

West Virginia Surface Mining & Reclamation Association's

Green Lands

QUARTERLY
SPRING 1973



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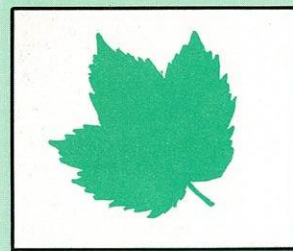
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West Virginia Surface Mining & Reclamation Association

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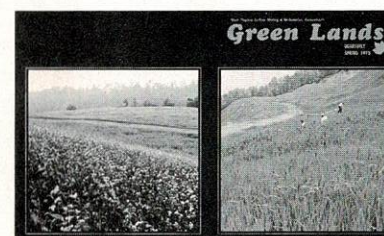
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ABOUT THE COVER

Effective reclamation on the steep slopes is of great concern to everyone. The front cover shows a mulch experimentation site on Bolt Mountain in Raleigh County (story on page 14) and the back depicts highwall elimination in the mountainous terrain of Wyoming County, West Virginia.



Pictured above at the head table before the program got underway are: (from the left) Jim and Shirley Wilkinson, Carl Bagge, Jim and Julia Compton and Jim and Shelley Poindexter.

Eight Companies Honored

WVSMRA Banquet, Bagge Draw Largest Crowd

The Annual Awards Banquet of the West Virginia Surface Mining and Reclamation Association, held in Charleston on January 13, proved to be the best attended and most successful ever.

Held in conjunction with the Association's semi-annual business meeting, the banquet was highlighted by the appearance of National Coal Association President, Carl E. Bagge and the presentation of reclamation awards by Ira S. Latimer, Jr., Director, Department of Natural Resources.

Nearly 300 members and guests heard Bagge deliver a hard-hitting speech claiming that environmentalists, who endanger the survival of the coal industry are making the American public "the ultimate endangered species." It was the largest crowd to turn out for an Association function in the seven year history of the organization.

Latimer, telling the group he felt West Virginia Surface Mining Rules and Regulations were doing a good job and that there is no need for federal guidelines, followed with the presentation of awards for outstanding reclamation to eight companies. The awards went to:

- Rocky Ridge Enterprises, Inc., for excellent mining techniques and progressive reclamation which have resulted in the elimination of orphaned areas and the overall improvement of the land.
- Dippel & Dippel Coal Company for continuous cooperation with state and federal agencies and outstanding surface mining and reclamation work while operating in the critical Dent's Run Watershed.
- X-Cello Corporation and Pratt Mining Company for outstanding haulroad construction and the innovative use of gabion structures in the drainage system.
- Valley Camp Coal Company for excellent control of all water entering and exiting the operations and the use of top soiling in the reclamation program.

- Ranger Fuel Corporation for design and construction of embankment water treatment structures and effective development of valley fill method of mining and reclamation.
- Cannellon Industries, Inc. for outstanding total reclamation effort with particular emphasis on regrading the steep outer slopes and development of mined land for future use.
- Perry & Hylton, Inc. for outstanding achievement in preplanning the operation with consideration of future development of the land.
- Grafton Coal Company for comprehensive preplanning and overall concern for the future of the land after mining.

The meeting actually got underway at 11 a.m., January 12, with the Board of Directors' meeting and luncheon, followed by consecutive technical sessions by the Department of Natural Resources and the Soil Conservation Service, respectively.

"Accomplishments of Reclamation in West Virginia" were discussed by Ben Greene, Chief of Reclamation for the Department of Natural Resources, followed by a "1972 Soil Conservation Service Progress Report" by Frank Glover.

The Association's technical sessions lasted throughout Saturday morning following the theme of reclamation accomplishments of operators throughout the state. Participating in the program were: Lawrence Streets, Allegheny Mining Company; Jim Wilkinson, Kingwood Mining Company and Association President; Floyd Stiles, Mountain State Surveying; Bob Legg, Ford Coal Company; Dave Ozmina, D & D Reclamation, Inc.; and Jim White, of the Pittston Coal Group.

The afternoon activities were topped off by business meetings followed by the Awards Banquet at 7:30.

Held in conjunction with the West Virginia Surface Mining and Reclamation Association, was the annual meeting of the Steering Committee for Reclamation Research in West Virginia on Thursday and Friday.

Also on the schedule was the initial organizational meeting of the Steering Committee for Surface Mining and Reclamation Research in Appalachia.

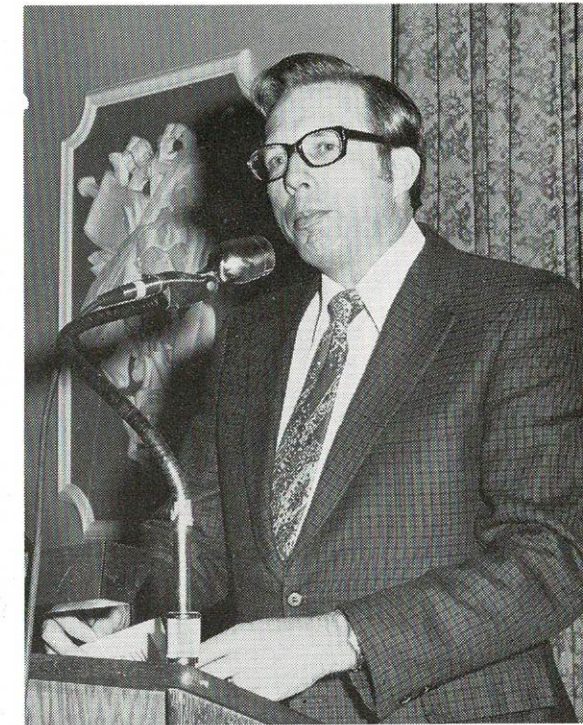
Making the presentation of awards for outstanding reclamation achievements was Department of Natural Resources Director Ira S. "Sandy" Latimer, Jr. Awards were given to eight companies for their individual excellence in various phases of surface mining and reclamation.



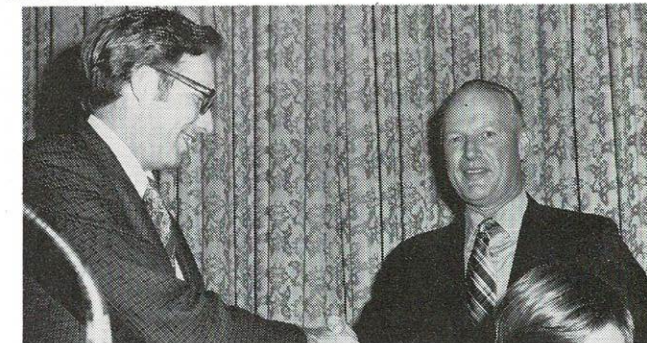
A big smile from Grafton Coal Company President Jim Compton receiving an award for comprehensive preplanning and overall concern for the future of the land after mining.



An award for outstanding total reclamation effort with particular emphasis on regrading the steep outer slopes and development of mined land for future use.

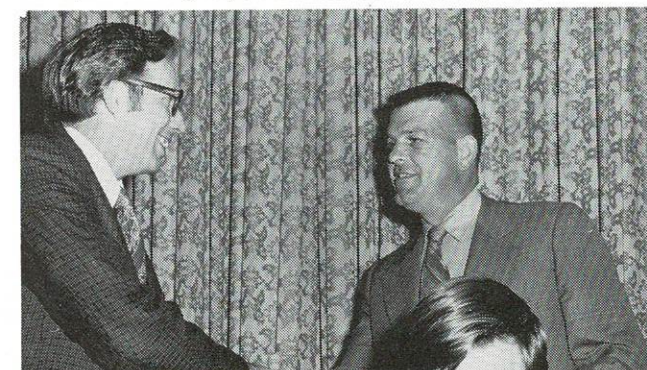


Receiving the award from Latimer for excellent mining techniques and progressive reclamation resulting in the elimination of orphaned areas and the overall improvement of the land is Melvin Reckart, President of Rocky Ridge Enterprises, Inc.



Jim White, who is in charge of all surface reclamation for the Pittston Coal Group, accepts Ranger Fuel Corporation's award for design and construction of embankment water treatment structures and effective development of the valley fill method of mining and reclamation.

Valley Camp Coal Company won for excellent control of all water entering and exiting the operations and the use of top soiling in the reclamation program. Accepting the award is surface mining superintendent Zeb Pendergrass Jr.



Lawson Hamilton Jr., President of Pratt Mining Company and X-Cello Corporation accepts the award for outstanding haulroad construction and the innovative use of gabion structures in the drainage system.

Also receiving awards, but not pictured were Dippel and Dippel Coal Company for continuous cooperation with state and federal agencies and outstanding surface mining and reclamation work while operating in the critical Dent's Run Watershed, and Perry and Hylton, Inc., for outstanding achievement in preplanning the operation with consideration of future development of the land.

WVSMRA Convention 1972

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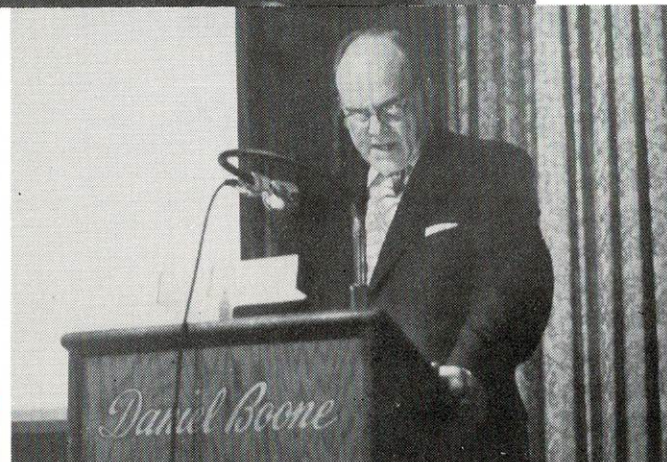
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1

Part of the crowd of participants in the Research Steering Committee meeting listens intently to a presentation. Nearly 60 people attended the quarterly meeting of the research group.

2

Our surprise "guest speaker" was a surprise to everyone, including the speaker. But Lawson Hamilton has never been at a loss for words and this was no exception, but the audience didn't seem to be interested.

3

Enjoying the ladies luncheon and fashion show are from the left, Association secretary Bev Snow, Shirley Wilkinson, Sonja Lusk, and Katherine Folio.

4

The ladies program included a luncheon and fashion show sponsored by a local clothing store.

5

Also on the special session Friday was Reclamation Chief Benjamin C. Greene, who told the group, through the use of a slide presentation, that reclamation techniques were continually improving.

6

Immediately following the annual business meeting the Executive Committee held an impromptu session. From the left, Tom Horne, Gil Frederick, Ben Lusk, Fil Nutter Sr., Lawson Hamilton and Jim Wilkinson.

7

Bill Plass of the U. S. Forest Service and Dave Ozwin of D & D Reclamation, Inc. handled all the arrangements for the Research Steering Committee meetings for West Virginia and the new Appalachian group.

8

Frank Glover, State Conservationist for the Soil Conservation Service, appeared at a special session for Association members on Friday afternoon. Frank explained in detail the assistance that is available to surface mining companies from the SCS.

9

If you don't register, you don't get in! The girls have to handle the arduous task of making sure everyone registers for the various events. From the left Patty Bruce, Mary Ann Steele, Jack Anderson and Walter Burton.

10

Jim White, who is in charge of all surface reclamation for the Pittston Coal Group, shows Ranger Fuel's Valley-fill method of mining and reclamation near Bolt Mountain. He was one of six participants in the Association's Saturday morning technical session.

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Appalachian Research Group Formed

Representatives from four states conducted the second organizational meeting of the Steering Committee for Surface Mining and Reclamation Research in Appalachia in Charleston, recently.

Research personnel from West Virginia, Ohio, Virginia and Tennessee, comprising an interim committee established in mid-January, met to outline proposals for organizational structure and objectives of the committee.

The group decided to pattern itself after the sponsoring West Virginia Steering Committee, which provides controlled, equal membership of industry, and regulatory agencies, government research agencies and colleges and universities. A chairman, vice-chairman and secretary will be elected at the next meeting scheduled for mid-May.

The basic objective of the group is to promote and support research relating to surface mining and reclamation in Appalachia, but more specifically:

- To develop methods for interpreting demonstrating the practical application of surface mining and reclamation research conducted in the Appalachian Region.
- To encourage communications between research scientists, the regulatory agencies and the surface mining industry so that research projects concern relevant problems.
- To offer advice on proposed research and demonstrations and to cooperate with the research scientist in obtaining assistance necessary to initiate specific projects.
- To foster and advance knowledge of surface mining and reclamation for the general public.

In addition to those states represented on the interim committee, Kentucky, Pennsylvania, Maryland and Alabama are expected to participate in the May meeting. The regulatory agencies and reclamation associations from each state will be invited, along with the University of Tennessee, Penn State, Virginia Polytechnic Institute and West Virginia University.

Other groups involved or invited are the U. S. Forest Service, Agricultural Research Service, Economic Re-



The seemingly untiring Bill Plass is at it again. Besides being the principal plant ecologist at the Forest Products Market Lab in Princeton, W. Va., he is Secretary of the Steering Committee for Surface Mining and Reclamation Research in West Virginia, and acting secretary of the new Appalachian group.

search Service, Soil Conservation Service, Tennessee Valley Authority, Appalachian Regional Commission, Inter-state Mining Compact and the National Coal Association.

The next meeting is tentatively scheduled for May 15 and 16 at the Daniel Boone Hotel in Charleston, and will feature a planning session, banquet and field trip.

Those present at the meeting were: William T. Plass, U. S. Forest Service; Dave Ozmina, D & D Reclamation, Inc.; Steve Layton, West Virginia Department of Natural Resources; Donald E. Richter, Ohio Reclamation Association; Thomas G. Zarger, Tennessee Valley Authority; Danny R. Brown, Virginia Department of Conservation and Economics Development; and Dan Gerkin, West Virginia Surface Mining and Reclamation Association.

Research is the name of the game. Here, Plass and several other scientists inspect a test plot located on White Oak Mountain in Raleigh County. The new Appalachian Steering Committee hopes to expand such projects throughout the Appalachian region.





The Ultimate Endangered Species

Editor's Note: "THE ULTIMATE ENDANGERED SPECIES" was an address given by Carl E. Bagge at the Semi-Annual Awards Banquet of the West Virginia Surface Mining and Reclamation Association (Charleston, W. Va.) on January 13, 1973.

Carl E. Bagge is president and chief executive officer of the National Coal Association, the industry trade association representing major commercial bituminous coal producers, coal sales companies, mining equipment manufacturers, coal-carrying railroads and barge lines, and resource developers. Before joining NCA in 1971, Mr. Bagge served as a member of the Federal Power Commission. A Republican, he was nominated by President Johnson in 1965 to fill the unexpired term of Commissioner Harold C. Woodward. Mr. Bagge took office May 27, 1965, and was reappointed by President Johnson in 1967 to a full five-year term. He served twice as vice chairman of the Commission—in 1966 and 1969.

It is a real pleasure to be here tonight, for I want to discuss with you a topic dear to the heart of the environmentalists who seem to have the ear of our lawmakers and the press these days. It is a subject which occasions impassioned letters to the editor, petitions to Congress, and large-scale fund-raising by environmental organizations.

The subject, of course, is preservation of an endangered species. And I speak tonight of a species which is in real danger of being exterminated. However, it is not the timber wolf or the bald eagle or the Florida alligator, but the American surface miner.

Now there's an endangered species for you.

Show me an alligator and I'll show you a sneaky reptile with enough friends to get elected to Congress. I won't speculate on whether that may already have happened in a few cases.

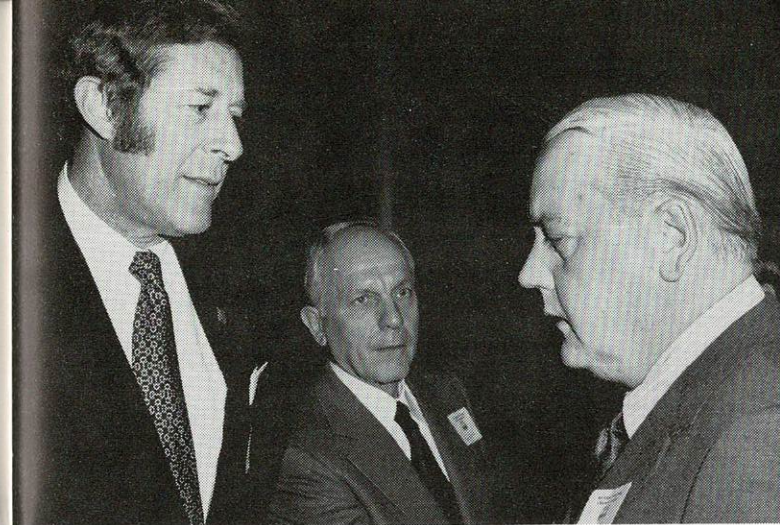
But show me a surface miner, and we'd both better

duck. All the people who are trying to make the world safe for alligators and Kodiak bears and Nevada pupfish will be trying to exterminate him by fair means or foul. Do not mistake me. I believe endangered species should be preserved. I do not want the surviving alligators translated into handbags. I say hurrah for the Kodiak bear, though I wouldn't want one moving into my neighborhood. But I don't want to see the surface miner's hide nailed to the wall either. He's a socially useful species, far more so than the alligator.

If and when the last alligator vanishes from the swamps, I imagine that the essential features of American life as we know it will somehow survive. But if the dedicated enemies of the surface miner succeed in wiping out coal production by this method, we will be missing some essentials of our present life style—enough electricity, for instance, to light our homes and run our factories.

So I count it a privilege to be here tonight in Charleston, at a great gathering of surface miners. I am particularly glad to come here to salute you on a victory, for this state was the crucible in the last great test of whether your part of the American coal industry would be allowed to continue supplying its important share of the nation's energy needs.

As the nation watched, the people of West Virginia last November cast their votes in an election in which surface mining was an issue. They overwhelmingly rejected the illogical, emotional appeals which would have closed down a great industry and helped to cripple a great nation at the very time the energy crisis is beginning to pinch our economy.



Following his presentation Mr. Bagge talks with Charles Jones, President of Amherst Coal Company (left) and Paul Morton, President of Cannelton Industries.

So tonight I say, "Congratulations." I wish I could add, "Relax and go about your business; you will survive." But I cannot. You are still an endangered species, and it is still open season. The struggle is moving back — again — to the halls of Congress. It is about as sure as anything can be, that Congress will pass a bill this year to regulate strip mining and reclamation. The only question is the form and spirit of the bill finally enacted — whether it will allow continued mining with stringent requirements for good reclamation, or whether it will prohibit surface mining on every acre — and on every pretext — that misguided environmentalists can contrive to include.

Let me make the National Coal Association's position clear, though I think you know it already. With the full backing of our members who produce coal by surface mining, we support reasonable federal legislation to ensure that mined land is reclaimed to productive use. We have held this position for two years. We know that responsible coal operators are doing an effective job of reclaiming the land they mine. Quite frankly, we believe that every operator should be required to do a good reclamation job, either voluntarily or by force of law; those who shirk this responsibility not only harm the land, they damage the whole surface mining industry and the responsible companies who are doing their part properly.

I know that members of your association are doing a good job of reclamation. You show your dedication to that goal by your membership in the West Virginia Surface Mining and Reclamation Association, and by your presence here tonight. You are demonstrating that the need for surface-mined coal is not in irreconcilable conflict with environmental needs. You are developing new methods of mining which make the reclamation task easier, and new grading and planting techniques which reclaim the land quicker and more effectively.

I congratulate you. I also warn, like the red queen in "Alice in Wonderland," that you must run like mad in order to stay in the same place. I know you will continue to improve your performance, and to make sure that all operators follow your high

Immediately following Mr. Bagge's timely speech, Association President Jim Wilkinson presented him with a plaque on behalf of the WVSMRA in appreciation for his outstanding efforts on behalf of the coal industry. The plaque reads "In Appreciation to Carl E. Bagge, President, National Coal Assn., for his Outstanding Contributions in Support of The Surface Mining Industry . . . West Virginia Surface Mining and Reclamation Association".

standards. When the public sees — or reads about — reclamation neglected or poorly done, nobody stops to ask whether it was done by the good guys or the bad guys, or whether the operator was penalized by the law. The public simply blames the whole industry, writes more letters to Congress, and renews its dues to environmental lobbies.

Last year in Congress the House and Senate Interior Committees, after prolonged hearings and deliberation, produced strip mine bills which differed markedly in their basic approaches. Each was a stringent bill, but the Senate bill said, in effect, that land should not be mined unless the problems involved in reclaiming it could be solved. The House bill, on the other hand, made the bald assumption that there would be problems in reclaiming certain types of terrain, and simply prohibited mining there.

