



**A Citizen's Guide to
Mining and Reclamation in Ohio**

**Ohio Department of Natural Resources
Division of Mineral Resources Management**

Citizen's Guide to Mining and Reclamation in Ohio

OVERVIEW

This guide is intended to provide an overview of the extensive requirements and procedures related to past and present mining of coal and other minerals. It describes the opportunities that exist for public involvement as provided by the Ohio Revised Code (ORC). Current Division of Mineral Resources Management (DMRM) policy is fully established. Because it is impossible to fully delineate the requirements imposed by these provisions in a document of this limited scope, any inconsistencies with statute or regulation are due to a concern for brevity and clarity.

To help the reader, appropriate code citations are included on many of the topic headings for reference purposes. However, this document cannot and does not replace or modify any statutory or regulatory requirement, nor does it serve as a formal or informal statement of DMRM policy. Complete copies of the ORC and the Ohio Administrative Code (OAC) are available on the State of Ohio Government Internet pages at www.ohio.gov.

DMRM was created in July 2000 with the consolidation of two existing divisions of the Ohio Department of Natural Resources (Division of Oil and Gas, and Division of Mines and Reclamation.) Its responsibilities are defined by the ORC Chapter 1509, 1513, 1514, 1561, 1563, 1565, 1567, 1571 and regulations are established under OAC 1501, 1513, 4101 and others.

DMRM responsibilities include the regulation of oil and gas production, surface and underground mining of coal and industrial minerals, and reclamation activities. The division also plugs abandoned oil and gas wells, and restores abandoned mine lands, enforces mining safety laws, ensures protection of freshwater resources, and maintains a database of oil and gas well owners. For more information about the division, visit www.ohiodnr.com/mineral.

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**A coal-fired steam shovel that operated on rails.
Circa 1890s.**

Mining History

OHIO'S HISTORY OF COAL MINING

Coal mining in Ohio began around 1800. It was an unregulated industry during its first 150 years. Until the time of World War I, coal mining in Ohio was conducted almost exclusively underground and largely by manual labor. These underground mining operations gained access to coal seams either by vertical mine shafts up to 200 feet deep, by horizontal mine entries (drift entries) cut into hillsides at the coal elevation, or by sloping tunnels angling downward from the ground surface. Early underground mines were small, discontinuous, and poorly mapped. To maximize coal production, roof support was usually minimal. Further, coal pillars were often removed upon abandonment of the mines, making the mines highly prone to later subsidence.

With the advent of large, efficient excavating equipment, new drilling techniques, and newly developed explosives in the mining industry around World War II, large earthmoving operations became possible. Surface mining operations became an economic alternative to underground mining. In surface mining, all of the rock and soil (overburden) above the desired coal seam are excavated, exposing the coal seam at the surface. The excavated rock and soil, known

as “mine spoil,” are placed in piles away from the excavation site. The exposed coal is removed in a way that includes as little non-coal rock as possible.

Due to the development of automated mining equipment, a very efficient recovery system of underground coal mining, known as longwall mining, has become the primary method of coal mining in Ohio. This technique involves total removal of large blocks of coal, which allows the overburden to collapse or subside in a controlled and predictable manner. This technique has significantly increased productivity and reduced costs, allowing underground mining to remain competitive with surface mining.

HISTORY OF INDUSTRIAL MINERALS MINING

The term “industrial minerals” refers to geological deposits that can be mined for commercial and industrial uses, as opposed to minerals used as gems or fuel minerals such as oil, gas, and coal. Ohio has a long history of industrial mineral production, but an exact date when minerals were first produced is unknown. It is known that Native Americans exploited raw materials long before the arrival of the first European settlers. They carried on extensive quarrying in the Flint Ridge area in Licking and Muskingum Counties. Pottery fragments found at many archaeological sites evidence the use of alluvial and glacial clays. The first mining of clay and shale by European settlers appears to have been for use in the brick industry in the late 1700s and early 1800s.

Gypsum, discovered along the shores of Lake Erie in the early 1800s, was first used as a soil conditioner. Gypsum was last mined in 2004 in only one location in Ohio, Ottawa County. Its use primarily is the manufacture of wallboard.

The first use of limestone and dolomite also occurred in the late 1700s and early 1800s. It is known that lime was sold for whitewashing and plastering as early as 1817. By the mid 1800s, limestone was the most valuable building material among Ohio's natural resources. Its

primary use was for building foundations, chimneys, and fireplaces.

In the early 1800s, Ohio became one of the major producers of sandstone in the nation. Sandstone was used for building stone, foundations, and architectural purposes.

Sand and gravel were the last of the State's mineral resources to be developed extensively for commercial use. This did not occur until after the turn of the century. Since the primary use of sand and gravel is for construction, its production is tied closely to the economy and the expansion of our cities and highways.



Sand and gravel is used primarily for road construction and in concrete, aggregate and masonry products for building construction.

MOST COMMON USES OF COAL AND INDUSTRIAL MINERALS

COAL: Most of Ohio's coal is used for the generation of electricity, while some is used for making steel.

SAND AND GRAVEL: Road construction and resurfacing; general uses in building construction; concrete; concrete block; and backfill/bedding.

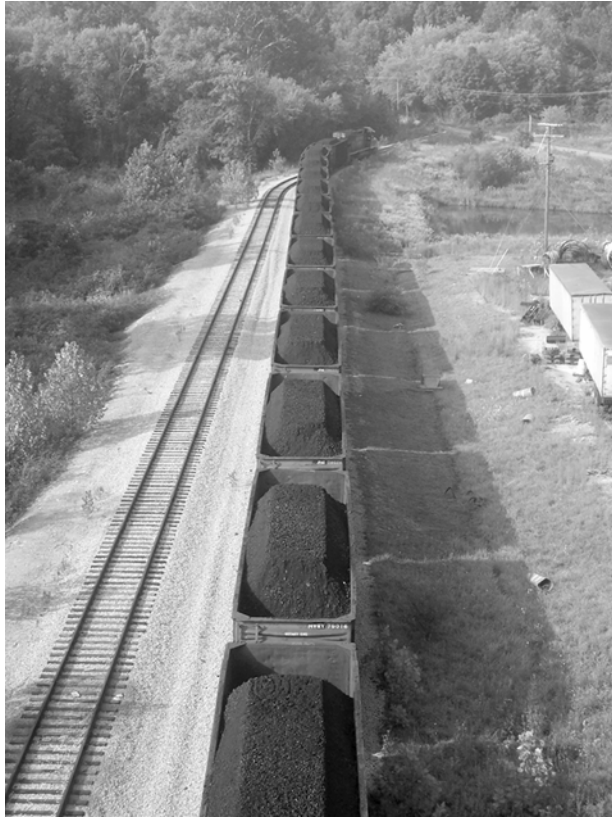
LIMESTONE/DOLOMITE: All of the above uses, as well as for building blocks, road bases, rip rap, and agricultural lime; cosmetics and other personal hygiene products; paints; glossy paper; caulking; medicines; fiberglass; roofing shingles; trap shoot targets; rubber hoses; window glass and auto windshields; and wall speckling.

SANDSTONE/CONGLOMERATE: Ground for foundry and silica "flour," and for use in manufacture of glass, ceramics, pottery, scouring cleansers, and porcelain enamel; and dimension (cut) stone used for buildings and decorative architectural features.

CLAY: Brick, drain and decorative tiles; pottery; ceramics; firebrick and flue liners, cement, sports and hobby uses; and liners and caps for landfills, ponds, and oil and gas wells.

SHALE: Used interchangeably or combined with clay for many of the same purposes listed for clay.

GYPSUM: Plaster and wall board; filler for medication, water treatment; and cake frosting.



Loaded coal cars carry the majority of Ohio's coal to electricity-generating power plants.

Mining Regulations

REGULATION OF COAL MINING

Ohio's first state law regulating coal mining, the Strip Coal Mining Act, became effective in 1947. This law required Ohio mine operators to have a state-issued license and, to ensure that reclamation would be performed, to pay a bond of \$100 for each acre of land mined. In 1949, a strengthened version of this law created the Division of Reclamation within the Department of Agriculture.

Early surface reclamation requirements enforced by the division were much less strict than the requirements in place today. The early versions of the surface mining laws in Ohio were refined and strengthened throughout the next three decades. Gradually, reclamation bonds were increased and requirements for the success of revegetation and for the restriction of off-site pollution were tightened. In 1972, a far-reaching

revision of the strip mine law took effect in Ohio. This law required regrading of the mine spoil to approximate pre-mining contour of the land; replacement of topsoil; and the establishment of a successful vegetation cover by the mine operator prior to the State's release of reclamation bond. When this law was passed, it was the most comprehensive strip mine law in the nation.

The first Ohio law governing underground coal mining went into effect in 1949. It required miners to close or fence all surface openings to underground mines abandoned after June of 1941. In 1981, this law was made more stringent to remain in compliance with federal law. Underground mines now require a permit from DMRM, and have reclamation requirements similar to those for surface mines.

On August 3, 1977, the United States Congress passed the Surface Mining Control and Reclamation Act (SMCRA). This Act established stringent national standards for coal mining and reclamation. SMCRA created the federal Department of the Interior's Office of Surface Mining Reclamation and Enforcement.

Because of the diverse mining conditions in the United States, Congress intended that the states become the primary regulator, upon approval by the Secretary of Interior of a state's proposed law and regulations. Under the law, the Secretary of the Interior must approve any state program, which meets or exceeds the federal standards. State standards must be at least as effective as the federal standards to ensure that citizens receive the same protection they would under the federal standards. This procedure allows individual states to gain primary control over the regulation of surface mining.

The Secretary of Interior approved Ohio's regulatory and AML programs in 1982.

In addition to the mining and reclamation laws, operators must comply with a host of other local, state, and federal laws and programs to maintain a permit to mine coal in Ohio. Federal laws include the Clean Air Act, Clean Water Act,

Federal Coal Mine Safety and Health Act, Endangered Species Act, Fish and Wildlife Coordination Act, National Historic Preservation Act, Archaeological and Historic Preservation Act, and Executive Order 11593 that relates to the protection of both historic and prehistoric sites.

In 2006 the statute was revised to allow the mine operator two options in posting monies to ensure reclamation of the mine site. The first option is to post \$2500 for each acre of land to be disturbed and to pay an additional \$0.14 per ton of severance tax. The severance tax money is placed into a reclamation pool to be used should any company fail to reclaim a mine site and the state is forced to do so. The second option open to the mine operator is to post “full cost” performance security to ensure the mine site is reclaimed. The “full cost” amount is based upon the estimated cost for the state to reclaim a mine site at the point of maximum disturbance.



Large dimension stone will be cut into smaller pieces for a variety of building uses.

REGULATION OF INDUSTRIAL MINERALS MINING

Chapter 1514 of the Ohio Revised Code regulates the mining of sand, gravel, clay, shale, gypsum, limestone, dolomite, halite, sandstone, and any other stones, ores, or substances of commercial value that are excavated in a solid state from natural deposits. Originally enacted in 1975, Ohio’s Industrial Minerals Law was

amended in 2002 with the passage of Am. Senate Bill 83 to grant the Division of Mineral Resources Management authority to regulate all surface mining and in-stream mining of industrial minerals.

Extraction of all minerals but coal and peat are regulated by ORC Chapter 1514 except for the following:

- Test or exploration borings.
- Extraction of minerals by a landowner for noncommercial use on his/her property in an unprocessed form.
- Removal of minerals from an area not exceeding five feet in depth or over an acre in size.
- Removal of minerals incidental to construction work where a valid building permit has been issued.
- Borrow pits for highway construction with a Department of Transportation reclamation plan and bond.
- Underground mining methods of mineral extraction.
- Extraction or movement of soil or minerals within a solid waste landfill facility.
- Routine dredging of a watercourse for purely navigational or flood control purposes.

Surface mining permits are issued for a period of fifteen years and are renewable and transferable. Amendments to permit areas and modifications to the mining and reclamation plan may be made at any time during the permit period. Operators are required to submit an annual report and map on each anniversary of the permit. Information in the annual report includes the type of minerals and amounts mined during the previous permit year, the acres affected under the permit to date, an estimation of acres proposed to be affected during the next year, and acres to be reclaimed for the permit year.

Mine Safety Program

The purpose of the Mine Safety Program is to promote safe mining practices through four program services: inspections at surface and underground mines, with a focus on accident prevention; certification testing; mine rescue support; and safety training. Mine Safety Inspectors also inspect oil and gas well plugging operations where necessary to protect coal reserves and underground coal miners. The program derives authority from the Ohio Revised Code to enforce and supervise compliance with all health and safety laws at Ohio's mines.



DMRM mine safety inspector checks air quality in an underground mine for oxygen and hazardous gases.

MINE SAFETY INSPECTIONS AND ACCIDENT PREVENTION

The division's inspectors conduct safety inspections at all mine sites and investigate accidents reported by mine operators. Information collected during these investigations is analyzed and used to prepare recommendations for prevention of similar accidents. The division utilizes Special Alert Bulletins to share this information with the mining industry.

EXAMINATION AND CERTIFICATION TESTING

Mine Safety staff conduct certification testing for a variety of underground and surface mining

positions and assist in the training that helps prospective applicants acquire the knowledge and skills necessary to become certified. Certification is an essential part of promoting and maintaining the safety and productivity of Ohio's mining community.



Division-trained mine emergency rescue teams practice mine rescue skills.

MINE RESCUE

DMRM maintains mine rescue stations at Shadyside (Belmont County) soon to be relocated to Barnesville (Belmont County), Cadiz (Harrison County), Glouster (Athens County) with a fourth rescue station scheduled to open in Salem (Columbiana County). Through these stations, the division maintains a rescue network capable of responding to any mine emergency at any time. In the event of an emergency situation, each mine rescue station has a truck containing the equipment necessary to support mine rescue teams. Equipment is regularly serviced and calibrated to maintain a state of readiness. The division also maintains a mobile air quality lab in support of mine rescue efforts.

Under a Memorandum of Understanding with the federal Mine Safety and Health Administration (MSHA), and agreements with underground mine operators, the state Mine Rescue Network provides coverage to all underground mines in the state. MSHA inspects each rescue station

twice a year for compliance with the Code of Federal Regulations for equipment readiness, and monitors state rescue team training sessions.

MINE SAFETY TRAINING

The Mine Safety Training program, funded in part by an MSHA training grant, works to improve the health and safety conditions of Ohio's mines. In an effort to reduce fatalities, accidents and mining-related illnesses (like black lung disease and silicosis), Mine Safety Inspectors train miners and contractors how to recognize and respond to safety and health hazards. Classes include Annual Refresher, Electrical, Mine Rescue, First Aid, CPR, New Miner and Certification for Foreman.

The Mine Safety Training Center opened in Cadiz in the spring of 2009. The facility has two 158' x 200' simulated mines that provide a venue for critical hands-on training. There are also four classrooms onsite, which allow DMRM staff to conduct informative training sessions.

EDUCATIONAL OUTREACH

Abandoned Mine Safety Campaign

Stay Out - Stay Alive is a national public awareness campaign to warn children and adults about the dangers of exploring and playing on abandoned mine sites. The safest thing to do is to stay completely out of them. Abandoned mines are nothing like naturally formed caves which are attractive to recreational and professional explorers, and should *never* be mistaken for caves. Old mines and shafts conceal a multitude of potentially lethal hazards. Each year, dozens of people across the country are injured or killed in recreational accidents on mine property.

