Co., U.S.A., The Ludington plant S. Madison St. Ludington, Michigan 49431	S (3)	Ludington <u>MASON COUNTY</u>	1

LIME PRODUCING COMPANIES CONTINUED

Name of Operation	Map No.	Limekiln Location	Reported Products and Uses
Marblehead Lime Co. 25 Marion Ave. River Rouge, Michigan 48218	F (4)	River Rouge <u>WAYNE COUNTY</u>	2, 3, 4, 5, 6, 8
Michigan Sugar Co. Box 960 Saginaw, Michigan 48606	S (5)	Sebewaing <u>HURON COUNTY</u>	7
	(6)	Carrollton <u>SAGINAW COUNTY</u>	7
	(7)	Croswell <u>SANILAC COUNTY</u>	7
	(8)	Caro <u>TUSCOLA COUNTY</u>	7
Monitor Sugar 2600 S. Euclid Ave. Bay City, Michigan 48706	S (9)	Bay City <u>BAY COUNTY</u>	7

MARL

Michigan Marl was called "bog lime" years ago. It is a non-consolidated calcium carbonate rich material which was deposited in a lake or marsh area by plant and/or animal life. Michigan's glacial overburden has a number of present and former lakes which contain large accumulations of marl. There are now only five companies left which produce marl for use as a soil conditioner for local use. At one time there were a great many marl producers in the state. Marl also used to be produced in Michigan for the manufacture of cement and lime, and to be used as an ingredient in tooth powder, scouring powder, and in paints.

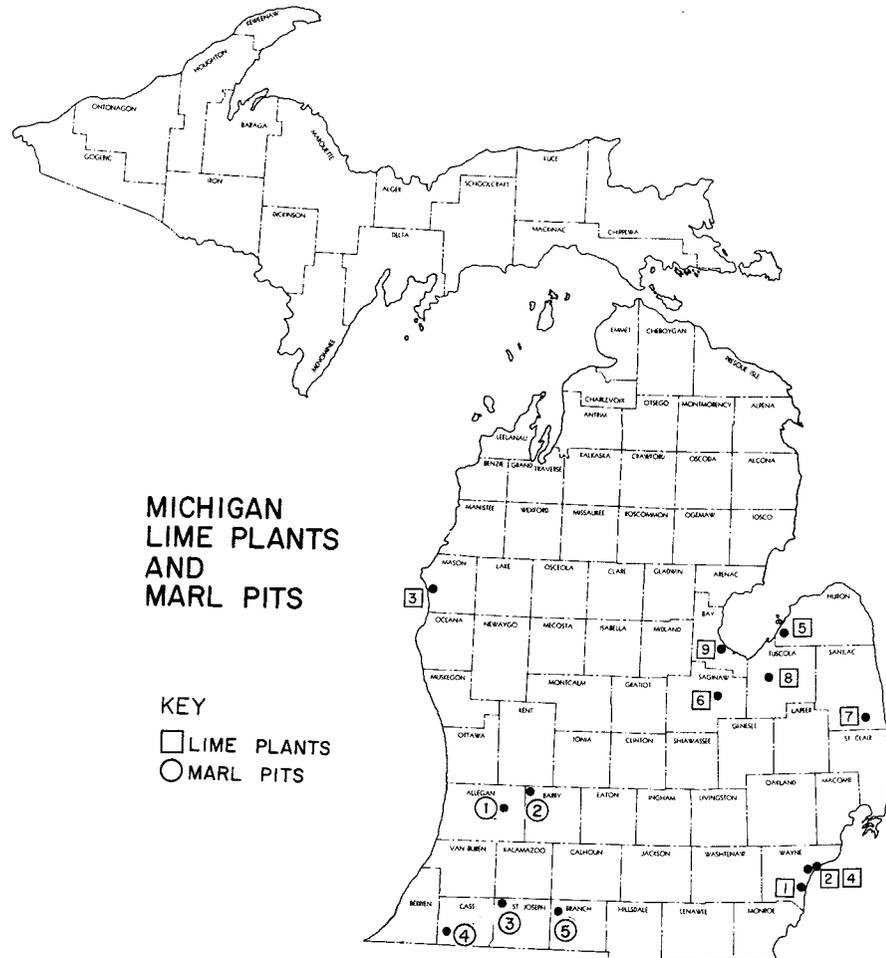
MARL COMPANIES

Name of Operation	Map No.	Pit and County
Brenner, Kevin Route #1 Hopkins, Michigan 49328	(1)	Sec. 34, T2N, R13W 1 Mi. SE of Allegan <u>ALLEGAN COUNTY</u>
Currier, William Route #1 Middleville, Michigan 49333	(2)	Sec. 6, T4N, R10W 4 Mi. NE of Middleville <u>BARRY COUNTY</u>
Kerr Peat & Marl Route #1, P.O. Box 76 Three Rivers, Michigan 49093	(3)	Sec. 13, T6S, R12W 1 Mi. W of Three Rivers <u>ST. JOSEPH COUNTY</u>
Poehlman & Sons Route #2 Cassopolis, Michigan 49031	(4)	NW NE Sec. 13, T7S, R16W 6 Mi. SW of Cassopolis <u>CASS COUNTY</u>
Taylor and Son Route #1 Orland, Indiana 46776	(5)	Sec. 16, T8S, R5W 1½ Mi. S of California <u>BRANCH COUNTY</u>

NATURAL BRINES

By W. A. Walden

Figure 12 LIME PLANTS AND MARL PITS 1978



-24-

Natural brines, sometimes referred to as natural salines, are naturally occurring salty waters in the earth's crust. These fluids contain varying amounts of calcium, magnesium, and sodium chloride, plus minor quantities of potassium, bromine, and iodine. The natural discharge of these fluids at the earth's surface is referred to as a salt spring or salt lick. Such points of discharge were sources of salt, sodium chloride, for wild animals, Indians, and early settlers.

When Michigan achieved statehood in 1837, one of the first acts of the legislature created a Geological Survey with Dr. Douglass Houghton as State Geologist. The principal mission of the newly created agency was to locate and study salt springs so that adequate supplies of salt could be developed for the people of the state. Monies were also appropriated for the drilling of wells at the sites of salt springs in search of adequate supplies of saline waters. This amounted to \$15,000 on two occasions.

No supplies were located, although one private endeavor did locate a small brine source in 1841 which resulted in some salt being produced. It was not until 1859, with the passage of "an act to encourage the manufacture of salt in the State of Michigan" through property tax exemptions and a bounty on salt produced, did the search for natural brines begin in earnest. The incentive was enough to establish a need for natural brine and a salt producing industry in Michigan.

The early growth was rapid. Saginaw County, home of the natural brine industry, experienced an expansion from one producer in 1860 to 23 by mid-1862. Plants also began to appear in Bay and Huron counties. Even amending the law to encourage salt production in 1861 did not discourage expansion of the industry. The amendment limited the property tax exemption to five years, the bounty to \$1,000.00, and applied these benefits only to companies in production as of August, 1861. Growth of the industry continued and by 1869 there were 69 companies in existence. It was no longer necessary to have any incentives for salt production, so the "encouragement act" was repealed. The number of companies continued to increase to a maximum of 136 in 1886 and has declined ever since, except for brief periods in the 1890's and in 1901.

The decline in the number of plants reflected the passing of Michigan's lumbering industry. The salt plants were associated with saw mills and used the mill waste, and in some instances exhaust steam, to evaporate the brine. With the closing of the mills, the cheap fuel or heat source was lost, along with the salt producer's competitive edge. Furthermore, salt production was being taken over by the younger, larger, and more efficient plants utilizing artificial brine.

Artificial brine is obtained by injecting fresh water down wells drilled into bedded salt deposits. The water dissolves the salt and forms a sodium chloride rich brine, which is pumped back to the earth's surface and evaporated. Because this brine is rich in sodium chloride, lower fuel costs are realized per ton of salt produced than that experienced with natural brines.

When natural brines are evaporated and sodium chloride forms, a liquor of soluble constituents, called bittern, also remains. The bittern content is a characteristic which detracted from the use of natural brines for salt production, but later enhanced their use by the chemical industry. The bitterns are rich in calcium and magnesium chloride, bromide, and iodide, and are considered an impurity in salt manufacturing. Some of the early operators used the bitterns for manufacture of calcium chloride, sodium chlorate and bromine in conjunction with salt production. This was the beginning of the utilization of natural brines by the chemical industry.

NATURAL BRINES CONTINUED

Presently, several chemical companies operate numerous natural brine wells and process the brine into various chemical compounds. Sodium chloride is usually now considered an impurity and is injected back into the earth's crust. Velsicol Chemical Corporation, which concluded operations in Gratiot County in September of 1978, manufactured salt in addition to calcium and magnesium chloride and bromine.

Michigan ranks first in the U.S. in the production of calcium chloride and magnesium compounds. It ranks second in the production of bromine and iodine, being one of only two states producing the latter.

Natural brines are also used for dust control, ice control, and stabilization of unpaved roads. Several county road commissions operate one or more brine wells for these purposes. Oil well operations produce natural brine as a by-product. Some of these operations supply brine for road uses. The remainder of these oil-field brines are returned to the earth's crust through brine disposal wells, or for use in water flooding operations to enhance oil recovery.

Chemical companies produce natural brines from several geologic horizons in Michigan. The geologic horizons are listed in descending order of age. The Marshall Sandstone Formation is the youngest and is of the Lower Mississippian System. The Dundee Limestone Formation and the Detroit River Group, which includes the Filer Sandstone of the Amherstburg Formation and the Sylvania Sandstone Formation, are older and belong to the Middle Devonian System.

The accompanying map shows the locations of the chemical operations and the geologic age of the formation from which the natural brine is utilized.

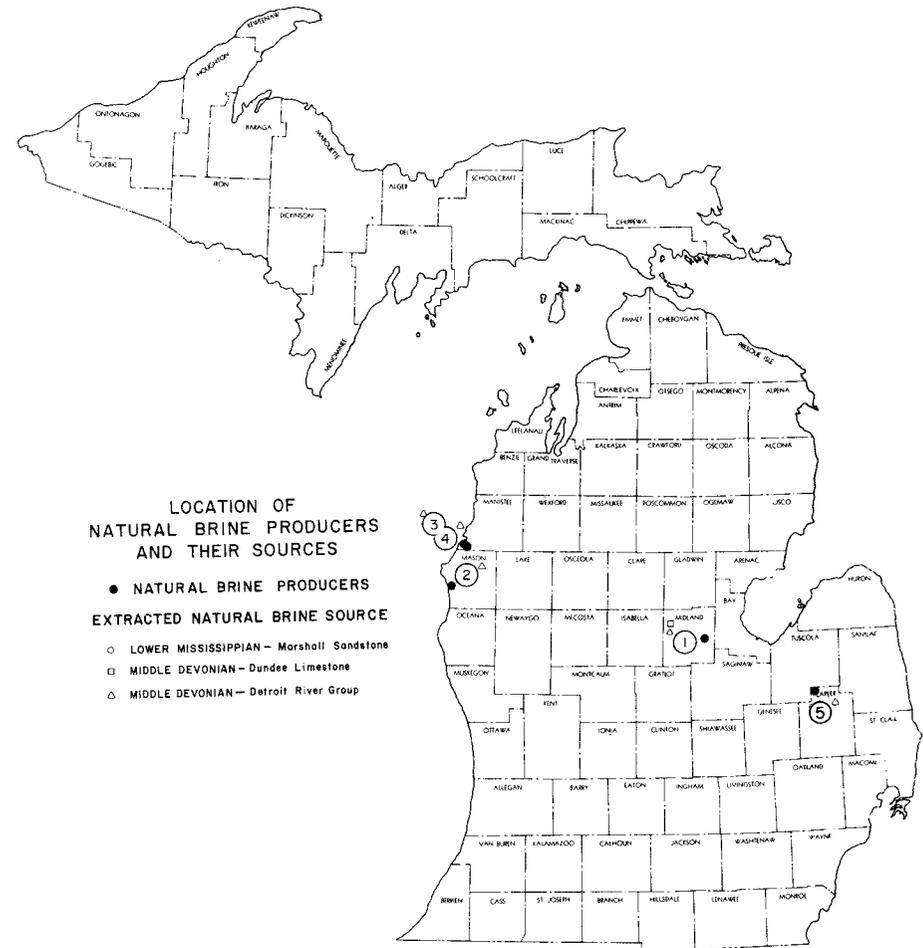
COMPANIES PRODUCING AND UTILIZING NATURAL BRINES S

Name of Operation	Map No.	Products	Plant Location
Dow Chemical Co., U.S.A., The 2020 Dow Center Midland, Michigan 48640	(1)	Bromine, bromine compounds, magnesium compounds, calcium chloride, iodine, potash	South side of Midland T14N, R2E <u>MIDLAND COUNTY</u>
Ludington plant S. Madison St. Ludington, Michigan 49431	(2)	Bromine, magnesium compounds, calcium chloride	1 Mi. SE of Ludington SW¼, Sec. 23, T18N, R18W <u>MASON COUNTY</u>
Morton Chemical Co. Div. of Morton Norwich Prod. Inc. 180 Sixth St. Manistee, Michigan 49660	(3)	Bromine, magnesium compounds	At Manistee Sec. 12, T21N, R17W <u>MANISTEE COUNTY</u>
Martin-Marietta Chemicals Refractories Div. P.O. Box 398 Manistee, Michigan 49660	(4)	Magnesium compounds	1 Mi. NW of Stronach SE¼ Sec. 18, T21N, R16W <u>MANISTEE COUNTY</u>
Wilkinson Chemical Co. 8290 Lapeer Rd. Mayville, Michigan 48744	(5)	Calcium-magnesium chloride	S of Mayville Sec. 21, T10N, R10E <u>LAPEER COUNTY</u>

COUNTIES WHICH OPERATE BRINE WELLS FOR BRINE TO USE ON ROADS S

Crawford	Ionia	Lapeer	Sanilac
Eaton	Jackson	Lenawee	Tuscola
Huron	Kalkaska	Oakland	Washtenaw

Figure 13 NATURAL BRINE PRODUCERS 1978



PEAT

Peat is an accumulation of various dead plant materials, particularly mosses, in a bog which forms an organic soil containing less than 30 percent mineral soil. Michigan ranks first in peat production in the U.S. During 1978, there were 17 peat producers which processed various types of peat for use as a soil conditioner. The 1977 production of Michigan peat amounted to 290,855 short tons valued at \$4,753,529.

Historically, peat has been used as a fuel and is presently being studied in Minnesota and North Carolina to be used in power plants as it is used in some parts of Europe. With other fuel supplies diminishing and the advancement of technology, peat may become a supplementary fuel of the future in Michigan.

The accompanying map indicates the location of the 1978 peat operations and the approximate acreages of organic soils in the 83 counties of the state. It should be noted that not all organic soils meet the organic content requirements of peat.

In 1976, William A. Walden, a geologist on the Geological Survey Division staff, prepared an Intradivisional Information Circular entitled "Report on Michigan Peat Reserves." This short unedited report is an updating on Michigan's peat reserves and separates peat from organic soils which have sometimes been classified together as peat in the past. Copies of this report are available for reading in the Survey's Lansing office or arrangements may be made for a loan copy.

The U.S. Department of Energy funded the evaluation of fuel grade peat deposits in six states in 1979. Michigan was chosen as one of these states. A grant was given to the Michigan Energy and Resource Research Association to contract with the School of Forestry and Wood Products of Michigan Technological University to study the state's peat resources. The study will continue through part of 1980 and is expected to determine the quantity and location of available fuel grade peat.

PEAT COMPANIES - 1978 S

Name of Operation	Map No.	Kind of Peat	Location
Al-Par Peat	(1)	reed-sedge	6 Mi. NE Ovid Sec. 18, T8N, R2E <u>SHIAWASSEE COUNTY</u>
Anderson Peat Co. 332 Graham Rd. Imlay City, Michigan 48444	(2)	reed-sedge bulk & packaged	3 Mi. E of Imlay City parts of Secs. 23, 25, 26, 36, T7N, R12E <u>LAPEER COUNTY</u>
	(3)	humus packaged	3 Mi. S of Laingsburg parts of Secs. 3, 4, 9, 10, 16, T5N, R1E <u>SHIAWASSEE COUNTY</u> (Operated until 10/78 by Scenic Lakes, Inc.)
Douglas, Charles E. Wayland, Michigan 49438	(4)	reed-sedge bulk	3 Mi. NE of Wayland NW Sec. 26, T4N, R11W <u>ALLEGAN COUNTY</u>
Fletcher and Rickard 25800 Haas Road New Hudson, Michigan 48165	(5)	humus bulk	3 Mi. E of South Lyon Secs. 14, 23, T1N, R7E <u>OAKLAND COUNTY</u>
Gummer's Peat Co. Route #2 Lakeview, Michigan 48850	(6)	moss, reed-sedge bulk & packaged	11 Mi. N of Lakeview Sec. 28, T13N, R8W <u>MECOSTA COUNTY</u>

PEAT CONTINUED

Name of Operation	Map No.	Kind of Peat	Location
Hilu Peat Co. 3040 Clinton Trail Route #3 Charlotte, Michigan 48813	(7)	reed-sedge bulk	2 Mi. SE of Charlotte NW Sec. 22, T2N, R4W <u>EATON COUNTY</u>
Kent Lake Peat Farms, Inc. 1683 Lamb Road Mason, Michigan 48854	(8)	humus packaged	3 Mi. N of Mason NW NE Sec. 27, T3N, R1W <u>INGHAM COUNTY</u>
Kerr Peat and Marl Route #1 Box 76 Three Rivers, Michigan 49093	(9)	reed-sedge bulk	2 Mi. NW of Three Rivers Sec. 13, T6S, R12W <u>ST. JOSEPH COUNTY</u>
Link Norman E. Route #1 Petersburg, Michigan 49270	(10)	humus bulk	4 Mi. SE of Petersburg Sec. 24, T7S, R6E <u>MONROE COUNTY</u>
Michigan Peat, Inc. P. O. Box 66388 Houston, Texas 77006	(11)	reed-sedge packaged	4 Mi. SW of Minden Sec. 20, T14N, R14E
	(12)		1 Mi. E. of Sandusky Sec. 3, T11N, R14E
	(13)		2 Mi. SE of Sandusky Sec. 11, T11N, R14E <u>SANILAC COUNTY</u>
Oxford Peat Co. 1430 E. Drahnner Road Oxford, Michigan 48051	(14)	reed-sedge bulk & packaged	Near Oxford Sec. 35 or 36, T5N, R10E <u>OAKLAND COUNTY</u>
Scenic Lakes, Inc. P. O. Box 926 East Lansing, Michigan 48823	(15)	humus packaged	3 Mi. S of Laingsburg parts of Secs. 3, 4, 9, 10, 16, T5N, R1E <u>SHIAWASSEE COUNTY</u> (Peat Operation taken over by Anderson Peat 10/78)
Wicker's Inc. 6498 Bishop Road Lansing, Michigan 48910	(16)	moss bulk	SW side of Lansing SW NW Sec. 7, T3N, R2W <u>INGHAM COUNTY</u>
Wonderland Peat 3843 Michigan Rd., NE Grand Rapids, Michigan 49506	(17)	moss bulk	Near Grand Rapids S½ Sec. 23, T7N, R11W <u>KENT COUNTY</u>

Figure 14

PRODUCTION AND VALUE OF MICHIGAN PEAT 1938-1977

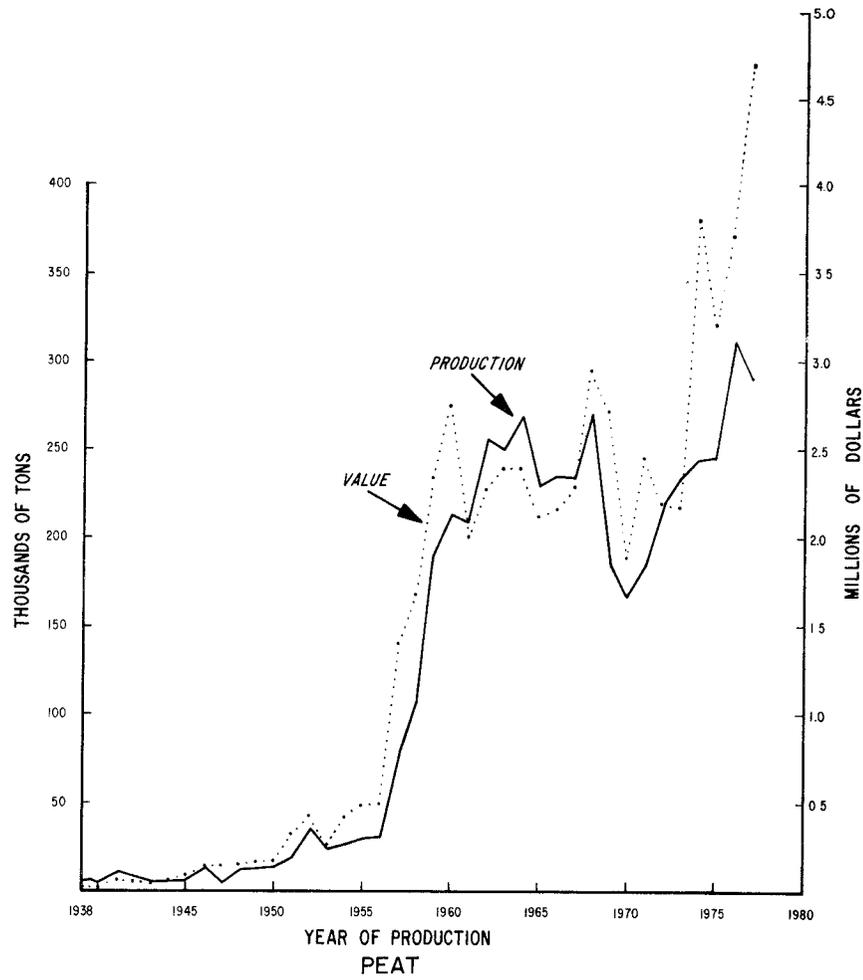
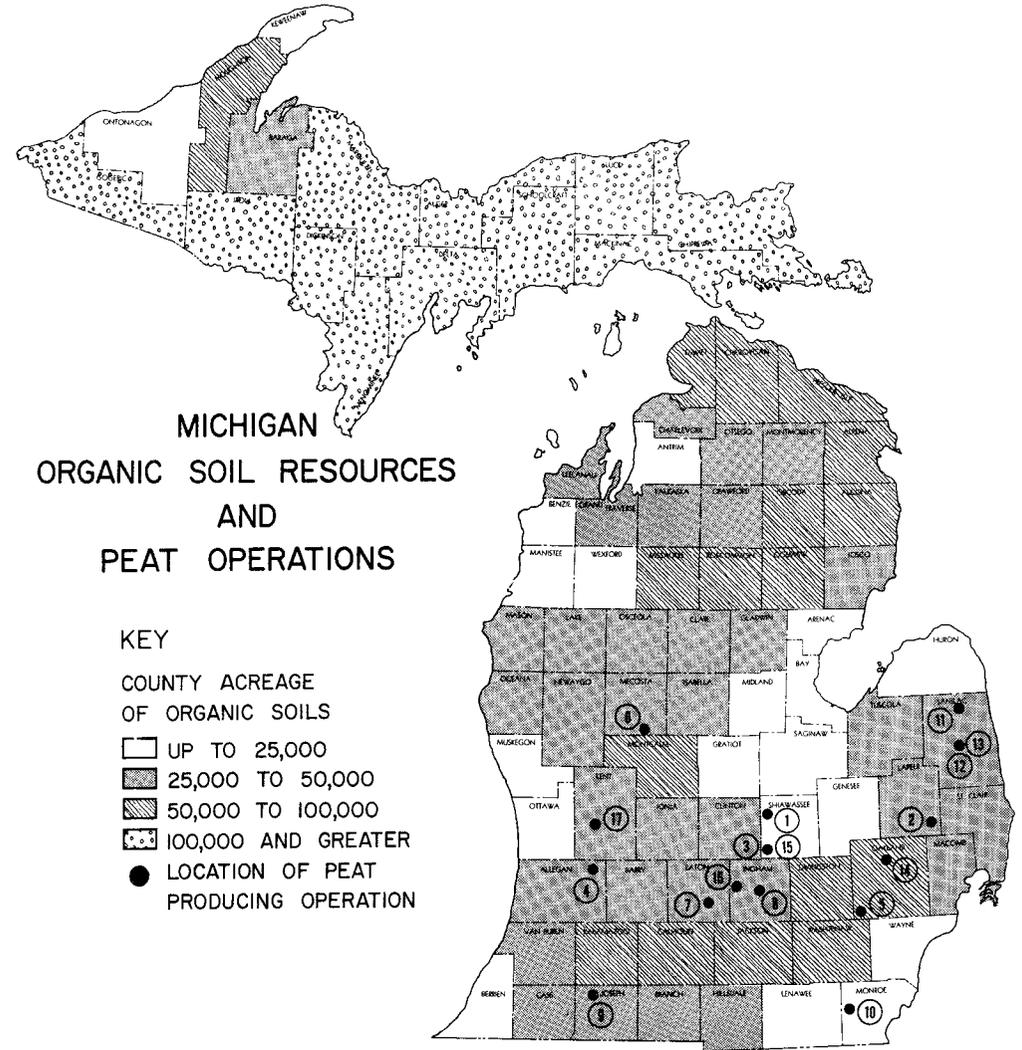


Figure 15 ORGANIC SOIL RESOURCES AND OPERATIONS 1978



SALT DEPOSITS

by W. A. Walden and M. A. Gere

Salt deposits, bedded rock salt, have been utilized as a source of sodium chloride since 1881. This was shortly after the first discovery of salt in Michigan, during the drilling of an unsuccessful oil and gas well at the Town of Manistee in Manistee County. Shortly thereafter, salt was discovered in St. Clair County in 1882 and utilized in 1883.

