

IMPLEMENTATION OF SUBSIDENCE CONTROL REGULATORY REQUIREMENTS

by

Daniel Barkley²

Abstract. Underground coal mining in Illinois has shown an increasing percentage of total coal mined relative to surface mining. In the past 20 years, the percentage of underground to surface mine production has steadily increased. Underground mining is expected to continue to dominate Illinois coal production into the 21st century. The drive for higher production and lower operating costs should increase the number of longwall and high extraction retreat mines. This will be achieved through conversion of existing room and pillar mines or initiation of new underground mining operations.

The environmental regulations that govern the mitigation of surface impacts have evolved at both the state and federal level. Federal regulations passed in 1995 modifying the Surface Mining Control and Reclamation Act mandated additional restrictions and regulatory requirements beyond those adopted in 1977. State regulatory bodies that implement the regulations are now working to bring their regulations and procedures into compliance with the oversight federal counterpart. Many states have raised concerns over the practical application of certain aspects of the new permitting requirements. This paper describes past and present subsidence regulations in Illinois, their impact on the coal industry and on the landowners above underground coal mining. Potential problems in implementation of the new regulatory requirements as well as additional burdens placed on coal companies to comply with the regulations are explored.

Additional Key Words: subsidence insurance, subsidence mitigation, Energy Policy Act

Introduction

Illinois underground production has captured an increasing percentage of total coal mined. In the past 20 years, the percentage of underground to surface mine production has increased from approximately 53 to 85 percent. The production from longwall mining has also grown since its introduction in Illinois in the early 70's. It is anticipated that underground mining will continue to dominate Illinois coal production into the 21st century. The industry will continue to strive for higher production and lower operating costs and therefore the number of longwall and high extraction retreat mines should increase through conversion of existing room and pillar mines or initiation of new underground mining operations. The growth of underground mining in Illinois has been accompanied by the evolution of regulations governing underground mining effects over the past two decades.

On August 3, 1977, the Surface Mining Control and Reclamation Act (SMCRA) became law. The Act created the U.S. Department of Interior's Office of Surface Mining Reclamation and Enforcement (OSM). As suggested by both the names of the act and the regulatory body created to administer the act, impacts of underground mining was not the primary focus or centerpiece of the legislation. In the infancy of SMCRA and at the beginning of state primacy, OSM left the choice of enforcement of subsidence repair and compensation of land and structures affected by mine subsidence to state law. More recently, OSM passed specific subsidence regulations in an attempt to set a national minimum standard for regulating and enforcing subsidence impacts and repairs.

Subsidence Insurance for Abandoned Mines

In 1979, the first specific protection afforded Illinois citizens occurred when the General Assembly created the Illinois Mine Subsidence Insurance Fund. The insurance fund was created to address the problems of abandoned mines causing damage to homes and related structures. Subsidence damage to surface lands such as farmland is not covered under the Illinois Mine Subsidence Insurance Fund.

¹ Paper presented at the 16th Annual National Conference of the American Society for Surface Mining and Reclamation, Scottsdale, Arizona, August 13-19, 1999.

² Daniel Barkley, Mining Engineer, P.E., Illinois Department of Natural Resources, Office of Mines and Minerals, Land Reclamation Division, Springfield Ill. 62701-1787

Many states now have some form of subsidence insurance protection. The level of coverage and entity managing the insurance varies from state to state. Illinois' insurance program, although enacted by the states General Assembly, functions as a private reinsurance group funded through premiums paid to the home owners' insurance company. A government body manages the insurance program in Pennsylvania and other states.