A free safety video, available through DMRM, addresses a variety of mine safety issues such as dangers associated with old structures, blasting caps, impoundments, shafts, etc.; is geared toward students; and includes a number of useful resources suitable for classroom instruction.



A potentially dangerous deep mine portal opening remains as evidence of past mining activity.

Resources of the Ohio Division of Geological Survey

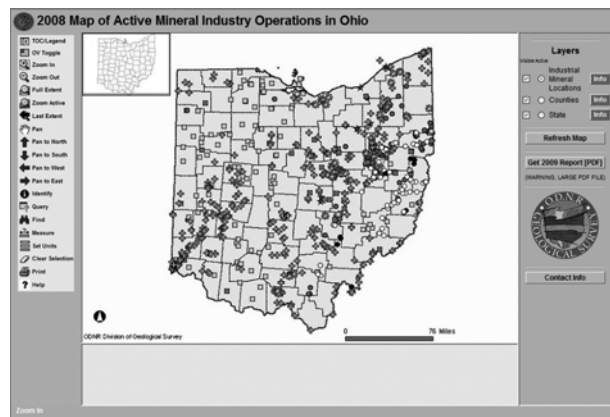
The Ohio Department of Natural Resources, Division of Geological Survey is responsible for collecting and interpreting information on the geology and mineral resources of Ohio; conducting geologic investigations having economic, environmental, or educational significance; and publishing and distributing the results of this work. This information on Ohio's geology and mineral resources is made available to government, private industry, and the public as published, open file, unpublished maps, reports, and databases. Much of the division's information is available on the Internet at www.ohiodnr.com/tabid/7105/default.aspx

Individuals or companies who are interested in current or abandoned mines can check with the Ohio Division of Geological Survey. The division's extensive database on abandoned underground mines has been combined into an Abandoned Underground Mine GIS and Address Locator also offered on their website at www.ohiodnr.com/tabid/8409/default.aspx.

The Ohio Division of Geological Survey's annual Report on Ohio Mineral Industries, available at www.ohiodnr.com/tabid/7798/default.aspx, provides summaries of coal, petroleum, and industrial mineral activities in Ohio and detailed directories of coal, sand and gravel, limestone and dolomite, clay and shale, sandstone and conglomerate, salt, and gypsum operations.

An interactive map of mining operations in the state accompanies the report providing an improved method for quickly researching coal and industrial mineral activities in Ohio. Standard map navigation tools are included, which allow users to graphically access basic information about individual mines or groups of mines. Information available from the interactive map includes company name and phone number, permit number, commodities produced, and tonnage produced or sold during the calendar year.

The digital Ohio mineral industries map is updated annually by the Division of Geological Survey and is an important part of the division's integrated geographic information system.



An interactive Ohio mineral industries map is available online from the Ohio Division of Geological Survey.

Types of information available from the Division of Geological Survey include:

- Site specific rock descriptions and measurements.
- Drill-hole and rock-core descriptions.
- Mine maps and location maps of abandoned underground mines.
- Coal location, elevation, and thickness maps.
- Sand/gravel and limestone/dolomite resource maps.
- County-scale bedrock-topography and drift-thickness maps.
- Quadrangle (6.5 x 8.5-mile area) bedrock-geology, bedrock-topography, and bedrock-structure maps at 1:24,000 scale.
- Surficial materials maps.
- Various county- or regional-scale publications detailing geologic or resource investigations.
- Location and production statistics information on coal and all industrial minerals produced in Ohio.

- Chemical analyses and/or physical test data on coal, limestone, brine, clay, and shale.
- Records on location and other data on thousands of oil and gas wells, including drillers' logs and geophysical logs.
- Rock cuttings and rock core samples from thousands of sites around Ohio, including numerous near surface rock samples.
- Report summaries of coal, industrial minerals and petroleum activities in Ohio with detailed directories of operators and interactive map of mining operations in Ohio.



The Digital Map Series includes computer generated products like this shaded bedrock-topography map of Ohio.

Contact the Ohio Division of Geological Survey
at:

2045 Morse Road, Bldg. C1
Columbus, OH 43229-6693
Phone: 614-265-6576
Fax: 614-447-1918
Email: geo.survey@dnr.state.oh.us



A dragline is used to excavate sand and gravel deposits below the water table.

Current Coal and Industrial Minerals Environmental Regulatory Programs

This program oversees active mining operations and the reclamation of the land by mining companies after extraction of coal or other minerals. DMRM has the unique and difficult responsibility of regulating the mining industry in a way which strikes a balance between protection of society and the environment from the adverse effects of mining operations and providing for the nation's need for coal as an essential source of energy and for other minerals for many uses. The Regulatory program involves three primary areas:

- Permitting
- Inspection/enforcement
- Technical services (hydrology, engineering, blasting, soils, and archaeology)

Responsibilities of the permitting section include reviewing permit applications, amendments, revisions, and land use changes. The permitting staff works closely with the inspection and enforcement staff to ensure that permits contain proper safeguards and comply with all requirements.

The permitting section also includes hydrologists, engineers, an archaeologist, a soil scientist, and a blasting expert who provide technical assistance to all other DMRM sections. Their main responsibility is reviewing the technical aspects of permit applications with regard to the area to be mined and technical matters during mining and reclamation, such as:

- Geology.
- Hydrological impacts.
- Mine drainage control.
- Soil conditions and land capability.
- Wildlife habitat.
- Underground mine subsidence control.
- Land use and revegetation.
- Prime farmland productivity restoration.
- Cultural and historic resources.

The inspection and enforcement section includes mineral resources inspectors who are highly trained professionals responsible for ensuring compliance with all mining rules at the mine site. Mineral resources inspectors monitor mining activities from the time the permit is issued until the last acres are reclaimed and bond is released. Inspections of active mines ensure compliance with regulations designed to protect both people and the environment from the potential impacts of mining. Emphasis is placed upon proper operation and control of impacts on:

- Topsoil handling.
- Surface and subsurface protection of water systems.
- Regrading and revegetation.
- Blasting.
- Potential damage to land and structures caused by underground mine subsidence.
- Toxic material handling.

Abandoned Mine Land (AML) Restoration Programs

DMRM administers a federally-funded Abandoned Mine Land (AML) program and a state-funded AML program to reclaim those areas disturbed by mining operations (primarily coal) for which there is no continuing reclamation responsibility by a mine operator. Program staff investigate AML problems, determine their eligibility and priority for the appropriate program, and oversee the design and construction of the selected projects.

The federal AML program includes an emergency program and a non-emergency program. Both are funded by a federal fee levied on mined coal. The fee for surface mined coal is thirty-five cents per ton and fifteen cents per ton for underground mined coal. The fees are paid by coal companies to the federal Office of Surface Mining Reclamation and Enforcement (OSM). OSM allocates the monies to eligible states on an annual basis. The monies received from OSM are used to reclaim lands affected by mining operations conducted prior to August 3, 1977; between August 4, 1977 and August 16, 1982 where performance security is not sufficient to provide for adequate reclamation; or between August 4, 1977 and November 5, 1990 where the surety of the mining operator became insolvent and no money was available from the proceedings to provide for adequate reclamation.

The AML Emergency program responds quickly to problems that require immediate action to protect the public health, safety, general welfare, and property from extreme danger of the adverse impacts of coal mining practices.

The AML Non-emergency program focuses on projects to protect the public health, safety, and general welfare from adverse effects of coal mining practices and on projects to restore the land, water resources, and the environment

previously degraded by adverse effects of coal mining practices.

The state AML program, funded by severance taxes on coal and industrial minerals currently mined, reclaims lands affected by mining prior to April 10, 1972. This program emphasizes environmental restoration through the reclamation of:

- Lands that cause pollution of the waters of the state.
- Lands that damage adjacent property.
- Lands which, when reclaimed, the public can use for soil, water, forests, wildlife conservation, or public recreation purposes.
- Lands which, when reclaimed, will facilitate commercial or industrial site development.
- Lands which, when reclaimed, will facilitate the use or improve the enjoyment of nearby public conservation or recreation lands.

Performance Security Forfeiture

DMRM also administers a program to reclaim areas where performance security has been forfeited by coal and industrial minerals operators on current mine permits. These are areas that have been mined but not reclaimed to current standards by the mine operator. In this program, DMRM collects the forfeited performance security monies from the mine operator or from the operator's surety bond company. DMRM then contracts with a third party to reclaim the areas.

In addition to forfeited performance security monies, a severance tax on coal and industrial minerals is being assessed and deposited into a DMRM account to supplement the per-acre performance security amount. This money is used when the cost to reclaim exceeds the amount of monies forfeited for a particular operation.

AML PROBLEM TYPES

The following sections briefly describe typical AML problems that DMRM reclaims. When the public encounters such problems and questions arise concerning the eligibility for reclamation of such features, contact may be made with the local DMRM office listed in this guide.

Some AML features are very dangerous and extreme caution should be exercised around them until the problems are abated.

Mine Openings

When many older underground mines were abandoned, the entries into them were not adequately sealed. These unstable or open horizontal portals and vertical shafts can be very hazardous but also expose people to dangers lurking within the mines. These dangers include poisonous or explosive gases, oxygen deficiency, flooded sections, unstable roofs, and disorienting mazes of mine workings. These problems are compounded by total darkness within underground mines.

Highwalls

Highwalls are created during surface mining as sides of hills are removed to expose coal seams. Rock faces resembling cliffs remain at the point where the mining excavation ceased. Before stricter reclamation laws were passed, miners were not required to backfill mine spoil against highwalls. Thus, there are many miles of highwall remaining in Ohio. Typically, they range in height from 20 to 100 feet. The degree to which a highwall poses a danger to the public is determined by its proximity to human dwellings or activities and to public roads; and to its stability, height and angle.

Landslides

Spoil banks from surface mines, coal waste piles, and natural slopes at abandoned mines sometimes become unstable. The most



Emergency measures were required to eliminate a deep mine subsidence sink hole below a county road.

common causes of landslides include saturation of slopes by water from underground mines, surface mine pits, or natural aquifers; steep slopes; and the inherent instability of the disturbed materials. Landslides can damage roads and buildings, and can block paths of streams, causing upstream flooding.

Acid Mine Drainage

Rock layers associated with the coal seam sometimes contain iron sulfide minerals, with pyrite the most common. Sulfur-bearing materials exposed to air and water during mining react with oxygen and water to form dilute solutions of sulfuric acid, which may also contain a number of other dissolved minerals. This contaminated water, referred to as acid mine drainage (AMD), often seeps from underground mines and, sometimes, from surface mined areas. AMD is a significant environmental problem associated with Abandoned Mine Land and is often very difficult to control.

Erosion

Poorly vegetated mine spoil and coal refuse are highly erosive. Sediment from these unreclaimed areas often causes flooding problems by clogging stream channels and culverts.



Erosion of disturbed, bare or poorly vegetated unreclaimed mine land clogs streams and leads to mine-related flooding.

Subsidence

More than two billion tons of coal have been removed from underground mines in Ohio since the 1800s. Geologists estimate that up to 600,000 acres are underlain by 6,000 abandoned underground mines in the 30 coal producing counties in Ohio. Approximately two-thirds of the deep mines are mapped.

Mine subsidence is the lowering of the earth's surface as a result of the collapse of overlying earthen materials into a mine void. It is a common problem associated with abandoned underground mines and its potential is governed by such factors as the age of the mine, the depth of the mine, the geology overlying the mine, and the coal extraction methods associated with the mine. When buildings, roads and utilities are constructed above mines, major structural damage and serious injury can occur if the mine subsides.

The Ohio legislature enacted a law in October 1987 that established the Ohio Mine Subsidence Insurance Fund. It allows individuals residing in certain counties to purchase insurance for protection from losses due to mine subsidence.

On January 1, 1993, changes in the mine subsidence law affected residents in 37 Ohio counties. Coverage depends on whether you reside in a “mandatory” coverage or an “optional” coverage area.

For more information on mine subsidence insurance, contact your insurance agent or company. You can also contact the Ohio Mine Subsidence Underwriting Association at 614-839-6446 or 1-800-282-1772; or view on-line at www.ohiominesubsidence.com.

Ohio Mine Subsidence Insurance Coverage Areas

<i>Mandatory</i>		<i>Optional</i>
Athens	Mahoning	Delaware
Belmont	Meigs	Erie
Carroll	Monroe	Geauga
Columbiana	Morgan	Lake
Coshocton	Muskingum	Licking
Gallia	Noble	Medina
Guernsey	Perry	Ottawa
Harrison	Scioto	Portage
Hocking	Stark	Preble
Holmes	Trumbull	Summit
Jackson	Tuscarawas	Wayne
Jefferson	Vinton	
Lawrence	Washington	

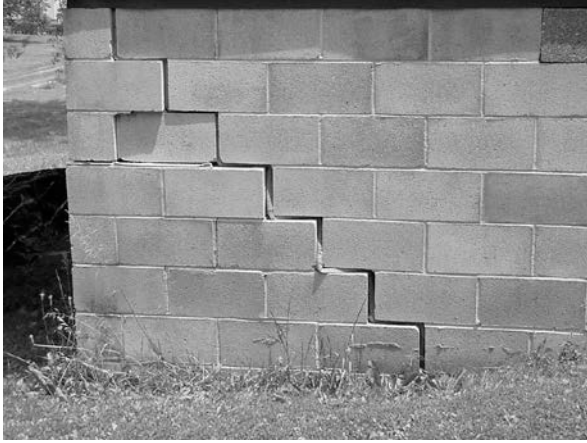
EDUCATIONAL OUTREACH EFFORT

Abandoned Mine Land Development Guide

The DMRM has created the *Ask Before You Build Guide* as an educational outreach resource for the public and local officials. The purpose of the document, and an associated video production, is to alert landowners, developers and local officials about the potential hazards of developing on abandoned strip mine land and over abandoned underground mines without consideration of proper site development prior to construction.

The guide provides information sources that can assist in a site's pre-development evaluation. This document may be obtained through the nearest DMRM office or local Soil and Water Conservation District office or at www.minerals.ohiodnr.gov/portals/minerals/pdf/aml/amlguide.pdf. It should be noted that the DMRM AML program might not be able to assist landowners in abating mine-related problems associated with more recent

development on or over previously existing mines.



Building near or above abandoned underground mines can result in structural problems if settling occurs.

PUBLIC INVOLVEMENT IN THE AML PROGRAM

DMRM holds public meetings in several areas of the coal mining region annually to obtain input from the public on AML projects that are planned and to obtain information on previously unknown AML problems. These meetings are announced in local newspapers and other media. Interested persons may also contact the local DMRM office at any time concerning specific areas that are in need of reclamation or to obtain information on specific projects.

DMRM is interested in identifying and working with local environmental groups, watershed groups, or individuals who would like to become involved in correcting problems associated with AMD or other problems related to AML. Please contact any DMRM office to express your interest and to obtain additional information.



An unreclaimed strip mine before and after reclamation to reduce erosion of sediment that caused flooding and environmentally degraded stream habitat.