Since discovery, bedded salt has replaced natural brine as a source of sodium chloride. The higher sodium chloride content of salt deposits makes it more economical to utilize and there is much less waste in the processing.

Bedded salt is extracted by two different methods in Michigan: Dry mining and Solution mining.

Dry mining is the conventional type of underground mining which most people think of when the word mining is used. The International Salt Co., Inc. uses this method to produce rock salt in Michigan. Their Detroit Mine underlies about 900 acres of the cities of Detroit and Melvindale at a depth of approximately 1100 feet. Since 1910 about 36 million tons of salt have been produced from this mine.

Solution mining of bedded salt is done by pumping water into a known bed of solid salt within the bedrock in the ground. The salt is dissolved by the water and produces an artificial brine, or sodium chloride rich water. The artificial brine is then pumped out of the ground and salt and other chemicals are removed from it by different methods. The remaining salt and chemical companies listed use this method.

Michigan's production of artificial brine was reduced somewhat on December 1, 1978. That is when the BASF Wyandotte Corporation ceased producing soda ash by the Solvay process at their chlor-alkali plant at Wyandotte. The company is still using salt brine for the production of chlorine.

The accompanying map shows the extent of the various ages of bedded salt deposits. The location and type of extraction and geologic age of the salt beds are indicated.

COMPANIES PRODUCING AND UTILIZING BEDDED SALT

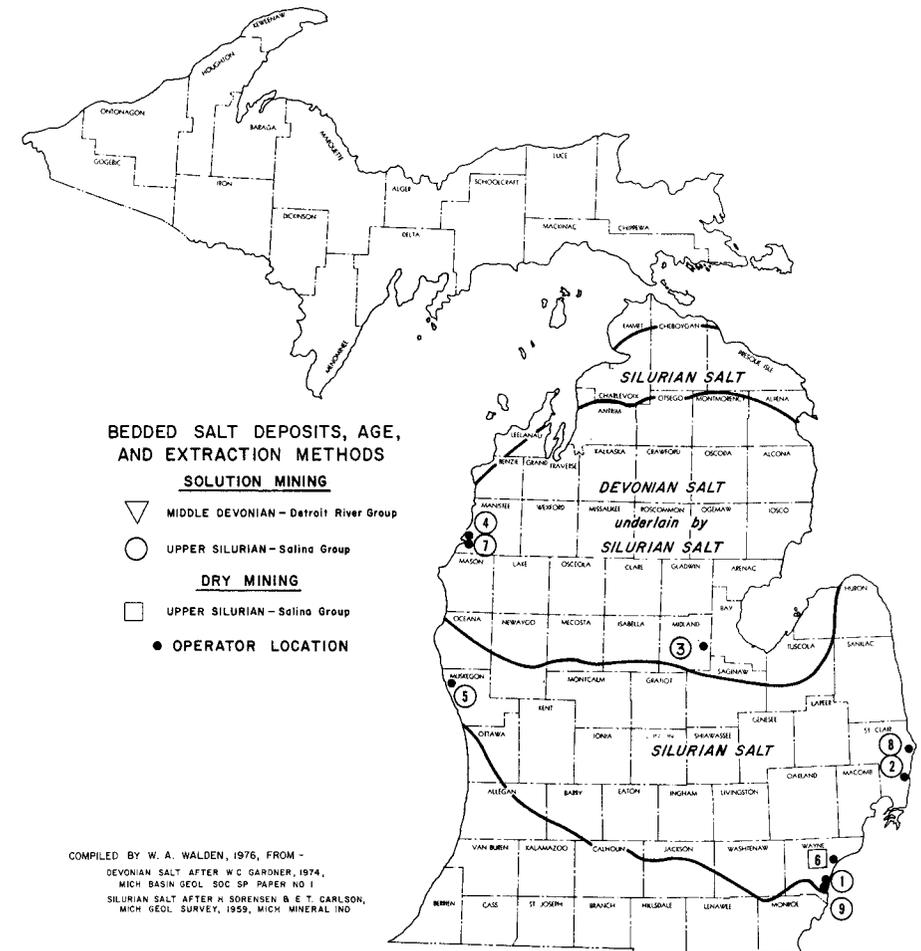
Company and Address	Map No.	Product	Location
BASF Wyandotte Corp. 1609 Biddle Avenue Wyandotte, Michigan 48192	S (1)	Salt brine (chlorine, soda ash)	At Wyandotte WAYNE COUNTY
Diamond Crystal Salt Co. 916 S. Riverside St. Clair, Michigan	S (2)	Evaporated salt	At St. Clair, Sec. 31, T5N, R17E ST. CLAIR COUNTY
Dow Chemical Co. 2020 Dow Center Midland, Michigan 48640	S (3)	Salt brine (chlorine)	At Midland MIDLAND COUNTY
Hardy Salt Co. 1501 Main St. Manistee, Michigan 49660	S (4)	Evaporated salt	At Manistee MANISTEE COUNTY
Hooker Chemical and Plastics Corp. P. O. Box 295-01d Channel Trail Montague, Michigan 49437	S (5)	Salt brine (chlorine, caustic soda, hydrogen)	At Montague NE 1/4 Sec. 31, T12N, R17W MUSKEGON COUNTY

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SALT DEPOSITS CONTINUED

Company and Address	Map No.	Product	Location
International Salt Co., Inc. Detroit Mine: 12841 Saunders St. Detroit, Michigan 48217	F (6)	Rock salt	At Detroit SW Ext. Sec. 32, T2S, R1E WAYNE COUNTY
Morton Salt Co. Div. Morton-Norwich Products, Inc. 180 Sixth St. Manistee, Michigan 49660	S (7)	Evaporated salt, salt brine	At Manistee E 1/2 Sec. 12, T21N, R17W MANISTEE COUNTY
Marysville plant 601 Busha Hwy. Port Huron, Michigan 48040	S (8)	Evaporated salt	At Marysville SE 1/4 Sec. 29, T6N, R17E ST. CLAIR COUNTY
Pennwalt Corp. 4655 Biddle Ave. Wyandotte, Michigan 48192	S (9)	Salt brine (chlorine, caustic soda, hydrogen)	At Wyandotte WAYNE COUNTY

Figure 16 BEDDED SALT DEPOSITS AND OPERATIONS 1978



SAND AND GRAVEL

Sand and Gravel are important nonmetallic mineral commodities in this State. Michigan consistently ranks in the top 2nd to 4th place in the U.S. in the value of sand and gravel produced annually. In 1977 over 46.9 million short tons of sand and gravel valued at over 97.9 million dollars were produced. The 1978 preliminary figures are greater for both production and value. These values include both construction sand and gravel and industrial sand.

When the glaciers grew and pushed across the state many thousands of years ago, they bulldozed around a tremendous amount of broken rock, sand, and clay. The glaciers finally melted away about 10,000 to 15,000 years ago and left the materials behind in a number of forms. Some of the material was left as a mixture in the form of end moraines, ground moraines, etc. In other locations the melt waters reworked the material and sorted out areas of sand, areas of gravel, and some of mostly clay. Along the shores of the Great Lakes the water and wave action has done more sorting and breaking down of materials and the prevailing westerly winds have built large sand dunes along the western coast of the state. It is in the sorted out areas where good deposits of clean sand, sand and gravel, or clay are now available for extraction for use by man.

Construction sand and gravel and industrial sand are actually separate commodities with different specifications and uses. Thus, they are handled separately on the following pages.

CONSTRUCTION SAND AND GRAVEL

Nearly 41.1 million short tons of construction sand and gravel, valued at almost 72.6 million dollars, were produced in Michigan in 1977, down slightly in production and up in value from 1976. The production rate rises and falls with the economy. As construction, especially of roads, increases or decreases, so does the rate of production of construction sand and gravel.

Sand and gravel is a relatively heavy, bulky commodity and the per ton value is low, so the cost of transportation becomes a very important item. Thus, the distance between the source pit and the location where it is used is usually kept to a minimum. Not all areas of the state are blessed with abundant sand and gravel deposits, so costs vary greatly depending upon location.

The use of construction sand and gravel is greater in urban areas due to more construction there. However, urban areas frequently build over sand and gravel deposits, forcing the transportation of building materials from more distant, but usable, sites. If more geologic insight were used in urban and highway planning and zoning, known areas of good sand and gravel deposits, or other potentially usable minerals, may be excluded from urbanization until the mineral commodities are extracted and the mining surface reclaimed. This would result in more efficient utilization of our nonrenewable resources. Like the old saying "Gold is where you find it", we do not have the choice of obtaining minerals where we would like them to be, but must be able to obtain them from where they actually are.

Following is a list of the known construction sand and gravel producers in the state, information on their types of operations, and the counties in which they operate. Also included is a list of State owned gravel pits which are periodically leased and worked by various operators. Additional sand and gravel pit locations are frequently established by lease on Federally owned lands.

A comprehensive listing of sand and gravel pits from which material has been tested by the State Department of Transportation is available. The list is arranged by county, includes county maps showing pit locations, and abrasion and soundness test results are given when available. Copies of the "Aggregate Source Inventory" may be obtained for \$12.00 plus postage and sales tax, prepaid, from: Publications Unit, Contract Section, Michigan Department of Transportation, Box 30050, Lansing, MI 48909.

CONSTRUCTION SAND AND GRAVEL F

Type of Operations:	(HMS) - Heavy media separation equipment
D - Dredge	
DI - Dragline	Crushing and Screening equipment
F - Front end loader	S - Stationary
Sh - Shovel	P - Portable
BR - Bank Run	

Name of Operation/Office Address	Type of Operation	County
A A.B.C. Sand Co. 36444 Cowan Rd. Westland, Michigan 48181	(D 1)	WAYNE
Abram, Rueben, Excavating Box 57 Gould City, Michigan 49838	(BR)	MACKINAC
Adrian Sand & Gravel Company 7831 Sylvania Avenue Sylvania, Ohio 43560	(P)	LENAWEE
Aggregate Materials Corp. 598 Conrad Rd. Niles, Michigan 49120		CASS
Aggregate Processors, Inc. Box 566 White Pigeon, Michigan 49099	(D)	ST. JOSEPH
Ajax Materials Corporation 5700 E. Nevada Detroit, Michigan 48234	(S, BR)	OAKLAND
Albert Sand & Gravel, Inc. 4621 Wilcox Road Holt, Michigan 48842	(D, S)	LIVINGSTON
Albrecht Sand & Gravel Co. 3790 W. Sanilac Rd. Sandusky, Michigan 48471	(P)	SANILAC
Alcona County Road Commission 301 N. Lake Street Lincoln, Michigan 48742	(P)	ALCONA
Alger County Road Commission Drawer 359 Munising, Michigan 49862	(P, BR)	ALGFR
Allied Chemical Corporation 1200 Lake George Road Attica, Michigan 48412	(P, BR)	LAPEER
Alpena Aggregate, Inc. 7590 Weiss Road Alpena, Michigan 49707	(P)	ALPENA
Alpena County Road Commission 1400 N. Bagley Alpena, Michigan 49707	(F, P, BR)	ALPENA

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
American Aggregates Corporation Drawer 160 Greenville, Ohio 45331	(D1, S) (D, Sh, F, S) (D1, S) (D, D1, S)	KALAMAZOO, LIVINGSTON (HMS), MACOMB (HMS), OAKLAND (HMS)
Andersen Sand & Gravel Co. 1705 Boxwood Street P. O. Box 1806 Saginaw, Michigan 48601	(D, S)	TUSCOLA
Anderson Gravel & Excavating Co. 233 Thurman Bellding, Michigan 48809	(F, P, BR)	MONTCALM
Arenac County Road Commission 116 Bridge Street Omer, Michigan 48749	(F, BR)	ARENAC
B & K Sand & Gravel Rt. #1 Wallace, Michigan 49893	(S)	MENOMINEE
Balkema, Henry, Sand & Gravel 7758 Kilowatt Dr. Kalamazoo, Michigan 49001	(F, BR, P)	KALAMAZOO
Baraga County Road Commission P. O. Box 227 L'Anse, Michigan 49946	(D1, F, P, BR)	BARAGA
Barry County Road Commission P. O. Box 158 1845 W. Gun Lake Road Hastings, Michigan 49058	(F, Sh, BR, P)	BARRY
Beckman Bros., Inc. 3455 W. Baker Road, P.O. Box 268 Shelby, Michigan 49455	(F, D1, P, S)	OCEANA
Bedrock Aggregates 4225 W. Columbia Rd. Mason, Michigan 48842		INGHAM
Beeman Trucking & Bulldozing Co. Rt. #1 Grawn, Michigan 49637	(F, P, BR)	GRAND TRAVERSE
Bennett Excavating & Gravel Co., Inc. 10835 Hamburg Road Hamburg, Michigan 48139	(D1, P)	LIVINGSTON
Bentley Sand and Gravel Co. 9220 Bennet Lake Road Fenton, Michigan 48430	(F, S)	LIVINGSTON

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Benzie County Road Commission 13118 Main St. Honor, Michigan 49640	(P)	BENZIE
Berenthal Sand & Gravel, Inc. 2021 Gates St. P. O. Drawer L Reese, Michigan 48757	(F, D, S)	TUSCOLA
Bichler Gravel & Concrete Co. Box 263 Escanaba, Michigan 49829	(F, S)	DELTA
Bit-Con Corp., Plant 6 900 Boogie Lake Road Milford, Michigan 48042		OAKLAND
Blumke Excavating Co., Inc. Box 126A Alanson, Michigan 49706	(S)	EMMET
Boerman, John, Sand & Gravel Route 4 Allegan, Michigan 49010		ALLEGAN
Boichot Concrete Corporation 1800 Turner Street P. O. Box 5247 Lansing, Michigan 48906	(D, BR, S)	CLINTON (HMS)
Brade Ready-Mix & Concrete Co. 108 Joan St. Kinde, Michigan 48445	(D1, S, BR)	HURON
Branch Co. Road Commission 23 E. Garfield Coldwater, Michigan 49036		BRANCH
Briggs, Gale, Inc. 311 State Street Charlotte, Michigan 48813	(D, S, BR)	EATON (HMS)
Britton, Don, Inc. 1480 Westwood Road Marquette, Michigan 49855	(F, BR)	MARQUETTE
Brow, Gene, Construction Co. 1124 Rt. #2 Newberry, Michigan 49868	(D1, F, P)	LUCE, MACKINAC
Brownell Sand & Gravel Co. 14020 Morley Rd. Manitou Beach, Michigan 49253		LENAWEE

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Bunting Sand & Gravel Prod., Inc. 3247 Cook Road West Branch, Michigan 48661	(F, Sh, P)	OGEMAW
C & L Gravel Co. 10660 Linden Dr., N.W. Grand Rapids, Michigan 49504	(S)	OTTAWA
Calhoun County Road Commission County Building 13300 - 15 Mile Rd. Marshall, Michigan 49068		CALHOUN
Carter, George S., Co., Inc. 5800 Van Dyke Road Almont, Michigan 48003	(P)	MACOMB
Cash & Carry Gravel Co. P. O. Box 1105A Holland, Michigan 49423	(P)	ALLEGAN
Cass County Road Commission P. O. Box 68 Cassopolis, Michigan 49031	(F, P, D)	CASS
Central Michigan Sand & Gravel Co. 505 Austin Road Ovid, Michigan 48866	(F, S, BR)	SHIAWASSEE (HMS)
Certified Sand & Gravel 869 Marshall Road Coldwater, Michigan 49036	(D, S)	BRANCH
Champion, Inc. 105 E. "A" Street P. O. Box 490 Iron Mountain, Michigan 49801	(Sh, S)	DICKINSON
Charlevoix County Road Commission Box 39 1051 E. Division Boyne City, Michigan 49712	(F, BR)	CHARLEVOIX
Cheboygan Cement Products, Inc. 702 Lafayette Avenue Cheboygan, Michigan 49721	(F, P)	CHEBOYGAN
Cheboygan County Road Commission 729 N. Main Cheboygan, Michigan 49721	(Sh, BR, P)	CHEBOYGAN

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Clare County Road Commission 3900 Mannsiding Road Harrison, Michigan 48625	(F, BR)	CLARE
Click Sand & Gravel P. O. Box 273 Port Huron, Michigan 48060	(D)	ST. CLAIR
Coit Avenue Gravel Company, Inc. 4772 Coit Avenue NE Grand Rapids, Michigan 49505	(D, S, BR)	KENT
Cole Brothers Contr., Inc. 4100 Dickman Road Battle Creek, Michigan 49015	(F, P, S)	CALHOUN, JACKSON
Combs, Emil Gravel & Ready Mix 3250 18½ Mile Road Tekonsha, Michigan 49092	(D1, S, BR)	CALHOUN
Compton Sand and Gravel Co. 203 Brook Dr. Romeo, Michigan 48065	(D1, P, BR)	MACOMB, OAKLAND
Concrete Services, Inc. W. Front Street Traverse City, Michigan 49684	(D1, F, S)	GRAND TRAVERSE
Consumers Sand & Gravel Co. P. O. Box 231, Nazareth Rd. Kalamazoo, Michigan 49005	(D, S)	KALAMAZOO
Contractors Gravel Co. Box 83 Sparta, Michigan 49345	(D1, S, BR)	KENT
Corey & Hartwig, Inc. 4353 Pratt Road Hadley, Michigan 48455	(P, S, BR)	LAPEER
Cousineau Gravel Co., Inc. P. O. Box 222 Big Rapids, Michigan 49307	(F, P, S)	KENT, MECOSTA, NEWAYGO, OSCEOLA, OTTAWA
Covington Construction Co. Covington, Michigan 49919	(F, BR)	BARAGA
Crandell Trucking Co. 800 Island Highway Charlotte, Michigan 48813	(F, P, BR)	EATON, IONIA
D. & B. Service, Inc. R#1 Eckerman, Michigan 49728		CHIPPEWA

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
D. & J. Gravel Co., Inc. R#2 4950 Mason Road Howell, Michigan 48843	(D, S)	LIVINGSTON
Dean, Henry, & Sons P.O. Box 184 Onaway, Michigan 49765	(P)	CHEBOYGAN, PRESQUE ISLE
DeBoer Materials R#1, Box 81 Three Rivers, Michigan 49093	(S)	ST. JOSEPH
Delta County Road Commission P. O. Box 298 Escanaba, Michigan 49829	(P)	DELTA
Dennison Construction Co. 7205 Simons Lexington, Michigan 48450	(F, BR)	SANILAC, GLADWIN
Devries, E., & Sons Sand & Gravel 959 Bristol Avenue NW Grand Rapids, Michigan 49504	(F, S, BR, D)	KENT
DeVries, Jack, Excavating Co. 6490 East Fulton Ada, Michigan 49301		KENT
DeWent Gravel Company 0-1600 Chicago Drive Jenison, Michigan 49428	(D1, F, S, BR)	OTTAWA
Dickinson Co. Hwy. Dept. 1107 S. Milwaukee Avenue Iron Mountain, Michigan 49801	(P, BR)	DICKINSON
Drenth Brothers, Inc. P. O. Box 197, R. #1 Ellsworth, Michigan 49729	(F, P, BR)	ANTRIM
Dubey, Earl, & Sons R. #3 Alpena, Michigan 49707		ALPENA
Du-Pine Company 1241 South Maple Road Ann Arbor, Michigan 48106	(D1, F, P)	WASHTENAW
Dunbar Sand & Gravel P. O. Box 246 Cadillac, Michigan 49601	(D1, F, S, BR, D)	WEXFORD
Dyer Company Box 98 McBrides, Michigan 48852	(D1, P, D)	MONTCALM

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
E Eastman Gravel Pit R#1 422 Stover Road Standish, Michigan 48658	(D, S)	ARENAC
Eichenberg, Howard, Contracting R#1 1322 Osborn White Cloud, Michigan 49349	(P, BR)	MANISTEE
Emmet County Road Commission Box 0 Petoskey, Michigan 49770	(D1, P, BR)	EMMET
F Fayas & Sons, Inc. 609 Carpenter Ave. Kingsford, Michigan 49801	(F, S, BR)	DICKINSON
Fenton Gravel Co., Inc. 11301 Fenton Hill Road P.O. Box 21 Fenton, Michigan 48430	(D1, F, P)	LIVINGSTON
Fischer Gravel Co. 2604 S. Snyder Road Wellston, Michigan 49689	(P, BR)	MANISTEE
Fisher Sand & Gravel Co. 921 S. Jefferson Avenue Midland, Michigan 48640	(D1, P)	CLARE
Fitzgerald Gravel Co. 3990 E. Six Mile Creek Owosso, Michigan 48867	(D1, F, BR)	SHIAWASSEE
Fleming Gravel Company 122nd Avenue R#3 Allegan, Michigan 49010	(F, D, P)	OTTAWA
Franke Septic Tank Co. R#1 Tustin, Michigan 49688		WEXFORD
Fransted Construction 4275 Wolf Lake Road Grass Lake, Michigan 49240		JACKSON
Fuoss Gravel Company R#1 Durand, Michigan 48429	(D, D1, F, S, P, BR)	SHIAWASSEE
G Gilliland Construction Co., Inc. 2607 Werth Road Alpena, Michigan 48054		ALPENA, PRESQUE ISLE

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Gillisse Gravel Company P. O. Box 278 Grandville, Michigan 49418	(D1, S,)	KENT
Glancy, R. E., Inc. 1055 S. Bay Drive Tawas City, Michigan 48763	(F, P)	ALCONA, ALPENA, IOSCO, OGEMAW, OSCODA, OTSEGO MONTMORENCY
Globe Industries Inc: Mill Street Ironwood, Michigan 49938	(P, BR)	GOGEBIC
Gogebic County Road Commission New County Building Bessemer, Michigan 49911	(Sh, P, BR)	GOGEBIC
Gordon, James A. R#3, Box 123 Sault Ste. Marie, Michigan 49783	(BR)	CHIPPEWA
Grand Rapids Gravel Co. 2700-28th Street SW Grand Rapids, Michigan 49509	(D1, S)	KENT
Grand Traverse County Road Comm. 3949 Silver Lake Road Traverse City, Michigan 49684	(F, P)	GRAND TRAVERSE
Grand Valley Gravel Company 10578 Linden Drive NW Grand Rapids, Michigan 49540	(F, S)	OTTAWA
Gratiot County Road Comm. 920 E. Center Street Ithaca, Michigan 48847	(F, BR)	GRATIOT
Great Lakes Gravel Co. 490 Spaulding SE Grand Rapids, Michigan 49506	(F, S)	KENT
Great Lakes Gravel Co., Inc. 1455 E. Romeo Road Leonard, Michigan 48038	(F, P, BR)	OAKLAND
Gronlund Gravel Company R#2, Box 28 Bear Lake, Michigan 49614	(P)	MANISTEE
H Halliday Sand & Gravel, Inc. Route #79, Box 331 Houghton Lake, Michigan 48629	(P)	OGEMAW, ROSCOMMON
Haltunen Sand & Gravel Box 155 Copper City, Michigan 49917	(F, P)	HOUGHTON

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Hamilton Block & Redi-Mix, Inc. R#3, 4510-132nd. Ave. Hamilton, Michigan 49419	(P)	ALLEGAN
Harris Excavation Company Route 1 Greenville, Michigan 48838	(P)	MONTCALM
Havelka Construction Co. R#1 Wallace, Michigan 49893	(D1, BR, D, P)	MENOMINEE
Hayes Washed Sand & Gravel Co., Inc. 15205 Middlebelt Road Livonia, Michigan 48154	(D1, F, P, BR)	OAKLAND
Hersey Sand & Gravel, J. P. Burroughs & Son, Inc. Aggregate Division P.O. Box 1468 Saginaw, Michigan 48605	(F, S BR)	OSCEOLA (HMS)
Hillsdale County Road Comm. P.O. Box 357 294 Hudson Road Hillsdale, Michigan 49242	(F, P, BR)	HILLSDALE
Hillsdale Sand and Gravel Co. c/o Miller Bros. Construction Archbold, Ohio 43502		HILLSDALE
Hocking, George, Construction Co. Box 488 3rd and Champiom Street South Range, Michigan 49963	(P)	HOUGHTON
Hodgkiss & Douma, Inc. P. O. Box 311 Petoskey, Michigan 49770	(F, P, BR)	CHARLEVOIX
Hoffman Bros., Inc. 1355 Dickman Road Battle Creek, Michigan 49015	(F, BR)	CALHOUN
Holloway Sand & Gravel Co., Inc. Div. of Holloway Construction Co. 29250 Wixom Rd. Wixom, Michigan 48096	(D1, P)	OAKLAND, WASHTENAW, OSCODA
Holly Sand & Gravel, Aggregate Division of J. P. Burroughs & Son, Inc. P. O. Box 1468 Saginaw, Michigan 48605	(F, S, BR)	OAKLAND (HMS)
HoImberg Concrete Mounted Route - Kipling Location Gladstone, Michigan 49837	(D1, S)	DELTA

