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West Virginia Mining
and Reclamation Association
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Spring 1986

# Green Lands

# COAL'S SILENT PARTNER.

From initial start-up to final reclamation, Flat Top Insurance Agency is the coal industry's silent partner. We're behind the coal operations every phase, assisting in three very important ways.

## BONDING

An important first-step in any mining operation is a bonding program. As America's Energy Agency, we invite you to check with us for your all-important bonding requirements.

## INSURANCE

Flat Top Insurance Agency offers a broad range of insurance protection for the coal industry. It will pay you to check with us if you're not already under the protection of the familiar top.

## EXPERIENCE

The coal industry is a specialized industry requiring specialized insurance programs. Flat Top has been insuring coal operations for almost a century...a claim few insurance agencies can make.

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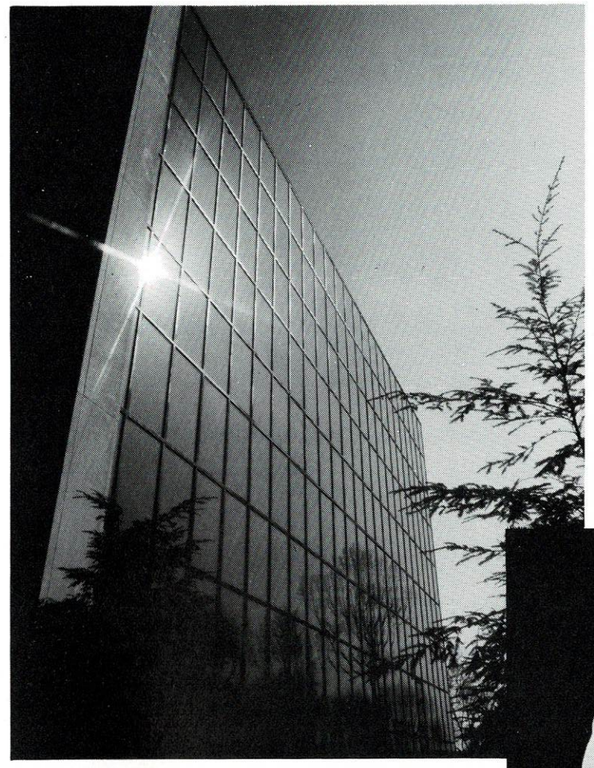

*The McDonough Caperton Insurance Group corporate headquarters, located in Charleston West Virginia, serves as the home base for all McDonough Caperton activities. McDonough Caperton also maintains offices in eleven cities throughout West Virginia, Ohio, Pennsylvania, Kentucky, Virginia, and Bermuda.*

**McDonough Caperton** is a company with a purpose — a purpose which recognizes its responsibility to provide clients with the most cost effectively designed insurance and benefit plans. To do this McDonough Caperton has developed an outstanding staff of uniquely capable and professionally competent people . . . people who listen, people who work hard, people who are honest and sincere, and people dedicated to serving others through excellence.

Established in 1936, the McDonough Caperton Insurance Group has grown rapidly in the last five years and is now listed among the nation's ten largest privately-owned insurance agencies. Our growth is its own testimony to our capabilities.

We believe that our size is our strength . . . big enough to handle large projects, but small enough to be creative and responsible in handling the needs of individual clients.

When you meet and work with our people, I sincerely believe you will see why we are one of the fastest growing insurance brokers in the U.S.

Gaston Caperton
*President*

## McDonough Caperton Insurance Group

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## Index to Advertisers





# Green Lands

**Volume 16 Number 1**



**Our Cover** — Our Spring cover, chosen for this special issue reviewing the industry, belies the old abolitionist saw that "you can't put it back." This Alleghen y Mining site, near Mt. Storm in Grant County, challenges even the trained eye to detect any trace of mining activity. More examples may be seen from cover to cover.


**Green Lands** is a quarterly publication of the West Virginia Mining and Reclamation Association with offices at 1624 Kanawha Boulevard East, Charleston, West Virginia 25311 Telephone ((304) 346-5318

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# The West Virginia Mining and Reclamation Association

The West Virginia Mining and Reclamation Association is the largest trade organization of its kind in the nation, representing nearly 300 companies and thousands of individuals involved directly and indirectly with coal mining.

The organization was founded in 1966 to represent the industry to the public and in government, and to assist the membership in compliance with constantly evolving mining, reclamation, and personnel laws and regulations.

Tailoring its services to meet the needs of its members and the industry at large, the Association has initiated new programs, encouraged technological advancements, and participated with government and the public in formulating laws and regulations which simultaneously protect the environment while proceeding with the business of producing energy.

One trait common to the handful of companies that formed WVMRA was a sense of responsibility to the communities in which they lived and worked, and one of the initial tasks facing that group was to transmit that responsibility to the rest of the industry. Today's membership rolls and the respect for West Virginia operators throughout the industry are testimonies to the success of that effort.

The Association took active part in the passage in 1967, of what became known as the most stringent surface mining law in the country. From the legislative battles emerged a law that turned the corner environmentally, yet allowed the industry the opportunity to adapt and comply.

It was fortunate for the surface mining industry that by 1971, WVMRA was firmly established. For in that year, the abolition movement was near its peak. The story of the move to abolish surface mining in West Virginia was perhaps more widely covered in the gubernatorial election of 1972. But in 1971, an abolition bill actually went to the floor of the House of Delegates for a vote.

The Association effort played a key role in the legislative compromise which led to a revision of the 1967 surface mining law.

Throughout the 70's the WVMRA was involved in legislative proposals on the federal level, through testimony, guided tours, and exhaustive meetings and consultations. The result was a federal bill modeled largely on West Virginia's nationally recognized program.

The Association was the only state coal organization in the nation invited to the signing of the Surface Mining Control and Reclamation Act by President Jimmy Carter on August 3, 1977.

Association influence has also been heavily felt in the implementation phases of these laws. More restrictive laws emphasize the need for advanced technology in mining and reclamation techniques.

West Virginia operators have perfected the "controlled placement" theory of surface mining in developing the two most innovative mining methodologies of the 70's, steep slope haulback and mountaintop removal.

Throughout its 20 year history, the Association has nurtured a committment to mining excellence. One of the greatest points of pride for West Virginia coal operators is to win one of the annual "Reclamation Awards," a program which WVMRA founded in conjunction with the Department of Natural Resources, now the Department of Energy.

Coal miners are equally proud of the "Mountaineer Guardian Award," presented to the work forces of those companies which achieve specified tonnage goals without suffering a fatal accident. The Mountaineer Guardian program is another joint venture between WVMRA and the West Virginia Department of Energy.

Though skeptics find it hard to accept, Association member companies favor a balance of environment and industry. Certainly, the Association is on record as promoting compliance with existing laws, and many members have gone far beyond the requirements of the law to protect the environment in particular situtations.

It is the stated position of the West Virginia Mining and Reclamation Association that West Virginians are justly proud of their state and that our members should and will do everything in their power to both protect and utilize our abundant natural resources. The Association believes that economic, environmental, and energy goals are not mutually exclusive, and that each can be achieved through reasonable regulation, strict enforcement, and industry cooperation.



# The Issues and the Industry

The surface mining of coal is nearly a century old in practice, but still relatively young as an industry.

West Virginia, long synonymous with coal in the nation's mind, was an early leader in production and, in 1939, saw fit to enact this country's first surface mining law.

Lax by today's standards, the law nevertheless marked the Mountain State as a pioneer on both sides of the controversy yet to come. For the coal industry has changed with the country's shifting priorities.

West Virginia is the only state which lies entirely within Appalachia, still the most productive coal region in the world. As such, West Virginia has been a focal point for much of the controversy over surface mining.

As U.S. industry shifted into high gear with the onset of World War II, West Virginia coal boomed and environmental protection was a phrase scarcely conceived, let alone practiced.

Production was the priority of the day and the coal industry, consistent with the mainstream of American life, placed all emphasis on tonnage mined, not acreage reclaimed.

By the early 1960's Americans began to realize the long term futility of wasting the country's natural resources, and priorities shifted toward conservation and environmental protection.

