



25th Anniversary of the Surface Mining Law

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About the 25th Anniversary

On August 3, 1977, the Surface Mining Law¹, which provides authoirty for regulating coal mining and reclamtion on public and private lands and reclaiming mines abandoned before that date, was signed by the President. Since that time there have been many advances in mining and reclamtion techniques and on-the-ground coal mining reclamation accomplishments have been monumental.

In 1967, the Interior Department published a special report, *Surface Mining and Our Environment*², describing the environmetal impacts of mineral production in the United States by surface mining methods. In 1977, the Interior Department began the task of regulating surface coal mining reclamation following enactment of national legislation that year. In 1987³, 1992⁴, and 1997⁵acknowledging that much remained to be done, the Interior Department's Office of Surface Mining presented special reports describing how environmental protection and land reclamtion have been built into the process of coal mining in the the United States, as required by the Law. Today, 25 years after Congress passed the Surface Mining Law, successful land reclamtion and environmental proteciton have become routine and national coal production is at record breaking levels.

During this 25-year period, more than 5.3 million acres of land was permitted and more than 23 billion tons of coal mined. This Law has literally changed the face of the earth in America and coal remains a vital part of out nation's energy future. Coal mine operators now reclaim land and protect the natural resources as they mine. And, when mining and reclamation are completed the land closely resembles the landscape before mining. Today, mining and reclamtion are a temporary use of the land and when properly done, productive long-term land uses are all that remains when mining is completed.

Surface Coal Mining Reclamation: 25 years of Progress, 1977-2002

**A report on the protection and restoration of the Nation's land
and water resources under the Surface Mining Law**

**United States Department of the Interior
Office of Surface Mining
Washington, D.C. 20240
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Surface mining of coal involves removing overlying soil and rock in order to expose the coal, which typically is 30-90 feet underground. Compared to underground coal mining, surface mining generally costs less, is safer for miners, and usually results in more complete recovery of the coal. However, it also results in much more extensive, though temporary, disturbance of the land, which can cause serious environmental problems unless controls are thoroughly followed and the mined land is carefully reclaimed.

The earliest commercial U.S. coal production began in the 1740's at the Richmond, Virginia coalfield. Beginning in 1807, mining became important enough for the federal government to begin keeping statistics on annual production. During those early years of coal mining, reclamation of mine sites was not required by law; however, in the 1930's, as surface mining became more widespread, the idea of mandatory environmental protection and reclamation started to grow. In 1939, West Virginia enacted the first law to regulate the coal mining industry. Similar laws were enacted by Indiana in 1941, Illinois in 1943, and Pennsylvania in 1945. During that period, coal production accelerated greatly and the surface mining of coal became much more prevalent. During World War II, the demand for coal took priority over environmental concerns, with little consideration for reclaiming the land after mining. Mining **pits** were not **backfilled**. Dangerous **highwalls** were left exposed. Trees and other vegetation were buried by waste material that was simply dumped down the slopes below mines. **Topsoil** was buried or allowed to wash away. **Landslides** formed on unstable hillsides. Slopes eroded rapidly because of the lack of vegetation. Polluted water collected in mine pits. Streams became clogged with sediment. Streams and rivers were frequently polluted by **acid mine drainage**. This vivid image of surface coal mining remains indelible in the minds of many Americans, who remain unfamiliar with modern surface coal mining methods and the changes brought about by the Surface Mining Law.

Introduction



The Surface Mining Law established a cooperative program between the states and the federal government to prevent the abuses of coal mining that had prevailed in many areas. Prior to the Law, coal mining often left a barren, unreclaimed landscape such as this view in eastern Tennessee. Although all active coal mines are now required to be reclaimed, many people incorrectly envision today's surface coal mining still looking this way.

During the 1950's and 60's, coal production continued to increase and more coal producing states instituted regulatory programs. Many required permits for mining. Some included inspections. A few made operators post **performance bonds** to guarantee reclamation when mining was completed. However, due to the variations in those individual programs, it cost less to produce coal in states with less stringent reclamation requirements, giving operators in those states an economic advantage, generally at the expense of environmental quality.

With the 1970's came a surge in the demand for coal resulting from the nations need for increasing electric power generation, the uncertain supply, and increased cost of imported petroleum-based fuels. The resulting increased coal production prompted a series of state laws, aimed at controlling the environmental effects of surface mining. During this period North Dakota, Wyoming, Colorado, and Montana passed laws to regulate mining and reclamation.

The continuing lack of uniformity among the state surface mining programs and the increase in unreclaimed land and associated pollution of water and other resources caused a growing demand for nationwide regulation of surface coal mining. After many years of debate, Congress passed the Surface Mining Law, which was signed into law August 3, 1977. The Law established a coordinated effort between the states and the federal government to prevent the problems that had characterized surface and underground coal mining in the past. It also required a balance between the Nation's call for environmental quality and its need for energy resources.

Two major programs were created by the Surface Mining Law:

- A regulatory program that established standards and procedures for approving **permits** and inspecting active coal mining and reclamation operations both surface and underground; and
- A reclamation program for abandoned mine lands, funded by fees that operators pay on each ton of coal mined, to reclaim land and water resources adversely affected by pre-1977 coal mining. In 1990 Congress expanded the law to include reclamation of mines abandoned after passage in 1977.

The Office of Surface Mining was created by the Surface Mining Law as a new federal agency within the Department of the Interior. The Office of Surface Mining was charged with the responsibility for preparing the regulations and for assisting the states financially and technically to carry out on-the-ground regulatory activities. Today, the Office of Surface Mining strives to maintain consistency among state programs and ensure compliance with the law and regulations through oversight of state programs.

Reclamation of this 200-acre steep-slope **contour mine** in eastern Kentucky exemplifies the intent of the Surface Mining Law. With proper planning and effective site management, both economical mining and successful reclamation can be achieved. This view, five years after mining was completed and the site reclaimed, shows how natural plant succession has resulted in native trees and shrubs becoming established and reforestation quickly progressing.



Even after years of Congressional debate, the Surface Mining Law was considered unworkable by many people. Further, some feared that the Law would be an economic disaster for the coal industry because of the increased operational costs of environmental safeguards and of reclaiming surface mined lands. Those fears, which actually delayed final approval of surface mining legislation until 1977, proved to be mistaken. Instead, the coal industry has met the challenge, using ingenuity and modern technology to operate successfully and responsibly within the law. The result is clear: surface coal mining has truly become just a temporary use of the land. Reclamation begins even before mining ends in an area, so that without delay the land is either returned to its original use or is improved for new uses that benefit both landowners and communities. So successful is the process in most instances that there is literally nothing to see when the process is complete, and the reclaimed land blends back into its surroundings.

Successful implementation of the Surface Mining Law by state and federal agencies hasn't come easily. The technical problems of reclaiming surface mined land are complex, and the law enacted to protect the environment during mining covers every aspect of coal mine operations. Not every operator has complied. During the past 25 years, and especially during the early part of that period, the problems created by a small number of irresponsible mining operators created virtually all the public attention, while there was comparatively little recognition for the majority of operators who achieved excellent reclamation and complied with the law.

The Office of Surface Mining and the corresponding state regulatory and Abandoned Mine Land Reclamation programs have formed an effective relationship that is fundamental to the implementation of the Surface Mining Law. Early in the evolution of the program the Office of Surface Mining focused its oversight activities on the states procedural compliance with processes and procedures. Currently the evaluation focuses more on end results and on-the-ground success of meeting the Surface Mining Law's environmental protection and public participation goals.

