DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY
Lawrence H. Wickstrom, Chief

Open-File Report 1980-1

Investigation and Inventory of Abandoned Underground Mines in Columbiana, Mahoning, and Trumbull Counties, Ohio

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Cover image: Mine subsidence near the Briarfield at the Ridge nursing home, Mineral Ridge, Trumbull County, Ohio.

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Investigation and Inventory of Abandoned Underground Mines in Columbiana, Mahoning, and Trumbull Counties, Ohio

Introduction

The Ohio Department of Natural Resources, Division of Geological Survey has been mapping the locations of abandoned underground mines since the late 1960s. The first set of maps were created to show the distribution of underground mining and to assist with calculating the remaining coal resources within Ohio. These maps used a base map, scale, and tiling system that matched the coal resource maps that the Division of Geological Survey had created in the late 1950s (commonly referred as the "O'Neill coal resource maps"), and they have some significant limitations for determining if a property is undermined by an abandoned mine. The base maps only show county, township, and section boundaries. In addition, neither roads nor topography are shown on the maps. Finally, much of the detail of the abandoned underground mine maps is lost at 1:62,500 scale. However, even with these deficiencies the maps were instrumental in showing the general distribution of underground mining as well as how much coal may be left for mining within the state.

On June 13, 1977, a mine shaft collapsed underneath a garage located at 523 W. Hylda Street in south Youngstown, Ohio. The collapse of the mine shaft brought to light the fact that the State of Ohio did not have any modern maps showing the locations of abandoned mines. Consequently, a project was initiated to map the locations of all the abandoned underground mines in the tri-county region of Trumbull, Mahoning, and Columbiana counties. In addition, mines in the adjoining counties of Carroll, Jefferson, Portage, and Stark were also mapped and located. The locations of abandoned underground mines in this region were mapped onto U.S. Geological Survey topographic maps at 1:24,000 scale, which provided information on the elevations and the then-modern road network that was missing in the original abandoned mine map series from the late 1960s. Individual houses, buildings, and urban areas also are shown on these topographic base maps, providing property owners with enough information to determine if a property is possibly undermined by abandoned mines. This regional mapping project was completed in 1980 and was instrumental in showing the potential danger of mine subsidence in the tri-county area.

Open-File Report 1980-1 presents the summary results of the project to map the location of abandoned underground mines in the Trumbull, Mahoning, and Columbiana tri-county area. Far more importantly, the techniques used in this tri-county area were then applied to mapping abandoned underground mines throughout the rest of the state; the mapping work was initially completed in 1988[1]. This report is a fundamental reference and provides the basic framework on how the mapping of abandoned underground mines was conducted in the tri-county area and subsequently, throughout the remainder of the state of Ohio. Mapping of newly located abandoned mines and refining the accuracy of currently located abandoned underground mines continues to this day, using the basic framework presented in this report. The 1:24,000-scale abandoned underground mine maps are available as print-on-demand maps through the Geologic Records Center at the Survey and the abandoned underground mine information can be accessed as an online, interactive mapping application, via the Survey's Web site: www.OhioGeology.com.

James McDonald
January 5, 2012

[1]See DeLong, R.M., 1988, Coal-mine subsidence in Ohio: Ohio Department of Natural Resources, Division of Geological Survey, *Ohio Geology*, Fall, p. 1–4.

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STATE OF OHIO

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL SURVEY

HORACE R. COLLINS, CHIEF

INVESTIGATION AND INVENTORY OF ABANDONED UNDERGROUND MINES IN COLUMBIANA, MAHONING, AND TRUMBULL COUNTIES, OHIO

by

Douglas L. Crowell

May 1980

CONTENTS

TABLES

FIGURES

7½-MINUTE ABANDONED UNDERGROUND MINE MAPS
(see OFR 1980-1 introduction)

Alliance	East Liverpool North	Homeworth	Salem
Campbell	East Liverpool South	Kensington	Salineville
Canfield	East Palestine	Lake Milton	Sharon West
Columbiana	Elkton	Lisbon	Warren
Cortland	Gavers	Minerva	Wellsville
Damascus	Girard	New Middletown	West Point
Deerfield	Hanoverton	Orangeville	Youngstown

ABANDONED UNDERGROUND MINES DATA SHEETS
(accompanying report)

Columbiana County, v. 1 and v. 2
Mahoning and Trumbull Counties
Carroll, Jefferson, Portage, and Stark Counties

INTRODUCTION

Coal and clay mining have greatly added to the socio-economic base of Ohio as well as of the United States, but hazards attendant with underground mining have been a continuing problem. Hundreds of thousands of dollars in property damage has occurred in undermined areas of the eastern United States as a result of foundation disturbance and highway collapse (Earth Satellite Corp., 1975, p. 1). As of 1971, according to the U.S. Bureau of Mines, 7.1 million acres of land have been undermined for coal in the United States, of which 1.9 million acres have been affected by surface subsidence. Of the 5.2 million acres of land undermined for coal that have not yet been affected by subsidence, it is estimated that about 418,000 acres are located in urban areas. In Ohio 21,800 acres in urban areas are threatened with potential subsidence; the estimated cost to prevent subsidence is $654 million (Johnson and Miller, 1979, p. 6-9).

Although subsidence due to collapse of mine workings is not new in Ohio, there has been no systematic analysis of this potential hazard made available to the public. The hazard presented by underground mines was recently illustrated by mine shaft collapses in high-density residential neighborhoods in Youngstown, Ohio. A particularly hazardous situation occurred on June 13, 1977, when the improperly sealed Foster No. 1 mine (OGS 18) shaft collapsed underneath a garage located at 523 W. Hylda Ave., Youngstown, Ohio, leaving a 115-foot-deep opening (*Youngstown Vindicator*, June 16, 1977). Because of numerous recent mine shaft collapses in high-density residential areas, the need for comprehensive data on abandoned underground mines was realized. As a result, the Ohio Department of Natural Resources (ODNR), Division of

Geological Survey received a grant from the U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSM) to compile a data base on abandoned underground mines in the tri-county area of Columbiana, Mahoning, and Trumbull Counties (fig. 1) and to evaluate the hazard potential of these mines.

The major intent of this study was to assemble maps and other data on the location and extent of abandoned underground mines and the location of all mine openings in the tri-county area and to make this information available to the public and to governmental agencies in a useable form. Once the data base was established, the hazard potential of the mines or mine openings was assessed. Abandoned-mine data compiled in this study are vitally important for (1) any future or site-specific hazard evaluation or subsidence mitigation, and (2) future reclamation as part of the OSM-ODNR, Division of Reclamation's abandoned-mine land reclamation program. These data also will serve as an important tool for citizens, industries, and other governmental agencies concerned with land-use decisions.

GEOLOGIC SETTING

The rocks cropping out in the coal-bearing portions of the tri-county area embrace a little over half of the vertical sequence of the Pennsylvanian System (fig. 2), which, in Ohio, consists primarily of a repetitive sequence of sandstones, shales, siltstones, and mudstones with lesser amounts of limestones, clays, and coals. The Pennsylvanian System has been divided, primarily on the basis of presence or absence of mineable coal, into four groups: Pottsville, Allegheny, Conemaugh, and Monongahela. The Pennsylvanian-age rocks in the tri-county area include rocks from the Pottsville, Allegheny, and lower Conemaugh Groups. Unconsolidated deposits left by continental

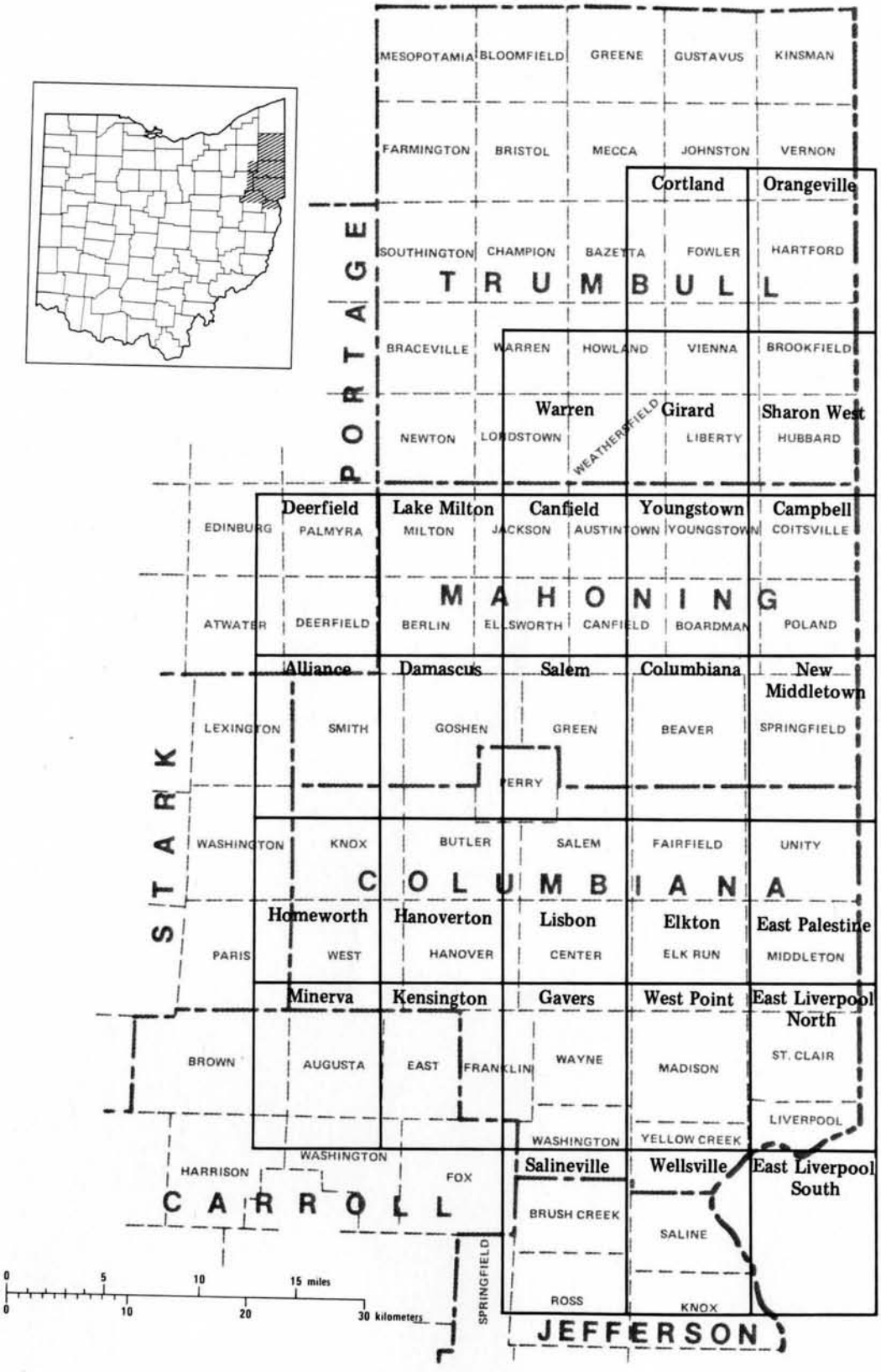

Figure 1.-Map of study area showing counties, townships, and 7½-minute quadrangles.

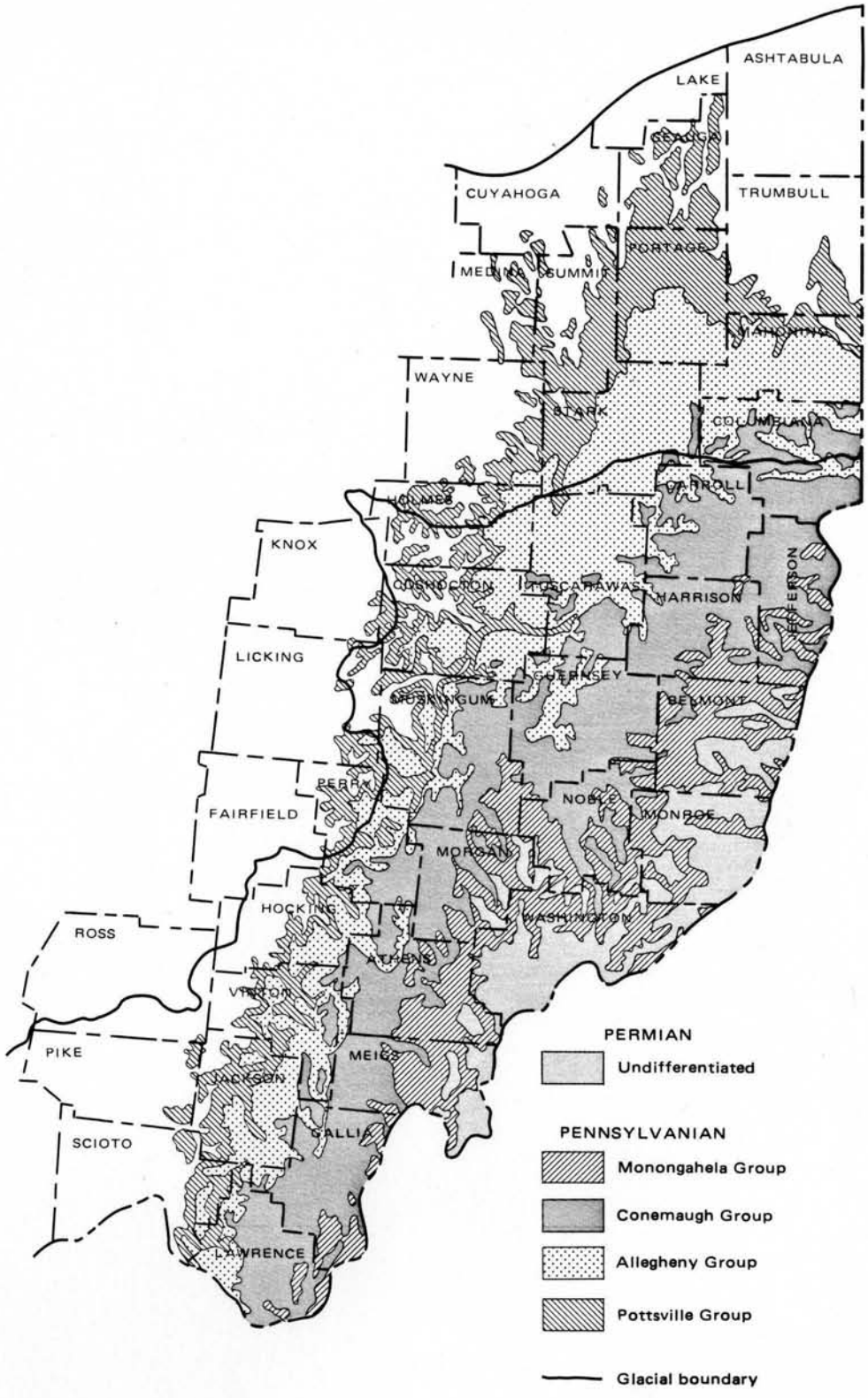

Figure 2.-Generalized geologic map of the coal-bearing rocks of Ohio.

glaciers during the Pleistocene Epoch mantle the bedrock in all of Trumbull and Mahoning Counties and the northern half of Columbiana County.