In West Virginia, as elsewhere, the need for change was apparent. Recognizing this, the State reorganized its Conservation Commission, in 1961, into the Department of Natural Resources with a Division of Reclamation to oversee surface mining.

In 1967, the State Legislature passed what many considered to be the most stringent surface mining law in the country. Certainly it proved a turning point in reclamation, for West Virginia has led the nation in areas reclaimed every year since then.

During that time, the abolition argument has cooled off and heated up repeatedly. As with most controversial issues, reality has worked a compromise between the two extremes.

In any event, the results of this long debate must be satisfying to moderates on both sides of the issue. True, West Virginia has lost its position as the nation's leading producer of coal. But it has traded that honor for another, perhaps more important achievement. West Virginia has struck the balance of energy and environment that Congress was seeking for the entire nation when it gave approval to the Surface Mining Control and Reclamation Act of 1977.

As the national law was implemented, West Virginia maintained its leadership role. Technology perfected in the state, such as haulback, mountaintop removal, and rock core valley fill, formed the basis of responsible reclamation practice nationwide. West VIrginia was the first state in the east to regain regulatory primacy from the federal Office of Surface Mining.

Now, under the auspices of the new West Virginia Department of Energy, the industry looks forward to a period of regulatory stability, as it tackles the challenge of the worldwide marketplace.

Modern preparation plants like this facility serving Buffalo Coal and Davis Trucking have made coal production more efficient.

# Coal and West Virginia

By the end of the 1970's there were 1129 companies mining coal in West Virginia, operating from 2353 mines, employing 58,565 miners. Production in 1979 was 112.4 million tons, down 32 million tons from the beginning of the decade.

By the end of 1984, production had snapped back to 131 million tons, still not good enough to prevent Wyoming from overtaking the Mountain State as the nation's number 2 coal producer. Of more concern was the shrinking nature of the industry itself. The number of operating companies was down to 818, a drop of nearly 28% The number of mines was down to 1955, a decrease of 17%; and the number of employees had dwindled to 40,041, down 32%.

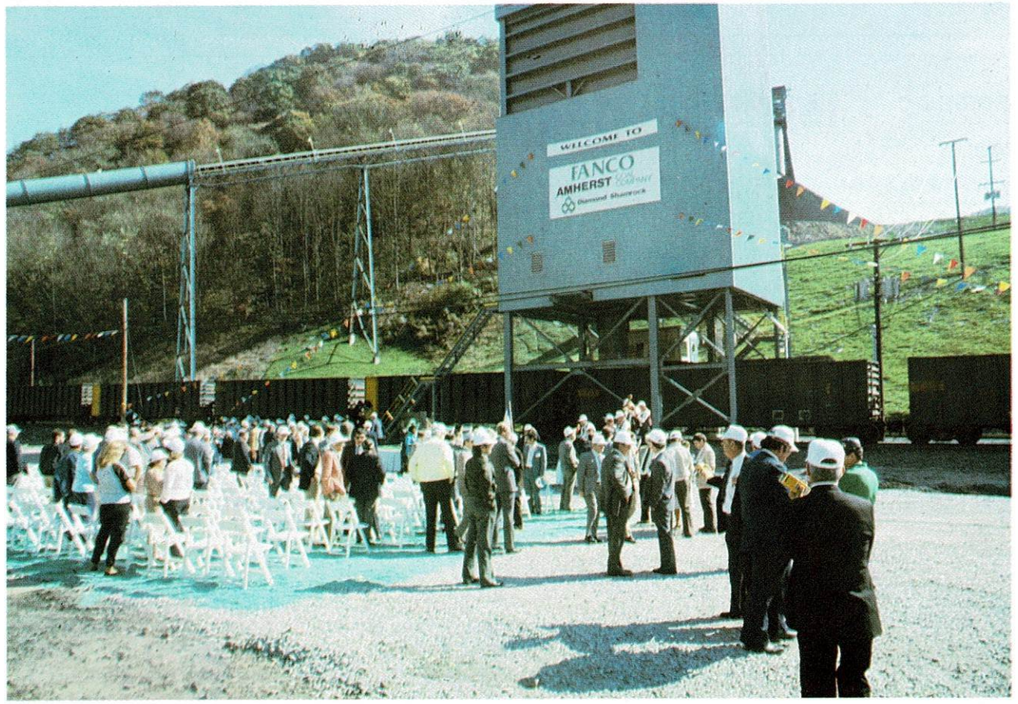
By all analyses, these are companies, mines, and mining jobs that the state will not recoup. The corresponding rise in production indicates an increase in productivity and efficiency, a positive sign, but even in production, West Virginia is not maintaining its share of the national total, or its share of the market.

Still, coal is West Virginia's key industry. Probably no other state is tied more directly to one industry as West Virginia is to coal. Even a depressed employment figure of 40,000 is impressive in a state of fewer than two million citizens. These workers represent a collective payroll of more than a billion dollars, making coal miners the highest paid industrial workers in America. West Virginia coal, in 1984 had a market value of well over $5 billion.

Those are only the direct figures. It's impossible to determine just how many West Virginia jobs depend on coal, how many dollars are spent, how much tax is collected, and how many towns exist because the coal industry is there.

There is reason for optimism. Major companies continue to invest in the state's coal industry because of its vast potential for meeting the nation's energy needs. West Virginia's production capacity, at present, vastly exceeds its market. This must change if the industry is to fulfill its promise of prosperity.






A new unit train loading facility at Fanco has modernized Diamond Shamrock's Amherst Division in Logan County.


Elk Run Coal Co. symbolizes the new breed of West Virginia mining, with high productivity, a stable labor force, and generally clean, safe, efficient operations.

| UNDERGROUND | | SURFACE | TOTAL |
|---|---|---|---|
| COMPANIES | | | |
| **1978** | 684 | 404 | 1088 |
| **1979** | 674 | 455 | 1129 |
| **1980** | 644 | 394 | 1038 |
| **1981** | 634 | 372 | 1066 |
| **1982** | 601 | 371 | 972 |
| **1983** | 571 | 306 | 877 |
| **1984** | 504 | 314 | 818 |
| MINES | | | |
| **1978** | 1347 | 903 | 2250 |
| **1979** | 1338 | 1015 | 2353 |
| **1980** | 1269 | 931 | 2200 |
| **1981** | 1213 | 840 | 2053 |
| **1982** | 1181 | 858 | 1939 |
| **1983** | 1075 | 743 | 1818 |
| **1984** | 1023 | 932 | 1955 |
| EMPLOYEES | | | |
| **1978** | 53,631 | 9351 | 62,982 |
| **1979** | 50,179 | 8386 | 58,565 |
| **1980** | 46,977 | 8525 | 55,502 |
| **1981** | 46,839 | 8572 | 55,411 |
| **1982** | 45,492 | 8449 | 53,941 |
| **1983** | 30,526 | 5695 | 36,221 |
| **1984** | 32,881 | 7160 | 40,041 |
| PRODUCTION | | | |
| **1978** | 65,356,587 | 19,340,461 | 84,697,048 |
| **1979** | 91,239,618 | 21,141,265 | 112,380,883 |
| **1980** | 96,408,980 | 25,174,782 | 121,583,762 |
| **1981** | 89,585,532 | 23,228,440 | 112,813,972 |
| **1982** | 104,216,916 | 24,561,160 | 128,778,076 |
| **1983** | 92,291,209 | 22,844,245 | 115,135,464 |
| **1984** | 106,400,251 | 24,640,315 | 131,040,566 |

# West Virginia Production Trends

It is risky to place too much emphasis on one year production totals, which can be greatly affected in either direction by specific events such as labor strikes, or unusual weather conditions.

But in looking at figures over a period of several years significant trends emerge. For example, it is obvious that West Virginia has lost its position as the nation's leading coal producer, and last year fell to the third position.

Of a less obvious nature, but perhaps more consequential, is the fact that our share of total U.S. production is declining. In 1985, it was up slightly over 1984. But look back 10, 20, and then 30 years, and a steadily downward trend becomes apparent.