This report, which updates the Office of Surface Mining's 20th Anniversary progress report⁵, deals with the accomplishments of the regulatory and abandoned mine land reclamation programs after 25 years of mining and reclamation under the law. Abundantly illustrated, this report presents a summary of the Surface Mining Law requirements, Program Implementation highlights, and short case studies showing active mining operations that have achieved or surpassed what the architects of the Surface Mining Law envisioned and a successful abandoned mine land reclamation project that is typical of the thousands of similar projects that have been completed throughout the country. It is a view showing on-the-ground conditions at the 25th anniversary of the Surface Mining Law.

Statistical information for implementation of the Surface Mining Law are provided in the Office of Surface Mining's Annual Reports which are all available in electronic format on CD-ROM and the Office of Surface Mining's web site (www.osmre.gov). This information includes state and national statistics for: coal production, number of mines, enforcement action – inspections and citations issued, acreage permitted, acreage of reclamation bonds released, funding and grants, and Abandoned Mine Land reclamation. This report is available in both printed and electronic format (see www.osmre.gov/25thanniversaryreport.htm for the electronic copy). Additional information or printed copies of this report may be requested electronically at the web site or by calling or writing to:

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Important terms commonly used to describe mining and reclamation conditions or techniques appear in **boldface type** in the text the first time they are used and are explained in the glossary on page 40.

Regulatory Program

The Surface Mining Law contains five principal regulatory provisions that form the basis for protecting people and the environment during coal mining and ensuring prompt land restoration afterward. These are carried out by the 24 **primacy** states and the Office of Surface Mining in federal program states and on Indian lands.

Performance Standards

Performance standards are intended to ensure that all surface coal mining is conducted in a way that protects the environment and the public and ensures that the mined land is restored to productive use following mining. The standards provide a basic level of compliance during coal mining and reclamation.

Permits

Before developing a surface or underground coal mine, an operator must have a permit issued under the Law. An application for a permit to conduct a coal mining operation is a detailed document that consists of text and numeric data describing the proposed mining and reclamation. Information must be furnished on premining environmental conditions, existing land use, proposed mining and reclamation, how the performance standards will be met, and the postmining land use. This provides the regulatory authority with the information necessary to determine that the operation can be conducted in accordance with the regulations.

Performance Bonds

Before a permit can be granted, an operator must post a performance bond sufficient to cover the cost of reclaiming the site in the event the operator does not complete reclamation. The bond is not fully released until all performance standards have been met and full reclamation of the site (including permanent revegetation) has been determined to be successful – after five years in the East and Midwest, and after 10 years in the arid West. However, the bond can be partially released as various phases of reclamation (backfilling, regrading, revegetation) are successfully completed.

The Surface Mining Law



Mining requires the use of explosives to break up rock layers in the overburden and sometimes the coal itself. To prevent damage to nearby dwellings and other structures, blasting must be carefully planned and carried out by qualified blasters. Before the Surface Mining Law, blasting could be performed by untrained personnel and sometimes damaged nearby dwellings. Now blasters must be state-certified. A pre-blasting survey of dwellings within a half-mile of the mine is performed to identify any conditions that may require special procedures. Signs and audible warnings are provided before blasting, and access within the blasting area by unauthorized persons is restricted.

This Office of Surface Mining inspector is checking the blasters certification during a mine inspection of a Tennessee surface mine.

Inspection and Enforcement

If a violation of the Surface Mining Law or of a state surface mining and reclamation law is observed, an inspector issues a **notice of violation** to the operator. The violation must be corrected within a specific time, and the operator may also have to pay a fine based on the severity of the violation. If the violation is not corrected, a **cessation order** is issued to stop active coal mining immediately until the infraction is corrected, and the operator must pay a fine. If a violation is especially serious (for example, creates an imminent danger to public health or safety or causes significant damage to land, air, or water resources) the inspector immediately issues a cessation order. An operator must correct all violations in order to continue work or obtain permits for new mines.

Lands Unsuitable For Mining

Congress recognized that certain coal deposits cannot be mined without permanent damage to unique cultural or natural resources. As a result, the Surface Mining Law protects those resources in two ways:

- It prohibits mining within the boundaries of national parks, forests, wildlife refuges, trails, wild and scenic rivers, wilderness and recreation areas; in areas which will adversely affect sites listed on the National Register of Historic Places; and within a restricted distance of occupied dwellings, public roads, buildings, parks, schools, churches, and cemeteries; and
- Provides a process that allows anyone whose interests may be adversely affected by proposed mining to petition to have specific lands designated unsuitable for surface coal mining.

Abandoned Mine Land Reclamation Program

The Abandoned Mine Land Program provides for the restoration of eligible lands mined and abandoned or left inadequately restored before passage of the Surface Mining law.

Fees of 35 cents per ton for surface mined coal, 15 cents per ton for coal mined underground, and 10 cents per ton of lignite mined are collected on all active coal mining operations. The fees are deposited in the U.S. Treasury's interest-bearing Abandoned Mine Reclamation **Fund**, which is used to pay reclamation costs of abandoned mine land projects. Expenditures from the fund are controlled through the regular congressional budgetary and appropriations process. The Surface Mining Law specifies that 50 percent of the reclamation fees collected in each state with an approved reclamation program, and from Indian lands where the tribe has an approved reclamation program, are to be allocated to that state or tribe for use in its reclamation program. The remaining 50 percent is used by the Office of Surface Mining to fund emergency projects and high-priority projects in states without approved Abandoned Mine Land programs; to fund the Small Operator Assistance Program⁶; to fund additional reclamation of abandoned mine problems directly through state reclamation programs; and to pay collection, audit, and administration costs.

In some states, particularly in the West, problems stemming from abandoned non-coal mines are more severe than those caused by coal mines. The Office of Surface Mining may approve the expenditure of Abandoned Mine Land funds to abate hazards on those lands where the states certify that threats to public health and safety exist from non-coal sources and that all abandoned coal sites have been addressed.

Emergency Projects

Emergency projects are those involving abandoned coal mine lands that present an immediate danger to the public health, safety, or general welfare. Typically, emergencies include landslides near homes and across roads, subsidence occurring under houses and public



Reclamation at this West Virginia Abandoned Mine Land site eliminated 6,000 linear feet of highwalls and sealed four mine openings. To prevent future damage, an under-drain was placed along the length of the highwall to collect drainage from **auger mining**. Since no topsoil was available, the **spoil** was direct-seeded with a special seed mix. Today this landscape bears little resemblance to its appearance before the abandoned highwalls and spoil were reclaimed.

buildings, mine and coal waste fires, and open shafts discovered near populated areas. Because public health, safety, and property can be seriously threatened by abandoned mine emergencies, the capability for rapid response is critical. Reported emergencies are usually investigated within 24 hours and abated in less than a month. Emergencies are addressed through the Office of Surface Mining's three Coordinating centers (in Pittsburgh, Pennsylvania; Alton, Illinois; and Denver, Colorado) and by states which have established their own emergency reclamation programs (Alabama, Alaska, Arkansas, Illinois, Indiana, Kansas, Missouri, Montana, North Dakota, Ohio, Oklahoma, Virginia, West Virginia) During the 25 years under the Surface Mining Law more than 6,500 emergency projects have been completed.

High-Priority Projects

The Law sets out six **priorities** of eligibility for reclamation funding. The highest—priority projects protect public health, safety, general welfare, and property from the potential danger (as opposed to imminent danger, which categorizes them as emergency projects) and from the adverse effects of abandoned coal mining problems. The Law requires that these priorities be reflected when selecting the order of reclamation projects.

Subsidence Insurance Program

The Surface Mining Law authorizes states and tribes with approved reclamation programs to use Abandoned Mine Land funds to establish self-sustaining, individually administered programs to insure private property against damage caused by land **subsidence** resulting from abandoned underground coal mines. Such programs are in operation in Colorado, Indiana, Kentucky, Ohio, West Virginia, and Wyoming.