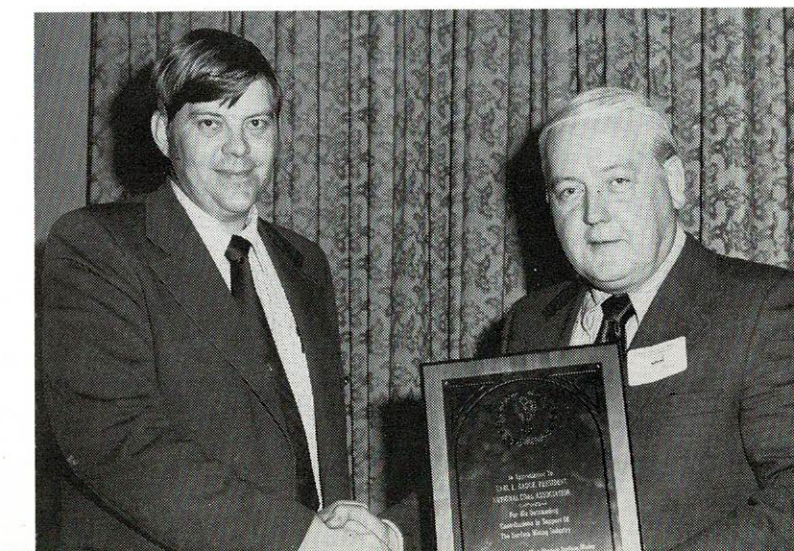
The House bill, for example, prohibited placing overburden on outcrops steeper than 14 degrees. On slopes above 20 degrees, it prohibited mining entirely unless the operator could affirmatively show to the Secretary of the Interior that he could effectively reclaim the land—and the required proof could be made so stringent as to constitute indirect prohibition. It is no wonder that former congressman Ed Edmondson of Oklahoma, then chairman of the Mines and Mining Subcommittee, said that the bill hit Appalachia right between the eyes.

The House approved its bill in the last days of Congress, but not enough time remained for the Senate to act on the subject and then reconcile its differences with the House. The legislation, therefore, died with the adjournment of Congress.

The new session, which began last week, will take up the issue again. However, there are signs that the Senate will take the initiative this time.

Last month I was privileged to introduce Senator Henry M. Jackson of Washington, chairman of the Senate Interior Committee, when he made a major speech on the nation's energy problems to the Coal Mining Institute of America in Pittsburgh. Senator Jackson is not only directing his committee in a far-reaching study of the nation's need for an energy policy (with the help of Senator Jennings Randolph of West Virginia), but will also be in charge of his committee's deliberations on strip mine legislation. He introduced a bill of his own late in the last session which modified his committee's bill.

To his audience in Pittsburgh, Senator Jackson said there is a strong consensus on the need for federal surface mining legislation, but he said the bill passed by the House last year was adopted "without a full and realistic appreciation of all its consequences and the serious policy questions it poses."





Carl E. Bagge, National Coal Association President, told an overflow crowd of Association members and their guests that environmentalists are making the surface miner an endangered species. The 300 plus crowd was the largest ever for an Association function.

He said, for example, that the House bill gave the authority for regulating surface mining exclusively to the federal government. Senator Jackson continued, "While I agree with the need for a strong federal role to insure coordinated and adequate regulations and enforcement, I believe the states properly have the primary responsibility and should be encouraged to take the lead role. This is the approach I have taken in the bill I introduced late in the last session."

Senator Jackson then announced that to gain a better understanding of the impact of regulatory approaches proposed in the House-passed bill and other measures, he asked the Council on Environmental Quality to set up an interagency task force to report on the impact of blanket prohibition of surface mining, and of slope degree limitations which operate as bands and prohibitions.

Specifically, he asked for answers to these questions: How much of our coal resources could not be mined under the proposed prohibitions and limitations? What impact would these proposals have on electric power reliability and fuel sources for specific power plants now using surface mined coal? What would be the impact on other industries such as steel? What would be the impact on employment, local tax base and levels of local government service in the regions affected? What would be the environmental and other benefits from a system of prohibitions and slope limitations?

Senator Jackson concluded with these words:

"In my view, it is essential that legislators at both the national and state levels have a clear understanding of all the costs, all of the benefits, and all of the consequences of specific regulatory proposals. It is clear that coal must play an increasingly important role in meeting further energy needs. Because of this, it does not make sense to impose a regulatory system which arbitrarily denies the use of this resource unless the denial is warranted by the facts and by the environmental benefits."

Senator Jackson asked for the report by February 1, and I can testify that his request spoiled the Washington holiday lull for scores of government employees in at least six agencies. From the widespread scurrying around which followed his request, it became obvious that government had

never assembled — if it ever possessed — reliable information on how much coal would be forever locked in the ground by some of the slope restrictions in the House-approved bill, and what effect this would have on the national economy.

And of course this says something about the wisdom of the House in approving such drastic and far-reaching legislation with no clear idea of its impact. This year, therefore, we may see the Congress acting more on the basis of information and less on emotion, particularly if the Senate acts first, as Senator Jackson seems to intend it should do.

Of course, this will not be the only bill considered. I am sure there will be an Administration bill, probably as part of a legislative package sent to the Hill after President Nixon sends his energy message in a few weeks.

Already the House bill has been reintroduced by Congressman Wayne Hays of Ohio. And congressman Ken Hechler of West Virginia has shown up again with his prohibition bill, slightly modified. This time he would still forbid contour-mining in six months, but he would give a slight reprieve to area mining, not killing it for 18 months. Thus, he still wants to kill the surface-mining half of the coal industry, and deprive the nation of half its coal supply, but he wants to do it to his adopted state first.

There are some hopeful signs that some members of Congress are taking a more reasonable approach, as Senator Jackson is doing. However, there is no assurance today that they are in a majority. It will require the utmost efforts of the coal industry and its representatives to ensure that the bill which is finally enacted is reasonable, effective, and one which the industry can live with. We must convince Congress not only that surface mining is too vital to our nation to be exterminated, but that the execution is unnecessary. We must show that mined land is being effectively reclaimed, not just in a few places but throughout the industry.

I promise you that we at NCA will make effective surface mining legislation a top priority this year. We will be working on it night and day, and coordinating our efforts with other associations such as your own. But we will need your help as individual coal producers also, to make your positions known to your elected representatives.

As crucial as surface mining legislation is to your survival, it is unfortunately only one of the threats to your survival. The question of whether you can produce coal by surface mining may become moot if you don't have a place to sell it. And your ability not only to mine but to sell coal is under serious challenge. The American coal industry is under siege, battered from all sides by broad elements of our political leadership—state and federal—by the "new primitives" school of environmentalists, by substantial segments of the news media, and a host of self-anointed social critics and cynical demagogues who seek to bring this proud and vital industry to its knees.

Today the men of coal are frustrated and discouraged. From miner to manager, from engineer to executive, the men who serve the American public in the coal industry are downhearted and even despairing. Coal markets are being legislated and regulated out of existence, the industry's image is abused and scorned, its productivity is decreased, indeed its very ability to produce is shackled, it is denied the right to reasonable profit, the right to expand and grow—and here in West Virginia, mines are being closed and miners are unemployed.

What are the causes of this debacle? First, a national environmental orgy which has grown from a natural and justified concern for the ecology to an overzealous crusade which is crippling the economy and harming our total national interest; second, by an often-hostile press which seizes on simplistic answers and ignores the critical importance of the coal industry as a keystone of our industrial economy; third, by some lawmakers who would bind and chain our industry by denying it the right to strip mine for coal, even with effective reclamation, at a time when the nation needs energy as never before; fourth, by professed friends of mankind who would destroy jobs of working men and relegate them to relief; fifth, by demagogues who would advance their own careers by standing on the corpse of the coal industry; and finally, by economic regulators who shut themselves off from the real world and insist that it behave as their charts predict, who ignore the realities of fuel conversion and would deny the coal industry access to the sources of capital growth it needs to thrive and expand to meet future needs.

I speak of these forces tonight because we need public understanding of our problems, and public support for the necessary solutions. We who share in the proud traditions of the mining industry know that nature seldom freely bestows her favors on resource developers. Coal comes hard, from the hard earth, in a titanic struggle. Mining is a contest with nature, not to degrade nature but to serve man, and nature may sometimes show the effects of the fight. But man has gained the knowledge and experience to heal nature's scars, and the responsibility to see that it is done. These elemental facts must be more fully understood by both the public and our political leadership.

But understanding is slow in coming.

There are a few signs that help is on the way, but whether it will arrive in time is still undetermined.

Producers of high-sulfur coal, whether by deep or surface methods, face an uncertain prospect of future markets. Already much of their product is unacceptable in major markets, and if future air quality standards are implemented on schedule, most Eastern coal can be used only in plants that have installed sulfur dioxide removal devices—and it will be several years before this happens to any significant extent. The effects of the air pollution control push are already apparent in northern West Virginia. Mines are being closed and miners are being laid off.

Meanwhile, all the coal industry is being pinched by price controls. Producers are unable to compensate for much of their increased labor costs. The Price Commission insists on the fiction that productivity is increasing at the same rate that it did from 1958 to 1969, while in fact output per man-day has declined.

Furthermore, since nobody can predict what price controls will be in effect even a year from now, let alone in five or ten years, producers are precluded from signing the long-term contracts which are essential to the opening of large new mines.

Between the pressures of price controls which prohibit an adequate return on investment, and air pollution controls which threaten future coal markets, it is no wonder that the industry is unable to attract the investment capital necessary for expansion. Few if any new mines are being opened in the East.

And all this is happening, as I hardly need to remind you, as the nation plunges deeper into an energy crisis with every passing day. We in the coal industry have warned of an energy crisis for

years, and have recommended, urged, beseeched and all but cried for this nation to adopt a national energy policy in order to assure adequate energy supplies. Nobody listened. We were treated like the boy who cried "Wolf!"

Well, look at your newspapers. The wolf is real. The wolf is here. In Denver, schools have been closed because they had no fuel, and the management of the huge new air terminal said grimly they were trying to keep it warm by body heat. In the upper Midwest, farmers have no fuel to dry their crops. The list goes on, and winter is not half over. In the face of this, it is preposterous to see the coal industry besieged and battered, and facing the threat of still more restrictions. Nevertheless, it is true.

I do discern a few signs that rationality might break out again. Rationality has never been epidemic in our nation's handling of energy questions, but occasionally there is a scattering of isolated cases. The Environmental Protection Agency, for example, is becoming concerned about what will happen in 1975 when state implementation plans outlaw the burning of most Eastern coal without sulfur removal devices. It is considering a plan to postpone some compliance deadlines in areas where the air meets the primary standards of no damage to health. The Federal Power Commission is allowing higher prices to be paid for natural gas at the wellhead, which will encourage exploration for new supplies. High-level policy makers are concerned by the prospect of ever-increasing dependence on the Middle East for a critical share of our oil supplies.

We hope that President Nixon's forthcoming energy message will point the way to logical solutions of some of these irrational dilemmas. We hope that the Congress will cooperate, and take the lead where necessary, in effective legislation on energy matters. That very definitely includes a reasonable and effective strip mine bill. It also includes ample funding for coal research, more reasonable price controls, and environmental controls which do not outrun the development of technology necessary to achieve their goals.

The Department of the Interior says we will need 893 million tons of coal in 1985, just a dozen years from now. The National Petroleum Council says we will need 1 billion to 1.5 billion tons of coal in that year. Either figure is a tremendous challenge—a production increase of more than 50 per cent for even the lowest estimate, and more than 260 per cent for the highest.

The coal industry has risen to challenges before, and it can do it again. But it cannot increase its production—indeed, it can barely survive—while being treated as it is today.

As both coal men and realists, we must expect some regulation of our environmental efforts, but we have a right to insist that it be reasonable. We have a right to a reasonable profit, and a reasonable chance to expand and grow. If America expects our industry to produce coal, we can do it—but not if we are put out of business.

The surface miner is an endangered species, all right—and so is the whole American coal industry. And if the American coal industry is exterminated, the whole American economy is endangered as is the American public. And the new breed of conservationists who have been waxing so eloquent about the kodiak bear and the Nevada pupfish had better get concerned about the survival of the American public which is the ultimate endangered species.



Dr. Richard Smith (left) studies a five-year-old reclamation site near Summersville in Nicholas County. He was participating in a state wide evaluation of land reclamation in the Mountain State.

Overburden Makes the Difference

**Richard Meriwether Smith
and Walter E. Grube Jr.**

In every surface mining operation, rock and soil from the coal to the land surface is variable, and success depends on handling each kind of material correctly.

New mining techniques are being developed and put into practice in West Virginia. One example is the method described by Compton (1972) and called the "continuous backfill method". Some people may call it or similar methods by other names. As a matter of fact, no two operations are identical. Each depends on topography, coal, rock, soil, plant cover, machinery and weather conditions; but there is no way to escape the fact that overburdens differ and success depends on efficient removal and placement.

Almost everybody has some knowledge or ideas about the layers of rock and soil overlying our coals. Many operators have excellent in-

formation about one location but they may make mistakes at other locations where materials differ. Nobody has all the facts that may be needed. Experienced operators, in general, probably know more about behavior of different kinds of rocks and soils than any other group of people. Geologists know the sequences, names and sedimentary conditions represented by rocks in test cores or exposures. Engineers know the rules and calculations involved in predicting answers to many earth and water questions. Soil Scientists (or Pedologists) know how to map and predict the behavior of the top few feet under the original land surface. Agronomists, Foresters, and Horticulturists know many of the plant food, air and water requirements for growing crops or cover. Conservationists understand many techniques of managing soil, water and biological interaction. Economists know how to calculate cost, price and profit relationships.

Other groups could be identified that hold special competence in subjects involved in surface mining and reclamation. However, the success of all these people depends upon properties of overburden that may not be known unless appropriate studies and measurements have been made. Conventional knowledge satisfies requirements only if it is based on valid assumptions and is combined with other essential information. Precise measurements and calculations provide meaningless numbers if applied to the wrong problems. Knowing rocks by names like sandstone, shale and limestone does not tell us very much unless we have extra information about each rock type. Special terms like "soapstone", "fireclay", "mudstone", "drawslate" may be useful in one neighborhood but may confuse others. In order to transfer knowledge from one mining operation to another we must be sure what each name means. This is where scientific research plays a part. It obtains and systematizes new knowledge, and in addition, it should find a way to communicate such knowledge to those who can put it to use.

One of the authors, Research Assistant Walt Grube of the West Virginia University College of Agriculture and Forestry, works on a soil sample in the laboratory in Morgantown. Grube has done extensive research on overburden materials.

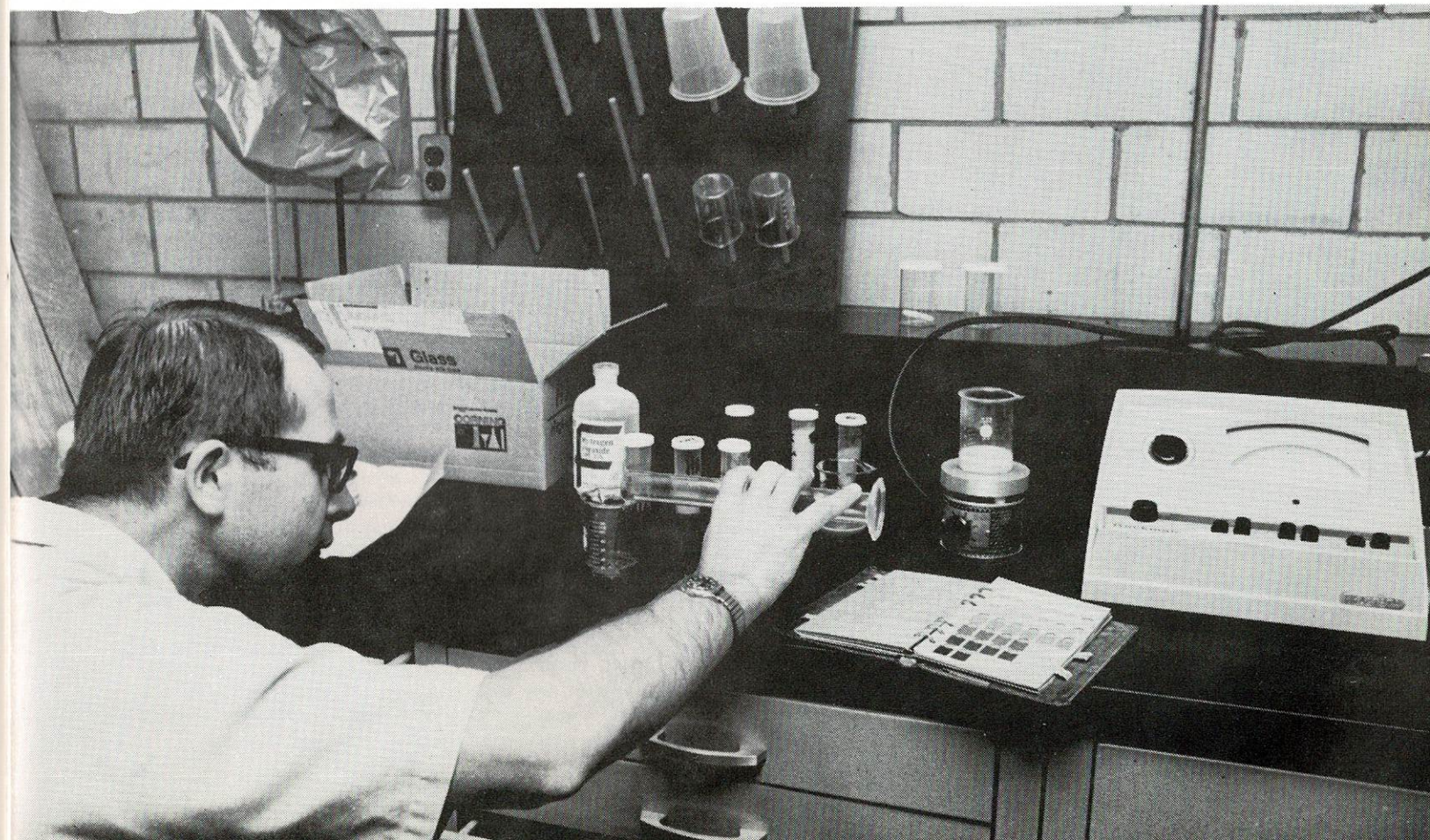
Our group at West Virginia University has now been studying coal overburden materials for several years and we want to be able to say that we are achieving our stated research goals. We have obtained, systematized and published considerable new information (W. Va. Univ., 1971). Moreover, we are aware that surface miners and agency people are putting some of our new information to use. This is evident in connection with the dramatic improvements in reclamation and minesoil use observable throughout West Virginia. Even so, we believe that we are obligated to do a better job of keeping you informed about our latest research results. The purpose of this article, therefore, is to invite your attention to our work that has been completed and published, and to propose that we should write more articles explaining our work and results for future publication in **Green Lands**.

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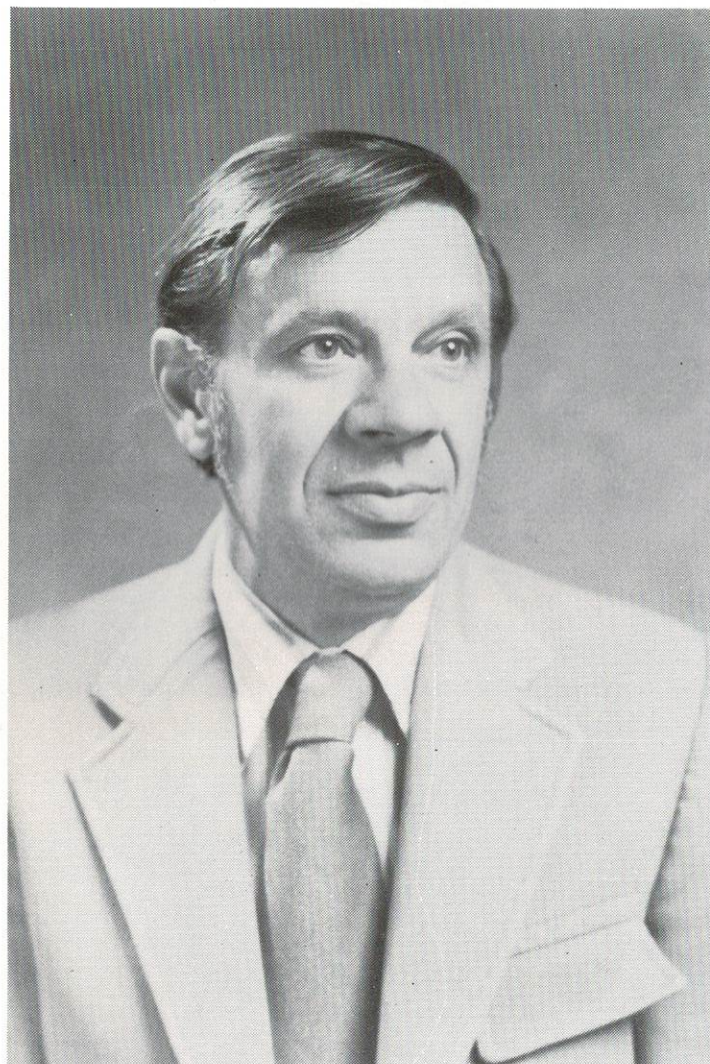
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Bolt Mountain Demonstration Of Mulches and Soil Stabilizers



By William T. Plass

Sixteen weeks after the demonstration of mulches and soil stabilizers was established on Bolt Mountain, it was evident the treatments applied affected vegetation establishment and growth as well as the rate of erosion. Equally important is the fact that several mulches and soil stabilizers effectively controlled erosion while the vegetation was becoming established.

The demonstration was established during the week of May 15 through 21. Thirty-one treatments were applied utilizing 10 mulches and 10 soil stabilizers, alone or in combination. Catchment boxes were installed on 20 plots to estimate the rate of erosion after treatment. Vegetation establishment and growth were observed and described on all treatments. This report summarizes the important results after the first growing season.

The vegetative growth during the summer indicates weather conditions were favorable during the entire 1972 growing season. Temperatures may have

averaged a few degrees below normal, but rainfall was adequate and well distributed. A total of 18 inches of precipitation was measured during the 16-week study period. For four of these weeks, the weekly rainfall totaled over 2.5 inches.

Japanese millet proved to be an excellent summer annual cover crop. The 15 pounds per acre rate provides a good ground cover, and some perennials can establish under the millet. An estimate of the perennial ground cover density and species composition will be made during the second growing season.