Acid Mine Drainage (AMD) Abatement Program

The division recognizes that the role of government is to assist the public in its desire to restore the quality of water resources in local communities impacted by acid mine drainage (AMD). As such the DMRM is committed to developing partnerships with local community watershed groups and other governmental agencies in order to pool resources and leverage funds. It is the objective of the DMRM in developing such partnerships to support and assist local efforts aimed at restoring streams to their pre-mining ecological condition, and to construct AMD remediation projects that demonstrate cost-effective environmental benefits.



Mine-contaminated water, referred to as acid mine drainage (AMD), often seeps from abandoned mine openings and is a significant environmental problem very difficult to control.

APPALACHIAN CLEAN STREAMS INITIATIVE

The Appalachian Clean Streams Initiative (ACSI) is a broad-based program to eliminate acid drainage from coal mines. The mission of the ACSI is to facilitate and coordinate citizen groups, university researchers, the coal industry, corporations, the environmental community, and local, state, and federal government agencies that are involved in cleaning up streams polluted by acid drainage. Although the program was

initiated by the US Office of Surface Mining (OSM) and the US EPA Region 3, numerous participants and sponsors have joined these agencies through the signing of the “Statement of Mutual Intent”. The ODNR Division of Mineral Resources Management is one such agency. OSM provides seed money for ACSI projects in the form of challenge grants. ACSI project selection criteria include:

- The presence of partnerships that will provide significant local support in the form of leveraged funding or in-kind services.
- The use of proven or innovative technology with a high probability of success.
- Projects with quantifiable environmental benefits resulting in restored stream miles, fisheries, or aquatic life uses.

AMD SET-ASIDE PROGRAM

The Ohio legislature established the Acid Mine Drainage Abatement and Treatment (AMDAT) fund in March 1995. The division transfers up to 10% of the annual federal Abandoned Mine Land (AML) grant into the AMDAT fund. Grant moneys placed into the interest bearing fund, pursuant to ORC 1513.37 (E) will be utilized to abate mine drainage problems within watersheds that have been approved as hydrologic units. Priority will be given to the expenditure of AMDAT funds whenever other sources of funding can be leveraged for Acid Mine Drainage abatement projects. It is the purpose of the AMDAT fund to provide for the long-term clean up of watersheds impacted by AMD in accordance with the criteria established in ORC 1513.37 (E) for hydrologic units.

Local community watershed groups and other governmental agencies may request assistance from the DMRM in developing watershed abatement plans. The DMRM can provide assistance in the form of subsurface drilling, development of watershed monitoring plans, laboratory analysis of water samples, matching funding for water monitoring, hydrology and engineering technical assistance, construction

contract administration, and construction oversight. Once watershed restoration plans are developed for a hydrologic unit, the DMRM may also provide matching funding for the purpose of construction of an abatement project that has been demonstrated to be a priority component of a watershed restoration plan.



Innovative treatment methods, such as using aerobic microorganisms to treat impaired stream water, are specifically designed and constructed to treat acid mine drainage (AMD).

GRANTS TO WATERSHED GROUPS

In March 1999 the Ohio DMRM gained the authority to grant money from the AMDAT fund directly to watershed groups in accordance with the following criteria:

- The watershed group meets the criteria for a charitable organization as defined in ORC 1716.01.
- The watershed group provides matching funding, including in-kind services, for 50% of the cost of the proposed project.

The funds may be used for the following:

- Data collection and analysis necessary to qualify a watershed as a hydrologic unit.
- Monitoring of water quality changes resulting from an abatement project.
- Engineering design and construction costs for a priority reclamation project in the qualified hydrologic unit.

REMINING

The division recognizes that remining can result in a significant contribution to the restoration of watersheds impacted by acid mine drainage. In watersheds targeted for restoration, DMRM will examine the potential for remining, and will offer incentives to encourage remining if technologically and economically feasible. Such incentives would include the use of consultants to assist with water quality data collection for the establishment of baseline pollution loads and the development of pollution abatement plans for water quality improvement. In addition DMRM will attempt to negotiate contracts directly on a case-by-case basis with mine operators operating in areas causing significant pollution loadings in targeted watersheds. The objectives of using remining incentives will be the same as the overall AMD program – the restoration of streams biologically impaired by drainage from abandoned mines.

Each of these program areas can be used by the division, in partnership with other agencies and organizations, to address Ohio's mine drainage problems impacting streams and water supplies. Collectively the program provides for numerous opportunities to mitigate mine drainage problems in a holistic manner, in addition to continuing the abatement of other abandoned mine land problems causing adverse impacts to the public.

Opportunity for Public Involvement (Coal)

LANDS UNSUITABLE PETITIONS (OAC 1501:13-3-07)

Ohio law provides any person who has an interest which is or may be adversely affected, with the right to petition the chief to have an area designated unsuitable for coal mining. A Lands Unsuitable for Mining Petition must supply facts and supporting evidence. For more information on this process, contact DMRM at (614) 265-6633.

COAL MINE PERMIT APPLICATION PREPARATION (OAC 1501:13-4-01 through 16, and 1501:13-5-01 through 03)

ORC and OAC ensure that appropriate procedures are provided for public participation in the development, revision, and enforcement of regulations, standards, reclamation plans, or programs. The public has a right to participate at every phase of the permit application and mining process.

While public participation is not and cannot be a substitute for governmental authority, public involvement in all phases of the regulatory scheme will help ensure that the decisions and actions of the governmental authority are grounded upon complete and full information. ORC provides for public access to all information and records relating to permits, inspections, performance security, and other information on which DMRM bases its decisions.

Permit applications from coal companies require information compiled and analyzed by professionals from various scientific communities before it can be accepted by DMRM. Geologic information regarding the overburden (rock and coal) must also be identified by the applicant.

All structures must be designed by a registered professional engineer before submittal and then certified after construction is complete.

Many laboratory analyses (listing of the contents) of rocks, coal, and water must be completed before permit submittal.

Permit applicants must show that they have met adequate minimums of public liability insurance by submitting certified insurance documents from companies licensed to insure in Ohio.

Archaeological concerns are addressed through various levels of reconnaissance on the permit site. This investigation must be performed by a qualified professional who is on a list of people who meet the minimum professional qualifications established by the U.S. Department of the Interior.

When blasting is proposed, the applicant must explain vibration limits and seismographic monitoring that will prevent damage to homes and other structures, and an anticipated blast design must be prepared, or reviewed and approved, by an Ohio Certified Blaster.

Review of applications to identify potential public concern comes from other places in addition to DMRM and the public hearing opportunity. Agencies charged with specific concerns all have an opportunity to comment on each permit application. The opportunity to comment on each permit application is provided to the Ohio Historical Society, Ohio Division of Wildlife, Ohio Division of Natural Areas and Preserves, County Agriculture Agents, U.S. Fish and Wildlife Service, Ohio Environmental Protection Agency, OSM, Department of the Army (Corps of Engineers), U.S. Department of Agriculture Natural Resource Conservation Service, Forest Service, Mine Safety and Health Administration, Local Watershed Conservancy Districts, the County Commissioners, Local Planning Commissions, and the Township Trustees.

PUBLIC INVOLVEMENT DURING THE PERMIT APPLICATION REVIEW PROCESS (OAC 1501:13-5-01)

When a permit application is deemed administratively complete for a surface or

underground coal mine operation, the applicant publishes a public notice in a local newspaper. This notice, which must appear once a week for four consecutive weeks, identifies the public location where the permit application may be reviewed and copied. This notice provides the public with an opportunity to provide comments or request an informal conference regarding the permit application.

Following the publication of the notice that an application has been received, any interested party has the right to review the application and submit written comments to DMRM. The application can be reviewed either in the county recorder's office or at the local DMRM office in the county where the mine will be located. Written comments should be specific to the application and provide as much information as possible concerning omissions, inaccurate representations, or other areas of concern that have been identified. All comments received are addressed during the technical review of the application.

Interested parties may also request an informal conference concerning the application. DMRM will only accept a *written* request for an informal conference. In the letter, the requester should explain how issuance of the permit may adversely affect the requester's interest. The letter should also contain a brief summary of the issues to be raised at the conference. A request for an informal conference must be made within the public comment period as identified in the published public notice. Requests should be made in writing to the Chief, Division of Mineral Resources Management, at the Columbus office address.

The purpose of an informal conference is to provide information to DMRM concerning the application and to provide a second avenue for public input during the permitting process. As with written comments submitted during normal public input, comments received in an informal conference or public hearing will be considered during the review of the application.

If an interested party feels that a concern has not been addressed sufficiently and that the approval or denial of an application has been inconsistent with the requirements of the ORC or OAC, formal objections to the decision can be filed with the Ohio Reclamation Commission. Please refer to the Legal Activity section of this guide for additional information about this process.

Citizen participation during a permit amendment, significant revision, or renewal is the same as those for a permit application (see above).

PREBLAST SURVEY (OAC 1501:13-9-10)

At least thirty days before initiation of blasting, the mine operator must provide written notification to all residents or owners of dwellings or other structures located within one-half mile of the permit area about how to request a preblast survey. The purpose of the survey is to document the condition of the dwelling or structure and any preblasting damage and other physical factors that could reasonably be affected by the blasting.

No fee is charged to a resident or owner for the preblast survey. Any survey requested more than ten days before the planned initiation of blasting must be completed before blasting begins. All other preblast surveys must be completed within 45 days after a request is received.

Preblast survey requests must be in writing and sent directly to the mine operator by certified mail, **or** by regular mail to the chief of DMRM who will promptly notify the mine operator by certified mail. For the purpose of requesting a preblast survey, the request should be directed to the Division of Mineral Resources Management at the New Philadelphia office address in this guide.

Copies of the preblast survey must be given to the resident or owner and to DMRM. If the resident or owner disagrees with the contents or recommendations contained therein, he or she may submit to both the mine operator and the division chief, a detailed description of the specific areas of disagreement.

An updated survey of any additions, modifications, or renovations shall be performed by the mine operator if requested by the resident or owner.

CITIZEN'S REQUEST FOR INSPECTION / CITIZEN COMPLAINTS (OAC 1501:13-14-01)

Citizens may request that an inspection be conducted if they believe that any condition or practice at a mine site is in violation of the law or rules. Such requests, generally known as citizen complaints, should be filed *in writing*, or verbally, followed by a written statement. The requests should be as specific as possible in describing the condition believed to be in violation. Specific information is needed to ensure that the inspector can accurately determine the nature of the complaint and fully investigate the situation. Complaints or requests should also contain the name of the mine operator and the permit number (if known), and an address *and* telephone number where the citizen may be contacted. Written complaints should be sent to DMRM's office closest to the mine site. A list of field offices is located within this guide. Complaints filed by telephone will be investigated, but the citizen may be asked to provide a written statement for clarification.

Citizens have the right to accompany DMRM on inspections resulting from their complaints. Citizen complaints will be held confidential if requested, but citizens who choose to participate in an inspection of the mine site waive confidentiality. DMRM will notify the citizen as far in advance as possible of any inspection that will be conducted as a result of the request. DMRM will provide the citizen with a written response to the complaint within ten days of the inspection, or, if no inspection is conducted, within 15 days after receipt of the complaint. The written response will include copies of inspection reports and any enforcement actions taken as a result of the complaint, and an explanation of the right to request an informal review of the action taken.

Investigations of water supply complaints (e.g., well or spring contamination or diminution), and blasting annoyance and/or damage complaints, may require long-term monitoring of water quality or quantity and/or seismographic monitoring of blast vibrations.

Any person who may be adversely affected by a coal mining and reclamation operation may request, *in writing*, that the chief of DMRM informally review an inspector's decision not to inspect; or to conduct adequate, complete, or periodic inspections; or to take appropriate enforcement in response to the matter alleged by that person's request for inspection. The request must include a statement of why the decision merits review and how the person is or may be adversely affected.

Requests for informal review should be directed to the DMRM chief at the Columbus office address in this guide. Any landowner, mine operator, or other potential, adversely affected party may request a review and hearing on DMRM's response to a request for inspection (complaint) before the Ohio Reclamation Commission. If a party continues to disagree, judicial review may be sought.

PERFORMANCE SECURITY RELEASE - COAL (OAC 1501:13-7-05, 05.1 & 08)

The public has an opportunity to provide input at all phases of performance security release.

An operator must formally apply for the approval of the reclamation of a yearly segment. As part of this procedure, the operator must:

- Publish a newspaper advertisement in a local newspaper announcing the performance security release request, once a week for four consecutive weeks.
- Identify the precise location of affected land.
- Provide the number of acres proposed for release.
- Provide the amount of performance security filed and portion sought for release.

- Provide the type and dates of reclamation work performed.
- Provide a description of results achieved pertaining to the reclamation.
- Notify adjoining landowners and/or local governmental agencies by letter of the intent to seek performance security release.

Upon publication of the request for approval of reclamation, any person with a valid legal interest who may be adversely affected by the request may file written objections with DMRM or request an informal conference within 30 days after the last publication of the operator's request for approval of reclamation notice.

DMRM should conduct an inspection and evaluation of the reclamation work involved within thirty days of the receipt of the following three items: request for release, a copy of the public notice, and letters to adjoining landowners. DMRM will notify the surface owner, agent, or lessee of the inspection. DMRM encourages citizen participation in the performance security release inspection. DMRM will evaluate compliance with the approved plan including:

- Restoration of the approximate original contour and slope.
- Soil replacement thickness.
- Crop productivity records.
- Number of living trees or shrubs present per acre.
- Erosion control.
- Water quality.
- Plant coverage and type.
- Impoundment designs.

When an operator who is in the bond pool completes the backfilling, regrading, and drainage control of a bonded area according to the reclamation plan, 50 percent of the performance security is released. After topsoil has been replaced and revegetation has been

established on the regraded mined lands, 35 percent of the performance security is released.

Release of the remaining portion of the performance security occurs when an operator has successfully completed all remaining surface mining and reclamation requirements, and a liability period of two to five years (depending on whether the area was mined prior to current mining) has passed since the area was planted.

When an operator who has posted full cost performance security completes the backfilling, grading and drainage control of the entire mining unit according to the reclamation plan, up to 50 percent of the performance security is released. After topsoil has been replaced and revegetation has been established on the entire mining unit, up to 35 percent of the performance security is released. Release of the remaining portion of the performance security for the mining unit occurs when the operator has successfully completed all of the remaining reclamation requirements and a liability period of two or five years (depending on whether the area was mined prior to the current mining) has passed since the area was last planted.

The chief must notify any interested party of the decision to release or deny the performance security release request within 60 days after the applicant has filed a request for release if no informal conference is scheduled, or within 60 days after an informal conference is held.

Any landowner, coal operator, or other potential, adversely affected party may request a review and hearing on DMRM's performance security release decision before the Reclamation Commission. If a party continues to disagree, judicial review may be sought.

AVAILABILITY OF RECORDS (OAC 1501:13-1-10)

Copies of all applications for permits, revisions, renewals, transfers, assignments or sales of permit rights, inspection and enforcement actions, records, reports, inspection materials, and other subject information are available to the

public for inspection and copying at reasonable times at the local DMRM office closest to the mining operation until at least five years after final performance security release. If there is no DMRM office in the county where the mine is located, information and documents are available by mail upon request.