Clean Streams Program

In 1995, the Clean Streams Program⁷ began as a partnership to clean up acid mine drainage problems using private and governmental resources. To date 76 projects have been completed and a growing number of citizen groups are becoming involved with this unique stream restoration program.



The Surface Mining Law requires the Office of Surface Mining to maintain an inventory of eligible abandoned coal mine lands that meet the public health, safety and general welfare criteria used to prioritize problems. State and Indian Abandoned Mine Land Programs identify the sites, collect data, and enter it electronically into the inventory system. The inventory currently contains 17,231 abandoned mine land problem areas.

At this abandoned Colorado mine site (above) a state reclamation specialist is collecting information that includes the number of open portals and their proximity to a nearby road. This information is used when setting priorities for projects that will be reclaimed using the annual Abandoned Mine Land grant provided to the state.



Abandoned mine openings such as this **adit** in Kentucky (right) are extremely dangerous. Partially caved in at the entrance, this example is typical of abandoned mine openings found throughout the country in areas where underground coal mining has taken place.

A primary objective of the Surface Mining Law is to establish uniform national regulatory standards for protecting the environment during mining and for reclaiming land after it is disturbed by current and future coal mining. In recognition of the wide range of climatic and geologic conditions in coal-producing areas, Congress provided that, with Interior Department approval, individual states could establish their own programs for regulating surface and underground coal mining and reclamation on private land. The standards for state programs must be at least as effective as the federal standards.

Initial and Permanent Regulatory Programs

Congress recognized the importance of establishing regulations to implement the Law as quickly as possible, while recognizing that the preparation of such complex regulations would be a lengthy process following enactment. Consequently, a two-phase schedule was established. An abbreviated initial program was put in place immediately, followed by a more extensive and detailed permanent regulatory program. The initial program regulations were published in December 1977, and mine permits issued by states after February 1978 were required to conform with those regulations. Regulatory provisions contained in the initial program included 12 basic performance standards, continuation of existing state permitting, bonding, and enforcement processes (although if those features did not already exist, they did not have to be added), a federal inspection frequency of once every six months, joint state and federal inspection and enforcement in states that had existing programs, and the prohibition of mining in the specific areas listed for special protection in the Surface Mining Law.

Permanent program regulations were published in March 1979, following extensive review and comment from the public, including the coal industry and environmental groups. The regulatory provisions in the permanent program expanded those in the interim program by including the implementation of all performance standards contained in Surface Mining Law, a new permitting process, a requirement for performance bonds, an increased inspection frequency (one per month), a new enforcement process, and a process for designating lands unsuitable for surface mining. The regulations for the permanent program have been revised several times since 1979; more revisions can be made as needed or when new mining and reclamation techniques are developed. Such changes were anticipated by Congress; in fact, a provision in the Law for experimental practices encourages advances in mining and reclamation techniques, and people can petition the Office of Surface Mining to consider additional regulations they think are needed.

Program Implementation



The first permanent program mining permit under the Surface Mining Law was issued in December 1980 by the Montana regulatory authority. The permit authorized mining of a 1,738-acre site by the Western Energy Company, Colstrip, Montana. Seven years later, with mining completed, the site was returned to grazing land and is being used by a local rancher.

State Regulatory Programs

States have the principal role in implementing the Law. For a state to have primacy (authority to regulate coal mining operations within its borders) it must enact a program that demonstrates its capability to carry out the provisions of the Law. Specifically, states are required to:

- Establish laws that are no less stringent than those standards contained in the Surface Mining Law and that regulate all critical aspects of surface coal mining and reclamation operations;
- Provide penalties for violations of the laws, regulations, and permit conditions;
- Create an agency with sufficient administrative and technical personnel and adequate funding to operate the program; and

- Establish a process for the effective implementation, maintenance, and enforcement of a permit system for all coal mining operations.

Once a state's program is approved by the Secretary of the Interior, the state has primacy – that is, the state becomes the **regulatory authority** for surface and underground mining of coal on private (non-federal and non-Indian) lands within its borders. From February 1980 to March 1983, 25 states passed legislation and developed regulations consistent with the federal requirement and thus attained primacy. The expenses primacy states incur in operating their approved regulatory programs are shared by the Office of Surface Mining on a 50-50 basis.

Federal Regulatory Programs

The Surface Mining Law encourages state authority over mining and reclamation. However, if a state chooses not to develop its own program, the Office of Surface Mining is required to regulate all surface and underground coal mining and reclamation operations within that state. The Office of Surface Mining is also required to regulate all such operations if the state does not implement, enforce, or maintain its program adequately.

Eleven states with coal reserves elected not to establish their own regulatory programs. Of these, only Washington has active coal mining. Tennessee repealed its regulatory program in 1984, and there are currently 12 states (Arizona, California, Georgia, Idaho, Massachusetts, Michigan, North Carolina, Oregon, Rhode Island, South Dakota, Tennessee, and Washington) with federal programs in effect.

The Office of Surface Mining also regulates coal mining on Indian lands and is assisting four Tribes (Crow, Hopi, Navajo, and Northern Cheyenne) in developing programs for regulating coal mining operations on Indian lands, in anticipation of future authority from Congress to approve Indian primacy programs.



Top soil is important in reestablishing native vegetation and crop, forage, and timber production. Subsoil and weathered rock overburden beneath the topsoil supply additional nutrients and moisture for plant growth. The removal and replacement of all topsoil is required by the Surface Mining Law unless it is demonstrated that selected subsoil or spoil is better suited to grow plants. Topsoil is removed as a separate layer before mining and is either spread on nearby regraded areas or, if necessary, temporarily stockpiled. Topsoil is spread to the appropriate depths for the approved postmining land use. **Prime farmland** topsoil and subsoil may be handled with special care by using spreading techniques that minimize compaction that would hinder root penetration and water absorption by new seedlings. At this Midwest reclaimed mine site top soil was carefully handled and the crops continue to yield above average production levels.

Federal Lands Programs

The Surface Mining Law requires the Secretary of the Interior to implement a program for all surface and underground coal mining and reclamation on federally owned land – a feature that is significant because the federal government owns vast coal reserves. In the West, 60 percent of the 234 billion tons of identified coal reserves is federally owned. However, any state with an approved regulatory program may enter into a cooperative agreement with the

Secretary of the Interior to regulate coal mining and reclamation on federal lands within the state. Currently twelve states (Alabama, Colorado Illinois, Montana, New Mexico, North Dakota, Ohio, Oklahoma, Utah, Virginia, West Virginia, and Wyoming) have signed cooperative agreements to regulate mining and reclamation operations on federal land.

State & Indian Land Reclamation Programs

As soon as states established approved regulatory programs, they were eligible to submit Abandoned Mine land reclamation programs to the Secretary of the Interior for approval. Beginning with Texas in 1980, the Office of Surface Mining has approved state reclamation programs so that currently all primacy states except Mississippi have approved Abandoned Mine Land reclamation programs. In addition, during 1988 and 1989 the Navajo, Hopi, and Crow Tribes received approval for their Abandoned Mine Land programs. Once states gain approval of their reclamation programs, funds are distributed through grants to correct abandoned mine problems through reclamation. By September 30, 2002, more than \$6.5 billion had been collected for the Abandoned Mine Reclamation Fund, with more than \$3.2 billion distributed to states/tribes for completion of reclamation projects.

Federal Reclamation Program

Until states had approved Abandoned Mine land reclamation programs, the Office of Surface Mining completed both high-priority and emergency reclamation projects. Currently work done under the Federal Reclamation Program is principally high-priority reclamation projects in non- primacy states and tribes, and emergency problems in states and Indian reservations that do not operate their own emergency programs.