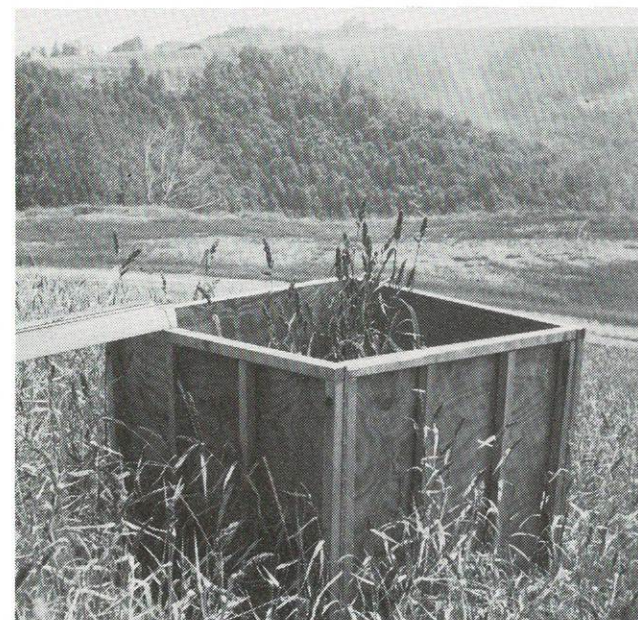
All vegetation germinated more rapidly following treatments with a mulch or a soil stabilizer—wood fiber combination. The most rapid germination occurred following the straw and hardwood bark treatments. Other materials favoring rapid germination were Conwed wood fiber #1, Curasol "AH" with wood fiber, and Aerospray 70 with wood fiber. The differences in germination were not reflected by the height of the millet 8 to 10 weeks after seeding. Apparently other factors determined millet growth after the seed germinated.

Measurements of the millet on 20 plots, 12 weeks after seeding, showed significant differences in height between treatments. The spoil was quite uniform chemically and physically on these plots, and a uniform rate of fertilizer was applied with each treatment. Therefore, it is assumed differences in the height of the millet may be related to the mulch and soil stabilizer treatments. The millet averaged over 3 feet in height after the following treatments: Genequa 743, XB-2386, Aerospray 70 with wood fiber (high rate), and the unmulched check plots. On plots with the slowest growth, the millet averaged about 2 feet tall.

A foliar analysis was made of leaf samples collected from several millet plants on each of 20 plots. Preliminary summations of the data from these analyses showed wide variations between treatments for each of the 13 nutrients. Although spoil differences may have contributed, it is assumed most of the variation relates to the mulch or soil stabilizer treatment. It is conceivable that chemical constituents of the material applied could react with the spoil and influence nutrient uptake.

On the plot where chicken litter was substituted for ammonium nitrate, the millet growth was slow and the foliage had a distinct yellow color. These plots contrasted dramatically with adjacent treatments where ammonium nitrate was used as the nitrogen source. It is assumed processed chicken litter is a poor source for nitrogen. There is also evidence that this material has no value for erosion control when applied at a rate of 1,000 pounds per acre.

The shredded paper applied at an estimated dry weight rate of 1,500 pounds per acre slowed germination. At the end of 16 weeks, there appeared to be no difference in millet growth between the plot mulched with paper and adjacent plots treated with other materials.



One of the collection boxes constructed to measure silt runoff seems to be filled with grass rather than mud. The photo was taken after the 16 week evaluation.

The catchment boxes provided substantial evidence that some of the seed washes off during precipitation events. No attempt was made to quantify the percentage lost by species. This loss occurred on slopes prepared by walking a crawler tractor up and down the slope. Cleat depressions at right angles to the slope provided traps for seed and runoff water.

The rate of erosion was less than expected. Factors affecting erosion were the degree of slope, the erosion control treatments applied, and the millet cover crop. For all 20 plots with catchment basins, the mean sediment yield for the 16-week period was 225 cubic feet per acre. Of this total, 138 cubic feet per acre was deposited during the first 8-week period. During the second 8-week period after the millet provided effective site protection, the sediment yield dropped 40 percent to 87 cubic feet per acre.

The effects of treatment and vegetative cover were more apparent on plots 1 through 13 where the degree of slope ranged from 16 to 20 degrees. Total sediment yield for the 16-week period averaged 138 cubic feet per acre on these plots. Ninety-two cubic feet were deposited during the first 8 weeks, and 47 cubic feet during the second 8 weeks. Thus, the millet cover reduced the erosion loss by 50 percent. Straw tacked with Curasol "AH", and Curasol "AH" with wood fiber were the most effective treatments on plots 1 through 13. Other effective treatments were Genequa 743, Conwed wood fiber #2, Aerospray 70 with wood fiber (high rate), and M-145 (high rate).

Large variations in erosion rates occurred on plots 14 through 20 where the slope ranged from 21 to 24 degrees. On these seven plots, the mean sediment yield was 386 cubic feet per acre. For the first 8-week period, sediment yield averaged 220 cubic feet per acre. This was reduced by 25 percent to 166 cubic feet per acre during the second 8-week period.

On plots 14 through 20, Conwed wood fiber #2 was the most effective erosion control treatment. On the check plot where the vegetation alone controlled erosion, the sediment yield was three times higher than on the plot treated with Conwed wood fiber #2.

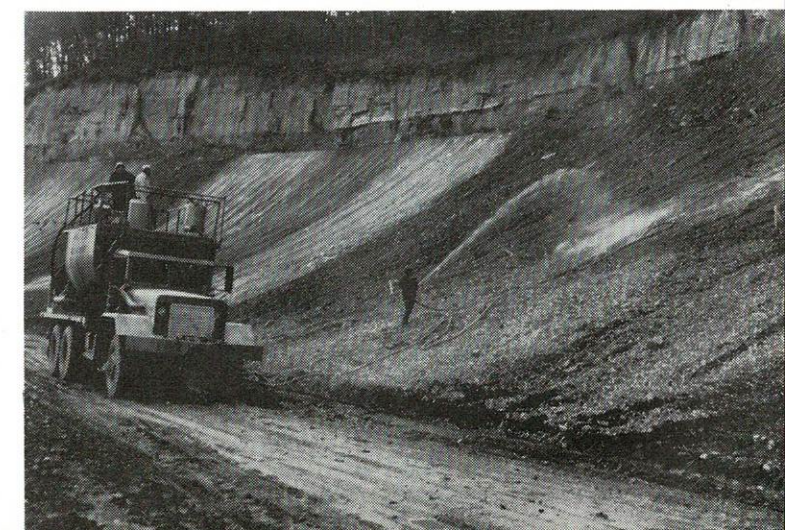
On one plot with a slope of 24 degrees, surface runoff originating outside the plot cut deep rills before the vegetation protected the site. The sediment yield on this plot totaled 963 cubic feet per acre for the 16-week period. Sixty percent of this total came during the first 8-week period. This was the highest sediment yield for all plots, and it is believed none of the treatments applied would have been effective under these conditions.

A physical analysis of the sediment from 20 plots showed that 60 percent of the material was 2 mm. or less in size. These are very small particles which can be easily dislodged and carried away by runoff water. Fifteen percent of the material collected was over a quarter-inch in size.

A similar analysis of the spoil material showed 45 percent of the spoil was 2 mm. or less in size. Thirty percent of the material was over a quarter-inch.

The 16-week measurements will not terminate the study. It is planned to leave the catchment basins in place during the winter. Next spring the collected sediment will be measured and analyzed. Later during the summer of 1973, measurements and observations will be made on the density and species composition of the perennial vegetation.

These two photographs show the initial stages of the experiment. A crew from Ranger Fuel Corporation is loading the hydroseeder (left) and at right they are applying it to the actual test plots. The photograph on the front cover shows this same area about three months after seeding.



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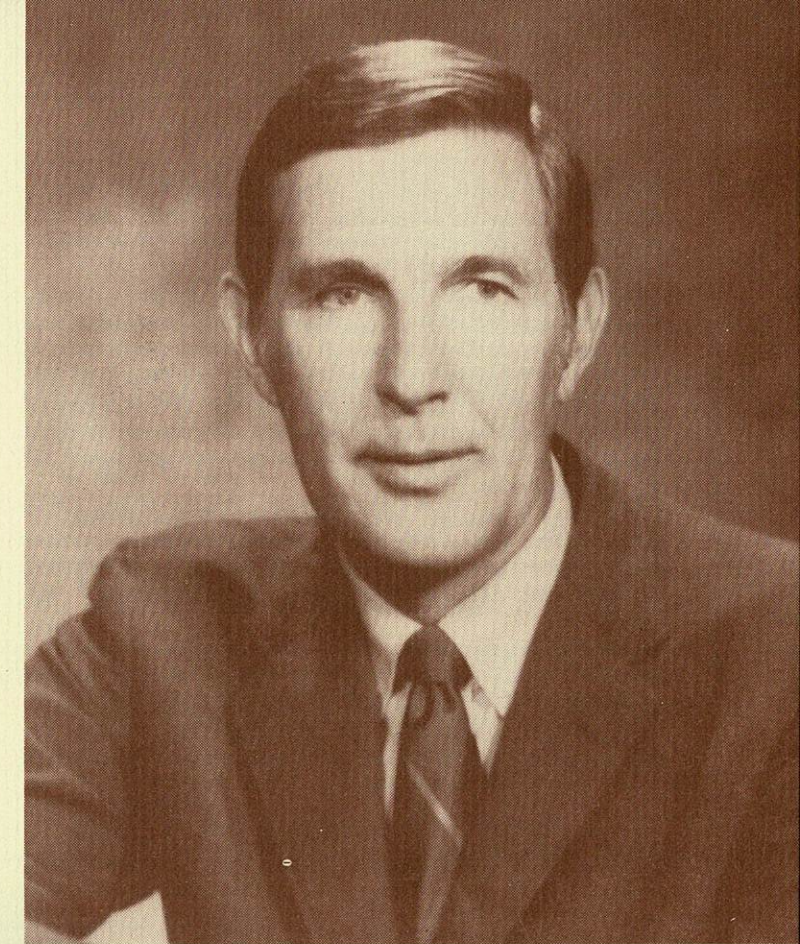
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Congressman Morris K. Udall of Arizona

Special Technical Report

NCA Symposium Shows Advances In Surface-Mined Land Reclamation

Representatives from government, industry, research and environmental groups gathered this week in Pittsburgh to hear experts discuss the latest developments in reclamation at NCA's First Annual Research and Applied Technology Symposium on Mined-Land Reclamation.

Addressing an overflow crowd at Wednesday's opening session NCA President Carl E. Bagge praised the exchange of information as a step toward "changing what has been the art of reclamation into a science."

The NCA sponsored symposium was organized by Bituminous Coal Research, Inc., NCA's research affiliate, and presented in cooperation with the U. S. Dept. of Agriculture; U. S. Dept. of the Interior; U. S. Environmental Protection Agency; Soil Conservation Society of America and the Coal Industry Advisory Committee on Water Quality.

Featured speakers at the symposium were Sen. Richard S. Schweiker (R-Pa.) and Rep. Morris K. Udall (D-Ariz.) who discussed the necessity of surface mined coal and the likelihood of a federal surface mine bill passed by this year's Congress.

"There is a new urgency to developing reclamation technology," Sen. Schweiker said. "No matter what those who would ban surface mining say, I do not believe that the coal industry can meet the coming crisis and demand solely by underground production. To prohibit even present surface mining would really put the shackles on urgently needed production. It could also sound retreat in the battle to win the energy crisis," he said.

Schweiker said continued strip mining will be needed to meet the nation's coal needs, which he said are expected to "double or triple" by 1985.

"Coal will be called upon more and more to fill

the gap between our compounding need for energy and our dwindling supplies of other fuels," he told more than 450 coal representatives and government officials at the William Penn Hotel.

Rep. Udall, chairman of the Interior subcommittee on environment, predicted at Wednesday's luncheon that this session of Congress will pass a stringent federal law which may include partial abolition. He said the law may well include a fund for the reclamation of orphan lands and said that coal will cost more as a result of the law, with the increase being passed on to the consumer.

"We're going to have to face some trade-offs," Rep. Udall said. "We can't continue to pass tougher and tougher laws and regulations and still have cheap endless supplies of electricity doubling every ten years."

Mr. Bagge, presiding at the luncheon, cited progress made in "developing ways to draw on the earth's resources and at the same time heal the scars we create. The papers presented at this meeting reflect the expanding boundaries of our knowledge," Mr. Bagge

said. "But they reflect a larger fact: in our industries we are learning how to inhabit the planet successfully."

The two-day symposium drew more than 450 registrants from federal and state agencies, industries, universities, research organizations and environmental groups. Thirty speakers presented papers dealing with the various aspects of mining methods and their relation to reclamation; preplanning procedures; preparation of mined land for planting; plant selection and materials; slope stabilization and sediment control; and the utilization and management of mined land.

Chairing the six sessions were Edwin R. Phelps, president, Peabody Coal Co.; James A. Borders, president, The Pittsburgh & Midway Coal Mining Co.; Ralph C. Beerbower, Jr.; president, Amax Coal Co.; Andrew V. Bailey, acting chief, Branch of Mining Operations, U. S. Geological Survey; Dr. Warren Doolittle, director, Northeastern Forest Experiment Station, Forest Service, U. S. Department of Agriculture; and J. A. Curry, Division of Forestry Development, Tennessee Valley Authority.

**Improved Reclamation Potential with the Block Method
of Contour Stripping**
Lee W. Saperstein and Edwin S. Secor
**Department of Mineral Engineering, The Pennsylvania State University,
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Introduction

Strip mining of coal in the United States is one of the most productive methods of obtaining fuels. In an era of increasing shortages of fuel and, hence, dependence on extra-national imports, there has been a jump in production of surface-mined coal in order to fill the gap. The old national production ratio of one-third surface and two-thirds underground is rapidly becoming half and half. In spite of being safer than underground mining, strip mining has evoked tremendous criticism. This criticism is directly linked to the disruption of the surface caused by this process. There are those who believe that this disruption is so appalling that any price is worth paying to achieve its end.

If strip mining is criticized in some quarters, then mining on hill-sides called contour mining, is the butt of abusive diatribes. This is because the hilly terrain commonly found with contour mining exacerbates the problems of acid runoff, erosion, and landslide. With steep slopes, and current practices, it becomes inevitable that erosion and ground slides will occur during contour mining. This is because the overburden from the first cut is tacked on the outslope of the mined bench and the slope of the resulting pile is at or exceeds the material's angle of repose. Figure 1 shows an outslope that has eroded and Figure 2 shows one that has had a slide.

The legal environment under which surface miners of coal must operate is changing due to the duress placed on it by strip-mining critics. Accordingly, the mining methods used by the operators must also change so that they may remain profitable and in compliance with the law. A further reason for change is to remove the cause for complaint that is generating the changes in the law. One possible change that would tend to alleviate the problems due to out-slope stacking of overburden and, simultaneously, increase the potential for reclamation is to the block method of mining. This method, which already has some strong adherents among the operators, provides for storage of overburden on the mined-out bench rather than on the outslope and, thus, removed one of the major causes of environmental degradation, namely, solids pollution from spoil bank erosion. Additionally, with an increase of stability of the bank, there is a greater opportunity for vegetation to establish itself and add further to the bank's stability.

The Block Method Illustrated

Having seen the advantages that result from the block method, the authors have been attempting to popularize it in a series of papers, the most detailed of which will be Secor's thesis (to be released in the Spring of 1973). The authors have visited a series of surface mines in the States of Kentucky, Maryland, Pennsylvania, Tennessee and West Virginia; on the whole, the best reclamation efforts were observed where block mining was practiced. It is hoped that their impressions can be conveyed to the industry and that the benefits of the block method can be seen by a wider audience. It must be emphasized that the block method is an innovation evolved within the industry; the authors are only trying to increase awareness of its existence.

To arouse interest in the block method some illustrations will be presented in this section. Subsequently, there will be a discussion of operating methods and costs. All of the following illustrations were taken in Pennsylvania and depict various attempts at reclamation under the latest versions of this state's law. Essentially, the operator must return the bench to its original profile, he must re-establish vegetation, and, naturally, he must limit acid and silt runoff. The important restriction in the Pennsylvania law, and one that may be incorporated into a Federal law, is the return to original profile. Other restrictions in this state include the use of a 25-ft., undisturbed outcrop barrier, and a 1500-ft limitation on exposed highway. The block method works well under these restrictions. Most of the pictures were taken in the Spring of 1972, consequently the plantings were only two or three weeks old and are mostly indistinct in the photos.

Figures 3 and 4 were taken at an operation that is stripping a lower seam and simultaneously reclaiming an older operation in an upper seam. In a compact before-and-after sequence, Figure 4 shows the orphan bank on the right and the reclaimed job on the left. The same operator mined a small portion of another bank by the block method. Essentially he made an opening box cut, moved one block into the box, and then reclaimed the area by moving the spoil from the box cut into the area that was block mined. Figure 5 shows an

overview of the bank and Figure 6 was taken with the camera in the center of the old box cut looking left into the area of the block. The dramatic aspect of Figure 6 is the presence of original vegetation up to the old outcrop. This bank was planted in trees, which were growing at the time of being photographed (May, 1972). There was some invasion by weed grasses and the runoff had a pH of approximately 7.

In the right-hand portion of Figure 5 is the back of another job that is pictured in Figure 7. This picture clearly demonstrates the amelioration of degradation that is possible with the block method. The center of the job shows where the box cut was taken and piled below the outcrop. On either side of the box cut a block was mined; at these blocks, the original vegetation is intact right up to the old outcrop. The blocks have consumed less land, required less replantings, and, most importantly, reduced the amount of material re-handling necessary to restore to original contour.

The next sequence of figures illustrates the moves made in order to obtain the results in Figures 3 and 4. Figure 8 is a working block with the ultimate high-wall on the left and the working wall on the right. Figure 9 shows the stacked overburden with light, acid-free material segregated from the darker material. Figure 10 shows an area that has been partially reclaimed and awaits only final high-wall reduction and top-soil spread. A return to Figure 3 shows the final result. On this job, all overburden removal and hauling was done with a 17-cubic-yard front-end loader. Figure 11 shows a different job of another operator. Here overburden is loaded with two front-end loaders into a truck. The truck then hauls the spoil across the block. The advantages to this scheme are a longer block length and easier segregation of acid and non-acid spoil. The truck can dump the acid spoil on the bench next to the righwall and then drive to the top of the pile to dump acid-free material. The disadvantage to this scheme, over that of using a loader alone, is the extra labor cost for the additional machine.

Engineering Methods

In this section, there is an attempt to define the maneuvers of the block method such that operators who are exposed to this paper can determine the implications of the method for their own operations. Aspects of block layout, blasting, spoil movement, and coal removal are covered.

When beginning to mine an outcrop, consideration must be given to the position of the box cut. It should be centrally located in the property, because mining will proceed from both sides. Additionally, it should be located at a shallower part of the slope, or at some other position such as the head of a valley, where it is convenient to stack material on the outslope. As sketched in Figure 12, the box cut, as are all block cuts, is mined directly back to the ultimate high-wall. The length of the box cut, measured along the bench parallel to the highwall is twice that of an ordinary block. Once the coal is removed from the box cut, block mining can begin in earnest. The length of each subsequent block is a compromise between very long for maximum coal uncovering and very short for minimization of haul times with the front-end loader. The pit pictured in Figure 8 is 200 feet long, the truck haulage pit is moderately longer. Blocks are mined in an alternating fashion. While the overburden is being removed from a block on the left of the box, coal is being stripped from a block on the right. When the coal is all removed, the machines exchange position, and the overburden from the next right-hand block is stacked in the empty pit while coal is being stripped from the prepared left-hand block. In this fashion, a continuous flow of coal from the operation can be provided. Figure 12 also suggests that the last blocks of the bank, as the property boundary is neared, be shortened so as to minimize the amount of overburden that has to be hauled to fill the final pit.

Blasting in the block method follows the same general patterns as in any contour mining. The only special consideration is that fragmentation should be sufficiently fine for efficient loading with front-end loaders. This may mean a moderate reduction of burden and spacing. The major draw-back of a front-end loader compared to a shovel or dragline is the expensive tire wear that accompanies poor digging situations. A small expenditure on blasting can give substantial savings on tire replacement costs.

The manipulation of spoil within a block will depend upon the type of machinery used for overburden handling. No matter, however, whether the machine is a front-end loader, dragline, or bucket-wheel excavator, good reclamation demands that the top-soil be reserved and any acid-bearing overburden be buried well away from the outcrop. The steps taken to achieve these goals will depend upon the machinery involved. This section will touch upon those steps taken by a front-end loader in moving spoil within a block.

The first step of overburden removal is the movement of top-soil. On flat terrain, this is most easily arranged with elevating scrapers. These machines may not be applicable though to the smaller volumes of earth that are found over contour-strip jobs. In this case, a bull-dozer can do an adequate job of pushing the soil out of the way. The diagram in Figure 13 shows the soil being moved to a position just below the outcrop. An advantage to the block method is that the reserved soil does not contribute much to erosion because it is returned so quickly. Once the soil is removed, and the strata blasted, the loader proceeds to move the burden along the blocks. Care must be taken not to exceed the safe working ranges of the machines. For instance, the maximum loading height of a 15-cubic-yard loader is 29 feet. If the bank height substantially exceeds this number, a bull-dozer should cut the height by feeding the upper material to the loader. Similarly, the maximum dumping height of these machines is around 20 feet. Accordingly, the material should be stacked and then contoured with bull-dozers. The second part of Figure 13 shows a stacking order that will put acid material under non-acid. Final profile is achieved by pushing the non-acid material upslope over the acid, and, then, by pushing the top-soil back into place. Once the coal is exposed, it is removed in a fashion normal to that seam.