RULEMAKING (OAC 1501:13-1-08)

Any person may petition the DMRM chief to initiate proceedings for the adoption, amendment, or repeal of any rule promulgated to enforce Ohio Code 1513. The petitioner must set forth facts which the petitioner claims necessitate the promulgation, amendment, or repeal of that rule. The petition must specify the petitioner's proposed adoption, amendment, or repeal of a rule and indicate if the petitioner desires a hearing. Within 90 days of receipt of the petition, the DMRM chief shall either grant or deny the petition.

SUMMARY

It should be clear from the preceding discussion that the surface mining program values public input. What you have to say about a permit application is very important to DMRM in its application review process. It is important that you know your comments and concerns will receive the careful examination they deserve and that they will be considered to the fullest extent allowed by the law. DMRM encourages citizens to use the opportunities explained in this guide to become better informed about surface coal mining operations. By being knowledgeable about the operations of the DMRM, you can be sure that your interests will be represented.

If you have any questions on this subject, please contact the Division of Mineral Resources Management at (614) 265-6633.



Preparing to excavate coal from a surface mine in southern Ohio.

Surface Coal Mine Permit Application Review Process

In Ohio, all coal-mining operations are required to obtain a permit from DMRM. This applies to all coal-mining activities, as defined by law, regardless of mining method or size of the operation. (ORC provides some very limited exceptions for obtaining a permit. Please contact the DMRM office concerning these exceptions.)

Persons exploring for coal must also notify DMRM of their intent to explore. DMRM will then determine if the exploration activity will substantially disturb the land and, if so, require an exploration permit.

There are four major components to every permit application.

- Legal, Financial, Compliance, and Related Information (OAC 1501:13-4-03)
- Environmental Resources Information (OAC 1501:13-4-04)
- Reclamation and Operations Plan (OAC 1501:13-4-05)
- Special Categories of Mining (OAC 1501:13-4-12)

As part of the permit application, the applicant publishes a notice in the local newspaper of the county where the mine will be located, once a week for four weeks. The notice states that the application has been filed and is available for public review. This announces the opportunity

for the public to file written comments and request an informal conference or public hearing regarding the pending permit application. The public may present comments on the proposed permit and provide site-specific information to DMRM for their review and consideration when making a decision on the application. Permit decisions, for approval or denial, are subject to challenge from any potential, adversely affected party, including a private citizen or coal mine operator. This must be done by filing a petition for review with DMRM within 30 days of applicant notification of permit approval or denial.

PRE-MINING INVENTORY AND MAPS

A company's first step in compiling a surface mining permit application is to gather data and map the site in a pre-mining inventory, including information on:

- Land boundaries and ownership.
- Right-of-entry.
- Boundaries of the proposed mining activities.
- Locations of all structures.
- Pre-mine land use.
- Soils and land capability.
- Major plant communities and wildlife habitat.
- Public roads within 100 feet of the permit area.
- Boundaries of parks, public lands, historical, culturally significant archaeological sites and cemeteries.

Additional required maps must show locations and descriptions of:

- Geological test borings and core samples.
- Monitoring stations for water quality.
- Dams, embankments and impoundments.
- Surface and ground water.
- Coal seam depth, thickness and outcrops.
- Active, inactive, or abandoned underground mines and surface openings.
- Waste disposal areas.

- Pre-mining land slopes.
- Oil, gas and water wells.
- Sequence of the land to be mined.

The operator must consult with the U.S. Natural Resource Conservation Service (NRCS) to determine if the permit contains prime farmland. The operator must provide a demonstration in the permit application that they are technically capable of restoring prime farmland to achieve yield standards identified by the Ohio Cooperative Extension Service Bulletin Number 685. The operator must restore non-prime cropland to meet or exceed the average county yield for comparable crops.

The capability of the land to support a variety of uses based on the soils and topography is determined. For cropland, productivity prior to mining must be provided in terms of crop yield.

DMRM also makes an exhaustive check for any part of the proposed permit area which may have been designated unsuitable for mining, whether by petition or statutory designation, as described below. Each application must describe and evaluate cultural and historic resources, including natural and archaeological features within the proposed permit and adjacent areas.

LAND USE (OAC 1501:13-9-17)

In the pre-mining inventory, the operator must include the existing land uses and a description of the condition and productivity of the land to be mined. A map of land uses at the time of application must also be included. The operator must also describe historic uses, if the use of the land was changed within five years of the proposed mining operation.

When conducting the pre-mining inventory, a post-mining land use must be considered and proposed so it may be designed into the mine operation and reclamation plan. Typical land uses that landowners and operators work toward are cropland (prime farmland and non-prime farmland), pasture land, forest, residential, industrial or commercial, recreation, fish and

wildlife habitat, undeveloped land, and developed water resources. *Permit applicants are required to seek the landowner's comments on any change in land use.*

MINING PROHIBITIONS (OAC 1501:13-3-03)

There are certain areas where mining may not be conducted, except where an operator can show that valid existing rights (VER) to mine existed before August 3, 1977 (implementation date of SMCRA). Unless VER is established, mining is prohibited:

- Within 300 feet of an occupied dwelling (unless allowed by the owner).
- Within 300 feet of any public building, school, church, community or institutional building, or public park.
- Within 100 feet of a cemetery.
- Within 100 feet of a public road (except where an opportunity for a public hearing has been provided, DMRM finds that the public interest will be protected, and the local road authority allows mining closer than 100 feet).
- Within the boundaries of the National Parks, the National Wildlife Refuges, the National System of Trails, the National Wilderness Preservation System, corridors of Wild and Scenic Rivers, and National Recreation Areas designated by Congress.
- Within the boundaries of any National Forest without approval by the Secretary of the Interior.
- On publicly owned parks or any place listed on the National Register of Historic Places which would be adversely affected, unless jointly approved by DMRM and the agency with jurisdiction over the lands in question.

House Bill 163, effective September 30, 2011, defined the surface owner consent and waiver provisions in statute as affected by surface mining operations that actually cause surface disturbance, such as common contour strip mining. The mining prohibitions listed above are not applicable to highwall mining or auger mining operations where no surface disturbance is to occur.

VIOLATION INVENTORIES

DMRM reviews inventories of the compliance history of the permit applicant and operator using OSM's nationwide Applicant Violator System (AVS). A permit cannot be issued if any mining operation owned or controlled by the applicant is in violation of any state or federal surface mining laws, until the violation is corrected or is in the process of being satisfactorily corrected, and all civil penalties and federal AML fees are paid. A permit cannot be issued to any applicant or operator who controls or has controlled mining operations if the applicant has a demonstrated pattern of willful violations resulting in irreparable damage to the environment.

MINE OPERATIONS PLAN

The mine operation plan details the operator's proposal for mining coal. In the mine operation plan, the applicant must include a description of the mining operation that will be conducted, proposed life of the mine, and the information that demonstrates that the reclamation can be accomplished.

The applicant must submit an operation plan that describes the following:

- Type of mining.
- The direction of mining.
- Access roads.
- Facilities for coal processing.
- Coal-processing waste disposal sites structures.
- Water impoundments and land uses.
- Stream diversions.
- Water and air pollution control facilities.
- Overburden and topsoil handling storage areas.

The mine operator proposes the actual mining process and techniques used to extract coal. These must be approved by DMRM prior to implementation.



Prior to mining, valuable topsoil is carefully removed and stored separately from sub-soil, then replaced during reclamation.

TOPSOIL REMOVAL AND STORAGE (OAC 1501:13-9-03)

Before beginning mining, operators must plan for the replacement of topsoil after the coal has been removed. Details involving the removal, storage, replacement, and protection of the topsoil from wind and water erosion are listed in the mine operation plan.

A topsoil substitute or supplement may be used where it is determined that selected overburden materials are equal to or more suitable chemically and physically than the existing topsoil for sustaining revegetation. A substitute may also be used if topsoil does not exist. Examples of using a topsoil substitute would be if, prior to mining, the topsoil had been contaminated/destroyed, or if erosion had lessened the quality of the soil.

To comply with these requirements, operators usually operate in the following manner. Before mining begins, scrapers or other machinery remove the topsoil and either place it directly on graded overburden or stockpile it for replacement after mining. Seeding and mulching protect the topsoil from wind and water erosion. Marking stockpiles as topsoil and protecting them with a cover of vegetation prevents the soil from becoming mixed with any other stored material.

Careful handling of the topsoil and subsoil is crucial for reclamation, because this is the medium in which the success or failure of plant growth on the reclaimed site is determined. The replaced soil profile on areas designated as prime farmland must be at least 48 inches, in most cases, including topsoil and subsoil.



Holes are drilled and loaded with explosives in preparation for a blast.

BLASTING (OAC 1501:13-9-06)

After the topsoil and subsoil layers are removed, blasting may be necessary to loosen the rocky material covering the coal seam. Coal operators drill holes to set the explosives in to fracture the rock layers. The blasting agent commonly used in coal mines is called ANFO, a mixture of ammonium nitrate (a common fertilizer) and fuel oil. After blasting, a dragline, bulldozers, trucks, shovels, or other heavy equipment remove the rocky overburden to expose the coal seam.

The applicant must submit a detailed blasting plan that demonstrates how the blasting operation will be conducted in compliance with Ohio's regulations to prevent damage. A certified blaster must either conduct or directly supervise the loading and detonation of all surface coal mine blasts.

Also, the operator must submit a sample of the blasting schedule. The operator must publish the schedule in a local newspaper and distribute it to residents or owners of dwellings and other structures within one-half mile of the blasting

area, at least ten days before blasting begins. The operator must republish and redistribute the blasting schedule at least every twelve months.

Blasting may only take place between sunrise and sunset at times approved by the chief and published in the blast schedule. Warning and all clear signals, audible within one-half mile from the blast, must be sounded. Restricted access to the blasting area is required during blasting operations.

As part of the blasting plan, the applicant must also submit a copy of the format he will use to notify residents and owners within one-half mile of the permit area about how to request a preblast survey. Refer to Opportunities for Public Involvement - Preblast Survey section of this guide for a more thorough explanation of preblast surveys.

Blasting may not be conducted within 300 feet of a dwelling, unless the operator has written consent to conduct *mining* activities (including blasting) within 300 feet or valid existing rights.

All blasts generate ground vibration and air blast (airborne noise and/or concussion). However, compliance with the existing blasting regulations should ensure that the ground vibrations and air blasts reaching all homes are under the legal limits. The legal limits were established through extensive research conducted by the U.S. Bureau of Mines, and later adopted by OSM and DMRM. The limits were designed to prevent cosmetic damage such as hairline cracks in wallboard. For minor and major damage (e.g.; mortar joint cracks, concrete cracks, foundation wall displacements) to occur, ground vibration levels at least three to five times greater than the legal limits would be required.

Whenever the explosive charge-weight to be detonated within any eight-millisecond period will be larger than the maximum allowable by the mathematical relationship known as the scaled distance equation, the mine operator must conduct seismographic monitoring at the nearest dwelling, public or commercial building, school, church, or community or institutional building

outside the permit area to prove compliance with the ground vibration limits. The mine operator must also conduct periodic airblast monitoring to ensure compliance with the air blast limits. Whenever monitoring of ground vibration and/or airblast is required, the mine operator must include the data with the required blast record information. Each seismogram (a record of an individual blast vibration) must include a calibration signal or certification of annual calibration. This ensures that the seismograph was functioning properly. Blast records and seismographic data are periodically inspected by DMRM personnel to determine compliance with the blasting regulations.

Records of all blasts, including required seismograph recordings, must be maintained for a minimum of three years. These records are available for public inspection at the mine site or an office of the mine operator designated in the blast plan.

Flyrock must not be cast from the blasting site more than one-half the distance to any dwelling or other occupied structure, beyond the regulated blasting area, or beyond the permit boundary.

In the rare event that flyrock is cast beyond the permit boundary, blasting must cease until the certified blaster has filed a report with DMRM. The flyrock report must include a copy of the blast record, a description of the flyrock damage, if any, and an explanation of the probable cause and the corrective measures taken to prevent another flyrock violation.

OVERBURDEN REMOVAL AND PLACEMENT (OAC 1501:13-9-07 & 14)

After the loose soil materials and rocky overburden are removed, the coal seam is finally exposed and ready for extraction.

The coal operator places the rocky material in the bottom of the pit once coal removal in the area is complete. Overburden can contain layers with pyrite, which, when exposed to air and water, can produce acid. Mixing these layers and burying



A haul truck is loaded with overburden, the soil and rock that lie above the desired coal seam.

them with neutral materials in the pit prevent acid production by blocking exposure to oxygen.

Any toxic overburden identified in the pre-mining inventory must be treated or covered with an adequate layer of nontoxic, noncombustible earthen material.

SURFACE AND GROUND WATER (OAC 1501:13-9-04)

To prevent water pollution, all water affected by the mining operation must pass through approved drainage control structures before leaving the mine site. Any water leaving the site must be in compliance with all applicable state and federal water quality laws, including water discharge permits issued by the Ohio Environmental Protection Agency. The mine operation plan must show the routing of water, sediment pond locations, pond design, and embankment and spillway details. In order to ensure that plans are adequate to protect water quality, the mine operator must obtain approval for:

- Design of sediment ponds.
- Chemical water treatment systems.
- Pond maintenance procedures.
- Water quality monitoring procedures.
- Water quality standards.

Sediment ponds collect water from the mine site. They must provide adequate sediment storage

and detention time to allow the silt in the water to settle out and to clarify the water to meet state and federal limits. If ponds fill with sediment during the mining process, dredging takes place.

Coal operators maintain siltation structures on the site until permanent revegetation has been established and the quality of water coming into the pond meets water quality standards. Ponds not approved for retention after mining must be removed and reclaimed.

It is the responsibility of mining operators to monitor ground water levels and quality throughout the mining and reclamation process. The operator will furnish an alternative water supply, in conformance with ORC 1501:13-9-04, where an existing water supply used for agricultural, domestic, industrial, or other legitimate purposes is affected by contamination, diminution, or interruption due to surface or underground mining activities.



Numerous conveyers are located on the mine site to move material through the processing phase of a coal mining operation.

COAL PROCESSING WASTE (OAC 1501:13-9-09)

The applicant for a coal mining permit must submit detailed plans for handling, storage, and disposal of all acidic and toxic forming materials, and any materials brought to the site specifically for disposal purposes.

Coal waste, the result of the cleaning and processing of coal, may be found in the form of slurry or coarse or fine refuse. DMRM has

entered into a memorandum of agreement (MOA) with the Ohio Environmental Protection Agency (OEPA) to coordinate cooperative reviews of disposal plans for coal waste materials, including locating, monitoring, and reclamation of the disposal sites. Such sites must meet the statutory requirements, administered by both agencies, which are meant to protect the local hydrologic balance, enhance reclamation, and ensure vegetation success. Disposal areas must minimize contact with surface and ground water resources; include plans for covering the material with a minimum of four feet of nontoxic, non-acidic cover material; include necessary stability and permeability analyses; and other pertinent technical information as required by statute or policy.