For many years the trees used for the National Christmas Pageant of Peace tree-lighting ceremony on The Ellipse in Washington, D.C. were grown on tree farms located on reclaimed mine land. One year they came from this Christmas tree farm in Garrett County, Maryland that was previously a reclaimed coal mine. Following the month-long pageant, the balled-and-burlaped trees were transported to permanent locations at parks throughout the Washington, D.C. area.

In 1991, Solar Sources, Inc., a Midwest coal mining company established in 1974, received an Office of Surface Mining Award for reclamation at its Sky-Point Mine near Lynnville Indiana. In 2002, this operation was awarded the Gold 25th Anniversary Award – the highest award ever presented by the Office of Surface Mining.

The company has been widely recognized as a leader in mine reclamation. This outstanding work had its roots during the mid-1970's in Gibson County, Indiana where they reclaimed mine land to **approximate original contour** standards and reestablished agricultural and recreational land uses before passage of the Surface Mining Law. Solar Sources' Sky-Point Mine is most likely the finest example of restoration to the original contour and soil replacement for agricultural land uses achieved under the Surface Mining Law.

The mine, one of three conducted by Solar Sources in Warrick County, Indiana since 1979; produced over five million tons of coal; and considering the nine different landowners involved at Sky-Point, the intertwining network of public roads and streams, close proximity of occupied houses, and long history of productive agriculture, one might describe this as very difficult mining and reclamation. Historically the Sky-Point Mine had been a very slow moving operation prior to Solar's acquisition from Four Rivers Coal Co. in 1984. The mine began in June, 1979 under an Interim Program permit and by the time of the acquisition had mined only about forty acres. Solar Sources began mining under a contractual agreement with Four Rivers Coal Company while negotiating for the final transfer of the properties and application to place the mine under a Solar Sources permit.

Solar Sources Lynnville, Indiana



The first priority in reactivating the mine was to begin soil removal ahead of the mining to insure reclamation to equal or better agricultural conditions. A large amount of the mine land contained soils that are exempted by the Regulatory Authority from soil recovery operations because they are either normally wet or steep and an alternate material can be substituted. However, Solar Sources has removed and replaced these difficult soils without using alternate materials. Additionally, the soil has been replaced to prime farmland depths on all mined areas even though nearly 600 acres of the 900 permitted acres are non-prime farmland and could have been replaced at the 12 inch replacement depth required for non-prime pasture and hay.

The close tie with the landowners using agreements of both written and "handshake" variety have been a key to the success of this mining and reclamation. Some of the landowners had been farming their property for more than 50 years and expected to continue farming after the mining and reclamation. The company's outstanding landowner policy has been of great benefit in avoiding conflicts and getting the landowners involved and quickly back onto their land. The effectiveness of Solar's outstanding landowner policies can be seen at the on-site bond release inspections where no landowners objected to any part of the proposed releases.

An important element of the mine operator/landowner agreements include soil preparation by the mining company and tillage and seeding by the landowner, with the landowner retaining the crop produced.



The Nora Schumacher residence (above) was adjacent to the mining and reclamation operation and other than a temporary disturbance of the land surrounding the property there were no problems. The company worked closely with the residents near the mine site before, during, and after the mining. This progressive "good neighbor" policy resulted in the kind of mine operator/land owner relationship that was envisioned by the architects of the Surface Mining Law.

Permanent impoundments included in the reclamation provide farmers with water for livestock, greatly add to the wildlife habitat, and increase recreational value of the land. This large permanent impoundment at the reclaimed Sky Point Mine (right), provides a lake setting for the surrounding residential property.



Solar's work in preparing the land for farming included, grading and stabilizing drainage through the fields where intermittent or ephemeral streams previously ran; building **riprap** check dams, placing fiber and plastic erosion control matting; grading and leveling slopes to prevent low spots that would hinder farming, and constructing temporary and permanent erosion control **terraces**. Soil preparation included 6 tons of agricultural lime per acre and 1,000 lbs./acre of fertilizer. Medium depth tillage was completed by a chisel plow that incorporated the lime and fertilizer into the top 14 - 16 inches of soil in a uniform manner. Chisel plowing normally brings a variety of undesirable objects to the surface, such as rocks, fence wire, stumps, as well as bricks from old house foundations. These objects are removed by hand picking them from the fields. Solar employs two or three temporary workers each summer and fall who clean the reclaimed areas of debris which could harm farming equipment. Following at least one chisel plowing and

sometimes two, the reclaimed fields are further cultivated by a field cultivator. Using a grain drill, a starter mix of fertilizer containing nitrogen is then applied with the seed mix. Straw dams were installed in some areas of concentrated water flow and machine mulch using a bale mulcher was applied on larger areas prone to sheet or rill erosion.

Mining the Nora Schumacher property was a challenge. Solar had to mine and blast within 63 feet of the Schumacher residence, 20 feet of the barn, and to the right of way of the state road. There were no problems and following mining and reclamation the property was seeded in the fall and now produces three cuttings of high quality alfalfa and orchard grass hay.



The success of topsoil handling is measured by the land's crop productivity after reclamation. Crops grown on this reclaimed farm land have consistently been above required yields (right).

In 1991, the mining operation was in close proximity to surrounding homes. This area had been family owned since the 1920's and contained deep erosion ditches, the old homestead and barnyards, and an old tire dump filled one of the creek beds. When mining was completed this land was also reclaimed to prime farmland soil standards though many areas of the farm were not prime soils before mining. Today, the landowner enjoys drainage terraces and cropland that has continually produced high corn, soybean and wheat yields.

The final property mined at Sky-Point is owned by Solar Sources. This provided a unique opportunity in what could be called land-use banking and an good solution to a problem raised by two of the mine's actively farming land owners. Because reclamation improved the land for farming, two landowners did not want to replace their forest and wildlife acreage. Solar offered to accept those land-uses on its own property and distribute its acreage of prime farmland among the farms not reestablishing the forest and wildlife uses. The agreement was a win-win situation for everyone.



The farm operators did not have to receive their premining tree acreage and none of the acreage of prime farmland soils was lost. And, although Solar's land was reestablished with tree planting it was reclaimed to prime soil replacement standards.

Solar Sources has reclaimed the Sky-Point Mine to the diverse land uses of cropland, pasture and hay, forest land, wildlife habitat, and water impoundments. The operation restored prime farmland soil depths throughout the entire mine area resulting in reclaimed land that has the capability to support a variety of future uses. The end product at this coal mine has been efficient recovery of the coal resource and reclamation that has resulted in agricultural land that is superior to conditions before mining. This is mining and reclamation that was originally envisioned by the architects of the Surface Mining Law.

The two aerial photographs (top) show this site being mined and following reclamation. Today, this rural landscape looks just as it did before mining began.

Successful soil replacement can also be seen in the hardwood trees planted on the reclaimed land (center). There was minimum loss at planting and the tree seedlings have quickly become established.

The economic benefits of this mining operation can also be seen on the reclaimed land. New roads were constructed as part of the reclamation and farm buildings have been improved and modernized -- a direct result of royalty money paid to the landowners for mining their property. Today, this is a prosperous agricultural community that has benefited from the temporary coal mining that took place here (bottom).

The Bellaire Corporation, an affiliate company of the North American Coal Corporation, Indian head Mine was one of the oldest surface mines in the country. Production began in 1922 when it was known as the Zap Colliery Company. Surface mining was done using a steam operated 2 ½ cubic yard dragline which was moved on skids and large wooden rollers. A one yard steam shovel that was mounted on wooden wheels was used to load the coal in rail cars that went to the company tippie. At that time the mine produced 500 to 600 tons of **lignite** coal per day. When mining ended in 1992 production had grown to 1.2 million tons per year.