Some care must be taken in the scheduling of operations. For instance, the coal within a block may be loaded much faster than the overburden can be shifted. Working two shifts on overburden, but only one on coal loading would help smooth out that problem. The use of mobile, rubber-tired equipment increases its utilization. For instance, in the last example on scheduling, the coal loader could be used in the second shift to help spread top-soil.

Cost Considerations

Secor, in his yet to be released thesis, has developed some hypothetical costs for the block method and for conventional dragline contour mining. A brief synopsis is presented here. Working on the assumption that the contour strip would have to be back-filled to contour, which is consistent with Pennsylvania law, the block method was found to be 33 cents per ton less expensive than the conventional one. Presumably, this is because the conventional pull-back method involves double handling of material. This method of deriving costs was employed because of the diversity of accounting schemes used in the industry.

Operating conditions although assumed, were chosen to be consistent with the observed operations. Machine costs were based on manufacturers' quotes and then tempered with reasonable availability factors. Similarly, machine production rates were assigned. These production rates were then applied to the volumes involved in order to obtain hourly production costs and thence costs per ton of coal mined. Table 1 summarizes the operating costs of the two methods, Table 2 does the same thing for ownership and fixed costs, and Table 3 makes final comparisons between the two systems. The model was worked for a three-foot thick seam of coal which sells for 6.40 dollars per ton. The slope was assumed at 20 degrees. A 25-foot barrier was incorporated, and the working bench was taken at 125 feet with a 55-foot highwall.

It should be remembered that these costs are estimates only and can vary from operation to operation according to local wage scales and machine utilization factors. The important concept is that the block method is no more expensive and may be much less than conventional dragline pull-back mining.

Conclusions

The block method has the potential for improving reclamation procedures in contour strip mining. The elimination of double-handling of spoil and the reduction of land disruption combine to make this method attractive aesthetically and financially. Although this paper has concentrated on mobile machinery methods, in reasonably small pits, there is no reason why the concept of moving overburden along the bench can not be incorporated into larger-scale mining schemes which use draglines, bucket-wheel excavators, or conveyor stackers.

It is firmly believed that the use of good mining methods coupled with responsible attitudes toward reclamation and revegetation will diminish the causes for criticism of strip mining. It is hoped that operators will at least try a method like block mining to see if it is suited for their conditions.

ACKNOWLEDGEMENTS

Doverspike Brothers Coal Company, Dora, Pennsylvania
Markle-Bullers Coal Company, Clarion, Pennsylvania
Marty Coal Company, Jackson, Kentucky
Grafton Coal Company, Clarksburg, West Virginia

Table 1 — Operating Costs, Dollars

ITEM	COST/HOUR	COST/WEEK	COST/TON
Block Method (4710 tons of coal per week)			
17-yd ³ loader	25.52	3060	0.650
6-yd ³ loader	15.50	620	0.132
drill	20.71	1657	0.352
blast*	177.74	3450	0.733
trucks (2)	26.38	1055	0.224
dozers (2)	25.66	2567	0.545
reclamation (replanting only)			0.029
royalty			0.550
TOTAL			3.215
Conventional (3810 tons of coal per week)			
dragline**	15.21	2555	0.672
dragline (O. T. Labor)	7.37	265	0.070
6-yd ³ loader	15.50	620	0.163
drill	20.71	1366	0.359
drill (O. T. Labor)	14.74	254	0.067
blast*	177.74	2840	0.745
trucks (2)	26.38	1055	0.277
dozer	12.83	2155	0.566
dozer (O. T. Labor)	7.37	265	0.070
replanting			0.056
royalty			0.550
TOTAL			3.595

* Blasting hourly costs include the price of explosive delivered in one hour at \$0.10 per pound of explosives.

** The duty of the dragline is split with 103.5 hours/week on stripping and 64.5 hours/week on pull back.

Table 2 — Ownership and Fixed Costs, Dollars

ITEM	COST	LIFE, YEARS	STRAIGHT LINE COST/YEAR
Block Method			
17-yd ³ loader	210,000	5	42,000
6-yd ³ loader	75,000	5	15,000
drill	35,000	10	3,500
dozers (2)	120,000	5	24,000
trucks (2)	90,000	5	18,000
superintendent	12,000	1	12,000
			114,500
Annual Production = 235,000 tons or 0.486/ton			
Conventional			
17-yd ³ dragline	400,000	20	20,000
6-yd ³ loader	75,000	5	15,000
drill	35,000	10	3,500
dozer	60,000	5	12,000
trucks (2)	90,000	5	18,000
superintendent	12,000	1	12,000
			80,500
Annual Production = 190,500 tons or 0.422/ton			

Table 3 — Comparisons

ITEM	BLOCK	CONVENTIONAL
Production, tons per week	4710	3810
Land Disturbance, acres per mile	18.2	32.7
Estimated Cost, Dollars per Ton of Coal		
Operating*	3.215	3.595
Blaster's Profit	0.073	0.075
Overhead and Unassigned (5 percent)	0.164	0.183
	3.452	3.853
Ownership**	0.486	0.422
Working Capital (5 percent)	0.024	0.021
	0.510	0.443
TOTAL	3.962	4.296
Initial Capital Expense	530,900	660,000
Estimated Bond Costs, Per Ton	0.023	0.042
Break-Even Stripping Ratio	16.7 yd ³ /ton	15.2 yd ³ /ton

* See Table 1

** See Table 2

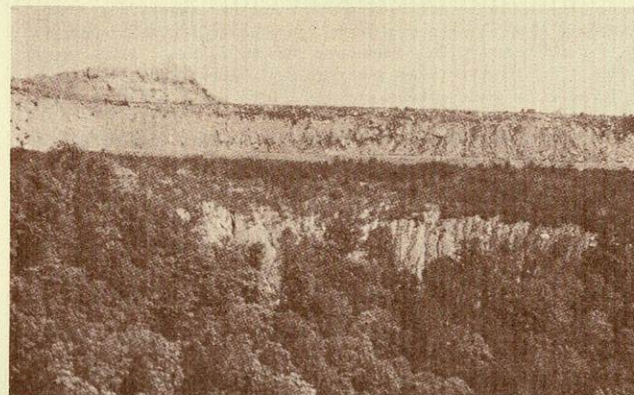


Figure 1: An eroded outslope.



Figure 2: An outslope that has had a slide.



Figure 3: An example of reclamation on block mined land. Seeding was done two weeks ago.

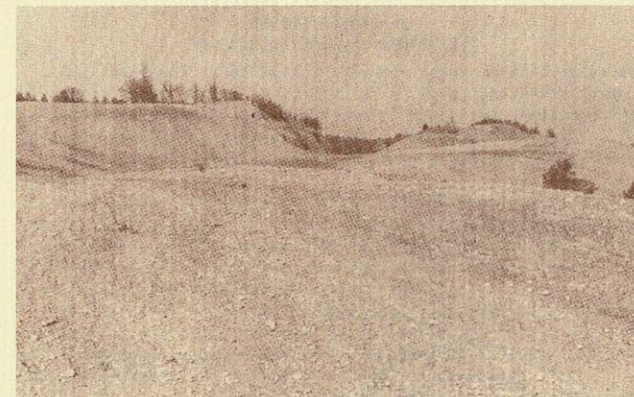


Figure 4: Same job as in Figure 3. Note orphan bank in right background.



Figure 5: An overview of the reclamation shown in Figure 6.



Figure 6: A reclaimed block. Note vegetation at left, growing up to the old outcrop.



Figure 7: A reclaimed block method operation. Note the presence of vegetation on either side of the box-cut spoil.



Figure 8: A working block before coal is removed. Ultimate highwall is on the left and the working wall on the right.



Figure 9: Stacked spoil prior to recontouring; light material in foreground is acid-free and dark material in background contains acid.



Figure 10: Graded spoil prior to highwall reduction and topsoil return.

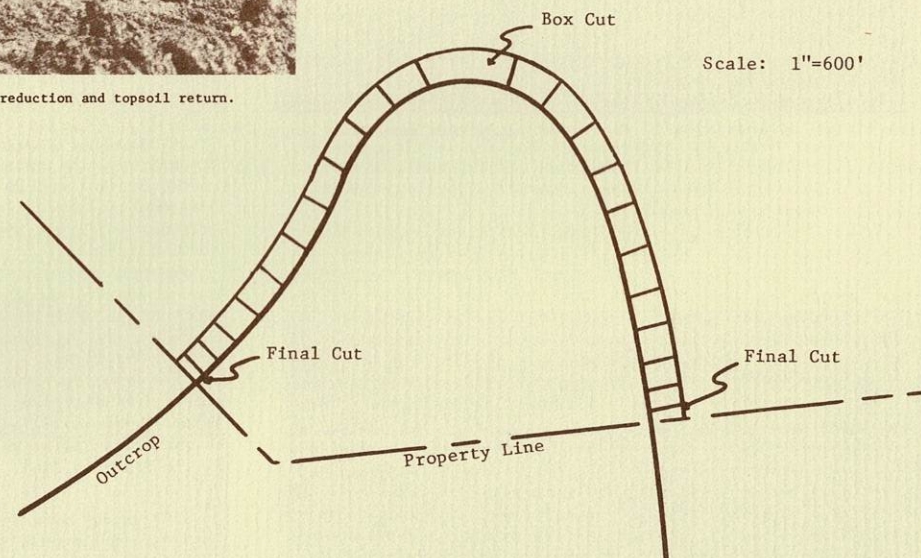


Figure 12: Sketch showing box cut centrally located at head of valley. Note shortening of final blocks.

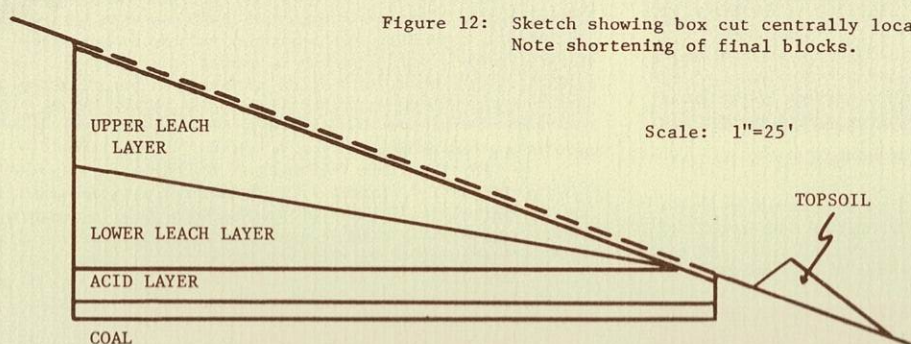


Figure 13A: Sketch showing moving of topsoil to a point below active mining area.

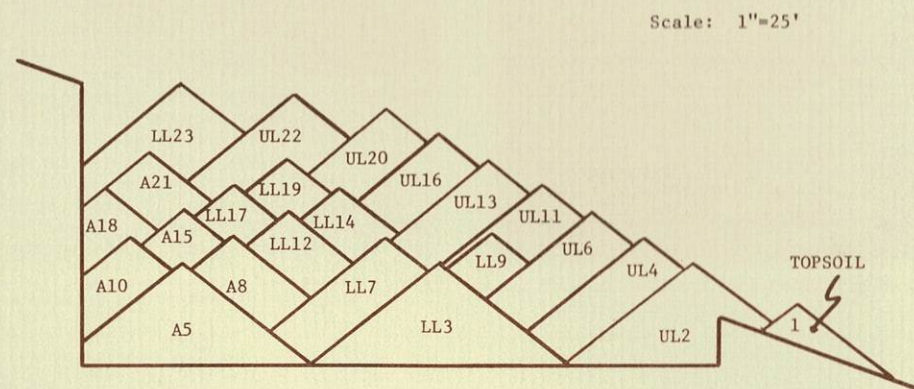


Figure 13B: Movement of spoil within a block to insure segregation and burial of acid-bearing material.

EXPERIMENTAL MULTIPLE SEAM MINING AND RECLAMATION ON STEEP MOUNTAIN SLOPES NATIE ALLEN, JR. TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority power system is the largest electric system in the Nation. As almost all of its steam electric generating stations are fueled with coal, TVA is one of the Nation's largest consumers of coal. Approximately half of the coal purchased by TVA is produced from surface mines of the Appalachian and Illinois Basin coalfields.

Even before TVA became a major user of coal, it has been concerned with the effects of surface mining on the environment. From the mid-1940's to the present TVA has, in cooperation with private organizations and Government agencies, sought more effective ways of reclaiming land disturbed by surface mining.

In 1965, TVA began to include surface mine reclamation requirements in its long term contracts for the purchase of coal. These requirements have been strengthened several times since then as reclamation technology has improved.

As a part of its continuing study of surface mine reclamation, the TVA Board of Directors decided in 1971 that a study should be made of a combined mining and reclamation method that would permit the mining of coal amenable to the surface mining methods without creating unstable spoil piles on steep mountain slopes and unsightly, and often dangerous, highwalls.

TVA's Office of Engineering Design and Construction had the primary responsibility of the study. OEDC has had considerable experience in the design and cost estimation of TVA projects that include major earthmoving projects. With basic coal data supplied by the Office of Power and general land reclamation and revegetation information furnished by the Division of Forestry, Fisheries, and Wildlife Development, OEDC developed cost estimates for surface mining with no resulting highwall and a predetermined amount of outcrop on a selected portion of the coal property in Campbell County, Tennessee, which is owned by TVA.

Cross-sections were made of the terrain adjacent to the coal seams using information from a USGS 7-1/2 minute topographic map. The mountain slopes were found to be between 2:1 and 2-1/2:1 (22 degrees — 27 degrees). Excavation yardages were calculated using an average slope of 2-1/4:1 (approximately 24 degrees) and an average stripping ratio of 16.5 feet of overburden per foot of seam thickness.

The character of the overburden was assumed to be about 75 percent shale and sandstone and 25 percent earth. All excavation was assumed to swell 25 percent. That is, each 100 cubic yards of overburden in place makes 125 cubic yards to store or haul away.

The total excavation yardage was divided into four categories:

1. The amount of material which could be placed on the out-slope.
2. The amount of material that could be retained in the strip pit at the active area.
3. The amount of material that could be transported by trucks along the strip pit to areas where mining had been completed and pit backfilling could be made.
4. The amount of material that would have to be transported by trucks to an off-site disposal area.

Three plans were examined with respect to the amount of fill on the mountain slope, namely:

- A. Outcrops with a maximum fill height of 40 feet below the cropline.
- B. Outcrops with a maximum fill height of 20 feet below the cropline.
- C. No outcrops.

It was estimated that with the coal seam thickness in the study area, Plan A would cost \$2.00 per ton of recoverable coal more than with conventional mining and reclaiming methods. The increased cost for Plan B was estimated to be \$2.60 per ton and Plan C \$3.00 per ton. These estimates were based on unit costs as follows:

Loading and hauling overburden off-site	\$0.50 per cubic yard
Loading and hauling overburden along pit	\$0.30 per cubic yard
Dressing backfill	\$500 per acre

It was agreed that the general concepts of this study should be introduced into a surface mining operation to determine its accuracy and effectiveness.

The contractor selected to conduct the experimental project was the Long Pit Mining Company who is operating a conventional surface mine on the TVA property approximately two miles from the study area mining the same coal seams that had been examined. Long Pit is producing coal for TVA on a cost plus fixed fee contract so there was no difficulty in adapting their mining plans to accommodate the experimental work.

Stripping equipment used by Long Pit in the experimental mining and restoration project consists of three Caterpillar front-end loaders (one 992, one 988, and one 966), two Caterpillar D-9 dozers, one Robbins RR10S vertical highwall drill mounted on a D-9 tractor, one Salem 1530 coal recovery auger, and three Caterpillar 773 rear dump trucks that were purchased especially for this project.

After considerable study and discussion, it was decided that a complete elimination of a spoil pile was virtually impossible and impractical, as any equipment movement on a mountainside results in some material moving down slope. It was decided that on mountain slopes of 28 degrees or less, spoil placement would be limited to an area that extended 20 feet vertically below the coal elevation. When the mountain slope exceeds 28 degrees, no material would be deliberately placed on the mountain slope, and an attempt would be made to minimize the unintentional spoil pile. All material below the coal elevation would be compacted by dozer back-blading to approximately 1-1/2 to 1 grade.

It was decided that, instead of completing the mining on one seam before advancing to the next higher seam, no more than one-half mile of stripping on the lowest seam would be completed before the overburden removal of the higher seams were started. This was done to minimize the time between the surface disturbance and final spoil placement and revegetation. Areas will be hydroseeded within one week following final grading with a mixture of wood fiber, fertilizer, and grass seed. Tree planting will follow in the proper planting season.

It was also agreed that, in areas where the interval between the coal seams was approximately equal to the depth of the cut to be made on the lower seam, backfilling of the lower pit would be done by dozers pushing from the higher seam rather than by hauling material in the trucks.

The areas dedicated to the experimental project extend for approximately 3-1/2 miles along the mountainside. Core drilling established approximately 10 miles of mineable outcrop involving four seams of coal. Six miles is expected to be augered with a minimum head size of 24 inches.

An access road was built from Long Pit's active stripping area into the experimental area in the early summer of 1972. Overburden removal began on July 24 with the first coal loaded on July 31. Mining is still in process in the initial 3,000 feet long area which will be not only completely mined but also restored to approximately the original contour before mining is started in an adjacent area. Provisions will be made for a future underground mine opening at the juncture of the two areas by limiting the backfill to four feet of nontoxic material over the pit bottom and exposed coal face at the underground mine site.

The first mining area was prepared for mining by the removal of all organic material, starting a little above the elevation which would be the top of the highwall of the Pee Wee Rider seam or the top seam to be mined and permanently placing it in a window about 25 feet vertically below the Red Ash seam or the lowest seam to be mined. Essentially, the windrow of trees and brush would be just down slope from the toe of the spoil to be created in mining the Red Ash seam.

Mining began on the Red Ash seam at the point where the access road intersects the coal seam and proceeded west along 1,000 feet of outcrop. Enough material was pushed down slope to create a spoil fill with the toe being 20 feet vertically below the elevation of the coal. The remainder of spoil was hauled off-site and placed in a pit created by previous mining. When strip mining was completed along this 1,000 feet, the equipment moved to the beginning point and began mining in an easterly direction with augering beginning in the 1,000-foot pit just vacated. Stripping continued for 2,000 feet establishing a 20-foot spoil fill as before with the excess spoil being hauled off-site. When augering was completed in the 1,000-foot pit of initial mining, off-site haulage of spoil ceased and backfilling of this pit began and continued until the highwall was eliminated. Prior to hydroseeding, the outslope of this fill was dressed reducing the slope to approximately 1.5:1. The outer 30 feet of the bench was kept clear of spoil to provide a roadway for future mining. By reducing the fill slope we hope to eliminate the possibility of a cirque or slab-slide movement of the material. Augering followed stripping as closely as possible.

When strip mining was completed along the 2,000 feet of outcrop, the equipment moved to the beginning point of mining and began to cut on the Pee Wee seam approximately 55 feet above the Red Ash seam. Most of the spoil from this cut was pushed into the Red Ash pit below with the excess being hauled off-site. The out-slope of this fill was also dressed and the slope reduced to some-

thing near 1-1/2:1. The constructed roadway on the outer 30 feet of the bench on the Red Ash level was kept free of spoil. Following the cut on the Pee Wee seam mining began on the Pee Wee Rider seam at the initial point of mining. A cut establishing a highwall of approximately 40 feet was made on this seam. Approximately 50 percent of the spoil was dozed into the Pee Wee pit below and 50 percent hauled to the off-site permanent storage area. In order to minimize the amount of material that had to be hauled to the off-site disposal area, the Pee Wee Rider seam augering was delayed until after the mining had been completed on the Pee Wee seam and the pit back-filled to the Pee Wee Rider elevation.

Following this mining, a second cut was started on the Pee Wee seam at the initial point of mining. To this date mining has progressed about 1,200 feet. For the first 500 feet all of the spoil was hauled off-site but is now being permanently placed in the pit behind the auger where all mining is complete. Backfilling to the Pee Wee Rider seam is currently being done, the object being to auger the Rider seam prior to completely backfilling the pit. Many problems have been encountered, one has been in maintaining the 20-foot vertical out-slope. In addition to the natural human instinct of wanting to dispose of the spoil material in the easiest manner of pushing it down the mountain slope, the normal blasting sequence of shooting rows of holes from the outcrop to the highwall resulted in some blasted material falling outside the outslope area, and some defoliation of trees at the toe of the outslope. Reversing the blasting sequence appears to have solved this problem.

Efforts are continuing on truck scheduling to improve the efficiency of the front-end loaders. Preliminary information revealed that approximately 10.3 cubic yards of overburden material was hauled by trucks for each ton of Red Ash coal recovered by strip mining. This ratio has been 3.4 to 1 in the Pee Wee seam and 6.3 to 1 in the Pee Wee Rider seam. Trucking costs have averaged almost \$2 per ton. However, considerably more operating data will be required before any reliable information can be generated. The full trucking cycle has not been completed, and it is believed that, when it is complete, less overburden will be moved to off-site disposal and more will be retained in the mining area for backfilling.

Whatever the trucking costs prove to be, it cannot all be considered additional costs as a large part of the reclamation grading is being accomplished.

We believe that this concept of mining can be used to recover coal reserves on steep slopes that cannot be mined by other mining methods without causing long-range damage to the environment. We hope that our production information will demonstrate its feasibility, and we look forward to the time we can make it available to the industry for whatever value it may have.