Although coal constitutes a minor percentage of the total thickness of the stratigraphic section, it is the most important rock in terms of economic value. The occurrence of coal in Ohio was known as early as 1755, when early frontiersmen discovered a seam of coal burning near Bolivar, in Tuscarawas County (Roy, 1883, p. 122; Whittlesey, 1872, p. 1). The earliest account of coal mining in the tri-county area is that of the Mount Nebo mine, which was opened in Poland Township, Mahoning County, in 1828 (Williams and Bro., 1882, v. II, p. 72). By the mid to late 1800's underground mining in the tri-county area was very active, with several hundred mines operating in several seams. Much of the underground mining ceased during the early 1900's, and by 1980 only one underground mine remains in operation; this mine is reported to be extracting the Middle Kittanning No. 6 coal in Madison Township, Columbiana County (Ohio Division of Mines, personal communication).

In the tri-county area, as elsewhere in Ohio, local stratigraphic names commonly were applied to the various coals, leading to confusion in their identification and correlation. Therefore, local stratigraphic names commonly used in the tri-county area and the respective standard terminology are listed in Table 1.

The Sharon No. 1 was the only Pottsville coal (fig. 3) extensively mined underground in Mahoning or Trumbull Counties. Because of the discontinuous and sinuous nature of the Sharon coal, mining of this coal was spotty throughout the Mahoning Valley, and the underground mines in this area for the most part cover only a few acres and are irregularly shaped. Allegheny Group coals, for example, the Brookville No. 4, the Lower Kittanning No. 5, and the Middle Kittanning No. 6, were extensively mined underground in Mahoning County. In

TABLE 1.-*Local stratigraphic names used in the tri-county area*

Standard stratigraphic name	Local stratigraphic name
Mahoning No. 7a	No. 7 Brush Creek Salineville Strip Vein
Upper Freeport No. 7	No. 6 Salineville Big Vein
Lower Freeport No. 6a	No. 5
Middle Kittanning No. 6	No. 4 (Columbiana County) No. 5 (Mahoning County) Hammondsville Strip Vein
Lower Kittanning No. 5	No. 3 (Columbiana County) No. 4 (Mahoning County) Hammondsville Creek Vein Potter's or Clay Vein Clarion or Canfield Cannel
Sharon No. 1	Black Blackband Briar or Brier Hill Mahoning

System	Group	Principal coal seams
Pennsylvanian	Conemaugh	Mahoning No. 7a
	Allegheny	Upper Freeport No. 7
		Lower Freeport No. 6a
		Middle Kittanning No. 6
		Lower Kittanning No. 5
		Clarion No. 4a
		Brookville No. 4
	Pottsville	Tionesta No. 3b
		Bedford
		Upper Mercer No. 3a
		Middle Mercer
		Lower Mercer No. 3
		Quakertown No. 2
		Sharon No. 1

Figure 3.-Stratigraphic succession of the principal coals of the lower to middle Pennsylvanian System in Ohio.

addition, underclays from the Brookville and the Lower Kittanning coals were mined underground. In Columbiana County the following Allegheny Group coals were mined underground: Lower Kittanning, Middle Kittanning, Lower Freeport No. 6a, and Upper Freeport No. 7. The Mahoning No. 7a coal of the Conemaugh Group also was mined underground in Columbiana County. Extensive underground mining of clay in Columbiana County was restricted to the Clarion No. 4a and Lower Kittanning underclays. Both coal and clay were simultaneously extracted from several mines in the tri-county area. Calcareous shale was mined underground from one mine (Ca-47), in Center Township, Columbiana County.

MINING METHODS

The method of underground mining in the tri-county area was almost entirely room and pillar; in this system of mining the material is mined in rooms separated at regular intervals by roof-supporting pillars or ribs. In some instances as the initial mining neared completion, the pillars would be "drawn" or "robbed"—either partially or completely removed—leaving little or no roof support. Longwall mining, a method which involves removal of an entire section of a seam during a single mining episode, was used in only a few mines in the tri-county area. In longwall mining the space from which the material was removed is allowed to collapse or is completely or partially backfilled with waste material.

Three types of entryways or openings are used in underground mining to reach the coal: shaft, slope, and drift (fig. 4). Lateral openings within the mine once the coal has been reached are variously called entries, headings, and rooms. A shaft or slope opening is the means of access to a seam or bed either under thick cover or at or below drainage. A shaft opening is a vertical excavation, which in the Mahoning Valley field was commonly 8 feet

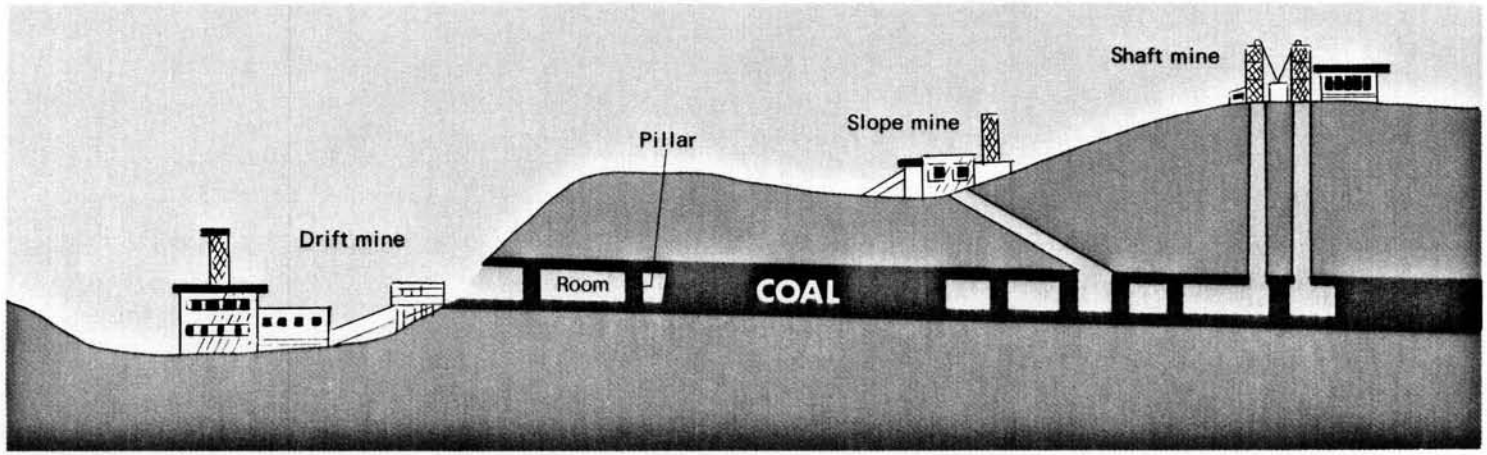

Figure 4.-Principal types of mine openings used in Ohio underground mines.

wide and 16 feet long (Ohio Inspector of Mines, 1883, p. 24), made for access to a seam or bed, raising of mined material, and hoisting or lowering of men and materials. In the tri-county area, a shaft opening can be as little as a few tens of feet deep to as much as 246 feet deep (Palmer mine (Mg-8), Youngstown Township, Mahoning County). A slope opening is an inclined passage or tunnel, which in early days was commonly 10 feet wide and 6 feet high (Ohio Inspector of Mines, 1883, p. 23), excavated to a seam or bed. According to the Ohio Inspector of Mines (1883, p. 20), slope openings were rare where the coal was more than 150 feet below the surface, for below this depth it was more costly to sink the opening and deliver coal by a slope than by a shaft. A drift opening, common in Columbiana and southern Mahoning Counties, is a horizontal excavation exploiting a seam or bed above drainage. The height of a drift opening generally does not exceed the thickness of the commodity mined.

Some mines in the tri-county area used more than one type of opening and some used several openings of the same type. In addition to the principal underground mine openings, air and pumping shafts were common for mine ventilation and removal of water from the mine. Coal mines are required by law to have at least two openings to the surface. This law, however, was not passed until 1874, long after many of the mines in the tri-county area were already operating.

The method of infilling mine shafts during the mid to late 1800's and early 1900's was to jam timbers, trash, garbage, and dirt in the opening or to cover the shaft opening with timbers and bury the site with dirt. In some instances a concrete cap was placed over the opening and in some cases nothing at all was done to the opening. In any case, the method of infilling was inadequate and in time the debris filling or covering the opening compacts,

rots, decays, disintegrates, or dissolves away, leaving the shaft with no covering or with a very unstable filling susceptible to collapse. The method of infilling slope and drift openings was much the same as that for shafts, using available mine waste material and loose debris or simply caving in the opening. According to the *Youngstown Vindicator* (March 29, 1936), as part of a WPA mine-sealing project, 70 of 322 mines in Mahoning County were sealed by building a wall of brick and cement across the mine opening. the primary goal of the WPA mine-sealing project was the abatement of acid mine drainage, not stabilization of the mine opening.

PREVIOUS WORK

Although subsidence due to underground mining has been addressed extensively both in Europe and in the United States, only limited work has been done to inventory Ohio's abandoned underground mines or evaluate the potential hazard these mines present. During a field investigation conducted to locate potential sources of water for municipalities and industrial concerns, Fuller and Sturgeon (1941) documented information on about 152 abandoned underground mines in Trumbull and northern Mahoning Counties. In 1977 H. R. Collins and R. M. DeLong (Ohio Division of Geological Survey open-file reference material) re-examined some selected Fuller and Sturgeon locations in Youngstown, Ohio. B. E. Smith, R. M. DeLong, and H. R. Collins plotted all known abandoned underground coal mines on maps (Ohio Division of Geological Survey open-file maps OF 1-14) at a scale of 1:62,500 (1 inch = 1 mile). Mitchell (1978) investigated the abandoned underground mines in Summit and Portage Counties, Ohio, with respect to possible subsidence and assigned a risk designation for each abandoned underground mine.

ACKNOWLEDGMENTS

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METHOD OF INVESTIGATION

The tri-county study area of Columbiana, Mahoning, and Trumbull Counties was chosen because of hazards presented by the high incidence of mine shaft collapses in high-density residential areas in these counties. Portions of Carroll, Jefferson, Portage, and Stark Counties are included in the interest of presenting abandoned underground mine information on a complete 7½-minute quadrangle basis. Abandoned underground mine data are presented on 7½-minute base maps and on data sheets for each individual mine.

Sources of abandoned underground mine information used in this study are: original mine maps and other materials on file with the Ohio Department of Industrial Relations, Division of Mines; reference material on file with the Ohio Department of Natural Resources, Division of Geological Survey and Division of Water; literature references (Reference List accompanying data sheets); 1:4,800 stereo aerial photographs; mine deeds; and surveyors' notes. In one case surveyors' notes were used to construct a map of an abandoned underground mine for which no map existed.

Since about 1880 an accurate mine map was required by law of any mine having an excavation of not less than 15,000 cubic yards. The map must be updated annually and be filed with the Division of Mines. All original abandoned underground mine maps are on file at the Division of Mines and

are referenced by a county abbreviation-numeric system. Microfilm copies of these mine maps are filed at the U.S. Bureau of Mines and are referenced by a document number.

Original maps of abandoned mines in the tri-county area on file with the Division of Mines were loaned to the Division of Geological Survey for photographic reduction of the maps to a unified scale of 1:24,000 (1 inch = 2,000 feet); at this scale, mine outlines and the locations of all mine openings were transferred onto stable-base mylar copies of U.S. Geological Survey 7½-minute (1:24,000) topographic quadrangle maps. The original mine maps also were reduced to a unified scale of 1:4,800 (1 inch = 400 feet) and printed on stable-base mylar for use in conjunction with 1:4,800 stereo aerial photographs of the tri-county area. The 1:4,800 maps and photos aided in the location and identification of features such as gob piles, subsidence areas, mine openings and tipples, and abandoned railway lines or spurs indicative of underground mining activities.

The 7½-minute quadrangles accompanying this report show the location and type of all known mine openings; the extent of mining of all known, located, and mapped abandoned underground mines; and the location of gob piles and areas of subsidence identified on aerial photographs or by field reconnaissance. Gob piles or areas of subsidence may indicate an abandoned underground mine in the immediate vicinity and the need for additional investigations in these areas. Gob piles in Jefferson County were identified by the Ohio Environmental Protection Agency.

The mine outlines indicate the relation of mine elevation to local major drainage; solid lines are used where mine areas are above drainage and dashed lines where areas are below drainage. The mined-out areas are shaded for easy identification. A stipled pattern indicates mines superimposed on one another

which mined from different seams (for example, see Ca-60, Ca-61, and Ca-87 in Sec. 12, Middleton Township, Columbiana County, East Palestine quadrangle). Areas where the extent of mining is not shown on the Division of Mines mine map but is indicated by "old works" or "inaccessible old workings" are shown by a diagonal dashed-line pattern.

The mine outlines, openings, and data locations plotted on the 7½-minute quadrangles are referenced to the data sheets which accompany this report by either the county abbreviation-numeric designation or the Ohio Division of Geological Survey (OGS) numeration. The county abbreviation-numeric designation is consecutive and nonrepeating except for mine maps which are missing and for strip mines and quarries not included in this study. The OGS numbers are consecutive and nonrepeating within each county and refer to located abandoned underground mines for which original mine maps are not available. Mine data which could not be located accurately on the 7½-minute quadrangles were not plotted, but data sheets for these data are included in the inventory of the tri-county area abandoned underground mines. Mines are indexed by county abbreviation-numeric and OGS numeric designations in Appendix A.

The data sheets record pertinent mine information for each documented abandoned underground mine in the tri-county area and are grouped by county and subdivided into three categories:

(1) mapped - includes data on both located and unlocated mines for which original mine maps are available;

(2) unmapped and located - includes data on mines for which original mine maps are not available but whose locations could be plotted on the 7½-minute quadrangles;

(3) unmapped and unlocated - includes data on mines for which

original maps and accurate locations are not available.

Plotted abandoned underground mines are located by county, township, section or lot number, 7½-minute quadrangle, and Ohio Coordinate System x and y coordinates. Unlocated mines are identified to at least county and in most cases township.

Mines known by identical names were consecutively numbered in parentheses immediately following the name depending on the opening date of the mine, so that identification of such mines would be easier; for example, Mg-6 and Mg-11 in Salem Township, Mahoning County, are the National (No. 1) and National (No. 2) mines, which opened in 1881 and 1883, respectively. In several instances a particular mine was known by several different names. To aid in the identification of the mine, all the names are given on the abandoned underground mine data sheets, listing the most recent name first followed by the other names in reverse chronological order. Appendix B is an alphabetical listing of mines in the tri-county area. Similarly, a particular mine may have had several different operators; these names also are listed on the data sheets in reverse chronological order.