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Hoogerhyde Sand & Gravel Co R#1, Box 92 Gaylord, Michigan 49735	(F, P)	OTSEGO
Houghton County Road Comm. P.O. Box 269 Hancock, Michigan 49930	(F, P)	HOUGHTON
Hubscher & Son, Inc. P. O. Box 411 Mt. Pleasant, Michigan 48858	(D, D1, P, BR, S)	CLARE, GRATIOT, ISABELLA
Huhtala Construction, R.H. Rt. 2, Box 16 L'Anse, Michigan 49946	(P)	BARAGA
Huizenga Gravel Company 10015 Gordon Zeeland, Michigan 49464	(D1, S)	OTTAWA
Hutfilz, Walter 2850 Bay Road Saginaw, Michigan 48601		SAGINAW
I Indiana Hwy. Materials, Inc. 705 S. Beiger St. Mishawaka, Indiana 46544	(D1, F, P)	CASS
Ionia County Road Comm. 169 E. Riverside Dr., Box 76 Ionia, Michigan 48846	(F, P, BR, D)	IONIA
Iosco County Road Comm. 810 W. Westover East Tawas, Michigan 48730	(F, P, BR)	IOSCO
Irish Hills Gravel Co. 1100 S. Jackson Cement City, Michigan 49200	(D1, F, S)	LENAWEE
Iron County Road Comm. County Court House Crystal Falls, Michigan 49920	(D1, P, S)	IRON
Iron Mountain, City of Iron Mountain, Michigan 49801		DICKINSON
Ironwood Concrete Products Co. P. O. Box 486 Ironwood, Michigan 49938	(S)	GOGEBIC
Isabella County Road Comm. 2261 E. Remus Road Mt. Pleasant, Michigan 48858	(F, P, BR)	ISABELLA

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
J John R. Sand & Gravel Co. 19225 John R. Detroit, Michigan 48303	(D1, S)	LAPEER
Johnson, Norman, Company R#1, Box 111 Daggett, Michigan 49821	(F, BR)	MENOMINEE
Jolly Road Sand Company 1842 Jolly Road Mason, Michigan 48854	(F, BR)	INGHAM
K K & V Gravel Company 403 Cherokee Drive Fremont, Michigan 49412	(S)	NEWAYGO
Kalkaska County Road Commission 1049 Island Lake Road Kalkaska, Michigan 49646	(D1, BR)	KALKASKA
Kalin, Construction, Inc. 3403 Niles Road St. Joseph, Michigan 49805	(P)	CASS
Karber Gravel Company 917 Church Street St. Johns, Michigan 48879	(D, S)	CLINTON
Kent County Road Commission 1500 Scribner Ave. NW Grand Rapids, Michigan 49504	(BR)	KENT
Keweenaw County Road Commission Mohawk, Michigan 49950	(F, P)	HOUGHTON
Kiell Excavating Company Niles, Michigan 49120	(F, BR)	BERRIEN
Kish's Gravel Co. 13164 Seymour Montrose, Michigan 48457		GENESEE
Klumpp Bros. Gravel Co. 3342 Page Avenue Jackson, Michigan 49203	(Sh, S)	JACKSON
Koboski Ready-Mix 114 Washington Street Petoskey, Michigan 49770	(D, S)	EMMET
Koenig Fuel & Supply Co. 1955 Lakeville Road Oxford, Michigan 48051	(D1, S, BR, D)	OAKLAND (HWS)
Kruse Gravel Company 1090 W. Clark Road Ypsilanti, Michigan 48197	(D1, F, S, BR)	WASHTENAW

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Krygoski Construction Co. P.O. Box 116, 2511 - 10th Menominee, Michigan 49858	(D1, F, P)	MARQUETTE
Kurtz Gravel Company G-5300 N. Dort Highway Flint, Michigan 48505	(D1, S, BR)	OAKLAND
Lake City Redi-Mix, Inc. P.O. Box 333 Lake City, Michigan 49651	(P, BR)	MISSAUKEE
Lake Construction Company P.O. Box 427 Indian River, Michigan 49749	(F, BR, P)	ALCONA, CHEBOYGAN, OTSEGO
Lake County Road Commission P.O. Box 245 1180 N. Michigan Ave. Baldwin, Michigan 49304	(D1, P)	LAKE
Lake Sand and Gravel Co. P.O. Box 829 Baldwin, Michigan 49304		LAKE
Lamar Gravel Co., Inc. R#2 Grawn, Michigan 49637	(P)	GRAND TRAVERSE
Lapeer Co. Road Comm. Box 327 Lapeer, Michigan 48446		LAPEER
Larson, Mel, Sand & Gravel Tuttle Road, Rt. 4 Ionia, Michigan 48846		IONIA
Leelanau County Road Comm. P.O. Box 337 Suttons Bay, Michigan 49682	(D1, P)	LEELANAU
Liberty Sand Company Box 1046 Ann Arbor, Michigan 48106	(F, S, BR)	WASHTENAW
Lindberg, A., & Sons, Inc. 560 Mather Avenue Ishpeming, Michigan 49849	(F, Sh, P, S, BR)	DICKINSON, MARQUETTE
Livingston County Road Comm. 918 North Street Howell, Michigan 48843	(S, BR, P)	LIVINGSTON, SHIAWASSEE
Long Lake Gravel, Inc. 758 Lakewood Road Traverse City, Michigan 49684	(P)	GRAND TRAVERSE, LAKE, LEELANAU, MANISTEE
Luce County Road Comm. P.O. Box 401 Newberry, Michigan 49868	(D1, F, P, BR)	LUCE
Lyon Sand & Gravel Co. (Div. E. C. Levy Company) 51455 W. Twelve Mile Road Wixom, Michigan 48906	(F, S)	OAKLAND (HMS)

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Marby & Melton Sand & Gravel Co. 251 W. Montcalm Pontiac, Michigan 48053	(F, P)	OAKLAND
Mackinac County Road Comm. State A Street St. Ignace, Michigan 49781	(F, BR, P)	MACKINAC
Mackinac Gravel Co. P. O. Box 427 Indian River, Michigan 49749		CHIPPEWA, CHEBOYGAN
Manistee County Road Comm. 425 Parkdale Avenue Manistee, Michigan 49660	(BR, P)	MANISTEE
Marquette County Road Comm. N. Second Street Ishpeming, Michigan 49849	(F, Sh, P, BR)	MARQUETTE
Marsack Sand & Gravel, Inc. 20900 - 14 Mile Road Roseville, Michigan 48066	(D1, S, BR)	MACOMB
Martin Aggregates, Inc. 1520 E. Main Street Lansing, Michigan 48912	(D1, S)	CLINTON
Marvic, M., and Sons 1514 N. 16th. St. Escanaba, Michigan 49829	(Sh, P)	DELTA
Mason County Road Comm. P. O. Box 247 Scottville, Michigan 49454	(S)	LAKE
Mason Gravel Co. R#4, Box 289 Gaylord, Michigan 49735	(Sh, D, P)	OTSEGO
McGuire, John Lakeshore Road Ontonagon, Michigan 49953		ONTONAGON
McMahon Brothers Box 530 Iron River, Michigan 49935		DELTA, MACKINAC
Mecosta County Road Comm. 120 N. DeKraft Avenue Big Rapids, Michigan 49307	(P)	MECOSTA
Menominee County Road Comm. 3222-10th Street Menominee, Michigan 49858	(P, BR)	MENOMINEE
Michigan Aggregates Corp. Rt. 1 Jerome, Michigan 49249	(D1, F, S)	HILLSDALE, (HMS)

CONSTRUCTION SAND AND GRAVEL (CONT'D)

Name of Operation/Office Address	Type of Operation	County
Mickelson Corporation 435 Granger Road, P. O. Box 92 Oxford, Michigan 48051	(F, D1, P, S, BR)	OAKLAND (HMS)
Middleton Gravel Co. 713 Burroughs Flint, Michigan 48507		OAKLAND
Mid-Michigan Materials, Inc. 6929 Fisher Road Jeddo, Michigan 48032	(F, S, BR)	SANILAC
Mil-Co. Trucking 509 Jackson Street Archbold, Ohio 43502	(D1, F, S)	HILLSDALE
Miller, Dave 2323 Gerald H. Miller Rd. Prescott, Michigan 48756	(D1, P, BR)	OGEMAW
Miller, George, & Sons, Inc. 3300 Hollywood Rd. St. Joseph, Michigan 49085	(D1, P)	CALHOUN, HILLSDALE, KALAMAZOO, ST. JOSEPH
Miller, Paul C. 1110½ - 13 Mile Rd. Sparta, Michigan 49345	(D1, F, P)	OCEANA
Miller Prod. & Supply Co. P. O. Box 548 North U. S. -2 Iron Mountain, Michigan 49801	(F, P)	DICKINSON
Miller Sand & Gravel Co. 1466 - 120 Avenue West Hopkins, Michigan 49328	(D1, F, S, BR)	ALLEGAN
Milliken, Jack, Inc. Rt. 5, Box 5058 Grayling, Michigan 49738		CRAWFORD
Millington Gravel Co. P. O. Box 1 Millington, Michigan 48746	(D1, F, S)	TUSCOLA
Missaukee County Road Comm. P. O. Box A Lake City, Michigan 49651	(F, BR)	MISSAUKEE
Molesworth Contracting Co. P. O. Box 159, 7727 Brockway Drive Yale, Michigan 48097	(D1, P)	HURON, LAPEER, LIVINGSTON, OAKLAND, SANILAC, ST. CLAIR
Montmorency County Road Comm. Rt. #2, Box 50 Atlanta, Michigan 49709	(BR)	MONTMORENCY
Moore Bros. Sand & Gravel 3701 Henry Russ Rd. Romulus, Michigan 48174	(D, S)	WAYNE

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Morgan Sand & Gravel Co. 1875 Old U.S. 23 Brighton, Michigan 48116	(F, D, S, BR)	LIVINGSTON, MACOMB
Muskegon Gravel & Redimix Co. R. R. #1, Box 183 Ravenna, Michigan 49451	(S)	OTTAWA
N Nashville Gravel Company 9000 Huntington Rd. Battle Creek, Michigan 49017	(D, F, S)	CALHOUN (HMS)
National Aggregates Corp. 6911 M-52 Hwy. Manchester, Michigan 48158	(F, S, BR)	WASHTENAW
Natural Aggregates Corp. 65545 Mound Road Romeo, Michigan 48065	(D, S, BR)	LIVINGSTON (HMS), MACOMB (HMS)
Neadow, James R#1 Cooks, Michigan 49817	(F, BR, S)	SCHOOLCRAFT
Nieb Concrete Prod. Company (Niles Sand & Gravel Div.) 2779 Hoyt Drive Niles, Michigan 49120	(F, S)	CASS
Northeast Gravel Company 4300 Cannonsburg Road NE Belmont, Michigan 49306	(D1, S)	KENT
Nurmella Sand & Gravel, Inc. Star Rt., Box 3 Michigamme, Michigan 49861		BARAGA
O Oceana County Road Comm. P. O. Box 112 Hart, Michigan 49420	(D1, F, P, BR)	OCEANA
O Olson, Rudy Box 12 Quinnisec, Michigan 49876		DICKINSON
Ontonagon County Road Comm. 415 Spar Street Ontonagon, Michigan 49953	(Sh, P, BR)	ONTONAGON
Osceola County Road Comm. 300 S. Chestnut St. Reed City, Michigan 49677	(F, P, BR)	OSCEOLA
Otisville Stone Company 300 Center Street Otisville, Michigan 48463	(D1, P, BR)	GENESEEE
Otsego County Road Comm. P. O. Box 537 Gaylord, Michigan 49735	(F, P)	OTSEGO

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Ottawa County Road Comm. 616 N. 6th Street Grand Haven, Michigan 49417	(D1, F, BR)	OTTAWA
Oxford Mining Company 9820 Andersonville Road Davisburg, Michigan 48019	(D1, S, BR)	OAKLAND
Ozanich Sand & Gravel Box 115 Engadine, Michigan 49827	(P)	MACKINAC
P. & B. Gravel Company R#3 Ithaca, Michigan 48847	(D, Sh, P, S, BR)	GRATIOT
Page1 Sand & Gravel, Inc. 11580 Brooks Rd. Lennon, Michigan 48449		SHIAWASSEE
Palmer Sand & Gravel 2531 E. South Street Jackson, Michigan 49201	(D1, S)	JACKSON
Paquin & Sons, Inc. R#1 Gladstone, Michigan 49837	(D1, F, P)	DELTA
Paris Gravel Company, Inc. R#1, Box 282 Big Rapids, Michigan 49307	(D1, S, D, BR)	MECOSTA
Parker, Russell G. 295 Hayes NW Comstock Park, Michigan 49321		KENT
Peninsula Asphalt Corp. P. O. Box 726 Traverse City, Michigan 49684	(S)	LEELANAU
Peterhans, H. O., Sand & Gravel 530 Pearl Street Caro, Michigan 48723	(D1, BR)	TUSCOLA
Peters Construction Co., Inc. 3325 E. Kilgore Road Kalamazoo, Michigan 49002	(D1, F, BR)	KALAMAZOO
Petersen Gravel & Excav. 350 Norwood Rockford, Michigan 49341	(S, BR)	KENT
Pickitt & Schreur Div. Reith Riley Const. P. O. Box 1108 Elkhart, Indiana 46514	(P)	KALAMAZOO, KENT OTTAWA
Portable Aggregate Producers, Inc. 4500 E. Nevada Detroit, Michigan 48230	(D1, F, P)	OAKLAND

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Powell Sand & Gravel 2284 Main Street Fairgrove, Michigan 48733	(P)	TUSCOLA
Presque Isle County Road Comm. 1164 S. Bradley Hwy. Rogers City, Michigan 49779		PRESQUE ISLE
Proksch Construction Co. P. O. Box 151, 132-3rd. Avenue Iron River, Michigan 49935	(F, P)	CHIPPEWA, IRON, MACKINAC
Pryor Brothers, Inc. P. O. Box 89 Grand Ledge, Michigan 48837	(S, BR)	EATON
Randall, Clayton Box 44, C Lake Rd. Ironwood, Michigan 49504		GOGEBIC
Raymond Excavating Co., Inc. 800 Gratiot Blvd. Marysville, Michigan 48040	(D1, F, BR)	ST. CLAIR
Ray's Aggregate Co. 2040 Packard Hwy. Charlotte, Michigan 48813	(P)	CALHOUN
Reyhl Sand & Gravel Co. 450 W. Highland Rd. Howell, Michigan 48843	(F, BR)	LIVINGSTON
Richmond Sand & Gravel Box 178 Richmond, Michigan 48062	(D)	MACOMB
Riverside Sand and Gravel Co. 1050 Maynard Avenue SW Grand Rapids, Michigan 49504	(F, Sh, BR)	KENT
Riverview Gravel Co. 805 Taylor Street Jeninson, Michigan 49428	(F, P, BR)	OTTAWA
Rocks Ready-Mix Concrete Co., Inc. 2401 Chicago Drive Grand Rapids, Michigan 49509	(D1, P)	KENT
Roscommon Co. Road Comm. Box 117 Roscommon, Michigan 48653	(BR)	ROSSCOMMON
Roslund Gravel Company 401 S. St. Johns Ithaca, Michigan 48847	(D, BR)	GRATIOT

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
S St. Joseph County Road Comm. Rt. #1 Centreville, Michigan 49032	(F, P, BR)	ST. JOSEPH
Saginaw County Road Comm. 3020 Sheridan Saginaw, Michigan 48601	(D, D1, F, BR)	SAGINAW
Salem Sand & Gravel Aggregates Division of J. P. Burroughs & Son, Inc. P. O. Box 1468 Saginaw, Michigan 48605	(D, F, S, BR)	OAKLAND
Sanderson, C.G., Company 3204 Lakeshore Drive Sault Ste. Marie, Michigan 49783	(F, P, BR)	CHIPPEWA
Sargent Sand Company 2840 Bay Road Saginaw, Michigan 48605	(D1, F, S, BR)	TUSCOLA, SAGINAW GENESEE
Schinella - Mottes Construction Co. P. O. Box 498, West U.S.2 Iron River, Michigan 49935		IRON
Schlegel, Carl, Inc. 16527 Wood Lansing, Michigan 48906	(F, P, BR, S)	CLINTON, INGHAM
Schnurer Excavators, Inc. Rt. 1, Box 459 Manistique, Michigan 49854		SCHOOLCRAFT
Schworm, Inc. P. O. Box 162 - M-37 South Traverse City, Michigan 49684	(F, P)	VARIOUS, GRAND TRAVERSE
See's Sand & Gravel, Inc. 4500-31 Mile Road Romeo, Michigan 48065	(S)	MACOMB
Shiawassee County Road Comm. 112 E. McArthur Street Corunna, Michigan 48817	(D1, F, BR)	SHIAWASSEE
Sievert Brothers, Inc. 200 E. River Street Manistee, Michigan 49660	(D1, F, P)	LAKE
Smith, Bill Sand & Gravel, Inc. P. O. Box 23, 446 12th. Street Otsego, Michigan 49078	(D1, F, P, BR, S)	ALLEGAN
Smith, D. L., Sand & Gravel, Inc. Route #3, Box 289, Bailey Road East Jordon, Michigan 49727	(F, BR)	CHARLEVOIX
Smiths Creek Sand Co., Inc. 2110 Burns Road Smiths Creek, Michigan 48074		ST. CLAIR

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Snider Construction Co., Inc. Box 25, 5791 LaVern Avenue Levering, Michigan 49755	(P)	EMMET
Soo Gravel & Asphalt Co. 1107 W. Easterday Ave. Sault Ste. Marie, Michigan 49783		CHIPPEWA
South Flint Gravel Co., Inc. P. O. Box G Holly, Michigan 48442		OAKLAND
Spartan Aggregates, Inc. P. O. Box 25 Holt, Michigan 48842	(D1, F, P)	CLINTON, EATON, INGHAM, JACKSON, OAKLAND, TUSCOLA, SHIAWASSEE
Standard Aggregate Company 1384 Lake Lansing Rd. Lansing, Michigan 48912	(D, S)	CLINTON
Standard Gravel Company, Inc. Division of Whittaker & Gooding 5800 Cherry Hill Road Ypsilanti, Michigan 48197	(F, P, S)	WASHTENAW
Stevick Gravel Company 7591 S. Meridian Road Clark Lake, Michigan 49234	(P)	JACKSON
Stidham Gravel Company 227 S. Michigan Avenue Hastings, Michigan 49058	(F, S, BR)	BARRY
Stockwell Sand & Gravel R#1 St. Johns, Michigan 48879	(BR)	CLINTON
Stony Lake Sand & Gravel R#1 Augusta, Michigan 49012	(F, SH, S)	KALAMAZOO
Straits Aggregates & Equip. Co. 120 Oak Street Tawas, Michigan 48763	(F, S, P)	PRESQUE ISLE (HMS)
Superior Sand & Gravel, Inc. 1028 Ethel Avenue Hancock, Michigan 49930	(F, P, BR)	HOUGHTON
T Tanton Ready-Mix 2740 E. Deckerville Rd. Deckerville, Michigan 48427	(F, Sh, S, BR)	HURON
Taylor Lumber Co. 360 Meridian Road Cedarville, Michigan 49719		MACKINAC
Tecumseh Gravel Company P. O. Box 247, 6395 Green Hwy. Tecumseh, Michigan 49286	(D, S)	LENAWEE

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Tharp & Kosiba 445 Brown Road Pontiac, Michigan 48053	(P)	OAKLAND
Thelen Gravel & Redi-Mix, Inc. 5900 Clarksville Rd. Portland, Michigan 48875	(F, S, BR)	IONIA
Theut Concrete Products 138 E. Harrington Croswell, Michigan 48422		SANILAC
Thompson Construction Co., Inc. 234 W. Garfield Coldwater, Michigan 49036	(S, F, BR)	BRANCH
Thomson Sand & Gravel, Inc. 48399 W. 7 Mile Rd. Northville, Michigan 48167	(D1, F, P, BR)	WAYNE
Three S Gravel Company 2252 White Street Niles, Michigan 49120	(D1, F, BR)	CASS
Tip-Top Gravel Company Rt. #1 9741 Fulton Street Ada, Michigan 49301	(F, P, BR)	KENT
Tod Gravel Company 6498 W. M-21 Rt. #1 Ovid, Michigan 48866		SHIAWASSEE
Tracy Sand & Gravel P. O. Box 490 Dowagiac, Michigan 49047	(P)	CASS
Traverse City Sand & Gravel Co., Inc. 1117 S. Airport Traverse City, Michigan 49684	(F, P)	GRAND TRAVERSE, LEELANAU
Tri-City Aggregates, Inc. 14300 Shields Road Holly, Michigan 48442	(F, P, BR)	OAKLAND
Tri-County Sand & Gravel, Inc. P. O. Box 266 Alden, Michigan 49612		ANTRIM
Tuckey Block Company 6044 E. Cass City Road Cass City, Michigan 48726	(D, P, BR)	TUSCOLA
Tuscola County Road Comm. 1733 S. Mertz Rd. Caro, Michigan 48723	(BR)	TUSCOLA

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
U Underwood Sand & Gravel Co. 2255 Hamlin Road Utica, Michigan 48087	(D, F, S, BR)	OAKLAND
V Van Buren County Road Comm. Box 156 Lawrence, Michigan 49064	(D1, F, Sh, P, BR)	VAN BUREN
Vergote & Sons Sand & Gravel 44680 Elizabeth Mt. Clemens, Michigan 48043	(F, S)	MACOMB
Vertz, Fred W. Trout Lake, Michigan 49793	(F, BR, P)	MACKINAC
Vollmer Sand & Gravel 136 S. Caseville Road Pigeon, Michigan 48755	(D, F, S)	HURON
W Wagner Ready-Mix 8260 Sand Beach Rd. Harbor Beach, Michigan 48441	(F, Sh, S, BR)	HURON
Walker Industries 900 Bogie Lake Road Milford, Michigan 48042	(D1, F, P)	OAKLAND
Washtenaw County Road Comm. 555 N. Zeeb Road Ann Arbor, Michigan 48106	(D1, F, P, BR)	WASHTENAW
Washtenaw Sand & Gravel, Inc. 4984 Earhardt Ann Arbor, Michigan 48103	(S)	WASHTENAW
Waterford Sanitary Landfill Corp. 7900 Gale Road Pontiac, Michigan 48054		OAKLAND
Wayne Sand & Gravel, Inc. P. O. Box 267, 39891 Ecorse Wayne, Michigan 48184	(D, S)	WAYNE
Weaver, Ronald, Gravel Co., Inc. P.O. Box 116, 729 Williamston Road Dansville, Michigan 48819	(D1, P)	CLINTON, EATON, INGHAM, IONIA, SHIAWASSEE
Weber's Sand & Gravel 350 W. Silverbell Road Pontiac, Michigan 48057	(D1, F, P, S, BR)	LAPEER, OAKLAND
Wedenoja, Melvin Hannu Road Ironwood, Michigan 49938		GOGEBIC
Weldon's Transit Mix, Inc. 1184 N. County Farm Road Harrison, Michigan 48625	(F, S)	CLARE

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
West Branch Sand & Gravel 3350 Rau West Branch, Michigan 48661	(D, S)	OGEMAW
West Shore Constr. Co., Inc. 188 Jefferson St. Zeeland, Michigan 49464	(F, P)	OTTAWA
Western Materials Div. of Medusa Aggregates Co. Box H, 4780 South Hill Rd. New Hudson, Michigan 48165	(DI, F, P, S)	OAKLAND (HMS)
Wexford County Road Comm. P. O. Box 88, 1288 N. Mitchell St. Cadillac, Michigan 49601	(F, P, BR)	WEXFORD
Wexford Gravel Co. 300 Haynes St. Cadillac, Michigan 49601	(F, P, BR)	WEXFORD
Wheeler Transit Mix Concrete 9266 Snows Lake Road Greenville, Michigan 48838	(F, S, BR)	MONTCALM
White, Alden, & Sons Rt. #3, Box 343 Watervliet, Michigan 49098	(F, Sh, P)	BERRIEN
Whitehead, I. L., Co. 1107 W. Easterday Avenue Sault Ste. Marie, Michigan 49783	(P)	MACKINAC
Whittaker & Gooding Co. 5800 Cherry Hill Road Ypsilanti, Michigan 48197	(Sh, S)	WASHTENAW (HMS)
Whittum's Gravel Company Rt. #4, 4728 Whittum Rd. Eaton Rapids, Michigan 48827	(F, S, BR)	EATON
Wicker's, Inc. 6498 Bishop Road Lansing, Michigan 48910	(P, BR)	CLINTON, EATON, INGHAM
Wiggins & Sons Merritt, Michigan 49667	(F, P, D)	ANTRIM, CRAWFORD, MANISTEE, MISSAUKEE
Williams Brothers Asphalt Paving Co., Inc. P. O. Box 54 Saranac, Michigan 48881	(DI, F, P, D)	HURON, IONIA,
Williams Redi-Mix Rt. #1 Crystal Falls, Michigan 49920		IRON
Winkleman Excavating Company Box 16 Lewiston, Michigan 49756	(DI, P)	MONTMORENCY

CONSTRUCTION SAND AND GRAVEL (CONT'D.)