Fuels Planning Branch
12-22-72

MINING AREA WITH SEAM INTERVALS

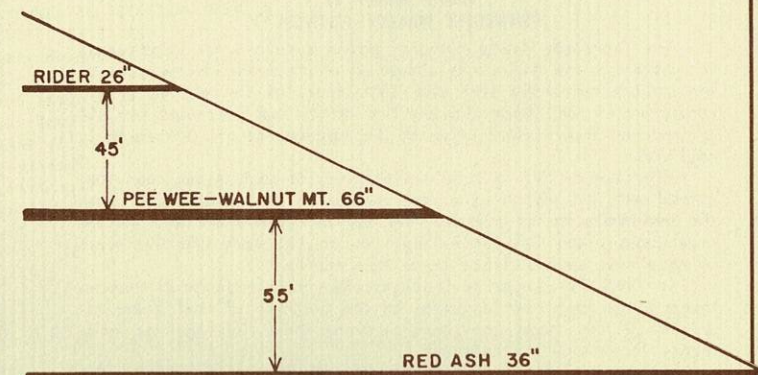


FIG. 1

STRIPPING SEQUENCE

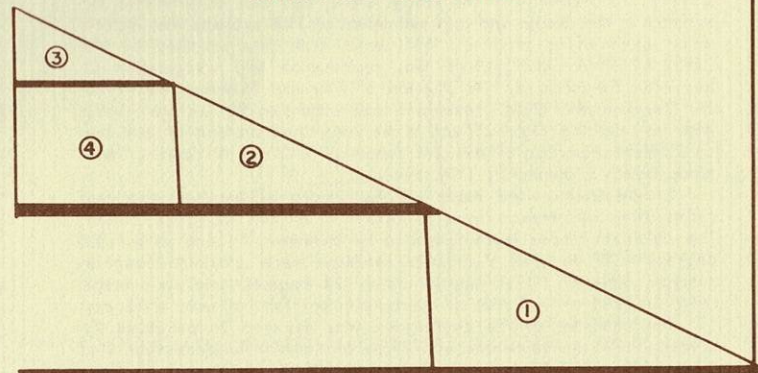


FIG. 2

APPROXIMATE FINAL PROFILE OF BACKFILLED AND GRADED PIT AREA

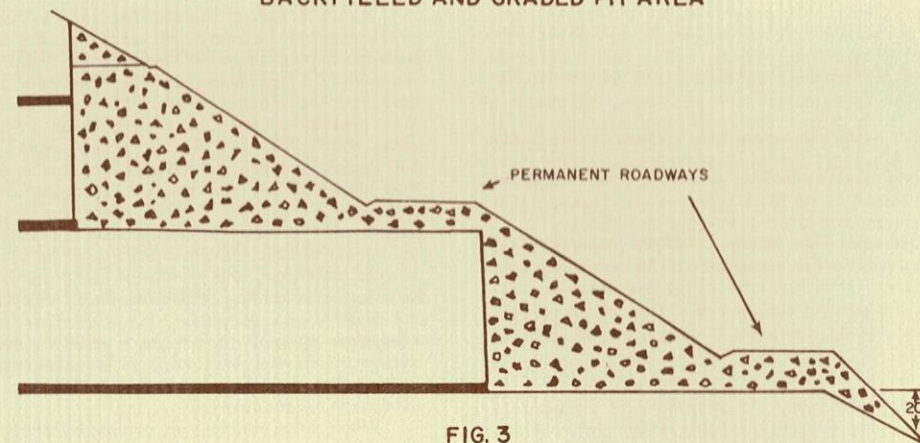


FIG. 3

A NEW METHOD OF SURFACE COAL MINING IN STEEP TERRAIN

Walter N. Heine
Associate Deputy Secretary
Mines & Land Protection
and
William E. Guckert
Director
Bureau of Surface Mine Reclamation
Department of Environmental Resources

INTRODUCTION

Ever since surface mining became an important method for producing coal, generally after World War II, there have been demands by the public for restoration of strip mined lands. These demands are made for aesthetic reasons, elimination of water and air pollution, safety hazards, land slides, sediment problems, and maintenance of property values adjacent to the mines. These demands have manifested themselves into a multitude of laws passed by state legislatures for the purpose of regulating the surface coal mining industry. Generally these laws vary from those which require minimal reclamation measures to those which prescribe rigid standards for complete reclamation, pollution control, performance bonding and stringent penalties against violators.

In some states, the surface coal mining control laws have evolved slowly through the years. This has been dependent upon the relative political influence of conservationists and the coal industry, and upon acceptance of technical developments in reclamation and pollution prevention. Pennsylvania, for example, has enacted more than twenty surface mining laws and amendments which are environmentally oriented since 1941.

Environmental technology in surface coal mining has developed more rapidly in areas of the country with flat or gently rolling topography because restoration of the surface to near-original contour configurations has proven to be economically feasible. Until now, this was not demonstrated in the more hilly and mountainous portions of the country. Here it has been generally accepted that removal of overburden has to be accomplished in the most efficient manner from the coal producer's viewpoint. This means casting the overburden downhill in the time-honored manner. Profit margins are thought to be insufficient to innovate any new methods, particularly in the absence of regulatory pressures. This belief has resulted in unsatisfactory pollution control and reclamation in mountainous areas with a concomitant public outcry for stricter control, even to the extent of outlawing all surface coal mining.

PURPOSE

It is the intent of the writers to describe a new method of surface coal mining now being undertaken in hilly portions of Pennsylvania. The method is called the "Modified Block-cut" or "Put and Take" method of surface mining. This paper will use the former name.

The procedure incorporates all the essential ingredients of a successful surface mining operation; safety, rapid coal production, and concurrent complete reclamation. We believe this method, or variations thereof, is applicable to most if not all mining operations in steeply sloped terrain. It is hoped that sufficient interest will be generated to encourage a thorough evaluation and consideration of the method's merits by operators and governmental agencies.

GENERAL RECLAMATION AND POLLUTION CONTROL REQUIREMENTS

Some states, particularly in the Appalachian area, have laws and regulations which require (1) surface coal mine operators to obtain

permits based on a plan of mining, (2) strict compliance with the plan and (3) bonding to assure that the plan will be followed to completion. The following sets forth the typical method of operation required at surface coal mines in Pennsylvania. These steps are particularly applicable to flat or rolling country, i.e., slopes of 14° (25%) or less. These operational requirements and procedures must be understood to have a clear understanding of the problem of mining in hilly and mountainous areas and to grasp the importance of the concept of this new method of mining. The general operational steps required in Pennsylvania are as follows:

1. Brush and trees are cleared for construction of access or haul roads into the area to be mined. Trees of any value are harvested for market. Construction of haul roads is undertaken with care so that fill material does not contain any acid-bearing potential. Where banks are created which could erode, quick growing vegetation is planted. The area where mining is to be initiated and where appurtenant storage, repair and office buildings are to be located is cleared of trees and brush. This is kept to a minimum so that as little area as possible is subject to erosion.
2. Bulldozers and/or scrapers are used to scrape off topsoil and any needed subsoil for segregation and storage. Sometimes this soil is stockpiled above the highwall for easy handling after backfilling is completed. Stockpiled soil is usually not seeded because the practice of concurrent backfilling requires imminent use of this soil before erosion-controlling vegetation could be established on it.
3. The operation of overburden removal is undertaken with the spoil being placed on the "low wall" side of the cut a sufficient distance from the highwall to permit movement of men and machinery in the pit.
4. As the overburden removal operation reaches strata with acid-forming potential, this material is segregated from the clean spoil and stored in a corner of the pit or a prepared area on the low wall where contact with water is minimal. This is one of the most important steps in the entire surface mine operation from the standpoint of prevention of water pollution from acid discharges.
5. After the coal is exposed and removed, the process of reclamation soon follows. In some large operations, the steps in the entire operation are carried out almost simultaneously, i.e., brush removal, topsoil segregation, spoil removal, acid strata segregation, coal removal, and backfilling. Pennsylvania regulations do not allow the total length of open cut to exceed 1,500 feet, except where specifically approved by permit when large-size equipment is involved. This requirement has minimized pollution and has practically eliminated forfeiture of bonds.
6. Reclamation includes layering and compacting of the acid-forming refuse at the bottom of the pit (depending upon ground-water conditions), replacement of spoil material until approximately original contour is achieved, placement of the previously segregated topsoil and finally liming, fertilizing

and planting of the area to establish a quick-growing grass cover.

7. Several design features are included to control water pollution:

- Water diversion ditches are usually required along the top of the highwall and at other appropriate locations to minimize erosion and to control the amount of water entering the pit of the mine.
- Usually two earthen settling basins are constructed which receive all pumped water from the floor of the pit. This water must be neutralized prior to pumping if it is found to have a pH less than 6.
- Under no circumstances may the low wall of the pit be breached to allow a gravity discharge. All water from the pit must be pumped. This is to assure that, after reclamation, no permanent acid seepage will be established at the points where the low wall was breached.
- In some extreme cases, particularly when immediate downstream water use must be protected, erosion control basins are constructed which receive runoff from the entire disturbed area of the mine to prevent downstream siltation. In Pennsylvania, newly adopted erosion control regulations will probably result in use of basins on every operation.
- A barrier of undisturbed coal and overburden of at least 25 feet in width is left between the outside wall of the pit and the outcrop of the coal. This helps to promote the reestablishment of the groundwater table above the coal seam after backfilling is completed by retarding groundwater movement through the restored area. The resulting inundation of the seam and the acid-forming refuse practically eliminates acid water formation and subsequent acid seeps.

OPERATION AND RECLAMATION IN STEEP TERRAIN

The principal problem introduced by surface mining in steep terrain involves handling of the overburden. For the purpose of this presentation, steep terrain shall be defined as that with slopes exceeding 14° (25%). In traditional contour stripping, material disturbed on the surface tends to roll and slide downhill and away from the operation beyond easy reach of the miner's equipment. As the first excavation is developed, the spoil is placed, as normal in contour stripping, on the downhill side of the excavation. This excavation uncovers the coal deposit and provides space for haul roads and equipment movements. The total flat "table" area developed is usually 100 feet or more in width from the highwall to the low wall. As the mining operation progresses around the mountain, the typical appearance of mountainside coal strip mining becomes evident; a steep highwall, a wide flat table area and a long trail of trees, rocks and dirt which has cascaded down the mountain. This material is then virtually impossible to recover for reclamation purposes. It is unstable and will continually erode and slide, causing perpetual siltation of streams below. This ugly and destructive phenomenon is most onerous to the public. The mountainous mining controversy has led to polarization of the conservation and coal mining interests into separate belligerent camps and has been the subject of State and Congressional legislation.

Several years ago a Pennsylvania surface coal mine operator applied for a permit to mine coal in an area where the ground slope exceeded 20° (36%). The state regulatory agency determined that the traditional method of contour surface mining around the mountain as described above could not control erosion and subsequent siltation of the nearby stream. The company, Mears Coal Company of Marion Center, Pennsylvania, decided rather than sacrifice the coal or initiate a costly appeal of the state agency's decision, it would work with the agency in attempting a new method of mining which would overcome the agency's objections.

Goals of the Modified Block-cut Method

It was important that the new operating plan achieve certain goals in order to be accepted: (a) It had to be economically competitive with other regional methods of mining, including conventional flat terrain stripping, and (b) it had to meet all pollution control standards and result in complete area restoration meeting rigid state requirements, including stable and vegetated slopes. In order to attain these goals, certain specific criteria had to be met:

- No significant investment in equipment above that used in flatter terrain surface mines could become necessary.
- Continuous production of coal was essential without long delays and "dead work" in extra earth moving.

- Sufficient space had to be provided in every cut for equipment mobility, storage of coal and for operation of augering equipment.
- Use of explosives, if required in the mining operation, had to be practical.
- Compliance with all federal and state safety regulations and practices had to be easily attainable.
- Overburden handling had to be minimal and within the capabilities of standard earth-moving equipment.
- No overburden could be placed in such a manner that would negate its recoverability for restoration.
- Reasonable concurrence of reclamation had to be achieved.
- Restoration to approximate original contour or, at least, a terrace configuration with no exposed highwall had to be accomplished.
- Water handling and control facilities had to readily incorporate into the new method.
- Multiple seam mining had to be practical and still achieve the desired goals.

The method developed by Mears Coal Company exceeded all expectations in meeting these goals with the possible exception of its practical adaption to auger mining. This is because most augering is done by contract between the operators and augering contractors. It is expected that many contractors will be reticent to become involved in an operation where the length of the highwall and operational area available is constrained. It is possible, however, that even these drawbacks can be overcome in some instances.

What is the Modified Block-cut Method?

Surface mining by the "block-cut" method has been employed since the inception of surface mining. It simply involves removing overburden and placing it around the periphery of a box-shaped cut. After coal extraction, the spoil material is pushed back into the cut and the surface blended into the surrounding topography. The word "modified" in Mears Coal Company's method originates from the company's adaption of the block-cut method to steeply sloped areas. The modification essentially involves backfilling with spoil from succeeding blocks rather than from the spoil-producing block.

Figure 1 diagrams successive steps in the operation. Mining can be conducted in either one direction along the coal outcrop or in two directions as shown in Figure 1. In this example, duplicate equipment would be provided. The overburden is removed from the area noted as Cut 1 (Diagram A) and placed in such a location that it will be retrievable for reclamation or so it can be graded, blended into the topography and vegetated. This initial cut should be carefully selected, preferably in a swale of the hillside or where low areas requiring fill material are nearby. The initial cut is often two or three times larger than subsequent block-cuts, particularly when subsequent blocks will be excavated in both directions around the mountain as shown in Figure 1. Every block is excavated into the hillside to the maximum highwall height economically feasible to the operator. Additional constraints on this distance are existence of deep mine workings, streams, roads, power lines, etc. The overburden from Cut 2 is then pushed into Cut 1 as shown in Diagram B. When mining is proceeding in both directions from the first cut, the overburden from Cut 3 is also pushed into Cut 1 as shown in Diagram C. The spoil from succeeding block-cuts is pushed to the previous cut as shown in the subsequent diagrams. In Pennsylvania, an outcrop barrier of 25' of the undisturbed coal is required as shown on the diagrams.

It is obvious that in moving spoil from one block to a preceding cut, the stratigraphy of the material is reversed. In order to assure that the position of acid-forming material (boney) and topsoil are not reversed in the reclaimed areas, special precautions must be taken. Whenever technically practical, topsoil is first removed and stored either above the highwall or downhill from the cut. A place to store this material must be chosen for each operation depending upon topography. Efforts must be made to protect it from erosion. This can be best accomplished by compacting the soil and sloping away the adjacent earth to enhance diversion of surface water.

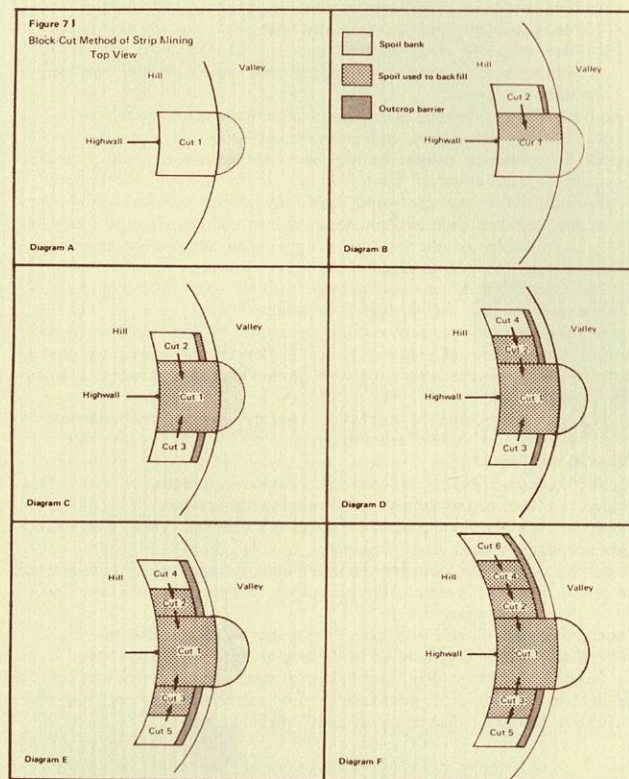
As the spoil is being pushed into the preceding block-cut, a void area is purposely left near the highwall of the cut being filled. When the boney is encountered, it is removed by the front end loader and deposited in the void. Clean spoil material is then placed over the boney and compacted. It is important that this boney disposal operation be completed promptly to minimize oxidation of the material.

It should be noted that this method does not disturb the ground surface downhill of the cuts except where the initial cut is taken. The other advantages to this method are enumerated later in this paper.

Application of the Modified Block-Cut Method

The Mears Coal Company has already used the modified block-cut method at several operations. It has also been used by other coal companies in western Pennsylvania. Described here is one operation where the Mears Coal Company is presently mining two seams of bituminous coal. This operation proceeds only in one direction from the initial block-cut, not in both directions as described in the previous section.

The upper seam varies in thickness from 19" to 23". The coal contains approximately 17% ash and 3½% sulfur. The processed coal has had a BTU value of 13,000 with 11% ash and 2% sulfur.



Reject refuse varies from 10% to 18%. At this particular operation, the company utilizes a 7-year old HD 21 bulldozer and a 4-yard capacity front end loader. The total investment of the company in this equipment has been \$15,000 for the bulldozer and \$18,000 for the front end loader. The value of the coal delivered at the coal preparation plant has rather consistently been \$6.60 per ton. The ability of this relatively small investment to satisfy equipment needs successfully met the first criteria of the new method's goals.

The general slope of the surface in the mining area was 20° (36%). The average overburden depth was 60 feet. In order to minimize the amount of spoil disturbed in the critical first cut, a portion of the hillside containing a swale was chosen for the initial block-cut. Care was taken in handling this initial spoil. Since there was no open pit available for disposal, as there would be in subsequent cuts, this initial spoil would be most subject to erosion and loss by sliding. Because only the first cut involves disposal of the spoil, the operator could afford the investment in time and equipment to grade, compact and vegetate it in the swale below the operation.

The second criteria of minimization of "dead work" time was also successfully accomplished. The method actually lends itself to continual coal production if it is operated in both directions around a mountain. Additional speed in coal production can further be accomplished by opening several "initial" pits at various locations on the coal tract. This offers the advantage of efficient continual use of haul trucks and minimum stockpiling of coal. In this particular two-

piece equipment operation, coal loading had to wait for the exposure of the coal by the bulldozer as it pushed the overburden back into the pit where the coal was just removed. With a two-piece operation, this "dead time" would also be unavoidable in the old contour mining method where the overburden is pushed down the mountain. It is at this point that the remarkable advantage of the modified block-cut method became obvious. The overburden is handled just once, and that is in moving it from above the coal in the new block-cut to the previous block-cut. In effect, coal exposure and reclamation are simultaneously accomplished. Mears Coal Company has found this to be the most significant feature of the method since it directly relates to the reason for any private enterprise to exist—to make a profit.

This key feature to the method met criteria numbers six, seven, eight and nine relating to minimization of overburden handling, concurrence of reclamation and near-contour backfilling with no exposed highwall.

The company reports that the subject operation produces about 2,000 tons per month, is operated by one full-time man and one part-time. The total manpower input is about 73 hours per week. On some days the operation produces 100 tons.

Each block-cut varies in length from 85 feet to 150 feet with widths (low wall to highwall) of 100 feet to 125 feet. This provides sufficient space for equipment mobility (including augering) and storage of coal. This meets the third criteria point.

A conscious effort is made to balance the "earthwork."

Despite the removal of the initial spoil and coal and oversizing the first block-cut, the method usually produces an excess of overburden material when it is removed from its natural state. This is expected in most earthwork projects. In order to avoid this excess, the operator may decrease the size of the last few block-cuts to reduce the amount of spoil that is generated. He also may attempt to terminate the operation in a swale or gully to minimize overburden and to waste excess spoil in the swale. The filling and smooth grading of a few swales is not environmentally detrimental and often results in establishment of smoother topography which is more valuable to the landowner. Since swales and gullies promote water runoff at high velocity, their elimination will discourage erosion.

This method should permit the use of explosives for loosening of the overburden rock so that the desired block-cut configuration can be achieved. Although the use of explosives was not necessary in the Mears Coal Company's jobs, the operator believes this method should present no obstacles to the use of explosives.

Meeting all federal and state safety regulations and practices was paramount in devising this method of surface mining. Since the length of open highwall is reduced by this method and the total equipment manhours required for restoration is minimized, this method should not only present no new safety hazards but will, in fact, also reduce the total number of accidents per ton of coal mined.

One of the most impressive advantages of the modified block-cut method is its water control and pollution prevention features. First of all, the total amount of disturbed area is considerably reduced because of the absence of spoil outside of the cut. As indicated previously in conventional contour strip mining in steep areas, this material is drastically eroded, resulting in serious stream siltation problems.

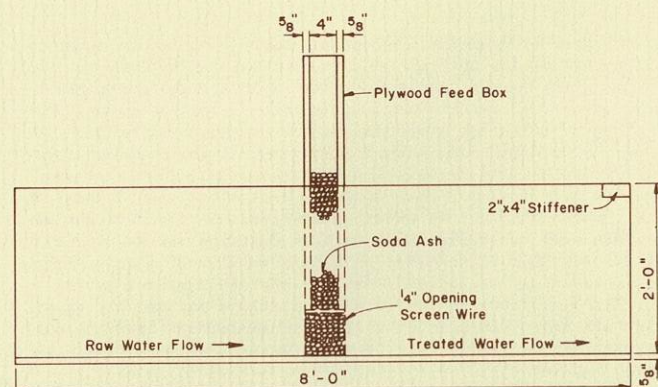
The minimization of the amount of open pit at any one time greatly reduces the amount of water which must be handled by the operator. Since the acid-forming spoil is exposed to the elements for a relatively short period of time, oxidation of the material is not significant before it is layered and compacted in the block-cut being reclaimed. In short, the method minimizes the amount of water which can come in contact with acid-forming material, it reduces the disturbed area which can be eroded by water, and it reduces the amount of water which must be pumped and treated by the operator.