The dates when the mine opened or its earliest survey and when the mine was abandoned or its last survey are given to aid the reader in determining how long the mine was in operation, and how long ago it was abandoned, although the number of years the mine was in operation does not necessarily reflect how extensive the mine workings may be, nor does the length of abandonment indicate the likelihood of collapse or subsidence.

Identification of the seam mined was determined by elevation of the seam and by referring to adjacent or connecting mines where the seam mined is known.

Seam elevation is listed in feet above sea level at the base of the

seam and is determined either from the original mine map or, where the coal crops out, directly from the topographic map. Elevations derived from the literature also are listed. Seam elevation can also be derived by subtracting shaft depth, if available, from the topographic surface elevation. Seam elevation is very useful in stratigraphic identification or correlation and is necessary in determining cover thickness.

Cover thickness is the thickness of consolidated rock and unconsolidated material overlying the unit being mined. In the case of shaft or slope mining, the cover thickness is given in terms of the depth of the shaft opening as well as the depth of air or pumping shafts less the thickness of the coal. For a drift mine the cover thickness is given as a maximum for the entire mine. The thickness of cover for a given mine can vary considerably depending upon the topography of the overlying land surface and the uniformity of the seam elevation.

Additional available mine data are listed under Remarks on the data sheets for completeness of the data base and include information such as: room, pillar, or rib dimensions; roof conditions; property ownership; mine superintendent or mine boss; railway connections; mine relationship to surrounding mines (connected, overlying, or underlying); and notable historical accounts.

HAZARD POTENTIAL

Mine-related problems in the tri-county area are largely associated with the points of entry into a mine (mine openings) as opposed to general subsidence over abandoned workings. Subsidence is defined as the lowering of earth materials, including the surface, due to underground excavations (Thrush, 1968, p. 1097). The dangers to life and property obviously are

considerably higher in the collapse of a shaft, which could result in a fall of hundreds of feet, than in subsidence over old workings, where the surface displacement may be measured only in inches or at most a few feet. Subsidence, as distinguished here from collapse at a point of entry, seldom reaches and cannot exceed the thickness of material removed from the mine. In the tri-county area the thickness of the coal mined was commonly on the order of 3 to 5 feet.

Subsidence poses a hazard primarily to property in the form of structural damage to buildings, roads, and other structures and tends to occur slowly over a period of several years. Collapse of an improperly filled shaft or slope tends to occur rapidly, even instantaneously, and may result in personal injury or death as well as property damage.

The evaluation of hazard potential attendant with underground mining can address either the immediate risk that the mine opening itself presents or the risk of maximum subsidence of an undermined area, particularly in relation to land usage. For either approach, before development in an undermined area begins, detailed site engineering should be employed to ascertain the stability of the undermined area and the mine openings.

The method used by the Division of Geological Survey to categorize hazard potential of abandoned underground mines considers the immediate risk to public safety caused by the type of mine opening used. All mine shafts have a high hazard potential because of the large vertical dimension associated with shaft openings and the commonly inadequate methods of infilling, which may lead to subsequent collapse of the filled material. Slope openings have a moderate hazard potential because the vertical dimension of the slope opening is considerably less than that of a shaft opening of equal cover thickness, and the vertical collapse of the slope opening would be considerably

less. Drift openings have a low hazard potential because collapse of cover material into drift openings can amount to no more than the thickness of the seam or bed mined, whereas cover material collapsing into a slope opening not only may fall the height of the opening but also may be washed or carried down the slope, leaving a considerably larger collapse feature. However, the area potentially affected by either a slope or drift opening is limited by the thickness as well as the character of the cover material.

For all categories, greater emphasis should be attached to those mine openings which are located in highly developed or highly populated areas. High-development or high-population-density areas are characterized by multifamily dwellings, high-density residential neighborhoods, and industrial and commercial utilization; the risk to property and public safety in such areas due to underground mining is high. In comparison, low-development or low-population-density areas consist largely of agricultural and minimal commercial and residential utilization; the risk to property and public safety in such areas due to underground mines is less. For example, OGS 40 and OGS 24 in Mahoning County are deep mines with shaft openings under the Wood Street School and near the Kirkmere School, respectively, and a greater emphasis should be placed on these potentially high-risk shafts than on a shaft opening in an undeveloped area. Mines in the tri-county area are listed in Appendix C by county and are grouped according to hazard potential of the mine opening.

Because of the complexity of mine-related subsidence, no acceptable system exists which is capable of accurately predicting the time or amount of subsidence. The amount of deep-mine subsidence is influenced by a number of parameters including seam thickness, percentage extraction, seam depth, consolidated cover thickness, unconsolidated cover thickness, lithology and

integrity of cover, pillar dimension, width of unsupported excavated area, backfill, and length of time of abandonment. Recent efforts (Mitchell, 1978; Baker, 1976; HRB-Singer, Inc., 1975) in subsidence mitigation have made use of a subsidence algorithm incorporating the more important subsidence-influencing parameters to classify underground-mined areas on a maximum-subsidence-possible basis. The intent of this system is to provide a means of estimating the possible subsidence and merely provides a framework for comparison of degrees of significance. Because of the extreme variability of conditions of mining in the tri-county area, the calculation of subsidence factors for specific mines was considered to be beyond the scope of this study and was not attempted.

SUMMARY

This study has compiled documentation for approximately 962 abandoned underground mines in the tri-county area; 866 mines are located in Columbiana, Mahoning, and Trumbull Counties (table 2). An additional 96 abandoned deep mines are located in the portions of Carroll, Jefferson, Portage, and Stark Counties immediately adjacent to the tri-county area. Documentation for peripheral areas includes only those mines for which mine maps exist. The locations of about 352 of the 962 mines, or roughly one third of all the documented abandoned underground mines in the tri-county area, are plotted on twenty-eight 7½-minute topographic quadrangle base maps (accompanying report).

Locations of approximately 743 mine *openings* are plotted on the 7½-minute quadrangles; 561 mine openings are located in Columbiana, Mahoning, and Trumbull Counties (table 3). All shaft openings are classified as having a high hazard potential, slope openings have a moderate hazard potential,

TABLE 2.-*Documented abandoned underground mines in the tri-county area*

County	Mapped & located	Mapped & unlocated	Unmapped & located	Unmapped & unlocated	Total
Columbiana	166	8	57	256	487
Mahoning	74	1	83	84	242
Trumbull	20	3	71	43	137
Carroll[1]	16	2			18
Jefferson[1]	49	1			50
Portage[1]	12	1			13
Stark[1]	15	0			15
Total	352	16	211	383	962

[1]Number represents only those mines immediately adjacent to the tri-county area for which mine maps exist.

TABLE 3.-*Hazard potential of abandoned underground mine openings in the tri-county area*

County	High	Moderate	Low	Total
Columbiana	18	27	277	322
Mahoning	67	44	36	147
Trumbull	38	49	5	92
Carroll	2	0	45	47
Jefferson	8	12	86	106
Portage	13	1	0	14
Stark	8	1	6	15
Total	154	134	455	743

and drift openings have a low hazard potential. Of the mine openings located in the tri-county area and plotted on the 7½-minute quadrangles, 154 are shaft openings, 134 are slope openings, and 455 are drift openings.

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APPENDIX A.-Mine designation index of mapped or located mine data for the tri-county area

Mine designation	Mine name	Type of mine	Township	Quadrangle	Plotted
			COLUMBIANA COUNTY		
Ca-1	New Slope	slope	Washington	Gavers, Salineville	yes
Ca-2	Pleasant Valley No. 6	drift	Middleton	East Palestine	yes
Ca-3	Walker No. 5	drift	Liverpool	East Liverpool North, East Liverpool South	yes
Ca-4	Vulcan Clay	drift	Yellow Creek	Wellsville	yes
Ca-5	Beech Grove	drift, slope	Yellow Creek	Wellsville	yes
Ca-6	Whiteleather	drift	West	Homeworth	yes
Ca-7	Second National	drift	Perry	Salem	yes
Ca-8	Evans (No. 1)	slope	Center	Lisbon	yes
Ca-9	Carbon Hill No. 2	drift	Middleton, Unity	East Palestine	yes
Ca-10	Pine Hollow	drift	Perry	Salem	yes
Ca-11	West Pittsburgh No. 6	shaft	Salem	Lisbon	yes
Ca-12	Pentz	shaft	Knox	Alliance	no
Ca-12	Tolerton	shaft	Knox	Alliance	no
Ca-13	Teegarden	shaft, slope	Center, Salem	Lisbon	yes
Ca-14	Elk Run	drift	Middleton, Elk Run	Elkton	yes
Ca-15	Anderson (No. 1)	drift	Washington	Gavers	yes
Ca-16	Shephard	drift	Perry	Salem	yes
Ca-17	Prospect Hill Drift No. 1	drift	Middleton, Unity	East Palestine	yes
Ca-18	Mollenkopf	drift	Unity	East Palestine	yes
Ca-19	New Shaft	shaft, slope	Washington	Gavers	yes
Ca-20	Cedar Hill	drift	Washington	Salineville	yes
Ca-21	John Hays	drift	Washington	Salineville	no
Ca-22	Empire	drift	Washington	Salineville	no
Ca-23	First National	drift	Perry	Salem	yes
Ca-24	Hetherington	drift	Washington	Gavers, Salineville	yes
Ca-25	Carbon Hill No. 1	drift	Unity	East Palestine	yes
Ca-26	Standard (No. 1)	shaft	Center	Lisbon	yes

Ca-27	Klondyke No. 4	drift	Center	Gavers, Lisbon	yes
Ca-28	West Pittsburgh No. 2	drift	Salem	Lisbon	yes
Ca-29	Ohio Cement	drift	Center	Lisbon	yes
Ca-30	Farquhar	shaft	Perry, Green (Mahoning Co.)	Salem	yes
Ca-31	Clay Shaft No. 1	shaft, slope	Yellow Creek	Wellsville	yes
Ca-32	Prospect Hill Slope No. 1	slope	Unity	East Palestine	yes
Ca-32	Prospect Hill Slope No. 2	slope	Unity	East Palestine	yes
Ca-33	Prospect Hill No. 7	drift	Unity	East Palestine	yes
Ca-34	Prospect Hill Drift No. 2	drift	Unity	East Palestine	yes
Ca-35	Wheat Hill (No. 2)	drift	Unity	East Palestine	yes
Ca-36	Peerless	drift	Salem	Salem	yes
Ca-37	Beech Hollow	drift	Perry	Salem	yes
Ca-38	Negley	drift	Middleton	East Palestine	yes
Ca-39	Strabley	drift	Washington	Salineville	yes
Ca-40	Oak Hill	slope	Salem	Salem	yes
Ca-41	Salem	drift	Salem	Salem	yes
Ca-42	West Pittsburgh No. 3	drift	Salem	Lisbon	yes
Ca-43	Rogers	drift	Elk Run	Elkton	yes
Ca-44	Neiheisel	slope	Fairfield	Columbiana	yes
Ca-45	Jones	drift	Unity	East Palestine	yes
Ca-46	New Salisbury	drift	Yellow Creek	Wellsville	yes
Ca-47	Lisbon (No. 2)	drift	Center	Lisbon	no
Ca-48	United	shaft	Fairfield, Salem	Columbiana, Salem	yes
Ca-49	Delmore	slope	Salem	Lisbon	yes
Ca-50	Cutta	drift	St. Clair	East Liverpool North	yes
Ca-51	Rock Camp	drift	Madison	West Point	yes
Ca-52	Old Slope	slope	Washington	Salineville	yes
Ca-53	American No. 36	drift	Elk Run	Elkton	yes
Ca-54	Anderson (No. 2)	drift	Center, Hanover	Lisbon	yes
Ca-55	Fire Clay No. 2	slope	Center	Lisbon	yes
Ca-56	Shepherd (No. 1)	drift	Hanover	Lisbon	yes
Ca-57	Elk Run No. 1	drift	Elk Run	Elkton	yes
Ca-58	McNab	shaft	Perry	Salem	yes

Ca-59	Lisbon (No. 1)	drift	Center	Lisbon	yes
Ca-60	Pleasant Valley No. 2	drift	Middleton	East Palestine	yes
Ca-60	Pleasant Valley No. 3	drift	Middleton	East Palestine	yes
Ca-61	Pleasant Valley No. 1	drift	Middleton	East Palestine	yes
Ca-62	Foster	drift	Washington	Gavers	yes
Ca-63	Campbell	drift	Middleton	East Palestine	yes
Ca-64	Fairfield No. 1	drift	Unity	East Palestine or Elkton	no
Ca-65	Fairfield No. 2	drift	Fairfield, Unity	Elkton	yes
Ca-66	Fairfield No. 3	drift	Unity	East Palestine, Elkton	yes
Ca-67	Eureka	drift	Unity	East Palestine	yes
Ca-68	Farmers	drift	Washington	Salineville	yes
Ca-69	Central Slope	slope	Center	Lisbon	yes
Ca-70	Old Shaft	shaft	Washington	Gavers, Salineville	yes
Ca-71	Saratoga No. 2	slope, drift	Elk Run	Elkton	yes
Ca-72	Leetonia (No. 1)	drift, slope	Salem	Salem	yes
Ca-73	Peerless	drift	Salem, Green (Mahoning Co.)	Salem	yes
Ca-74	Cherry Valley No. 3	slope	Salem, Green (Mahoning Co.)	Columbiana, Salem	yes
Ca-75	Elk Run (No. 2)	drift	Elk Run	Elkton	yes
Ca-76	Garside	shaft	Washington	Gavers	yes
Ca-77	Elk Run No. 3	slope	Center	Lisbon	yes
Ca-78	Columbiana (No. 2)	drift	Washington	Salineville	yes
Ca-79	J. N. Buck	slope	Fairfield	Elkton	yes
Ca-80	Beaver No. 1	drift	Center	Lisbon	yes
Ca-81	Easton	drift	Center	Lisbon	yes
Ca-82	Grant	drift	Washington, Brush Creek (Jefferson Co.)	Salineville	yes
Ca-83	Leetonia (No. 2)	slope, drift	Salem	Lisbon	yes
Ca-84	National	strip	Middleton	East Palestine	no
Ca-85	Ohio Clay Products	slope, shaft	Washington	Salineville	yes
Ca-86	State Line No. 1	drift	Unity	East Palestine	yes
Ca-87	Negley	drift	Middleton	East Palestine	yes
Ca-88	Black Diamond	drift	Madison	West Point	yes
Ca-89	West Point	strip	Madison	West Point	no