Name of Operation/Office Address	Type of Operation	County
Wolverine Gravel Co. 3790 Puite S.W. Grandville, Michigan 49418		OTTAWA
Woodland Paving Co. P. O. Box 309 Comstock Park, Michigan 49321		KENT
Y Yerington Construction Co. Rt. #3, Box 34 Benton Harbor, Michigan 49022	(DI, P, S)	BARRY, BERRIEN, CASS

STATE OWNED PITS

There are a number of state owned gravel pits which are sometimes mined by private firms through obtaining a mineral permit and paying a royalty to the state. These pits are on lands under the jurisdiction of the D.N.R. and are mined according to a mine plan which includes the overall reclamation of the pit site upon completion of the gravel removal operations. For information concerning specific locations, contact the nearest D.N.R. Forester, or the D.N.R. Forest Management Division, Box 30028, Lansing, Michigan 48909.

Following is a listing of the current D.N.R. gravel pits arranged by county.

ALCONA

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
3	SE SW	10	25 N	9 E
12	NE NW	3	25 N	9 E
122	NE SE	35	25 N	5 E
123	NW SW	36	25 N	5 E
132	NE NW	34	27 N	7 E
180	SE NE	24	27 N	5 E
204	SW SW	19	27 N	5 E
205	W $\frac{1}{2}$ SW & SW NW	32	25 N	9 E
232	NE NE	12	25 N	6 E
236	NE SE	25	27 N	7 E
280	SE NE	24	25 N	7 E
285	SW SW	31	25 N	6 E
313	SW SE	19	27 N	5 E
329	SE NW	6	26 N	9 E
333	S $\frac{1}{2}$ SW & SE	5	26 N	8 E
338	SE	32	26 N	5 E
393	S $\frac{1}{2}$ NE	30	26 N	5 E
394	W $\frac{1}{2}$ SW	30	26 N	5 E
414	SW SW	32	27 N	5 E

ALGER

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
65	SW NW	25	44 N	21 W
66	NE NE	11	45 N	21 W
68	SW NW	19	46 N	17 W
70	SW NE	23	46 N	17 W
98	City of Munising	Lot 2	47 N	19 W
147	NW SE	30	45 N	21 W
215	NE SE	15	46 N	17 W
225	NE SE	15	47 N	17 W
247	SE NW	19	46 N	17 W
319	SW NE	15	46 N	17 W

ALLEGAN

None

ALPENA

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
18	NW SW	2	29 N	6 E
19	NE NE SE	3	29 N	6 E
20	NE NE	23	29 N	6 E
21	SW NW SE	21	30 N	6 E
22	NW NW	34	32 N	8 E

ALPENA (Cont'd.)

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
27	SE SW	33	30 N	6 E
	NE SW	33	30 N	6 E
173	NW NW	31	32 N	5 E
173-A	W $\frac{1}{2}$ SW	30	32 N	5 E
320	SW SW	31	29 N	9 E
321	SE NE	16	31 N	9 E
359	SW SE	14	29 N	6 E
407	SE SW	31	29 N	9 E
408	NE NE & NE SW	12	31 N	6 E
409	NE NW	30	32 N	5 E
451	E $\frac{1}{2}$ NE	16	30 N	6 E
463	SW SW	22	32 N	6 E
464	NW NW	23	30 N	6 E

ANTRIM

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
107	N $\frac{1}{2}$ SW	14	30 N	8 W
248	NW SW	36	32 N	9 W

ARENAC

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
Bay Co. Rd. Comm, Ls. quarry	S $\frac{1}{2}$ S $\frac{1}{2}$	34	20 N	5 E

BARAGA

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
53	NW NW	12	48 N	32 W
152	SW NE	16	50 N	33 W
217	NE SW	1	51 N	31 W
238	SW NE	18	48 N	31 W
334	SW SW	18	50 N	32 W
339	W $\frac{1}{2}$ SE	3	50 N	35 W
399	NE NE	30	49 N	32 W
445	SW SE	8	47 N	34 W
453	SE SW & SW SE	32	48 N	34 W
460	NW NE	18	48 N	31 W

BARRY

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
47	SW SW	35	3 N	10 W
209	NW SE	4	2 N	10 W

BAY

None

BENZIE

<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
48	SW NW	29	26 N	15 W
374	SW NW	17	26 N	13 W

None BERRIEN

None BRANCH

None CALHOUN

None CASS

CHARLEVOIX

Pit No.	Description	Sec.	Town	Range
244	Lot 2			
	NW SE	31	34 N	8 W
272	SW NW	9	32 N	4 W
341	SE SE	13	37 N	11 W
342	SE NE	35	38 N	10 W
344	NW NW	27	38 N	10 W
381	N $\frac{1}{2}$ SW	33	34 N	7 W
403	SW SW	21	38 N	10 W
422	SW SW	36	33 N	4 W
	SW SW	11	37 N	10 W
	NW NW	31	33 N	4 W
441	NW NW, except 1 acre in NW corner	6	33 N	4 W

CHEBOYGAN

Pit No.	Description	Sec.	Town	Range
1	SE NE	2	34 N	1 W
2	SE SW	29	34 N	3 W
8	NE NW	10	35 N	1 E
9	NE NW	24	36 N	1 E
51	SW SW	14	37 N	1 W
52	SE NE	23	35 N	1 E
54	NW NE	36	38 N	3 W
214	NE NE	4	33 N	1 E
220	SW NW	3	38 N	3 W
223	SE NE	21	35 N	1 E
259	SE NW	14	36 N	1 W
265	SW NW	1	33 N	2 W
290	NE NE	24	35 N	1 E
351	NW NE	2	34 N	1 W
362	NW NW	35	37 N	1 E
398	W $\frac{1}{2}$ SW SE	29	38 N	1 E
	NW NE	32	38 N	1 E
457	N $\frac{1}{2}$ NW SW	17	34 N	2 W
458	SE SE	27	34 N	3 W

CHIPPEWA

Pit No.	Description	Sec.	Town	Range
73	SE SE	18	45 N	2 W
74	NW SW	16	41 N	7 E
104	NE SE	18	43 N	2 E
105	SE SW	1	47 N	1 E
131	NE SE	30	47 N	2 E

CHIPPEWA (Cont'd.)

Pit No.	Description	Sec.	Town	Range
153	NE SW	30	45 N	1 W
192	N $\frac{1}{2}$ NE	4	44 N	1 W
192	S $\frac{1}{2}$ SE	33	45 N	1 W
241	NE SE	31	42 N	5 E
251	NW NE	30	44 N	5 W
254	SE NW	3	41 N	6 E
322	NW SW	32	42 N	5 E
417	NW NE	3	41 N	6 E
433	NW SW	20	42 N	6 E (pit depleted?)
	SW NW	7	41 N	6 E
446	SW NW	7	41 N	6 E
466	N $\frac{1}{2}$ N $\frac{1}{2}$	22	41 N	7 E
469	NW NW	9	41 N	5 E

CLARE

Pit No.	Description	Sec.	Town	Range
38	NE SW	1	20 N	5 W
230	W $\frac{1}{2}$ NW NE NW	3	20 N	5 W
270	E $\frac{1}{2}$ NW	18	20 N	4 W
309	N $\frac{1}{2}$ SE	4	18 N	4 W
323	S $\frac{1}{2}$ NW	7	20 N	4 W
370	SW NE & SE	32	20 N	4 W
	SW SE & E $\frac{1}{2}$ SW	4	20 N	5 W

CLINTON

None

CRAWFORD

Pit No.	Description	Sec.	Town	Range
26	SW of NE & SE of NW	9	25 N	4 W
28	SW SE	2	26 N	1 W
29	NW NW	34	26 N	3 W
30	NW SW	4	26 N	4 W
31	NE SE	5	26 N	4 W
32	NW NE	24	27 N	2 W
33	SE NE	25	27 N	3 W
34	NE NW	25	27 N	3 W
35	SE NE	21	28 N	2 W
36	SW NW	29	28 N	4 W
166	SE SE	28	28 N	3 W
199	NE NE (16) & SE SE (9)	9 & 16	25 N	3 W
	Part of SW NW	27	25 N	2 W
206	SW NE	2	27 N	4 W
261	SW NE	2	27 N	4 W
267	NE NE	8	25 N	4 W
275	NE NE	27	25 N	2 W
278	SW SW	28	26 N	3 W
311	Part of N $\frac{1}{2}$ of NW	32	25 N	2 W
317	NW NE	36	26 N	2 W
324	NE NE	21	28 N	2 W
350	SW of NE & NW SE	34	26 N	4 W
357	NE SW	2	26 N	1 W
375	NE NE	24	27 N	2 W
378	NW of SE & SW of NE	15	28 N	4 W
435	SE NW SW & NE SW SW SW	27	25 N	2 W

DELTA				
Pit No.	Description	Sec.	Town	Range
91	NW NE	14	40 N	23 W
92	SW NE	6	42 N	20 W
93	SE NE	7	43 N	18 W
154	NW SE	22	41 N	22 W
158	Lot 3 NE of SW	24	40 N	20 W
163	NE NW	22	41 N	22 W
202	SE SW	6	43 N	22 W
213	SW SE	22	42 N	22 W
252	E $\frac{1}{2}$ NW	15	42 N	21 W
287	NE NW	23	43 N	23 W
293	NE NW	20	43 N	20 W
318	SW NW	25	43 N	23 W
330	SE SE	26	42 N	21 W
352	NW NW	35	43 N	22 W
438	Lots 3 & 4 N $\frac{1}{2}$ NW	11	40 N	23 W
447	SE SW	14	39 N	18 W
472	SE NE	34	43 N	22 W

DICKINSON				
Pit No.	Description	Sec.	Town	Range
59	SW SW	30	41 N	29 W
60	SW SW	26	43 N	27 W
61	NW NE	12	43 N	28 W
62	NE SW	20	43 N	29 W
63	NW SE	26	44 N	28 W
64	SW SW	22	44 N	30 W
164	NE of SW & NW of SE	30	42 N	29 W
167	NW NW	29	42 N	29 W
182	SW NW	18	39 N	28 W
184	SE NE	32	43 N	28 W
185	S $\frac{1}{2}$ of N $\frac{1}{2}$ of NE	33	42 N	30 W
186	SE SE	35	40 N	28 W
188	NE SE	30	42 N	29 W
193	Village of Breitung Skidmore Addition #3 Block 20: Lots 48 & 49			
250	W $\frac{1}{2}$ SE	36	41 N	28 W
283	NW NW	7	39 N	28 W
284	Kingsford Realty Co. Subd'n. Block 7: Lots 4 to 22 incl.			
340	NE SW	20	41 N	29 W
345	SE SE	30	41 N	29 W
395	SW NW	33	41 N	29 W
400	NE NW	32	41 N	29 W
402	SE SW	21	44 N	27 W
455	SE SE	17	42 N	28 W

None

EATON

EMMET				
Pit No.	Description	Sec.	Town	Range
55	Village of Levering Hunt & Walker Addition Lot 4 (Part of NE NE)	3	37 N	4 W
56	SW SE	36	38 N	6 W
201	NE NW	27	39 N	4 W
234	NW NE	25	37 N	5 W
368	NW NW	31	37 N	5 W
385	NE NE NE	1	36 N	5 W
418	NE NW	25	39 N	4 W

None

GENESEE

GLADWIN				
Pit No.	Description	Sec.	Town	Range
237	SE SE	12	20 N	2 W
371	SW SE	10	20 N	2 W

GOGEBIC

Pit No.	Description	Sec.	Town	Range
82	NW NW	12	48 N	44 W
83	NE SE	16	48 N	44 W
84	SE NW	28	44 N	39 W
85	SE NW	32	48 N	45 W
87	NW SW	13	48 N	44 W
263	Undivided $\frac{1}{2}$ interest in NE SE	26	45 N	40 W
289	SW NW	5	45 N	43 W
294	NE NE	11	48 N	44 W
315	NE SE	8	45 N	43 W
316	SE SW	27	45 N	43 W
347	SW SW	23	46 N	44 W
360	SE of SW & SW of SE	28	44 N	39 W
366	SE NE	3	46 N	44 W
416	SW SE	8	48 N	46 W
432	SE NE	14	48 N	44 W
434	N $\frac{1}{2}$ SW & SE SW	26	47 N	44 W

GRAND TRAVERSE

Pit No.	Description	Sec.	Town	Range
67	SW SW	31	26 N	10 W
111	NE SE	8	27 N	11 W

None

GRATIOT

None

HILLSDALE

HOUGHTON

Pit No.	Description	Sec.	Town	Range
100	NE NE	19	47 N	37 W
273	NE	11	52 N	36 W
274	E $\frac{1}{2}$ of SE	11	52 N	36 W
310	City of Hancock W $\frac{1}{2}$ of NW	11		
456	NE NW	3	55 N	34 W
			51 N	35 W

None

HURON

None

INGHAM

63

IONIA				
None				
IOSCO				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
17	NE SE	6	24 N	9 E
115	NE NE	20	24 N	5 E
115-A	NE NW NE	20	24 N	5 E
117	NE NE	15	24 N	6 E
286	SE SW	10	24 N	5 E

IRON				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
89	NE SW	35	43 N	31 W
90	City of Iron River Part of SW of NW	26	43 N	35 W
203	NW NE	31	43 N	35 W
239	SE of NW & NE of SW	34	42 N	31 W
348	SE SW	36	43 N	31 W
364	NE NE	2	44 N	32 W
365	SE NW	20	46 N	34 W
396	NE NE	19	44 N	33 W
428	SE NW, SW NE	8	45 N	31 W
429	NW SE	10	45 N	31 W
430	NE NW	17	45 N	31 W

ISABELLA				
None				

JACKSON				
None				

KALAMAZOO				
None				

KALKASKA				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
37	SW SW	3	25 N	5 W
155	SW NW	16	26 N	8 W
175	NE SW	16	26 N	8 W
194	NE NW	26	25 N	8 W
226	NE NE	19	26 N	8 W
235	SW NE	13	28 N	7 W
245	NE NW	31	27 N	5 W
325	SW SW	36	25 N	6 W
454	E½ SE NE	33	25 N	6 W

KENT				
None				

KEWEENAW				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
373	SE SE	5	57 N	32 W
392	NE SE	5	57 N	32 W

LAKE				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
69	SW SW	29	20 N	13 W
150	SW NE NW	19	17 N	13 W
159	SW NW	2	18 N	13 W
221	NW SE	1	18 N	13 W
258	S½ SW	29	17 N	12 W

LAPEER				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
144	SE NW	13	6 N	9 E
145	SE SE	31	6 N	9 E

LEELANAU				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
296	S½ of SE SE	19	28 N	11 W

LENAWEE				
None				

LIVINGSTON				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
139	N½ of NE W of Teahen Rd.	11	1 N	5 E
140	N½ of NE NE	33	2 N	5 E
141	S½ of NE NE & N½ SE NE	33	2 N	5 E
142	SW SE	2	1 N	6 E

LUCE				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
106	SE NE	14	45 N	10 W
136	NE NW	1	48 N	8 W
376	SE NE	3	49 N	11 W
442	NE SW	20	48 N	8 W
443	SE NW	5	49 N	11 W
465	SE SE	5	49 N	10 W

MACKINAC				
<u>Pit No.</u>	<u>Description</u>	<u>Sec.</u>	<u>Town</u>	<u>Range</u>
72	SW SW	26	43 N	8 W
99	SE NE	15	42 N	4 W
101	NE SE	22	43 N	3 W
102	SE SE	5	43 N	11 W
174	SE SE	19	43 N	12 W
178	NE NW	18	44 N	12 W
179	SW SE	5	43 N	11 W
190	NW SE	32	44 N	7 W
195	NE & N½ of SE	26	42 N	2 W
200	NW NE	32	43 N	11 W
212	NE SE	32	42 N	11 W
218	NW NE	30	43 N	10 W
228	SW SW SE	16	42 N	5 W
240	SE NW	33	41 N	4 W

MACKINAC (Cont'd.)

Pit No.	Description	Sec.	Town	Range
249	W $\frac{1}{2}$ of NE except S $\frac{1}{2}$ of NW of NE	18	44 N	12 W
257	SW NE	22	43 N	3 W
260	SE NE	30	42 N	12 W
282	NE NE	28	43 N	5 W
298	NW	30	42 N	4 W
299	SE NW	18	44 N	12 W
312	SW SW	7	44 N	12 W
361	Lot 6 Bois Blanc Is.	19	39 N	1 & 2 W
363	SE SE	5	42 N	1 E
379	NW SE	31	43 N	10 W
380	Lot 2 Bois Blanc Is.	23	39 N	1 & 2 W
391	NW SE	6	43 N	7 W
419	SW SE	27	42 N	12 W
420	NW SE	12	44 N	9 W
437	SW NW	23	42 N	12 W
439	SE NW	23	42 N	12 W
440	SE SW	10	43 N	8 W
448	NW SE	27	44 N	8 W
449	NW NE	31	43 N	10 W
461	SE NW	1	41 N	12 W
473	N $\frac{1}{2}$ NE SW	34	44 N	7 W

None

MACOMB

MANISTEE

Pit No.	Description	Sec.	Town	Range
25	NW SW	20	24 N	13 W
146	N $\frac{1}{2}$ NE NW	13	21 N	13 W

MARQUETTE

Pit No.	Description	Sec.	Town	Range
57	SW SW	4	46 N	23 W
58	W $\frac{1}{2}$ of NE SW	5	46 N	23 W
94	NE SW	3	42 N	24 W
95	Lot 5 NW NW	5	42 N	24 W
96	S $\frac{1}{2}$ NE	9	42 N	24 W
97	N $\frac{1}{2}$ NW	17	47 N	25 W
222	NE SE	20	46 N	25 W
262	SE SE	5	46 N	25 W
269	SW NW	33	46 N	28 W
277	NE NW	5	42 N	24 W
288	NW	10	45 N	25 W
300	SE SE	23	46 N	26 W
301	SE SE	24	48 N	30 W
384	NE SE	32	47 N	23 W
386	NW NE NE	26	44 N	26 W
397	NE NE	2	48 N	29 W
423	SW NE	10	45 N	29 W
425	SW NE	31	46 N	28 W
431	NE SW	30	46 N	28 W
444	NE NE	30	45 N	27 W
468	SW NE NW	2	46 N	28 W

None

MASON

MECOSTA

Pit No.	Description	Sec.	Town	Range
49	SW SE	12	15 N	8 W
71	NW SE	27	16 N	10 W

MENOMINEE

Pit No.	Description	Sec.	Town	Range
86	NE NE	18	36 N	25 W
88	SE NE	24	37 N	26 W
148	SW NE	8	37 N	25 W
181	NE SE	34	36 N	28 W
191	SE SW	14	37 N	28 W
268	NW SW	2	40 N	26 W
302	SW NE	22	41 N	26 W
303	NW NE	18	35 N	25 W
304	NW NE	17	36 N	27 W
305	NE of NE except NW NE NE	10	35 N	28 W
343	N $\frac{1}{2}$ NE	36	36 N	25 W
346	NW NW	5	35 N	28 W
358	Lot 3 NE SE & SE NE	1	35 N	29 W
367	SE NE	15	38 N	26 W
401	NW SW	22	37 N	28 W
412	SE NE	7	34 N	28 W
421	SE SE	12	36 N	25 W
424	NE NE	13	40 N	26 W
427	NE SW	17	36 N	27 W
452	NE SW	3	40 N	26 W
459	NE SW	27	39 N	25 W
470	NE SW	2	33 N	27 W

MIDLAND

Pit No.	Description	Sec.	Town	Range
382	SW NW	7	14 N	2 W

MISSAUKEE

Pit No.	Description	Sec.	Town	Range
44	N $\frac{1}{2}$ NW	17	21 N	8 W
45	NW NW	5	23 N	5 W
46	N $\frac{1}{2}$ SW	13	23 N	8 W
161	N $\frac{1}{2}$ NW	13	23 N	8 W
276	N $\frac{1}{2}$ SE	12	24 N	5 W
337	SW NE	1	21 N	5 W
467	N $\frac{1}{2}$ NW NW SW & S $\frac{1}{2}$ SW SW NW	18	24 N	7 W

None

MONROE

MONTCALM

Pit No.	Description	Sec.	Town	Range
120	E $\frac{1}{2}$ SE	34	9 N	8 W
121	NE S	34	9 N	8 W

MONTMORENCY

Pit No.	Description	Sec.	Town	Range
13	NE SW	21	29 N	3 E
14	SE SW	21	29 N	3 E

MONTMORENCY (Cont'd.)

Pit No.	Description	Sec.	Town	Range
15	NE NE	21	31 N	3 E
16	NW NE	34	32 N	2 E
77	NW SW	6	29 N	3 E
109	SE NE	4	29 N	1 E
157	NE NW	30	31 N	4 E
162	SW of NW & NW of SW	31	31 N	1 E
297	NE NE	36	30 N	3 E
326	SW SW	14	31 N	2 E
331	E $\frac{1}{2}$ of SE	15	32 N	2 E
	NE NE	22		
332	S $\frac{1}{2}$ SE NW & N $\frac{1}{2}$ NE SW	22	29 N	2 E
372	SE SE	25	32 N	4 E
377	S $\frac{1}{2}$ NE	23	29 N	3 E
411	SW SW	1	30 N	2 E

MUSKEGON

None

NEWAYGO

Pit No.	Description	Sec.	Town	Range
172	NW SW	23	13 N	11 W
390	Govt. Lot 2 ex Shaw Pk.	19	12 N	12 W

OAKLAND

Pit No.	Description	Sec.	Town	Range
143	NE SE	24	4 N	10 E

OCEANA

Pit No.	Description	Sec.	Town	Range
168	SW SW	3	14 N	18 W
169	SE SE	4	14 N	14 W
170	NE NE	9	14 N	18 W
171	NW NW	10	14 N	18 W

OGEMAW

Pit No.	Description	Sec.	Town	Range
50	NE NW	23	24 N	2 E
176	NW NW	12	24 N	4 E
208	SW SE	10	24 N	4 E
216	NW SE NE	25	24 N	4 E
243	SW SE	31	24 N	4 E
281	NE NW	15	24 N	4 E
335	NW NE SW	14	24 N	4 E
354	SE NW	5	22 N	2 E
369	SW SW	14	24 N	4 E
471	NE SW	32	24 N	4 E

ONTONAGON

Pit No.	Description	Sec.	Town	Range
75	NW SE	3	46 N	39 W
76	NE SE	14	47 N	39 W
78	SE NE	24	47 N	40 W
79	SW SW	24	47 N	40 W
80	NW of SW & SW of SW	16	49 N	38 W
81	NE SE	24	51 N	38 W
133	NW SW	34	51 N	42 W
134	NE SE E of Creek	4	50 N	43 W
134-A	NE SE W of Creek	4	50 N	43 W
207	SW NW	19	47 N	39 W
253	Metes & bounds in NE NE	35	51 N	38 W
264	NE SE SE	14	47 N	39 W
306	E $\frac{1}{2}$ NE NW	19	47 N	39 W
307	Undivided 3/4 interest in NE NW & NW NW	15	51 N	37 W
308	SE NW	21	47 N	38 W
383	N $\frac{1}{2}$ SW	9	51 N	37 W

OSCEOLA

Pit No.	Description	Sec.	Town	Range
126	N $\frac{1}{2}$ SE	36	17 N	7 W
129	SE SW	24	19 N	9 W
279	NW NE	11	19 N	9 W

OSCODA

Pit No.	Description	Sec.	Town	Range
112	NE SE	18	27 N	1 E
118	SW NW	32	25 N	1 E
119	SE of SW & SW of SE	7	27 N	4 E
183	SE SE	18	27 N	1 E
187	SW SW	12	25 N	4 E
227	SE NE	21	27 N	4 E
	SW NW	22		
229	SW SW	28	28 N	3 E
	N $\frac{1}{2}$ NW	33		
233	NW SE	22	27 N	4 E
353	SW SW	12	28 N	1 E
387	SE SE	35	26 N	1 E
404	SE NE	24	28 N	2 E
	SW NW	19	28 N	3 E
405	S $\frac{1}{2}$ S $\frac{1}{2}$ SE	24	28 N	2 E
39	W $\frac{1}{2}$ SW	33	26 N	5 E?
413	NW NW	36	25 N	4 E
426	SW SE	21	25 N	4 E

OTSEGO

Pit No.	Description	Sec.	Town	Range
10	NE SE	31	30 N	1 W
11	NE NE	34	30 N	1 W
116	N $\frac{1}{2}$ NE SW	30	31 N	4 W
137	Lot 5 SE E of US-27	5	29 N	3 W
160	SW SE	18	32 N	1 W
349	NW SW	10	32 N	1 W
355	NW NW	10	32 N	1 W
415	NE SE	25	32 N	1 W
450	SW SE & SE SW	26	29 N	4 W

OTTAWA				
None				
PRESQUE ISLE				
Pit No.	Description	Sec.	Town	Range
4	NE NW	19	35 N	2 E
5	NW NE	26	35 N	3 E
6	NE SW	29	36 N	2 E
7	NW SE	29	36 N	3 E
108	NE SW & S $\frac{1}{2}$ SW	12	34 N	2 E
156	W $\frac{1}{2}$ NE	22	34 N	7 E
197	SW	13	34 N	7 E
224	NE NE	23	34 N	6 E
246	NE NW	26	35 N	3 E
327	NW NE	28	36 N	3 E
389-A	E $\frac{1}{2}$ SE SW	7	34 N	4 E
462	SW NW	22	34 N	7 E

ROSCOMMON				
Pit No.	Description	Sec.	Town	Range
39	NW NW	24	22 N	1 W
40	NW SW	29	22 N	4 W
41	E $\frac{1}{2}$ SW NW	17	23 N	2 W
113	NW NE	28	21 N	1 W
114	SW SW	24	24 N	4 W
125	SE NE	18	23 N	2 W
127	SE SW	33	23 N	1 W
165	SW SE	11	22 N	1 W
189	SW SE	33	23 N	1 W
196	NE NW	3	22 N	1 W
231	SW SW	17	23 N	2 W
242	NW SE NE	26	24 N	1 W
266	S $\frac{1}{2}$ SE SW	11	22 N	1 W
271	SE NW NW	3	22 N	4 W
295	NW	30	22 N	4 W
328	E $\frac{1}{2}$ SW SE	32	23 N	4 W
336	NW NW	32	23 N	4 W
356	NE SE	22	23 N	2 W

None

None

None

SANILAC				
Pit No.	Description	Sec.	Town	Range
211	NE NE	8	13 N	14 E

SCHOOLCRAFT				
Pit No.	Description	Sec.	Town	Range
103	N $\frac{1}{2}$ NW	28	42 N	17 W
135	W $\frac{1}{2}$ of E $\frac{1}{2}$ of NE	15	41 N	17 W

SCHOOLCRAFT (Cont'd.)				
Pit No.	Description	Sec.	Town	Range
255	NE NE	13	44 N	13 W
256	NE NW	13	44 N	13 W
292	NE NW	15	41 N	17 W
314	SE NW			
	W $\frac{1}{2}$ SE	4	41 N	13 W
SHIAWASSEE				
None				
TUSCOLA				
Pit No.	Description	Sec.	Town	Range
130	W $\frac{1}{2}$ NE NE	12	10 N	8 E
210	NW NW	18	10 N	9 E
VAN BUREN				
None				
WASHTENAW				
None				
WAYNE				
None				
WEXFORD				
Pit No.	Description	Sec.	Town	Range
24	NW	7	24 N	10 W
110	SW SE	35	24 N	9 W
151	SW NW	11	22 N	9 W
198	NE NE	16	24 N	9 W
291	S $\frac{1}{2}$ NE	14	22 N	12 W
388	NE SW	20	22 N	11 W
410	NE SE	20	22 N	11 W
	NW SE	20	22 N	11 W
436	SE SE	32	23 N	11 W

INDUSTRIAL SAND

Michigan's 1977 production of Industrial Sand was nearly six million short tons valued at over 25.4 million dollars. Both the volume and the value were up from the 1976 production figures of just over 5.4 million tons valued at 20.9 million dollars.