Non-coal waste encompasses all other waste, which may be disposed on-site. DMRM and OEPA coordinate reviews of disposal and beneficial use plans for coal combustion by-products and other wastes exempted from the OEPA solid waste regulations. Disposal plans, similar to those required by the coal waste disposal requirements, are also meant to protect the local hydrologic balance, enhance reclamation, and ensure vegetation success. In addition, DMRM and OEPA will coordinate beneficial use of exempted wastes when the waste material can be shown: to have a beneficial use in reclamation as a soil amendment; to neutralize toxic/acidic waste material or spoil; to enhance stability; for construction materials; or in other possible uses.

Other materials brought to the site for disposal (landfill waste, waste tires, construction and demolition debris, etc.) are reviewed on a site-specific basis by DMRM and OEPA, who coordinate with other governmental agencies as necessary and ensure that such disposal does not have a negative effect on the reclamation of a coal mining permit.

Coal stockpiles and toxic and acidic overburden must be handled as outlined in the DMRM statutory language and as reflected in the coal mining permit. The plans are meant to protect the

local hydrologic balance, enhance reclamation, and ensure vegetation success.

The operation plan must detail where coal will be stockpiled as well as what type of cleaning and processing will occur. The waste produced from the coal cleaning process can be potentially acid forming and unable to support plant life. The coal operator outlines in the plan how to dispose of the coarse coal refuse (gob) and the fine coal refuse (slurry). The material must be adequately treated or covered with an adequate layer of nontoxic, noncombustible earthen material, to neutralize and prevent production of acid water. Toxic materials must be placed in areas of the mine where contact with surface and ground water is minimized. Chemical treatment and proper handling procedures assure the prevention of post-mine water quality problems and successful reestablishment of vegetation.

MINE RECLAMATION PLAN

Placement of rocky overburden (spoil) by a mine operation greatly determines the success of reclamation. Carefully shaping the material assures proper grade, slope, and contour design. Throughout the reclamation process, coal operators must meet detailed requirements. A mine reclamation plan will show how spoil will be graded, subsoil and topsoil replaced and revegetated, post-mining land uses accomplished, and pre-existing streams restored.

Coal operators give a timetable for the completion of each step in the reclamation process. Operators also give an estimated cost of reclamation, including a statement as to how the operator plans to comply with the requirements of the law.

GRADING AND SOIL REPLACEMENT

For area mining, operators must plan to provide rough grading of mined overburden (spoil) within 180 days of coal removal and have no more than four ungraded spoil ridges behind the



To provide for proper drainage, an operator is required to return the mine site as close as possible to its approximate original shape during reclamation.

active pit. For contour mining, backfilling and rough grading shall be completed within 60 days or 1500 linear feet, whichever occurs first following coal removal, unless additional time is granted for a good reason such as adverse weather conditions. All reclamation efforts must follow the mining operation as contemporaneously as practical.

The replaced overburden must be shaped to the approximate original contour of the land so that it drains properly and pre-existing drainage patterns are replaced. Operators must grade materials to blend with unmined land.

Operators must complete the final grading in a timely manner, usually in time for the next growing season. This includes any subsoil or topsoil replacement and installation of erosion control measures such as terraces, diversions, grass waterways, and drains.

All of the pre-mining topsoil is required to be salvaged and replaced for those post-mining land uses other than prime farmland.

Soil on prime farmland must be restored to a depth of forty-eight inches unless a lesser depth occurred in the pre-mining soil. The subsoil is replaced first, followed by the topsoil. DMRM probes the restored prime farmland area to verify compliance with the restoration criteria.

Soil should be handled in a way that will minimize compaction. Handling soil during proper moisture conditions and using tracked

rather than rubber-tired machinery helps to limit compaction. The use of deep tillage equipment helps to alleviate compaction caused during reclamation activities.

POST-MINING LAND USE (OAC 1501:13-9-17)

The operator must describe all land uses planned after mining. The operator must restore the affected land to a condition, which can support the uses for which the land was used prior to any mining. Or, where feasible and desirable, the operator can restore the land to a higher and better use than that which existed prior to the mining.

The pre-mined soil capability, pre-mine land use, landowner's preference, and local citizen and government priorities, policies, and plans for use of the land, generally determine land use.

DMRM must approve any changes from the pre-mining land use. Submitted in the operator's reclamation plan are comments from landowners and state and local government agencies responsible for approving or authorizing the resulting land use. Also submitted is a discussion of the reclaimed land's capability to support a variety of alternative uses. To change how the land will be used following mining, the operator must file an alternative land use proposal in the reclamation plan portion of the permit application.

REVEGETATION AND PRODUCTIVITY (OAC 1501:13-9-15)

Reclamation plans must provide for testing the restored soil and the application of lime and fertilizer at the recommended amounts.

In most cases, plans provide for a temporary cover composed of small grains to limit erosion followed by a grass-legume mixture. The vegetation that is established must conform to the specified post-mining land use.

An extended responsibility period begins when the land is planted to a crop capable of supporting the post-mining land use. In certain cases where the land was disturbed by mining prior to the current mining, the responsibility

period is two years. For all other areas, the period is five years.

For prime farmland, the operator must demonstrate restored productivity by achieving acceptable yields for three crop years before a Phase II performance security release can be approved. Crops most commonly used for demonstrating restored productivity or prime farmland are corn, soybeans, wheat, oats, and hay.

For non-prime farmland cropland, pastureland, and grazing land, two acceptable yields must be achieved before final performance security release. Non-prime cropland yields are based on the county's average yield for the applicable crop. Pastureland must also meet the county average yield for hay crops and applicable ground cover standards.

Some land uses require establishment of trees and shrubs in addition to ground cover adequate to control erosion. A survival rate of 450 trees per acre must be achieved for performance security release if the post-mining land use is forestland and 250 trees per acre if the land use is fish and wildlife habitat.

The undeveloped land use category is intended to encourage natural succession. Revegetation standards require that trees or shrubs be planted on ten to fifty percent of the area and that adequate ground cover be established. However, there is no success standard on tree survival.



The operator must restore the affected land to a condition that can support the uses for which the land was used prior to any mining.

Underground Mine Permits

MODERN UNDERGROUND MINING

Longwall mining consists of laying out rectangular blocks of coal called “panels,” using special equipment called a shearer with roof support provided hydraulically by shields. Longwall panels are developed to maximize the recovery of coal and are now up to 1,200 feet wide by 20,000 feet long. Coal is completely removed from these panels by longwall equipment consisting of a rotating cutting wheel that moves back and forth across the width of the panel at the face. The broken coal falls onto a conveyor and is transported to the surface. Mining equipment and personnel are protected at the face by large hydraulic jacks that support the overlying strata. As the coal is mined, the roof supports and mining equipment move forward. The strata above the mined out void collapses resulting in surface subsidence that may cause structural damage and loss of water supplies.

In room and pillar mining the tunnels where the coal is removed are called rooms. The coal blocks which are left behind to support the roof and the surface are called pillars; hence the name “room and pillar mining.” A machine called a continuous miner rips the coal out of the seam with a rotating head. Blasting is seldom used in contemporary underground extraction of coal except for shaft development. Conveyors transport the coal from the working face to the shaft or slope entry where the coal is transported to the surface for processing and shipping. Secondary mining for partial pillar recovery is sometimes used for higher extraction, which also results in subsidence of the overlying surface and corresponding damage to structures and water supplies.

Regardless of the mining technique, DMRM regulates the surface subsidence and environmental effects of underground mining.



Underground miners install roof bolts in the ceiling of an active underground mine.

UNDERGROUND COAL MINE PERMIT APPLICATION PROCESS AND REQUIREMENTS

Procedures for public notice, public participation, and application review for underground permit applications are identical to those for surface mining applications. Environmental protection and reclamation requirements are also virtually identical; except that underground-mining applications must also contain a subsidence control plan. In addition, special provisions for prior notice to surface owners who will be subject to coal extraction are applicable.

SUBSIDENCE CONTROL PLAN (OAC 1501:13-4-14)

In addition to all other environmental and reclamation requirements, such as filling or covering shafts which extend from the coal to the land surface, underground mine applicants must devise a detailed subsidence prevention or control plan based on local geological conditions which also includes engineered safety factor calculations; and the type of surface features to be protected, such as buildings, impoundments, roads, and utility transmission lines.

As a component of a subsidence control plan, underground mine applicants must provide information on the coal removal technique, percentage of coal extraction, pillar and room dimensions, geological layers above and

below the coal, mapping of proposed mined areas, and ground water systems. For an operation proposing to cause subsidence (longwall or pillar recovery), the company must also provide an extensive inventory of land features and structures located above the coal to be mined, such as homes, outbuildings, roads, churches, public buildings, impoundments, utility transmission lines, and any other structures.

DMRM's technical staff evaluates supplied information to make a determination that sufficient mine stability is designed for room and pillar mines; or, that planned subsidence mining, such as longwall mining or pillar removal mining, is designed to occur in a predictable and controlled fashion with regard to location and timing of subsidence. In addition to plans to prevent or control subsidence, underground mine operators must provide for restoration of the surface land and features in the event that subsidence results in damage or diminished value to structures. The mitigation plan must demonstrate that the operator will restore the land and structures to a condition, which will support the same and/or foreseeable uses which existed prior to subsidence.



A continuous mining machine excavates coal in a room and pillar underground mine.

SURFACE OWNER NOTIFICATION (OAC 1501:13-12-03)

Underground mine operators must notify surface owners, owners and occupants of structures, wells, buried oil, gas or utility lines

of their intent to extract coal beneath their property by sending written notice directly to the owner/occupant at least six months prior to the beginning of mining beneath the property. The notice must indicate the type of mining method, whether or not planned subsidence will occur, and must identify the specific area that will be mined and the relationship of those areas to surface property and structures. In addition the notice must indicate the timing of mining activities beneath the property, the name of the company staff to contact regarding the mining activities, and information that the surface owner may review the subsidence control plan and mine progress maps during normal working hours.

PRE-SUBSIDENCE SURVEY (OAC 1501:13-4-14)

All residents and owners of structures and facilities above planned subsidence operations will be given a pre-subsidence survey at least six months in advance of mining. The DMRM considers a structure or facility to be any man-made object that is currently being used, or that is in a usable condition. The survey will be conducted by the mine operator to determine the pre-mining condition of structures or facilities and shall be used as a baseline to document the condition of the structure in the event damages occur subsequent to mining. A copy of the pre-subsidence survey shall be provided to the owner or occupant of the surface structure or facility.

SUBSIDENCE DAMAGE (OAC 1501:13- 12-03)

Prior to mining, the company may purchase lands and structures that it intends to undermine, or may negotiate an agreement with the surface owner regarding subsidence damages.

Anyone suspecting subsidence damage to land, structures, or water resources should first contact the mining company with their claim.

If a satisfactory conclusion is not reached, citizens should contact the local DMRM office. If the company is found liable, the regulations require the company to repair lands damaged by subsidence regardless of any private agreement. If structures are damaged by subsidence resulting from active mining, the mining company is required to repair the structure or compensate the owner for the diminished value to the structure.

All water supplies developed for a legitimate use, such as domestic, agricultural, or industrial use, impacted by mining are required to be replaced with a suitable alternative source. A suitable alternative source may be a new well, a new spring, or a public water supply. Generally, due to the cost associated with delivery of the water, public water is not an acceptable permanent replacement for an agricultural water supply. Negotiation for the replacement of water supplies should include compensation for operation and maintenance costs in excess of the customary and reasonable delivery costs of the premining water supply. If agreed to by the water supply owner, a one-time lump sum payment based upon the present worth of the increased annual costs for an agreed period of time may be used to fulfill the obligation to pay for these increased operations and maintenance costs. Surface owners of water supplies damaged by subsidence are entitled to interim water replacement within 48 hours of a loss due to subsidence. All costs associated with the delivery of interim water are to be borne by the mine operator until such time as the water is replaced on a permanent basis.

The DMRM requires water supplies to be monitored by the mine operator for at least one year prior to mining and one year subsequent to mining. The information provided to the DMRM by such data is important to assess the need to permanently replace a water supply, and the overall hydrologic impacts associated with mining. Landowners are encouraged to cooperate with

mine operators in order to allow access to the water supplies for monitoring purposes.

MINING PROHIBITIONS

The mining prohibitions previously identified as applicable to surface mines (OAC 1501:13-3-03) do not apply to surface areas above the underground workings of an underground mine where the only potential disturbance is subsidence.

Underground mining may not be conducted beneath or adjacent to public buildings or facilities, churches, schools or hospitals, or impoundments with a storage capacity of twenty acre feet, unless a specific demonstration can be provided to the chief showing that such facilities will not be materially damaged by subsidence.

In addition, the chief may suspend underground coal mining beneath urbanized areas, cities, towns, communities, buildings, major impoundments, or perennial streams if the chief makes a finding of imminent danger to the inhabitants of such areas.



A coal shuttle car moves coal from a continuous mining machine to a conveyor belt that carries it to the surface.

Performance Security (Coal)

After DMRM approves an application, but before a permit is issued, the operator must provide a performance security guaranteeing reclamation to the standards of the ORC and OAC. The performance security is payable to the State of Ohio, Department of Natural Resources. The performance security covers the area of land affected by the coal mining operation. The purpose of posting the performance security is to ensure that the state will have sufficient funds available to complete reclamation if the mine operator does not fulfill its obligation.

Performance Security Forfeiture (OAC 1501:13-7-06)

DMRM may order the forfeiture of all or part of a performance security for a permit area if:

- the mine operator does not conduct reclamation operations in accordance with the applicable reclamation plan.
- the mine operator does not fulfill one or more of the conditions under which the performance security was posted.

Any operator who forfeits a performance security for non-compliance is banned, by law, from obtaining another permit to mine coal.



A coal tippie site abandoned by the mine operator; site reclamation was accomplished using forfeited performance security funds.

Inspection and Enforcement (Coal)

INSPECTIONS (OAC 1501:13-14-01)

Mineral resources inspectors ensure compliance with the environmental protection performance and permitting standards during all phases of mining and reclamation operations by inspecting all mine sites on a routine basis. The law requires at least one complete inspection of a site every quarter and one partial inspection every month for active mines that have not met Phase II performance security release requirements. Inspections occur without prior notice to the mine operator. The inspector prepares a written report following each inspection.

Mineral resources inspectors examine the mine area as well as the area surrounding a mine to look for evidence of a problem. For example, sediment occurring in a stream near the mine could be traced to a violation of erosion control or water quality standards on the permitted area.

If a state inspection is made as a result of written information provided by a citizen, DMRM will send a written report to both the citizen and the mine operator, detailing any enforcement action taken. Refer to Opportunities for Public Involvement - Citizen's Request for Inspection/Citizen Complaints section for additional information concerning citizen complaints.



Removing and loading coal at a surface mine. Such sites are inspected on a regular basis for compliance.

ENFORCEMENT (OAC 1501:13-14-02)

Notice of Violation

ORC requires mineral resources inspectors to issue a notice of violation (NOV) to an operator whenever the inspector observes a violation of law, rule, and/or the permit.

The NOV must list the nature of the violation, where it occurred on the mine site, the specified action the operator must take to correct the violation, and a reasonable time for correction of the violation.

The total time allowed to correct an NOV (including extensions) must not exceed 90 days from the date of issuance, unless special circumstances exist.