Through production was up in 1984 versus recent years, it is still considerably down versus the late 1960's and before. It may also be noted that tonnage in recent years is coming from fewer companies, fewer mines, and fewer employees. Though this points to greater efficiency, the loss of companies and jobs is a source of great concern to the state. At a time when West Virginia coal ought to be booming as a storehouse of American energy, we are struggling to survive as an industry.

| | VS 1975 | | VS 1970 | | VS 1965 | |
|---|---|---|---|---|---|---|
| Kentucky | up | 12.7% | up | 12.3% | up | 88.6% |
| Wyoming | up | 480.0% | up | 1,813.9% | up | 4,075.8% |
| West Virginia | up | 16.5% | down | 11.7% | down | 14.7% |
| Illinois | up | 4.7% | down | 4.3% | up | 6.5% |
| Pennsylvania | down | 26.0% | down | 22.7% | down | 22.6% |
| Virginia | up | 24.8% | up | 26.6% | up | 29.9% |
| Texas | up | 295.5% | non-producer | | non-producer | |
| Ohio | down | 23.1% | down | 35.0% | down | 8.6% |
| Indiana | up | 37.5% | up | 54.7% | up | 121.1% |
| Montana | up | 47.1% | up | 885.9% | up | 8,025.0% |
| USA | up | 37.1% | up | 46.3% | up | 72.3% |



# The Rise of Wyoming Coal

For the most part, the heavy producers of coal have always been the heavy producers of coal. A look at the following sample years of coal production reveals that changes in coal production rankings for the most part reflect the upsurge in Kentucky's coal industry following World War II, and more recently the development of western coal, as dramatically illustrated by Wyoming. West Virginia lost its annual leadership to Kentucky in 1971, and has now fallen to third behind Wyoming which just over a decade ago, produced a state record 21 million tons.

| | 1945 | 1959 | 1970 | 1977 | 1979 | 1983 | 1985 |
|---|---|---|---|---|---|---|---|
| **1.** | WV | WV | WV | KY | KY | KY | KY |
| **2.** | PA | PA | KY | WV | WV | WV | WY |
| **3.** | IL | KY | PA | PA | PA | WY | WV |
| **4.** | KY | IL | IL | IL | WY | PA | IL |
| **5.** | OH | OH | OH | OH | IL | IL | PA |

# West Virginia's U.S. Share Year by Year

**(numbers expressed in million tons)**

| YEAR | WV | US | WV% | YEAR | WV | US | WV% |
|---|---|---|---|---|---|---|---|
| 1935 | 99.2 | 372.4 | .266 | 1961 | 113.1 | 403.0 | .272 |
| 1936 | 117.9 | 439.1 | .269 | 1962 | 118.5 | 422.1 | .281 |
| 1937 | 118.6 | 445.6 | .266 | 1963 | 132.6 | 458.9 | .289 |
| 1938 | 93.2 | 348.6 | .267 | 1964 | 141.4 | 487.2 | .290 |
| 1939 | 108.4 | 394.9 | .274 | 1965 | 149.2 | 512.1 | .291 |
| 1940 | 126.4 | 460.8 | .274 | 1966 | 149.7 | 533.9 | .280 |
| 1941 | 140.2 | 514.1 | .273 | 1967 | 153.7 | 552.6 | .278 |
| 1942 | 155.9 | 582.7 | .268 | 1968 | 145.9 | 545.2 | .268 |
| 1943 | 148.8 | 590.1 | .252 | 1969 | 141.0 | 560.5 | .252 |
| 1944 | 164.7 | 619.6 | .266 | 1970 | 144.1 | 602.9 | .239 |
| 1945 | 152.0 | 577.6 | .263 | 1971 | 118.3 | 552.2 | .214 |
| 1946 | 144.0 | 533.9 | .270 | 1972 | 123.7 | 595.4 | .208 |
| 1947 | 176.1 | 630.6 | .279 | 1973 | 115.4 | 591.7 | .195 |
| 1948 | 168.9 | 599.5 | .282 | 1974 | 102.5 | 603.4 | .170 |
| 1949 | 123.8 | 435.0 | .285 | 1975 | 109.3 | 648.4 | .169 |
| 1950 | 144.1 | 560.4 | .257 | 1976 | 108.9 | 678.7 | .160 |
| 1951 | 163.3 | 576.3 | .283 | 1977 | 95.4 | 688.6 | .139 |
| 1952 | 141.7 | 466.8 | .304 | 1978 | 85.3 | 665.1 | .128 |
| 1953 | 134.1 | 457.3 | .293 | 1979 | 112.4 | 772.3 | .146 |
| 1954 | 116.0 | 391.7 | .296 | 1980 | 121.8 | 823.6 | .148 |
| 1955 | 139.1 | 464.6 | .299 | 1981 | 112.8 | 818.4 | .138 |
| 1956 | 155.9 | 500.9 | .311 | 1982 | 128.8 | 829.2 | .155 |
| 1957 | 156.8 | 492.7 | .318 | 1983 | 115.1 | 780.8 | .147 |
| 1958 | 119.5 | 410.4 | .291 | 1984 | 130.9 | 891.8 | .147 |
| 1959 | 119.7 | 412.0 | .291 | 1985 | 137.8 | 882.2 | .156 |
| | 118.9 | 415.5 | .286 | | | | |


**Fulfilling all legal obligations, the entrances to permit areas are sometimes reminicent of welcome signs at city limits.**

### Signs, Roads, and Ponds

# Getting the Preliminaries Right

It's been forty-seven years since West Virginia enacted the nation's first surface mining law. It's been nearly nine years since surface mine regulation "went national" with the Surface Mine control and Reclamation Act of 1977.

With all the attendant publicity and controversy, the public should be well aware of dominating role which land reclamation plans play in the surface mining process. But few outside the industry realize how much time, effort, expense, and manpower go into a mining operation before the first ton of coal is removed.

When mining rights have been established, the tedious permitting process begins. Permitting has been streamlined somewhat in recent years, but even without encountering major difficulties, companies must anticipate six months to a year in securing a permit.

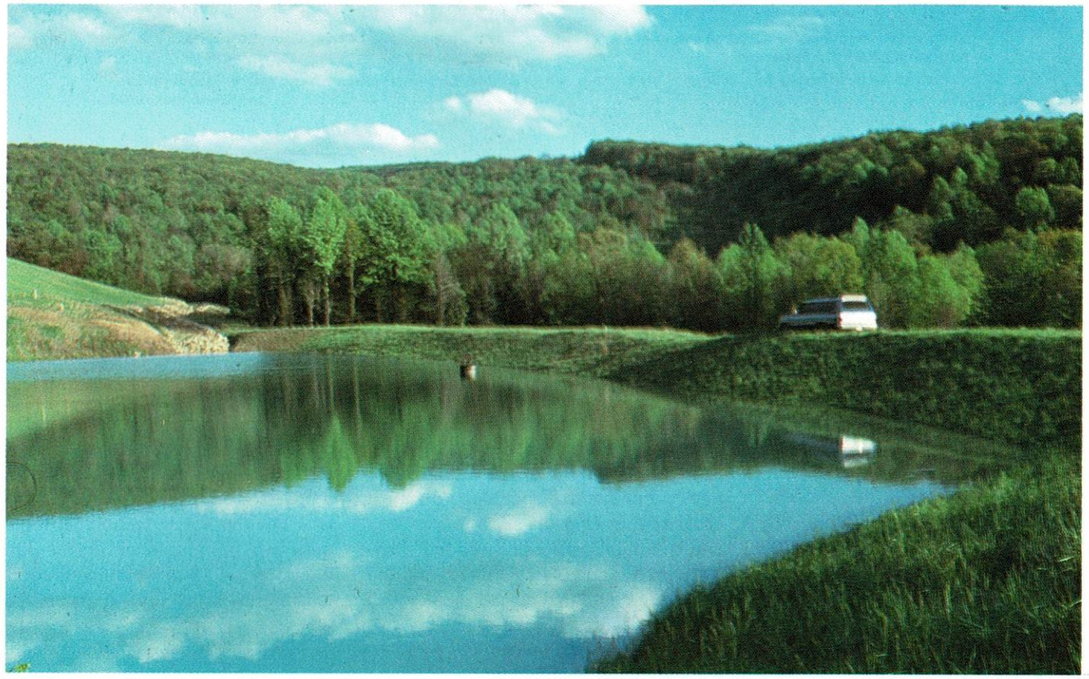
With permit in hand, the operator must still accomplish all of the following before actually mining any coal: engineering stakeout of the permit area, clearing and grubbing of the construction area, establishing the haul road, constructing sediment control systems, diversion ditches, and/or rock drainways, installing riser pipes, establishing fill areas for excess overburden, backfilling, compacting, seeding and mulching of all adjacent distrubed areas, and arranging for constant t esting and anaylsis of all of these facilities. In addition, haul roads and ponds must be certified by a registered professional engineer or other approved person. Also several different identifying and warning signs must be erected at the outer limits of the job site prior to any mining activity.

