



West Virginia Surface Mining & Reclamation Association's

Green Lands

QUARTERLY
SUMMER 1973



For insurance on surface mining operations, see the specialists!

Specializing in coal mine coverage for more than three-quarters of a century, Flat Top Insurance Agency is proud to help the forward-looking surface mining industry meet ever-growing demands in today's energy crisis. This unique agency is located in the heart of the coal fields and is staffed by experts in every form of protection needed by surface mining operators. Flat Top's skilled professionals provide the precise coverage for all types of surface and deep mining equipment, including dozers, end loaders, drills, coal augers. They're familiar with the

latest requirements for comprehensive coal mine liability, including air and water pollution coverage on an occurrence basis. They know what's necessary to obtain surface mining permits in the different states...like amounts of bonding needed, cash deposits, reclamation requirements, etc. They're experienced in protecting coal processing plants and other structures...in guarding against loss due to business interruption, vehicle damage and liability, and other hazards. What's more, Flat Top has its own Claims Department for loss claims, and experienced engineers to work with you in maintaining sound safety programs. It doesn't cost you a penny more to insure through the people who know the coal industry from the ground down. And it may save you a lot in event of a claim. Flat Top—leader in coal mine insurance. Contact us today.



FLAT TOP INSURANCE AGENCY

Bradmann Bldg., Bluefield, W. Va. 24701
Telephone: 304/327-6111

Other offices: Grundy, Va., Pearisburg, Va., Pikeville, Ky.
"Tops In Coal Mine Insurance"



Published Quarterly
by the West Virginia
Surface Mining and
Reclamation Association,
1033 Quarrier St.,
Charleston, W. Va.

EXECUTIVE DIRECTOR
BEN E. LUSK

BOARD OF DIRECTORS

President
JAMES L. WILKINSON

First Vice-President
C. E. COMPTON

Second Vice-President
JAMES C. JUSTICE

Secretary
F. B. NUTTER, SR.

Treasurer
L. W. HAMILTON, JR.
JOHN C. ANDERSON
JACK R. FAIRCHILD
ALAN A. FISCHER
BERNARD J. FOLIO
TOM L. HORN, JR.
FRANK D. JENNINGS
C. I. JOHNSTON
LONNIE ELLISON
ARCH F. SANDY, JR.
EARL SCHOLL
LAWRENCE STREETS
JOHN K. TURNER
FRANK VIGNEAULT
P. H. WEBER
LEWIS A. DAVISON, JR.

EDITOR
BEN E. LUSK

ASST. EDITOR
DAN GERKIN

West Virginia Surface Mining & Reclamation Association

Green Lands

QUARTERLY

SUMMER 1973

Contents: Summer 1973

Vol. 3/No. 2

Convention Program 3

Technical Report:
Steep Slope Mining. . .A New Concept 4

Photo Essay:
Montana Tours West Virginia 8

Features:
Valley Camp Expands Reclamation Program 10
Industry In The News 15

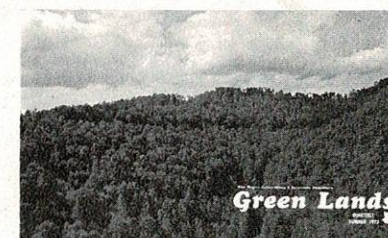
Special Convention Report:
Randolph, Moore Highlight AMC Convention 17

Research Report:
Choosing Topsoil to Fit the Needs 30

Federal Legislation 32
Testimony—Paul Morton 34
Testimony—U. S. Congressman John Slack 38
Testimony—James L. Wilkinson 42

Photo Essay:
Jim Wilkinson, 1966-1973 40

A Tribute To The President 44



About The Cover


Our cover picture graphically depicts the benefits of a new steep slope, contour surface mining method that has been developed by Hobet Mining and Construction Company. By utilizing controlled blasting and maintaining the material on the bench, the tree line is undisturbed and the highwall completely hidden from view.

HE HAS TO BE RIGHT TOO!

Before he offers you a dotted line to sign, our salesman has to be sure the machine he is furnishing will do what you expect of it. That every detail squares with his in-depth knowledge of applications, financing, and his in-the-field experience. He knows that his reputation and that of his company is at stake with each delivery. You can deal confidently with your Walker man, he wants to gain customers as well as sales.



CHARLESTON, W. VA. 304/949-4441
PARKERSBURG, W. VA. 304/485-4547
BECKLEY, W. VA. 304/253-2706

Caterpillar, Cat and  are Trademarks of Caterpillar Tractor Co.



PROGRAM

ANNUAL MEETING

June 14-17, 1973

Greenbrier Hotel

White Sulphur Springs, West Virginia

Thursday, June 14th

2:00 — 5:00 P.M.

Registration Registration Lobby

2:00 — 4:00 P.M.

Special Committee Meetings
 (At discretion of committee chairmen)

4:00 — 5:00 P.M.

Board of Directors' Meeting Chessie Room
 6:30 P.M.

Associate Cocktail Party and

Welcoming Dinner Golf & Tennis Club

Friday, June 15th

8:00 — 11:00 A.M.

Registration Registration Lobby

8:30 — 9:00 A.M.

Meeting of Associate Members Governor's Hall
 Meeting of General

Members Mountaineer Room

9:00 — 10:00 A.M.

Membership Business Meeting Governor's Hall
 10:00 — 10:30 A.M.

Meeting of New

Board of Directors Governor's Hall
 11:00 A.M. — 5:00 P.M.

Annual Tennis Tournament

1:00 — 5:00 P.M.

Women's Bridge Tournament Director's Room
 3:00 — 5:00 P.M.

Associate Committee Meetings

(At discretion of chairman)

5:00 — 6:00 P.M.

Registration Registration Lobby
 7:00 P.M.

New Orleans'

Mardi Gras Kate's Mountain Lodge
 (Event optional and only those who attend will be charged \$17.50 per person. Informal dress. Transportation will be provided in front of the Hotel from 6:30 to 7:30)

Saturday, June 16th

8:30 — 11:00 A.M.

Registration Registration Lobby
 8:30 — 10:00 A.M.

Technical Session Fillmore Room
 10:00 A.M.

Annual Golf Tournament
 (Fil Frasher, Tournament Director)

2:00 P.M.

Women's Swimming

6:30 — 7:30 P.M.

Cocktails Chesapeake Terrace
 7:30 — 9:00 P.M.

Banquet Chesapeake Hall
 (Formal dress optional)

Invocation — J. M. Poindexter

Toastmaster — Tom L. Horn, Jr.

Recognition of New Officers

State of Association Message

James L. Wilkinson, President

Presentation of Special Awards

Closing Remarks



WVSMRA Convention

New officers for the fiscal year 1973-74 will be elected at the Annual Meeting of the West Virginia Surface Mining and Reclamation Association at the Greenbrier Hotel. The convention promises to produce the largest turnout ever.

Officers during the past hectic year have been: James L. Wilkinson, President; C. E. Compton, First Vice-President; James C. Justice, Second Vice-President; F. B. Nutter, Sr., Secretary; L. W. Hamilton, Jr., Treasurer; and Tom L. Horn, Jr., Chairman, Associate Division.

Members of the Board of Directors whose terms expire are: Lonnie Ellison, Arch F. Sandy, Jr., Bernard J. Folio, James L. Wilkinson, F. B. Nutter, Sr. and James C. Justice.

This year's Greenbrier meeting is expected to break all attendance records, drawing nearly 250 surface miners and related industry representatives and their guests. The program has been designed to mix just the right amount of business meetings and recreational activities.