The Indian Head Mine has received six Office of Surface Mining awards for its outstanding mining and reclamation – three National Awards, a Best-of-the-Best Award, a 20th Anniversary Hall of Fame Award, and in 2002 the Silver 25th Anniversary Award. Since 1977, the Indian Head Mine has completed some of the most outstanding reclamation in the country and today with mining and reclamation finished the land is indistinguishable from the premining landscape.



Bellaire Corporation
Beulah, North Dakota



The mine contained a 2,909-acre **permit area** under the Surface Mining Law and about 2,184 acres were disturbed. All of this disturbed acreage has been reclaimed to agricultural land, and is now being used for small grain production, livestock grazing, and haying. The reclaimed lands resemble the natural surroundings and are virtually indistinguishable – an important value to many people in the community since the mining occurred within one mile of the cities of Beulah and Zap, North Dakota, and adjacent to a major state highway.

A major accomplishment at the Indian Head Mine was the preservation of wooded draws. Wooded draws are a natural feature of the North Dakota landscape that provide critical habitat for wildlife and a unique character to the natural landscape. Traditionally mining operations mine through these draws and then reclaim them. Although this has met with success, the Indian Head Mine took a new look at working with these unique natural features – they left the wooded draws alone.

Instead of mining through them, they mined around them.

The undisturbed wooded draws contain one of the largest diversities of wildlife in the mine area. The shrubby habitat provides ample shelter, food, and protection for many wildlife species. These wooded stands are now surrounded by reclaimed native rangeland that is used for cattle grazing and in addition to the wildlife benefits they provide, draws offer the cattle protection from the hot summer sun. The company's recognition of the wooded draws' unique value, and its innovative handling of them, has ensured the vegetation remains in its pristine state. The extra work needed to accomplish this reclamation has eliminated environmental impacts and provided reclamation that is already part of the surrounding unmined North Dakota landscape.



The aerial views of the site during mining and following reclamation show the undisturbed wooded draws, the extent of the land that was mined around, and reclamation that was immediately part of the natural landscape (above).



Another outstanding feature of the Indian Head Mine reclamation is the reestablishment of cropland and native grassland. At the Indian Head Mine all the land was reclaimed for agricultural use, just as it was before mining. This reclaimed land has consistently exceeded the required standards for revegetation success. For example, cropland has exceeded the required standard by 20 percent, prime farmland by about 22 percent, hay and pasture land by 45 percent, and native grassland by about 35 percent

Preserving the wooded draws eliminated the years necessary to reestablish mature vegetation. Wildlife found in the wooded draws includes a broad range of small mammals, big game animals, and birds. Today, the wooded draws are integral part of the land use, with cattle grazing on the surrounding reclaimed rangeland and using the wooded draws for shelter.

The Indian Head Mine incorporated many features into the reclamation efforts and management of the reclaimed land that are not typically done and are above the requirements of the Surface Mining Law. Some of these included: implementation of full scale livestock grazing and cropping early in the liability period, cooperative landowner involvement (especially considering 93 percent of the reclaimed land at the Indian Head Mine was privately owned), improved topography, careful post mining landscape design and land use planning, construction of permanent fencing and stockpond facilities, and replacement of shelter belts.



The sloping topography, marginal soils, and **semiarid** climate made reclamation difficult; however, the land is being returned to the landowners better than it was before mining. (right).

Today, with the mining and reclamation completed, the only reminder that this land is not just another section of natural North Dakota landscape is a company sign by the side of the highway (far right).

**RECLAIMED SURFACE
COAL MINE LAND**

MINED: 1989-1992

RECLAIMED: 1991-1993

INDIAN HEAD MINE

**BELLAIRE
CORPORATION
INDIAN HEAD MINE**

ADDRESS: PO BOX 299
BEULAH, ND 58523

TELEPHONE: 701-873-4714
701-873-7227

PERMIT NUMBERS: NAIM-8121
NAIM-8201
NAIM-8304
NAIM-8504

NO TRESPASSING OR SOLICITING

The Trapper Mining Inc., Trapper Mine is located in Northwestern Colorado. The mine began in 1977 and is operating under a 10,300 acre permit. Mining operations are conducted along the Northern side of the Williams Fork Mountains and recover multiple seams of high-quality low-sulfur **subbituminous** coal for use in the adjacent Craig Station power generating facility.

This is a high elevation mine, with ranges of 6,300 to 7,400 feet above sea level. The predominant vegetation at the mine site is mountain shrubs in the lower elevations and aspen in the higher areas. The average annual precipitation is 16.7 inches, with roughly one-third of this occurring as snowfall.

During the initial permitting process and for many years after starting the mining operation, grave concerns were raised asserting the potentially devastating effects of mining on wildlife populations in the area. Twenty-five years later, those concerns have proven to be completely unfounded.

Trapper Mining Inc.
Craig, Colorado



Baseline aerial winter surveys of big game animals in the Trapper Mine area were conducted before mining began in the 1970's. Aerial surveys were again carried out in the mid-1980;s and again during the winters of 2000 and 2001. Survey results indicate that overall big game use within the permit area has increased dramatically. Elk numbers have increased by an order of magnitude, while pronghorn antelope have increased from zero animals before mining to their current status as a significant presence in the mine area. While these populations have increased, mule deer numbers have remained stable since mining began. Not only have big game animals increased in numbers on the mine and surrounding areas; but, the animals are preferentially selecting reclaimed lands as a forage base. An aerial count of nearly 4,000 head of elk was documented on the Trapper Mine reclaimed lands during December 1999, a number that was more than the entire elk populations for some western states.

Populations of the Colombian sharp-tailed grouse in the Western states have diminished significantly. The species currently occupies less than 10 percent of its former range. Numerous factors, primarily related to habitat degradation resulting from land use changes, have contributed to this decline in population. On Trapper Mine reclaimed lands however, sharp-tailed grouse populations are thriving. In 2001, the average sharptail strutting ground density documented in northwestern Colorado was 0.07 strutting grounds/1,000 acres. On Trapper Mine reclaimed land there were 1.07 strutting grounds/1,000 acres, 14 times greater than the average.



A recent Trapper mine big game aerial survey data convincingly refutes the concerns voiced before mining operations began that big game species would move away from mining activities and habitat would be lost until mining activities ceased. To the contrary, this reclamation has proven to be a magnet for big game species and has become a highly preferred foraging area (above).

Even in areas of low rainfall sedimentation ponds are important in preventing offsite impacts of sedimentation. At the Trapper Mine **sedimentation ponds** are constructed below the active mining operation and collect all water before it leaves the mine site (right).



Columbian sharp-tails tend to establish dancing grounds on elevated knolls called leks, with low-growing vegetation and good visibility. At the Trapper Mine engineers and wildlife professional are focusing on the opportunity to incorporate similar land form features into the reclaimed landscape during regrading operations to accommodate the growing population of these birds.

Vigorous reclaimed plant communities anchor the reclamation achievement experienced at the Trapper Mine. Standard methodologies for reclaiming significantly disturbed lands are employed along with site-specific enhancements developed to maximize revegetation success. For example, Trapper uses diverse seed mixtures of native forbs, grasses, shrubs. Much research and planning goes into the selection of seed mixtures and seeding methods that will result in the most diverse reclaimed plant communities possible.

A primary Trapper Mine reclamation goal is the successful establishment of native shrubs on reclaimed areas for wildlife use. Mature shrubs are transplanted using front-end loaders from areas in advance of the mining operation and placed on areas that have been recontoured and topsoiled following the mining. Using these native shrubs, islands or groupings of about 250 plants have been established on the reclaimed land approximately 1,400 feet apart. Forage planted between the shrub islands on the reclaimed rangeland averages five times greater than that available in undisturbed mountain brush habitats.