Industrial sand uses include the following: Foundry molding, glass making, sand blasting, fire or furnace sand, engine or traction sand, and metallurgical sand. Only sand deposits meeting specific standards of purity, grain size and shape are usable.

The industrial sand mining operations in Michigan produce material from several types of deposits. These include: 1) Sand dunes along the Lake Michigan shore and some inland dunes; 2) Glacial outwash or other meltwater sorted deposits; 3) High purity consolidated sandstone; 4) and sand dredged out of Saginaw Bay of Lake Huron.

The readers interested in further discussions of Industrial Sand are referred to the following publications of the Geological Survey Division, Michigan Department of Natural Resources.

- 1) "Michigan Industrial Sand Resources", Circular 11, by Jerry D. Lewis, 1975. Cost is 50 cents.
- 2) "Economic Geology of the Sand & Sandstone Resources in Michigan", Report of Investigation 21, by E. Wm. Heinrich, 1979. Cost is \$2.00.
- 3) "An Economic Study of Coastal Sand Dune Mining in Michigan", Report of Investigation 20, by Ayres, Lewis, Norris and May, Inc., and Michael J. Chapman, 1978. Cost is \$2.00.

These publications are available at the above prepaid prices, plus 4% sales tax to Michigan residents, from:

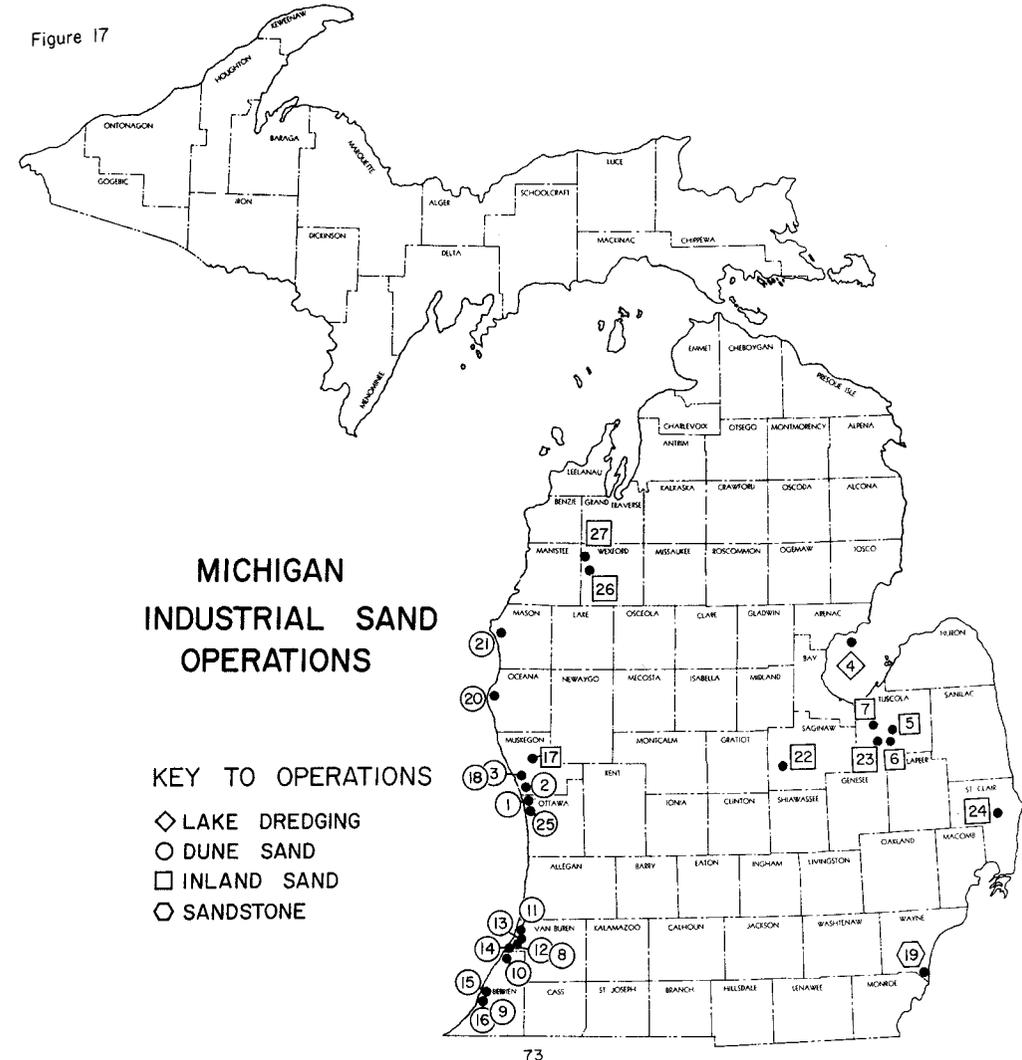
Information Services Center
Michigan Department of Natural Resources
Box 30028
Lansing, Michigan 48909

All payments should be made to the order of "State of Michigan".

Persons interested in the mining of sand dunes for industrial sand and its regulations, may wish to obtain a copy of the booklet "Designated Sand Dune Areas" Series I. This booklet contains Act. No. 222, Public Acts of 1976, the Sand Dune Protection and Management Act. Copies are available free from:

Reclamation and Mining Control Unit
Geological Survey Division
Michigan Department of Natural Resources
Box 30028, Lansing, Michigan 48909

Figure 17



INDUSTRIAL SAND PRODUCERS

F

Name of Operation	Map No.	Type Plant & Use	Location
Construction Agg. Corp. P. O. Box 6830 Ferrysburg, Michigan 49409	(1)	Plant: Stationary Uses: Molding	SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 17, T8N, R16W OTTAWA COUNTY
C. W. C. Casting Div. of Textron, Inc. 2672 Henry St. Muskegon, Michigan 49441	(2)	Plant: None Uses: Molding	Sec. 14, T9N, R17W MUSKEGON COUNTY
	(3)		NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 3, T9N, R17W MUSKEGON COUNTY
Erie Sand Steamship Co. P. O. Box 153 Foot of Sassafra St. Erie, Pennsylvania 16512	(4)	Plant: Ship dredge Uses: Foundry (molding), metallurgical	Dredge SAGINAW BAY OF LAKE HURON
Great Lakes Minerals Co. P.O. Box 1 Vassar, Michigan 48768	(5)	Uses: Stationary Molding, engine	SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 11, T11N, R8E TUSCOLA COUNTY
	(6)		W $\frac{1}{2}$ NE $\frac{1}{4}$ & E $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 22, T11N, R8E TUSCOLA COUNTY
	(7)		Sec. 27, T12N, R8E TUSCOLA COUNTY
Harris Trucking, Inc. P. O. Box 897 Benton Harbor, Michigan 49022	(8)	Plant: None Uses: Molding	W $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 29, T2S, R17W VAN BUREN COUNTY
Martin Marietta Corp. Industrial Sand Div. 110 E. Main Street Rockton, Illinois 61072	(9)	Plant: Stationary Uses: Glass, molding	NW $\frac{1}{4}$ Sec. 18, T6S, R19W BERRIEN COUNTY
	(10)		SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 1, T3S, R18W BERRIEN COUNTY
Manley Brothers of Indiana, Inc. Bridgman Div. P. O. Box 538 Chesterton, Indiana 46304	(11)	Plant: Stationary Uses: Molding, furnace, engine	NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 8, T2S, R17W VAN BUREN COUNTY
	(12)		W 3/4 SW $\frac{1}{4}$ Sec. 29, T2S, R17W VAN BUREN COUNTY
	(13)		SW $\frac{1}{4}$ Sec. 21, T2S R17W VAN BUREN COUNTY
	(14)		Parts of SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 30, T2S, R18W VAN BUREN COUNTY

INDUSTRIAL SAND PRODUCERS (CONTINUED)

Name of Operation	Map No.	Type Plant & Use	Location
	(15)		SW $\frac{1}{4}$ Sec. 5, T6S, R19W BERRIEN COUNTY
	(16)		NW $\frac{1}{4}$ Sec. 6, T6S, R19W BERRIEN COUNTY
McCormick Sand Corp. P. O. Box 506 2875 Lincoln St. Muskegon, Michigan 49443	(17)	Plant: Portable Uses: Molding, glass	SE $\frac{1}{4}$ Sec. 16, T11N, R16W MUSKEGON COUNTY
Nugent Sand Co., Inc. P. O. Box 506 2875 Lincoln St. Muskegon, Michigan 49443	(18)	Plant: Dredge, stationary Uses: Molding, engine, blast	SW $\frac{1}{4}$ NW $\frac{1}{4}$ & NE $\frac{1}{4}$ Sec. 3, N $\frac{1}{2}$ Sec. 10, T9N, R17W MUSKEGON COUNTY
Ottawa Silica Company 33620 Streicher Rd. Rockwood, Michigan 48173	(19)	Plant: Stationary Uses: Glass, molding, aggregate	Parts of Sec. 14, 15, 22, 23, T5S, R10E WAYNE COUNTY
Sand Products Corp. 2489 First Nat'l. Bldg. Detroit, Michigan 48226	(20)	Plant; Portable Uses: Molding	NE $\frac{1}{4}$ SW $\frac{1}{4}$ & NW $\frac{1}{4}$ Sec. 17, & NE $\frac{1}{4}$ Sec. 18, T15N, R18W OCEANA COUNTY
Sargent Sand Co. 2840 Bay Road Saginaw, Michigan 48605	(21)	Plant: Stationary, dredge Uses: Engine, metal- lurgical	W $\frac{1}{2}$ NW $\frac{1}{4}$ W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 28, E $\frac{1}{2}$, Sec. 29 W $\frac{1}{2}$ NW $\frac{1}{4}$ & NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 33, T19N, R18W MASON COUNTY
	(22)	Plant: None Uses: Metallurgical, fill, core	Near Hemlock S $\frac{1}{2}$ NE $\frac{1}{4}$ & N $\frac{1}{2}$ SE $\frac{1}{4}$ & NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 17, T10N, R2E SAGINAW COUNTY
	(23)	Plant: Stationary Uses: Engine, oil (hydrofrac)	Plant Near Vassar various pits in parts of Sec. 16 & 21, T11N R8E TUSCOLA COUNTY
Smith's Creek Sand Co., Inc. 2110 Burns Rd. Smiths Creek, Michigan 48074	(24)	Plant: Uses: Molding	Sec. 18, T6N, R16E ST. CLAIR COUNTY
Standard Sand Co. P. O. Box 290 Grand Haven, Michigan 49417	(25)	Plant: Stationary Uses: Molding, engine	Parts of Sec. 4 & 5, T7N, R16W OTTAWA COUNTY
Wexford Sand Co. 2840 Bay Rd. Saginaw, Michigan 48605	(26)	Plant: Stationary Uses: Metallurgical	SE $\frac{1}{4}$ Sec. 34, T23N, R12W WEXFORD COUNTY
	(27)		SW $\frac{1}{4}$ Sec. 30, T24N, R12W WEXFORD COUNTY

STONE

Under this heading we include the subheadings of Limestone and Dolomite, Sandstone, and Miscellaneous Stone. The total stone production in 1977 amounted to nearly 40.5 million short tons valued at just under \$85 million.

The U.S. Bureau of Mines placed Michigan in seventh place for volume and eighth place for value for 1977 stone production in the U.S.

LIMESTONE AND DOLOMITE

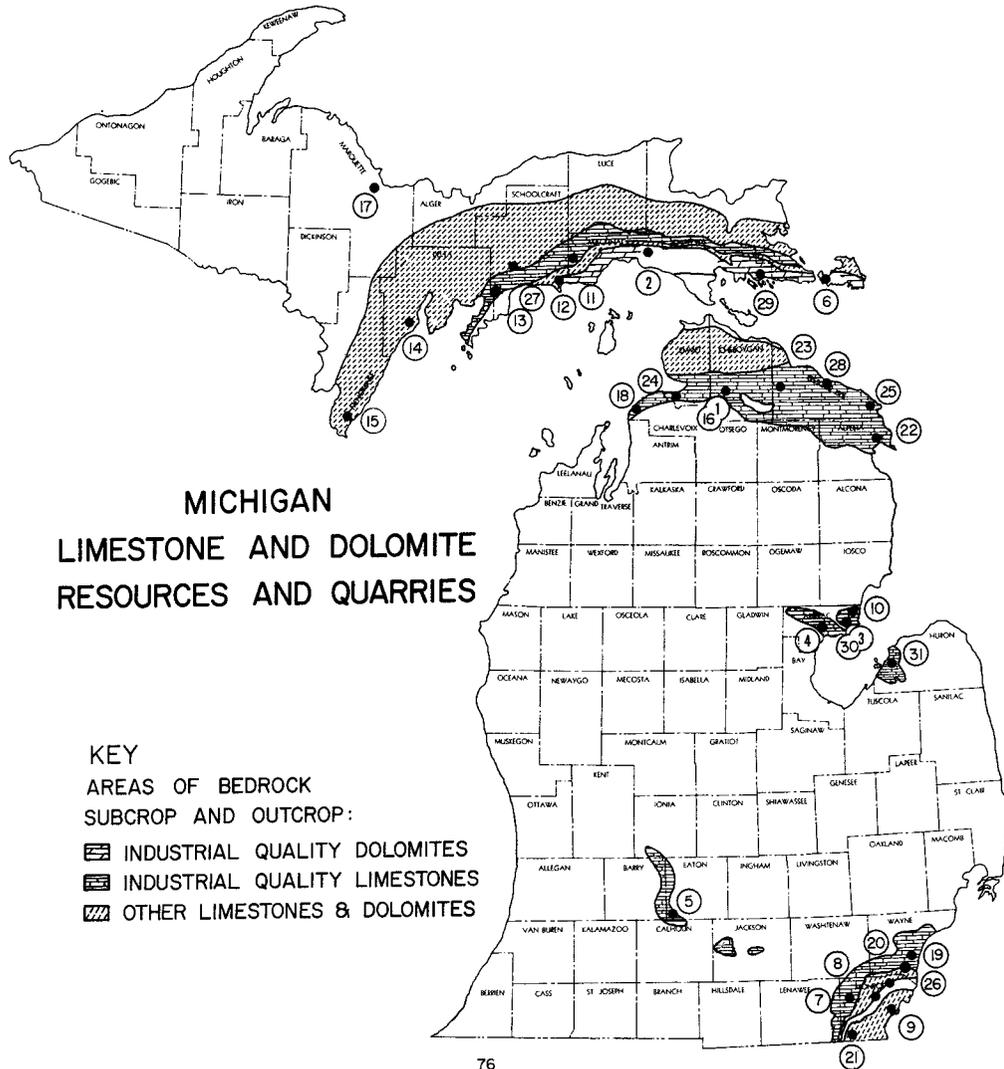
Michigan had 31 active Limestone and Dolomite quarries in 1978. These quarries ranged in size from very large to quite small. The U.S. Steel Company quarry at Rogers City is considered by the U.S. Bureau of Mines to be the largest limestone quarry in the country.

Limestone and Dolomite are quarried for a number of uses in Michigan. The largest uses are for crushed construction and road aggregate, flux stone for steel making, and raw material for making cement and lime. Other uses include riprap, dimension building stone, agricultural limestone, and railroad ballast. In 1977, nearly 39.5 million short tons of limestone and dolomite valued at over \$80.6 million were produced in the state.

Most of the larger quarries are located along the shores of Lakes Michigan and Huron which allow less expensive boat transportation of the processed stone to the down-lake markets. Many smaller quarries are scattered throughout the state wherever good limestone or dolomite occurs near the land surface in an area of possible economic use. The accompanying map indicates the location of the limestone and dolomite resources and quarries.

LIMESTONE AND DOLOMITE COMPANIES			F
Name of Operation	Map No.	Type of Stone and Use	Quarry Location
Afton Stone, Inc. Afton, Michigan 49705	(1)	Limestone, crushed, concrete aggregate	1 Mi. N of Afton Sec. 36, T35N, R2W <u>CHEBOYGAN COUNTY</u>
A. O. Company Div. of Sand Products Corp. P. O. Box 442 1st. Nat. Bank Bldg. St. Ignace, Michigan 49781	(2)	Dolomite, riprap	7½ Mi. N of Epoufette Sec. 34, T44N, R7W <u>MACKINAC COUNTY</u>
Arenac Co. Rd. Comm 116 Bridge Street Omer, Michigan 48749	(3)	Limestone, crushed, road aggregate, riprap	3 Mi. NE of Au Gres Sec. 5, T19N, R7E <u>ARENAC COUNTY</u>
Bay Co. Rd. Comm. 2521 S. Huron Rd. Kawkawlin, Michigan 48631	(4)	Limestone, crushed, construction aggregate	3 Mi. N of Omer Sec. 1, T19N, R5E <u>ARENAC COUNTY</u>
Cheney Limestone Co. P. O. Box 6 8038 Pease Rd. Bellevue, Michigan 49021	(5)	Limestone, rubble, crushed aggregate and agricultural	W of Bellevue Sec. 28, 29, T1N, R6W <u>EATON COUNTY</u>
Drummond Dolomite, Inc. Div. of Bethlehem Steel Corp. 701 East Third St. Bethlehem, Pennsylvania 18016	(6)	Dolomite, crushed, flux stone, construction aggregate	W end of Drummond Island Secs. 3 & 10, T41N, R5E <u>CHIPPEWA COUNTY</u>
Dundee Cement Co. P. O. Box 122 Dundee, Michigan 48131	(7)	Limestone, crushed, cement and road aggregate	2 Mi. N of Dundee Sec. 6, T6S, R7E <u>MONROE COUNTY</u>

Figure 18
LIMESTONE AND DOLOMITE RESOURCES AND QUARRIES 1978



LIMESTONE AND DOLOMITE CONTINUED

Name of Operation	Map No.	Type of Stone and Use	Quarry Location
France Stone Co. P. O. Box 1928 1800 Toledo Trust Bldg. Toledo, Ohio 43603	(8)	Dolomite, crushed, macadam aggregate, riprap and agricultural	At Grape (near Ida) Sec. 13, T6S, R7E (PC685) <u>MONROE COUNTY</u>
	(9)	Dolomite, crushed, macadam aggregate, railroad ballast, and riprap	At Monroe Sec. 7, T7S, R9E <u>MONROE COUNTY</u>
Glancy, R. E., Inc. 1055 S. Bay Drive Tawas City, Michigan 48763	(10)	Limestone, crushed, road aggregate, riprap	5 Mi. S of Alabaster Sec. 14, T20N, R7E <u>ARENAC COUNTY</u>
Glawe, Inc. 200 E. Chisolm Alpena, Michigan 49707	(15)(26) (28)(31)	Custom stone work for others. See quarry numbers listed.	HURON, MENOMINEE, PRESQUE ISLE & WAYNE COUNTIES
Inland Lime and Stone Co. Div. of Inland Steel Co. Gulliver, Michigan 49840	(11)	Limestone, crushed, construction, flux, riprap, railroad ballast, chemical, cement and lime manufacture	N of Port Inland Sec. 6, T42N, R12W <u>MACKINAC COUNTY</u>
	(12)	Dolomite, flux stone, railroad ballast, and filter stone	W of Port Inland Parts of Secs. 1, 3, 10, 11, T41N, R13W <u>SCHOOLCRAFT COUNTY</u>
Inwood Stone Products Co. P. O. Box 24 Cooks, Michigan 49817	(13)	Dolomite, dimensional (dressed)	3 Mi. NE of Cooks Sec. 8, T41N, R17W <u>SCHOOLCRAFT COUNTY</u>
Krygoski Construction Co. P. O. Box 116, 2511 - 10th Menominee, Michigan 49858	(14)	Dolomite, crushed, construction aggregate, riprap	NW NE Sec. 33, T39N R23W <u>DELTA COUNTY</u>
	(15)	Dolomite, crushed, construction aggregate, riprap	SE NW Sec. 2, T32N R27W <u>MENOMINEE COUNTY</u>
Limestone Products Co. 7736 Mill Street Vanderbilt, Michigan 49795	(16)	Limestone, crushed, agricultural, construction aggregate	1 Mi. N of Afton Sec. 36, T35N, R2W <u>CHEBOYGAN COUNTY</u>
Lindberg, A., & Sons, Inc. 560 Mather Avenue Ishpeming, Michigan 49849	(17)	Dolomite, crushed, construction aggregate	Hwy. 480 Sec. 8, T47N, R25W <u>MARQUETTE COUNTY</u>
Medusa Cement Co. Div. of Medusa Corp. P. O. Box 367 Charlevoix, Michigan 49720	(18)	Limestone, crushed, cement manufacture	2 Mi. W of Charlevoix parts of Sec. 27, 28, 29, 33, T34N, R8W <u>CHARLEVOIX COUNTY</u>
Mich. Foundation Quarry Co., Inc. 110 W. Jefferson Avenue Trenton, Michigan 48183	(19)	Dolomite, crushed, construction aggregate, agricultural, flux, riprap	At Trenton Sec. 7, T4S, R11E <u>WAYNE COUNTY</u>

LIMESTONE AND DOLOMITE CONTINUED

Name of Operation		Type of Stone and Use	Quarry Location
Michigan Stone Co. Route #2 Ottawa Lake, Michigan 49267	(20)	Dolomite, crushed, construction aggregate, riprap and railroad ballast	½ Mi. N of Maybee Sec. 29, T5S, R8E <u>MONROE COUNTY</u>
	(21)	Dolomite, crushed construction aggregate, riprap and railroad ballast	E. of Ottawa Lake Sec. 25, T8S, R6E <u>MONROE COUNTY</u>
National Gypsum Co. Cement Div. Alpena, Michigan 49707	(22)	Limestone, crushed, cement manufacture	At Alpena, Sec. 13, 23, 24, T31N, R8E <u>ALPENAC COUNTY</u>
Onaway Stone Co. c/o Cherryland Cut Stone Co. 715 - 3 mi. Rd. N Traverse City, Michigan 49684	(23)	Limestone, dimensional (rough and dressed)	1 Mi. N of Onaway Sec. 5, T34N, R2E <u>PRESQUE ISLE COUNTY</u>
Penn Dixie Industries, Inc. 3700 Charlevoix Rd. Petoskey, Michigan 49770	(24)	Limestone, crushed, cement manufacture	3.5 Mi. W of Petoskey parts of Sec. 2, 3, 6, 7, 8, 9, 10, T34N, R6W <u>EMMET COUNTY</u>
Presque Isle Corp. P. O. Box 426 Alpena, Michigan 49707	(25)	Limestone, crushed, flux, construction aggregate, lime manufacture	7 Mi. N of Lakeport Secs. 1, 2, 3, 10, 11, T33N, R8E, & Secs. 34, 35, T34N, R8E <u>PRESQUE ISLE COUNTY</u>
Rockwood Stone Co., Inc. P. O. Box 113 Rockwood, Michigan 48173	(26)	Dolomite, crushed, aggregate, riprap	NE ¼ Sec. 15, T5S, R10E <u>WAYNE COUNTY</u>
Schoolcraft Co. Rd. Comm. P. O. Box 152 Manistique, Michigan 49854	(27)	Dolomite, crushed, road aggregate	4½ Mi. N of Manistique Sec. 14, T42N, R16W <u>SCHOOLCRAFT COUNTY</u>
U.S. Steel Corporation Limestone Operations Rogers City, Michigan 49779	(28)	Limestone, crushed, construction aggregate, riprap, railroad ballast, flux, chemical, agricultural, cement and lime manufacture	At Rogers City Sec. 23, T35N, R5E <u>PRESQUE ISLE COUNTY</u>
	(29)	Dolomite, crushed, construction aggregate, riprap, flux, agricultural, lime manufacture	4 Mi. E. & 4+ Mi. N. of Cedarville Sec. 10, T42N, R1E <u>MACKINAC COUNTY</u>
Van Deusen Stone Co. 234 S. Huron Road Au Gres, Michigan 48703	(30)	Limestone, crushed, construction aggregate and riprap	3 Mi. NE of Au Gres Sec. 5, T19N, R7E <u>ARENAC COUNTY</u>
Wallace Stone Co. Div. J. P. Burroughs & Son, Inc. P. O. Box 1468 Saginaw, Michigan 48605	(31)	Limestone, crushed, construction aggregate, agricultural, riprap and railroad ballast	3 Mi. W of Pigeon Secs. 5 & 6, T16N, R10E. Secs 31, 32, T17N, R10E <u>HURON COUNTY</u>

MISCELLANEOUS STONE

This heading currently includes only Marble. The Marble is mined mainly for use as landscape aggregate. In the recent past the following were also mined; Basalt or Traprock, Granite, Feldspar, and Amphibolite. The Traprock is actually waste rock from old copper mines and was processed for construction aggregate, as was the Granite. The pink Feldspar and black Amphibolite were produced for decorative stone and terrazzo stone. Many years ago, around the turn of the century, both Verde Antique and Slate were also produced. The dark green Verde Antique was used for fancy dimension stone, such as building fronts and soda fountains. Slate was used to make slate roofing shingles. Some quartzite was also produced for local aggregate uses some years ago.