Ca-90	West Point	strip	Madison	West Point	no
Ca-91	Hart (No. 1)	drift	Madison	West Point	yes
Ca-92	Beaver Valley	drift	Salem	Salem	yes
Ca-93	National No. 8 and No. 9	drift	Middleton, Unity	East Palestine	yes
Ca-94	East End No. 3	drift	Liverpool	East Liverpool North	yes
Ca-95	Vasey	drift	Washington	Salineville	yes
Ca-96	Weikart No. 1	drift	Salem	Salem	yes
Ca-97	Padurean	drift	Elk Run	Elkton	yes
Ca-98	Hart (No. 2)	drift	Wayne	Gavers	yes
Ca-99	Bozzo	drift	Unity	East Palestine	yes
Ca-100	Colonial No. 9	shaft	Yellow Creek	Wellsville	no
Ca-101	Colonial No. 6	drift	Yellow Creek	Wellsville	yes
Ca-102	Hillside	drift	Madison	West Point	yes
Ca-103	McKenzie	drift	Wayne	Gavers	yes
Ca-104	Wilson	strip	Fairfield	Elkton	no
Ca-105	Wilson-Burt	strip	Elk Run	Elkton	no
Ca-106	Negley	strip	Middleton	East Palestine	no
Ca-107	Diamond	drift	Madison	West Point	yes
Ca-108	Eagle	drift	West	Homeworth	yes
Ca-109	Bowman	slope	Center	Lisbon	yes
Ca-110	Jones	drift	Middleton	East Palestine	yes
Ca-111	Weikart No. 2	drift	Salem	Salem	yes
Ca-112	E & F (No. 1)	drift	Yellow Creek	Wellsville	yes
Ca-113	Guilford	drift	Center	Lisbon	yes
Ca-114	Swearingen	drift	Yellow Creek	Wellsville	yes
Ca-115	E & F (No. 2)	drift	Elk Run	Elkton	yes
Ca-116	Buckeye No. 2	drift	Yellow Creek	Wellsville	yes
Ca-117	Colonial No. 5	drift	Yellow Creek	Wellsville	yes
Ca-118	Alliance	drift	Salem	Lisbon	yes
Ca-119	Groner	drift	Elk Run	Elkton	yes
Ca-120	Morris	drift	Elk Run	Elkton	yes
Ca-121	Buxton	drift	Washington	Salineville	yes
Ca-122	Brookwood	drift	Perry	Salem	yes

Ca-123	Callahan No. 3	slope, shaft	Salem	Lisbon	yes
Ca-124	Callahan	drift, slope	Salem	Lisbon	yes
Ca-125	Hall	drift	Wayne	Gavers	yes
Ca-126	Columbia	shaft	Unity	East Palestine	yes
Ca-127	Crook	drift	Unity	Elkton	yes
Ca-128	East Liverpool	drift	Liverpool	East Liverpool South	yes
Ca-129	Elk Run	drift	Elk Run, Middleton	Elkton	yes
Ca-130	Esterly	drift	Unity	East Palestine, Elkton	yes
Ca-131	Cunningham	drift	Unity	East Palestine	no
Ca-132	Evans (No. 2)	drift	Wayne	Gavers	yes
Ca-133	Eells	drift	Elk Run	Elkton, West Point	yes
Ca-134	Leatherberry	drift	Yellow Creek	West Point	yes
Ca-135	Grapevine	drift	Yellow Creek	Wellsville	yes
Ca-136	Gray	drift	Hanover	Kensington	yes
Ca-137	Grove	drift	Washington	Salineville	yes
Ca-138	Guthrie	drift	West	Kensington	yes
Ca-139	Powell	drift	Madison	West Point	yes
Ca-140	Kirtley	drift	Middleton	East Palestine	yes
Ca-141	Lafferty	drift	Washington	Salineville	yes
Ca-142	Dorr	drift	Hanover	Kensington	yes
Ca-143	Vender	drift	Salem	Salem	yes
Ca-144	Marcum	drift	Wayne	Gavers	yes
Ca-145	Wolfe	drift	Center	Lisbon	yes
Ca-146	Lizzie No. 1	drift	Madison	West Point	yes
Ca-147	Power Point	drift	Madison	West Point	yes
Ca-148	Peacock	shaft	Knox	Damascus	yes
Ca-149	Reeder	drift	Hanover	Kensington	yes
Ca-150	New Salem	drift	Salem	Salem	yes
Ca-151	Pine Hollow	drift	Elk Run	Elkton	yes
Ca-152	Rhea No. 1	drift	Madison	West Point	yes
Ca-153	Seger No. 3	drift	Madison	West Point	yes
Ca-154	Shepherd (No. 2)	drift	Salem	Lisbon	yes
Ca-155	Barnes	drift	Elk Run	Elkton, West Point	yes

Ca-156	L & S	drift	West	Minerva	yes
Ca-157	Snyder	shaft	Salem	Lisbon	yes
Ca-158	Standard (No. 2)	drift	Middleton	East Palestine	yes
Ca-159	Strudthoff	drift	Elk Run	West Point	yes
Ca-160	Vignon	drift	Salem	Salem	yes
Ca-161	West Columbiana	drift	West	Hanover	yes
Ca-162	Clay & Coal Strip	strip	Middleton	East Palestine	no
Ca-163	Williams	drift	Middleton	East Palestine	yes
Ca-164	Schory	drift	West	Kensington	yes
Ca-165	Mahoning	drift	Salem	Salem	yes
Ca-166	Hazel No. 2	drift	Madison	West Point	yes
Ca-167	Plate	drift	Washington	Salineville	yes
Ca-168	No mine map available				
Ca-169	Champion No. 11	drift	Yellow Creek	Wellsville	yes
Ca-170	Greenamyer	shaft	Perry	Salem	yes
Ca-171	Whitaker	drift	Wayne	Gavers	yes
Ca-172	Black Ridge No. 2	drift, strip	Yellow Creek	West Point	yes
Ca-173	Standard (No. 3)	drift	Middleton	East Palestine	yes
Ca-174	Pleasant Valley No. 13	slope	Yellow Creek	Wellsville, West Point	yes
Ca-175	C & W No. 4	drift	Madison, Wayne	Gavers, West Point	yes
Ca-176	Jersey Ridge No. 4	drift	Salem	Salem	yes
Ca-177	Manilla	drift	Unity	East Palestine	yes
Ca-178	Lewis	drift	Salem	Salem	no
Ca-179	Folts	slope, shaft	Salem	Lisbon	yes
Ca-180	Elkton	drift	Elk Run	Elkton	yes
Ca-181	West Point	drift	Madison	West Point	yes
Ca-182		drift	Washington	Salineville	yes
OGS 1	M. S. Stoffer		Knox	Alliance	yes
OGS 2		shaft	Knox	Alliance	yes
OGS 3			Salem	Salem	yes
OGS 4			Salem	Salem	yes
OGS 5			Perry	Salem	yes
OGS 6			Salem	Salem	yes

OGS 7	Libert		Salem	Salem	yes
OGS 8	Dickson	shaft	Salem	Salem	yes
OGS 9	Floyd and Brain		Salem	Salem	yes
OGS 10			Salem	Columbiana	yes
OGS 11			Unity	East Palestine	yes
OGS 12			Washington	Salineville	yes
OGS 13			Unity	East Palestine	yes
OGS 14	James Morris		Unity	East Palestine	yes
OGS 15			Unity	Elkton	yes
OGS 16			Fairfield	Elkton	yes
OGS 17			Fairfield	Elkton	yes
OGS 18			Unity	Elkton	yes
OGS 19	Perkins Bros.		Elk Run	Elkton	yes
OGS 20			Middleton	Elkton	yes
OGS 21			Center	Lisbon	yes
OGS 22			Center	Lisbon	yes
OGS 23			Salem	Lisbon	yes
OGS 24			Center	Lisbon	yes
OGS 25			Center	Lisbon	yes
OGS 26			Salem	Lisbon	yes
OGS 27	C. W. Barnes		Salem	Lisbon	yes
OGS 28			Salem	Lisbon	yes
OGS 29			West	Homeworth	yes
OGS 30		drift?	West	Minerva	yes
OGS 31			Washington	Gavers	yes
OGS 32			Elk Run	West Point	yes
OGS 33	Smith (No. 1)		Yellow Creek	West Point	yes
OGS 34		drift	Madison	West Point	yes
OGS 35	Malone		Liverpool	East Liverpool North	yes
OGS 36		drift?	St. Clair	East Liverpool North	yes
OGS 37	Smith (No. 2)		St. Clair	East Liverpool North	yes
OGS 38	Duck		Liverpool	East Liverpool North	yes
OGS 39	Delaney		Liverpool	East Liverpool North	yes

OGS 40			Liverpool	East Liverpool North	yes
OGS 41	Johnson		Liverpool	East Liverpool North	yes
OGS 42	Kinsey		St. Clair	East Liverpool North	yes
OGS 43	Moore		St. Clair	East Liverpool North	yes
OGS 44	Gaston		St. Clair	East Liverpool North	yes
OGS 45			Yellow Creek	Wellsville	yes
OGS 46			Yellow Creek	Wellsville	yes
OGS 47			Yellow Creek	Wellsville	yes
OGS 48	Dangelo		Yellow Creek	Wellsville	yes
OGS 49	Ainsworth	drift?	Yellow Creek	Wellsville	yes
OGS 50			Yellow Creek	Wellsville	yes
OGS 51	Sheckler		Yellow Creek	Wellsville	yes
OGS 52	Householder		Yellow Creek	Wellsville	yes
OGS 53			Washington	Gavers	yes
OGS 54			Washington	Gavers	yes
OGS 55			Washington	Gavers	yes
OGS 56			Washington	Salineville	yes
OGS 57	J. Crumley		Washington	Salineville	yes
		MAHONING COUNTY			
Mg-1	Pennell	slope,shaft	Austintown	Canfield	yes
Mg-2	Witch Hazel	shaft	Youngstown	Youngstown	yes
Mg-3	Poland	shaft	Poland	Campbell	yes
Mg-4	Poland No. 2	slope	Poland	Campbell	yes
Mg-5	Kyle	shaft	Youngstown	Youngstown	yes
Mg-6	National (No. 1)	drift	Green	Salem	yes
Mg-7	Brownlee	shaft	Youngstown, Boardman	Youngstown	yes
Mg-8	Palmer	shaft	Youngstown, Boardman	Youngstown	yes
Mg-9	Tippecanoe	shaft	Boardman, Canfield	Youngstown	yes
Mg-10	No mine map available				
Mg-11	National (No. 2)	shaft	Green	Salem	yes
Mg-12	McKinnie	slope	Youngstown	Youngstown	yes
Mg-13	John Pow	drift	Green	Salem	yes

Mg-14	Spait	shaft	Beaver	Columbiana	yes
Mg-15	Stanley	drift	Smith	Alliance	yes
Mg-15	Hemmingway	shaft	Smith	Alliance	yes
Mg-16	Paulin	shaft	Beaver	Columbiana	yes
Mg-17	F. J. Mentzer	shaft	Beaver	Columbiana	yes
Mg-18	Hutson No. 3	shaft, slope	Milton	Lake Milton, Deerfield	yes
Mg-19	Urmson	drift	Smith	Alliance	yes
Mg-20	Bandy	drift	Smith	Alliance	yes
Mg-21	McGill	slope	Beaver	Columbiana	yes
Mg-22	Bonsel	drift	Green	Salem	yes
Mg-23	Daniel Little	shaft	Beaver	Columbiana	yes
Mg-24	Manning	shaft	Youngstown	Youngstown	yes
Mg-25	John Henry	shaft	Austintown	Canfield, Warren	yes
Mg-26	Barber	shaft	Smith	Damascus	yes
Mg-27	Fairview (No. 3)	slope	Green	Columbiana, Salem	yes
Mg-28	Black Diamond No. 1	shaft, slope	Milton	Lake Milton	yes
Mg-29	North Lima	shaft	Beaver	Columbiana	yes
Mg-30	Lowellville	shaft, slope	Poland	Campbell	yes
Mg-31	McDonald	shaft	Beaver	Columbiana	yes
Mg-32	McKinley	shaft	Goshen, Smith	Damascus	yes
Mg-33	Allison	drift	Green	Salem	yes
Mg-34	North Lima	shaft	Beaver	Columbiana	yes
Mg-35	Egypt	drift	Green	Salem	yes
Mg-36	Millville	drift	Green	Salem	yes
Mg-37	Mellott	drift	Green	Salem	yes
Mg-38	Holroyd	drift	Green	Salem	no
Mg-39	Austin	shaft	Austintown	Warren	yes
Mg-39	Bowman	slope	Austintown	Warren	yes
Mg-39	Ohl	slope	Austintown	Warren	yes
Mg-39	Tibbit	shaft	Austintown	Warren	yes
Mg-40	Shepherd No. 2	drift	Green	Salem	yes
Mg-41	Roscoe Nye	shaft	Beaver	Columbiana	yes
Mg-42	Chestnut Hill	shaft	Youngstown	Youngstown	yes
Mg-43	Evans	shaft	Youngstown	Youngstown	yes
Mg-44	Ohltown	shaft	Austintown	Canfield	yes

Mg-45	Harroff (No. 1)	slope	Austintown	Canfield	yes
Mg-46	Packard	slope	Austintown, Youngstown	Youngstown	yes
Mg-47	Powers (No. 1)	shaft	Youngstown	Campbell, Youngstown	yes
Mg-48	Weaver	drift	Beaver, Springfield	Columbiana	yes
Mg-49	No mine map available				
Mg-50	Padurean	drift	Springfield	New Middletown	yes
Mg-51	Sebring	shaft	Smith	Alliance	yes
Mg-52	Pitsy	slope	Beaver	Columbiana	yes
Mg-53	Fisk	slope	Beaver, Green, Canfield	Columbiana, Salem	yes
Mg-54	Barnard Clay	drift	Green	Salem	yes
Mg-55	Lowellville Limestone	quarry	Poland	Campbell	no
Mg-56	Coy	shaft	Green	Salem	yes
Mg-57	Redinger	drift	Green	Salem	yes
Mg-58	Eynon	drift	Austintown	Canfield	yes
Mg-59	Ginger Hill	shaft	Springfield	New Middletown	yes
Mg-60	Green Mountain	drift, slope	Green	Salem	yes
Mg-61	Hahn	shaft	Beaver	Columbiana	yes
Mg-62	Myers (No. 1)	slope, shaft	Beaver	Columbiana	yes
Mg-63	Black Diamond (No. 2)	shaft	Green	Salem	yes
Mg-64	McDaniel	drift	Smith	Damascus	yes
Mg-65	Silver Creek	shaft	Green	Salem	yes
Mg-66	Myers	drift, slope	Springfield	New Middletown	yes
Mg-67	Ohlin & Bryan	slope, shaft	Springfield	New Middletown	yes
Mg-68	Pascola No. 2	slope	Beaver	Columbiana	yes
Mg-69	Pen-Hio Clay	strip	Boardman		no
Mg-70	Porter (No. 2)	shaft	Boardman	Columbiana	yes
Mg-71	Reed	drift	Green	Salem	yes
Mg-72	Silver Creek	shaft	Green	Salem	yes
Mg-73	Thornhill	shaft, slope	Youngstown	Youngstown	yes
Mg-74	Williams	shaft	Beaver	Columbiana	yes
Mg-75	Baldwin	slope	Youngstown	Sharon West	yes
Mg-76	Allen (No. 2)	slope	Youngstown, Coitsville	Campbell	yes
Mg-77	Sol Paulin	drift	Beaver, Springfield	Columbiana	yes