Even more startling for the uninitiated are the costs associated with these pre-mining chores. According to a cost analysis by the WVMRA in 1984, the cost of obtaining a permit for a medium size surface operation is between $30,000 and $35,000. If the permit is obtained, construction of required structures and facilities will cost in excess of $500,000.

This is why coal operators must make hard economic decisions as to the feasibility of mining a given tract of coal. And that is why it's a maxim in the coal industry that "getting there is half the work."



**Legal and practical requirements for haul road maintenance sometimes keep these roads in better condition than some county roads.**



**Sediment ponds are quite functional, but that doesn't keep them from being attractive as well, as this picturesque Patriot Mining scene from Preston County illustrates.**

**Even in its unvegetated state, the advantage of the controlled placement of overburden materials that haulback offers are apparent.**

# Haulback Puts it Back Right And Puts it Right Back

Even as West Virginia was losing its position as the nation's leading producer of coal, the state was solidifying its position as the pace setter in land reclamation.

No better example of this could exist than the haulback method of contour surface mining.

First adapted to steep slopes by Hobet Mining and Construction Co. in 1973, haulback basically involves moving overburden laterally along the bench and backfilling against the highwall behind the actual mining operation. Material from each new cut is placed in the pit which has just been mined. The area is then compacted and seeded, resulting in a grassy slope extending from the haulroad to the undisturbed tree line above the operation. In most cases, depending on post mining land use, the haul road itself is seeded when the permit is completely mined, and the entire area is thus returned expediently to its natural state.

The development of this technique completely revolutionized mining techniques in mountainous southern West Virginia, and became the standard by which steep slope reclamation is now measured under uniform federal standards.

The haulback technique requires quite a bit of adaptation on the part of the operator. When blasting is conducted, it must be controlled and precise.



**A completely revegetated haulback operation offers the eye a very pleasing and graceful view of the mountain contours.**

Benches often must be wider than usual to accommodate the extra machinery necessary for concurrent reclamation. Supervision and equipment maintenance become critical. Extra haulage machinery means extra manpower and all of this results in a significant increase in operating expense.

Returns on the investment have been great, however. Advantages to the haulback system are almost too numerous to mention. The acreage affected, and therefore under bond, is reduced by 25-40%. Water is more easily controlled and fewer siltation structures are required. Highwalls are effectively eliminated resulting in a more attractive final product.

Overburden materials are kept entirely on the bench, which better maintains the tree line below the bench, which in turn adds stability to the site. Also a reduction in disturbed area lowers revegetation costs and makes concurrent reclamation inherently easier by maintaining accessibility for revegetation equipment.

Those familiar with the mining and reclamation processes can readily see that haulback provides the most environmentally sound opportunity for reclaiming steep slope surface mines.

For the uninitiated, the success of the method has been born out in two concrete ways.

First, the implementation of federal standards on steep slope mines was largely based on techniques developed by haulback operators in West Virginia. Secondly, thirteen years after the haulback method was first attempted, the maturation process has proven this system to be the most successful yet developed in quickly returning steep slope mines to a natural state, where called for by post mining land use.

**Princess Susan Coal Co., whose Kanawha County operation is shown here in spring bloom and fall glory, was one of the earliest and most successful practitioners of haulback.**

# BECKWITH GIVES YOUR CAT® NEW LIFE WITH CATERPILLAR CERTIFIED REBUILD

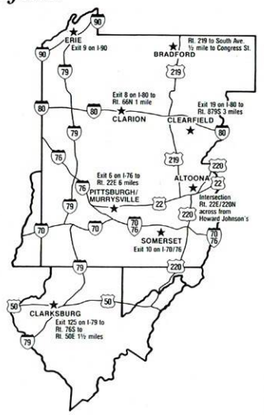
## *Now the choice is yours!*

*By Mike Majcher*

Beckwith Machinery Company, one of the nation's first and largest Caterpillar Tractor dealers, now performs Caterpillar Certified Rebuild.


This new Certified Rebuild program is a tractor rebuilding process so extensive that it virtually remanufactures Caterpillar equipment. A new identification number and a like-new warranty is assigned.

Beckwith is one of the top Caterpillar dealers in the U.S. and has long been noted for its extensive capability to service, repair and rebuild Caterpillar equipment. With one of the largest Cat dealer parts distribution centers in the world, Beckwith maintains over 50,000 items in stock as well as having eight full service branch locations and three major rebuilding facilities in western Pennsylvania.




CATERPILLAR CERTIFIED REBUILD

Of Beckwith's 750 full-time employees, over 200 are mechanics who have an average of 15 years service with the company—a major factor in Beckwith's rebuilding capability. In fact, these same skilled Beckwith personnel continue to rebuild all types of Caterpillar equipment. This capability has been a vital factor in maintaining Caterpillar equipment in this area for years.

Now, however, Beckwith provides Caterpillar owners with a choice of rebuilding programs. And, with the extensive new Caterpillar Certified Rebuild, they get:

- Like-New performance and machine availability from their present Caterpillar equipment
- Ownership at a fraction of new machine cost
- And a Like-New warranty, too!

Here's how it works:

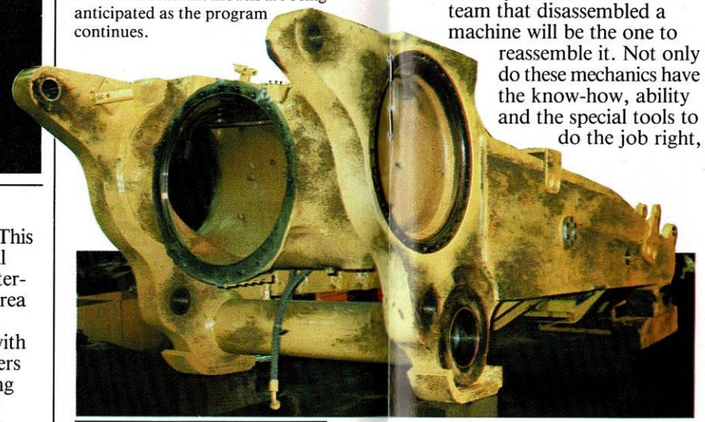
## STEP ONE

### Inspection and estimate.

Your tractor* is examined thoroughly by Beckwith service technicians. Operational and visual checks are made and maintenance records are examined. Oil sampling is conducted to determine the machine's internal condition. A written Condition Appraisal Report is then prepared as the basis for determining rebuild candidacy and cost.

A firm price quotation with a guaranteed turnaround time is supplied at this point.

*Not all machines qualify for the program. Some may require too many parts or too much labor to economically restore them to Caterpillar's rebuild standards. Others may be in too good a condition to warrant virtual "remanufacturing." At present, Caterpillar Certified Rebuild is available for qualified D8K, D9H, D9L, and D10 tractors. However, additional machine models are being anticipated as the program continues.