In the final analysis, wildlife species may well be the primary direct beneficiaries of the reclamation at the Trapper Mine. Mine lands are being rehabilitated into stable and productive condition suitable for a variety of uses, including wildlife habitat, grazing, recreation, and crop production. However, the growing population of wildlife should continue to flourish the for years to come.





At the Trapper Mine Sharp-tailed grouse and their habitat are studied to determine the importance of special landscape features during reclamation. Results of the study will include guidelines for identifying, enhancing, and preserving critical habitat for these birds in Colorado (near left).

Public tours of the mining and reclamation operations are encouraged and hundreds of visitors have toured the site. Visitors can see each step in the mining operation, land reclamation process, and use of the coal in the adjacent Craig Electric Generating Station (below left).

Shrubs are an important part of many natural plant communities and have particular value as food and cover for wildlife. A front-end loader was used at the Trapper Mine to transplant shrubs from land that will be mined to areas being reclaimed. This transplanting method results in moving large plants with few losses of shrubs. Large deer and elk herds inhabiting the permit area and surrounding lands make extensive use of these shrub areas (far left).



The Sunshine Mine was located in Knox County, Indiana in the northwest corner of the city of Bicknell. Historical records indicate that Bicknell, established in 1869, had a population of about 4000 by 1907. The first local commercial coal mine was started in 1873, and by 1920 there were approximately 20 shaft mines in the area providing jobs for over 2,000 men. The need for coal during this period was fueled by the industrial demands of World War I.

The Sunshine Mine was an underground shaft mine, which began operation in 1936 and continued until 1959. Records indicate that three different companies operated this mine during its life-span. During the life of the mine approximately 2.8 million tons of coal were removed from the Hymera coal seam, which was approximately five feet thick and located at a depth of 128 feet.

The processing operations associated with the Sunshine Mine left behind 25 acres of **gob, slurry**, abandoned and derelict **preparation plant** and other buildings, trash, and other debris. This abandoned mine was adjacent to State Highway 67, a heavily traveled corridor connecting Bicknell and other outlying communities to Vincennes, the county seat. The east side of the site adjoined the Knox County Fairgrounds, which seasonally hosts the county fair and other community activities. The site is bounded on the west by Indian Creek, a small tributary of the White River and agricultural farmland is located to the north.

This abandoned mine site had been a detriment to the town of Bicknell. Travelers often referred to Bicknell as “the city on Highway 67 that had the ugly old coal mine at the edge of town.” Notoriety of this sort makes it very difficult to project a positive image of what is otherwise a very industrious community.

Sunshine Abandoned Mine Reclamation Project Bicknell, Indiana



Indian Creek receives all of the drainage from this abandoned mine site. Since the mine was abandoned in 1959, the creek has been negatively impacted by the presence of the coal refuse. Chemical degradation included not only the acid mine drainage derived from the **pyritic** coal refuse, but also the associated precipitation of heavy metals in the stream. Physically, the creek received heavy loads of sediment, washed from the barren, loose coal refuse material.

This site also sustained periodic occurrences of fire in the gob material. Gob pile fires are a significant source of air pollution and unpleasant odors.

The objectives of the reclamation project included: reducing the adverse off site contamination (chemical and physical) caused by the barren coal refuse area, eliminating air pollution and the dangerous abandoned structures, improving the aesthetic value of the area, and restoring the property to a productive land use.

Reclamation consisted of demolition and disposal of buildings, excavation and burial of coal refuse, covering the graded construction area with excavated **borrow material**, installing erosion control features, and revegetation of all disturbed areas.

At a cost of \$896,000 the reclamation of the Sunshine Mine was not a large project, but the difficulty of the work makes this site worthy of recognition. The extremely close working quarters required a high degree of coordination on the part of the contractor, and a design that was flexible enough to accommodate unforeseen discoveries during excavation.



Before reclamation the abandoned mine known as "the ugly old coal mine at the edge of town" contained derelict buildings, coal refuse that was causing sedimentation, and acid mine drainage pollution of nearby streams. In addition, frequent coal fires at the site were the source of significant air pollution and danger to unsuspecting visitors to the site (above).

Today most drainage from the reclaimed site and the immediate surrounding area is directed into a small man-made wetland. This wetland improves aesthetics, eliminates offsite sedimentation, and enhances the water quality of adjacent Indian Creek (right).



The coal refuse excavation and hauling operation was an integral part of this project. Approximately 232,000 cubic yards of coal refuse were disposed of in the excavated borrow pit.

During the course of the project, approximately 207,000 cubic yards of borrow material were excavated to provide the necessary space for the gob disposal. This was enough material to place a four foot thick soil cap over the resulting 32 acres of disturbance.

A total of 3,429 tons of lime were applied to provide an alkaline barrier between the **acid forming materials** and the soil cover. The four foot deep soil cap is thick enough to significantly reduce infiltration of rainwater into the gob material. This will reduce the potential for production of acid mine drainage that could leave the site via seeps or groundwater flows.

In addition to the soil cap, 4,985 linear feet of various erosion control features were installed. These included grass waterways, rock lined ditches, and terraces. Most drainage from the site and the immediate surrounding area is directed into a small wetland. This wetland improved the site aesthetics, eliminated offset sedimentation, and has enhanced the water quality of adjacent Indian Creek.

Reclamation has eliminated the dangers associated with the buildings and the health and safety problems of past gob fires. Infiltration of precipitation into the gob has been reduced and drainage is directed away from the site more quickly and efficiently, thus reducing acid mine drainage and off site sedimentation. The aesthetics have been greatly improved and the site now has potential for productive use.

This project also included the demolition and burial of two concrete buildings.

Pre-reclamation water sampling of Indian Creek just downstream from the site revealed pH levels of less than 3.0. The evaluation of water quality will determine the degree of success that has been achieved on this site. Early analysis of post reclamation water quality show values for pH have gone from a low of 2.7 to a high of 6.9. Reduced levels of total suspended solids, total dissolved solids, iron, manganese and sulfates are good indicators that the site is already on the mend as a result of the reclamation.



Reclamation at this abandoned mine site has eliminated the dangers associated with the derelict buildings and health and safety problems of past gob fires. Water infiltration into the coal refuse has been reduced and drainage is directed away from the site more quickly and efficiently, thus reducing acid mine drainage and off site sedimentation. The aesthetics have been greatly improved and the site now has potential for productive use (above).