Mg-78	Tom Tyrrell No. 2	shaft	Youngstown	Youngstown	yes
OGS 1	Witch Hazel	shaft	Youngstown	Youngstown	yes
OGS 2	C. H. Andrews	shaft	Austintown	Canfield	yes
OGS 3		shaft	Austintown	Canfield	yes
OGS 4	Essential	shaft	Austintown	Canfield	yes
OGS 5	Hood & Lynn	slope	Austintown	Canfield	yes
OGS 6	Bowman	slope	Austintown	Canfield	yes
OGS 7	Lewis	shaft	Austintown	Canfield	yes
OGS 8	Harroff (No. 2)	shaft	Austintown	Canfield	yes
OGS 9	Chauncey Andrews	slope	Austintown	Canfield	yes
OGS 10	Hanssen	shaft	Austintown	Warren	yes
OGS 11	Cleveland	shaft	Canfield	Canfield	yes
OGS 12	Pikes Peak	slope	Austintown	Girard	yes
OGS 13	Leadville	shaft	Austintown	Youngstown	yes
OGS 14	Campbell	slope	Austintown	Warren	yes
OGS 15	Moherman	shaft	Austintown	Canfield	yes
OGS 16	Owens		Austintown	Canfield	yes
OGS 17	Brier Hill	slope	Youngstown	Girard	yes
OGS 18	Foster No. 1	shaft	Youngstown	Youngstown	yes
OGS 19	Foster No. 2	shaft	Youngstown	Youngstown	yes
OGS 20	Osborn	shaft	Youngstown	Youngstown	yes
OGS 21	Wellendorf	shaft	Youngstown	Youngstown	yes
OGS 22		shaft	Youngstown	Youngstown	yes
OGS 23	Powers	drift	Youngstown	Campbell	yes
OGS 24	Anchor	shaft	Youngstown	Youngstown	yes
OGS 25	Reno	slope	Youngstown	Youngstown	yes
OGS 26	Thorn	slope	Youngstown	Youngstown	yes
OGS 27	Milton Powers	slope	Youngstown	Youngstown	yes
OGS 28	Foster & Crane	shaft	Youngstown	Youngstown	yes
OGS 29	Allen	shaft	Youngstown	Campbell	yes
OGS 30	Allen	slope	Youngstown	Campbell	yes
OGS 31	Thorn Hill No. 1	slope	Youngstown	Campbell	yes
OGS 32	Welch	shaft	Youngstown	Campbell	yes

OGS 33	Wick Bros.		Youngstown	Youngstown	yes
OGS 34	Tom Tyrrell No. 1	shaft	Youngstown	Youngstown	yes
OGS 35	Philpot	slope	Youngstown	Youngstown	yes
OGS 36		slope	Youngstown	Youngstown	yes
OGS 37		shaft	Youngstown	Youngstown	yes
OGS 38	Hogg	drift	Youngstown	Youngstown	yes
OGS 39	Script Hill	shaft	Youngstown	Youngstown	yes
OGS 40	Wood Street	shaft	Youngstown	Youngstown	yes
OGS 41	Fulk	slope	Austintown	Girard	yes
OGS 42	Idaho	slope	Austintown	Girard	yes
OGS 43			Boardman	Youngstown	yes
OGS 44			Austintown	Canfield	yes
OGS 45			Austintown	Canfield	yes
OGS 46			Beaver	Columbiana	yes
OGS 47	Abbett	shaft	Jackson	Lake Milton	yes
OGS 48			Smith	Alliance	yes
OGS 49			Poland	New Middletown	yes
OGS 50			Smith	Alliance	yes
OGS 51			Smith	Alliance	yes
OGS 52	Evans	slope	Smith	Alliance	yes
OGS 53			Goshen	Damascus	yes
OGS 54			Smith	Damascus	yes
OGS 55	Hoover and Commco		Goshen	Damascus	yes
OGS 56	Wm. McDaniels		Goshen	Damascus	yes
OGS 57			Green	Salem	yes
OGS 58			Green	Salem	yes
OGS 59	Vitro	shaft	Springfield	Columbiana	yes
OGS 60			Green	Salem	yes
OGS 61			Green	Salem	yes
OGS 62			Green	Salem	yes
OGS 63	Bituminous		Springfield	New Middletown	yes
OGS 64	American Fire Clay	shaft	Green	Salem	yes
OGS 65	Weingart	drift	Green	Salem	yes

OGS 66		drift	Green	Salem	yes
OGS 67	L. H. Dougherty		Green	Salem	yes
OGS 68	R. L. Houts		Green	Salem	yes
OGS 69	Reed		Green	Salem	yes
OGS 70			Green	Salem	yes
OGS 71	John Pascola	shaft	Green	Salem	yes
OGS 72		drift	Green	Salem	yes
OGS 73			Green	Salem	yes
OGS 74	Black Bros.	shaft	Springfield	New Middletown	yes
OGS 75	Abe Stouffer		Green	Salem	yes
OGS 76			Beaver	Columbiana	yes
OGS 77			Springfield	Columbiana	yes
OGS 78			Springfield	Columbiana	yes
OGS 79			Springfield	Columbiana	yes
OGS 80	J. C. Robertson		Beaver	Columbiana	yes
OGS 81			Beaver	Columbiana	yes
OGS 82	Dunn (No. 2)	slope	Beaver	Columbiana	yes
OGS 83	Wise	shaft	Beaver	Columbiana	yes
			TRUMBULL COUNTY		
T1-1	Stewart (No. 1)	slope	Brookfield, Hubbard	Sharon West	yes
T1-2	Centennial	shaft	Liberty	Girard	yes
T1-2	Church Hill (No. 1)	slope	Liberty	Girard	yes
T1-2	Church Hill (No. 2)	shaft	Liberty	Girard	yes
T1-3	Keel Ridge	slope	Brookfield	Sharon West	yes
T1-4	Applegate	slope	Hubbard	Sharon West	yes
T1-5	Church Hill	slope	Liberty	Girard	yes
T1-6	Ashland	slope	Weathersfield	Warren	yes
T1-6	Blunt	slope	Weathersfield	Warren	yes
T1-6	Cambria (No. 1)	slope	Weathersfield	Warren	yes
T1-6	Cambria (No. 2)	shaft	Weathersfield	Warren	yes
T1-6	Osborne	slope	Weathersfield	Warren	yes
T1-6	Willow	slope	Weathersfield	Warren	yes

T1-7	Vienna (No. 1)	slope	Vienna	Girard	yes
T1-8	Vienna (No. 2)	shaft	Vienna	Girard	yes
T1-9	Mahoning No. 3	slope	Hubbard	Sharon West	yes
T1-10	Sodom	slope	Liberty	Girard	yes
T1-11	Harrison	shaft	Vienna	Girard	yes
T1-12	Niles	slope, shaft	Liberty	Girard	yes
T1-13	Jacobs No. 2	shaft	Hubbard	Sharon West	yes
T1-14	Stewart (No. 2)	shaft	Vienna	Girard	yes
T1-15	Hamilton	shaft	Vienna	Cortland	no
T1-16	Jacobs No. 2		Hubbard	Sharon West	no
T1-17	Hudson		Hubbard	Sharon West	no
T1-18	Adams	shaft	Hubbard	Sharon West	yes
T1-18	Burnett	slope	Hubbard	Sharon West	yes
T1-18	Love	slope	Hubbard	Sharon West	yes
T1-19	Blaine	shaft	Liberty	Girard	yes
T1-20	Brookfield	slope	Brookfield	Sharon West	yes
T1-21	Weathersfield	shaft	Weathersfield	Girard	yes
T1-22	Walls Kerr	shaft	Vienna	Girard, Sharon West	yes
T1-23	Blaine	shaft	Liberty	Girard	yes
OGS 1	Mineral Ridge Drain	drift	Weathersfield	Warren	yes
OGS 2	Payne	slope	Weathersfield	Warren	yes
OGS 3	New Found Out	slope	Weathersfield	Warren	yes
OGS 4	Peacock (No. 1)	shaft	Weathersfield	Warren	yes
OGS 5	Peacock (No. 2)	slope	Weathersfield	Warren	yes
OGS 6	Travelers Rest	slope	Weathersfield	Warren	yes
OGS 7	Lewis	slope	Weathersfield	Warren	yes
OGS 8	Ganow	shaft	Vienna	Girard	yes
OGS 9	Shoo Fly	slope	Vienna	Girard	yes
OGS 10	Ragweed	shaft	Vienna	Girard	yes
OGS 11	Brunswick	shaft	Vienna	Girard	yes
OGS 12	Holliday	slope	Vienna	Girard	yes
OGS 13	Barber	shaft	Vienna	Girard	yes

OGS 14	Moore	slope	Vienna	Sharon West	yes
OGS 15	Corn Cob	slope	Vienna	Sharon West	yes
OGS 16	George Chamberlin	shaft	Vienna	Girard	yes
OGS 17	Rogers	shaft	Vienna	Girard	yes
OGS 18	McClurg	shaft	Vienna	Girard	yes
OGS 19	Blackberry	shaft	Vienna	Girard	yes
OGS 20	Shady Side	shaft	Vienna	Girard	yes
OGS 21	Strip and At It	shaft	Vienna	Cortland	yes
OGS 22	Scoville	shaft	Vienna	Cortland	yes
OGS 23	Klondike	shaft	Vienna	Cortland	yes
OGS 24	Pinch Along	shaft	Liberty	Girard	yes
OGS 25	Garfield	shaft	Liberty	Girard	yes
OGS 26	Chinee	shaft	Liberty	Girard	yes
OGS 27	Hassen	shaft	Liberty	Sharon West	yes
OGS 28	Mahoning No. 4	slope	Hubbard	Sharon West	yes
OGS 29	California	slope	Hubbard	Sharon West	yes
OGS 30	Mahoning No. 8	slope	Hubbard	Sharon West	yes
OGS 31	Drake	slope	Brookfield	Sharon West	yes
OGS 32	Mahoning No. 9	slope	Liberty	Girard	yes
OGS 33	Mahoning No. 1	slope	Hubbard	Sharon West	yes
OGS 34	Long	slope	Hubbard	Sharon West	yes
OGS 35	Brass & Wire	drift	Brookfield	Sharon West	yes
OGS 36	Cleveland	shaft	Brookfield	Sharon West	yes
OGS 37	Applegate	slope	Hubbard	Sharon West	yes
OGS 38	Cramer No. 3	slope	Hubbard	Sharon West	yes
OGS 39	Cedar Corners	slope	Liberty	Girard	yes
OGS 40	Taylor	shaft	Liberty	Girard	yes
OGS 41	Hood	slope	Liberty	Girard	yes
OGS 42	Kline	slope	Liberty	Girard	yes
OGS 43	Foraker No. 1	shaft	Liberty	Girard	yes
OGS 44	Foraker No. 2	shaft	Liberty	Girard	yes
OGS 45	Powers	slope	Liberty	Girard	yes
OGS 46	Charley Herbert	slope	Hubbard	Sharon West	yes

OGS 47	Jenny Wheel	slope	Hubbard	Sharon West	yes
OGS 48	Dan Smith	slope	Hubbard	Sharon West	yes
OGS 49	Middle	slope	Hubbard	Sharon West	yes
OGS 50	Chauncey Andrews		Hubbard	Sharon West	yes
OGS 51	Jacobs No. 1	shaft	Hubbard	Sharon West	yes
OGS 52	Jacobs No. 3	shaft	Hubbard	Sharon West	yes
OGS 53	Bill Bird	slope	Hubbard	Sharon West	yes
OGS 54			Weathersfield	Warren	yes
OGS 55	Ab Lane	slope	Hubbard	Sharon West	yes
OGS 56			Weathersfield	Warren	yes
OGS 57	Veach	shaft	Hubbard	Sharon West	yes
OGS 58	Panic	shaft	Hubbard	Sharon West	yes
OGS 59	Reese Charles	slope	Hubbard	Sharon West	yes
OGS 60	Brisbine	slope	Hubbard	Sharon West	yes
OGS 61	Eureka	slope	Hubbard	Sharon West	yes
OGS 62	Cramer No. 1	slope	Hubbard	Sharon West	yes
OGS 63	Cramer Drain	tunnel	Hubbard	Sharon West	yes
OGS 64	Curtis Hill (No. 1)	drift	Brookfield	Sharon West	yes
OGS 65	Curtis Hill (No. 2)	drift	Brookfield	Orangeville	yes
OGS 66	Clingan	shaft	Hubbard	Sharon West	yes
OGS 67	Clingan Drain	tunnel	Hubbard	Sharon West	yes
OGS 68	Tod	slope	Weathersfield	Girard	yes
OGS 69	Kimberly	slope	Weathersfield	Girard	yes
OGS 70			Brookfield	Sharon West	yes
OGS 71			Liberty	Girard	yes
			CARROLL COUNTY		
C1-8	Starkey	slope	Brown	Minerva	no
C1-15	Big Vein	drift	Fox	Bergholz, Salineville	yes
C1-18	No. 6	drift	Brown	Minerva, Malvern	yes
C1-21	Strip Vein No. 7	drift	Fox	Gavers, Kensington	yes
C1-28	Metropolitan No. 5	slope	Brown	Minerva	no
C1-30	Kirk	drift	Fox, Washington (Columbiana Co.)	Gavers, Kensington	yes

Cl-34	New No. 6	drift	Brown	Minerva, Malvern	yes
Cl-37	Leishman	drift	Fox	Salineville	yes
Cl-44	Kirk, Carroll, Storn	drift	Fox, Washington (Columbiana Co.)	Gavers, Kensington	yes
Cl-49	Custer	drift	East	Kensington	yes
Cl-59	Sterling	drift	Fox, Brush Creek (Jefferson Co.)	Bergholz, Salineville	yes
Cl-60	Custer	drift	East	Kensington	yes
Cl-65	Montgomery	drift	East	Kensington	yes
Cl-67	Carroll	drift	Fox, Washington (Columbiana Co.)	Salineville	yes
Cl-82	Peacock	drift	East	Kensington	yes
Cl-83	Senior	shaft	East	Kensington	yes
Cl-93	Kensington	drift	East	Kensington	yes
Cl-97	Raines	drift	Brown	Minerva	yes
			JEFFERSON COUNTY		
Jfn-4	Big Vein	drift	Saline	Wellsville	yes
Jfn-6	McCrady	drift	Saline	Wellsville	yes
Jfn-7	Wallace	shaft	Saline	Wellsville	yes
Jfn-8	Diamond No. 2	drift	Saline	Wellsville	no
Jfn-13	Diamond	drift, slope	Saline	Wellsville	yes
Jfn-28	East Ohio Clay	shaft	Saline	Wellsville	yes
Jfn-28	East Ohio Clay	drift	Saline	Wellsville	yes
Jfn-31	Empire No. 7	drift, shaft	Knox	Wellsville	yes
Jfn-43	Iron Dale	drift	Saline	Wellsville	yes
Jfn-48	Diamond No. 1	drift	Saline	Wellsville	yes
Jfn-91	Dando No. 4	drift	Saline	Wellsville	yes
Jfn-91A	Dando No. 4	drift	Saline	Wellsville	yes
Jfn-130	Stratton Clay	drift	Knox, Saline	Wellsville	yes
Jfn-134	Balsar	drift	Ross	Salineville	yes
Jfn-135	Shockley	drift	Ross	Salineville	yes
Jfn-139	L & J	drift	Ross	Salineville	yes