## STEP TWO

### Disassembly of the machine and its components.

Beckwith strips your tractor to the bare frame. All components are removed and disassembled. Certain parts, such as hoses, belts, seals, and bearings are summarily replaced. Others are carefully inspected and measured against Caterpillar Parts Reusability Guidelines. Those which do not meet reusability standards are replaced with only genuine new, Exchange or Caterpillar Remanufactured Products.

Scores of parts, including all critical product improvements, are installed to meet Caterpillar Certification standards.

The main frame and tractor roller frames are completely disassembled and sandblasted to allow intensive structural examination for cracks, undue wear and straightness. They are welded, straightened and reinforced wherever needed to help ensure the structural integrity of the unit.

Instruments and controls are removed, inspected and replaced upon requirement. Worn linkage and pins are replaced so that controls operate with precision.

## STEP THREE

### Reassembly by experienced mechanics using special tools.

Usually the same Beckwith team that disassembled a machine will be the one to reassemble it. Not only do these mechanics have the know-how, ability and the special tools to do the job right, they'll know your tractor better than anyone! And they are Beckwith professionals. That's why you can be sure they will check and inspect all major parts and components with an exacting eye before and after installation.

And, Beckwith mechanics will check and recheck all critical torques, clearances and pressure settings to make sure your rebuilt Caterpillar tractor will perform with the like-new production capability you can expect from a Caterpillar Certified Rebuild.

## STEP FOUR

### Attachments mounted and day-long performance tests conducted.

Inspections and tests made during reassembly and afterward are now verified as meeting Caterpillar standards and specifications. Then extensive testing is conducted with machine attachments in place to verify the absence of leaks, proper turbocharger boost, throttle response and proper transmission and steering clutch pressures.

Such rigid performance testing assures that all instruments and operational functions meet Caterpillar Tractor Company requirements for on the job reliability.

## STEP FIVE

### Painted, re-identified and warranted.

Caterpillar issues a new identification number for your tractor which certifies that the rebuild process has been completed in accordance with Caterpillar Certified Rebuild specifications and the tractor is given like-new warranty.

This special new identification is applied over a fresh, new paint job to mark your machine as a Caterpillar Certified Rebuild with new resale value and warranty—ready to perform like new.

### *The choice is yours.*

No longer is a Cat owner faced with having to trade-in equipment that has become less productive and more expensive to maintain after thousands of hard working hours on the job. He can


choose a Beckwith rebuild—the same fine quality rebuild performed by Beckwith for all types of Caterpillar tractors, or the new Caterpillar Certified Rebuild—done to Caterpillar specifications and offering a new I.D. and like-new warranty. These programs are a testimony to the value inherent in new Caterpillar equipment—the same value that Beckwith has been selling for the past 61 years!

In either case, Beckwith offers owners the real economical advantage of their built-to-be-rebuilt Caterpillar tractor's quality and design.

It's true!

### *Beckwith offers your CAT a new life.*

With Caterpillar Certified Rebuild for D8K, D9H, D9L, and D10 tractors. Or, Beckwith Quality Rebuild for all Caterpillar tractors.

When it comes to construction, mining, energy and material handling equipment, nobody, but nobody, provides more ability, experience and choices than Beckwith.

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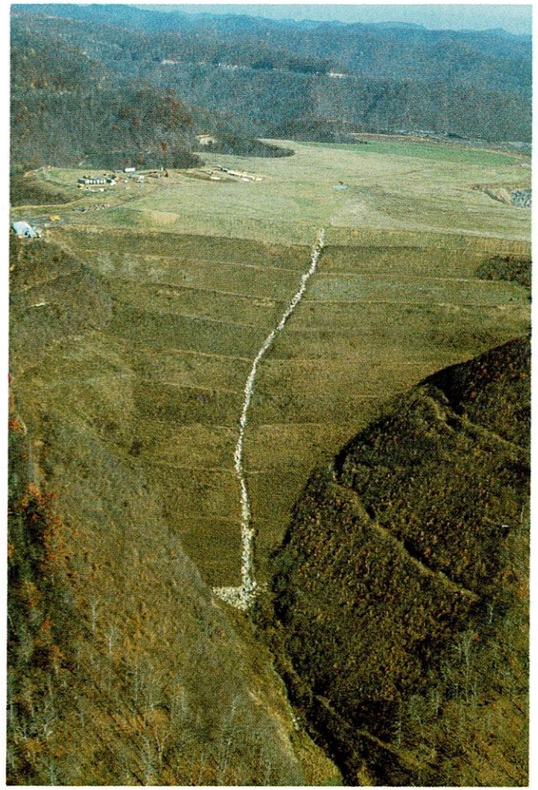
# Room at the Top



**Excess overburden from mountaintop mining operations is routinely placed in valley fills, where the terraced slopes and rock core center control drainage off the mountain and into sediment ponds.**

Haulback is not West Virginia's only claim to fame in the area of innovative surface mining techniques. In fact, it wasn't even the first.

Perry and Hylton, under contract to Cannelton Industries, began mining operations on Bullpush Mountain, in eastern Kanawha County in 1967, utilizing a revolutionary concept called mountaintop removal. With minable reserves on the site of some 4 million tons by conventional means, the company extracted over 14 million tons during the life of the operation.

That's the basic idea behind mountaintop removal -- get all of the coal that's there. Virtually the only mining system which allows 100% mineral recovery, the process might better be called flat top mining. In truth, the mountaintop is not removed; it's leveled out.

In contrast to haulback and other forms of contour mining, where economic decisions are made as to how much overburden can be moved and how much mineral recovered, the mountaintop calls for 100% overburden removal, and the controlled replacement of excess overburden.

In that sense, the concept has environmental advantages. When the mountaintop is resculptured, all highwalls are eliminated, outslopes remain undisturbed, and drainage is easier to control than in perhaps any other mining situation. Excess overburden is transported to engineered valley fills, creating a gently rolling plateau.

In the long term, mountaintop reclamation holds the potential for a partial solution to the chronic land shortage in southern West Virginia. In McDowell County, for example, only 6% of the land is flat enough to be developed, and most of that is in the middle of the flood plain.

Mount View High School, however, will never be flooded, for it sits on a 53 acre tract atop Tom's Mountain, a former mountaintop mining project, donated to McDowell County by Pocahontas Land Corp. (see page 40).

Similarly, in nearby Raleigh County, Independence High School sits adjacent to a mountaintop removal site mined by Sterling Smokeless Coal Company.

Mountaintop mining also has application in less mountainous northern West Virginia. Eastpointe Shopping Center, near Bridgeport, in Harrison County is a former mine site where reshaping the hillside made commercial development economically feasible.

West Virginian's had to wage a vigorous fight to salvage the concept of mountaintop mining when the Office of Surface Mining implemented national standards for reclamation, and initially mandated a "return to approximate original contour." Fortunately, more experienced heads prevailed, and the state was not robbed of the use of an innovative mining system which simultaneously enhances mineral recovery and post mining land use.



**Lynn Land Co. of dramatically increased Mingo County's developable acreage with this operation just outside Gilbert.**

**After yielding 14 million tons of coal to Cannelton Industries and Perry &Hylton, Inc., this eastern Kanawha County site is ready for economic development.**

**Terraces are slanted toward the rock core which prevents any significant flow of water across the face of the fill.**

**The stability and effectiveness of a properly constructed fill is such that mining can be carried out on adjacent acreage, as on this Cedar Coal site.**



**Buffalo Mining Co. demonstrates that valley fills can be of quite an imposing size which has proved especially beneficial to mountaintop operations.**

# The Core was the Key

The development of the valley fill construction may be the single most important technological advance in West Virginia's surface mining industry, for it made possible the implementation of both haulback and mountaintop removal.

West Virginia's entire controlled placement concept for mining steep slopes in an environmentally sound manner depended on solving the problem of what to do with the initial cut. In the case of mountaintop mining, the problem was more severe in that there is more excess overburden.

Dumping overburden into adjacent hollows was the obvious answer, but environmental considerations made it much more complicated than that. Under controlled placement, it is necessary to construct the fill in a stable manner, and in such a way that drainage through the hollow can be directed and controlled.

The answer proved to be constructing the fill from the hollow floor upward, in compacted terraces, with a core of durable rock, which extends from the face of the fill through to the original valley floor.