The wetland above this rock gabion dam filters all the water before it flows down stream into Indian Creek. Since reclamation of the site was recently completed, there are no long-term measurements of the effects of the project. However, current post reclamation analyses of water quality have been positive and are a good indication that the reclamation will provide long-term improvement of nearby streams (right)



	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Regulatory Program											
State Regulatory Grants*	\$8,600	23,900	36,680	35,000	24,432	32,150	38,100	36,734	35,387	45,110	44,044
Annual Budget Total*	\$30,880	53,939	84,687	89,679	58,515	60,878	70,695	80,347	80,774	100,003	102,125
Acreage Permitted ⁸	173,815	358,008	341,342	379,862	291,946	445,386	584,747	328,684	310,226	221,465	225,485
Number of Mines ⁹	5,308	5,635	5,132	4,978	5,260	5,101	4,755	4,805	4,365	4,082	3,827
Coal Production* ¹⁰	417,188	747,558	803,821	760,179	893,304	769,833	847,395	871,551	869,721	867,962	925,023
Inspections Completed ¹¹	9,433	22,662	38,281	73,477	93,436	145,112	168,430	196,186	174,215	176,592	174,246
Citations Issued ¹²	1,028	5,823	8,262	6,998	9,485	15,469	13,700	12,019	12,993	12,572	10,652
Acreage of Bonds Released ¹³	32,054	62,499	62,937	78,352	129,253	91,118	167,813	114,715	60,153	106,710	140,332

Abandoned Mine Land Reclamation

Fund Collections* ¹⁴	\$156,757	190,567	205,312	204,844	215,044	195,945	223,115	214,262	213,841	216,963	169,372
Reclamation Grants* ¹⁵	\$0	2,754	7,651	11,749	89,732	162,880	237,976	238,128	124,963	157,237	121,289
Federal Reclamation Program* ¹⁶	\$15,875	21,835	39,376	29,364	41,680	23,064	26,452	39,371	28,715	24,592	13,662
RAMP Transfers* ¹⁷	\$5,000	10,128	10,106	10,280	18,339	6,155	10,582	9,800	9,019	9,400	15,000
Small Operator Assistance Program*	\$10,000	10,000	10,000	5,000	0	0	(11,499)	(2,000)	2,949	0	0
Annual Budget Total*	\$36,657	61,451	94,843	82,483	115,333	213,079	271,228	296,941	197,277	203,720	199,380

* In thousands.

25 Years at a Glance: 1977-2002

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
46,335	45,682	48,562	48,481	51,661	51,661	51,562	50,762	50,676	50,176	51,156	52,156	55,574	56,575	1,071,156
101,095	101,228	109,350	109,700	111,716	110,552	109,695	95,470	94,172	91,774	93,032	95,585	100,578	102,759	2,239,228
203,617	197,399	131,973	147,980	105,787	135,790	143,076	125,132	95,233	86,594	55,720	75,952	108,715	115,089	5,389,023
3,625	4,584	4,186	4,186	3,809	4,007	4,561	4,269	4,150	4,265	4,215	4,235	4,198	3,644	NA
936,948	971,935	967,256	967,256	954,174	955,957	1,005,681	1,023,820	1,063,008	1,085,586	1,092,773	1,074,669	1,094,207	1,082,794	23,055,392
169,000	163,318	165,906	113,082	138,400	137,277	119,095	100,591	112,107	113,534	103,800	99,211	91,111	90,842	2,989,344
10,840	13,333	12,444	10,807	9,744	12,171	9,896	5,367	6,097	5,293	4,233	4,232	3,802	4,306	221,566
107,482	79,127	60,003	36,946	50,106	67,032	64,465	50,399	86,912	86,394	72,749	63,071	81,853	73,407	2,025,882
238,134	243,560	243,759	241,953	238,153	244,289	255,423	256,450	266,783	273,038	276,674	274,297	284,044	287,066	5,829,656
187,167	123,546	139,602	124,376	143,541	158,610	144,579	135,397	149,856	142,695	140,159	158,409	184,677	163,255	3,176,749
19,005	22,264	25,238	27,154	25,137	26,555	24,829	23,000	23,145	23,785	24,888	26,217	27,584	27,112	649,899
12,000	12,000	11,933	11,848	13,385	13,233	7,853	0	0	0	0	0	0	0	196,061
0	2,000	1,492	1,851	1,760	1,760	1,757	0	1,500	1,500	1,500	1,500	1,497	1,497	44,064
193,160	192,772	198,958	187,803	187,930	190,107	182,386	173,887	177,085	180,787	185,391	195,873	215,038	203,437	4,437,006

Acid-forming materials. Rock or coal layers containing significant amounts of pyrite or other minerals which, if exposed by coal mining will cause acid mine drainage to occur when acted upon by air and water.

Acid mine drainage. Any water with a pH less than 6.0 draining from a coal mine. Water is often orange-colored because of the presence of oxidized iron.

Adit. An underground mine entry at sites where coal seams are exposed at ground level.

Anthracite. Coal which is commonly called “hard coal” and contains a high percent of carbon. Anthracite is mined mostly in Eastern Pennsylvania.

Approximate original contour. The surface configuration achieved by backfilling and grading the mined area so that the reclaimed land closely resembles the general premining surface configuration and blends into and complements the drainage pattern of the surrounding terrain.

Area mining. A surface mining method that is carried on in level to gently rolling topography on relatively large tracts of land. Active area mine pits may be several miles long.

Auger mining. A mining technique often used by surface mine operators when the overburden becomes too thick for the coal to be mined economically using traditional surface mining methods. Large-diameter (usually 2-4 feet) horizontal holes are drilled as much as 300 feet into the vertical face of the coal bed by an auger. Like a bit used for boring holes in wood, coal augers consist of a cutting head with a screw-like extension. As the auger turns, the head breaks up the coal and the screw carries it back into a conveyor that loads it directly into a truck,

Backfilling. The operation of refilling an excavation using material removed during the mining process.

Barrow Material. Soil and rock fill that was dug from a nearby pit to furnish fill or soil cover for an earth moving project.

Bituminous. Coal which is commonly called “soft coal,” is high in carbon, and ranked between anthracite and lignite. Bituminous coal is most abundant in the Eastern states.

Cessation Order. Order to cease mining issued to a coal operator by the regulatory authority due to severity of violations.

Contemporaneous reclamation. Restoration of mined land that occurs as soon as practical after coal removal.

Contour mining. A mining method commonly used in eastern mountainous topography where coal is removed in a narrow strip around the hillside. The extent of the cut into the hillside is determined by the depth of overburden at the highwall compared with the thickness of the coal seam.

Fund (Abandoned Mine Land). Fees collected from active mining operations, contributions, late payment interest, penalties, administrative charges, and interest earned on investment of the fund’s principal that are deposited in the U.S. Treasury, and used to pay for reclamation of abandoned mine land hazards.

Grading. The process of smoothing the disturbed areas of the mine site, after the coal is removed, to closely approximate the pre-mining terrain.

Gob. A pile of loose waste, coal, and other minerals extracted from a mine that are not marketable. Gob may be left piled in underground workings or at the surface of the mine.

Highwall. The cliff-like excavated face of exposed overburden and coal in a surface mine,

Landslide. Unconsolidated material that becomes unstable due to overloading or water saturation and slides down-slope.

Lignite. Color coal that is commonly called “brown coal,” ranked between peat and subbituminous, and having less than 8,300 BTU’s. Lignite is commonly found in Western states.

Notice of Violation. Notice presented to coal mine operators by inspectors when performance standards or permit conditions are not being met.

Overburden. Rock material overlying the coal deposit, but excluding soil. Soil is generally removed separately for use in reclamation.

Performance bond. A financial guarantee posted by a mine operator to ensure faithful performance of the reclamation requirements of the Surface Mining Act. Bonds are returned to the operator upon successful completion of reclamation. If the operator does not complete the required reclamation, the bond is forfeited and the money is used to reclaim the site.

Permit. A document issued by the regulatory authority that gives approval for the operation of a surface coal mine under conditions set forth in the Surface Mining Law and the implementing regulations.

Permit area. The area of land and water within the boundaries specified in the mining and reclamation permit. At a minimum, this includes all areas that will be directly affected by the surface coal mining operation during the term of the permit.

Pits. The active part of a strip mine where active excavation and mineral extraction is being done.

Preparation plant. A facility at which coal is cleaned or processed before being shipped or used.

Primacy. A joint state/federal relationship where states have elected to develop, administer, and enforce approved programs for regulating coal mining and reclamation under the Surface Mining Law. Currently there are 24 primacy states.

Prime farmland. A special category of highly productive cropland that is recognized and described by the U.S. Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law.