Jfn-146	Banfield	slope, shaft	Saline	Wellsville	yes
Jfn-147	Bauer	drift	Knox	Wellsville	yes
Jfn-150	Shockley	drift	Ross	Salineville	yes
Jfn-154	Buckeye	drift	Ross	Salineville	yes
Jfn-156	Carmen	drift	Saline	Wellsville	yes
Jfn-164	Williams	drift	Brush Creek	Salineville	yes
Jfn-169	Pebley	drift	Saline	Wellsville	yes
Jfn-174	Yellow Creek	drift	Saline	Wellsville	yes
Jfn-182	Eckley	drift	Ross	Salineville	yes
Jfn-184	Lewis	shaft, slope	Saline	Wellsville	yes
Jfn-186	McCrady	drift	Knox, Saline	Wellsville	yes
Jfn-188	Wedding	drift	Ross	Salineville	yes
Jfn-197	Ohio Valley	shaft	Saline	Wellsville	yes
Jfn-202	Peerless	slope	Saline	Wellsville	yes
Jfn-208	Miller	drift	Ross	Salineville	yes
Jfn-209	Diamond	drift	Saline	Wellsville	yes
Jfn-214	Grafton	drift	Brush Creek	Salineville	yes
Jfn-218	Smith	drift	Ross	Salineville	yes
Jfn-221	Great Northern Clay	slope	Saline	Wellsville	yes
Jfn-228	Empire Clay	drift	Saline	Wellsville	yes
Jfn-230	Union Clay	drift?	Knox	East Liverpool South, Wellsville	yes
Jfn-231	Warren	drift	Knox	Wellsville	yes
Jfn-233	Wells	drift	Ross, Springfield	Salineville	yes
Jfn-234	Plate	drift	Ross	Salineville	yes
Jfn-235	Wilson	drift	Ross	Salineville	yes
Jfn-241	Centertown	drift	Ross	Salineville	yes
Jfn-246	Lewis	drift	Ross	Salineville	yes
Jfn-247	Black Ridge No. 1	drift	Brush Creek	Salineville	yes
Jfn-248	Tunnel Mill	drift	Ross	Richmond, Salineville, Wellsville	yes
Jfn-249	Parsons	drift	Springfield	Salineville	yes
Jfn-251	Brush Creek No. 1	drift	Brush Creek	Salineville, Wellsville	yes

Jfn-252	Beadnell	drift	Ross	Salineville	yes
Jfn-253	Brimstone No. 2	drift	Ross	Salineville	yes
Jfn-257	Sun No. 3	drift	Ross	Salineville	yes
			PORTAGE COUNTY		
Pe-1	Hutson No. 1	shaft, slope	Palmyra	Deerfield	yes
Pe-2	Hutson No. 2	shaft	Palmyra	Deerfield	yes
Pe-3	Hutson No. 5	shaft	Palmyra, Deerfield	Deerfield	yes
Pe-4	Hutson No. 6	shaft	Palmyra	Deerfield	yes
Pe-5	Hutson No. 7	shaft	Palmyra, Deerfield	Deerfield	yes
Pe-6	Hutson No. 8	shaft	Palmyra	Deerfield	yes
Pe-7	Hutson No. 4	shaft	Deerfield	Deerfield	yes
Pe-8	Hutson No. 10	shaft	Deerfield	Deerfield	yes
Pe-9	Black Diamond No. 3	shaft	Palmyra, Milton (Mahoning Co.)	Deerfield	no
Pe-10	Black Diamond	shaft	Palmyra	Deerfield	yes
Pe-11	Black Diamond No. 4	shaft	Palmyra	Deerfield	yes
Pe-12	Shaffer Bros.	shaft	Atwater	Deerfield	yes
Pe-13	Black Diamond No. 5	shaft	Deerfield	Deerfield	yes
			STARK COUNTY		
Sk-11	Carr	shaft	Lexington	Alliance	yes
Sk-15	Davis	shaft	Lexington	Alliance	yes
Sk-43	Eli	shaft	Lexington	Alliance	yes
Sk-91	Mound Hill	drift	Paris	Homeworth	yes
Sk-115	Lexington		Lexington	Alliance	yes
Sk-121	Mound Hill	drift	Paris	Homeworth	yes
Sk-127	North Side	slope?	Lexington	Alliance	yes
Sk-156	Somerville	drift	Paris	Homeworth	yes
Sk-223	Imperial	shaft	Washington	Homeworth	yes
Sk-224	Hillcrest	drift	Paris	Homeworth	yes
Sk-240	Westover	shaft	Lexington	Alliance	yes
Sk-241	Red Shaft	shaft	Washington	Homeworth	yes

Sk-249	New Franklin	drift	Paris	Homeworth	yes
Sk-251	Hetherington	drift	Paris	Homeworth	yes
Sk-267	Home	shaft	Lexington	Alliance	yes

APPENDIX B.-Alphabetical index for mapped or located abandoned underground mines in the tri-county area

Mine name	Mine designation	County
A	Mg-18	Mahoning
Ab Lane	OGS 55	Trumbull
Abbett	OGS 47	Mahoning
Abe Stouffer	OGS 75	Mahoning
Adams	T1-18	Trumbull
Ainsworth	OGS 49	Columbiana
Allen	Mg-76, OGS 29, OGS 30	Mahoning
Alliance	Ca-118	Columbiana
Allison	Mg-33, Mg-37	Mahoning
American No. 36	Ca-53	Columbiana
American Fire Clay	OGS 64	Mahoning
American Sewer Pipe	Ca-53	Columbiana
Anchor	OGS 24	Mahoning
Anderson	Ca-54	Columbiana
Anderson (No. 1)	Ca-15	Columbiana
Anderson No. 1 & No. 2	Ca-15	Columbiana
Anderson (No. 2)	Ca-54	Columbiana
Applegate	T1-4, T1-18, OGS 37	Trumbull
Ashland	T1-6	Trumbull
Austin	Mg-39	Mahoning
Baldwin	Mg-75	Mahoning
Balsar	Jfn-134	Jefferson
Bandy	Mg-20	Mahoning
Banfield	Jfn-146	Jefferson
Barber	Mg-26	Mahoning
Barber	OGS 13	Trumbull
Barnard Clay	Mg-54	Mahoning
Barnes	Ca-155	Columbiana
Bauer	Jfn-147	Jefferson
Beech Grove (Beach Grove)	Ca-5	Columbiana
Beech Hollow (Beach Hollow)	Ca-37	Columbiana
Beadnell	Jfn-252	Jefferson
Beaver No. 1	Ca-80	Columbiana
Beaver Valley	Ca-92	Columbiana
Big Vein	C1-15	Carroll
Big Vein	Jfn-4	Jefferson
Bill Bird	OGS 53	Trumbull
Bituminous	OGS 63	Mahoning
Black Bros.	OGS 74	Mahoning
Black Diamond	Ca-88	Columbiana
Black Diamond	Mg-63	Mahoning
Black Diamond	Pe-10	Portage
Black Diamond No. 1	Mg-28	Mahoning
Black Diamond (No. 2)	Mg-63	Mahoning
Black Diamond No. 3	Pe-9	Portage

Black Diamond No. 4	Pe-11	Portage
Black Diamond No. 5	Pe-13	Portage
Black Ridge No. 1	Jfn-247	Jefferson
Black Ridge No. 2	Ca-172	Columbiana
Blackberry	OGS 19	Trumbull
Blaine	Tl-19, Tl-23	Trumbull
Blue Ribbon	Tl-22	Trumbull
Blunt	Tl-6	Trumbull
Bonsel (Bonsall)	Mg-22	Mahoning
Bowman	Ca-109	Columbiana
Bowman	Mg-39	Mahoning
Bowman	OGS 6	Trumbull
Bozzo	Ca-99	Columbiana
Brain	Ca-120	Columbiana
Brass & Wire	OGS 35	Trumbull
Brier Hill	OGS 17	Mahoning
Brimstone No. 2	Jfn-253	Jefferson
Brisbine	OGS 60	Trumbull
Brookfield	Tl-20	Trumbull
Brookwood	Ca-122	Columbiana
Brownlee	Mg-7	Mahoning
Brunswick	OGS 11	Trumbull
Brush Creek No. 1	Jfn-251	Jefferson
Buckeye	Jfn-154	Jefferson
Buckeye No. 2	Ca-116	Columbiana
Burnett	Tl-18	Trumbull
Buxton	Ca-121	Columbiana
C & W No. 4	Ca-175	Columbiana
C. H. Andrews	OGS 2	Trumbull
C. W. Barnes	OGS 27	Columbiana
California	OGS 29	Trumbull
Callahan	Ca-124	Columbiana
Callahan No. 3	Ca-123	Columbiana
Cambria	Tl-6	Trumbull
Cambria (No. 1)	Tl-6	Trumbull
Cambria (No. 2)	Tl-6	Trumbull
Campbell	OGS 14	Mahoning
Campbell	Tl-2	Trumbull
Carbon Hill No. 1	Ca-25	Columbiana
Carbon Hill No. 2	Ca-9	Columbiana
Card & Prosser No. 4	Ca-27	Columbiana
Card & Prosser's No. 3	Ca-13	Columbiana
Carlton Bank	Tl-11	Trumbull
Carmen	Jfn-156	Jefferson
Carr	Sk-11	Stark
Carroll	Cl-67	Carroll
Cedar Corners	OGS 39	Trumbull
Cedar Hill	Ca-20	Columbiana
Cement	Ca-29	Columbiana
Centennial	Tl-2	Trumbull
Centertown	Jfn-241	Jefferson
Central	Ca-69	Columbiana

Central Slope	Ca-69	Columbiana
Chambersburg	Ca-108	Columbiana
Champion	Ca-169	Columbiana
Champion Clay	Ca-169	Columbiana
Champion No. 11	Ca-169	Columbiana
Charley Herbert	OGS 46	Trumbull
Chauncey Andrews	OGS 9	Mahoning
Chauncey Andrews	OGS 50	Trumbull
Cherry Valley	Ca-48, Ca-72, Ca-74	Columbiana
Cherry Valley No. 1	Ca-72	Columbiana
Cherry Valley No. 3	Ca-74	Columbiana
Cherry Valley Mine	Ca-72	Columbiana
Chestnut Hill	Mg-42	Mahoning
Chinee	OGS 26	Trumbull
Church Hill	T1-2, T1-5	Trumbull
Church Hill (No. 1)	T1-2, T1-5	Trumbull
Church Hill (No. 2)	T1-2	Trumbull
Clay Shaft No. 1	Ca-31	Columbiana
Cleveland	OGS 11	Mahoning
Cleveland	OGS 36	Trumbull
Clingan	OGS 66	Trumbull
Clingan Drain	OGS 67	Trumbull
Colonial No. 5	Ca-117	Columbiana
Colonial No. 6	Ca-101	Columbiana
Colonial No. 9	Ca-100	Columbiana
Colonial Clay	Ca-31	Columbiana
Columbia	Ca-126	Columbiana
Columbiana	Ca-78	Columbiana
Columbiana	Mg-68	Mahoning
Columbiana (No. 2)	Ca-78	Columbiana
Cork and Bottle	Mg-75	Mahoning
Corn Cob	OGS 15	Trumbull
Coy	Mg-55	Mahoning
Cramer No. 1	OGS 62	Trumbull
Cramer No. 2	T1-18	Trumbull
Cramer No. 3	OGS 38	Trumbull
Cramer Drain	OGS 63	Trumbull
Cranage & Anderson (Crange & Anderson)	Ca-15	Columbiana
Crook	Ca-127	Columbiana
Cunningham	Ca-131	Columbiana
Curtis No. 1	OGS 64	Trumbull
Curtis No. 2	OGS 65	Trumbull
Curtis Hill (No. 1)	OGS 64	Trumbull
Curtis Hill (No. 2)	OGS 65	Trumbull
Custer	C1-49, C1-60	Carroll
Cutta	Ca-50	Columbiana
Dan Smith	OGS 48	Trumbull
Dando No. 4	Jfn-91, Jfn-91a	Jefferson
Dangelo	OGS 48	Columbiana
Daniel Little	Mg-23	Mahoning
Davis	Sk-15	Stark
Delaney	OGS 39	Columbiana

Delmore	Ca-49	Columbiana
Dewey No. 2	Ca-75	Columbiana
Diamond	Ca-107	Columbiana
Diamond	Jfn-13, Jfn-209	Jefferson
Diamond No. 1	Jfn-48	Jefferson
Diamond No. 2	Jfn-8	Jefferson
Dickson	OGS 8	Columbiana
Dorr	Ca-142	Columbiana
Drake	OGS 31	Trumbull
Duck	OGS 38	Columbiana
Dunn	OGS 82	Mahoning
Dunn (No. 2)	OGS 82	Mahoning
E & F	Ca-112	Columbiana
E & F (No. 1)	Ca-122	Columbiana
E & F (No. 2)	Ca-115	Columbiana
Eagle	Ca-108	Columbiana
East End No. 3	Ca-94	Columbiana
East Fairfield No. 1	Ca-64	Columbiana
East Liverpool	Ca-128	Columbiana
East Ohio Clay	Jfn-28	Jefferson
East Ohio Coal	Jfn-28	Jefferson
Easton	Ca-81	Columbiana
Eckley	Jfn-182	Jefferson
Eells	Ca-133	Columbiana
Eli	Sk-43	Stark
Egypt	Mg-35	Mahoning
Elk Run	Ca-14, Ca-75, Ca-129	Columbiana
Elk Run No. 1	Ca-57	Columbiana
Elk Run (No. 2)	Ca-75	Columbiana
Elk Run No. 3	Ca-77	Columbiana
Elkton	Ca-180	Columbiana
Empire	Ca-22	Columbiana
Empire No. 7	Jfn-31	Jefferson
Empire Clay	Jfn-228	Jefferson
Essential	OGS 4	Mahoning
Esterly	Ca-130	Columbiana
Eureka	Ca-67	Columbiana
Eureka	OGS 61	Trumbull
Evans	Ca-8, Ca-132	Columbiana
Evans	Mg-43	Mahoning
Evans	OGS 52	Mahoning
Evans (No. 1)	Ca-8	Columbiana
Evans (No. 2)	Ca-132	Columbiana
Eynon	OGS 58	Mahoning
F. J. Mentzer	Mg-17	Mahoning
Fairfield	Ca-64, Ca-65	Columbiana
Fairfield No. 1	Ca-64	Columbiana
Fairfield No. 2	Ca-65	Columbiana
Fairfield No. 3	Ca-66	Columbiana
Fairview	Mg-27	Mahoning
Fairview No. 2	Mg-27	Mahoning
Fairview (No. 3)	Mg-27	Mahoning

