Ohio Department of Natural Resources
Division of Mineral Resources Management

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In Ohio, underground mining accounts for about half the coal produced in the state.

Coal is produced from underground mines using longwall or room-and-pillar mining technology. Longwall mining consists of developing the coal in rectangular blocks called "panels," using room-and-pillar mining equipment. Longwall panels are developed to maximize the recovery of coal and are up to 900 feet wide by 10,000 feet long. Coal is completely removed from these panels by a rotating cutting wheel that moves back and forth across the width of the panel at the face. The broken coal falls onto a conveyer 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 coal mining 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 Coal Mine Permit 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 geologic 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, geologic 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 to prevent subsidence; 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

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condition, which will support the same and/or foreseeable uses, which existed prior to subsidence.

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 areas 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, the information that the surface owner may review, and the location(s) of where the subsidence control plan of the underground operator may be examined.

Pre-Subsidence Survey

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. Public water is acceptable as a permanent replacement for an agricultural water supply if the mine operator demonstrates that other alternatives are not feasible. In the event a landowner desires public water for agricultural use in lieu of a natural source, then the operator must demonstrate that water resources remain available for development in sufficient quantity and quality to support foreseeable land uses. 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 that are applicable to surface coal 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, and communities, and adjacent to industrial or commercial buildings, major impoundments, or perennial streams if the chief makes a finding of imminent danger to the inhabitants of such areas.