Registration begins at 2:00 P.M. Thursday, June 14th, in the lower lobby, followed by committee meetings and the Board of Directors' meeting in the late afternoon. The Associate Cocktail Party and welcoming dinner will be held at 6:30 P.M. at the Golf and Tennis Club.

The annual membership meetings with election of new officers will get things underway Friday morning, followed by a meeting of the new Board. The Tennis and Bridge Tournaments will be held in the afternoon. After last year's success, Kates Mountain Lodge is on the program again. This year it's a New Orleans Mardi Gras with music provided by Pittsburgh's Benny Benack, one of the nation's leading jazz and Dixie Land bands.

A technical session on Saturday morning will be followed by the annual golf tournament and swimming party in the afternoon. The banquet starts at 7:00 P.M., with Tom Horn serving as Toastmaster, followed by the State of the Association message by Jim Wilkinson and the presentation of special awards.

The Program Committee which has worked long and hard to make this convention a success includes: Jim Wilkinson, Lawson Hamilton, Duane Snyder, Fil Frasher, Gil Frederick and Ben Lusk.



This dramatic picture shows the real benefits of this new steep slope mining method. By utilizing controlled blasting and maintaining the material on the bench, the tree line is undisturbed and the highwall completely hidden from view.

Steep Slope Mining... A New Concept

A new surface mining method is being successfully conducted by a coal company in mountainous southern West Virginia.

Developed by F. B. Nutter, Sr., and his son, Fil, Jr., of Hobet Mining and Construction Company, the technique is a modified block cut or "put and take" method of mining. The basic idea is not actually new, as it has been used successfully in the rolling hills of Pennsylvania, but Hobet is unique in that it is operating on 65% slopes and above.

The 130 acre permit is located on Trace Fork in the rugged mountains of Mingo County and has been in operation since January, 1973. The job is overseen by Area General Superintendent Jim Mooney and on-site by Foreman Darell Burkhamer.

It is highlighted by the almost total elimination of the outer spoil bank and highwall. The actual mining method consists of hauling the overburden from the pit area in two 35-ton off-road dump trucks and backfilling the material in the pit behind the auger operation.

Why change from the conventional contour mining techniques? Fil Nutter, Jr. cited two main reasons.

"Changing attitudes by the Reclamation Division on steep slope reclamation was a big factor," he said. "Our permit area was in excess of 65% and we felt in order to mine the coal to everyone's satisfaction, we had to develop a new system. We felt this was the only solution on these steep slopes."

After nearly five months of operation, according to Nutter, the advantages of the haul-back method are many.

"We have reduced our bonded and affected acreage by 25 to 35%, we have reduced the size of our drainage system and number of silt ponds because all the water is controlled on the bench, and controlled blasting allows us to keep 100% of the overburden material on the bench," Nutter said.

He also noted that revegetation costs have been cut and it is easier to keep the seeding current with the operation because of easy accessibility for the hydro-seeder. Reclamation costs are also lowered because the material is handled only once, whereas conventional contour mining requires moving part of the material two or three times.

With all these cost reducing factors, one might wonder why a company would chose any method but this one, but young Nutter explained it in one short sentence.

"When we first started this operation we projected our total increased cost to be around 30 to 40%." He explained that the reason for the increase in costs is due to the additional equipment and labor required for the haul-back process, along with the complicated and time consuming methods of drilling and blasting used to maintain control of the material. This has been partially justified by an increased market price for the coal, but Nutter also believes that the "personal peace of mind" provided by this method is worth the money.

"It's important to any operator to be able to leave the job and not to worry about a slide, or water problems, or being shutdown by the DNR," he said. "Since we started in January, we have had no problems and received no violations from the Reclamation Division at this job."

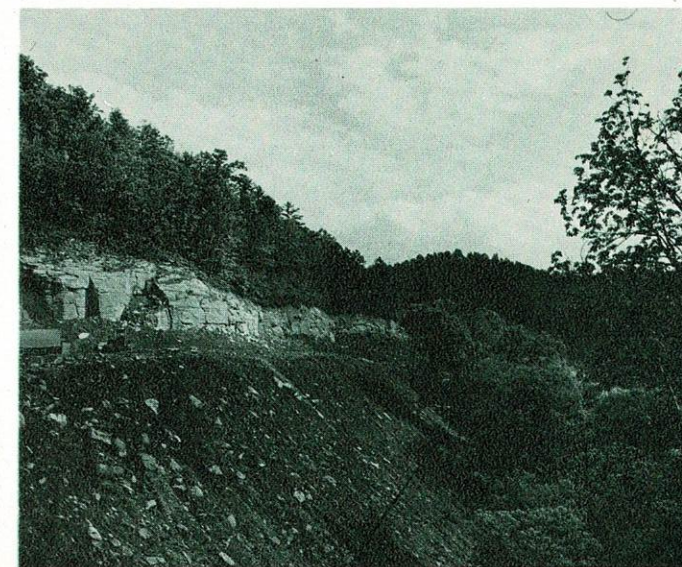
Reclamation Chief Ben Greene recently inspected the Mingo County operation and came away very enthusiastic.

"As far as we're concerned it's the way of the future if we are to continue contour surface mining," he said. "The environmental effects are very minimal and can be totally controlled by this mining method."

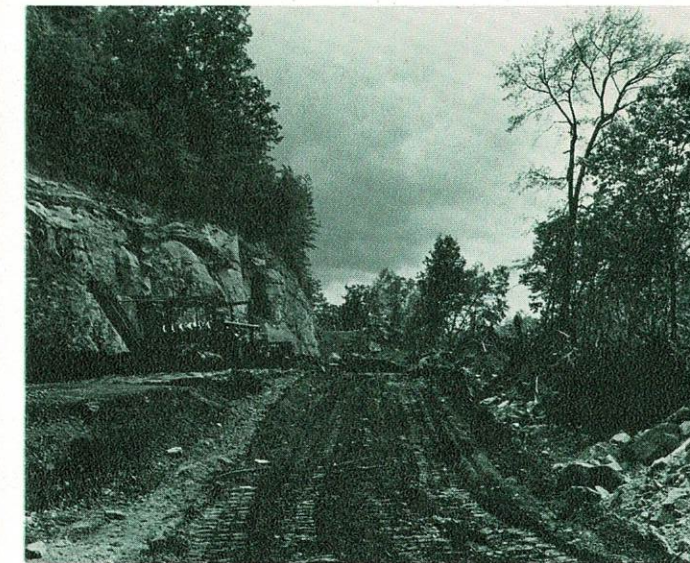
He noted two big advantages being that an operator is able to mine slopes in excess of what is lawful under the conventional methods and that the bond release procedures are greatly simplified.

He pointed out that by not creating an outer spoil bank costs for bond, special reclamation tax, drainage, and reclamation would all be reduced significantly.

The operation is producing 1,500 tons of high grade (12,200 BTU) low sulphur (0.07%) steam coal per day which is being sold to a power generating facility near Charleston. The company is removing approximately 55 ft. of overburden to get at the Coalberg seam which lies in four splits.



This picture shows the graphic difference between the old and the new methods of mining. On the old permit at the left, the overburden was placed over the side, but on the right the material was maintained on the bench and the highwall almost completely backfilled. Bonding and special reclamation costs are reduced significantly on the right because less area is disturbed.



Before backfilling begins the seam is being augered in order to recover as much of the coal as possible. After augering is finished, overburden is hauled from the pit area and backfilled against the highwall to within about eight feet of the top. Notice that the tree line is unbroken on the left and no material has been pushed over the out slope.