Mine Drainage Treatment

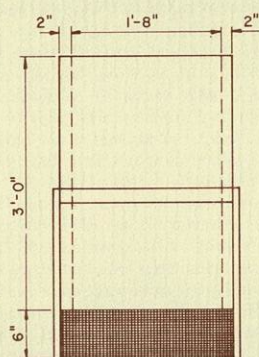
The treatment facilities at this operation involve two earthen settling basins and a mechanism to add alkalinity to the water pumped from the pits. This latter device consists of a screened box containing soda ash briquets (See Figure 2). As water passes through the device, soda ash is dissolved raising the pH to an acceptable level. The reactivity limitation of soda ash prevents over-treatment.

Since the pit water is promptly removed and boney oxidation has been limited, water from the pits is usually of acceptable quality, i. e., pH above 6 and iron less than 7 mg/L. If field pH tests indicate low pH, the water is passed through the treatment facilities.

Because the area that is disturbed by mining is being concurrently backfilled and planted in erosion inhibiting vegetation, further erosion reduction is achieved. The Mears Coal Company reports that



FRONT VIEW



END VIEW

FIGURE 2
SODA ASH REACTOR

this particular operation as previously described, actually can backfill at the rate of two to three acres per day. When the coal removal phase of mining at this site is completed, only the small remaining open area will have to be backfilled. This allows for early removal of the equipment from this site, thus it may be placed back in production at another site at the earliest possible moment. This again rewards the operator in practical economic terms.

Although the Mears Coal Company does not utilize a dragline in any of its operations, it is envisioned that the successive setups of the dragline could be planned to successfully utilize this method of mining; and in fact, to again reduce the necessary machine hours because of the minimal overburden handling.

The restored areas of the Mears Coal Company's operation are being utilized actively for cattle pasturing. The establishment of such land has been an additional plus for this area of the country which is generally hilly and wooded, affording little ready-made pasture land. Unfortunately, the landowner in some cases has allowed cattle to pasture during the first year of establishment of grasses. This is not good practice in establishment of any pasture land. Waiting two years before cattle are allowed to pasture a newly sown field is generally recommended.

It is the opinion of the writers and the operators familiar with this modified block-cut method that the method should be applicable to mining in areas even steeper than the 20° (36%) which was demonstrated at several Mears Coal Company's operations. The steepness of the topography does not appear to be a significant factor in the successful implementation of this method. The reverse, in fact, may be true. The advantages will multiply in those areas where extreme surface topography renders overburden control nearly impossible. Storage of topsoil and handling the initial overburden will become increasingly complex as slope steepness increases. With careful planning and diligent handling of the material, the problems encountered should not be insurmountable. In any event, this method offers the one ray of light for operators whose coal reserves are in mountainous areas, for pending laws and regulations will certainly constrain mining in those areas unless water pollution and erosion can be essentially eliminated and unless aesthetically pleasing backfilling can be accomplished.

CONCLUSION

Traditional or conventional methods of surface mining in hilly or mountainous areas are rapidly becoming anachronistic. The so-called contour mining method results in permanent disfigurement of the landscape as well as perpetual siltation and pollution of nearby streams. This is no longer acceptable to the public as a cost of obtaining this important energy resource. Existing and pending legislation at both the state and federal levels will soon make this method of mining as illegal as it is presently immoral. Aggressive and imaginative thinking has led to the development of the modified block-cut method of surface coal mining. This method has economic advantages to the operator as well as environmental advantages to the public. As demonstrated in several mining operations in Pennsylvania, the method has the following advantages over conventional surface mining:

1. The bulk of the overburden must only be handled once, thereby significantly reducing costs.
2. The amount of area disturbed is reduced over conventional methods by keeping most of the spoil inside the mined area.
3. It reduces revegetation costs of the operator.
4. Traditional mining equipment is utilized.
5. If properly planned, it does not interfere with continuous production of coal.
6. Explosives can be used but should be planned to fit into procedures involved in this method of mining. The method is, therefore, not limited to operations where the overburden requires no fracturing.
7. It introduces no new safety hazards and should reduce the accident vs. coal production ratio.
8. The concurrent reclamation inherent in the method reduces the amount of open pit and increases the speed of revegetation, thereby reducing the formation of acid mine drainage and siltation.
9. It is applicable to multiple seam mining and still retains the previously noted advantages.

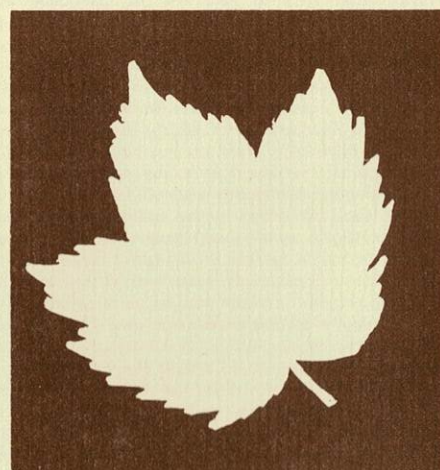
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An area that has benefitted greatly from the Special Reclamation fund is Elk Creek in Harrison and Barbour Counties. Through a cooperative effort with local citizens the quality of the stream is continually being improved by ongoing special reclamation work.

Special Reclamation Accelerated Program Needs More Funding

West Virginia's highly acclaimed special reclamation program, after rapid acceleration in the last few years has run into financial problems and unless supplementary funding is acquired, the ten-year-old project could be substantially reduced in effectiveness.

These are the sentiments of Reclamation Chief Benjamin C. Greene, whose division is charged with administering the fund. According to Greene, the situation is not yet critical but, "If we are to continue this outstanding program at its present accelerated rate, something will have to be done."

The Special Reclamation Fund was established in 1963, when it became apparent that the lack of an effective law and modern reclamation techniques had created problems that would have to be corrected. The surface mining industry volunteered to pay a tax of \$30 for each new acre of land disturbed. Since then, over \$5 million has been placed at the disposal of the Department of Natural Resources (DNR) for the purpose of reclaiming these orphaned lands.

During the first seven years, use of the fund has hampered because the Department of Natural Resources lacked sufficient administrative staff and money to carry out the program effectively. So, in 1971, the West Virginia Legislature raised the tax to \$60 per acre in order to pay for proper administration of the

program and for the first time funding was available for engineering, preplanning and other important preliminary work.

At that time, the Special Reclamation program was more than doubled, with the addition of a survey and engineering crew and various administrative personnel. By 1973, over 17,000 acres of orphaned lands had been reclaimed at a cost of over \$3 million, and at absolutely no expense to the taxpayers of West Virginia. It seemed the program was firmly established, but problems had already begun to materialize.

In fiscal 1970 and 71, at \$30 per acre, the fund had netted \$1 million and \$1.3 million respectively. So it was assumed that a full year at \$60 per acre would bring in approximately \$2 million. It had been decided that 15% of the annual income from the fund be used for administrative purposes, so the budget was set for about \$300,000.00.

But then the roof fell. Between 1970 and the end of 1972 the new state rules and regulations made it increasingly difficult to obtain permits, the coal market fell drastically, the number of permits granted decreased from 616 to 246 and nearly one hundred companies went out of business. Only \$1.7 million was collected while \$2.2 million was spent. This resulted in a banner year for special reclamation with over 4,200 acres treated, but left the financial stability of the program in serious doubt.

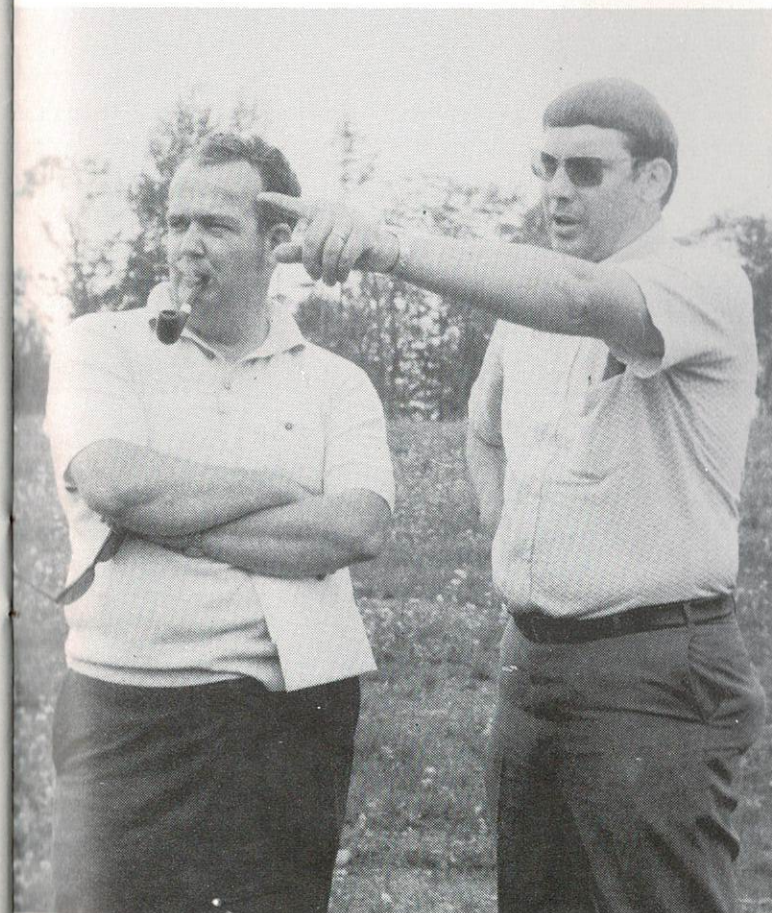
Another factor that helped drain the fund was that \$414,207 was refunded last year, because only 65% of the average permitted area is being utilized.

With all these problems, what will happen to the program in the future? Greene feels it is much too important to abandon.

"This unique and different approach to environmental problems is something that we all can take pride in," he said, "The surface mining industry in West Virginia is one of the few in the country that



This Barbour County land was mined many years ago and laid barren until special reclamation work began in early 1970. This photo was taken in October of 1971 and shows that what was once an ugly source of pollution could now be used for cattle grazing, farming or other various purposes.



Reclamation Chief Ben Greene and his top assistant Pete Pittsenbarger discuss reclamation results on a recent inspection tour. Greene believes the special reclamation program is too important to lose.

has taken on the responsibility of cleaning up its past problems."

He noted that Pennsylvania has a similar project but it is supported by a public bond revenue program and that Virginia recently initiated a special tax program much like West Virginia's, but at present it is only \$6 per acre.

"We feel the past record of the program warrants its continuation and expansion and we believe with five additional people, working specifically on special reclamation, we could achieve our goal of 5,000 acres a year," he said.

But Greene noted that even if the fund is unable to continue to support itself as it has in the past, there are several other possibilities for the future.

Governor Moore has asked for \$2 million in federal revenue sharing money to supplement the fund in 1973, and Greene feels it would be money well spent.

Along with this \$2 million there is also the \$100 million reclamation program being proposed by Senator Henry Jackson, that would bring federal money to the states for reclamation work. Also there are Appalachian Regional Development funds available for such projects.

However, he revealed that the "public ownership" clause in these two programs which prohibits the spending of public funds on private lands, could limit their effectiveness.

Another source of federal money for reclamation purposes is the Environmental Protection Agencies Demonstration Grants Program. For an example, Greene cited the massive Dents Run Project near Morgantown as one project benefiting from this program.

He noted that under this approach the state has the responsibility to gain the right of entry, then insure the future protection of the watershed in order to obtain the necessary matching funds.

"As far as the department is concerned, we are very optimistic and are continuing our plans for expansion of the program," he said. "With the national and state-wide interest generated by the issue I feel certain that adequate funding to continue acceleration of this important phase of land reclamation will be forthcoming."



**HEARING ON FEDERAL SURFACE MINING
LEGISLATION TESTIMONY OF THE
WEST VIRGINIA SURFACE MINING
AND RECLAMATION ASSOCIATION**

BY

**JAMES L. WILKINSON
PRESIDENT**

**SENATE COMMITTEE
ON INTERIOR AND INSULAR AFFAIRS**

MARCH 16, 1973

Mr. Chairman and Members of the Committee:

My name is Jim Wilkinson, Vice-President of Kingwood Mining Company, Kingwood, West Virginia. I am here today as President of the West Virginia Surface Mining and Reclamation Association, an organization comprised of 253 companies directly and indirectly involved in the surface mining of coal in West Virginia.

Our Association appreciates the opportunity to be heard and I, personally, am proud to appear before this committee to express my concern for our industry and for the future of West Virginia.

Nationally, the surface mining issue has presented problems, which the federal government, through this and other committees, must attempt to solve. We in West Virginia have experienced similar problems and have found answers which might be helpful in this committee's examination of proposed federal surface mine legislation.

Surface mining in West Virginia has virtually outgrown its earlier status as an emotional issue because of proven reclamation success, increased energy fuel requirements, and rigid enforcement of stringent state regulations.

By any yardstick of reason, those who advocate elimination of surface mining for environmental protection could only be interpreted as ill-advised and unrealistic. It is unsound because it ignores the serious and damaging consequences to the economy of both West Virginia and the nation. At best, it is an extremist solution to what is essentially an aesthetic problem.

In order to understand the full scope of the surface mining issue and how it has evolved, a review of several important points is essential.

The influence of history has weighed heavily upon the industry. Surface mining received its first major impetus during the national energy crisis of World War II. Urgent demands of war took precedence over concern for reclaiming disturbed land. Also, in those years, the science of reclaiming mined land was still in its infancy.

Today, the surface mining industry operates on a more scientific and knowledgeable basis than it did twenty or thirty years ago. The mistakes of the past are history and bear no relationship whatsoever with modern surface mining and reclamation practices.

In 1971, West Virginia amended one of the nation's most stringent surface mining and reclamation laws. Today, West Virginia is effectively preventing repetition of past practices, while at the same time, providing for total reclamation of abandoned surface mines.

A leader in mined-land reclamation, West Virginia proves that surface mining can and is being carried out responsibly—with total reclamation of all land disturbed in the mining process.

Since 1967, West Virginia has:

- Reclaimed more land than mined each year.
- Led all states in reclamation acreage each year with a total of 27,332 acres in 1972 alone.
- Reclaimed an average of more than 2,500 acres yearly of abandoned mines through the Special Reclamation Fund, supported solely by the industry at no expense to taxpayers.

One main reason West Virginia leads other states in reclamation is an extensive research program conducted by the industry in co-

operation with various state and federal agencies. Over a quarter of a million dollars is spent annually on various projects, including water quality, revegetation, and handling of overburden materials.

Many of the projects are still new, but important discoveries have aided reclamation specialists in attaining rapid revegetation and stabilization to eliminate soil erosion and siltation.

As surface mine operators, we take seriously our environmental obligations to the people of West Virginia. We fully support surface mining and reclamation methods and laws to regulate the industry. But the effect of restrictive legislation on the industry in West Virginia should be made public.

Figures from the State Department of Mines show West Virginia's surface mine coal production dropped from 27 million tons in 1970 to 21.8 million tons in 1972—a decrease of more than 30 per cent. West Virginia, the leading coal producing state since 1939 is now behind Kentucky, and nearly half the West Virginia companies operating in 1970 had gone out of business by the end of 1972.

Here, for comparison, are corresponding figures for the two years, as provided by the West Virginia Department of Natural Resources:

- 219 companies received 616 permits in 1970
- 118 companies received 246 permits in 1972

As the statistics clearly show, previously solvent companies and jobs were apparently eliminated by increased operating costs, reclamation requirements and decreased productivity, due largely to stringent legislation. Any additional legislation would virtually eliminate our industry in West Virginia.

Ironically, these reclamation requirements from the state coupled with strict emissions and safety standards from the federal government, come at a time of serious shortage of natural resources for energy production. And coal is the only abundant domestic source of energy available to overcome this shortage.

Those who contend that surface mining should be drastically curtailed are apparently unaware that over fifty per cent of all coal produced last year in the United States was surface-mined.

It would, of course, be impossible for this nation to function adequately without the energy derived from surface-mined coal.

In 1970, according to the National Coal Association:

- utilities consumed 55 per cent of the domestic coal production, of which 75 per cent was surface mined.
- coal provided nearly 50 per cent of the total kilowatt hours of electricity produced, of which half came from surface mines.

The demand for electric power is expected to double by 1980, possibly requiring twice the amount of coal consumed today, or 1.1 billion tons a year. Add another 150 million tons for conversion to gas and other uses, and the demand is 125 per cent greater.

Further setbacks affecting the surface mining industry would shrink coal supplies to a dangerous level and force a sharp increase in prices. This could mean severe power shortages and higher costs to consumers at a time when we all are concerned about inflation. It also would indirectly jeopardize the nation's coal exports when we should be attempting to improve our balance of trade with other countries.

In 1972, West Virginia produced 21.8 million tons of surface-mined coal at a total market value of more than \$200 million. The same quantity of coal could provide a city of 80,000 population, or 24,000 family units, with enough electrical power to last 550 years—for residential use. Adding business and industrial power usage, that amount of coal would furnish power to a city of 80,000 for 101 years.

Any significant loss in surface mine production could not be replaced by deep mining methods. A surface mine is twice as productive as a deep mine, requires less capital investment, and can be placed into production quickly. By comparison, a minimum of three to five years is needed to develop a deep mine.

To replace the 22 million tons of surface mined coal would require 22 new deep mines producing one million tons annually. At \$15 per annual ton (for development costs), the total capital investment would amount to more than \$330 million.

In addition, surface mining recovers coal deposits that usually cannot be mined by any other method. In most cases, surface-mined coal is found near the outcrop of mountains and other areas where rock strata is too weak to support a safe roof for deep mining.

Surface mining has also played an increasingly important role in the expansion of underground mining, by opening up previously un-accessible areas. Haul roads and bench areas created by surface mining help minimize initial costs of deep mine development.

In recent months there has been much publicity about a major shift in the industry to develop the vast western coal fields. But the tremendous percentage of high quality coal for metallurgical use is still located in the eastern United States. It is for this reason that the major electrical generation and metallurgical facilities are also located in the east, taking advantage of shorter hauling and lower transportation costs.

The large deposits of western coal are mostly sub-bituminous and lignite which are low in BTU content and high in ash. It is questionable whether the utilities can afford to transport this low quality coal from western fields to eastern markets.

The average BTU content of eastern coal is 12,000 as opposed to 8,000 BTU of western coal. Of course, the great majority of this high quality, low sulphur eastern coal lies in the mountainous Appalachian area. Therefore, we are concerned about any provisions for slope restrictions. Presently, surface mines throughout Appalachia are producing about one third of all the low sulphur coal burned for power generation. Obviously, we cannot afford to sacrifice this production.

In West Virginia, the problem is even greater. Last year, the House of Representatives passed a bill that would have restricted placement of permanent overburden on slopes greater than 14°, but few people realize that the average median slope in West Virginia is 14°. A specific example may better illustrate our concern. McDowell County in the southern part of the state is the largest coal producing county in the United States. 90% of the land surface of McDowell County is in excess of 20°. Any slope limitations could easily eliminate the industry in West Virginia.

On February 11, 1972, the Stanford Research Institute of Palo Alto, California, released an in-depth study revealing the impact of surface mining on the economy of West Virginia. SRI was commissioned for the \$75,000 project by the Joint Committee on Government and Finance of the West Virginia Legislature to provide factual information as a basis for future surface mine legislation. Several of the outstanding points brought out in the report follows.

First of all, according to the Stanford Report, 9,358 jobs are a direct result of the surface mining industry in West Virginia, broken down as follows:

- 5,720 — Surface mining
- 1,750 — Railroads
- 179 — Barge lines
- 560 — Trucking
- 1,149 — Supplies, services, equipment

Most of these jobholders have families. Based on 1970 Census Bureau figures, the average family in West Virginia consists of 3.17 persons. That would mean that 29,676 persons in West Virginia depend upon surface mining for food, housing and clothing.

Secondly, deep mines often depend on surface mining for three primary reasons:

- blending for proper sulphur, ash or BTU content.
- offsetting high costs of underground production.
- opening up and developing previously unaccessible underground reserves.

This is supported in the Stanford study, which says "the implications of surface mining relative to deep mining employment are apparently significant."

According to SRI, deep mining could not be significantly increased to offset surface mining production and employment.

"In fact", SRI says, "surface mining has been the principal means for maintaining total production levels and by inference, therefore, helping to sustain at least a portion of the total deep mine employment . . . If surface mining operations are related to deep mine employment in the same proportion as is production, then approximately 6-8,000 deep miners are affected in some way by surface mining."

Thirdly, Stanford estimated the total economic impact of surface mining in West Virginia at more than \$210 million annually. The report also said the economic impact is felt unevenly in the state, being most pronounced in counties where coal mining is the primary industry.

This includes:

- \$81.2 million annual payroll
- \$59.6 million for supplies and services
- \$56.9 million for transportation of surface-mined coal
- \$12.9 million in state and local tax revenues.

Tax sources listed by the SRI include the Business and Occupation, Workmen's Compensation, County Property, and Corporate Net Income, plus additional revenues through local and state sales taxes.