The slant of the terraces diverts ground water to the rock core, which acts as a deterrent to erosion and simultaneously channels the water into sediment control structures below.

After an initial bureaucratic battle with Washington at the advent of the federal Office of Surface Mining, the West Virginia method of valley fill construction has proved to be a sound basis for all forms of controlled placement mining.

**Quick and complete revegetation not only enhances the appearance of a reclaimed site, but prevents a myriad of problems which could otherwise arise from the unchecked flow of water over bare earth. Effective revegetation is even more critical in areas like steep sloped Logan County, where these shots were taken at the same site, just over six weeks apart.**



**In northern West Virginia, with its more rolling terrain, and open fields, a well reclaimed mine site is barely distinguishable from surrounding farm land. This Davis Trucking Co. site in Tucker County is an excellent example.**

# We Can Grow It

Revegetation is obviously a key to the reclamation process. Each reclamation man has his own favorite formula. But whatever the seed mix, the important thing is to get the regraded area covered with plant life, quickly and completely.

Increasingly, surface mining is seen as a land development source for commercial enterprises. But still, the majority of reclaimed land is returned to some form of natural resource, farm land, woodland, wildlife refuge, or pasture.

Tremendous advances in soil science, as well as reclamation techniques have brought the revegetation process to the point where anything that can be grown in West Virginia, can be grown on a reclaimed mine site.

# The Law of the Land

After more than two decades of changing, refining and redefining its surface mining law, West Virginia turned the corner on reclamation in 1961 with three paragraphs enacted by the State Legislature, creating the Department of Natural Resources and granting its director broad powers to enforce the law.

In the intervening years, the West Virginia DNR established itself as a national leader in mining regulation, cracking down when necessary, bending to accommodate innovative technology, and generally allowing the fledgling reclamation industry to grow in a controlled manner which benefitted both the economy and the environment of the state.

In 1977 and the years immediately following, DNR was forced to prove its worth all over again, in order to reestablish regulatory primacy in West Virginia from the federal Office of Surface Mining.

In 1985, a new Department of Energy was created, recognizing the increasing integration of the surface mining and underground mining industries. The new department combines the regulatory duties of the old DNR with those of the Department of Mines, which had been primarily concerned with deep mining.

But a glance at DoE's organizational chart reveals that much of the spirt and experience from DNR has carried over. As such, it appears that the industry may enjoy an unprecedented period of regulatory stability.

In the old days, things were simpler. In 1939, West Virginia passed the nation's first surface mining law. Though quite simple in its requirements, it laid down the basic requirements which still govern the industry today.

That first law required a permit prior to operations, a bond of $150 per acre mined, general reclamation -- mainly the replacement of soil, and provided for a punishment of $50-$500 and up to one year in jail for willful violations.

Thus began a slow but steady evolution of the West Virginia Code as it applies to the surface mining of coal. With the war boom of the early 1940's diminished, the West Virginia Legislature moved to tighten restraints on the industry.

Revisions to the law in 1945 called for specific information on the permit, required a $50 filing fee, raised the bond to $500 per acre, minimum $1000, and allowed one year for reclamation to be completed. The bill also specified operator obligations imposing the first drainage specifications, requiring refuse removal, and setting standards for regrading and revegetation.

Permits were disallowed to operators with reclamation bonds under forfeiture and the fine for violators was raised to $1000.

In 1947, the "Strip Mining Fund" was created to administer reclamation of lands on which bond was forfeited. The fund was financed through filing fees and forfeited bonds.

The Legislature stood pat on surface mining until 1959, but was still a few years ahead of the environmental movement to come when it tightened permit and inspection procedures. The permit filing fee was raised to $100. Permits were limited to one year with a $50 renewal fee. The position of State Surface Mine Supervisor was created with five inspectors charged with enforcement.

In 1961 the duties of these inspection personnel were specified, along with the stipulation that none could hold any financial interest in any mining operation.

Major changes were implemented that year, when the creation of the Department of Natural Resources laid the cornerstone for West Virginia's modern mining and reclamation law.

Although the DNR was to be concerned with much more than surface mining, its Director was granted broad powers in promulgating rules and regulations to govern the industry. Within the DNR, the Division of Reclamation was established to oversee surface mining directly.

The scope of powers delegated to the DNR generally, and to the Division of Reclamation in particular, made West Virginia's reclamation program the most successful in the nation.

Two years later, the Legislature added some refinements to the law which were to have far reaching effects. The bond was changed to per acre disturbed basis from per acre mined, which increased the bonding fee tenfold in some instances.

Also, the industry backed Special Reclamation Fund was established to reclaim orphaned lands. That fund, financed entirely by the operators , is still at work in West Virginia and was the forerunner of a more comprehensive plan in the new federal surface mining legislation. Also initiated in 1963 were requirements for monthly status reports by the operator and topographical mapping before, during, and after the mining operation.

Minor changes were made in 1964 and 1965, and major reform came again in 1967. The 1967 Act might be described as an expansion of the original 1939 law. Prospecting permits were required for the first time. A preplan for reclamation was required. It was mandated that grading, backfilling, and water management be kept current.

A mandatory inspection frequency of every 30 days was established with substantial increases in DNR supervisory and inspection personnel provided.

In 1971, additions to the law recognized inflation as bonds, fees, and fines were raised. The application fee went to $500 and $100 for renewal, the bond was raised to $600 to $1000 per acre disturbed with a $10,000 minimum, the special reclamation fee went from $30 to $60 per acre and penalties for willful violations were raised to $100-$10,000.

Other innovations were the first blasting restrictions, standards for allowable bench width and authorization of inspection personnel to issue cessation orders. Highwalls were thereafter limited to 30 feet. Inspection frequently was increased to 15 day intervals.

New requirements that year included Class III legal advertisement of permit application, and an operators planting and revegetation report.

Substantial funding provided for 20 new field inspectors, fully equipped, and the first use of a Bell Jet Ranger helicopter for inspection and surveillance.

In 1977 amendments to the law, the Legislature directed its emphasis to aesthetic values, mandating total elimination of all highwalls. One other provision of the latest amendments recognized legislatively what had been accomplished administratively four years earlier -- "controlled placement " of overburden.

A DNR internal memo dated May 16, 1973, from then Chief of Reclamation Ben Greene to his field supervisors, prohibited the placement of overburden materials on the outslope, wehre the original slope was 50% and greater. It is this prohibition, more than any other, that separates West Virginia's reclamation performance from that of other states. Greene is now President of the West Virginia Mining and Reclamation Association.

Thus West Virginia's Code as it applies to surface mining for coal and land reclamation incorporates all of the major applicable aspects of the federal law. In fact West Virginia's legislative program, its agency for implementation and enforcement, its operators' innovation and its overall reclamation record have all served as models for federal efforts to legislate, implement and achieve uniform envirnomental protection standards across the country.

When McDowell County needed a new consolidation high school, Perry & Hylton's mountaintop operation on Tom's Mountain proved to be the ideal location.

Sterling Smokeless Coal Co. built and shared an access road to this Raleigh County mine site while Independence High School was under construction on an adjacent lot.



One of the more picturesque post mining land use sites in southern West Virginia was one of the earliest. Scarlet Oaks, in Putnam County, was a surface mine in the 1950's, was reclaimed and converted to a dairy farm, and is now one of the area's most beautiful country clubs.

# Use It Again, Sam

Post mining land use in an aspect of surface mining that is unique in American industry. Almost every commercial or industrial development of land involves the more or less permanent conversion of the acreage to that particular purpose.

Surface mining, with its attendent reclamation, provides an opportunity to utilize acreage twice, first for mineral extraction, then permanent development as the local situation dictates. The relatively short life span of the typical active surface operation makes post mining land use a prime consideration in developing a mining and reclamation plan.

In the case of leased acreage, the wishes of the permanent land owner are of prime consideration in determining post mining land use. In either case, a full scale post mining land use plan is a prerequisite to obtaining a permit to mine. When reclamation is carried out with post mining development in mind, developers enjoy an obvious head start in terms of access, site preparation, etc.