At the left, a 35 ton dump truck deposits fill material near the top of what used to be a 55 ft. highwall. It is the use of these trucks and intricate controlled blasting techniques that may increase total mining costs to as much as 40%. With the highwall almost completely backfilled, it is easy to see that the possibility of a slide is almost nonexistent. The haul road on the left is easily maintained throughout the operation. Beyond the tree line the slope drops at an angle 65%

Nutter (continued)

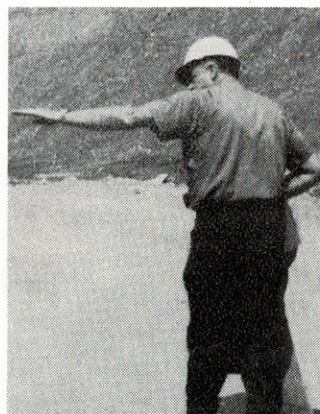
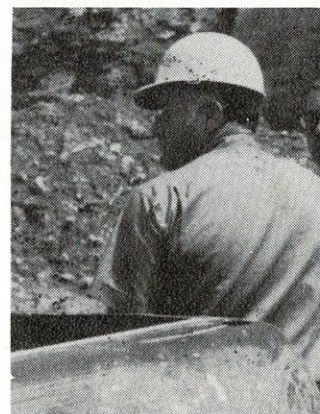
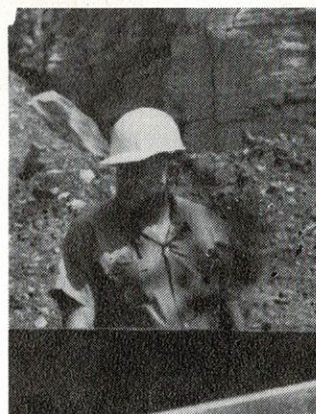
Although the increased costs have been significant on this Mingo County site, Hobet is now in the process of converting three other operations to this method.

"Right now it is really difficult to say what our total increased costs will be when the job is finished," he said. "We can only make projections. But one thing I do know is that part of our high costs on this job have been due to the fact that we have spent a lot of time actually developing and perfecting this method — testing various shot patterns, and finding the best times to run certain equipment to maintain efficiency and many others."

He said they'll be able to come up with more accurate cost figures on the next job, and he is sure the costs will be less.

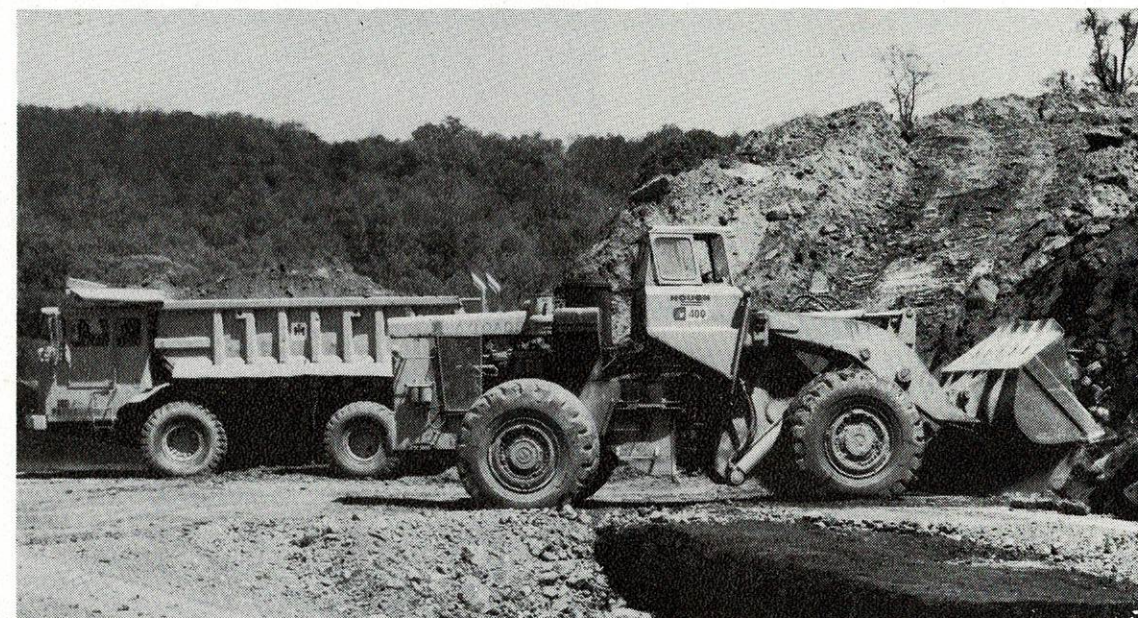
As for other companies interested in this method of operation Nutter explained that it all depends on the economics, which include the coal to overburden ratio, the type of overburden material, the haul distance, whether hauling on or off a highway and the price of the coal.

"Any company that would want to try this is going to have to compare all the economic factors of each individual site and decide if his operating structure will allow him to surface mine coal by this method," he said. "If the conditions are right, we can do just about anything."



Fil Nutter — Man with the Plan

THE MACHINES THAT KNOW COAL ALSO KNOW RECLAMATION



See Us For Your Production Reclamation Machines

Rish EQUIPMENT COMPANY

INTERNATIONAL CONSTRUCTION EQUIPMENT

Rt. 35
ST. ALBANS, W. VA.

Rt. 50 at Bridgeport
CLARKSBURG, W. VA.

Airport Road Near U.S. 52
BLUEFIELD, W. VA.

State Route 14
PARKERSBURG, W. VA.

South on U.S. 220 at Pinto
CUMBERLAND, MD.

MONTANA TOURS WEST VIRGINIA

Earlier this year the Montana Legislature passed an extensive surface mining and reclamation law, so government officials decided to tour other states to see how their respective laws worked. Their one-day tour swept through northern West Virginia on April 6th, where they were accompanied by representatives from the Department of Natural Resources, the Environmental Protection Agency and the West Virginia Surface Mining and Reclamation Association.



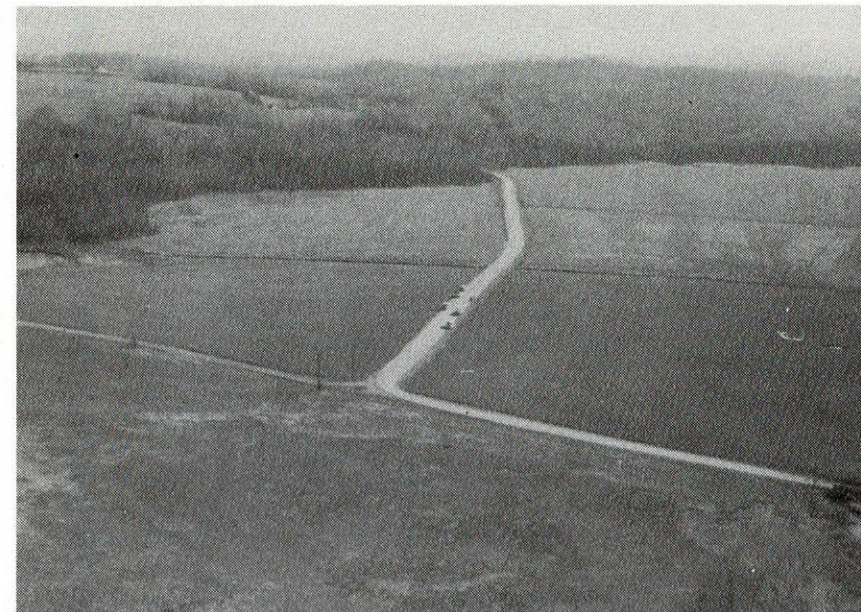
(Above) Arch Rose, project superintendent for Appalachian Coal Company, discusses his reclamation work on a site near Valley Point in Preston County. About 15 state and federal agency representatives accompanied the Montana dignitaries.