SMCRA and the Illinois Regulations of 1983

Although some form of Illinois mining reclamation law governing surface coal extraction had been in place prior to SMCRA dating back to 1962, no requirements for correction of subsidence impacts existed. Based on the expected trends of underground mining and planned subsidence operations, the Illinois regulatory program created as a result of SMCRA recognized the importance of Illinois farmland and the need to protect property owners from loss due to mine subsidence. The state of Illinois' Permanent Program Rules and Regulations were enforceable on February 1, 1983 and thus established coal operators legal liability for subsidence. Underground coal extraction performed by any method after this date is subject to specific subsidence permitting and performance regulatory requirements. Rules enacted at the state level endeavored to balance the rights of surface owners impacted by subsidence with the legal right of the coal operators to extract their coal resource.

Legal Rights

Property rights regarding the subsurface coal and the surface overlying the coal deposit are an integral part of underground mining and the regulation of subsidence effects. As far back as the early 1900's, companies began securing control of large blocks of coal reserves from surface owners not only for existing operations but also for speculation on future extraction. The contract severing the surface property from the mineral rights often incorporated language granting the entity obtaining the mineral property the right to extract all of the resource without liability for surface damage. This right is often referred to as the "right to subside."

Several legal challenges were launched by the Illinois industry contesting the mandate to mitigate, repair, or compensate for damages caused by subsidence. Certain companies contended that the transaction severing the surface and mineral rights also granted the right to extract all of the resource without liability for surface damage. The challenge contended that the right to subside without liability was acquired as part of a legal

transaction. Therefore, it should be construed a taking of property rights if mine operators were mandated to provide compensation or execute repairs.

Illinois' ability to enforce subsidence repair and compensation was continually upheld by the courts. Coal operators must repair subsidence damage caused by mining after February 1, 1983 to land and structures regardless of any waiver. Illinois maintains subsidence requirements based on the potential for subsidence affecting not only structures but also land capabilities. Structures damaged by subsidence must be repaired, replaced, or compensated for, while surface lands damaged must be mitigated to restore the value and capability that existed prior to subsidence.

Subsidence Control Plans

The regulatory framework is divided into *permitting* requirements and *performance* requirements. Permitting requirements set the threshold of information required in an application to receive a permit. Performance requirements measure the effectiveness of the operation to achieve the regulatory goals. A key permitting element of an underground mining application is the *mine subsidence control plan*. The subsidence control plan must demonstrate that either mine stability is being provided to prevent subsidence, termed "unplanned subsidence," or that mining will be carried out to produce "planned subsidence" resulting in immediate surface subsidence in a predictable and controlled manner.

As part of the subsidence control plan, operators must provide information on the technique of coal removal, percentage of coal to be extracted, pillar sizes, extraction dimensions and nature of the geologic strata above and below the coal seam. The subsidence control plan must include a survey of all structures and surface features.

If planned subsidence is proposed, operators are required to define the extent and location of subsidence, damage expected to occur, and measures to be taken to mitigate any material damage to land and structures. Site specific monitoring of subsidence movements is initially required to verify the accuracy of subsidence predictions. Pre-subsidence surveys of all structures potentially impacted by subsidence are also required. The surveys help document the pre-subsidence condition of the structures to aid in distinguishing damages attributable to subsidence.

The measure of the effectiveness of subsidence mitigation is found within the performance requirements of the regulations. Crops and coal are two very important

components of the Illinois economy. Over the past 15 years, the effects of subsidence on cropland have been closely monitored for mitigation. Unlike the permit area, the shadow area (area above underground workings, outside the permit area) is not bonded. Instead, the Department relies on the ability to impose violations when mitigation is not being accomplished. A pattern of violations could easily develop if a company became lax in their mitigation efforts. If a pattern of violations develops, a cessation order can be imposed requiring the operator to defend why the state should not revoke the permit. The lack of a structured bonding mechanism has not hindered achieving mitigation of land impacted by subsidence because of the regulatory potential to prevent mining.