Cessation Order

An order to cease all or part of operations is issued if an operator is found to have created a condition that is an imminent danger to the health or safety of the public, or is causing, or can reasonably be expected to cause significant, imminent environmental harm to land, air, or water resources.

A cessation order (CO) is issued in three circumstances:

- If a mining activity causes imminent danger to public health or safety, or if significant, impending environmental damage occurs to land, air, or water resources.
- If an NOV has not been corrected as directed in the time period required.
- If a person is mining without a valid permit.

Penalties (OAC 1501:13-14-03)

NOVs and COs carry civil penalty assessments. Designated field staff, in accordance with 1501:13-14-03, calculate a civil penalty assessment for an NOV or CO.

A maximum fine of \$5,000 per day may be imposed per violation. In assessing a monetary fine, DMRM considers the operator's history of previous violations, the seriousness of the

violation, negligence, and good faith in achieving compliance. DMRM may assess a monetary fine for each day from the date of issuance of the NOV or CO to the date the violation is corrected.

In addition, when a violation is not corrected within the period designated in the notice or order issued, a CO is issued for failure to correct an NOV. This CO carries with it a minimum mandatory penalty of \$750 a day for each day the violation remains unabated, up to 30 days.

Payment of the penalty must be made within 30 days of the operator's receipt of the assessment.

An operator may request a formal or informal review of a penalty assessment or of the validity of the violation. The operator must place the penalty into an escrow account with the Reclamation Commission or formal appeal will not be granted. As a result of the review, the fine can be affirmed, modified, or vacated.

When an NOV or CO is issued to a mining company, the NOV or CO must be filed along with an inspection report in the local DMRM field office. These documents become part of the public record.

PERMIT SUSPENSION OR REVOCATION (OAC 1501:13-14-02)

If the DMRM chief determines that a pattern of violation exists at a mining operation, or has reason to believe that the operator lacks the ability to comply with the laws and regulations, or has abandoned the mine site, DMRM can issue a show-cause order to require the company to explain why its permit should not be suspended or revoked or performance security forfeited. The DMRM field office must post a show-cause order when issued. A notice of a show-cause hearing is to be published in the local newspaper, if practicable.

Failure of an operator to file a timely answer to the show-cause order and to request a hearing may result in permit suspension or revocation and termination of the right to mine as set forth in the order.

Within 60 days of the hearing, the chief must decide whether or not to suspend or revoke a company's permit. Any decision may be appealed to the Reclamation Commission.

If the right to mine is suspended, the operator must correct all violations and unlawful practices as specified in the suspension order. If a permit is revoked, reclamation must be completed by the operator or the performance security will be forfeited.

Performance Security Forfeiture (OAC 1501:13-7-06)

If a permit is revoked and ordered reclamation is not performed, or if the operator has abandoned the site or lacks the ability to comply with applicable laws and regulations, performance security forfeiture proceedings are begun to provide DMRM with funds to complete reclamation on that site. A hearing before the Reclamation Commission may be requested on the performance security forfeiture notification. The Reclamation Commission determination may be appealed to the State courts.

Forfeiture of a performance security results in DMRM's obtaining the performance security money filed by the operator to guarantee completion of reclamation. DMRM staff designs the reclamation and contract for the construction of the permit with local coal operators, the landowner, or contractors.



A reclaimed forfeiture site in Belmont County is restored to a productive condition.



Limestone and dolomite are often excavated from large-scale quarry sites.

Industrial Minerals

SURFACE AND IN-STREAM MINING PERMITS

Prior to commencing any surface or in-stream mining operation, an operator must submit an industrial minerals permit application and map to the DMRM. Permit applications contain detailed information concerning the company’s standing as a legal entity; names of company officials; surface owner information on the property to be mined; mineral to be mined and estimated production rates; local zoning information; mining methods and plans; blasting plans and ground water modeling where applicable, and reclamation plans.

Applicants proposing to produce more than 10,000 tons of minerals per year must also submit a notarized mining and reclamation map that is certified by a registered surveyor or engineer. Required maps must clearly show the extent of the proposed permit area and all physical features and landowners within 500 feet of the permit boundaries. Operators proposing to mine less than 10,000 tons of minerals per year may submit a tax map and USGS topographic map in lieu of a map prepared and certified by a surveyor or engineer.

In addition to the application and required map, permit applicants must also submit the following:

- **FILING FEE:** All surface mining permit applicants must submit a filing fee in the amount of \$500 upon approval of their application. Filing fees for in-stream mining applicants are \$250 and must be submitted prior to the issuance of an in-stream mining permit.
- **ANNUAL FEE:** Each applicant reporting production of more than 10,000 tons/year must submit a filing fee of \$500 each year with their annual report. Small operators (producing less than 10,000 tons/year) and in-stream mining operators must submit a filing fee of \$250 each year with their annual report.
- **ACREAGE FEE:** All permit applicants and operators must submit a non-refundable acreage fee of \$75 for each acre proposed to be affected.
- **RENEWAL FEE:** Permit holders wishing to renew their surface mining permit must submit a renewal fee of \$1,000. Holders of in-stream mining permits wishing to renew their permits must submit a renewal fee of \$500 along with their application to renew a permit.
- **GENERAL LIABILITY INSURANCE:** All applicants must present evidence of general liability insurance equal to a minimum of \$100,000 for a single occurrence and \$300,000 aggregate coverage for bodily injury and property damage.

Permits for surface mining operations are valid for a period of fifteen years from the original date of issuance and are subject to renewal for successive fifteen-year periods. In-stream mining permits are valid for two years from the date of issuance and are subject to renewal for successive two-year periods.

APPLICATION PROCESS

Each applicant for a surface mining or in-stream mining permit must submit two copies of the application and any required maps to the DMRM Permitting section. Following a review to

determine administrative completeness, the applicant will be advised to publish notice of the application in a local newspaper when applicable, and the application will be forwarded to the respective DMRM field office for review. Following review, the applicant will be notified of any revisions that are necessary until such time that the applicant meets all legal requirements of Chapter 1514 of the Revised Code. Once such requirements are met, the application is approved.

Upon approval of the surface mining or in-stream mining application, the applicant is billed for the required bond and acreage fees. Once bond is deposited and fees are paid, the DMRM issues the permit.

GENERAL PERFORMANCE STANDARDS

Surface mining and in-stream mining operators must adhere to the mining and reclamation plan outlined in their approved permit. Additionally, provisions of Chapter 1514 of the Ohio Revised Code include performance standards that apply to all surface and in-stream mining operators. These include:

- Control of drainage from mining sites to protect off-site areas.
- No mining shall occur within 50 feet of an adjacent property or within 50 feet of the right-of-way of a public road without prior written consent.
- Topsoil must be stored where required, in sufficient quantities to complete resoiling of the permit once mining is complete.
- Contamination of surface and underground water supplies must be prevented.
- Explosives must be detonated in a manner that prevents damage to adjoining property.

RECLAMATION REQUIREMENTS

Ohio's Industrial Minerals Law requires all mined areas to be restored consistent with the reclamation plan contained in an operator's approved permit. This includes requiring the

grading of final landforms to no more than a 3:1 slope; resoiling of all affected areas and planting a permanent diverse vegetative cover of grasses and/or legumes. Any permanent impoundments must insure public safety and reclamation must be completed within three years of mining in an area.



Reclamation is designed to control drainage and may include permanent water impoundments.

RECLAMATION BOND

Revisions made to Ohio's Industrial Minerals Law in 2002 increased the reclamation bond required by surface and in-stream industrial minerals mining operators. All surface and in-stream mine operators must provide a minimum reclamation performance bond of \$10,000 for up to 20 acres affected plus \$500 per acre above 20 acres affected. Upon completion of the first phase of reclamation, that involves grading and resoiling an affected area, a partial release of the bond may be obtained by the operator. Remaining bond is released after two growing seasons when inspection reveals that planted vegetative cover is capable of regeneration and plant succession. The division maintains a minimum bond of at least \$10,000 on deposit until such time that final reclamation is completed in accordance with Chapter 1514 of the Revised Code.

Reclamation bond may be submitted in the form of cash, surety, letter of credit, or certificates of deposit made payable to the State of Ohio on

behalf of the operator. In the event that an operator fails to meet required reclamation the division shall issue an Order by the Chief requiring completion of reclamation. If the operator fails to comply with the Order, the bond on deposit becomes the property of the state and is used to perform the required reclamation.

INSPECTION AND ENFORCEMENT

The DMRM inspection staff is responsible for enforcement of the Industrial Minerals Law. The inspection personnel inspect each mining site to ensure that the mine operators conduct their operations in compliance with permit requirements and that reclamation is completed in compliance with the regulations. Persons mining without a required permit are issued Chief's Orders to require compliance. If an operator violates any requirement of the law or fails to perform any measure set forth in the approved mining and reclamation plan, the chief may issue an Order identifying the violation and establishing a time frame for compliance. Failure to comply with an Order of the Chief may result in revocation of the surface mining permit and/or the assessment of civil penalties in amounts up to \$1,000 per day. The mine operator has a right of appeal of any Order of the Chief to the Ohio Reclamation Commission and may appeal the Commission's decision to the Court of Common Pleas.

Mining without a permit or other violations identified in ORC Chapter 1514.99 are criminal violations subject to penalties that may be imposed by a criminal court system.

PUBLIC INVOLVEMENT

Applications for industrial minerals permits are filed by potential mine operators with the DMRM central office. The division's regional offices conduct field inspections of proposed mine sites prior to the issuance of a permit to mine to verify the information submitted by the applicant is accurate and that the proposed mining plan is feasible for the site. In some circumstances an applicant is required to publish

notice of their application in the newspaper. If an applicant has not received a zoning variance or conditional use certification that included a public hearing from an authorized local public authority within one-year prior to submitting an application of a mining permit, they must publish notice of their application for a surface mining permit in a newspaper of general circulation in the mine vicinity. Permits and applications are available for viewing in the DMRM regional office with jurisdiction over the mine or proposed location. Local governmental authorities (i.e. Township Trustees, County Commissioners) may request the division hold an informational meeting in the vicinity of a proposed mine site to explain the industrial minerals mining laws. The division welcomes comments and input from the public regarding mining permit applications and mine sites. Comments may be submitted (preferably in writing) to the regional offices or the division's central office at the addresses listed in this publication.

OTHER AGENCIES INVOLVED IN PERMITTING

Industrial minerals operators are required to meet all applicable state, local and federal requirements in addition to meeting the requirements of Chapter 1514 of the Revised Code. Other agencies that may have limited jurisdiction over surface and in-stream mining activities include:

ARMY CORPS OF ENGINEERS: issues permits for stream crossings or diversions and any dredging or filling performed in the waters of the United States, including wetlands.

OHIO ENVIRONMENTAL PROTECTION AGENCY: issues permits for storm water management, air quality, wastewater and discharges to streams and waterways.

ODNR DIVISION OF WATER: regulates construction of permanent dams, dikes, and levees. Also provides information regarding floodplain regulations and administers the Ohio Water Withdrawal Registration Program.

TOWNSHIP TRUSTEES AND/OR REGIONAL PLANNING COMMISSION: regulate local zoning and other land use planning requirements. Surface and in-stream mining operators are required to comply with local zoning ordinances and regulations in accordance with changes made to Chapter 1514 of the Revised Code as revised in 2002.

OHIO DEPARTMENT OF TAXATION: administers the Ohio Minerals Severance Tax Law.



A landslide caused by a coal mining operation required immediate enforcement measures.

Legal Activity

OHIO RECLAMATION COMMISSION (ORC 1513.05, 1513.13, 1513.14, 1514.09; and OAC 1513-3-01 through 1513-3-22)

The Ohio Reclamation Commission (established under Section 1513.05 of the Ohio Revised Code) conducts hearings on administrative appeals filed by any person claiming to be aggrieved or adversely affected by a decision of the chief of the Ohio Department of Natural Resources, Division of Mineral Resources Management. Appeals may be filed by mine operators, landowners, citizen groups, governmental units, or other affected and aggrieved parties. See more information at www.ohiodnr.com/tabid/17890/default.aspx.

Commission members are appointed by the Governor, with the advice and consent of the state Senate, to five-year terms. The seven-member Commission is comprised of two persons who are past or present farm owners, one person representing a coal mine operator, one person experienced in forestry, one person experienced in agronomy, one person experienced in earth-grading or civil engineering, and one person representing the general public. No more than four members can be of the same political party.

Administrative hearings may be requested, pursuant to ORC Section 1513.13 by potential, adversely affected persons as a result of any administrative determination made by the chief of DMRM.

Any interested party who believes that any decision by the division chief has been inconsistent with the requirements of the ORC or OAC may file formal objections to the decision by filing an appeal with the Reclamation Commission. At a minimum, a notice of appeal to the Reclamation Commission must:

- Be filed within 30 days of your receipt of the chief's decision.
- Include a statement of the grounds upon which your appeal is based.
- Have attached to it a copy of the chief's decision being appealed.
- If the appeal is from a civil penalty, include a check in the amount of the penalty.

A notice of appeal may include a request that the Commission members view the site in question. Temporary Relief may also be requested; this will allow for an expedited hearing.

A notice of appeal must be directed to the Reclamation Commission at the following address:

Ohio Reclamation Commission
2045 Morse Road, Bldg. F2
Columbus, OH 43229-6693

Also, a copy of your notice of appeal, including the attached copy of the chief's decision, must be sent to the division chief at:

Chief, Division of Mineral Resources
Management
2045 Morse Road, Bldg. H3
Columbus, OH 43229-6693

Failure to comply with any of these requirements will result in a dismissal of your appeal without a hearing.

Decisions of the Reclamation Commission, which involve coal mining operations, are

appealable to the Court of Appeals pursuant to ORC 1513.14. Decisions involving industrial minerals operations are appealable to the Court of Common Pleas pursuant to ORC 1514.09.

ATTORNEY GENERAL

Attorneys from the Ohio Attorney General's Office serve DMRM as legal advisors, representatives in administrative appeal actions and in criminal and civil court actions. The issues may encompass DMRM decisions on permitting and bonding, technical decisions, enforcement challenges, statutory and regulatory interpretation, and abandoned mine land questions.

Attorneys work with staff to prepare and present DMRM's case before the Ohio Reclamation Commission, who will render a decision based on hearings and/or briefs, as to whether the determination should be affirmed, modified, or vacated.



Federal Oversight (Coal)

Office of Surface Mining (OSM), authorized under the Surface Mining Control and Reclamation Act (SMCRA) of 1977, conditionally approved the Ohio Abandoned Mine Land and Regulatory programs in 1982. Program approval means that OSM determined that the Ohio program is no less stringent than the standards specified in SMCRA; is as effective as the federal rules adopted under SMCRA; and that DMRM has adequate resources to operate the program.

OSM provides 100 percent of the funding for the operations of DMRM's AML program and 50 percent of the funding to operate DMRM's coal regulatory program. OSM and DMRM work closely together through sharing of data and resources to continually improve implementation of the program and to improve reclamation of mined lands.