(Top Left) The Montana delegation enjoying a light moment before a helicopter tour of several surface mine operations. From the left: E. W. Christiansen, Lt. Governor; Mrs. Ted Schwinden; John Goers, Director, Division of Reclamation; and Ted Schwinden, Commissioner, Department of State Lands.

(Middle Left) Once in the air, the group toured several mining sites, but of particular interest to the Montana people was this Special Reclamation project near Bruceton Mills.

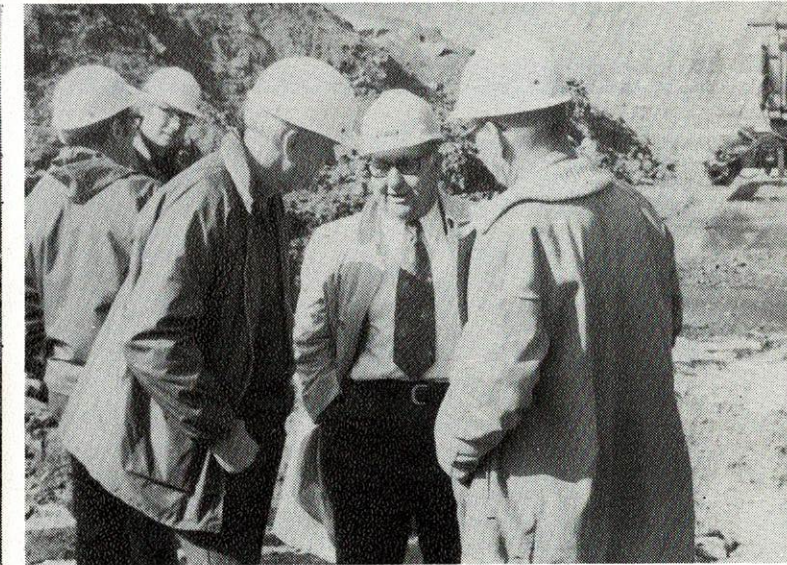
(Bottom Left) This stop at King Knob Coal Company's operations in Monongalia County produced an excellent look at drainage systems required by the Department of Natural Resources. Lt. Governor Christiansen showed little interest though noting that most of Montana receives only 8 to 10 inches of rain per year.



(Left) Flying back to the waiting cars, the group saw this most impressive view of Appalachian Coal's reclamation progress. Everything back to the tree line has been mined and reclaimed, by the area method, during the last several years.

(Below Left) Another stop in Monongalia County took the group to this site belonging to Dippel & Dippel Coal Company, which is the oldest operating surface mining company in the county. Bulldozers were in the process of grading the highwall back to contour.

(Below) Christiansen and his companions were very interested in auger mining, as they have seen none in their home state. King Knob President Chuck Brown explained the fine points as an auger operated in the background.





In July, 1972, an interagency evaluation of surface mine reclamation by the Department of Natural Resources and various other state and federal groups visited Valley Camp for a look at their water treatment structures. Here the group is inspecting a large pond located near their operation at Shrewsbury, West Virginia.

Valley Camp Expands Reclamation Program

With surface mining rules and regulations seemingly changing every day, it has been a challenge for many companies to stay ahead of the game. Valley Camp Coal Company has accepted that challenge.

Valley Camp has been one of the leading companies

in West Virginia since beginning operation in the early 1900's. With operations in Kanawha, Marshall and Ohio counties, the company produced 4.1 million tons of coal in 1972, which made it the 7th largest coal producer in the Mountain State.

The company produced underground coal exclusively, until the early 1960's, when they began contracting some of their surface mine deposits. In 1968, they decided to get into surface mining themselves and opened several mines on Kelley's and Witcher Creek in Kanawha County.

Valley Camp President Donald C. Howe explained why his company got into surface mining.

"We were in the same situation as many other companies," he said. "Our higher quality underground coal has all been mined, so we need something to blend with the lower quality product we are now producing. The good coal we have in surface reserves affords us this blending agent."

Valley Camp realizes that reclamation is the name of the game, and they are going at it 100%. They recently hired Bruce Kranz, a graduate biologist from Ohio State University, to assist surface mine superintendent Zeb Pendergrass and chief engineer Ed Simmons in their reclamation work.

On the job only six months, Kranz has already made great progress.

"My program is to organize for wide scale application the latest and most effective reclamation techniques," he said. "I am also going to get into some experimental plantings of grass-legume combinations and trees."

Kranz noted that he is working closely with Bill Plass of the U. S. Forest Service, who has established a large experimental plot on Valley Camp property.

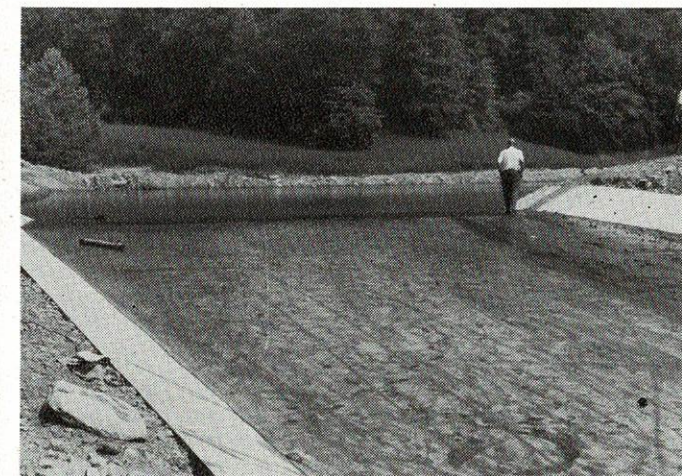
"We are trying different seasonal seed mixtures for spring, summer and fall and have begun a large scale tree planting program centered around the hybrid poplar. We hope to put in about 10,000 by winter," he said.

Plass is experimenting with a plant called crambe, which produces an oil that is valuable in the production of plastics and for use in mold preparation of castings. He thinks it could be a valuable crop for reclaimed surface mines and noted that Union Carbide has shown an interest in the development of the product.

According to Kranz, Valley Camp is also involved in a managed timber cutting program which includes about 1,000,000 board feet per year of saw timber and mine post cutting of smaller timber which was previously useless.

Howe is enthusiastic about Kranz's progress.

"I instigated many of the programs and Bruce has taken good initiative in following them up," he said. "He has talked to a lot of people and done a lot of good for us."



Located on Kelley's Creek near Cedar Grove in Kanawha County is one of 14 silt ponds constructed by Valley Camp with a concrete spillway. These long lasting structures have proven to be more efficient than "rip rap" spillways.



Valley Camp is top soiling all of its surface mine operations. On this job near Witcher Creek a bulldozer is working to put the good material back on the top. This method of regrading has greatly improved the revegetation program and helped the company win a reclamation award from the West Virginia Surface Mining and Reclamation Association.



Bruce Kranz, (left): biologist for Valley Camp, inspects revegetation with superintendent Zeb Pendergrass. Kranz is working closely with the U. S. Forest Service who has established several experimental plots on Valley Camp property. He is also experimenting with hybrid poplar, and several grasses and legumes.

Valley Camp (continued)

Most of the company's surface mining has been done in the upper 5 Block coal seam, which has caused some acid problems in the past. For this reason they have become very much concerned with water control and top soiling in the backfill operation.

On an inter-agency evaluation tour of surface mine reclamation conducted by the Department of Natural Resources and various federal groups last July, Valley Camp was commended by the group for its excellent progress in these two important areas. And at the Annual Awards Banquet of the West Virginia Surface Mining and Reclamation Association in January, 1973, the company was cited for its "excellent control of all water entering and exiting the operations and the use of top soiling in the reclamation process."