The only Miscellaneous Stone quarry location is included on the map entitled "Michigan Miscellaneous Stone and Sandstone Operations".

MISCELLANEOUS STONE		F	
Name of Operation	Map No.	Type of Stone & Use	Quarry Location
Felch Quarry Corp. P. O. Box 845 Iron Mountain, Michigan 49801	(1)	Marble, terrazzo and exposed aggregate (landscape aggregate)	½ Mi. SE of Felch Sec. 33, T42N, R28W <u>DICKINSON COUNTY</u>

SANDSTONE

Sandstone is currently mined for rough dimensional stone by two producers in Jackson County. There is one sandstone producer in Wayne County that mines sandstone to be processed into industrial sand for use in glass making and as foundry sand. They also produce some sandstone aggregate material.

Around the turn of the century there were at least two large sandstone quarries located in the Upper Peninsula which produced brown and red dimensional sandstone blocks which were used for fancy building fronts. Another abandoned industry quarried a gritty sandstone for the manufacture of grindstones in Huron County. These grindstones were sold all around the world, but the industry closed down with the advent of carborundum abrasives.

The current sandstone producers are located on the map showing "Miscellaneous Stone and Sandstone Operations."

SANDSTONE COMPANIES		F	
Name of Operation	Map No.	Type and use of stone	Quarry Location
Jude Sandstone Co. 338 Austin Road Napoleon, Michigan 49261	(2)	Sandstone, rough dimensional	½ Mi. E. of Napoleon Sec. 6, T4S, R2E and Sec. 31, T3S, R2E <u>JACKSON COUNTY</u>
Napoleon Sandstone Quarry P. O. Box 119 Napoleon, Michigan 49261	(3)	Sandstone, dressed and rough dimensional	½ Mi. E of Napoleon Sec. 6, T4S, R2E <u>JACKSON COUNTY</u>
Ottawa Silica Co. Michigan Silica Division 33620 Streicher Road Rockwood, Michigan 48173	(4)	Sandstone, glass and foundry use, and aggregate	At Rockwood Secs. 14, 15, 22 & 23 T5S, R10E <u>WAYNE COUNTY</u>

Figure 19 MICHIGAN MISCELLANEOUS STONE AND SANDSTONE OPERATIONS - 1978



KEY

MISCELLANEOUS STONE
○ MARBLE

SANDSTONE
○ SANDSTONE OPERATIONS

SULFUR

S

Some sulfur crystals are found in vugs in dolomite rock within the Detroit River Group of middle Devonian age in parts of southeastern Michigan. However, the sulfur produced in Michigan is a byproduct of oil refinery operations.

Name & Address of Producer	Nearest Town	County
Total Petroleum, Inc. Alma, Michigan 48801	Alma	<u>GRATIOT</u>
Marathon Oil Company 1300 S. Fort Street Detroit, Michigan 48217	Detroit	<u>WAYNE</u>

MINERAL PRODUCERS LISTED BY COUNTY

1978

Mineral producers are listed below by county. Location of the operation, when known, is given by quarter, quarter, section, township and range, or nearest city to operation, or pit name. Sand and gravel operators using portable equipment sometimes work in several locations each year, thus they may not be still operating in the reported locations at a later date.

ALCONA

Alcona Co. Road Comm.	14	28N	8E	Sand and gravel
Glancy, R. E., Inc.				" " "
Lake Construction Co.				" " "
Straits Aggregate and Equipment Corp.				" " "

ALGER

Alger Co. Road Comm.	6	46N	20W	Sand and gravel
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ALLEGAN

Boerman, John, Sand and Gravel	Wedge pit	34	2N	13W	Sand and gravel
Brenner, Kevin	Belden pit,	26	3N	14W	Marl
Cash & Carry Gravel Co., Middlemass-Heath pit,		NW 26	4N	11W	Sand and gravel
Douglas, Charles E.					Peat
Flemming Gravel Co.		26	4N	15W	Sand and gravel
Hamilton Block & Redi-Mix, Inc.		11 & 14	3N	12W	" " "
Miller Sand & Gravel Co.		34 3N 13W,	NE SW 12	2N 12W	Marl
Pavliak, Emil		24 1N 12W,	8	1N 14W	Sand and gravel
Smith, Bill, Sand & Gravel, Inc.	Maurer pit,	SE NE 11	2N	13W	" " "
Yerington Construction Co.					" " "

ALPENA

Alpena Aggregate, Inc.	24	32N	8E	Sand and gravel
Alpena Co. Road Comm.	20	31N	8E	" " "
Dubey, Earl, & Sons				" " "
Gilliland Const. Co., Inc.	W NW 13	32N 8E, 35	32N 8E	" " "
Glancy, R. E., Inc.		NE 30	31N 7E	Shale
National Gypsum Co., Cement Div.		13, 23, 24	31N 8E	Cement Limestone, crushed

ANTRIM

Drenth Bros., Inc.	NW SE 14	32N	8W	Sand and gravel
Medusa Cement Co.	NW SW 24	32N	8W	Shale
Tri-County Sand & Stone, Inc.	23	29N	8W	Sand and gravel
Wiggins and Sons	Antrim pit			" " "

ARENAC

Arenac Co. Road Comm.	W NE & NE NW	5	19N	7E	Limestone, crushed
	NW NW 14	19N 4E, 35	20N	4E	Sand
	SE SW & SE 34	20N 5E, NW NE 3	19N	5E	Limestone, crushed
Bay County Road Comm.		36	19N	5E	Sand and gravel
Eastman Gravel pit		SE 14	20N	7E	Limestone, crushed
Glancey, R. E., Inc.		SE NW 5	19N	7E	" " "
Van Deusen Stone Co.					" " "

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BARAGA

Baraga Co. Road Comm.	20 48N 31W	15	48N 33W	Sand and gravel
	NW 23 51N 31W	7	49N 33W	" " "
Covington Construction Co.				" " "
Huhtala Construction, R.H.	10 48N 33W	22	50N 33W	" " "
Menominee Co. Road Comm.	Roland Lake pit	6	50N 32W	" " "
Nurmella Sand & Gravel, Inc.		20	48N 31W	" " "

BARRY

Barry Co. Road Comm.	Various (20 pits)	13	3N 9W	Sand and gravel
Currier, William		6	4N 10W	Marl
Hamilton, Darrell L.		6	2N 7W	"
Stidham Gravel Co.		12	3N 9W	Sand and gravel
Yerington Construction Co.	SW SW	30	4N 10W	" " "

BAY

Aetna Cement Corp.		NE 14	14N	5E	Cement
Monitor Sugar Co.	Bay City				Lime

BENZIE

Benzie Co. Road Comm.		8	26N	14W	Sand and gravel
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BERRIEN

Crosby Marl Co.		14	8S	20W	Marl
Kiell Excavating Co.		14	7S	17W	Sand and gravel
Manley Brothers of Indiana, Inc.	SW 5 6S 19W,	NW 6	6S	19W	Industrial sand
Martin-Marietta	SE NE 1 3S 18W,	NW 18	6S	19W	" " "
Miller, George, & Sons,	St. Joseph pit				Sand and gravel
Inc.					" " "
White, Aiden, & Sons, Inc.		27	3S	17W	" " "
Yerington Construction Co.	NE SW 1 6S 18W, SE NW 28 6S 18W				" " "

BRANCH

Branch Co. Road Comm.					Sand and gravel
Certified Sand & Gravel	Coldwater pit	27	6S	6W	" " "
Cole Brothers Contr., Inc.					" " "
Taylor and Son		NE 16	8S	5W	Marl
Thompson Constr. Co., Inc.		SE 20	6S	6W	Sand and

CALHOUN

Calhoun Co. Road Comm.	Various				Sand and gravel
Cole Brothers Contr., Inc.	S $\frac{1}{2}$ 4 2S 8W	SW NW 25	4S	6W	" " "
Combs, Emil, Grav. & Ready-Mix		17	4S	5W	" " "
Hoffman Brothers, Inc.		11	2S	6W	" " "
Miller, George, & Sons,	Calhoun pit				" " "
Inc.					" " "
Nashville Gravel Co.		15 & 16	1S	7W	" " "
Ray's Aggregate Co.	Schaeffer pit				" " "

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CASS

Aggregate Materials Corp.		1	8S	16W	Sand and gravel
Cass Co. Road Comm.	Various	21	6S	14W	" " "
Indiana Hwy. Materials, Inc.		1	8S	16W	" " "
Kalin, Gerald, Contr.		24	6S	15W	" " "
Miller, George, & Sons, Inc.	Cass County pit				" " "
Nieb Concrete Prod. Co.		16	7S	16W	" " "
Pipher's Marl Service		15	5S	14W	Marl
Poehlman & Son		NW NE	13	7S 16W	"
Three S Gravel Co.		NE	7	6S 15W	Sand and gravel
Tracy Sand & Gravel		SW NE	10	5S 16W	" " "
Yerington Construction Co.					" " "

CHARLEVOIX

Bartlett, Norman, Sand & Gravel		NW SW	30	32N 6W	Sand and gravel
Charlevoix Co. Road Comm.	Various		12	34N 7W	" " "
Hodgkiss and Duoma, Inc.			27, 28, 29, 33	34N 8W	Cement, Limestone
Medusa Cement Co. (Div of Medusa Corp.)	Parts of	NW NW	28	32N 7W	Sand and gravel
Smith, D.L., Sand & Gravel, Inc.					" " "

CHEBOYGAN

Afton Stone, Inc.			36	35N 2W	Limestone, crushed
Cheboygan Cement Prod., Inc.		SW SW	14	37N 1W	Sand and gravel
Cheboygan County Road Comm.		33 37N 2W	19	34N 2W	" " "
Dean, Henry, and Sons			33	37N 2W	" " "
Lake Construction Co.		SE	36	35N 2W	Limestone, crushed
Limestone Products Co.			19	34N 3W	Sand and gravel
Mackinac Gravel Co.					" " "

CHIPPEWA

D. & B. Service, Inc.		3 & 10	18 46N 41N	3W 5E	Sand and gravel Dolomite, crushed
Drummond Dolomite, Inc.			23	47N 1W	Sand and gravel
Gordon, James A.			26	47N 1W	Sand and gravel
Mackinac Gravel Co.	Petkus pit				" " "
Proksch Construction Co.	Dollar Settlement pit				" " "
Sanderson, C. G., Co.					" " "
Soo Gravel and Asphalt Co.					" " "
Whitehead, I. L., Co.	Various				" " "

CLARE

Clare Co. Road Comm.	Various	SW SE	12 22 32 29	17N 18N 17N 19N	5W 4W 3W 4W	Sand and gravel " " " " " " "
Fisher Sand & Gravel Co.						" " "
Hubscher & Son, Inc.						" " "
Weldon's Transit Mix, Inc.						" " "

CLINTON

Boichot Concrete Corp.		NE SW	3 34	5N 5N	2W 4W	Sand and gravel Shale
Grand Ledge Clay Prod. Co.						Sand and gravel
Gratiot Co. Road Comm.		SE NW	34	8N 4W	2W 4W	" " "
Karber Gravel Co.			6	5N 4W	" " "	" " "
Martin Aggregates, Inc.			29	5N 4W	" " "	" " "
Pryor Bros., Inc.						" " "
Schlegel, Carl, Inc.	Pohl, Turner pits					" " "
Spartan Aggregates, Inc.	Smith pit					" " "

CLINTON - (Cont'd.)

Standard Aggregate		NE NW	36	8N 2W	Sand and gravel
Stockwell Sand & Gravel			27	8N 3W	" " "
Weaver, Ronald, Gravel Co., Inc.		W E & SW NE	33	8N 1W	" " "
Wicker's, Inc.	Simons, Searles, Paxton pits	SE NE	12	5N 3W	" " "

CRAWFORD

Millikin, Jack, Inc.		NE NE	16	25N 3W	Sand and gravel
Wiggins & Sons	Crawford pit				" " "

DELTA

Bichler Gravel & Concrete Co.			23	39N 23W	Sand and gravel
Delta Co. Road Comm.	Various	NE NW	8	40N 23W	" " "
Holmberg Concrete			15	40N 22W	" " "
Krygoski Construction Co.		NW NE	33	39N 23W	Dolomite
Marvic, M., and Sons			27	39N 24W	Sand and gravel
McMahon Bros.			27	39N 24W	" " "
Paquin & Sons, Inc.			12	39N 23W	Limestone
Proksch Construction Co.	Various				Sand and gravel

DICKINSON

Champion, Inc.		NE NE	19	40N 30W	Sand and gravel
Dickinson Co. Highway Department	Various (9 pits)				" " "
Fayas & Sons, Inc.			5	39N 30W	mine waste rock
Felch Quarry Corp.			33	42N 28W	Sand and gravel
Hanna Mining Co.- Groveland Mine	Open pit	31 & 32	42N 29W	Marble, crushed	Iron Ore
Iron Mountain, City of	Ozzellos pit				Sand and gravel
Lindberg, A., & Sons, Inc.		5 & 6	40N 30W	" " "	" " "
Miller Prod. & Supply Co.			7	40N 30W	" " "
Olson, Rudy			12	39N 29W	" " "

EATON

Briggs, Gale, Inc.			13	2N 5W	Sand and gravel
Cheney Limestone Co.		28 & 29	1N 6W	2N 4W	Limestone, crushed
Crandell Trucking Co.			32	2N 4W	Sand and gravel
Grand Ledge Clay Products		SE	3	4N 4W	Shale
Hilu Peat Co.		NW NW	22	2N 4W	Peat
Pryor Bros., Inc.					Sand and gravel
Spartan Aggregates, Inc.					" " "
Weaver, Ronald, Gravel Co., Inc.	Risner pit,	E NW	13	2N 3W	" " "
Whittum's Gravel Co.	SE NE 4 2N 4W,	NE SE	5	1N 3W	" " "
Wicker's Inc.			8	1N 3W	" " "
	E NW 13 2N 3W,	SE	8	3N 4W	" " "
	part of	NW NE	25	2N 3W	" " "

EMMET

Blumke Excavating Co., Inc.			16	35N 4W	Sand and gravel
Emmet Co. Road Comm.	Various (4 pits)				" " "
Koboski Coal Co., Inc.			14	35N 5W	" " "
Penn-Dixie Industires, Inc.			3	34N 6W	Cement
Snider Constr. Co., Inc.	parts of 2, 3, 6, 7, 8, 9, 10		8	34N 6W	Limestone
			8	34N 6W	Shale
		NW NE	27	38N 4W	Sand and gravel

GENESEE

Holloway Sand and Gravel Co., Inc.	Genesee Cty pit					Sand and gravel
Kish, Ernest, Sand & Gravel		9	9N	9E		" " "
Otisville Stone Co.		N 22	9N	8E		" " "
Sargent Sand Co.	NE SW 2 9N 8E, W SW 2	9N	8E			" " "

GLADWIN

Dennison Constrction Co.						Sand and gravel
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GOGEBIC

Globe Industries, Inc.	Various	NW NW 25	45N	41W		Sand and gravel
Gogebic Co. Road Comm.		13 47N	47W, 33	48N	46W	" " "
Ironwood Concrete Prod. Co.	Randall pit					" " "
Randall, Clayton		10	47N	47W		" " "
Wedenoja, Melvin						" " "

GRAND TRAVERSE

Beeman Trucking & Bulldozing Co.		8 27N	11W	36 26N	12W	Sand and gravel
Concrete Services, Inc.				4 27N	11W	" " "
Grand Traverse Co. Road Comm.				9 27N	11W	" " "
Lamar Gravel Co., Inc.				27 26N	12W	" " "
Long Lake Gravel, Inc.		12 26N	12W	2 26N	12W	" " "
Schworm, Inc.	Various	NW 9	26N	11W		" " "
Traverse City S. & G. Co., Inc.				16 27N	11W	" " "

GRATIOT

Gratiot Co. Rd. Comm.	SE SE 19 12N 4W, SW NW 22 12N 4W, SW NW	22 12N	4W			Sand and gravel
	Barton, Jerome, Rons, Thompson pits					" " "
Hubscher & Son, Inc.		3 10N	4W			" " "
P. & B. Gravel Co.	Various 10 9N 1W,	NW SE 9 10N	1W			" " "
Roslund Gravel Co.	St. Louis pit					" " "
Total Petroleum, Inc.	Alma					Sulfur

HILLSDALE

Hillsdale Co. Road Comm.	Various	23 9S	2W			Sand and gravel
Hillsdale Sand & Gravel Co.						" " "
Michigan Aggregates Corp.	Bundy Hill pit	23 9S	2W			" " "
Mil-Co. Trucking						" " "
Miller, George, & Sons, Inc.						" " "

HOUGHTON

Haltunen Sand & Gravel		5 56N	32W			Sand and gravel
Hocking, George, Constr. Co.	Boston pit, Various					" " "
Houghton Co. Road Comm.		10 54N	34W,	NW 21 54N	34W	Crushed basalt
		14 56N	33W,	NW SE 29 52N	36W	" " "
Keweenaw Co. Road Comm.	Copper City pit					Sand and gravel
Superior Sand & Gravel, Inc.		NE SW 27 55N	34W			" " "

HURON

Brade Ready-Mix & Concrete Co.		N SE 16 16N	13E			Sand and gravel
Glawe, Inc.	31 & 32 17N 10E,	5 & 6 16N	10E			Limestone(custom)
Michigan Sugar Co.	Sebewaing		5 15N	9E		Lime
Molesworth Contracting Co.	NW SW 16 16N 13E,	SE SE 17 16N	13E			Sand and gravel

HURON (Cont'd.)

Tanton Ready-Mix		33 16N	13E			Sand and gravel
Vollmer Sand & Gravel		22 15N	11E			" " "
Wagner Ready-Mix	27 15N 13E,	27 16N	15E			" " "
Wallace Stone Co.						" " "
Div. J. P. Burroughs	31 & 32 17N 10E,	5 & 6 16N	10E			Limestone, crushed
Williams Brothers Asphalt Paving Co., Inc.		16 16N	13E			Sand and gravel

INGHAM

Bedrock Aggregates	Snider Farm pit					Sand and gravel
Jolly Road Sand Co.		34 4N	1W			" " "
Kent Lake Peat Farms, Inc.		NW NE 27	3N	1W		Peat
Schlegel, Carl, Inc.	Standard pit					Sand and gravel
Spartan Aggregates, Inc.	Hills, Scarlett pits	16 2N	1W			" " "
Weaver, Ronald, Gravel Co., Inc.	Stillson, Hills, Voss, Capital pits					" " "
Wicker's, Inc.	Gilbert pit (closed 1978)	SW NE 24 2N 2W, SE NE 10 2N 1E, E SW 23 3N	1E			Sand and gravel

IONIA

Crandell Trucking Co.						Sand and gravel
Ionia Co. Road Comm.	23 7N 7W, 1 8N 6W,	NE 1 8N	6W			" " "
		NE 19 5N 5W,	SE 24 8N	6W		" " "
Larson, Mel, Sand & Gravel			NE 35 7N	7W		" " "
Thelen Gravel & Redi-Mix, Inc.		NW NW 22	5N	5W		" " "
Weaver, Ronald, Gravel Co., Inc.						" " "
Williams Bros. Asphalt Pav. Co., Inc.		32 7N 7W, 6 7N	8W			" " "

IOSCO

Glancy, R.E., Inc.	Burge pit					Sand and gravel
Iosco Co. Road Comm.	Various					" " "
Michigan Gypsum Co.		31 21N	6E			Gypsum
Gold Bond Building Prod., Div. of Nat'l. Gypsum Co.	26, 34, 35 22N	22, 26, 27, 28, 21N	6E			" " "
U.S. Gypsum Co.			7E			" " "

IRON

Inland Steel Co.,	Sherwood Mine-Underground (closed 7/78)	123 & 24 43N 35W				Iron Ore
Iron Co. Road Comm.	Various	18 43N 32W,	35 43N	31W		Sand and gravel
		29 43N 33W				" " "
Proksch Constr. Co.		8 42N 35W,	14 42N	35W		" " "
Schninella-Mottes Constr. Co.	Various		26 43N	35W		" " "
Williams Redi-Mix			7 43N	32W		" " "

ISABELLA

Fisher Sand & Gravel Co.	Oil City pit					Sand and gravel
Hubscher & Son, Inc.	Wing Rd., Deerfield pits,	E SW 20 14N	4W			" " "
			36 14N	4W		" " "
Isabella Co. Road Comm.	Various		16 14N	4W		" " "

JACKSON

Cole Brothers Contr. Inc.		18 4S	1E			Sand and gravel
Fransted Construction		17 3S	2E			" " "
Jude Sandstone Co.		NW NE 6 4S	2E			Sandstone
		SW SE 31 3S	2E			" " "
Klumpp Bros. Gravel Co.		12 2S	2E			Sand and gravel
Napoleon Sandstone Qy.		NW NE 6 4S	2E			Sandstone
Palmer Sand & Gravel		SW NW 8 3S	2E			Sand and gravel
Spartan Aggregates, Inc.						" " "
Stevick Gravel Co.		18 4S	1E			" " "