OSM conducts oversight of the Ohio program to ensure that the program is implemented as it was approved. Annually, OSM and DMRM develop an oversight plan that considers the goals and objectives of both agencies, as well as input from the public. OSM's oversight includes both programmatic review as well as providing technical and other assistance to DMRM. OSM monitors implementation of the Ohio program

through periodic inspections of mines, special focused oversight studies of program elements, and routine communication with DMRM staff and the public. OSM maintains an evaluation file of current and past oversight studies and an administrative record, which has all information on amendments to the approved program. These files are available for public review. OSM reports on the results of oversight through an annual report, which is also available to the public.

Although DMRM is the lead agency responsible for implementing and enforcing the approved program, OSM is authorized to respond to citizen complaints filed with OSM after providing DMRM with an opportunity to address the complainant's concerns.

For information on OSM activities in Ohio, contact:

Office of Surface Mining
4605 Morse Road
Room 102
Columbus, OH 43230
(614) 416-2238
www.osmre.gov/index.shtm

Division Program Funding

The Division of Mineral Resources Management receives funds from federal government grants, taxes on coal and other minerals produced in Ohio (ORC 5749.02), permit acreage fees, permit application fees, annual permit fees and very limited funds from the state's general fund.

The coal Regulatory program receives 50 percent of its funding through a severance tax paid by the coal operators on every ton of coal produced in Ohio. The other 50 percent comes from federal grants administered by OSM.

The industrial minerals Regulatory program is funded by a severance tax on minerals produced. In addition, a filing fee of \$500 is charged for each permit application and annual report, a \$1000 permit application renewal fee, and a fee of \$75 for each disturbed acre is required from the operator.

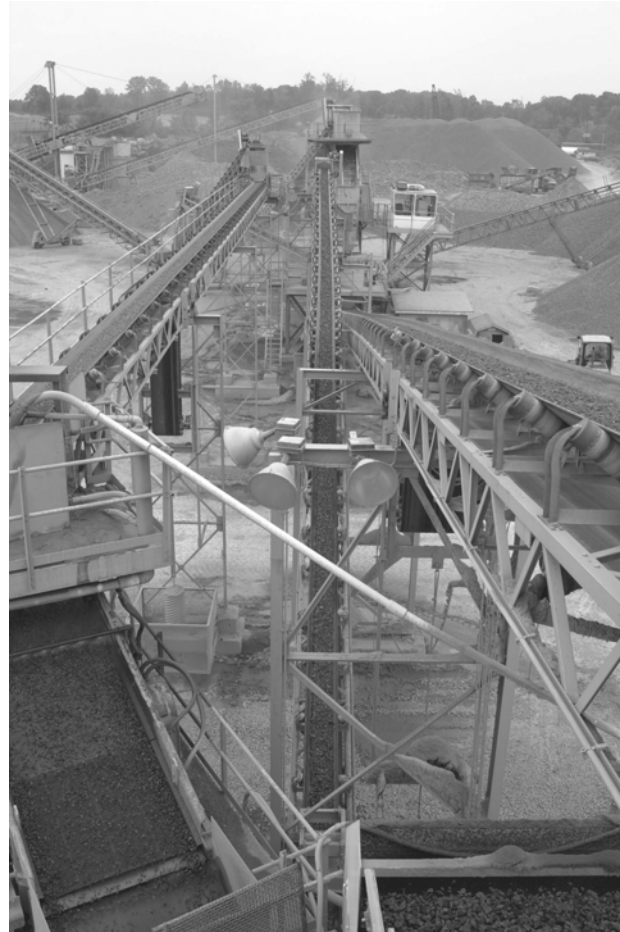
The federal AML program is 100 percent federally funded. OSM receives a fee of 35 cents per ton for surface-mined coal, and a fee of 15 cents per ton for underground-mined coal from mine operators. OSM returns these funds to DMRM through a state grant to address the highest priority public health and safety, and environmental problems.

The state-funded AML program for Ohio was realized with the establishment of the Unreclaimed Lands Fund in 1977. The fund is utilized to complete reclamation projects on public and private lands affected by strip and surface mining prior to April 10, 1972. A state severance tax is imposed on active strip and surface mine operators who extract coal and industrial minerals respectively. This state severance tax provides approximately \$1.0 million annually to the Unreclaimed Lands Fund to alleviate the adverse environmental effects of past mining.

The Mine Safety program receives funding from the Bureau of Workers' Compensation (BWC) Pneumoconiosis (Black Lung) Fund and federal

grants from MSHA targeted for mine operator training.

The Ohio Reclamation Commission receives funding from the state's general revenue fund.



Modern processing facilities crush, sort and clean raw aggregate before it is ready for market.

Frequently Asked Questions

Q. How can people find out about proposed coal mining operations? What sort of notification requirements exist? How can the general public tell from permit and section numbers, etc., where a mine is supposed to be located?

A: For coal mining operations, ORC Chapter 1513.071 and OAC 1501:13-5-01(A) require a complete application for a permit or renewal of a permit to be advertised at least once a week for four (4) consecutive weeks in a local newspaper of general circulation in the locality of the proposed coal mining operations. The advertisement must include the following information:

- Application number and name and address of the application.
- Location where a copy of the application is available for public review (either the county recorder's office or the DMRM office responsible for inspection of the proposed operations, if that office would be more accessible to local residents).
- Address of the division to which written comments or informal conference requests may be submitted.
- County, township, and section/lot numbers.
- Landowner name(s) upon whose property operations are proposed.
- Proposed acreage.
- Direction and distance from the local city, village, town, etc.
- Name of the USGS 7.5' topographic quadrangle map(s) which contain the proposed area.
- If applicable, a specific description of any road permit to conduct operations within 100 feet of a public road obtained from the local authority with jurisdiction over the road.

The advertisement provides enough information to allow an interested person to identify the

approximate location of proposed mining operations. An opportunity to further examine the entire proposed mining and reclamation plan, including all maps, is provided by the placement of a complete application in a public location for review by any interested person. Further, DMRM staff is available to assist any person with their review of an application.

For industrial minerals operations, ORC Chapter 1514 requires that an applicant for a permit must advertise the proposed mining permit application in a local newspaper unless a public hearing, relative to local zoning associated with the proposed mine, has already been held within 365 days of the submittal of the mining application.



Pre-planning by an operator provides for the desired post-mining land use.

Q. If I was growing corn on my property before the land was mined, will I be able to grow corn on it afterwards?

A: Yes, if the land was determined to be prime farmland, the coal mine operator is required to restore the soil on the property so that equivalent or higher levels of yield as non-mined prime farmland can be obtained. The Natural Resource Conservation Service (NRCS) has determined that the Ohio State University Cooperative Extension Service Bulletin 685 will be used as the source of target yields for prime farmland in Ohio. NRCS has determined that hay may be used as a reference crop in all counties. A coal mine operator is not required to use corn as the

reference crop in determining productivity. Bulletin 685 lists yields by soil series under high levels of management for corn as well as soybeans, oats, wheat, and hay. Corn grown on non-prime farmland cropland which has been mined and reclaimed must meet the average county yield as compiled by the Ohio Agricultural Statistics Service.

Industrial minerals operations have no specific requirements related to crop yields.

Q. How much am I allowed to participate in the permit review process?

A: Public participation is encouraged throughout the permit review process. In fact, public participation is encouraged from the permit process through the actual mining and reclaiming of the land. If you have any concerns or questions at any point, you are asked to contact the DMRM field office nearest you.

Q: How close to my home may a mine operator blast? Can vibration limits be waived?

A: No coal mining or blasting may be conducted within 300 feet of an occupied dwelling unless written consent is obtained from the owner and is approved by DMRM. Blasting vibration limits cannot be waived unless the dwelling is owned by the operator and the limits are waived by the occupant.

For blasting on industrial minerals operations, there are no specific distance limitations, although there are airblast and ground vibration limits designed to protect off-site properties.

Q: If a mine operator is mining near, through, or under a public road and a problem occurs, whom should I contact?

A: Problems causing a safety hazard should be immediately reported to 1) the local authority (e.g., county sheriff or highway patrol), 2) the mine operator, and 3) DMRM by calling the nearest field office location listed in this Guide. Problems that do not pose an immediate safety concern may be reported to the mine operator, with a follow-up call to DMRM if the

operator does not correct the problem to your satisfaction.



A backhoe-mounted jackhammer breaks massive pieces of limestone into smaller stone for processing.

Q: If I suspect that the air and water near my home are being adversely affected by a mine operation, whom should I contact?

A: For air pollution you should contact the Ohio EPA and for water problems you should contact the DMRM.

Q: Can I request that someone inspect my home before a mine operator begins to blast?

A: Yes, only if your home is within one-half mile of a coal mining permit area. Please refer to OPPORTUNITY FOR PUBLIC INVOLVEMENT - COAL section of this Guide for a thorough explanation of preblast surveys.

Q: Where can I get more information?

A: As previously indicated, all phases of the mining operation are monitored by DMRM. Professional staff in DMRM offices are available to answer general mining questions or specific questions about a mine in your area.

Q: Can the state force a mine operator to comply with a lease agreement?

A: Individual citizens and lessors of land to be mined should be aware that state mineral resources inspectors have no jurisdiction over terms of a mining lease that are not specifically addressed by Ohio mining laws or regulations.



Land disturbed by mining activities is graded in preparation for seeding.

Q: If an operator mines on my property, do I have to approve the reclamation of my land before bond is released on my land?

A: No, bond or performance security release is not dependent upon the approval of the individual landowner or concerned citizen. However, landowner comments may be considered when determining whether the land meets the success requirements of law.

Q: If there is any structure or water supply damage from mining and/or blasting, who will fix the damages? Who should citizens contact?

A: If structural or water supply damage occurs, the mine operator carries public liability insurance and is ultimately responsible for remediation. In the case of a damaged water supply, the law requires the mine operator to replace the affected water supply. In the case of blasting damage, DMRM may not be able to compel a mine operator to make repairs or compensate an owner for damages. This is often a private matter between the owner and the mine operator. If a property owner believes structural or water supply damage has occurred, DMRM suggests that the citizen first contact the mine operator. If the mine operator's response is unsatisfactory, the property owner may file a citizen complaint by writing to DMRM. DMRM will conduct an investigation and issue a written response. This complaint procedure in no way prevents a person from pursuing any claims as a

private matter. (For additional information on citizen complaints, see the section of this Guide titled OPPORTUNITY FOR PUBLIC INVOLVEMENT - COAL.)

Q. Common Blasting Questions:

Why is blasting necessary?

Is dynamite still used?

How far do fractures extend from a blast hole?

What causes ground vibration and how is it measured?

How is ground vibration controlled?

What is airblast and how is it measured?

How is airblast controlled?

What are ground vibration and airblast limits?

If the dishes rattle, is my home being damaged?

A: The above questions are answered in the section of this Guide titled BLASTING IN OHIO'S QUARRIES AND SURFACE COAL MINES.

Q: How can I obtain additional information on the mine subsidence insurance program?

A: Contact your insurance agent or company. You can also contact the Ohio Mine Subsidence Underwriting Association or the Ohio Insurance Institute at:

Ohio Mine Subsidence Insurance
Underwriting Associations (OMSIUA)
2500 Corporate Exchange Drive, Suite 250
Columbus OH 43231
(614) 839-6446
(800) 282-1772 inside Ohio
(614) 839-2882 FAX
www.ohiominesubsidence.com

Blasting in Ohio's Quarries and Surface Coal Mines

The word "blasting" often conjures up visions of destruction - mushroom clouds, gigantic craters, high-rise buildings collapsing, bridges falling and cars exploding. However, each day in Ohio, nearly half a million pounds of explosives are safely detonated in quarries and surface coal mines. The Ohio Department of Natural Resources, Division of Mineral Resources Management is the agency responsible for regulating the environmental effects of mining and blasting. Some of the commonly asked questions and misconceptions regarding blasting are addressed below.

Why is blasting necessary?

Blasting is the most cost effective way to fracture rock so that it can be excavated by earth-moving equipment. This in turn reduces the costs of building materials such as gravel and concrete, energy produced from coal, and many other products derived from limestone, coal and other minerals.



Drilling activities in preparation for blasting. Holes will be loaded with explosive charges.

Is dynamite still used?

People living near quarries and coal mines often express concern about "the dynamiting going on over there." In fact, dynamite, a nitroglycerin-

based explosive, is rarely used today in Ohio's quarries and surface coal mines. The most widely used explosive is a mixture of ammonium nitrate (AN) and fuel oil (FO) called ANFO. The ammonium nitrate is in the form of a prill (small, bead-like pellets), which absorbs the fuel oil. ANFO is far less hazardous than dynamite and breaks more rock per unit of cost.

How far do fractures extend from a blasthole?

Blastholes are normally drilled vertically and arranged in a grid pattern. Typical blasthole diameters range from two to seven inches in quarries and five to nine inches in surface coal mines, with typical depths from 10 to 70 feet. Upon detonation, fracturing of rock generally occurs no greater than 20 to 30 feet from any blasthole, depending largely upon hole diameter and the densities of the rock and explosive. A common misconception is that fracturing extends far beyond the mine property - even miles from the blast site. If this were true, the blastholes could be placed much farther apart than the commonly used spacing of six to 18 feet in quarries and 12 to 25 feet in surface coal mines, and blasting would be much more economical since less drilling and explosives would be necessary.

Another common misconception associated with blasting is that significant fracturing occurs far below the bottom of a blasthole. In fact, most of the gas pressure forces created by the detonation of the explosive radiate outward along the length of the cylindrical blasthole. Depending upon the hole diameter, type of explosive and nature of the rock, gas-pressure forces below the bottom of the blasthole are comparatively minimal and fracturing of rock is generally limited to several feet. In most surface coal mines, a buffer of only three to five feet between the bottom of the blastholes and the top of the coal seam adequately protects the coal (which is brittle to begin with) from being fractured and contaminated by the rock material immediately above it. Failure to protect the coal from

fracturing can increase the cost of cleaning the coal and significantly reduce the mine operator's profits.

What causes ground vibration and how is it measured?

When a blast detonates, some of the explosive energy not utilized in breaking rock travels through the ground in all directions as wave motion, similar to the ripple created in a pond when a stone hits the water. This wave motion, or ground vibration, travels mainly along the surface at speeds of 5,000 to 20,000 feet per second, depending upon the density and thickness of the rock and soil. Its energy level decreases rapidly with distance from the blast and normally decays to levels undetectable by humans beyond several thousand feet. Because explosives are expensive and vibration represents wasted energy, it is to the blaster's advantage to utilize as much of the energy as possible in fragmentation, thereby minimizing vibration.

Blasting seismographs are used to measure ground vibration in terms of particle velocity, which is the speed at which each particle in the ground oscillates as the wave motion passes. This would be similar to measuring the speed of a fishing bobber in a pond as it moves up and down when a ripple passes under it. Particle velocity is measured in inches per second, but beyond several hundred feet from a blast the actual movement of the ground, or displacement, is generally only a tiny fraction of an inch, about the thickness of a piece of paper, or less. So it is important to understand that a particle velocity reading expressed in inches per second refers to the speed at which the ground moved, and not the amount of movement.

How is ground vibration controlled?