Fairview No. 3	Mg-27	Mahoning
Farmers	Ca-68	Columbiana
Farquhar	Ca-30	Columbiana
Fire Clay No. 2	Ca-55	Columbiana
First National	Ca-23	Columbiana
Fisk	Mg-53	Mahoning
Five Point	Mg-31	Mahoning
Floyd Brain	OGS 9	Columbiana
Folts	Ca-13, Ca-179	Columbiana
Foraker No. 1	OGS 43	Trumbull
Foraker No. 2	OGS 44	Trumbull
Foster	Ca-62	Columbiana
Foster	OGS 18	Mahoning
Foster No. 1	OGS 18	Mahoning
Foster No. 2	OGS 19	Mahoning
Foster No. 3	Mg-9	Mahoning
Foster & Crane	OGS 28	Mahoning
Fosterville	OGS 18, OGS 19	Mahoning
Francis	Ca-152	Columbiana
Frank Lafferty	Ca-141	Columbiana
Fryfogle	Ca-148	Columbiana
Fulk (Foulk)	OGS 41	Mahoning
Ganow	OGS 8	Trumbull
Garfield	OGS 25	Trumbull
Garside	Ca-76	Columbiana
George Chamberlin	OGS 16	Trumbull
George Ohlin	Mg-67	Mahoning
Ginger Hill	Mg-59	Mahoning
Godward (Goodward)	Mg-13	Mahoning
Grafton	Jfn-214	Jefferson
Granage & Anderson	Ca-15	Columbiana
Granage & Anderson No. 1 & No. 2	Ca-15	Columbiana
Grant	Ca-82	Columbiana
Grapevine	Ca-112, Ca-135	Columbiana
Gray	Ca-136	Columbiana
Great Northern Clay	Jfn-221	Jefferson
Green Mountain	Mg-60	Mahoning
Greenamyer	Ca-170	Columbiana
Groner	Ca-119	Columbiana
Grove	Ca-137	Columbiana
Guilford	Ca-113	Columbiana
Guthrie	Ca-138	Columbiana
Hahn	Mg-61	Mahoning
Hall	Ca-125	Columbiana
Hamilton (Hamelton)	Tl-15	Trumbull
Hanssen	OGS 10	Mahoning
Harrison	Tl-11	Trumbull
Harroff (Haroff, Huroff)	Mg-45, OGS 8	Mahoning
Harroff (No. 1)	Mg-45	Mahoning
Harroff (No. 2)	Mg-8	Mahoning
Hart	Ca-91, Ca-98	Columbiana
Hart (No. 1)	Ca-91	Columbiana

Hart (No. 2)	Ca-98	Columbiana
Hassen (Hason)	OGS 27	Trumbull
Hayes (Hays)	Ca-39	Columbiana
Hazel No. 2	Ca-166	Columbiana
Hemmingway	Mg-15	Mahoning
Hetherington (Heatherington)	Ca-24	Columbiana
Hetherington	Sk-251	Stark
High	Tl-19	Trumbull
High Shaft	OGS 20	Trumbull
High Tone	Tl-19, Tl-23	Trumbull
Hillcrest	Sk-224	Stark
Hogg	OGS 38	Mahoning
Holliday (Halliday)	OGS 12	Trumbull
Holroyd	Mg-38	Mahoning
Holwick	Mg-37	Mahoning
Home	Sk-240	Stark
Home Bank	OGS 38	Mahoning
Hood	OGS 41	Trumbull
Hood & Lynn	OGS 5	Mahoning
Hoon	Ca-110	Columbiana
Hoover and Commco	OGS 53	Mahoning
Householder	OGS 52	Columbiana
Howell	Mg-37	Mahoning
Hudson	Tl-17	Trumbull
Hutson No. 1	Pe-1	Portage
Hutson No. 2	Pe-2	Portage
Hutson No. 3	Mg-18	Mahoning
Hutson No. 4	Pe-7	Portage
Hutson No. 5	Pe-3	Portage
Hutson No. 6	Pe-4	Portage
Hutson No. 7	Pe-5	Portage
Hutson No. 8	Pe-6	Portage
Hutson No. 10	Pe-8	Portage
Idaho	OGS 42	Mahoning
Imperial	Sk-223	Stark
Iron Dale	Jfn-43	Jefferson
J. C. Robertson	OGS 80	Mahoning
J. Crumley	OGS 57	Columbiana
J. N. Buck	Ca-79	Columbiana
Jacobs No. 1	OGS 51	Trumbull
Jacobs No. 2	Tl-13, Tl-16	Trumbull
Jacobs No. 3	OGS 52	Trumbull
Jacobs & Matthews	Tl-13	Trumbull
James Morris	OGS 14	Columbiana
Jenny Wheel	OGS 47	Trumbull
Jersey Bridge No. 4	Ca-176	Columbiana
Jersey Ridge No. 4	Ca-176	Columbiana
John Hays	Ca-21	Columbiana
John Henry	Mg-25	Mahoning
John Pascola	OGS 71	Mahoning
John Pow (John Paw, John Powe)	Mg-13	Mahoning
Johnson	OGS 41	Columbiana

Jones	Ca-45, Ca-110	Columbiana
Keel Ridge	Tl-3	Trumbull
Kensington	Cl-93	Carroll
Kimberly	OGS 69	Trumbull
Kinsey	OGS 42	Columbiana
Kirk	Cl-30	Carroll
Kirk, Carroll, Storn	Cl-44	Carroll
Kirtley	Ca-140	Columbiana
Kline	OGS 42	Trumbull
Klink	Tl-3	Trumbull
Klondike	OGS 23	Trumbull
Klondyke	Ca-27	Columbiana
Klondyke No. 4	Ca-27	Columbiana
Klondyke No. 7	Ca-27	Columbiana
Kyle	Mg-5	Mahoning
L & J	Jfn-139	Jefferson
L & S	Ca-156	Columbiana
L. H. Dougherty	OGS 67	Mahoning
Lafferty	Ca-141	Columbiana
Lane	Tl-18	Trumbull
Laney	Jfn-218	Jefferson
Lanterman	OGS 13	Mahoning
Leadville	OGS 13	Mahoning
Leatherberry	Ca-134	Columbiana
Leetonia	Ca-72, Ca-83	Columbiana
Leetonia (No. 1)	Ca-72	Columbiana
Leetonia (No. 2)	Ca-83	Columbiana
Leishman	Cl-37	Carroll
Lewis	Ca-178	Columbiana
Lewis	Jfn-184, Jfn-246	Jefferson
Lewis	OGS 7	Mahoning
Lewis	OGS 7	Trumbull
Lexington	Sk-115	Stark
Libert	OGS 7	Columbiana
Lisbon	Ca-47, Ca-59	Columbiana
Lisbon (No. 1)	Ca-59	Columbiana
Lisbon (No. 2)	Ca-47	Columbiana
Little, Peacock & Wilcox	Mg-14	Mahoning
Lizzie No. 1	Ca-146	Columbiana
Logan	Mg-8	Mahoning
Long	OGS 34	Trumbull
Love	Tl-18	Trumbull
Lowellville	Mg-30	Mahoning
M. S. Stoffer	OGS 1	Columbiana
McClurg	OGS 18	Trumbull
McCrady	Jfn-6, Jfn-186	Jefferson
McCurdy	Tl-10	Trumbull
McDaniel	Mg-64	Mahoning
McDonald	Mg-31	Mahoning
McDonald (No. 2)	Mg-31	Mahoning
McGill	Mg-21	Mahoning
McKenzie	Ca-103	Columbiana

McKinley (M'Kinley)	Mg-32	Mahoning
McKinney	Mg-39	Mahoning
McKinnie (McKennie, McKenny)	Mg-12	Mahoning
McNab	Ca-58	Columbiana
Mahoning	Ca-143, Ca-165	Columbiana
Mahoning No. 1	OGS 33	Trumbull
Mahoning No. 3	T1-9	Trumbull
Mahoning No. 4	OGS 28	Trumbull
Mahoning No. 8	OGS 30	Trumbull
Mahoning No. 9	OGS 32	Trumbull
Malone	OGS 35	Columbiana
Manilla	Ca-177	Columbiana
Manning	Mg-24	Mahoning
Marcum	Ca-144	Columbiana
Marshall	T1-6	Trumbull
Metropolitan No. 5	C1-28	Carroll
Middle	OGS 49	Trumbull
Miller	Jfn-208	Jefferson
Millville	Mg-36	Mahoning
Milton Powers	OGS 27	Mahoning
Mineral Ridge Drain	OGS 1	Trumbull
Moherman (Mocherman, Macherman)	OGS 15	Mahoning
Mollenkopf (Mellenkopf, Mollenkoph)	Ca-18	Columbiana
Montgomery	C1-65	Carroll
Moore	OGS 43	Columbiana
Moore	OGS 14	Trumbull
Morris	Ca-120	Columbiana
Morris & Price	T1-6	Trumbull
Mound Hill	Sk-91, Sk-121	Stark
Myers	Mg-62, Mg-66	Mahoning
Myers (No. 1)	Mg-62	Mahoning
National	Mg-6, Mg-11	Mahoning
National (No. 1)	Mg-6	Mahoning
National No. 1 & No. 2	Mg-6	Mahoning
National (No. 2)	Mg-11	Mahoning
National No. 8 & No. 9	Ca-93	Columbiana
National North	Mg-6	Mahoning
National Northside & Southside	Mg-6	Mahoning
National South	Mg-6	Mahoning
Negley	Ca-38, Ca-87	Columbiana
Negley No. 1	Ca-61	Columbiana
Negley No. 2	Ca-60	Columbiana
Negley Clay	Ca-87	Columbiana
Neiheisel	Ca-44	Columbiana
New Allen	Mg-76	Mahoning
New Foster	OGS 19	Mahoning
New Found Out	OGS 3	Trumbull
New Franklin	Sk-249	Stark
New Garfield	OGS 25	Trumbull
New House (Newhouse)	Ca-75	Columbiana
New No. 6	C1-34	Carroll
New Palmyra	Mg-18	Mahoning

New Salem	Ca-150	Columbiana
New Salisbury	Ca-46	Columbiana
New Shaft	Ca-19	Columbiana
New Slope	Ca-1, Ca-52	Columbiana
Nicholson	Jfn-6	Jefferson
Niles	Mg-1	Mahoning
Niles	T1-12	Trumbull
North Lima	Mg-29, Mg-34	Mahoning
North Lima No. 1	Mg-29	Mahoning
North Side	Sk-127	Stark
No. 3	Ca-74, Ca-153	Columbiana
No. 6	C1-15, C1-18	Carroll
No. 36	Ca-53	Columbiana
Oak Hill	Ca-40	Columbiana
Ohio Cement	Ca-29	Columbiana
Ohio Clay Products	Ca-85	Columbiana
Ohio Valley	Jfn-197	Jefferson
Ohl	Mg-39	Mahoning
Ohlin & Bryan	Mg-67	Mahoning
Ohltown (Ohlton)	Mg-44	Mahoning
Old Shaft	Ca-70	Columbiana
Old Slope	Ca-52	Columbiana
Old Slope No. 1	Ca-52	Columbiana
Osborn (Osburn)	OGS 20	Mahoning
Osborne	T1-6	Trumbull
Owens	Mg-45, OGS 16	Mahoning
Packard	Mg-46	Mahoning
Padurean	Ca-97	Columbiana
Padurean (Padoren)	Mg-50	Mahoning
Palmer	Mg-8	Mahoning
Palmyra A	Mg-18	Mahoning
Panic	OGS 58	Trumbull
Parsons	Jfn-249	Jefferson
Pascola No. 2	Mg-68	Mahoning
Paulin	Mg-16	Mahoning
Payne	OGS 2	Trumbull
Peacock	C1-82	Carroll
Peacock	Ca-148	Columbiana
Peacock	OGS 4, OGS 5	Trumbull
Peacock (No. 1)	OGS 4	Trumbull
Peacock (No. 2)	OGS 5	Trumbull
Peacock & Wilcox	Mg-14	Mahoning
Pebley	Jfn-169	Jefferson
Peerless	Ca-36, Ca-73, Ca-150	Columbiana
Peerless	Jfn-202	Jefferson
Pennell (Pennel)	Mg-1	Mahoning
Pentz	Ca-12	Columbiana
Perkins Bros.	OGS 19	Columbiana
Philpot	OGS 35	Mahoning
Pikes Peak	OGS 12	Mahoning
Pinch	OGS 24	Trumbull
Pinch Along	OGS 24	Trumbull

Pine Hill	Ca-13	Columbiana
Pine Hollow	Ca-10, Ca-151	Columbiana
Pitsy	Mg-52	Mahoning
Plate	Ca-167	Columbiana
Plate	Jfn-234	Jefferson
Pleasant Valley	Ca-60, Ca-61	Columbiana
Pleasant Valley No. 1	Ca-61	Columbiana
Pleasant Valley No. 2	Ca-60	Columbiana
Pleasant Valley No. 3	Ca-60	Columbiana
Pleasant Valley No. 6	Ca-2	Columbiana
Pleasant Valley No. 13	Ca-174	Columbiana
Poland	Mg-3	Mahoning
Poland No. 2	Mg-4	Mahoning
Porter	Mg-70	Mahoning
Porter (No. 2)	Mg-70	Mahoning
Pow (Powe)	Mg-13	Mahoning
Powell	Ca-139	Columbiana
Power Point	Ca-147	Columbiana
Powers	Mg-47, OGS 23	Mahoning
Powers	OGS 45	Trumbull
Powers (No. 1)	Mg-47	Mahoning
Prospect	Ca-17	Columbiana
Prospect No. 2	Ca-32	Columbiana
Prospect Hill	Ca-17, Ca-32	Columbiana
Prospect Hill No. 1	Ca-32	Columbiana
Prospect Hill No. 2	Ca-32, Ca-34	Columbiana
Prospect Hill No. 7	Ca-33	Columbiana
Prospect Hill Drift No. 1	Ca-17	Columbiana
Prospect Hill Drift No. 2	Ca-34	Columbiana
Prospect Hill Slope No. 1	Ca-32	Columbiana
Prospect Hill Slope No. 2	Ca-32	Columbiana
Prospect Slope	Ca-17, Ca-32	Columbiana
Prosser No. 4	Ca-27	Columbiana
Pumpkin	OGS 40	Trumbull
Quaker Valley	Ca-14, Ca-129	Columbiana
R. L. Houts	OGS 68	Mahoning
Ragweed	OGS 10	Trumbull
Raines	Cl-97	Carroll
Red Shaft	Sk-241	Stark
Redinger	Mg-57	Mahoning
Reed	Mg-71, OGS 69	Mahoning
Reeder	Ca-149	Columbiana
Reese Charles	OGS 59	Trumbull
Reno	OGS 25	Mahoning
Rhea	Ca-152	Columbiana
Rhea No. 1	Ca-152	Columbiana
Rock Camp	Ca-51	Columbiana
Rogers	Ca-43	Columbiana
Rogers	OGS 17	Trumbull
Rogers Bank	OGS 17	Trumbull
Roscoe Nye	Mg-41	Mahoning
Ryder	Mg-42	Mahoning