The drainage system that helped the company win an award last year is most impressive. Of the 17 silt ponds that they have built in Kanawha County, 14 have been constructed with efficient, long lasting concrete spillways. They have cost the company between \$4,000 to \$10,000 each, depending on the size and they are used to treat water from the six deep mines in the area as well as the surface mines.



On a recent inspection tour Reclamation Chief Ben Greene talked things over with superintendent Zeb Pendergrass, who is in charge of the surface operations. Valley Camp has been doing their own surface mining since 1968.



The benefits of top soiling are evident on this 130 acre reclamation site that was mined in 1971 and 1972.

The area was regraded, topsoiled and reseeded in the fall of 1972.



**Marketing Specialists
for the Mining Industry**

**SELECT FROM ONE OF THE WORLD'S LARGEST INVENTORIES OF USED AND
REMANUFACTURED UNDERGROUND MINING EQUIPMENT**

EXCLUSIVE SALES AGENTS REPRESENTING:

ELKHORN INDUSTRIAL PRODUCTS CORP.—

Battery powered scoops, tractors, and personnel carriers.

WILCOX MANUFACTURING CO.—

Mark 20 continuous miners, conveyor systems, roof bolters.

VORTEX AIR CORP.—

Dust control equipment.

**FAIRCHILD EQUIPMENT
& SUPPLY COMPANY**

Phone 304-252-7321

19-21 BY-PASS — P. O. BOX 1184 — BECKLEY, WEST VIRGINIA



WE COME TO THE MOUNTAIN

Whether your equipment is located on a mountain, in a forest, or on the prairie, we have the completely outfitted service trucks and technicians to give you fast, expert, on-the-job service. Down time costs you money. We know when you want service, you want it fast and at the job site — call us.

Cummins Engines of West Virginia, Inc.

CHARLESTON
CLARKSBURG

304-342-7178
304-622-1688

Industry in the News

EPA WOULD REVOKE PART OF SULFUR STANDARDS

The Environmental Protection Agency recently moved to cut some dead wood out of its air quality standards limiting emissions of sulfur oxides. EPA proposed to revoke the secondary annual-emission standard that it set to protect vegetation but which is apparently serving no purpose.

EPA said "new scientific data suggest" that it is not annual exposure to sulfur oxides that damages vegetation but high short-term concentrations.

Therefore, EPA would drop the existing secondary annual standard limiting sulfur oxides emissions to an average of 60 micrograms per cubic meter of air (0.02 part per million), but retain the secondary three-hour standard of 1,300 micrograms per cubic meter (0.5 ppm), which is not to be exceeded more than once a year. It also stressed that the primary sulfur oxides standard, to protect health, would remain in effect.

HENRY FORD ON ENERGY

One of Henry Ford's most striking characteristics is his willingness to speak publicly on almost any important issue. In a recent series of interviews with FORTUNE, he expressed his opinions on a wide range of subjects.

THE ENERGY CRISIS: "I'm more worried about it than any other problem. I'm not worried about gasoline for automobiles, but the whole infrastructure of the U.S. We've got to heat our homes, run our plants to employ people. People want air conditioning and a lot of other things that they're used to, and I don't see the power system of this country meeting the needs.

"What with the environmentalists crapping all over any suggestion before it's even tried—a fellow can't build a power plant that's not going to do something to somebody somewhere. If it goes on, we're going to have plant closedowns. There are lots of plants that are in trouble right now. In Ohio there isn't any more natural gas and you can't increase the size of a plant.

"I hope to hell New York goes dark for a week, then maybe something will happen.

NCA URGES EXTRA \$60 MILLION FOR COAL RESEARCH

NCA has urged Congress to vote an extra \$60 million "at the very minimum" for coal research to meet the nation's energy needs.

Joseph P. Brennan, NCA vice-president for economics and planning, said the coal industry is not sure \$60 million would be enough to add to the \$120 million which President Nixon has proposed for coal research in the next fiscal year. Some senators have proposed spending as much as \$2 billion a year on energy research, most of it on coal, and Mr. Brennan said "it may well be" that such amounts "will be more in keeping with the national welfare."

In testimony to both Senate and House Appropriations subcommittees, Mr. Brennan urged an additional \$24 million for research to produce synthetic petroleum from coal, \$12 million to speed research on converting coal to synthetic gas, \$12 million on advanced systems of gathering electric power, and \$12 million for research to develop safer, healthier and more efficient underground mining methods. The funds would go to the Office of Coal Research and the Bureau of Mines, both in the Department of the Interior.

EUROPE WARNED OF ENERGY CRISIS BY 1980

A committee of the European Parliament this week warned of an energy crisis by 1980 in which "quite literally the lights would go out over Europe" unless Common Market countries agreed on a comprehensive energy policy.

The committee report, which called for more active exploitation of existing energy sources and more research into new sources, predicted a growing role for coal in the future. In the long run, coal is "the only reliable and adequate source" of energy, the report to the Common Market assembly in Strasbourg, France, said.

The report urged that the European community seek an "amicable compromise" with the United States to prevent a political struggle for energy sources.

NELSON APPOINTED UMWA LOBBYIST

Robert R. Nelson, a West Virginia state senator, has been named director of Labor's Nonpartisan League, political arm of the United Mine Workers, a union spokesman said recently. He was appointed by UMW President Arnold Miller to replace James Kmetz, who resigned.

MOSS SCORES LEISURELY PACE OF COAL GASIFICATION

Sen. Frank E. Moss (D-Utah) said recently that the President's energy message reflected "a budget of token increases for coal research" that does not seem to promise "gasifying of coal at the stepped up rate which we need."

Sen. Moss said in a Senate speech that the President failed "to ignite the fire of concern of the American public" over energy problems. To gasify coal and bring other new energy sources into use "requires money, brains and a country willing to share an awareness of the problem and the risk of the cost," Sen. Moss said.

He referred to one estimate that it would be the end of this decade before an operating commercial coal gasification plant would be realized. "Do we really need seven years to get with it?" he asked.

Experts have pointed out that the main developmental problem in coal gasification is to get the gas price down to about 75 or even 60 cents per million Btu, which would require "heavy development," Sen. Moss said. He added that he saw no administrative efforts that could qualify as heavy development.

INCREASING COAL COST IS FACTOR IN LAWSUIT

The Ohio Power Company has been named defendant in an \$8.5 million breach of contract suit by Consolidation Coal, Inc. of Pittsburgh, Pa.