KALAMAZOO			
American Aggregates Corp.	SE 22 2S 9W		Sand and gravel
Balkema, Henry, Sand & Gravel	NW SW 25 2S 11W		" " "
Consumers Sand & Gravel Co.	13 2S 11W		" " "
Hayward Dry Marl	8 4S 10W		Marl
Miller, George, & Sons, Inc.			Sand and gravel
Peters Constr. Co.	Holton & Peters pit	8 2S 11W	" " "
	4th St. pit	5 4S 12W	" " "
Pickitt & Schreur	Butcher pit		" " "
Stone Lake Sand & Gravel		22 1S 9W	" " "
KALKASKA			
Kalkaska Co. Road Comm.		SE 14 27N 8W	Sand and gravel
KENT			
Coit Ave. Gravel Co., Inc.	23 8N 11W	29 8N 11W	Sand and gravel
Contractors Gravel Co.		23 9N 12W	" " "
Cousineau Gravel Co., Inc.	Buckner, Gronkey pits		" " "
DeVries, E., & Sons S&G		NE 22 7N 12W	" " "
Devries, Jack, Exc. Co.		34 7N 12W	" " "
Fleming Gravel Co.			" " "
Georgia-Pacific Corp.		NW 24 6N 11W	Gypsum
Gillisse Gravel Co.	Gillisse pit		Sand and gravel
Grand Rapids Gravel Co.	Various		" " "
Grand Rapids Gypsum Co.		34 7N 12W	Gypsum
Great Lakes Gravel Co.		31 7N 10W	Sand and gravel
Kent Co. Road Comm.			" " "
	SW SW 11 8N 9W	N SW 36 5N 9W	" " "
	SW NE 26 8N 10W	W SW 20 5N 9W	" " "
	NE NW 13 8N 11W	NE 10 5N 10W	" " "
	NE NE 25 9N 11W	NW SE 32 5N 11W	" " "
	W NE 23 10N 10W	NE SW 20 5N 12W	" " "
	W NE 11 10N 11W	N NE 17 6N 9W	" " "
	SE NW 14 10N 11W	NW SE 5 6N 12W	" " "
	NW NW 15 10N 12W	S SW 13 7N 9W	" " "
	SE SW SE 36 5N 9W	NE NE 32 7N 9W	" " "
		NE SW 24 8N 11W	" " "
		NW NW 32 5N 11W	" " "
Northeast Gravel Co.			" " "
Parker, Russel G.			" " "
Petersen Gravel & Excav.			" " "
Pickett & Schreur Inc.	Crampton, Katz pits	NE 21 7N 10W	" " "
	NE 20 7N 10W		" " "
Riverside Sand & Gravel Co.		19 8N 11W	" " "
Rocks Ready Mix Concrete Co., Inc.			" " "
Tip-Top Gravel Co.		6 & 7 6N 9W	Peat
Wonderland Peat		S 23 7N 11W	Sand and gravel
Woodland Paving Co.			" " "
KEWEENAW			
Keweenaw Co. Road Comm.		1 57N 31W	Sand and gravel
LAKE			
Lake Co. Road Comm.	SE NE 29 17N 12W, SE NW 12 19N 12W,	23 18N 13W	Sand and gravel
Lake Sand & Gravel Co.		5 18N 13W	" " "
Long Lake Gravel, Inc.		NW NE 33 18N 11W	" " "
Mason Co. Road Comm.		27 19N 14W	" " "
Sievert Brothers, Inc.		2 20N 14W	" " "

LAPEER			
Allided Chemical Corp.	(Closed early 1978)	16 7N 11E	Sand and gravel
Anderson Peat Co.	parts of 23, 25, 26,	36 7N 12E	Peat
Corey & Hartwig, Inc.		SW 20 7N 10E	Sand and gravel
John R. Sand & Gravel Co.	Metamora pit	10 6N 10E	" " "
Lapeer Co. Road Comm.	Various		" " "
Molesworth Contr. Co.	NE SW 21 7N 11E, S	SE 22 9N 12E	" " "
Weber's Sand & Gravel	Peake pit	5 6N 11E	" " "
Wilkinson Chemical Co.		21 10N 10E	Calcium-magnesium chloride
LEELANAU			
Leelanau Co. Road Comm.	33 30N 12W,	27 28N 13W	Sand and gravel
Long Lake Gravel, Inc.	Walters pit, 16 28N 13W,	S 17 28N 13W	" " "
Peninsula Asphalt Corp.		NE NW 16 28N 13W	" " "
Traverse City Sand & Gravel Co., Inc.		NE 25 28N 12W	" " "
LENAWEE			
Adrian Sand & Gravel Co.	NE SE 4 6S 4E,	SE 16 7S 3E	Sand and gravel
Brownell Sand & Gravel Co.		25 5S 1E	" " "
Irish Hills Gravel Co.		25 5S 1E	" " "
Tecumseh Gravel Co.	Tecumseh pit		" " "
LIVINGSTON			
Albert Sand & Gravel, Inc.		6 3N 3E	Sand and gravel
American Aggregates Corp.		NE NE 11 1N 6E	" " "
Bennett Excav. & Gravel Co., Inc.	Various		" " "
Bentley Sand & Gravel Co.		5 4N 6E	" " "
D. & J. Gravel Co., Inc.		SW SW 32 3N 4E	" " "
Fenton Gravel Co., Inc.		NE SE 2 4N 6E	" " "
Livingston Co. Road Comm.	23 2N 5E,	NW NW 36 4N 5E	" " "
	13 3N 6E,	4 2N 4E	" " "
		NW SE 32 2N 5E	" " "
Molesworth Contracting Co.	Portable Agg. pit,	NE 24 2N 6E	" " "
Morgan Sand & Gravel Co.		10 2N 6E	" " "
Natural Aggregates Corp.	Milford pit		" " "
Portable Agg. Prod., Inc.	Kensington Rd. pit		" " "
Reyhl Sand & Gravel	Mather pit		" " "
LUCE			
Brow, Gene, Constr. Co.	Brow No. 2 pit,	13 45N 11W	Sand and gravel
Luce Co. Road Comm.	14 45N 11W,	26 46N 10W	" " "
MACKINAC			
A. O. Company		SW 34 44N 7W	Dolomite
Abram, Rueben, Excavating		13 43N 12W	Sand and gravel
Brow, Gene, Constr. Co.		18 43N 11W	" " "
Inland Lime & Stone Co.		6 42N 12W	Limestone, crushed
Mackinac County Road Comm.	Various (16 pits)		Sand and gravel
McMahon Brothers	Feske pit		" " "
Ozanich Sand & Gravel		17 43N 10W	" " "
Proksch Constr. Co.		30 42N 12W	" " "
Taylor Lumber Co.		30 42N 1E	" " "
U. S. Steel Corp.		10 42N 1E	Dolomite, crushed
Vertz, Fred S.		SW SE 10 43N 4W	Sand and gravel
Whitehead, I.L., Co.	Various		" " "

MACOMB

American Aggregates Corp.	SW NW 4	4N 12E	Sand and gravel
Carter, George S., Co., Inc.	7	4N 12E	" " "
Compton Sand & Gravel Co.	3	1N 13E	" " "
Marsack Sand & Gravel, Inc.	30	3N 12E	" " "
Morgan S & G Co.	NW NE 8	4N 12E	" " "
Natural Aggregates Corp.	SW 3	4N 14E	" " "
Richmond S & G Co.	8	4N 14E	" " "
See's Sand & Gravel, Inc.			
Vergote & Sons Sand & Gravel			

MANISTEE

Fischer Gravel Co.	13	21N 13W	Sand and gravel
Gronlund Gravel Co.	7	23N 14W	" " "
Hardy Salt Co.	Manistee		Salt, evaporated
Long Lake Gravel, Inc.	NW NW 13	21N 13W	Sand and gravel
Manistee Co. Road Comm.	Various		" " "
Martin-Marietta Chemicals Refractories Div.	SE 18	21N 16W	Magnesium compounds
Morton Chemical Co.	Manistee	12 21N 17W	Bromine, Magnesium compounds, Calcium chloride
Morton Salt Co.	Manistee	E 1/2 Sec. 12 21N 17W	Salt, evaporated and brine
Sievert Bros., Inc.	Fischer pit		Sand and gravel
Wiggins & Sons	Fischer pit		" " "

MARQUETTE

Britton, Don, Inc.	17	48N 25W	Sand and gravel
Cleveland-Cliffs Iron Co.			
Empire Mine	open pit 24, 25	47N 27W, 19, 20, 30	47N 26W
Mather Mine	Underground (closed 7/79)	1 & 2	47N 27W
Republic Mine	open pit	7 & 18	46N 29W
Tilden Mine	open pit	26	47N 27W
Krygoski Construction Co.	NE NW 6	47N 25W,	31 48N 25W
Lindberg, A., & Sons, Inc.	SE SE	8 47N 25W	" " "
	NE	8 47N 25W	Dolomite, crushed
Marquette Co. Road Comm.	Various	12 42N 26W	Sand and gravel

MASON

Dow Chemical Co., U.S.A., The	Ludington	NW SW 23	18N 18W	Calcium chloride Magnesium compounds, Lime, Bromine
Mason Co. Road Comm.	Various			Sand and gravel
Sargent Sand Co.	W NW & W SW 28, E 29, W NW & NE SW 33, 19N 18W			Industrial sand

MECOSTA

Cousineau Gravel Co., Inc.	N	SE 28	13N 8W	Sand and gravel
Gummer's Peat Co.	Various			Peat
Mecosta Co. Road Comm.		22	16N 10W	Sand and gravel
Paris Gravel Co., Inc.				" " "

MENOMINEE

B. & K. Sand and Gravel	SE NW 2	26 34N 27W	Sand and gravel
Glawe, Inc.		32N 27W	Dolomite(custom)
Havelka Construction Co.		19 33N 27W	Sand and gravel

MENOMINEE (Cont'd.)

Johnson, Norman, Co.	Daggett pit				Sand and gravel
Krygoski Construction Co.		NW NW 26	34N 27W	" " "	" " "
		SE NW 2	32N 27W	" " "	" " "
Menominee Co. Road Comm.	N NE SW 11	38N 26W,	SE SE 8	34N 25W	Dolomite, crushed
	W NE 6	38N 25W,	NE SW 35	38N 28W	Sand and gravel
	W NE 33	33N 27W,	SE SW 18	38N 25W	" " "
	SW NW 9	35N 26W,	SW SW 18	38N 25W	" " "
	N NW SW 9	35N 26W,	SE NW 22	39N 26W	" " "
	S NW NE 35	39N 26W,	NE SW 2	33N 27W	" " "
	SW NW 9	37N 28W,	SE SE 24	38N 25W	" " "
	SW NW 21	37N 28W,	NW NE 15	38N 27W	" " "
	E SE 11	36N 26W,	SE SE 10	38N 26W	" " "
	N NW NE 35	39N 26W,	SE SE 25	35N 28W	" " "
	SW SW 12	35N 27W,	SE NW 14	37N 25W	" " "

MIDLAND

Dow Chemical Co., U.S.A., The	Midland		14N R2E	Bromine, Magnesium compounds, Calcium chloride, Salt brine
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MISSAUKEE

Lake City Redi-Mix, Inc.		34	23N 7W	Sand and gravel
Missaukee Co. Road Comm.	Various			" " "
Wiggins & Sons		5	22N 5W	" " "

MONROE

Appleman Farms		1	8S 6E	Peat
Dundee Cement Co.	NW	6	6S 7E	Cement, Limestone
		6	6S 7E	Clay
France Stone Co.		7	7S 9E	Dolomite, crushed
Monroe Quarry		13	6S 7E	" " "
Grape Quarry (Ida)		24	7S 6E	Peat
Link, Norman E.				
Michigan Stone Co.		29	5S 8E	Dolomite, crushed
Maybee Quarry		SW 25	8S 6E	" " "
Ottawa Lake Quarry		NE SW 16	5S 10E	Clay
Ritter, F. W., & Sons, Co.				

MONTCALM

Anderson Gravel & Excav. Co.		33	9N 8W	Sand and gravel
Dyer Co.				
McCrea, St. Germaine,				
Wheeler pits	NW SW	4	11N 10W	Sand and gravel
Borton pit	SE	36	11N 6W	" " "
	SE	19	12N 5W	" " "
Gratiot Co. Rd. Comm.	NE SE9 12N 5W,			
Harris Excavating Co.	N NE	1	11N 5W	" " "
Wheeler Transit Mix		34	9N 8W	" " "

MONTMORENCY

Glancy, R. E., Inc.				Sand and gravel
Montmorency Co. Road Comm.	Various			" " "
Winkleman Excavating Co.		NE 24	29N 1E	" " "

MUSKEGON

C. W. C. Casting, Div. of Textron, Inc.	NE NE 3 9N 17W, 14	9N 17W	Industrial Sand
Hooker Chemical Co.	NE 31	12N 17W	Salt brine
McCormick Sand Corp.	SE 16	11N 16W	Industrial Sand
Miller, Paul C.	32	10N 13W	Sand and gravel
Nugent Sand Co.	SW NW & NE3 & N 10	9N 17W	Industrial Sand

NEWAYGO

Cousineau Gravel Co., Inc.	Cousineau pit, Graham pit		Sand and gravel
Eichenberg, Howard, Contr.	DeLong pit, Mullenix pit		" " "
K. & V. Gravel Co.		6 12N 11W	" " "

OAKLAND

Ajax Materials Corp.		36 4N 10E	Sand and gravel
American Aggregates Corp.	NE NW 22 5N 10E, N	5 2N 7E	" " "
Bit Con Corp., plant 6		NE 29 3N 8E	" " "
Compton Sand & Gravel Co.	Mt. Vernon pit	14 & 23 1N 7E	Peat
Fletcher & Rickard		SW SW 36 5N 11E	Sand and gravel
Great Lakes Gravel Co., Inc.			" " "
Hayes Washed Sand & Gravel Co., Inc.		S 6 1N 7E	" " "
Holloway Sand & Gravel Co., Inc.		W NW 13 1N 7E	" " "
Holly Sand & Gravel	Parts of 32 & 33 5N 8E, NW SW 19 5N 8E,	4 4N 8E	" " "
Koenig Fuel & Supply Co.		SW SE 24 5N 10E	" " "
Kurtz Gravel Co.	NE SE & S NE 30	5N 8E	" " "
Lyon Sand & Gravel Co.		NW 19 1N 8E	" " "
Mabry & Melton S. & G. Co.		NW SE 11 3N 8E	" " "
Mickelson Corp.		NE SE 20 5N 10E	" " "
Middleton Gravel Co.	Middleton pit	8 2N 8E, NE NW 22	Sand and gravel
Molesworth Contr. Co.	Carter pit	5N 8E,	" " "
Oxford Mining Co.		E NW 26 4N 8E	" " "
Oxford Peat Co.		35 or 36 5N 10E	Peat
Portable Agg. Prod., Inc.		8 2N 8E	Sand and gravel
Salem Sand & Gravel		E NE 2 4N 9E	" " "
South Flint Gravel, Inc.		12 5N 7E	" " "
Spartan Aggregates		W SW & SE SW 33 5N 8E	" " "
Tharp & Kosiba			" " "
Tri-City Agg., Inc.	Buffalo pits 1 & 2	NW 2 3N 10E	" " "
Underwood Sand & Gravel Co.	NW SE 11 3N 8E,		" " "
Walker Industries	Lakeshore pit	SW 7 3N 9E	" " "
Waterford Sanitary Landfill Corp.		26 4N 10E	" " "
Weber's Sand & Gravel		34 & 35 2N 7E	" " "
Western Materials	NW NE 33 2N 7E,		" " "

OCEANA

Beckman Brothers, Inc.		24 14N 17W	Sand and gravel
Miller, Paul C.	NW NW 3	13N 15W	" " "
Oceana Co. Road Comm.	SE NE 5	13N 15W	" " "
Sand Products Corp.	NE SW & NW 17 & NE 18	15N 18W	Industrial Sand

OGEMAW

Bunting Sand & Gravel Prod., Inc.		SE NE 6 21N 2E	Sand and gravel
Glancy, R. E., Inc.	Ogemaw pit		" " "

OGEMAW (Cont'd.)

Halliday Sand & Gravel, Inc.				Sand and gravel
Miller, Dave		10 22N 3E	" " "	" " "
Ogemaw Co. Road Comm.		SW 5 22N 2E	" " "	" " "
West Branch Sand & Gravel		NE SW 6 21N 2E	" " "	" " "

ONTONAGON

Copper Range Co., White Pine Div.		4, 5, 9 50N 42W	Copper, silver
McGuire, John			Sand and gravel
Ontonagon Co. Road Comm.	Various		" " "

OSCEOLA

Cousineau Gravel Co., Inc.	Youngs pit		17N 9W	Sand and gravel
Hersey Sand & Gravel		17 & 19	17N 9W	" " "
Osceola Co. Road Comm.		11	17N 9W	" " "

OSCODA

Glancy, R. E., Inc.	Oscoda pit			Sand and gravel
Holloway Sand & Gravel Co., Inc.	Sleegh pit			" " "

OTSEGO

Glancy, R. E., Inc.	Various		3 30N 3W	Sand and gravel
Hoogerhyde Sand & Gravel Co.				" " "
Lake Constr. Co.				" " "
Mason Gravel Co.		11	30N 3W	" " "
Otsego Co. Road Comm.	Various			" " "

OTTAWA

C and L Gravel Co.			29 7N 13W	Sand and gravel
Construction Agg. Corp.		SE NW 17 & 18	8N 16W	Industrial Sand
DeWent Gravel Co.		SW SE NW 23	6N 13W	Sand and gravel
Grand Valley Gravel Co.		29	7N 13W	" " "
Huizenga Gravel Co.		NE 3	6N 13W	" " "
Miller, Paul C.		33	10N 13W	" " "
Muskegon Gravel and Redi Mix Co.		5	9N 13W	" " "
Ottawa Co. Road Comm.	Various (8 pits)			" " "
Pickitt & Schreur	Parts of 34 & 35 8N 15W, 1 &	12	7N 15W	" " "
Riverview Gravel Co.		2	7N 13W	" " "
Standard Sand Co.		parts of 4 &	5 7N 16W	Industrial Sand
West Short Constr. Co., Inc.		2	6N 13W	Sand and gravel
Wolverine Gravel Co.			6N 12W	" " "

PRESQUE ISLE

Dean, Henry, & Sons			28 34N 3E	Sand and gravel
Gilliland Construction Co., Inc.		NE SE 22	33N 8E	" " "
Giawe, Inc.		SE NE 23	35N 5E	Limestone(custom)
Onaway Stone Co.		NW NW 5	34N 2E	Limestone, di-
				mensional
Presque Isle Co. Road Comm.				Sand and gravel
Presque Isle Corp.	1, NW 2, 3, 10, 11 33N 8E, 34 & 35	34N 8E		Limestone,
				crushed
Straits Agg. & Equip. Corp.				Sand and gravel
U.S. Steel Corp.		SE NE 23	35N 5E	Limestone,
				crushed

ROSCOMMON							
Roscommon Co. Road Comm.	Various						Sand and gravel
SAGINAW							
Erie Sand Steamship Co.	Saginaw Bay of Lake Huron						Industrial Sand
Hutfilz, Walter							Sand and gravel
Michigan Sugar Co.	Carrollton						Lime
Saginaw Co. Road Comm.	Various (8 pits)						Sand and gravel
Sargent Sand Co.	S NE & N SE & NE SW 17 10N 2E						Industrial Sand
ST. CLAIR							
Click Sand and Gravel			27	7N	15E		Sand and gravel
Diamond Crystal Salt Co.			31	5N	17E		Salt, evaporated
Molesworth Contr. Co.		NW	17	7N	15E		Sand and gravel
Morton Salt Co.		SE	29	6N	17E		Salt, evaporated
Raymond Excavating Co., Inc.		S NE	35	6N	14E		Sand and gravel
Smiths Creek Sand Co., Inc.			18	6N	16E		Industrial Sand
			18	6N	16E		Sand and gravel
ST. JOSEPH							
Aggregate Processors, Inc.			24	8S	12W		Sand and gravel
DeBoer Materials			14	6S	12W		" " "
Kerr Peat and Marl			13	6S	12W		Marl, Peat
Miller, George, & Sons, Inc.	St. Joseph pit						Sand and gravel
St. Joseph Co. Road Comm.	Various		26	6S	11W		Sand and gravel
SANILAC							
Albrecht Sand & Gravel Co.			31	12N	12E		Sand and gravel
Dennison Construction Co.			13	9N	16E		" " "
Michigan Peat	Minden & Sandusky		11	11N	14E		Peat
			20	14N	14E		"
			3	11N	14E		"
							Lime
Michigan Sugar Co.	Croswell	SW SW	32	9N	16E		Sand and gravel
Mid-Michigan Materials, Inc.		E SE	31	9N	16E		" " "
Molesworth Contr. Co.							" " "
SCHOOLCRAFT							
Inland Lime & Stone Co.		1, 3, 10,	11	41N	13W		Dolomite, crushed
Inwood Stone Products Co.			8	41N	17W		Dolomite, dimensional
Neadow, James			27	42N	17W		Sand and gravel
Schnurer, Carl, Inc.							" " "
Schoolcraft Co. Road Comm.		SE SW	14	42N	16W		Dolomite, crushed
SHIAWASSEE							
A1-Par Peat Co.			18	8N	2E		Peat
Anderson Peat Co. (after 10/78)	parts of 3, 4, 9, 10,		16	5N	1E		"
Central Michigan Sand & Gravel Co.	SW NW 23 7N 1E,		15	7N	1E		Sand and gravel
Fitzgerald Gravel Co.	Various		22	8N	2E		" " "
Fuoss Gravel Co.			19	7N	2E		" " "
Livingston Co. Road Comm.			30	5N	3E		" " "
Michigan Brick, Inc.		SE 22,	23	7N	3E		Shale
Page Sand & Gravel, Inc.			36	7N	4E		Sand and gravel
Scenic Lakes, Inc. (until 10/78)	parts of 3, 4, 9, 10,		16	5N	1E		Peat
Shiawassee Co. Road Comm.			2	6N	3E		Sand and gravel
Spartan Aggregates, Inc.							" " "
Tod Gravel Co.			13	7N	1E		" " "
Weaver, Ronald, Gravel Co., Inc.	GRG, Eyde pits						" " "

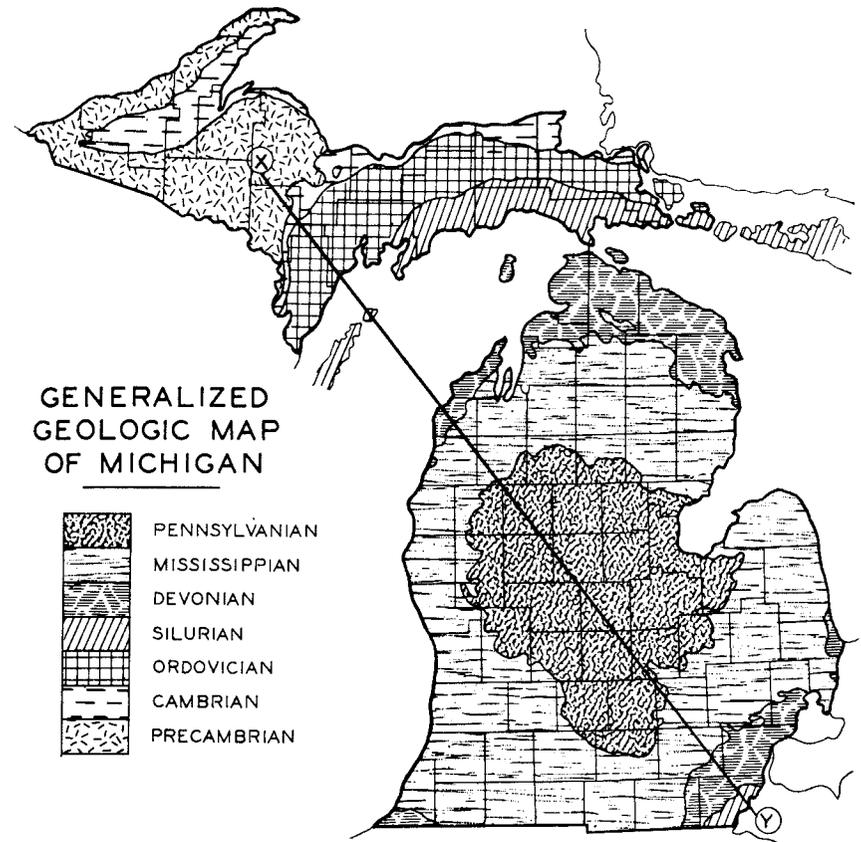
TUSCOLA							
Andersen Sand & Gravel Co.			20	9N	11E		Sand and gravel
Bernthal Sand & Gravel, Inc.		E NE 25	12N	8E			" " "
Great Lakes Minerals Co.		SW NE 11, W NE & E NW 22 11N 8E, 27	12N	8E			Industrial Sand
Michigan Sugar Co.	Caro						Lime
Millington Gravel Co.	Millington pit						Sand and gravel
Page Sand & Gravel, Inc.							" " "
Peterhans, H.O., S. & G.			13	12N	8E		" " "
Powell Sand & Gravel		SE SE SW & SE SE SE	8	13N	8E		" " "
Sargent Sand Co.		parts of 16 & 21	11N	8E			Industrial Sand
		NW SW 21 11N 9E, SW 28	10N	9E			Sand and gravel
Spartan Aggregates, Inc.	Baskman pit						" " "
Strausberg, Frank, & Son Co.		NW SW	30	11N	9E		" " "
Tuckey Block Co.		W NW	33	14N	11E		" " "
Tuscola Co. Road Comm.			14	12N	9E		" " "
VAN BUREN							
Budzen Cement Prod., Inc.			13	3S	14E		Sand and gravel
Harris Trucking, Inc.		W SE SW	29	2S	17W		Industrial Sand
Manley Bros. of Indiana, Inc.	NW SE 8 2S 17W, W3/4 SW		29	2S	17W		" " " "
	parts of SW & SE & NE 30 2S 18W, SW		21	2S	17W		" " " "
Miller, George, & Sons, Inc.	Various						Sand and gravel
Smith, Bill, S & G, Inc.			24	3S	14W		" " "
Van Buren Co. Road Comm.	Various						" " "
Yerington Construction Co.		NE SE	24	3S	15W		" " "
WASHTENAW							
Bennett Excavating & Gravel Co., Inc.			24	3S	5E		Sand and gravel
Du-Pine Co.		E NE	24	3S	5E		" " "
Holloway Sand & Gravel Co., Inc.							" " "
		NE 4 3S 5E, SE SE 12 & E NE	13	1S	7E		" " "
		N 22 1S 3E, SW 23 3S 4E, SE	4	4S	3E		" " "
		NE 4 3S 4E, NW 31 3S 4E, SW	3	2S	5E		" " "
			9	2S	6E		" " "
			32	2S	7E		" " "
Kruse Gravel Co.			25	2S	5E		" " "
Liberty Sand Co.			12	3S	3E		" " "
National Aggregates Corp.			21	3S	4E		" " "
Standard Gravel Co., Inc.		NW SW	21	3S	4E		" " "
Washtenaw Sand & Gravel, Inc.							" " "
Whittaker & Gooding Co.		SW NE 19 2S 7E, E SW	3	2S	5E		" " "
WAYNE							
A.B.C. Sand Co.			5	2S	9E		Sand and gravel
BASF Wyandotte Corp.	Wyandotte						Lime, Salt brine
Detroit Lime Co.	River Rouge						Lime
Glawe, Inc.			15	5S	10E		Dolomite(custom)
International Salt Co., Inc.	Detroit Mine	SW Ext. Sec.	32	2S	11E		Rock Salt
Levy Co.	Detroit						Cement
Marathon Oil Co.	Detroit						Sulfur
Marblehead Lime Co.	River Rouge						Lime
Mich. Foundation Quarry Co.	Trenton	NW NW	7	4S	11E		Dolomite, crushed
Moore Bros. Sand & Gravel		NW NW	9	3S	9E		Sand and gravel
Ottawa Silica Co.		parts of 14, 15, 22, 23	5S	10E			Sandstone, crushed (Industrial-silica sand)
Peerless Cement Co., Div. Amcord Co.		Ext. Sec. 28	2S	9E			Cement
Pennwalt Corp.	Wyandotte	NW Ext. Sec. 36	2S	10E			Clay
Rockswood Stone Co., Inc.	Rockwood		15	5S	10E		Dolomite, crushed
Thompson Sand & Gravel, Inc.		NW NE	8	1S	8E		Sand and gravel
Wayne Sand & Gravel, Inc.			12	3S	8E		" " "
Wyandotte Cement, Inc.	Wyandotte						Cement

Dunbar Sand & Gravel
 Franke Septic Tank Co.
 Wexford Gravel Co.
 Wexford Sand Co.