Salem	Ca-41	Columbiana
Salisbury	Ca-46, Ca-117	Columbiana
Saratoga No. 2	Ca-71	Columbiana
Saratoga No. 4	Ca-27	Columbiana
Schory	Ca-164	Columbiana
Scoville	OGS 22	Trumbull
Script Hill	OGS 39	Mahoning
Sebring	Mg-51	Mahoning
Second National	Ca-7	Columbiana
Seger No. 3	Ca-153	Columbiana
Senior	Cl-83	Carroll
Shady Side	OGS 20	Trumbull
Shaffer Bros.	Pe-12	Portage
Sheckler	OGS 51	Columbiana
Shenango	Tl-4	Trumbull
Shephard (Shepherd, Shepard, Sheppard)	Ca-16	Columbiana
Shepherd	Ca-56, Ca-154	Columbiana
Shepherd (No. 1)	Ca-56	Columbiana
Shepherd (No. 2)	Ca-154	Columbiana
Shepherd No. 2	Mg-40	Mahoning
Shields	Mg-43	Mahoning
Shockley	Jfn-135, Jfn-150	Jefferson
Shoo Fly	Tl-7, OGS 9	Trumbull
Silver Creek	Mg-65, Mg-72	Mahoning
Slope	Ca-52	Columbiana
Slope No. 2	Ca-1, Ca-32	Columbiana
Smith	OGS 33, OGS 37	Columbiana
Smith	Jfn-218	Jefferson
Smith (No. 1)	OGS 33	Columbiana
Smith (No. 2)	OGS 37	Columbiana
Snyder	Ca-157	Columbiana
Sodom	Tl-10	Trumbull
Sol Paulin (Solomon Paulin)	Mg-77	Mahoning
Somerville	Sk-156	Stark
Spait (Spaite)	Mg-14	Mahoning
Standard	Ca-26, Ca-158, Ca-173	Columbiana
Standard (No. 1)	Ca-26	Columbiana
Standard (No. 2)	Ca-158	Columbiana
Standard (No. 3)	Ca-173	Columbiana
Stanley	Mg-15	Mahoning
Starkey	Cl-8	Carroll
State Line	Ca-86	Columbiana
State Line No. 1	Ca-86	Columbiana
Sterling	Cl-59	Carroll
Stewart	Tl-1, Tl-14	Trumbull
Stewart (No. 1)	Tl-1	Trumbull
Stewart (No. 2)	Tl-14	Trumbull
Stouffer (Stoffer, Stoffers)	Mg-11	Mahoning
Strabley	Ca-39	Columbiana
Stratton Clay	Jfn-130	Jefferson
Strip and At It	OGS 21	Trumbull
Strip Vein No. 7	Cl-21	Carroll

Strudthoff	Ca-159	Columbiana
Sun No. 3	Jfn-257	Jefferson
Swearingen	Ca-114	Columbiana
Taylor	OGS 40	Trumbull
Teegarden	Ca-13	Columbiana
Thorn	OGS 26	Mahoning
Thorn Hill No. 1	OGS 31	Mahoning
Thorn Hill No. 2	Mg-75	Mahoning
Thornhill	Mg-73	Mahoning
Thornton	Mg-25	Mahoning
Tibbit (Tibbett)	Mg-39	Mahoning
Tippecanoe	Mg-9	Mahoning
Tod	OGS 68	Trumbull
Tolerton	Ca-12	Columbiana
Tom Tyrrell No. 1	OGS 34	Mahoning
Tom Tyrrell No. 2	Mg-78	Mahoning
Traveler's Rest	OGS 6	Trumbull
Tunnel Mill	Jfn-248	Jefferson
Union Clay	Jfn-230	Jefferson
United	Ca-48	Columbiana
Urmson	Mg-19	Mahoning
Vasey	Ca-95	Columbiana
Veach	OGS 57	Trumbull
Veach & Burnett	OGS 57	Trumbull
Vender	Ca-143	Columbiana
Vienna	Tl-7, Tl-8, OGS 17	Trumbull
Vienna (No. 1)	Tl-7	Trumbull
Vienna (No. 2)	Tl-8	Trumbull
Vignon	Ca-160	Columbiana
Vitro (Viteo)	OGS 59	Mahoning
Vulcan	Ca-4	Columbiana
Vulcan Clay	Ca-4	Columbiana
Walker No. 5	Ca-3	Columbiana
Wallace	Jfn-7	Jefferson
Walls Kerr	Tl-22	Trumbull
Walters Bank	Mg-11	Mahoning
Warren	Jfn-231	Jefferson
Weathersfield (Withersfield)	Tl-21	Trumbull
Weaver	Mg-48	Mahoning
Wm. McDaniels	OGS 56	Mahoning
Williams	Jfn-164	Jefferson
Williams	Mg-74	Mahoning
Wedding	Jfn-188	Jefferson
Weikart	Ca-96, Ca-111	Columbiana
Weikart No. 1	Ca-96	Columbiana
Weikart No. 2	Ca-111	Columbiana
Weingart	OGS 65	Mahoning
Welch	OGS 32	Mahoning
Wellendorf (Welingdorf)	OGS 21	Mahoning
Wells	Jfn-233	Jefferson
West Columbiana	Ca-161	Columbiana
West Pittsburgh	Ca-11	Columbiana

West Pittsburgh No. 2	Ca-28	Columbiana
West Pittsburgh No. 3	Ca-42	Columbiana
West Pittsburgh No. 6	Ca-11	Columbiana
West Point	Ca-152, Ca-181	Columbiana
Westover	Sk-240, Sk-267	Stark
Wetzel No. 4	Mg-60	Mahoning
Wheat Hill	Ca-35	Columbiana
Wheat Hill (No. 2)	Ca-35	Columbiana
Whitaker	Ca-171	Columbiana
Whiteleather	Ca-6	Columbiana
Wick Bros.	OGS 33	Mahoning
Willow	Tl-6	Trumbull
Wilson	Jfn-235	Jefferson
Wise	OGS 83	Mahoning
Witch Hazel	Mg-2, OGS 1	Mahoning
Wolfe	Ca-145	Columbiana
Wood Street	OGS 40	Mahoning
Yellow Creek	Jfn-174	Jefferson

APPENDIX C.-Hazard potential of abandoned underground mines in the tri-county area, on basis of type of mine opening

NOTE: Only mines plotted on 7½-minute base maps are included; see data sheets for mine descriptions

COLUMBIANA COUNTY

High hazard potential: Ca-11, Ca-19, Ca-26, Ca-30, Ca-31, Ca-48, Ca-58, Ca-70, Ca-76, Ca-85, Ca-123, Ca-126, Ca-148, Ca-157, Ca-170, Ca-179, OGS 2, OGS 8.

Moderate hazard potential: Ca-1, Ca-8, Ca-13, Ca-31, Ca-32, Ca-40, Ca-44, Ca-49, Ca-52, Ca-55, Ca-69, Ca-71, Ca-72, Ca-74, Ca-77, Ca-79, Ca-83, Ca-85, Ca-109, Ca-123, Ca-124, Ca-174, Ca-179.

Low hazard potential: Ca-2, Ca-3, Ca-4, Ca-5, Ca-6, Ca-7, Ca-9, Ca-10, Ca-14, Ca-15, Ca-16, Ca-17, Ca-20, Ca-22, Ca-23, Ca-24, Ca-25, Ca-27, Ca-28, Ca-29, Ca-33, Ca-34, Ca-35, Ca-36, Ca-37, Ca-38, Ca-39, Ca-41, Ca-42, Ca-43, Ca-45, Ca-46, Ca-50, Ca-51, Ca-53, Ca-54, Ca-56, Ca-57, Ca-59, Ca-60, Ca-61, Ca-62, Ca-63, Ca-65, Ca-66, Ca-67, Ca-68, Ca-71, Ca-72, Ca-73, Ca-75, Ca-78, Ca-80, Ca-81, Ca-82, Ca-83, Ca-86, Ca-87, Ca-88, Ca-91, Ca-92, Ca-93, Ca-94, Ca-95, Ca-96, Ca-97, Ca-98, Ca-99, Ca-101, Ca-102, Ca-103, Ca-107, Ca-108, Ca-110, Ca-111, Ca-112, Ca-113, Ca-114, Ca-115, Ca-116, Ca-117, Ca-118, Ca-119, Ca-120, Ca-121, Ca-122, Ca-124, Ca-125, Ca-127, Ca-128, Ca-129, Ca-130, Ca-132, Ca-133, Ca-134, Ca-135, Ca-136, Ca-137, Ca-138, Ca-139, Ca-140, Ca-141, Ca-142, Ca-143, Ca-144, Ca-145, Ca-146, Ca-147, Ca-149, Ca-150, Ca-151, Ca-152, Ca-153, Ca-154, Ca-155, Ca-156, Ca-158, Ca-159, Ca-160, Ca-161, Ca-163, Ca-164, Ca-165, Ca-166, Ca-167, Ca-169, Ca-171, Ca-172, Ca-173, Ca-175, Ca-176, Ca-177, Ca-180, Ca-181, Ca-182, OGS 6, OGS 30, OGS 34, OGS 36, OGS 49.

MAHONING COUNTY

High hazard potential:	Mg-1, Mg-2, Mg-3, Mg-5, Mg-7, Mg-8, Mg-9, Mg-11, Mg-14, Mg-15, Mg-16, Mg-17, Mg-18, Mg-23, Mg-24, Mg-25, Mg-26, Mg-28, Mg-29, Mg-30, Mg-31, Mg-32, Mg-34, Mg-39, Mg-41, Mg-42, Mg-43, Mg-44, Mg-47, Mg-51, Mg-56, Mg-58, Mg-59, Mg-61, Mg-62, Mg-63, Mg-65, Mg-67, Mg-70, Mg-72, Mg-74, Mg-78, OGS 1, OGS 2, OGS 3, OGS 4, OGS 7, OGS 8, OGS 10, OGS 11, OGS 13, OGS 15, OGS 19, OGS 20, OGS 21, OGS 22, OGS 24, OGS 28, OGS 29, OGS 32, OGS 34, OGS 34, OGS 37, OGS 39, OGS 40, OGS 47, OGS 54, OGS 59, OGS 64, OGS 71, OGS 74
Moderate hazard potential:	Mg-1, Mg-4, Mg-11, Mg-12, Mg-18, Mg-21, Mg-27, Mg-28, Mg-30, Mg-39, Mg-45, Mg-46, Mg-60, Mg-62, Mg-66, Mg-67, Mg-68, Mg-75, Mg-76, OGS 5, OGS 6, OGS 9, OGS 12, OGS 13, OGS 17, OGS 25, OGS 26, OGS 27, OGS 30, OGS 31, OGS 35, OGS 36, OGS 41, OGS 42, OGS 52, OGS 79, OGS 82
Low hazard potential:	Mg-6, Mg-13, Mg-15, Mg-19, Mg-20, Mg-22, Mg-33, Mg-35, Mg-36, Mg-37, Mg-40, Mg-48, Mg-50, Mg-54, Mg-57, Mg-58, Mg-60, Mg-64, Mg-66, Mg-71, Mg-77, OGS 18, OGS 23, OGS 38, OGS 65, OGS 66, OGS 72, OGS 83

TRUMBULL COUNTY

High hazard potential:	T1-2, T1-6, T1-8, T1-11, T1-12, T1-13, T1-14, T1-18, T1-19, T1-21, T1-22, T1-23, OGS 4, OGS 8, OGS 10, OGS 11, OGS 13, OGS 16, OGS 17, OGS 18, OGS 19, OGS 20, OGS 21, OGS 22, OGS 23, OGS 24, OGS 25, OGS 26, OGS 27, OGS 34, OGS 36, OGS 43, OGS 44, OGS 51, OGS 52, OGS 57, OGS 58, OGS 66

TRUMBULL COUNTY (cont'd)

Moderate hazard potential: T1-1, T1-2, T1-3, T1-4, T1-5, T1-6, T1-7, T1-9, T1-10, T1-12, T1-18, T1-20, OGS 2, OGS 3, OGS 5, OGS 6, OGS 7, OGS 9, OGS 12, OGS 14, OGS 15, OGS 28, OGS 29, OGS 30, OGS 31, OGS 32, OGS 33, OGS 37, OGS 38, OGS 39, OGS 40, OGS 41, OGS 42, OGS 45, OGS 46, OGS 47, OGS 48, OGS 49, OGS 53, OGS 55, OGS 59, OGS 60, OGS 61, OGS 62, OGS 68, OGS 69

Low hazard potential: OGS 1, OGS 35, OGS 63, OGS 64, OGS 65, OGS 67

CARROLL, JEFFERSON, PORTAGE, AND STARK COUNTIES

High hazard potential: C1-83, Jfn-7, Jfn-28, Jfn-31, Jfn-146, Jfn-184, Jfn-197, Pe-1, Pe-2, Pe-3, Pe-4, Pe-5, Pe-6, Pe-7, Pe-8, Pe-10, Sk-11, Sk-15, Sk-43, Sk-223, Sk-240, Sk-241, Sk-267

Moderate hazard potential: Jfn-13, Jfn-146, Jfn-184, Jfn-202, Jfn-221, Pe-1, Sk-127

Low hazard potential: C1-15, C1-18, C1-21, C1-30, C1-34, C1-37, C1-44, C1-49, C1-59, C1-60, C1-65, C1-67, C1-82, C1-93, C1-97, Jfn-4, Jfn-6, Jfn-13, Jfn-28, Jfn-31, Jfn-43, Jfn-48, Jfn-91, Jfn-91A, Jfn-130, Jfn-134, Jfn-135, Jfn-139, Jfn-147, Jfn-150, Jfn-154, Jfn-156, Jfn-164, Jfn-169, Jfn-174, Jfn-182, Jfn-186, Jfn-188, Jfn-208, Jfn-209, Jfn-214, Jfn-218, Jfn-228, Jfn-230, Jfn-231, Jfn-233, Jfn-234, Jfn-235, Jfn-241, Jfn-246, Jfn-247, Jfn-248, Jfn-249, Jfn-251, Jfn-252, Jfn-253, Jfn-257, Sk-91, Sk-121, Sk-156, Sk-224, Sk-249, Sk-251