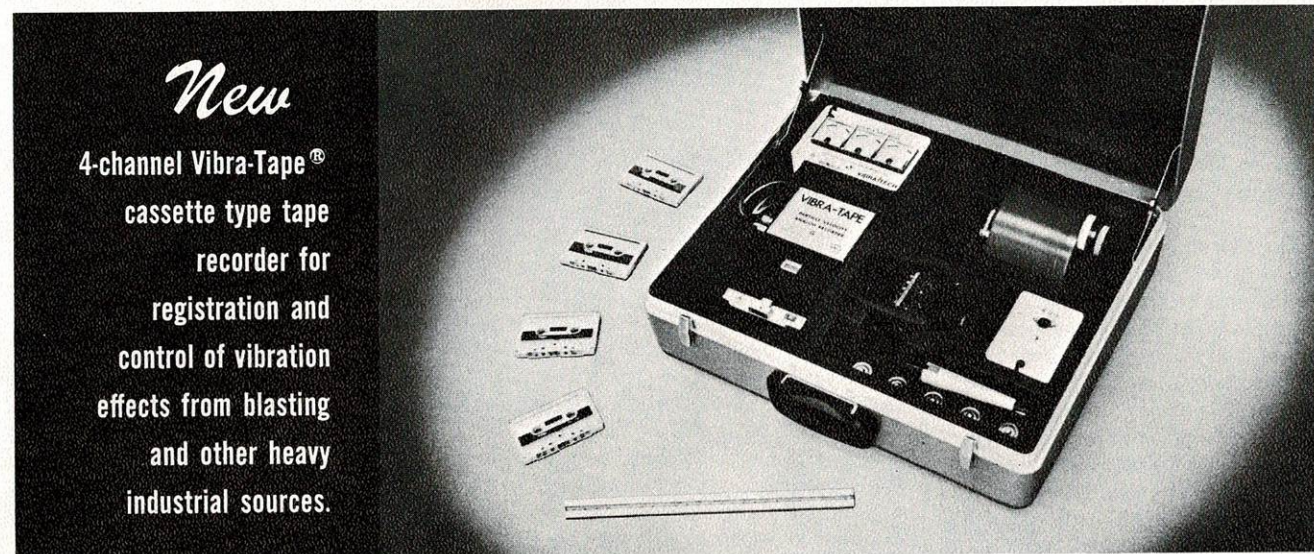
In the action filed in U.S. District Court in Huntington, Consolidation seeks payment of the amount to cover the increase in cost of coal and coal deliveries to Ohio Power since enactment of the 1969 Federal Coal Mine Health and Safety Act.

Consolidation claims a contract entered into by the two firms in 1957 provides price adjustments to compensate for cost changes resulting from the revision of existing regulations or passage of new coal regulations.

The plaintiff contends it has computed the extra cost to be paid for coal furnished to the Kammer Power Plant in Marshall County and billed Ohio Power, but the defendant has refused to make any of the payments.



if you can pick up a suitcase... you can carry blast protection with **VIBRA-TAPE®**



- 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**.



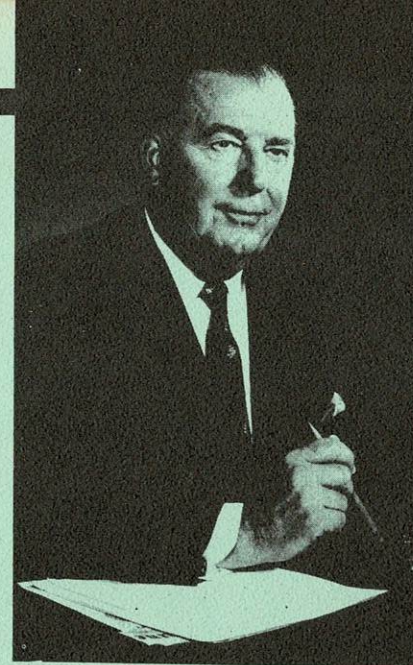
ASSOCIATES INCORPORATED

9600 Perry Highway — Pittsburgh, Pa. 15237 (412) 366-2773
Attention: Gordon C. French

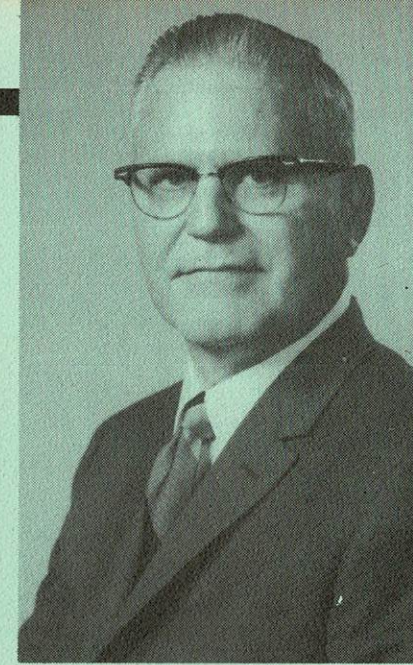
P. O. Box 348 — Montgomery, W. Va. — (304) 442-2077
Attention: Michael Rosenthal

Other Offices: Hazleton, Harrisburg & Philadelphia, Pa.
Washington, DC; Poughkeepsie, N.Y.; Atlanta, Ga.

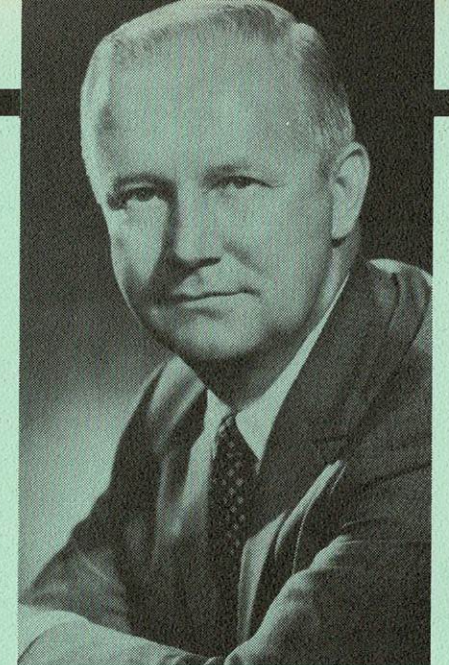
for details contact



U. S. Senator Jennings Randolph



AMC President Allen Overton



W. Va. Governor Arch Moore

Record Attendance

Randolph, Moore Highlight AMC Coal Convention

The largest gathering of coal industry representatives in history met in Pittsburgh last month for the annual coal convention of the American Mining Congress.

Nearly 3,500 coal men and their guests flocked to the Steel City for discussions centering around the theme, "Energy and America's Future."

The opening session was highlighted by keynote speaker Senator Jennings Randolph of West Virginia, who moderated a four-member panel discussing the need for a national energy policy. Randolph criticized the administration's recent energy message, charging it failed to stress the need for more research to develop a commercial process for turning coal into liquid and gaseous forms of energy. He also warned against the U.S. becoming too dependent on foreign energy sources.

"We must explore in depth what can be done to produce coal for augmentation of our domestic energy supplies through the manufacture of synthetic gas and also through liquefaction," Randolph said.

"It is time coal, steel and electric

utilities and gas pipeliners and gas marketers place their joint expertise on the line and produce revolutionary new domestic energy supplies and sources," he said.

Many of the conventioners who had come to hear Charles DiBona, special consultant to President Nixon, were surprised by the announcement of a major reorganization within the U.S. Department of the Interior. Stephen A. Wakefield, assistant secretary for Energy and Minerals told delegates of the new set-up, which produced a favorable response from both J. Allen Overton, Jr., executive vice-president of AMC and Carl Bagge, president of the National Coal Association.

At a Tuesday Luncheon, another West Virginia dignitary, Governor Arch A. Moore, Jr., discussed surface mining in his state and across the nation. He told an overflow crowd that coal cannot be placed at a disadvantage in the market place at a time when the nation is facing a serious energy crisis. He suggested a "crash program on two salient" fronts to save the industry.