Priority. Eligibility of abandoned mine land projects for fund expenditures based on the degree of adverse effects on health and safety. The priority of projects is as follows:

1. the protection of public health, safety, general welfare, and property from extreme danger of adverse effects of coal mining practices;
2. the protection of public health, safety, and general welfare from adverse effects of coal mining practices;
3. the restoration of land and water resources and the environment previously degraded by adverse effects of coal mining practices including measures for the conservation and development of soil, water (excluding channelization), woodland, fish and wildlife, recreation resources, and agricultural productivity;
4. the protection, repair, replacement, construction, or enhancement of public facilities such as utilities, roads, recreation, and conservation facilities adversely affected by coal mining practices; and
5. the development of publicly owned land adversely affected by coal mining practices including land acquired as provided in this title for recreation and historic purposes, conservation, and reclamation purposes and open space benefits.

Pyrite. A yellowish mineral, iron disulfide (FeS_2), commonly found in coal beds and associated rocks, that results in acid drainage when it comes into contact with air and water.

Regulatory authority. The state agency, or Office of Surface Mining, which has responsibility for administering the Surface Mining Law in a given geographic area.

Riprap. Large pieces of broken or crushed durable rock or concrete placed on earth dams and in drainage channels for protection against water erosion.

Sedimentation pond. An impoundment constructed on the mine site to remove suspended solids from surface water before the water leaves the permit area.

Semiarid regions. Lands, generally west of the 100th meridian, where water use by native vegetation equals or exceeds that supplied by natural precipitation, and rainfall is insufficient to support traditional agriculture. Annual precipitation is normally 20 inches or less,

Slurry. Fine coal and other materials washed from marketable coal during the cleaning process

Spoil. The rock overburden, not including the soil layers, that has been removed in surface mining to gain access to the coal seam.

Subsidence. Surface caving or sinking of a part of the earth's crust due to underground mining excavations.

Sub-Bituminous. Black lignite or coal ranked between lignite and bituminous with a BTU range of 8,300-13,000. Subbituminous coal is commonly found in Western states.

Terrace. A depression across the face of a steep hillside that slows the flow of surface water and minimizes soil erosion.

Topsoil. The dark, fertile uppermost layer of the soil.

1. **Public Law 95-87, Surface Mining Control and Reclamation Act of 1977 (SMCRA)** [Copies available on request www.osmre.gov/order1.htm, or used on-line at www.osmre.gov/smcra.htm]
2. **U.S. Department of the Interior. *Surface Mining and Our Environment***. Washington, D.C. 1967. 124pp. [Out of print]
3. **U.S. Department of the Interior, Office of Surface Mining. *Surface Coal Mining Reclamation: 10 Years of Progress, 1977-1987***; Washington, D.C. August 3, 1987. 48pp. [Out of print]
4. **U.S. Department of the Interior, Office of Surface Mining. *Surface Coal Mining Reclamation: 15 Years of Progress: 1977-1992; Part 1***. Washington, D.C. August 3, 1992. 53pp.; *Part 2: Statistical Information* 78pp. [Out of print]
5. **U.S. Department of the Interior, Office of Surface Mining. *20th Anniversary: Surface Mining Control and Reclamation Act, A report on the protection and restoration of the Nation's land and water resources under the Surface Mining Law, Part 1***. Washington, D.C. August 3, 1997. 36pp.; *Part 2: Statistical Information*. Washington, D.C. June 1, 1999. 82pp. [Electronic copies available at www.osmre.gov/annivrep.htm]
6. **The Small Operator Program**, authorized by Section 401(c)(11) of the Surface Mining Law, authorizes up to \$10 million annually of the fees collected for the Abandoned Mine Reclamation Fund to be used for technical assistance to help qualified small mine operators obtain technical data needed for permit applications. Operators who produce fewer than 300,000 tons of coal per year are eligible for assistance.
7. **The Clean Streams Program** began as a broad-based activity to eliminate acid drainage from abandoned coal mines. Today the program is more focused, with a clear goal of cleaning up acid drainage problems using a combination of private and governmental resources. The success of cooperative solutions to acid drainage problems has been building from the grassroots level in recent years. Watershed associations, community groups, and recreation associations are working together, with funding from government (federal, state, and local) and private sources. This cooperative approach supports greater efficiency and gets better results from the expenditures of public funds. The Clean Streams Program is an opportunity for a partnership to solve one of the major environmental problems facing the ecosystems of the coalfields.
8. **Acreage Permitted**: Acreage permitted data was compiled from annual reports developed by Office of Surface Mining field offices and historical field office records. The acreage listed includes only new permits during the year shown and is not the total acreage under permit during that year.

References, Endnotes, and Credits

- 9. Number of Active Mines:** The number of mines was compiled from Office of Surface Mining Fee Collection System data described in footnote 1 above. This information was reported by mine operators on the Form OSM-1 when submitting their fees.
- 10. Coal Production:** Under Section 402 of the Surface Mining Law (Public Law 95-87), coal operators are required to pay a fee when coal is sold, used, or transferred. These fees are deposited in the U.S. Treasury as the Abandoned Mine Land Fund. Information about the tonnage is tabulated on Form OSM-1 and submitted with the fee, which is paid quarterly to the Office of Surface Mining. The coal production data presented in this report was compiled from information stored in the Office of Surface Mining Fee Billing and Collection System computer data base. Collection of the fee began with the last quarter of 1977. Fee and tonnage information remittance is required 30 days after the end of the quarter. The coal production data in this report details actual fee and tonnage information in the fiscal year in which they were received. Therefore, 1978 data includes the last quarter of 1977 and the first two quarters of 1978. Subsequently, 1979 data includes the last two quarters of 1978 and the first two quarters of 1979. Information for each successive year follows the same tabulation pattern.
- 11. Inspections Completed:** These statistics were compiled from annual reports developed by Office of Surface Mining field offices and historical field office records. The data presented are all inspections completed by both the state regulatory authority and the Office of Surface Mining, and included oversight inspections. Citations issued are the sum of Notice of Violations (NOVs) and Cessation Orders (COs), including oversight citations.
- 12. Citations Issued:** The number of citations was compiled from annual reports developed by Office of Surface Mining field offices and historical field office records. The annual data presented are the sum of Notice of Violations (NOVs) and Cessation Orders (COs), issued by both the state regulatory authority and the Office of Surface Mining, and includes oversight citations.
- 13. Acreage of Bonds Released:** Acreage of reclamation bonds released was compiled from annual reports developed by Office of Surface Mining field offices and historical field office records. These numbers include the sum of final Interim Regulatory Program bonds and Phase III (or final release) bonds and indicates the land area where reclamation is complete and has been released by the regulatory authority.
- 14. Fund Collections:** Total Abandoned Mine Land Fund collections — all Abandoned Mine Land fees paid by active coal mine operators and audit collections (including interest, administration, penalty, etc.)
- 15. State Reclamation Grants:** Annual Abandoned Mine Land state/federal share net obligations.
- 16. Federal Reclamation Project Costs:** Obligations for reclamation projects completed by the Office of Surface Mining. This includes all emergency and non-emergency (high priority) Abandoned Mine Land reclamation projects.
- 17. RAMP Transfers:** Annual amounts transferred to the U.S. Department of Agriculture to administer the Rural Abandoned Mine Land Program.

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Looking much like highway construction projects, current surface coal mining disturbs the land for a short time and is reclaimed. During the mining, blasting, machinery noise, increased truck traffic, and loss of well-known landscape views are constant problems for citizens living near active operations. However, mining companies are becoming more involved with the public and property owners in planning and operating the mining and reclamation activities. This interaction helps everyone understand the problems and what needs to be done to minimize the impact of mining on the community. And, in the end results in positive benefits for everyone.



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