Subsidence Mitigation

Subsidence from longwall or high extraction retreat mining creates a "sag" type subsidence on the surface. A low lying, bathtub shaped depression results that can be 1200 feet in width and a mile or two long. The depth of overburden and longwall equipment specifications controls the width and length of the surface area affected. This bathtub effect is experienced side by side as a series of longwall panels are mined creating a washer board effect. In flatter topography as often found in Illinois, subsidence can create closed depressions and pond water. To successfully drain closed depressions, the surface can be re-contoured or surface waterways can be installed to carry away water collected in the depressions. Cut and fill operations are also performed to help restore surface drainage. When suitable soils are present, subsurface drainage tiles can be placed to aid drainage. Often, a combination of the above may be incorporated over several mine panels to successfully mitigate a watershed affected by subsidence.

A second impact that occurs to surface lands is a series of tension ground cracks. The ground movements that take place can create uniform and parallel cracking as the wall progresses. The cracking varies in width from an inch or less under most circumstances but can occasionally reach as much as a foot in width. Transverse cracks occur in a radial pattern in advance of the mining direction. The transverse cracks tend to close as the dynamic subsidence wave passes. Longitudinal cracks occur at the panel's edge in the tensional zone. The longitudinal cracks along the edge can remain open and require some form of mitigation (Van Roosendaal et al. 1992). In farm fields, plowing easily eliminates narrow cracking. Wider tension cracks can necessitate filling with appropriate soil, sand, or lime, then mulched to control erosion. Sand and lime are used because they are inexpensive flowable fills that can efficiently seal ground

cracks. It can also be beneficial to excavate larger cracks down to a depth where the separation has tightened before beginning to backfill and compact to ground level. Topsoil should be removed and replaced upon completion of repairs.

The timing of mitigation repairs can often be complicated by several extenuating factors. Repairs to structures and land are not required until the subsidence movements have stabilized. Mitigation carried out before the area is stable would only have to be repeated later. Adverse ground conditions due to precipitation can prevent drainage repairs and push the necessary construction work into the next growing season. Most farmers prefer that such work take place in the fall when the fields are dry and the crops have been harvested. Another delaying factor in farmland mitigation can be the need to allow a second or third panel to be mined and subsided to implement proper drainage repair to a larger watershed. Because of these unavoidable delaying factors, the Department has required a mechanism for crop loss compensation in planned subsidence permits. If acreage is inundated because mitigation has yet to be accomplished, the operator must compensate the landowner for the acreage that is not farmable. This compensation is a temporary measure until mitigation is successfully completed.

Often, to meet the regulatory performance requirements associated with subsidence, operators must work with local road authorities and local drainage districts. It is sometimes necessary to deepen existing main branch drainage ways or road ditches to allow tiling or waterways to outlet properly. Culverts must sometimes be placed under a roadway where they did not exist before the subsidence altered topography. Communication and cooperation with the various local road and drainage jurisdictional bodies is essential to achieving drainage mitigation.

Energy Policy Act of 1992

Congress sought a national regulatory framework for subsidence impacts as a part of the Energy Policy Act of 1992 (EPACT). Simply stated, the Act sought to require repair of or compensation for damaged structures and provisions for replacement of drinking water lost or degraded due to mine subsidence.

Mandated by EPACT, OSM passed federal regulatory requirements in the March 31, 1995 Federal Register. The three-year delay in finalizing the rules resulted in part due to controversy over the content of the regulatory language proposed.

Most of the performance requirements now in place at the federal level through EPACT are being enforced in Illinois through existing regulations. One specific area of EPACT that was not previously a regulatory performance requirement in Illinois is the mandate to replace water lost or contaminated by subsidence. The requirement to replace water was apparently one of the driving forces behind the incorporation of subsidence language into the EPACT. Water loss due to subsidence tends to be a more prominent issue in the Appalachian coal fields than in the Illinois coal basin. Groundwater in much of the area of underground coal mining of the state of Illinois is not of sufficient quantity and/or quality to make it potable, and therefore much of the drinking water is derived from natural or man made surface water bodies. When subsidence does affect groundwater, the geology of Illinois tends to be forgiving and allows most impacts to be short term (Van Roosendaal et al. 1992).