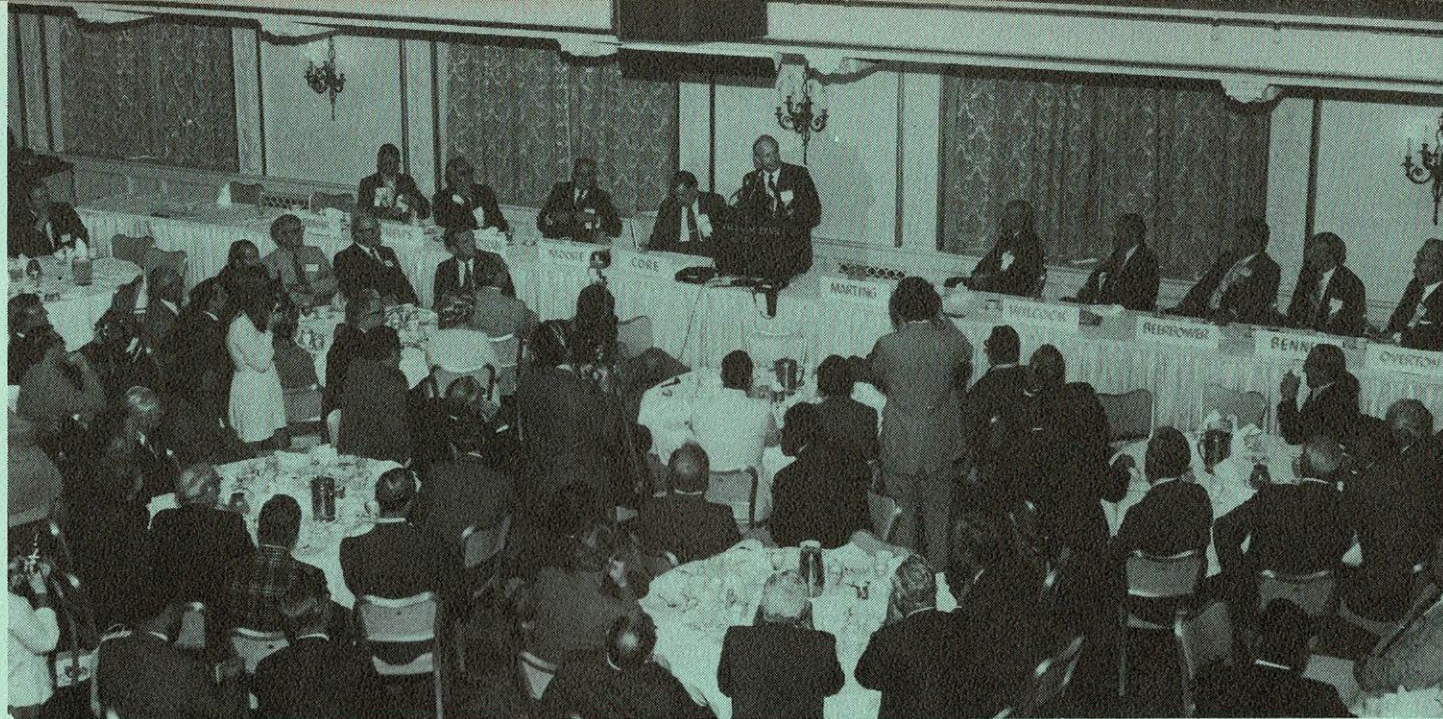
"I believe it is long past the due time when we should be exerting

all scientific and technical talent to the problem of making the consumption of high sulphur coal compatible with our environmental needs," he said. "Coal or other energy sources cannot be continually placed at a disadvantage in the nation's market place by over regulation to the point where economic disaster would plague us."

The Governor said that for sometime ecological concerns and the economic welfare of the nation have been on a collision course and charged, "The paralyzing hostility of certain environmental groups has been a contributory cause to our present-day crisis."

He suggested it is time to "strike an intellectual balance between our regulational ideals — that could result in full economic and industrial collapse — and our ecological ideals."

Provided in this year's program were expanded sessions on surface mining, health and safety and environmental controls, to provide delegates with maximum information on advanced technology and environmental protection.



The Coal Division Luncheon on Tuesday was highlighted by an address by West Virginia Governor Arch A. Moore, Jr., who told the crowd that the rhetoric of the environmental movement must be replaced by common sense if the nation is to survive its current fuel crisis.

Gov. Arch A. Moore

"Coal Remains Our Strongest Hope"

As you can well imagine, my interest in the health and future of coal, as it affects both the coal miner and the operator, is more than a passing one.

It is a constant concern of mine, as governor of West Virginia, because coal is our bedrock industry.

The mining of coal is not only of vital importance to my state, but to the nation's economy as well.

Because of my deep respect for all parties, and its affect upon the state of West Virginia. . .

. . . I was pleased to respond to the request of both parties in mediating the coal contract dispute in the fall of 1971.

I felt that it was imperative that we act for the best interests of my state and the nation. . .

And that is what motivated our efforts in helping to forge a new contract.

I must hasten to add, however, that my concern for the well-being of coal extends well beyond that particular incident.

This interest has been honed to an even sharper degree by the energy crisis that besets our nation today.

Energy is the life and breath of our nation. Without energy, all other industrial resources are useless.

Since World War Two, the American appetite for energy has been insatiable.

Our demands for energy, in only 20 years, have doubled.

With only 6 percent of the world's population, the United States, nonetheless, is the biggest user of energy. . .

. . . And our entire way of life is built around it.

We have in excess of 150 million motor vehicles. . .

. . . 70 million homes. . .

. . . We own more electrical appliances than all other nations combined.

Yet, our present-day demands for energy are only about 60 percent of what they will be in just 12 years.

If, today, we are in the throes of a full-blown energy crisis — what of the future?

Our newest energy crisis is in gasoline.

In 21 states, natural gas is often denied new customers — and even existing contracts often can't be honored.

Our electric reserves are so thin that brown-outs would have been frequent the past two years in our larger cities — except for cool summers and mild winters.

Petroleum reserves are at an all-time low.

We import 25 percent of today's need. . .

. . . And by 1985, the prospects are that we will have to import 60 percent of our needs.

Our coal reserves are ample: But, confusion over federal mining and environmental regulations have brought coal, our main source of energy, to a virtual standstill.

As a matter of fact, we may be retrogressing.

The shortage of energy to keep our nation industrially and economically healthy is a serious one.

It is estimated that nuclear power now supplying one percent of our energy. . .

. . . May supply 16 percent by 1985.

Coal today supplies 17 percent of our nation's energy needs. . .

. . . And is expected to remain at this level through 1985.

Depletion of our natural gas reserves will cause a four percent drop in natural gas production by the year 1985.

Today, we depend upon gas for 33 percent of our energy needs.

Energy from geo-thermal power, and from shale deposits of the far-western states, is proceeding too slowly to be of any immediate consideration.

Solar energy and energy from hydrogen fission are not expected to add to energy sources until into the next century.

The U.S. Geological Survey estimates that we have coal reserves to last fifteen-hundred years.

Our natural gas supply, on the other hand, is ample for three-hundred years. . .

. . . If drilling is extended to the outer continental shelf along the east coast and the Gulf of Mexico. . .

. . . And if deep wells inland, and the Alaskan fields, produce as expected.

But the fact remains. . .

. . . We may have awakened too late, and delayed counter-action to the energy crisis for too long.

The cost of developing resources to meet our energy demands in the next few years is almost staggering.

Deep well drilling and research for nuclear hydrogen, or thermal power, is tremendously expensive.

As you gentlemen well know, it costs about \$400 million to bring a single coal gasification plant on-line.

That is why I urge that the highest priority possible be given by industry by the states and by the nation. . .

. . . To expand development and utilization of our nation's coal reserves.

Technological research is expensive, but it is mandatory now, if we are to save ourselves from possible chaos.

In the recent past, we have had a series of decisions against coal as our primary energy source.

Each decision against coal increases petroleum or gas consumption.

It also compromises our nation's self-sufficiency by upsetting the balance of world trade —

— And all the while increasing the cost of the energy we use.

Four months before the president delivered his energy message to Congress, I had asked the Environmental Protection Agency for a two-year extension — to 1977 — for West Virginia to meet the Air Pollution Control Standards of the Federal Clean Air Act. . .