Finally, beyond the direct contribution to the economy by surface mining, coal hauling and mine equipment industries, there is a second cycle of monetary expansion among non-related businesses.

Economists have determined that to measure accurately the effect wages have on the economy, wages should be multiplied three times, on the basis that every dollar spent will generate three other dollars in trade as it circulates through commercial channels. (A multiplier of 3 is conservative; in many areas a factor of 5 or 7 is common.)

In 1971, for instance, the annual \$81.2 million payroll in surface mining and related industries probably generated another \$243.6 million of business through year-long purchasing of consumer items, such as food, clothing, housing and transportation. Local businessmen, in turn, must hire clerks, salesmen, and other employees to satisfy demands generated by surface mining and related industry payrolls.

It is inconceivable that federal government would be willing to sacrifice economic considerations of this magnitude.

The surface mining industry has a strong sense of responsibility in supplying the nation's demand for coal and returning surface-mined land to beneficial use.

In conclusion, the industry as represented by the West Virginia Surface Mining and Reclamation Association supports comprehensive legislation establishing criteria for achieving sound reclamation and requiring states to develop and enforce regulations to meet federal standards.

However, the Association opposes any federal legislation that would selectively prohibit surface mining of coal in West Virginia.

In general, I believe the following recommendations should be given major consideration in dealing with federal surface mine legislation:

- (1) Any bill to regulate the surface mining industry should include all minerals.
- (2) Federal programs should be implemented only if states are unwilling or unable to enforce federal guidelines.
- (3) Due to differences in terrain from state to state, there should be no finite numerical limitations on highwall heights, degree of slope, bench width and regrading.

(4) There should not be provisions specifying compaction or regrading to the approximate original contour because requiring only these in every instance is not environmentally sound. For example, compacting materials makes revegetation extremely difficult after the mining process. Also, returning the land to the approximate original contour in some areas have proved to be a cause of extensive erosion and siltation.

(5) Exorbitant permit fees bonding penalties, moratorium and administrative expenditures do nothing to insure sound environmental practices and serve only as an economic harassment for the industry.

With sound and reasonable legislation the state of West Virginia has proven that it is possible to mine coal which is so vital to the energy needs and the economy of the country while at the same time, protect the environment for future generations.

The surface mining industry, as it evolved, has faced many difficult problems. But we have done, and are doing, much to solve them. As surface mine operators, we have two responsible jobs to perform; to supply the nation with its demand for more coal and to return surface mined land to beneficial use. We intend to do both jobs well.

ACRES RECLAIMED

	1971	1970	1969	1968	Total	*1970 Surface Production
WEST VIRGINIA	20,369	13,245	17,117	19,918	70,649	27,657
KENTUCKY	18,481	11,703	7,171	9,800	47,155	62,695
PENNSYLVANIA	10,259	9,089	9,914	10,811	40,073	25,108
OHIO	9,230	12,972	12,459	11,105	45,766	37,240
ILLINOIS	5,354	5,253	5,478	9,820	25,905	33,026
INDIANA	3,510	3,938	3,701	1,730	12,879	20,169
VIRGINIA	3,013	2,682	1,915	2,125	9,735	6,998
OKLAHOMA	2,780	1,427	723	465	5,395	2,208
MISSOURI	2,664	1,229	1,655	2,332	7,881	4,447
TENNESSEE	2,456	650	1,214	1,609	5,929	3,886

(Thousand
short tons)

*Source: U. S. Bureau of Mines

Reclamation figures not available for other states for 1972.

PROVEN RECOVERABLE RESERVES OF MAJOR ENERGY FUELS

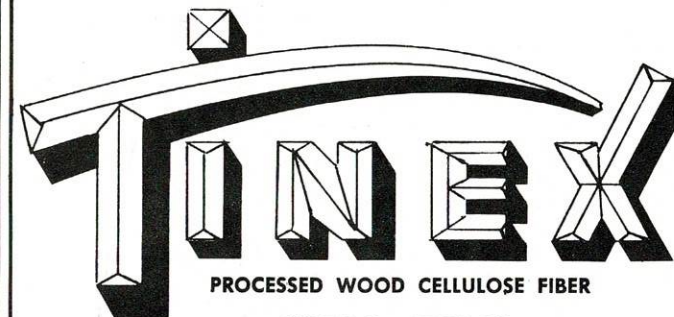
FUEL	QUANTITY	ESTIMATED TIME
OIL	— 52 Billion Barrels	— 10 years
GAS	— 3,000 Trillion Cubic Feet	— 11 years
URANIUM	— 450,000 Tons	— 13 years
SHALE OIL	— 160-600 Billion Barrels	— 35 to 120 years
COAL	— 1.5 Trillion Tons	— 500 years

Source: U. S. Geological Survey

WEST VIRGINIA RECLAMATION BY YEAR

YEAR	S.C.D.	OPERATOR	SPECIAL RECLAMATION AND BOND FORFEITURE	TOTAL
1961	878.00			878.00
1962	2,471.08	600.00		3,071.08
1963	2,574.05	460.00		3,034.05
1964	2,373.70	605.00	25.30	3,004.00
1965	3,668.10	901.00	786.60	4,335.70
1966	3,213.20	690.50	2,753.57	6,657.20
1967	4,100.36	740.00	2,552.68	7,303.04
1968	8,956.37	9,054.86	1,199.87	19,918.00
1969	8,253.11	4,463.41	4,400.88	17,117.40
1970	5,355.88	5,985.72	1,903.87	13,245.47
1971	5,352.92	12,321.01	2,695.76	20,369.69
1972	3,665.19	20,052.50	3,604.87	27,332.52

Source: West Virginia Department of Natural Resources



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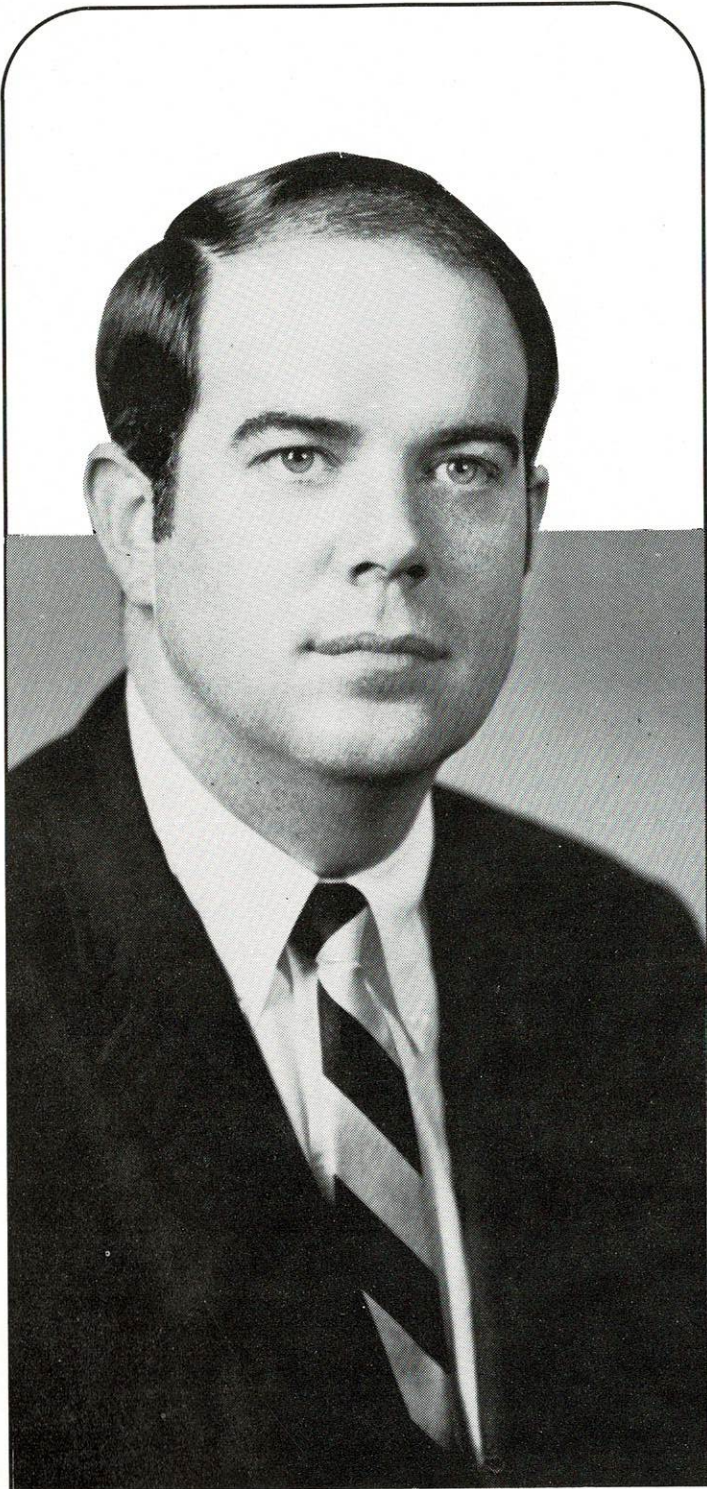
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RICHARD WALKER

**HEARING ON FEDERAL SURFACE MINING
LEGISLATION TESTIMONY OF THE
CECIL I. WALKER MACHINERY COMPANY
CHARLESTON, WEST VIRGINIA**

BY
RICHARD WALKER
PRESIDENT

**SENATE COMMITTEE
ON INTERIOR AND INSULAR AFFAIRS
MARCH 16, 1973**

My name is Richard Walker and I am President of Cecil I. Walker Machinery Company of Charleston, West Virginia. Our company sells and services heavy earthmoving equipment in southern and western West Virginia and southern Ohio. We employ approximately 300 people. Before the current "softening" of the coal industry, 40% of our company's annual volume of sales was derived from the surface mine market.

West Virginia was one of the first states to pass stringent legislation regulating the surface mining industry. This strict legislation emphasizes reclamation, not abolition; for West Virginia realizes that surface mining is an integral segment of the total coal mining industry, which is the backbone of the economy of our state.

In May, 1971, the West Virginia Legislature commissioned the Stanford Research Institute to initiate a study of surface mining in West Virginia. Completed in February, 1972, the report is now recognized as an authoritative source of economic information of the surface mining industry in West Virginia. Coal accounts for 12.6% of the total earnings in West Virginia, as opposed to 3.6% in Kentucky, 1.1% in Pennsylvania, .7% in Ohio, and 1.1% for the U. S. average. Coal is responsible for 9.5% of the total employment of our state, as opposed to 3.1% in Kentucky, .9% in Pennsylvania, .5% in Ohio and .9% for the U. S. average.

In 1970, according to the Stanford Report, more than 27 million tons of coal were mined by the surface method, representing 20% of the total production in West Virginia. The Stanford Research Institute using an average multiplier rate of \$7 million per million tons of production concluded that the surface mining industry was contributing approximately \$210 million annually to the economy of West Virginia. The Institute also reported that approximately 5,700 people were directly employed in surface mining operations, and another 6,000 to 8,000 deep miners jobs were dependent upon the survival of the surface mining industry. Therefore, a total of 12,500 miners' jobs are dependent upon the surface mining of coal. In addition, approximately 1,700 railroad jobs, 175 river transportation jobs, 550 trucking jobs, and 1,100 jobs are directly related to the surface mine supply,

service and equipment industry. Therefore, approximately 16,000 jobs in West Virginia are dependent upon the surface mining industry. In my company alone, 150 jobs will depend upon the surface mining industry remaining stable in the future.

The second area of concern is the worsening energy crisis. In the January 22, 1973 issue of **Newsweek**, the U. S. Geological Survey that the domestic reserves for prime sources of energy were as follows:

- Oil — 52 billion barrels or an estimated 10 years reserves
- Gas — 3,000 trillion cubic feet or an estimated 11 years of reserves
- Uranium — 450 thousand tons or an estimated 13 years of reserves
- Shale Oil — 160 - 600 billion barrels or an estimated 35 - 120 years of reserves
- Coal — 1.5 trillion tons or an estimated 500 years of reserves

Passage of sulphur emissions standards have forced many huge electrical generator plants to switch their prime source of fuel from coal to oil. This short-sighted action has caused our oil reserves to dwindle at an ever increasing rate and is causing this country to depend upon oil imported from the Middle East. This dependence is not in the best interest of national security because of the rather unstable and volatile political situation in that part of the world.

A third area of concern is the critical deficit in the balance of payments this country has experienced during the past few years. SRI states, "In 1970, coal production in the United States was about 592 million tons with about 143 million tons from West Virginia. Domestic coal consumption increased by about 14 million tons over 1969. Exports, however, increased by more than 30 million tons. About 75% of total U. S. Exports (53 million tons) were from West Virginia. Exported coal is commonly of higher quality, thereby commanding a premium price. There is an economic incentive to increase production for export. This could lead to a rise in surface mining to provide for domestic needs or to blend with deep mined coal for either domestic or export markets. Without surface mined coal the nation would face a fuel shortage on the domestic and export scene that could lead to increased dependence on foreign fuel supplies, which could adversely affect balance of payments and national security."

Mr. John G. McLean, Chairman of the Committee on U. S. Energy Outlook and Chairman and Chief Executive Officer of Continental Oil Company and Mr. Warren B. Davis, Chairman of the Co-ordinating Subcommittee of the Committee on U. S. Energy Outlook and Director of Economics, Gulf Oil Corporation made a presentation to the National Petroleum Council on December 11, 1972. The McLean-Davis Report stated that greater oil and gas imports will have a major impact on the nation's balance of payments. The cost of imported fuels, less the sales revenue from fuel exports, results in a sizable net dollar drain. This drain was \$2.1 billion in 1970 and will probably range between \$9 billion and \$13 billion by 1975.

Gentlemen, any proposal that would reduce the maximum allowable slope for mining from 33° to 14° would not regulate surface mining in West Virginia. **It would abolish surface mining.** With the abolishment of an existing industry, 16,000 jobs in West Virginia would be done away with by an Act of Congress. Abolition of the surface mining industry in West Virginia would mean the annual loss of millions of tons of coal, some of which is high metallurgical type that is exported and thus contributes favorably to the balance of payment problem.

Therefore, with the chronic problem of unemployment in West Virginia, with the problem of the energy crisis in America, and with the serious problem of the gold drain out of this country caused by a critical deficit in balance of payments, this committee should work for the best interest of America, by drafting legislation that will not only protect the environment but help this most important industry. This committee should not abolish surface mining in West Virginia by lowering maximum slope requirements, but should recommend money be appropriated for accelerated research in the removal of sulphur from coal, so that it can be burned without deteriorating the environment. This committee should recommend that money be appropriated for continuing research in reclamation in order that the eventual goal of 100% restoration of land can be achieved.

We implore you to promote research and reclamation, not abolishment through your proposed regulations.

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**STEERING COMMITTEE FOR
SURFACE MINE RESEARCH IN WEST VIRGINIA**

Presented By: David J. Ozmina

STATEMENT TO BE PRESENTED TO THE SENATE COMMITTEE
ON INTERIOR AND INSULAR AFFAIRS,
FRIDAY, MARCH 16, 1973

You are well aware that West Virginia has been the leader in coal production until the last two years. It is also well documented that this state has the largest reserve of low-sulfur coal east of the Mississippi River. Much of the scarce natural resource can be recovered by surface mining methods. It is appropriate, therefore, that the state that is among the leaders in coal production should also lead in surface mining and reclamation research. I am certain you appreciate the value of a diversified research program in developing methods to minimize effects from surface mining activities. It is unfortunate that more consideration has not been given to research results when drafting regulatory statutes.

The West Virginia Steering Committee for Surface Mine Research accepts two basic assumptions regarding surface mining. First, surface mining is more efficient than underground mining. It is more highly mechanized, and the rate of mineral recovery is much higher. The latter is very important when considering a non-renewable natural resource that is essential to our national growth. The second assumption is that any side-effects to other natural resources is temporary. It can be minimized, reduced and then eliminated in time by careful planning, good mining methods, and effective restoration practices.

Within the next few minutes, I shall attempt to briefly describe West Virginia's surface mining and reclamation research program. I will review the history of the organization, describe some of its activities, and comment on future plans.

In 1967, representatives from the West Virginia Department of Natural Resources, and the West Virginia Surface Mining and Reclamation Association attended a mined land reclamation symposium in Owensboro, Kentucky. They were impressed by the accomplishments of the Forest Service research, and submitted to the Director of the Northeastern Forest Experiment Station a proposal for a cooperative research effort. State and industry funds would be contributed to support a Forest Service research project in West Virginia. A tripartite agreement was signed in 1968, and the Forest Service assigned a senior scientist and a technician to their laboratory at Princeton, West Virginia.

Four representative were selected by each of the signatories of the tripartite agreement. In addition, the following organizations each selected one representative: Soil Conservation Service, the Soil Conservation Districts of West Virginia, West Virginia University, and the National Coal Association. This committee selected research problems, and assigned each a priority. The Forest Service used these recommendations in developing a diversified research program.



David J. Ozmina

Once the Steering Committee was organized and functioning, the meetings were opened to the public. People interested in surface mining were encouraged to attend and participate. These semi-annual meetings became quite popular, and we had no problem in generating interesting and informative discussions. Last year, the Agricultural Research Service accepted our invitation to serve on this committee. They had initiated a very interesting program concerned with the revegetation of extremely acid spoils.

We individually or as a group endorse research proposals. This may assist a scientist in obtaining funds or cooperation. For many field studies a scientist needs land equipment and materials to establish a project. We have been able to recommend surface mine operators who would be willing to cooperate. Arrangements have also been made for researchers to enter several properties for the purpose of data or sample collection. All of these activities simplify the research process.

This year, the committee reexamined its activities and functions. We prepared the following objectives to guide us as the program becomes more diversified, and new research projects are initiated:

To develop methods for interpreting and demonstrating the practical application of surface mining and reclamation research.

To encourage communication between research scientists, the regulatory agencies, and the surface mining industry so that research concerns relevant problems.

To offer advice on proposed research and demonstrations, and to cooperate with the research scientist in obtaining assistance necessary to initiate specific projects.

To foster and advance an understanding of surface mining and reclamation by the general public.

Our major accomplishment has been to stimulate an interest in surface mining research. Before the Steering Committee, the major research efforts were small projects located at West Virginia University, and field evaluations of plant materials by the Soil Conservation Service. In a 4-year period, this has developed into a half-million dollar effort involving six federal agencies, two colleges and universities, two state agencies, and several coal companies. The subjects under investigation have expanded from revegetation to comprehensive studies concerning geology, hydrology, methodology, soil science, engineering, and economics. Long and short-term studies are included, and several require a multi-disciplinary approach to a problem.

The Steering Committee selected as one of its priority projects a detailed analysis of the overburden above the Upper Freeport coal seam in northern West Virginia. The coal body has extensive reserves, but the spoils often are extremely acid. Through the committee's efforts, Dr. Richard M. Smith, an agronomist at West Virginia University, became interested in the problem, and a grant was obtained from the Environmental Protection Agency. With other coopera-

tive assistance, Dr. Smith has been able to make substantial progress toward solving this difficult problem. His accomplishments will have application in Ohio and Pennsylvania. Furthermore, his techniques for overburden analysis may have national significance.

The committee initiated a large-scale field demonstration this year. We will establish several demonstration sites to show how to plan and develop an area disturbed by surface mining as attractive habitat for wildlife. Professional wildlife biologists will contribute their expertise to planning these sites. Surface mine operators will supply the labor and materials to complete the plans. We want to demonstrate to the public the tremendous potential surface mined areas have as wildlife habitat when reclamation treatments are planned for this purpose.

Steep slope mining methods have been developed and by proper selection of equipment, seed, fertilizer, mulch and other materials successful revegetation has been accomplished on these contour mined areas in steep mountainous terrain.

Research experience has shown that contour back-filling is often creating more problems than it is solving. This is due to the difficulty of accomplishing this in some areas, difficulty in the revegetation effort, excessive siltation leaving the site during and after regrading and the desire of many landowners to have the flat bench left for grazing, farming, housing, wildlife habitat, commercial and industrial sites, etc.

Our plans for the future include continued expansion of the research program. We are also sponsoring the Steering Committee for Surface Mine Research in Appalachia. This group will be structured after the West Virginia committee. It will bring together industry, regulatory agencies, colleges and universities, and federal research agencies. Eight states have been invited to participate, and the response to our invitation has been very encouraging. We will hold the organizational meeting in May.

In summary, I want to emphasize that sound research programs are not developed by a handful of scientists working alone. The participation and cooperation of many groups is needed to keep the program relevant to today's problems. This committee has created the most favorable environment for a dynamic research program by bringing together the coal industry, state agencies, universities, and federal agencies. It is our hope that you will recognize that this type of research program is the most promising way to minimize effects on other natural resources by surface mining. We encourage you to use available research results as a basis for drafting new legislation. On behalf of the West Virginia Steering Committee I would like to invite you to come and see for yourself what is being accomplished before you make recommendations.

In closing I would like to remind you that only through proper research can we have research properly applied.



In accordance with the provisions of the 1971 Surface Mining Act complete drainage systems and sedimentation ponds must be included in the mining plan. Water flowing into the pond above circulates allowing the silt particles time to settle to the bottom before the water runs out into the stream.

West Virginia

Is Reclamation Leader For 5th Straight Year

Figures recently released by the Department of Natural Resources show that West Virginia has had another outstanding year in mined-land reclamation and has topped its own record, which made it the nation's leader in 1971.

The annual "Status Report" from the Division of Reclamation reveals that from July 1, 1971, through June 30, 1972, 27,332 acres of mined land were reclaimed in the Mountain State, surpassing the old mark of 20,369 by nearly 7,000 acres.