Though farmland and wildlife areas are still of prime importance as post mining land use, the long term trend will probably tend toward commercial development, particularly in land scarce southern West Virginia.

Already, reclaimed mine sites ahve been converted to housing, shopping centers, airports, motels, churches, driving, offices, golf courses, industrial parks, schools, and hospitals.

As West Virginia's relatively small urban areas expand, this aspect of the mining process will become increasingly important, limited only by the imagination of developers.

**Reclamation of a refuse pile near Bradshaw, McDowell County, by G.E. Ray.**

**Reclamation of a refuse pile near Oak Hill, Fayette County, by Brumfield Construction Co.**



**Reclaimed refuse area on Peach Creek, Logan County, by Geupel Construction Co., Inc.**

# A Point of Pride

West Virginia coal operators can point with pride to the industry's modern reclamation record, second to none in the United States. It is a simple fact that shifting public priorities have placed increasingly greater emphasis on environmental protection with each passing decade.

With the coming of a national surface mining law in 1977, regulatory authorities not only sought to prevent present and future abuses of coal lands, but to bring mined out acreage up to modern reclamation standards. This was the basis of the Abandoned Mine Lands Fund, which assesses coal operators at the rate of 35 cents per ton for surface coal, and 15 cents a ton for underground coal.

As with many other aspects of the federal surface mining act, West Virginia was well ahead of the pace, having initiated the Special Reclamation Fund in 1963.

Proposed and supported by West Virginia coal operators, the Fund was enacted by the Legislature and administered by the Department of Natural Resources. Operators were assessed $30 per acre disturbed, later increased to $60 per acre.

Since the AML fund was created, West Virginia operators have pumped over $180 million into it. The federal Office of Surface Mining is in charge of recycling the money back to the state regulatory authority, which in turn administers the actual reclamation work on a site priority basis. Though the system of shuttling the money back and forth between Washington D.C. and Charleston, W.V. denies West Virginia the full use of the funds, many AML projects have been fully reclaimed to modern standards.

It is indeed a tribute to West Virginia surface operators and to the old Special Reclamation Fund that most of the projects reclaimed thus far under the AML priority system have been refuse piles, and not surface mines. It is also important to note that all of this is accomplished at no cost to the taxpayer.

# Glossary

## A brief explanation of frequently used terms in the surface mining industry

BACKFILL -- The operation of refilling an excavation. Also the material placed in an excavation in the process of backfilling.

BENCH -- The surface of an excavated area at some point between the material being mined and the original surface of the ground on which equipment can set, move or operate. A working road or base below a highwall as in contour stripping for coal.

BOX CUT -- The initial cut driven into a property, where no open side exists; this results in a highwall on both sides of the cut.

CFS -- Cubic feet per second -- measurement of water flow.

COAL SEAM-- A layer, vein, or deposit of coal. A stratigraphic part of the earth's surface containing coal.

COMPACTION -- The closing of the pore spaces among the particles of soil and rock, generally caused by running heavy equipment over the area, as in the process of leveling the overburden material.

CONTOUR -- An imaginary line connecting points of equal height above sea level as they follow the relief of the terrain.

CONTOUR MINING -- The removal of overburden and mining from a coal seam that outcrops or approaches the surface at approximately the same elevation, in steep or mountainous areas.

CONTROLLED PLACEMENT -- Method of surface mining that dictates preplanning, site preparation, removal and control of overburden during the mining operation and provides for a productive, stable end use.

CORE DRILLING -- The process by which a cylindrical sample of rock and other strata is obtained through the use of a hollow drilling bit which cuts and retains a section of the rock or other strata penetrated.

CROP COAL -- Coal at the outcrop or near the surface of the seam. It is usually considered of inferior quality due to partial oxidation, although this is not always true.

CUT -- Longitudinal excavation made by a surface mining machine to remove overburden in a single progressive line from one side or end of the property.

DISTURBED LAND -- Land on which excavation has occurred or upon which overburden has been deposited, or both.

DIVERSION DITCH -- A man-made waterway used for collecting surface runoff on the uphill side of a mine in order to keep it out of the workings; a ditch designed to change the normal or actual course of water.

DRAGLINE -- An excavating machine that utilizes a bucket operated and suspended by means of lines or cables, one of which hoists or lowers the bucket from a boom; the other, from which the name is derived, allows the bucket to swing out from the machine or to be dragged toward the machine for loading. Mobility of draglines is by crawler mounting or by a walking device for propelling, featuring pontoon-like feet and a circular base or tub. The swing of the machine is based on rollers and rail. The machine usually operates from the highwall side of the mine.

DRAINAGE BASIN -- The area from which water is carried off by a drainage system, a watershed or a catchment area.



DRAINAGE PLAN -- The proposed methods of collection treatment, and discharge of all waters within the affected drainage area as defined in the pre-mining plan.

DRIFT -- A deep mine entry driven directly into a horizontal or near horizontal mineral seam or vein when it outcrops or is exposed at the ground surface.

EFFLUENT -- Any water flowing out of the ground or from an enclosure to the surface flow network.

EMERGENCY SPILLWAY -- A spillway designed to convey water in excess of that impounded for flood control or other beneficial purposes.

EXCAVATION -- The act of removing overburden material.

FILL -- Depth to which material is to be placed (filled) to bring the surface to a predetermined grade. Also, the material itself.

FILL BENCH -- That portion of the bench which is formed by depositing overburden beyond the cut section.

FLOOD 10- YEAR -- The flow of a stream which has been equaled or exceeded, on the average once in 10 years (or other designated period).

FORAGE -- Unharvested plant material which can be used as feed by domestic animals. Forage may be grazed or cut for hay.

FRENCH DRAIN -- A covered ditch containing a layer of fitted or loose stone or other pervious material.

GABION -- A mesh container or waste basket used to confine rocks or stones and used to construct dams or line st stream channels.

GEORGIA V-DITCH -- Grading is performed to create positively draining swales midpoint between and parallel to the highwall and lowwall to convey water runoff to drains established to carry the water away from the spoil area.

GERMINATION -- Sprouting; beginning of growth.

GOB -- Waste coal, rock pyrites, slate, or other unmerchantable material of relatively large size which is separated from coal and other mined material in the cleaning process.

GOUGING -- Gouging is a surface configuration intended to trap precipitation, increase infiltration and reduce erosion.

GRADE --
(1) The inclination or slope of a stream channel or ground surface, usually expressed in terms of the ratio or percentage of number of units of vertical rise or fall per unit of horizontal distance.
(2) The finished surface of a road bed, top of an embankment or bottom of an excavation.
(3) To establish a profile by backfilling.

GROUND COVER-- Any living or dead vegetative material producing a protecting mat on or just above the soil surface.

GROWING SEASON -- The season which in general, is warm enough for the growth of plants, the extreme average limits of durating being from the average date of the last killing frost in spring to that of the first killing frost in autumn. On the whole, however, the growing season is confined to that period of the year when the daily means are above 42F.

# Glossary

HAULBACK METHOD -- This method removes coal by stripping and augering with no material being placed on the downslope. Laterial movement reduced disturbed acreage by nearly two thirds when compared with conventional surface mining because the overburden is hauled by truck laterally along the bench and then backfilled against the highwall.

HAULROAD -- Road from pit to loading dock, tipple, ramp, or preparation plant used for transporting mined material by truck.

HIGHWALL -- The unexcavated face of exposed overburden and coal in a surface mine or the face or bank on the uphill side of a contour surface mine excavation.

HYDROLOGY -- The science that relates to the water systems of the earth.

HYDROSEEDING -- Dissemination of seed hydraulically in a water medium. Mulch, lime, and fertilizer can be incorporated into the sprayed mixture.

IMPERVIOUS -- Prohibits fluid flow.

IMPOUNDMENT -- A reservoir for collection of water. Collection of water by damming a stream or the like. May be used in connection with the storage of tailings from a mine.

INTERMITTENT STREAM -- A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and is dry for a large part of the year.