Blasters control ground vibration mainly by limiting the weight of explosives detonated within any 8-millisecond period of time. They do this by using millisecond delay detonators (blasting caps) to separate the firing time of each hole from adjacent holes. In a typical 50-hole

blast, the result would be 50 smaller and separate explosions instead of one large blast. A common misconception is that the number of blastholes determines the resulting intensity of vibration. However, given the same charge-weight per delay (pounds of explosive detonated within any 8-ms period) and the same distance, a 100-hole blast can be designed to produce no more vibration than a 10-hole blast.



Detonation of explosives is a mining process to break and move rock materials.

What is airblast and how is it measured?

When a blast detonates, some energy is lost to the atmosphere in the form of noise and/or concussion. This phenomenon is caused by the venting of gases through cracks and fissures and the upward and outward movement of the rock on top and in front of the blastholes. The resulting increase in the air pressure is commonly called airblast. Like ground vibration, airblast levels decrease rapidly with distance from the blast. However, airblast travels only at the speed of sound, around 1,100 feet per second, depending upon air temperature, and can be greatly influenced by wind direction and speed, and by atmospheric temperature inversions which can bend it back toward the earth and focus its energy several miles away.

Airblast is usually measured with a special microphone connected to the same type of seismograph that measures ground vibration. The most common units of airblast measurement

are pounds per square inch (psi) and the decibel (dB), which is based on a logarithmic sound-pressure scale related to human hearing. The threshold of hearing begins at zero decibels (see Table 1. Airblast Effects). An increase of six decibels represents a doubling of air pressure. As an example, an airblast measured at 126 dB would have twice the air pressure of an airblast at 120 dB.

How is airblast controlled?

Airblast is controlled mainly by the proper use of stemming material (the drill cuttings or crushed stones that are shoveled back into the blasthole after the explosive material has been loaded to a predetermined depth from the surface), and by not loading explosives into portions of holes with cracks, voids or mud seams. These techniques minimize the escape of gases and confine the explosive energy where it is needed to efficiently break rock.



After a blast, the active face of this mining operation shows evidence of the drilling holes above the most recent pile of shot rock.

What are the ground vibration and airblast limits?

The United States Bureau of Mines (USBM) conducted extensive research over a 35-year period on the effects of blast-induced ground vibration and airblast on residential structures. This research produced recommended

limits that, if adhered to, will effectively protect residential structures from damage, even if the blasting is repeated on a daily basis over a period of many years.

Around 1983, the State of Ohio adopted a modified version of the USBM ground vibration and airblast limits for surface blasting in Ohio coal mines, as required by the federal Office of Surface Mining. In their simplest form, ground vibration must not exceed 1.0 inch per second and airblast must not exceed 133 decibels at any dwelling. And in 2002, the USBM limits were adopted for Ohio quarries. In quarries and coal mine blasting, seismographic monitoring is required if the explosive charge-weight per delay will exceed the maximum allowed by specific formulas, based on the distance to the nearest dwelling.

Who may conduct blasting?

Only a certified blaster may conduct blasting in Ohio's quarries and surface coal mines. To become certified, a blaster must obtain 2 years of blasting crew experience including on-the-job training, attend 30 hours of classroom training, and pass an exam covering blast design, safety, vibration control and monitoring, and state and federal blasting regulations. Once certified, a blaster must attend 24 hours of continuing education during every 3-year renewal period.

If the dishes rattle, is my home being damaged?

It is helpful for homeowners to know that even when blast vibrations are far below the legal limit, highly perceptible vibration can be experienced inside the home; windows and dishes might rattle, knickknacks and pictures might move or fall if not securely fastened, and hanging lamps might sway. These effects can be generated by ground vibration or airblast acting separately or together, and can last from one to three seconds or more, depending upon the distance from the blast, geologic influences and other factors. Despite these sometimes startling

effects, there is no direct correlation between how a blast "feels" and its potential for causing structural damage to a home. In fact, cultural stresses (e.g., doors slamming, kids jumping, people pounding nails) and natural stresses (e.g., sunlight, wind, rain, temperature and humidity fluctuations and changes in soil moisture) can place greater stresses on a home than legal blast vibrations.

Table 1. Airblast Effects

dB	psi	
180	3.0	Conventional structures severely damaged
		Plaster cracks at 176 dB
170	1.0	Most windows break at 171 dB
160	0.3	
150	0.1	Some windows may break at 151 dB
140	0.03	Exceeded by strong wind gusts in Ohio
130	0.009	DMRM limit is 133 dB
120	0.003	
100	3×10^{-4}	Pneumatic hammer
80	3×10^{-5}	
60	3×10^{-6}	Conversational speech
40	3×10^{-7}	
20	3×10^{-8}	
0	3×10^{-9}	Threshold of hearing

Modified from DuPont (1977) and Konya (1990); Revised June 2004

More specific questions regarding blasting can be addressed to the DMRM Blasting Specialist at the division's New Philadelphia regional office.

Glossary

acid-forming materials: earthen materials that contain sulfide minerals or other minerals which, if exposed to air, water, or weather processes, form acids that may create acid mine drainage.

acid drainage: water with a pH of less than 6.0 that is discharged from an active or abandoned surface coal mine and reclamation operation and is usually red or orange.

adjacent area: land located outside the affected area, or permit area, where air, surface or ground water, fish, wildlife, vegetation, or other resources protected by the state law may be adversely impacted by surface coal mining and reclamation operations.

administratively complete application: an application for permit approval, or approval for coal exploration where required, or approval for an exemption for coal extraction incidental to the extraction of other minerals, which the chief determines to contain information addressing each application requirement of this article and to contain all information necessary to initiate processing and public review.

affected area: any land or water upon or in which mining activities are conducted or located.

applicant: any person seeking a permit or exploration approval from DMRM to conduct mining and reclamation operations.

approximate original contour (AOC): the surface configuration achieved by backfilling and grading the mined areas so that the reclaimed area closely resembles the general surface configuration of the land prior to mining.

bond forfeiture: occurs when a company fails to perform industrial mineral mining and reclamation procedures in accordance with the reclamation plan approved as part of the permit to mine. The bond is collected by the state and used to restore inadequately restored land to a productive status. *(The term “performance security” replaces “bond” when referencing coal mining and reclamation activities.)*

certified blaster: a person who 1) has at least two years of experience in blasting operations and on-the-job training under a certified blaster; 2) completed an approved 30-hour training course in blast design, safety, vibration control and monitoring, and state and federal blasting regulations; 3) successfully passed the blaster certification exam; 4) holds a valid certificate issued by the current DMRM or former Mine Examining Board; and 5) attends at least 24 hours of continuing education during every 3-year renewal period.

cessation order: an order by the chief of the Division of Mineral Resources Management to suspend mining operations.

civil penalty: penalty assessed against an operator for failure to operate within the terms of the approved permit to mine and any applicable conditions of the state regulatory programs.

coal preparation plant: a facility or facilities that perform coal preparation to separate coal from its impurities.

coal-processing waste (gob and slurry): earthen materials that are separated from the coal product during cleaning or processing.

coal seam: a bed or stratum of coal usually about five feet thick in Ohio.

compliance: conducting extraction and restoration activities in accordance with terms and conditions established by law.

contemporaneous: mining and reclamation operations conducted during the same period of time.

dewatering: as it relates to industrial minerals mining, the withdrawal of ground water from an aquifer or saturated zone that may result in the lowering of the water level within the aquifer or saturated zone or a decline of the potentiometric surface within that aquifer or saturated zone.

diminution: a lessening, decreasing, or reduction.

DMRM: the Division of Mineral Resources Management; one of the divisions of the ODNR. Regulates the mining, reclamation, and mine safety activities for the extraction of coal and other minerals and restores land abandoned by coal mining conducted prior to 1972.

disturbed area: an area where vegetation, topsoil, or overburden is removed or upon which topsoil, spoil, or coal processing waste is placed by surface coal mining operations. Those areas are classified as disturbed until reclamation is complete and the performance bond/security is released.

effluent limits: limitations on the amount and quality of water leaving the permit area.

flyrock: rock, mud, or debris traveling in the air or along the ground as a result of a blast.

gob: rock or other coarse materials sorted out of the coal either during mining or processing.

ground water: subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

historic lands: historic or cultural districts, places, structures, or objects including archaeological and paleontological sites, national historic landmark sites, sites listed or eligible for the Ohio State Register of Historic Sites and Structures or the National Register of Historic Places, sites having religious or cultural significance to native Americans or religious groups, or sites for which historic designation is pending.

hydrology: science dealing with the waters of the earth, their distribution on the surface and underground, and the cycle involving evaporation, precipitation, etc.

imminent danger: existence of any condition, practice, or violation of a permit or requirement of Ohio law in a coal mining operation which could reasonably be expected to cause substantial physical harm to persons outside the permit area before the condition, practice, or violation can be corrected.

impoundment: a basin, naturally formed or artificially built, which is dammed or excavated for the retention of water, sediment, or waste.

in-stream mining: all or any part of a process followed in the production of minerals from the bottom of the channel of a watercourse that drains a surface area of more than one hundred square miles. It does not include routine dredging for purely navigational or flood control purposes during which materials are removed for noncommercial purposes, or the extraction of minerals by a landowner for the landowner's own noncommercial use when the material is extracted and used in an unprocessed form on the same tract of land.

land use: specific use or management-related activity, rather than the vegetation or cover of the land. The categories of land use are cropland, developed water resource, fish and wildlife habitat, forestry, industrial/commercial, pasture land (or land occasionally cut for hay), recreation, residential, and undeveloped land.

lands unsuitable for mining: area where coal mining may not be conducted.

Mineral Resources Inspectors: staff members of DMRM who review permit applications, conduct inspections for performance bond/security release, and ensure enforcement of detailed performance standards of all phases of mining and reclamation.

mulch: vegetation residues or other suitable materials that aid in soil stabilization and soil moisture conservation, thus providing conditions suitable for seed germination and growth.

notice of violation (NOV): document used to inform the coal operator of noncompliance with a certain regulation.

ODNR: Ohio Department of Natural Resources.

OSM: U.S. Department of the Interior's Office of Surface Mining Reclamation and Enforcement; the federal agency that oversees the work of the state agencies enforcing the federal coal mining law.

operator: any person, partnership, or corporation engaged in coal mining.

overburden: all of the soil and rock that lie above the coal seam.

pH: a symbol for the degree of acidity or alkalinity of a solution. pH values from 0 to 6.5 indicate acidity and from 9 to 14 indicate alkalinity. A solution with a pH of 6.5 to 8 is considered neutral.

performance bond/security: surety bond, certificate of deposit, letter of credit, or a combination thereof, by which a permittee assures performance of all the requirements of IC 13-4.1 and those of the permit and reclamation plan.

performance security forfeiture: occurs when a company fails to perform coal mining and reclamation procedures in accordance with the reclamation plan approved as part of the permit to mine. The performance security is collected by the state and used to restore inadequately restored land to a productive status.

permit: a permit to conduct surface coal and industrial minerals mining and reclamation operations issued by DMRM under the state program.

permit area: the areas of land and water within the boundaries of the permit which are designated on the permit application maps, as approved by DMRM. This area shall include all areas, which are proposed to be affected by the industrial minerals or surface coal mining and reclamation operations during the term of the permit.

post-mining land use: use of the land proposed after mining. The mined land must be reclaimed to support the use approved by DMRM in the permit application.

primacy: term for the state's authority to regulate coal mining and SMCRA. DMRM gained authority to administer the federal mining and reclamation law in January 1981.

reclamation: actions taken to restore mined land, as required by regulations, to a post-mining

land use approved by DMRM.

regulatory program: any approved state or federal program.

revegetate: the act of establishing plant growth on reclaimed land with grasses, trees, crops, etc.

SMCRA: Surface Mine Control and Reclamation Act of 1977; passed by Congress to establish minimum national standards for mining and reclamation.

sediment: matter that settles to the bottom of a liquid; matter deposited by water or wind (i.e., sand, silt, dirt, etc.)

show-cause order: an order to show cause why a coal mine should not cease operations presented to a company with a demonstrated pattern of violation, inability to comply with regulations, or abandonment of the mine site.

siltation structure: a primary sediment control structure designed, constructed, and maintained in accordance with regulations as a barrier, dam, or excavated depression which slows down water runoff to allow sediment to settle out.

slurry: material left after washing the coal prior to shipment. It is a fine coal refuse with the consistency of wet sand.

soil amendments: additives to the soil to enhance its productivity, such as fertilizer or agricultural lime.

spillway: a passage for surplus water over and around a dam or similar obstruction.

spoil: overburden material removed from above the coal seam during surface mining.

subsidence: the collapsing of underground mines that may cause depressions or holes on the surface and/or damage to structures.

subsoil: layer of soil beneath the topsoil.

topsoil: upper layer of soil, usually darker and richer than the subsoil; surface soil.

valid existing rights: related to coal mining, those property rights of the applicant in existence on August 3, 1977, that were legally created by a lease, deed, contract, or other document which

authorizes the applicant, any subsidiary, affiliate, or persons controlled by or under common control with the applicant to produce coal by a mining operation. The person proposing to conduct coal mining must have been validly issued, on or before August 3, 1977, all state and federal permits needed to mine or be able to demonstrate that the coal is both needed for, and immediately adjacent to, an ongoing coal mining operation which was permitted prior to August 3, 1977. For haul roads, valid existing rights means a right-of-way, easement, or road issued or in existence as of August 3, 1977. See OAC 1501:13-1-02 for a complete definition.

Division of Mineral Resources Management Regional Offices



WEST REGIONAL OFFICES

2045 Morse Road, Bldg H
Columbus, OH 43229
 (614) 265-6633
 (614) 265-7998 (fax on H3)
 (614) 265-7999 (fax on H2)

952 Lima Avenue
Findlay, OH 45840
 (419) 429-8304
 (419) 424-5008 (fax)

505 South State Route 741
Lebanon, OH 45036
 (513) 933-6717 or
 (513) 933-6718
 (513) 933-9245 (fax)

117 East High Street, Suite 257
Mt. Vernon, OH 43050
 (740) 392-4499
 (740) 393-6705 (fax)

SOUTH REGIONAL OFFICES

280 East State Street
Athens, OH 45701
 (740) 592-3748
 (740) 593-7086 (fax)

AML Public Health and Safety
 11296 E. Pike Road
Cambridge, OH 43725
 (740) 439-3640
 (740) 439-5495 (fax)

Environmental Lab
 325 North 7th Street
Cambridge, OH 43725
 (740) 439-5591
 (740) 439-3075 (fax)

2050 E. Wheeling Avenue
Cambridge, OH 43725
 (740) 439-9079
 (740) 432-7711 (fax)

34 Portsmouth Street
Jackson, OH 45640
 (740) 286-6411
 (740) 286-1868 (fax)

NORTH REGIONAL OFFICES

2207 Reiser Avenue SE
New Philadelphia, OH 44663
 (330) 339-2207
 (330) 339-4688 (fax)

3601 Newgarden Road
Salem, OH 44460
 (330) 222-1527
 (330) 222-2137 (fax)

3575 Forest Lake Drive, Suite 150
Uniontown, OH 44685
 (330) 896-0616
 (330) 896-1849 (fax)



Ohio Department of Natural Resources
Division of Mineral Resources Management
www.ohiodnr.com/mineral

A Citizen's Guide to Mining and Reclamation in Ohio
www.ohiodnr.com/portals/11/publications/pdf/citizens_guide.pdf

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