These figures indicate that West Virginia, which has led all other states in reclamation during the past four years, will make it five in a row in 1972. Kentucky was the closest contender last year with 18,481 acres, Pennsylvania was third with 10,259. Reclamation figures have not yet been released from other states for 1972.

According to the report, three different groups are involved in the state's outstanding reclamation success, but it's the surface mine operators themselves who are accounting for most of the work. Private companies finished work on 20,052 acres out of the total 27,332. The remaining acreage was reclaimed by the Soil Conservation Districts with 3,665, and West Virginia's Special Reclamation Fund accounted for 3,421 acres. This program is supported solely by the surface mine operators and funds reclamation work on orphan banks.

It's interesting to note that West Virginia is not the leading state in surface mine production, but fifth behind Kentucky, Ohio, Illinois and Pennsylvania, and that surface production has even been decreasing here for the past three years.

Production decreased from 27.6 million tons in 1970, to 25.9 million tons in 1971, and after the first three quarters of 1972, production is projected to reach only 20 million tons. During the same three year period, reclamation acreage increased from 13,245 acres, to 20,369 acres, to the 1972 total of 27,332 acres. Since 1968, nearly 100,000 acres of surface mined land have been reclaimed in West Virginia.

Explaining this reclamation boom in the Mountain State, Jim Wilkinson, President of the West Virginia Surface Mining and Reclamation Association, said, "Much of the credit must go to a new concentrated effort on the part of industry, government and various research groups who are dedicated to a productive, successful reclamation program in this state."

Getting into more detail, Wilkinson continued, "Under the new law, we are performing progressive reclamation, during the active operation, which results in total reclamation of the land disturbed."

"Another big factor," according to Wilkinson, "is the special reclamation program, which is now in full swing and reclaiming well over 3,000 acres of abandoned surface mines each year."



Farming is one of the many uses found for reclaimed surface mined land in West Virginia. Hay is being mowed off this land in Harrison County which was mined in the mid-1950's.

He noted that this program, which "does not cost the taxpayers a nickel," has already funded work on nearly 18,000 acres of orphaned banks, and that there are approximately 30,000 more acres to reclaim.

"At the present rate, all the old scars should be gone in less than 10 years," he said.

Since its inception in 1963, operators have paid \$5.4 million into the Special Fund and in turn, the state has spent \$3.8 for the reclamation work. The operators pay nearly \$1 million into this fund each year according to Wilkinson.

He also pointed out that West Virginia has the most stringent surface mining law in the nation and that strict enforcement is overseen by a staff of nearly 50 in the Department of Natural Resources.

"For those who don't believe our law is being enforced, a look at the latest figures should open some eyes," Wilkinson said. "In 1967, there were five prosecutions for surface mine violations; in 1968, seven; 1969, six; 1970, 24; 1971, 124; and in the first nine months of this year, there have been 242 prosecutions."

"We believe that the combination of a strong law, strong enforcement, the special reclamation fund and a concerted effort by government and industry are responsible for making West Virginia number one in reclamation during the past four years, and will continue to do so," he said.

Sericea lespedeza is growing in abundance on this reclaimed mine near Pageton, W. Va., in McDowell County. This area was mined in 1969 and planted by hydroseeder in the spring of 1970. Lespedeza is used extensively to cover slopes along our inter-state highways.



Industry in the News

COOK URGES MORE COAL DESULFURIZATION RESEARCH

Sen. Marlow W. Cook (R-Ky.) told the Senate recently that more research on coal desulfurization systems is needed to meet the nation's energy needs compatibly with federal clean air standards. Methods of converting coal to clean fluid fuels are promising but "six or seven years away," he said. "We just cannot afford to wait this long."

In passing the Clean Air Act, Congress foresaw "at least part of the impact" on the coal industry and the nation and tried to moderate it by providing for research and development of technology for clean coal use, Sen. Cook said. However, he added, "regulation has today far outrun research," and "we must reverse this trend by increasing our research effort."

One of coal's key contributions to national energy supply is in providing fuel for the generation of electric power, he said. "The full potential of this coal is not being realized and there is a danger that coal's limited contribution may no longer be possible," he said.

The main problem facing the coal producer and the utilities is that "to my knowledge there is no effective commercially tested desulfurization system available for installation" to allow consumers to burn high-sulfur coal and meet the standards of the Environmental Protection Agency for air quality control by the 1975 deadline, Sen. Cook said. Even EPA, he added, has indicated that complete implementation of state air control plans may not be attainable in the time prescribed.

"I submit that without the benefit of a desulfurization system, we automatically force our utilities to turn to imported oil for fuel, compounding our oil shortage," he said. "The resulting dollar drain could literally cripple our economy." In addition, he said, the power to shut off a vital part of U.S. energy supply is "simply too potent a weapon" to place in the hands of Middle East oil exporting countries.

CEQ ESTIMATES EFFECTS OF SLOPE RESTRICTIONS

The Council on Environmental Quality told the Senate Interior Committee recently that slope restrictions on surface coal mining could knock out as much as 108 million tons of production a year in Appalachia.

That was the top figure which CEQ estimated would result if surface mining were prohibited on slopes of 15 degrees and more, and if the production could not be made up elsewhere, either by deep mining or use of gentler slopes. The loss would represent up to 70 per cent of Appalachian surface mine production, 39 percent of total U. S. surface coal production, up to 18 per cent of national production by all methods, and 41 per cent of total strippable reserves in Appalachia.

The CEQ report, which was called an "assessment of alternatives," was prepared for Senator Henry M. Jackson (D-Wash.) chairman of the Senate Interior Committee, who asked CEQ to head an interagency study of the effects of prohibiting surface mining on steeper slopes.

CEQ estimated total costs of reclamation for contour strip mining with what it called minimal reclamation—shaping and revegetating spoil banks—at 39 cents per ton. For complete reclamation, including mining by the modified back-cut method to keep spoil off the outslope, it estimated reclamation costs at 56 cents per ton. It said some other reclamation techniques would cost even more. It said the additional cost over the reclamation now required in Appalachian states would range from 17 cents to 56 cents per ton.

CEQ pointed out that slope limits would preclude the mining of much low-sulfur coal which it said is valuable for steel production and export and for compliance with the Clean Air Act. It said Appalachian surface mines produce about 30 per cent of all low-sulfur coal used by electric utilities—and 23 per cent comes from central Appalachian, almost all from slopes steeper than 20 degrees.

Slope limits would have a significant economic effect in central Appalachia, especially where coal is a major industry and few other jobs exist, the report said.

IMPORTS WILL COST MORE

The price advantage long held by foreign oil in relation to domestic supplies is expected to be virtually destroyed by the action of the government

recently in the 10 per cent devaluation of the U.S. dollar.

The result will be that foreign crude oil will now largely be equal or higher in price than domestic oil. The cost to U.S. consumers is expected to be about \$400 million more per year because of the higher price.

Devaluation of the dollar also will act as a spur to domestic exploration and production.

The major oil exporting countries will receive higher royalties on their oil production as a result of escalation clauses in prevailing contracts.

WEST VIRGINIA REGAINS NO. 1 COAL RANKING

In conflict with earlier preliminary figures, official totals now show that West Virginia in 1972 regained from Kentucky the ranking as the nation's leading coal-producing state. West Virginia lost the lead to Kentucky in 1971 after 40 consecutive years as first.

Figures released by the respective state departments of mines placed West Virginia's 1972 total production at 122,856,378 tons, compared to 120,271,247 tons for Kentucky. Earlier estimates from the Bureau of Mines had Kentucky's total at 125 million tons.

In a recent statement West Virginia Coal Assn. President Stephen G. Young said he was pleased to see West Virginia back in front. "However, it is a distinction that does nothing to change the dismal situation in West Virginia's coal industry," Young said. "As we have moved into 1973, mines in West Virginia are still being closed or cut back and miners are being put out of work."

Young noted that West Virginia coal employment in January of this year, according to recent data from the Bureau of Labor Statistics, totaled 46,300—a drop of 4,100 jobs from Jan. of 1972.

UMW WANTS SURFACE MINING OUTLAWED WHERE LAND CAN NOT BE RESTORED

The United Mine Worker's Union told Congress today that surface mining should be outlawed where the land can not be restored.

"We cannot allow the corporate interests in their zeal for profits to destroy our ecological balance, destroy our land and create panic among those who labor to produce the wealth of our country," said UMWA President Arnold Miller.

Miller's comments were presented to the Senate Interior and Insular Affairs Committee hearings on proposed strip mining laws.

Miller said an energy conglomeration has "exploited resources all over the world with little, if any, concern for the people of this country who either consume their products or work to produce them."

"Coal operators usually have only one thought in mind," Miller said, "It is simply: Get coal to market with as low a cost as possible, and get as much profit as you can."

"Surface mining should not be allowed in any part of our country where the land cannot be restored or where the operators have proven repeatedly that they will not restore the land," Miller testified.

As protection for displaced workers, Miller suggested a tax on surface-mined coal to hire miners for reclamation work; a portion of the current coal depletion allowance be set aside for a special fund to retrain and relocate miners, and special unemployment benefits for miners who lose their jobs because of federal strip mining legislation.

BLASTING SEMINAR IN MORGANTOWN

A short course on "Current Blasting Practices" will be held June 6-8, 1973 at the Lakeview Country Club, Morgantown, W. Va. The course is designed to update and improve skills of those individuals engaged in using explosives as a tool for rock excavation.

The program begins with registration at 8:30 a.m., June 6th and ends at 5:00 p.m. June 8th. The meeting is sponsored by Intercontinental Development Corporation and the deadline for registration is May 21, 1973. Registration fee is \$275 (\$250 for ISES members) covers lectures, reference material coffee breaks and banquet. Room reservations are the responsibility of the individuals attending.

COAL FOR POWER MOSTLY SURFACE MINED

More than 61 per cent of the coal shipped to steam-power generating plants was produced in surface mines, the Federal Power Commission (FPC) reported.

The data is based on the third quarter of last year, when coal accounted for 52.6 per cent of the fossil-fuel requirements.

The report, from the FPC's Bureau of Power, took no position on regulation of strip mining, but noted Congress and some state agencies are considering limiting or prohibiting it.

Also noted was the "great concern among environmentalists" about the effects of strip mining.

The report found low-sulfur coal was the cheapest nationally, because much of it was consumed at mine-mouth plants in the West.

Most high-sulfur coal is consumed in the eastern half of the country, where the price of coal is higher.

ENERGY ASSOCIATION HEADS CALL FOR POLICY RESHAPING

The presidents of five U. S. energy associations have described the nation's energy situation as potentially "a major national crisis" that demands a reshaping of U. S. energy policies.

In a joint statement made public at a press conference at the National Press Club, the presidents of NCA, American Gas Association, American Petroleum Institute, Edison Electric Institute and Atomic Industrial Forum emphasized that the United States has sufficient resources to meet foreseeable energy needs. But they said the development of badly needed energy resources has been discouraged by a number of factors, including the lack of coherent national energy policies.

The five association presidents are F. Donald Hart of the American Gas Association; Frank N. Ikard of the American Petroleum Institute; Charles Robbins of the Atomic Industrial Forum, Inc.; W. Donham Crawford of Edison Electric Institute; and Carl E. Bagge of the National Coal Association. George L. Gleason, AIF vice president, substituted for Mr. Robbins at the press conference.

Four primary objectives were urged as the bases of sound energy policies:

1. "The development of an adequate supply of energy at reasonable prices, to permit our nation to enjoy continued economic progress and a high living standard."

2. "The achievement of relative self-sufficiency through the maximum development and utilization of domestic fuel resources to the extent justified by appropriate economic and national security considerations, supplemented by oil and gas imports as needed."

3. "The maintenance of a safe and healthy environment for both present and future generations."

4. "The attainment of maximum efficiency in the production, distribution and utilization of all forms of energy."

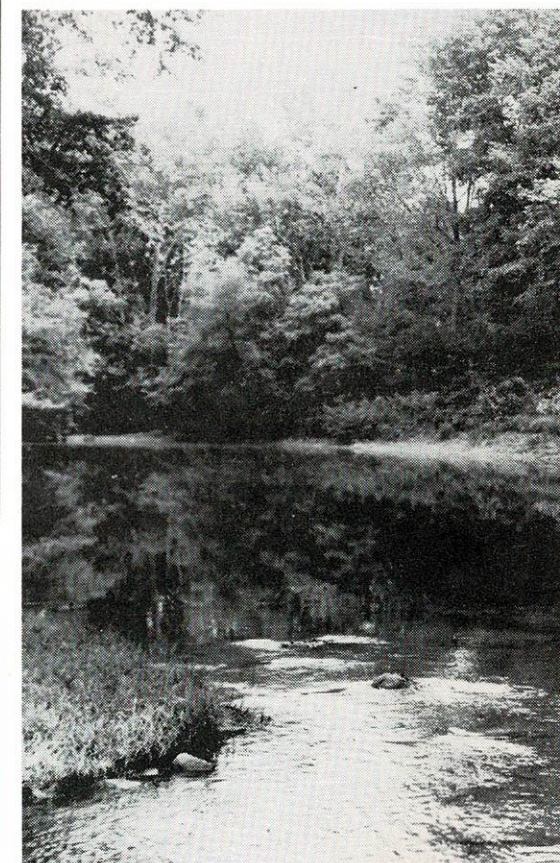
"There is no real conflict between these goals," the presidents said. "By reshaping our energy policies to broaden the energy base, we can provide adequate and secure sources of reasonably-priced energy in harmony with environmental needs."

BELLMON URGES DEVELOPMENT OF U.S. ENERGY SOURCES

Sen. Henry L. Bellmon (R-Okla.) told Congress recently that the nation should adopt "a national energy policy geared to make the country basically self-reliant" instead of continuing "to depress—politically, environmentally and economically—the production of energy from our abundant domestic resources."

Sen. Bellmon introduced a bill (S 1162) proposed as the National Energy Resource Development Act of 1973 that would encourage the development of U.S. natural energy resources "to assure dependable and adequate energy supplies."

The bill would convert the Joint Committee on Atomic Energy to a Joint Committee on Energy, with responsibility and authority for all forms of energy; create the position of under secretary of the Interior for energy; and end the Federal Power Commission's authority to regulate natural gas rates.



About the Association



WORKSHOPS SUCCESSFUL

The workshops held recently by the Department of Natural Resources, the Soil Conservation Districts and the Soil Conservation Service proved to be an overwhelming success. The four meetings held at Fayetteville, Logan, Philippi and Kingwood produced a total attendance of over 300, including approximately 200 representatives of the surface mining industry.

The purpose of the workshops was to acquaint surface miners with the various services available from the Soil Conservation Districts, the fine points of successfully applying for a permit and a review of engineering criteria and dam construction.

Frank Glover, Assistant State Resource Conservationist, described how the Soil Conservation Service can be of assistance in maintaining soil and water control, including consulting, design and construction assistance.

Ben Greene emphasized the importance of the legal advertisement, the DR-4, and the proposal map, containing exactly the same information and for better comprehension, he is requesting that the strike and dip of the coal seam is shown on the drainage map. He also said that future water quality forms should not be sent to Charleston but kept by the operator until the inspector picks them up.

Jim Clevenger, Assistant State Conservation Engineer, for the Soil Conservation Service discussed engineering considerations. A pleasing discovery by those in the attendance was learning that greater than 200 acres of watershed can be handled properly by a settling pond which is no greater than the permissible fifteen feet in height.

J. D. Breckenridge, Chief of the Engineering and Planning Division, discussed dam construction and emphasized the importance of having good compaction and proper slopes to avoid failure.

Everyone involved with setting up the training sessions was more pleased with the turnout as the meeting rooms overflowed at almost every location. This year's success of these programs is a good indication that they will continue in the future.

KING KNOB EMPLOYEE "OUTSTANDING"

Richard H. Everson, an employee in the accounting department of King Knob Coal Company at Philippi, will appear in the 1972 edition of Outstanding Young Men of America.

Now in its eighth year, Outstanding Young Men of America is an annual biographical compilation sponsored by leading men's civic and service organizations. The awards volume features the accomplishments of approximately 8,000 young men of exceptional achievement from throughout the country including service to others, professional excellence, business advancement, charitable activities, and civic and professional recognition. The men selected are between ages of 21 and 35.

Everson is an honor graduate of Philippi High School where he was active in extra curricular activities, including the National Honor Society, Hi-Y, was vice-president of the Student Council, treasurer of the Key Club, to name just a few.

He is a graduate of A-B College, where he was a member of Sigma Delta Nu social fraternity, serving as treasurer, was treasurer of the Management Club, a member of the Circle K Club, and among other activities participated in intra-mural sports.

Young Everson currently is the president of the Philippi Jaycees, member of the Philippi Voluntary Fire Department and the West Virginia Surface Mining and Reclamation Association.



EINSTEIN PROMOTED

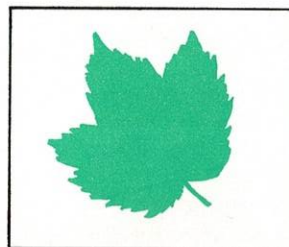
John L. Einstein III has been made President of Advanced Mining Equipment and Services Company of Huntington. He joined the company in 1965 as production manager and was most recently serving as operations manager before his promotion.

POCAHONTAS WINS BEAUTIFICATION AWARD

Pocahontas Fuel Company has been selected as the Business Division winner in a beautification campaign sponsored by the Pocahontas (Virginia) Women's Club. Mrs. Donald Perfin of the Women's Club presented the award to Owen Umbarger, assistant environmental engineer for Pocahontas Fuel Company, a division of Consolidation Coal Company. The award calls attention to the reclamation work Pocahontas Fuel is doing on the old 2,000,000-ton coal refuse pile overlooking the community of Pocahontas, Virginia. This is part of an extensive three-year cleanup program that Pocahontas Fuel is carrying out on its properties in southern West Virginia and southwestern Virginia. It includes the demolition of abandoned mine buildings and preparation plants and the removal of and revegetation of refuse piles.



Owen Umbarger Accepts for Pocahontas Fuel Co.



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WANTED — responsible surface mine operator for excellent Logan and Mingo County property. Deep mine contractors also reply to Box 702, 1033 Quarrier Street, Charleston, West Virginia 25301.

WANTED TO BUY — reclaimed or unreclaimed surface mined land within approximately 50 miles of Charleston. Contact **Green Lands Quarterly**, Box 704, 1033 Quarrier Street, Charleston, West Virginia 25301.

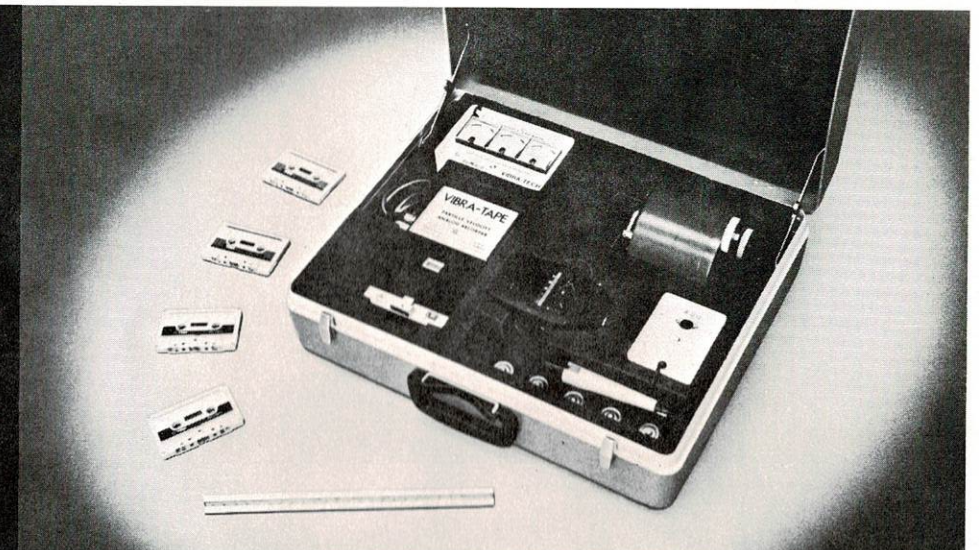
WANTED — person with at least two years actual field experience in surface mine reclamation. College education preferred but not mandatory. Contact **Green Lands Quarterly**.

FOR SUBSCRIPTIONS to Green Lands Magazine please contact Box 704, 1033 Quarrier Street, Charleston, West Virginia 25301.

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recorder for
registration and
control of vibration
effects from blasting
and other heavy
industrial sources.



- Self-contained lightweight suitcase package
- Direct Particle Velocity recording
- Calibration pulse every record to certify equipment accuracy
- Three channels for 3-component vibration information
- Fourth channel -dB air concussion and noise recording*
- Peak meters for immediate results*
- Tape data played back by Vibra-Tech for analysis and report
- Size: 19½" x 7½". Overall weight: 24 lbs.
- Recording time: up to 1 hr. Standard "C" cells

■ **Vibra-Tape®** advantages over conventional blast seismographs — Smaller size and weight — More portable and convenient — Simpler operation — Snap-in cassette loading — Data mailing more convenient and economical — Much longer recording time — Eliminates timing errors and missed blasts — More practical and effective for pile driving and industrial vibration recording — Voice data and/or sound effects recording — More sophisticated record analysis — Tape eliminates exposure risk and inconvenience of film and camera.

*Options — 3-component **BLAST PEAK METER** provides immediate vibration effects and comparison with occupational vibrations for more effective complaint settlement. Air blasts effects recorded on 4th trace in decibels and lbs. per sq. inch thru hand held **SOUND LEVEL METER**.



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