WEXFORD

	15	21N	9W	Sand and gravel	
		"	"	" " "	
		"	"	" " "	
	10	21N	9W	" " "	
SW 30	24N	12W,	SE 34	23N 12W	Industrial Sand

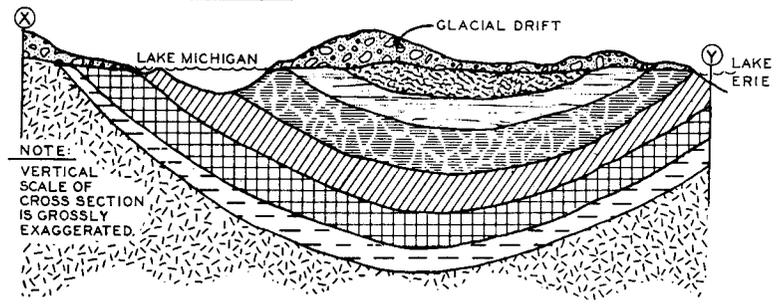
Figure 20



GENERALIZED
 GEOLOGIC MAP
 OF MICHIGAN

-  PENNSYLVANIAN
-  MISSISSIPPIAN
-  DEVONIAN
-  SILURIAN
-  ORDOVICIAN
-  CAMBRIAN
-  PRECAMBRIAN

CROSS SECTION X-Y



NOTE:
 VERTICAL
 SCALE OF
 CROSS SECTION
 IS GROSSLY
 EXAGGERATED.

STRATIGRAPHIC SUCCESSION IN MICHIGAN

PALEOZOIC THROUGH RECENT



MICHIGAN DEPARTMENT OF NATURAL RESOURCES

EDUCATIONAL SURVEY DIVISION
Arthur E. Slaghter, State Geologist and Chief

ACKNOWLEDGMENT: Compiled with the general assistance of the Department, the U.S. Geological Survey, Michigan's universities, other state Geological Surveys, and geologists within Michigan's oil and gas industry. Dr. Avelar E. Cross, Department of Geology, Michigan State University, donated rocks of Mississippian age and suggested pertinent age assignments.

GEOLOGIC NAMES COMMITTEE
Gordon D. Ellis, Chairman, Robert W. Kelly, Secretary,
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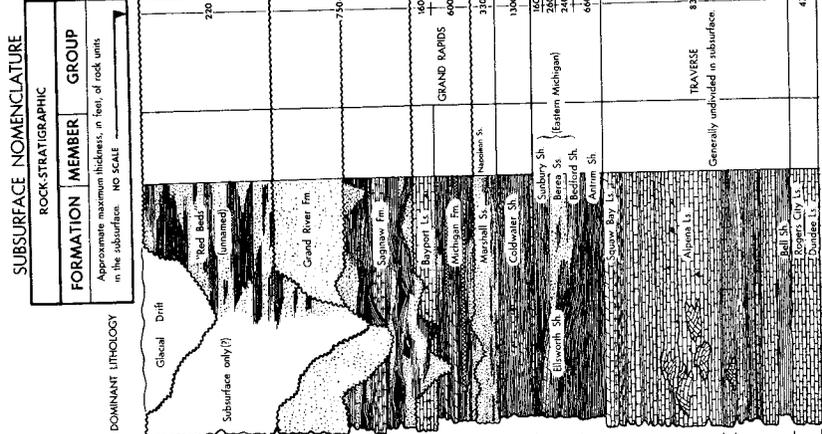
INFORMAL TERMS

Principal oil and gas plays, and informal terms used in petroleum geology, are listed and applied to parts of formations or groups in the subsurface.

STRATIGRAPHIC POSITION	INFORMAL TERMS	PAYS
Basal sandstones of Saginaw Fm.	Perma sandstone	
In lower part of Michigan	wide type brown line may get very gl they in	Gas Gas & Oil Gas & Oil
Marshall Sh.	Coldwater line Veer and Coldwater redrock	Gas
Coldwater Sh.		
In upper part of Ellettsworth Sh.	"Berea" (Western Michigan)	Oil & Gas
Berea Sh.	Berea and (Eastern Michigan)	Oil & Gas
Saginaw Bay Ls.	Saginaw Bay	Oil & Gas
Upper part of Traverse Group in Western Michigan	Traverse (Western Michigan)	Oil & Gas
Rogers City Ls.	(Shore Lake zone)	Oil & Gas
Dundee Ls.		Oil & Gas
Dundee Ls. (B) Upper part of Lucas Fm. (?)	Red City zone	Oil & Gas
In Lucas Fm.	reservoir ash near zone massive ashiferous by ashiferous folded zone	Oil & Gas Oil & Gas Oil & Gas

ERA	PLEISTOCENE NOMENCLATURE		STAGE
	SYSTEM	SERIES	
CENOZOIC	QUATERNARY	RECENT	Valders Slide Two Creeks Interstrade Manikabo Slide (P. Huron?)
		PLEISTOCENE	Wisconsin Glaciation Cary Slide Tazewell Slide Savannah Inter-glaciation Illinoian Glaciation

ERA	OUTCROP NOMENCLATURE		FORMATION	MEMBER
	SYSTEM	GROUP		
MESOZOIC	DEVONIAN	KIMERIDGIAN	Grand River Fm.	York, Eaton, and Washville Sandstones
			Pottsville	Saginaw Fm.
			Meramecian	Bygonia Ls.
			Osagian	Michigan Fm.
			Kinderhookian	Marshall Sh.
			Devonian	Coldwater Sh.
			Devonian	Ellettsworth Sh. (Western Michigan)
			Devonian	Antrom Sh.
			Devonian	Saginaw Bay Ls.
			Devonian	Thunder Bay Ls.
MESOZOIC	DEVONIAN	ERIAN	Traverse Group	Traverse (Western Michigan)
			Traverse Group	Berea Sh.
			Traverse Group	Bedford Sh.
			Traverse Group	Alcona Ls.
			Traverse Group	Alpena Ls.
			Traverse Group	Stewart Bay Ls.
			Traverse Group	Stewart Creek Ls.
			Traverse Group	Genesee Fm.
			Traverse Group	Ferron Point Fm.
			Traverse Group	Rockport Quarry Ls.
MESOZOIC	DEVONIAN	ERIAN	Traverse Group	Traverse (Western Michigan)
			Traverse Group	Berea Sh.
			Traverse Group	Bedford Sh.
			Traverse Group	Alcona Ls.
			Traverse Group	Alpena Ls.
			Traverse Group	Stewart Bay Ls.
			Traverse Group	Stewart Creek Ls.
			Traverse Group	Genesee Fm.
			Traverse Group	Ferron Point Fm.
			Traverse Group	Rockport Quarry Ls.



SUBSURFACE NOMENCLATURE

ROCK-STRATIGRAPHIC

FORMATION / MEMBER

GROUP

Approximate maximum thickness, in feet, of rock units in the subsurface. NO SCALE

DOMINANT LITHOLOGY

Table 4

(available separately as Chart 1)

ERA	PALEOZOIC		FORMATION	MEMBER
	SYSTEM	GROUP		
CAMBRIAN	MIDDLE	ULSTERIAN	Anderson Fm.	Anderson Fm.
			Lucas Fm.	Lucas Fm.
			Amherstburg Fm.	Amherstburg Fm.
			Sylvania Sh.	Sylvania Sh.
			Box Bluff Fm.	Box Bluff Fm.
			Garden Island Fm.	Garden Island Fm.
			Basin River Dol.	Basin River Dol.
			Paris Bay Dol.	Paris Bay Dol.
			St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
CAMBRIAN	MIDDLE	CAYUGAN	Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
			Manitoulin Dol.	Manitoulin Dol.
			Bay Hill Fm.	Bay Hill Fm.
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
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			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
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			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pelee and Cheneau Sh.
			Engadine Dol.	Engadine Dol.
			Manistique	Manistique
			Schoolcraft Dol.	Schoolcraft Dol.
			Henshield Dol.	Henshield Dol.
			Byron Dol.	Byron Dol.
			Lime Island Dol.	Lime Island Dol.
			Cabor Head Sh.	Cabor Head Sh.
Manitoulin Dol.	Manitoulin Dol.			
CAMBRIAN	MIDDLE	CAYUGAN	St. Ignace Dol. (northern Peninsula)	St. Ignace Dol. (northern Peninsula)
			St. Ignace Dol. (southern Peninsula)	St. Ignace Dol. (southern Peninsula)
			Pelee and Cheneau Sh.	Pe

SELECTED MINERAL COMMODITIES BY GEOLOGICAL SYSTEMS

<u>COMMODITY</u>	<u>GEOLOGICAL SYSTEM</u>	<u>PRODUCER</u>
<u>COPPER</u>		
<u>PRECAMBRIAN</u>		
Upper Keweenaw (PE Y)		White Pine Division, Copper Range Co.
Nonesuch Shale.....		White Pine Mine
<u>IRON</u>		
<u>PRECAMBRIAN</u>		
Upper Huronian (PE X)		Hanna Mining Co.
Riverton Iron-Formation.....		Groveland Mine
Middle Huronian: (PE X)		Cleveland Cliffs Iron Co.
Negaunee Iron-Formation.....		Empire Mine
		Mather Mine (closed 7-79)
		Republic Mine
		Tilden Mine
Vulcan Iron-Formation.....		Inland Steel Co.
		Sherwood Mine (closed 7-78)
<u>CLAY AND SHALE</u>		
<u>Quaternary System</u>		
Pleistocene Clay.....		Dundee Cement Co.
		Peerless Cement Co., Div. Amcord, Inc.
		Ritter and Sons Co., Inc.
<u>PENNSYLVANIAN SYSTEM</u>		
<u>Lower Pennsylvanian</u>		
Saginaw Formation.....		Grand Ledge Clay Products Co.
		Michigan Brick, Inc.
<u>DEVONIAN SYSTEM</u>		
<u>Upper Devonian</u>		
Antrim Shale.....		National Gypsum Co. (Cement Div.)
Ellsworth Shale.....		Medusa Cement Co.
<u>Middle Devonian</u>		
Traverse Group		
Gravel Point Shale (Alpena Limestone).....		Penn-Dixie Industries, Inc.
<u>GYPSUM</u>		
<u>MISSISSIPPIAN SYSTEM</u>		
<u>Upper Mississippian</u>		
Michigan Formation.....		Georgia-Pacific Corp.
		Grand Rapids Gypsum Co.
		Michigan Gypsum Co.
		National Gypsum Co.
		United States Gypsum Co.

MARL

Quaternary System		
Pleistocene Recent.....		All Operations (listed on page 23)

NATURAL BRINES

DEVONIAN SYSTEM

<u>Middle Devonian</u>		
Detroit River Group.....		Dow Chemical Co. - Ludington
(Includes the Sylvania and/or		Dow Chemical Co. - Midland
Filer Sandstones)		Martin Marietta Co.
		Morton Chemical Co. - Manistee
		Wilkinson Chemical Co.
Dundee Limestone.....		Dow Chemical Co. - Midland

PEAT

Quaternary System		
Pleistocene-Recent.....		All Operations (listed on page 28)

SALT

SILURIAN SYSTEM

<u>Upper Silurian</u>		
Salina Group.....		BASF Wyandotte Corp.
		Diamond Crystal Salt Co.
		Dow Chemical Co. - Midland
		Hardy Salt Co.
		Hooker Chemical Corp.
		International Salt Co., Inc.
		Morton Salt Co. - Manistee
		Morton Salt Co. - St. Clair
		Pennwalt Corp.

SAND AND GRAVEL

Quaternary System		
Pleistocene-Recent.....		All Operations (listed under Sand & Gravel)

STONE-DOLOMITE

DEVONIAN SYSTEM

<u>Middle Devonian</u>		
Detroit River Group.....		France Stone Co. - Ida
		Michigan Foundation Quarry Co., Inc.
		Michigan Stone Co. - Maybee

SILURIAN SYSTEM

Upper Silurian
Bass Islands Group.....France Stone Co. - Monroe
Michigan Stone Co. - Ottawa Lake
Rockwood Stone Co.

Middle Silurian
Engadine Dolomite.....A. O. Stone Co.
Drummond Dolomite, Inc.
Inland Lime and Stone Co.
U.S. Steel Corp. - Cedarville
Hendricks Dolomite.....Inwood Stone Products Co.
Schoolcraft Co. Road Comm.

ORDOVICIAN SYSTEM

Middle Ordovician
Trenton-Black River Group.....Krygoski Construction Co. -
Delta Co.
Krygoski Construction Co. -
Menominee Co.
Proksch Construction Co.

PRECAMBRIAN

Middle Precambrian (PEX)
Kong Dolomite.....Lindberg, A., & Sons, Inc.

STONE-LIMESTONE

MISSISSIPPIAN SYSTEM

Upper Mississippian
Bayport Limestone.....Arenac County Road Comm.
Bay County Road Comm.
Cheney Limestone Co.
Glancy, R.E., Inc.
Van Deusen Stone Co.
Wallace Stone Co.

DEVONIAN SYSTEM

Middle Devonian
Traverse Group.....Afton Stone, Inc.
Limestone Products Co.
Medusa Cement Co.
National Gypsum Co. (Cement Div.)
Onaway Stone Co.
Penn-Dixie Industries, Inc.
Rogers City Limestone.....Presque Isle Corp.
U.S. Steel Corp. - Rogers City
Dundee Limestone.....Dundee Cement Co.
Presque Isle Corp.
U.S. Steel Corp. - Rogers City

SILURIAN SYSTEM

Middle Silurian
Hendricks Dolomite
Fiborn Limestone Member.....Inland Lime and Stone Co.

STONE MISCELLANEOUS (Marble)

PRECAMBRIAN

Middle Precambrian (PE X)
Randville (marble).....Felch Quarry Corp.

STONE-SANDSTONE

MISSISSIPPIAN SYSTEM

Lower Mississippian
Marshall Sandstone.....Jude Sandstone Co.
Napoleon Sandstone Quarry

DEVONIAN SYSTEM

Middle Devonian
Detroit River Group
Sylvania Sandstone.....Ottawa Silicia Co.

SOME SUGGESTED READINGS

FROM MICHIGAN DEPARTMENT OF NATURAL RESOURCES, GEOLOGICAL SURVEY DIVISION

Limestone

Johnson, Allen M., and Sorensen, Harry O.; "Drill Core Investigation of the Fiborn Limestone Member in Schoolcraft, Mackinac, and Chippewa Counties, Michigan", Report of Investigation 18, 1978, 51+ pg., \$2.00. From the abstract "Progress on evaluation of high-purity, high-calcium limestones of the Middle Silurian Fiborn member of the Henricks Formation, Burnt Bluff Group in the eastern portion of the Northern Peninsula is presented". This publication covers part of the work done as a joint effort of the Geological Survey Division and the Institute of Mineral Research at Michigan Technological University, Houghton, Michigan.

Reclamation

Shetron, S.G.; et al., "Establishing Vegetation on Alkaline Iron and Copper Tailings" Report of Investigation 17, 1977, 13+ pg., \$2.00. This report covers the methods used and results realized from a five year research program to establish vegetation on mine tailings as part of a mine reclamation program.

List of Publications

Currie, William W.; "Annotated List of the Publications of the Michigan Geological Survey 1838-1977", Circular 16, 1978, 38+ pg., \$2.00. This well organized list is indexed by author, mineral, and county.

Price Lists

"Available Maps of the Michigan Geological Survey", Map List 2, 1979, free. A detailed listing of available geological maps and their prices.

"Publications Available from the Geological Survey Division", List 21, 1979, free. A detailed list of available publications and their prices.

FROM THE U.S. BUREAU OF MINES

Statistics and Industry Information

Peterson, Edward C.; Middlewood, Esther A.; "Minerals in the Economy of Michigan", State Mineral Profiles 7, 1978, 14+ pg., free. This brief booklet includes a number of short accountings of happenings within the State's mineral industry in 1977. Production figures are given, as well as state and federal legislation and program changes, state and federal income from mineral royalties and severance taxes, etc. This will prove to be a handy new annual series produced by the U.S.B.M.

Peterson, Edward C.; Middlewood, Esther, A.; "The Mineral Industry of Michigan", from "1976 Minerals Yearbook", 1978, U.S. Bureau of Mines and "Annual Statistical Summary 27, Michigan Department of Natural Resources, Geological Survey Division, 26 pg., free. This annual booklet presents detailed mineral commodity production and value information as well as industry news and law changes which affect the mineral industry.

"Mineral Commodity Profiles", U.S.B.M 1977 - 1979, free. These short publications are described as "A new series presenting timely data on selected mineral raw materials". As of November 1979 there were 38 booklets in this series, a number of which cover materials found or produced in Michigan. Consult the U.S.B.M. for the current listing.

SOME SUGGESTED READINGS

Popular Books about the Geology of the State

These books may be ordered from your local bookstore.

Dorr, John A., and Eschman, Donald F.; "Geology of Michigan", 1970, 484 pg., \$15.00.
The University of Michigan Press
839 Greene Street
Ann Arbor, Michigan 481061

This hardbound textbook explains the geology of Michigan and includes many illustrations and lists of collecting areas, museums, etc. General geology concepts are explained and Michigan examples are given.

Paull, Rachel Krebs, and Paull, Richard A.; "Geology of Wisconsin and Upper Michigan", 1977, 232 pg., \$6.95.
Kendall/Hunt Publishing Company
2460 Kerper Boulevard
Dubuque, Iowa 52001

This well written, and illustrated, softbound book describes the geology of Wisconsin and Upper Michigan and parts of adjacent states. Concepts of general geology are explained and a 13 page glossary of geological terms are included. One nice feature of this book is that it covers the geology of an area beyond stateline boundaries.

Popular Books about Mining in Michigan

Boyum, Burton H.; "The Saga of Iron Mining in Michigan's Upper Peninsula", 1977, 48+ pg. \$3.75 (plus \$.15 sales tax and \$.60 postage)
The Marquette County Historical Society, Inc.
213 North Front Street
Marquette, Michigan 49855

This booklet gives a well written, brief history of Michigan iron mining. Many old photographs of mining scenes are included. Two additional features are a glossary of mining terms and a good "selected" bibliography on the subject.

Murdoch, Angus; "Boom Copper", 1943
255 pg. The Copper Country edition, 1964 is available for \$7.95, tax paid, plus \$1.00 shipping, from:
Quincy Mine Hoist Association, Inc.
Box 265
Hancock, Michigan 49930

"Boom Copper, the Story of the First U.S. Mining Boom" includes over 20 chapters, each one covering different aspects of mining and living in Michigan's Copper Country from prehistoric times up to the 1940's. Some old photographs and drawings help the reader relive the past which is described so well.

Topographic Maps - U.S. Geological Survey Topographic Maps of Michigan are available through the Michigan Department of Natural Resources. A list of these maps, which are sold by the Information Services Center, is available upon request.

Department of Natural Resources
Information Services Center
Box 30028
Lansing, Michigan 48909
(Michigan residents add 4% state sales tax)

U.S. Bureau of Mines
Branch of Publications Distribution
400 Forbes Avenue
Pittsburg, Pennsylvania 15213

Unless a specific address is given, these publications may be ordered from their proper agency above.

READINGS RELATED TO BRICK

The featured product in this directory is Brick. Bricks are made of the mineral commodity clay and shale. Both clay and shale are widely distributed in Michigan.

Three articles and books which discuss Michigan's clay and shale resources and uses are listed below. While these Michigan Geological Survey publications are out-of-print, they should be available at libraries through the interlibrary loan system.

Ries, H.; 1900, "Clays and Shales of Michigan - Their Properties and Uses", part I, vol. VIII, Geological Survey of Michigan 1900 - 1903, 67 p.

Brown, George Granger; 1924, "Clays and Shales of Michigan and Their Uses" Pub. 36, Geological Series 30, Geological Survey Division, Michigan Department of Conservation, 443 p.

Sorensen, Harry O.; 1970, "Michigan's Clay Deposits and Industry", 13 p., in "Proceedings - Sixth Forum on Geology of Industrial Minerals", W.A. Kneller, editor, Miscellany 1, Geological Survey Division, Michigan Department of Natural Resources.

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PERMIT INFORMATION

For information concerning what D.N.R. permits may be required when starting a new mining project, contact the following agency:

Michigan D.N.R.
Environmental Enforcement Division
Project Review Section
Box 30028
Lansing, Michigan 48909
Telephone (517) 373-3503

Either Mr. Donald L. Inman, Section Chief, or Mr. Gary M. Gettel will advise you what specific D.N.R. Division to contact directly.

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MICHIGAN DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
---LANSING OFFICE---
4th Floor Stevens T. Mason Building
(Pine and Allegan Streets)
Box 30028, Lansing, Michigan 48909
Telephone - Area Code "517"
373-1256 or 373-7860

Arthur E. Slaughter, Chief, State Geologist

ECONOMIC AND ENVIRONMENTAL GEOLOGY SECTION

OIL AND GAS SECTION

Mining & Economic Geology Unit	- 373-1256	Production & Proration Unit	- 373-1256
Geology & Minerals Research Unit	- 373-1256	Subsurface & Petroleum Geology	- 373-1256
General Geology Unit	- 373-7860	Unit	- 373-1256
Mineral Wells Unit	- 373-1256	Regulatory Control Unit	- 373-1256
Reclamation & Mining Control Unit	- 373-1256		
Ground Water Geology Unit	- 373-7860		

Field Organization

Region I - Marquette Regional Headquarters, P.O. Box 190, Marquette, MI 49855(US41-S)
Phone - 906/226-7505

Escanaba Field Office, 201 State Office Bldg., Escanaba, MI 49829
Phone - 906/786-0333

Region II Roscommon Regional Headquarters, P.O. Box 128, Roscommon, MI 48653
Phone - 517/275-5151 (8717 N. Roscommon Rd.)

Cadillac Field Office, R#1, 8015 South 131 Rd., Cadillac, MI 49601
Phone - 616/775-9727

Gaylord Field Office, P.O. Box 576, Gaylord, MI 49735 (1732 W. Main St.)
Phone - 517/732-3541

Mount Pleasant Field Office, 204 Court St., Mt. Pleasant, MI 48858
Phone - 517/773-9965

Grayling Field Office, Box 507, 4895 W. County Rd., Grayling, MI 49738
Phone - 517/348-6371

Region III Lansing Regional Headquarters, Box 30028, Lansing, MI 48909 (State Government Secondary Complex-Dimondale)
Phone - 517/322-1300

Imlay City Field Office, P.O. Box 218, Imlay City, MI 48444 (715 S. Cedar St.)
Phone - 313/724-2015

Rose Lake Field Office, R#1, East Lansing, MI 48823 (8562 E. Sto11 Rd.)
Phone - 517/339-8638 (641-4071) or (641-6000)

Plainwell Field Office, P.O. Box 355, Plainwell, MI 49080 (621 N.10th St.)
Phone - 616/685-6851

Grand Rapids Office, 350 Ottawa St. NW, Grand Rapids, MI 49503
Phone - 616/456-5071