LATERAL MOVEMENT -- See Haulback Method.

LEACHING -- The removal of materials in solution by the passage of water through soil.

LEGUME -- A member of the legume or pulse family, leguminosae. One of the most important and widely distributed plant families. Includes many valuable food and forage species, such as the peas, beans, peanuts, clovers, alfalfas, sweet clovers, lespedezas, vetches and kudzu. Pratically all legumes are nitrogen-fixing plants.

LITTER -- Freshly fallen or slightly decomposed organic debris.

LOAD -- (Water quality use) The quantity of material carried by flowing water -- generally expressed as pounds per day.

LONGWALL STRIPPING -- Longwall mining accomplished in areas of shallow cover where surface mining might normally have been conducted. The outby end, where the longwall controls, pumps, and face conveyor discharge end are located, is located in a ditch that is exposed to the surface. Roof chocks are used to protect the mining area and the roof (or overburden) is allowed to settle into the mined out section.

MINE DRAINAGE -- Any water forming on or discharging from a mining operation. May be alkaline or acid in nature.

MINED-LAND -- Land with new surface characteristics due to the removal of mineable commodity by surface mining methods and subsequent surface reclamation.



MOUNTAINTOP REMOVAL -- In this mining method, 100 percent of the overburden covering a coal seam is removed in order to recover 100 percent of the mineral. Excess spoil material may be hauled to a nearby hollow to create a valley fill.

MULCH -- A natural or artificial layer of plant residue or other materials placed on the soil surface to protect seeds, to prevent blowing, to retain soil moisutre, to curtail and to modify soil temperature.

MULTIPLE SEAM MINING -- Surface mining in areas where several seams are recovered from the same hillside.

NURSE CROP -- A planting or seeding that is used to protect a tender species during its early life. A nurse crop is usually temporary and gives way to the permanent crop. Sometimes referred to as a companion crop.

OPENCUT -- A method of excavation in which the working area is kept exposed.

OPEN PIT MINING -- Surface mining, a type of mining in which the overburden is removed from the product being mined and is dumped back after mining; or may specifically refer to an area from which the overburden has been removed and has been filled.

OPERATION -- All of the premises, facilities, railroad loops, roads, and equipment used in the process of extracting and removing a mineral commodity from a designated surface mine or in the determination of the location, quality , and quantity of a natural mineral deposit.

ORPHAN BANKS -- Abandoned surface mines, operated prior to the enactment of comprehensive reclamation laws, that require additional reclamation.

OUTCROP -- Coal which appears at or near the surface; the intersection of a coal seam with the surface.

OUTSLOPE -- The exposed area sloping away from a bench cut section.

OVERBURDEN -- The earth, rock, and other materials which lie above the coal.

OVER THE SHOULDER -- A method of handling overburden whereby it is moved parallel to the highwall instead of at right angles to the wall as normally done.

PERCOLATION -- Downward movement of water through soils.

PERMEABILITY -- The measure of the capacity for transmitting a fluid through the substance.

PH -- The symbol refers to a scale commonly used to express the degrees of acidity or alkalinity. On this scale pH of 1 is the strongest acid, pH of 14 is the strongest alkali, pH of 7 is the point of neutrality at which there is neither acidity or alkalinity. pH is not a measure of the weight of acid or alkali contained in or available in a given volume.

PIT -- Used in reference to a specifically describable area of open cut mining. May be used to refer to only that part of the open cut mining area from which coal is being actively removed or may refer to the entire contiguous mined area.

PREPLANNING -- Process of foreseeing reclamation problems and determining measures to minimize off-site damages during the mining operation and to provide for quick stabilization of the mining area.

# Glossary

PROSPECTING -- The removal of overburden, core drilling, construction of roads, or any other disturbance of the surface for the purpose of determining the location, quality and quantity of the natural mineral deposit.

RECLAMATION -- The process of reconverting mined land to its former or other productive uses.

RED DOG -- A gob pile after it has burned. The material is generally used as a road surfacing material; it has no harmful acid or alkaline reaction.

REFUSE -- All the solid waste from a coal mine, including tailings and slurry. Other synonyms are: dirt, gob, shale, slate, etc.

REGRADING -- The movement of earth over a depression to change the shape of the land surface. A finer form of backfilling.

RETENTION -- The amount of precipitation on a drainage area that does not escape as runoff. It is the difference between the total precipitation and total runoff.

REVEGETATION -- Growth which replaces original ground cover following land distrubance.

RIPRAP -- Broken rock, cobbles, or boulders placed on earth surfaces, such as the face of a dam, bank of a stream, or lining drainage channels, for protection against the action of water.

RUNOFF -- That portion of the rainfall that is not absorbed by deep strata: is utilized by vegetation or lost by evaporation or may find its way into streams as surface flow.

SEAM -- A stratum or bed of coal.

SEDIMENT -- Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

SEDIMENT BASIN -- A reservoir for the confinement and retention of silt, gravel, rock, or other debris from a sediment-producing area.

SEDIMENT STRUCTURE -- A barrier or dam constructed across a waterway or in other suitable locations to form a silt or sediment basin.

SEEP -- A more or less poorly defined area where water oozes from the earth in small quantities.

SHOTGUN MIXTURE -- Seeding a number of species at random.

SHOVEL -- Excavating or coal-loading machine that utilizes a bucket mounted on and operated by means of a handle or dipper stick that moves longitudinally on gears which is lifted or lowered by cable. The entire machine is mounted on crawlers for mobility and the upper structure is mounted on rollers and rail for swing or turn.

SILT -- Small mineral soil grains the particles of which range in diameter from 0.05 to 0.002 mm (or 0.02-0.002 mm in the international system).

SLIP OR SLIDE -- A mass of spoil material that moves downward and outward to a lower elevation due to the force of gravity, generally caused by overloading of the downslope, freezing and thawing, or saturation of the fill.



SLOPE -- (See Grade)

SLOPE STABILITY -- The resistance of any inclined surface, as the wall of an open pit or cut, to failure by sliding or collapsing.

SLURRY -- Refuse separated from the coal in the coal cleaning process of relatively small size which is readily pumpable in the washing plant effluent. A pulverized coal-liquid mixture transported by pipeline.

SOLID BENCH -- That portion of the bench located on undisturbed material.

SPILLWAY -- A waterway in or about a dam or other hydraulic structure for the escape of excess water.

SPOIL -- (See ACID SPOIL or TOXIC SPOIL) The overburden or non-coal material removed in gaining access to coal or mineral material in surface mining.

SURFACE MINING -- Mining method whereby the overlying materials are removed to expose the mineral for extraction.

TERRACE -- Sloping ground cut into a succession of benches and steep inclines for purposes of cultivation or to control surface runoff and minimize soil erosion.

TOE -- The point of contact between the base of an embankment or spoil bank and the foundation surface. Usually the outer portion of the spoil bank where it contacts the original ground surface.

TOPOGRAPHY -- The shape of the ground surface such as hills, mountains, or plains. Steep topography indicates steep slopes or hilly land; flat topography indicates flat land with minor undulations and gentle slopes.

TOPSOIL -- Presumed fertile soil material -- used as a top dressing. Distinction has been made among synthetic, weathered, and geologic topsoil. Synthetic topsoil can include sand and stone chips as well as fly ash, sawdust, or manure not usually a part of geological soil and rock. Weathered topsoil is the natural topdressing material that has been subjected to weathering throughout geologic time.

VALLEY FILL METHOD (Also HEAD OF THE HOLLOW) -- Placement of overburden material from adjacent contour or mountaintop surface mines is placed in compacted layers in narrow, steepsided hollows to facilitate surface drainage.

VOLUNTEER -- Springing up spontaneously or without being planted; a volunteer plant.

WATER BAR -- Any device or structure placed in or upon a haul or access road for the purpose of channeling or diverting the flow of water off the road.

WATERSHED -- Surface region or area contributing to the supply of a stream or lake, drainage area, drainage basin, catchment area.

WEIR -- A notch over which liquids flow and which is used to measure the rate of flow. A dam across a stream for diverting or measuring the flow.