The March 31, 1995 Federal Register detailed permitting requirements envisioned by OSM to achieve the regulatory goal of subsidence mitigation of land, water and structures. Requirements such as bonding, timing and content of pre-subsidence surveys, public participation, and level of detail in the permit application were contained in the rules.

Implementation problems

The state regulatory authorities were mandated to bring their programs into compliance with the requirements presented in the March 31, 1995 Federal Register. Although the intent of the regulations to set minimum standards for protecting surface owners above active underground mining operations was clear, the practical implementation of the permitting standards created some concerns.

Requirement to conduct pre-mine condition surveys regardless of the type of mining. Condition surveys are done to document a structure's physical condition and value prior to any impacts of subsidence taking place. It is a snap shot in time as a reference to determine what is or is not subsidence related after impacts occur. This type of survey is very valuable in longwall situations.

One potential problem with the current rule is requiring condition surveys of all underground mines regardless of the design. It is not nearly as valuable in the case of room and pillar mining designed to preclude subsidence. Although room and pillar mines can result in isolated subsidence events years or decades after extraction, prudent mine design can preclude damages in most situations. A survey performed decades in advance

will do very little to determine mine related impacts at the time of failure. This requirement to perform condition surveys even when a stable room and pillar mine plan is executed places an unnecessary burden on the industry.

Pre subsidence water quality or quantity surveys regardless of the method of mining. Similar to the issue raised above concerning structures, water quality and quantity data collection may not be necessary in all mining situations. Experience in Illinois has shown minimal impacts to aquifers utilized as drinking domestic or residential water supplies. It would be prudent to limit such surveys to planned subsidence such as longwalls or site specific situations where impacts are more probable.

Requirement to minimize damage in the absence of a waiver. The federal regulations mandate some form of damage prevention be enacted on structures to "minimize damage" from planned subsidence mining. Companies routinely support or "float" structures during longwall operations. Other methods such as flexible gas connections or foundation trenching to minimize lateral compressive forces are attempted. However, a mandate to minimize without any clear cut threshold level renders this requirement very subjective. In the end, the company must make the landowner economically whole regardless of interim minimization steps.

Presumption of causation of damage within a 30-degree angle of draw. The rules established a rebuttable presumption that damage to a structure was caused by subsidence if the damage occurs within a 30-degree angle of draw from the edge of underground workings. The rule in essence places the burden of proof on the mine operator for any alleged damages within this zone. The problem is in interpreting how this presumption would actually work. For example, it is unclear what active role the regulatory authority would play in the site investigation to determine the validity of subsidence damage claims. The presumption also appeared to be based on a nation wide general angle of draw that limited consideration of regional geotechnical aspects of subsidence.

Recent Court Decision on the March 31, 1995 Federal Register

Two specific rule issues were overturned in the United States Court of Appeals for the District of Columbia, Circuit Court, a decision was rendered on April 27, 1999 in the National Mining Association v. Bruce Babitt, Secretary, United States Department of the Interior et al. The court ruled that the angle of draw of 30-degrees was arbitrary and capricious and lacked scientific support. Therefore, the presumption of guilt

has been overturned because the survey was based on the angle of draw. The same problem with the validity of the angle of draw caused the court to overturn the requirement to conduct pre subsidence condition surveys. The court did find in favor of both the planned subsidence minimization of damage requirement and the requirement to repair or compensate despite the possession of pre-existing subsidence agreements recognized by state common law.

Conclusion

The regulation of subsidence impacts continues to be an important issue for both land owners residing over coal fields and the coal industry. The creation and enforcement of the governing regulations must strive to strike a balance between the coal company's legal rights and the rights of the surface owners. As evidenced by the recent court decision, regulations drafted with too many details can prove to be counter productive. Coal regulations drafted on a national level should consider regional differences and be general enough to allow states flexibility in achieving established performance goals. The ultimate goal should be to determine how best to protect the public and the environment while working with the industry to maximize the utilization of our coal resources.

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