. . . Which we ourselves set in good faith.

E-P-A's decision, by the way, is still pending.

I thought my request to defer such pollution controls — until technology had pulled abreast of environmental regulations — was a judicious one.

I could not, in good conscience, stand idly by and permit — by my inaction — loss of job after job. . .

. . . The threatening of West Virginia's economy. . .

. . . And the closing of mine after mine.

Because of standards which had been prescribed to solve a problem for which technically feasible answers have yet to be found.

Following my request to the E-P-A, the president himself gave support to my action.

In his message to the congress, the president stated that strict enforcement of both primary and secondary clean air standards, by 1975, would result in the loss of one-hundred and fifty-five millions of tons of coal per year. . .

. . . Nearly 20 percent of our production. . .

And would threaten the loss of an estimated twenty-six thousand coal mining jobs.

As you know, the president urged that, during the current period of shortages of low sulphur coal —

—The states should not require the burning of such fuels except where necessary to meet the primary standards for the protection of health.

I firmly believe, and I support, the president's policy in this regard.

Incidentally, I take strong objection to other aspects of that energy message.

I fought too long and too hard in the Congress for a balanced energy program to permit it to be so easily dismantled.

For several years now, our economic welfare, and ecological concerns, have been on a direct collision course.

The paralyzing hostility of certain environmental groups has been a contributory cause to our present-day crisis.

It is ironic, indeed, that the very same environmental concerns that have decreased the availability of energy. . .

. . . Have been greatly responsible for the increased need for it.

For example — power is needed to re-cycle sewage and solid wastes. . .

. . . To rid our streams of pollution. . .

. . . To gasify coal. . .

. . . To eliminate the lead pollutants from gasoline would raise our power consumption by fifteen percent.

Yet, all of us have deep environmental concerns.

If a general classification could be placed on all true Americans —

—I believe it would be that "All have to be classified as strong environmentalists."

But, I also happen to believe that, as never before, we need to strike an intellectual balance between over-regulation —

—That could result in full economic and industrial collapse —

And our ecological ideals.

I have no quarrel with any single ecological ideal that will clean our air —

—Purify our streams and lakes.

—Rid our landscapes of clutter.

—And result in a cleaner, healthier, better, more beautiful America.

But, until technological answers are provided, I see over-regulation as a real threat to our country — to our states — and to ourselves.

Wanton degradation of our environment cannot be acceptable, in any form, regardless of our economic posture.

We must end wanton degradation of our environment, by the strictest regulations possible.

And, we must see that all regulations related to the general health and welfare of our nation — be met in a reasonable time frame. . .

. . . And enforced in the most rigid manner.

On the other hand, we cannot move precipitously ahead of the technological answers to our questions.

Coal, nor other energy sources, cannot be continually placed at a disadvantage in the nation's market place by over-regulation to the point where economic disaster would plague us.

I believe we must balance the equities — between need and enforcement — until such time

that we work our way out of a century of accumulated problems.

I believe it is time for a crash program on two salient fronts —

—One. I believe it is long past the due time when we should be exerting all scientific and technical talent to the problem of making the consumption of high sulphur coal compatible with our environmental needs.

We also need to develop all our other energy resources in a similar fashion — because we are going to need them all.

—Two. I think we need to take a critical look at our environmental needs —

And make a proper assessment of those controls that can be applied, and for which technical answers are available.

Anyone can cite the problems —

—Solutions are rarely as easy.

By this, I mean that we must look at every energy use —

—Analyze this use as to its effect upon the environment. . .

. . . And if the degradation does occur —

—Find the solution to the problem —

—Before writing controls that could kill us industrially or economically.

In many instances, we must look to see if alternatives, even at personal sacrifice, could not work just as well.

For example:

The autos we drive — how large should they be —

—How much power should they use —

—And, how much of our resources should they be allowed to consume!

It has been estimated that to meet environmental standards as they relate to automotive emissions control —

—That it is costing the nation more than one-and-one-half million barrels of oil a day.

This is partly to blame for the talked-of gasoline shortage that could affect us all this summer.

It is interesting to note that the 1974 federal budget provides for creation of a new central energy fund in the Interior Department.

This fund would provide additional money for non-nuclear research and development —

—With the greatest part designated for high sulphur coal research.

This is a start, but a slow start. . .

. . . In consideration of the closeness to a technological solution.

The budget also calls for increased funds for solvent refined coal process —

—Which would produce low ash, low sulphur fuels, from high sulphur coal.

All together, coal research and development, and proposed funding, are increased by twenty-seven percent in the federal budget.

These federal proposals are certainly not the panacea for the challenges facing coal.

However, I believe it is a limited step in the right direction —

—One which demonstrates the Federal Government's recognition of the necessity to rise to the task and respond to this difficult challenge.

Be that as it may, it is not only from the Government sector that confident action must come.

I would venture to say that at the moment, financial institutions — for which coal is dependent upon for capitol investment — tend to look on the prospects as being bearish.

But I suggest that is an extremely short-sighted view.

Quite to the contrary, coal — in my judgment — is now facing its greatest opportunity for growth.

The reasons are easy to identify.

Coal is our most abundant fuel resource.

All signs point to energy demands outpacing available supplies.

Our nation has time and again demonstrated its ability to rise to the challenge in developing the necessary technology. . .

. . . Coal as a whole, therefore, should be a very strong and financially attractive selling point to investor interests.

I believe we will see the rhetoric of the environmental movements replaced by a rude awakening of realistic common sense.

We will witness a shift toward eliminating inefficiencies in energy —

—Which will serve as a means of reducing the gap between supply and demand.

Amid all popular swirling thrusts couched in turn-of-the-century epithets, used to assault the very energy source that made us the great nation that we are—

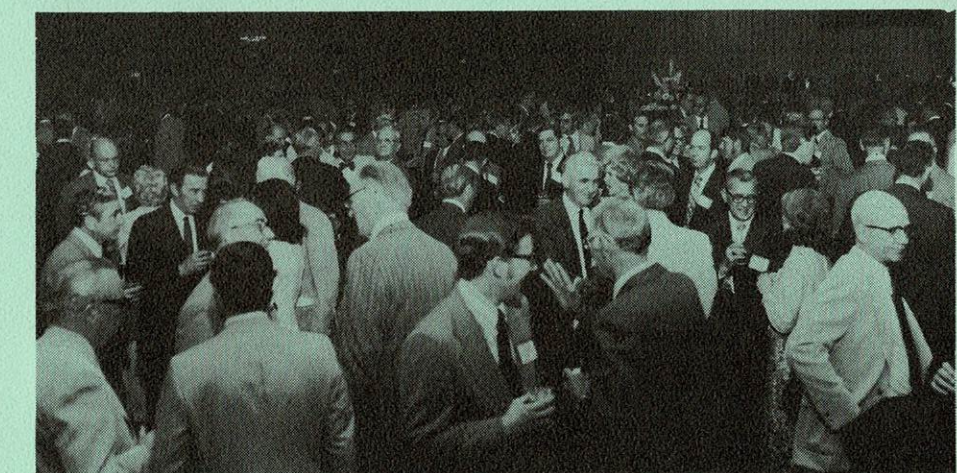
—With all this, I am convinced that high sulphur coal. . .

. . . The fossil fuel that has unobtrusively heated our homes and energized our factories —

—Cooled the offices and lighted our highways and by-ways —

—And, brought in conveniences and recreations — the likes of which no one even dared to dream possible a hundred years ago —

Coal remains our strongest hope, and our best answer, in meeting the energy challenge.

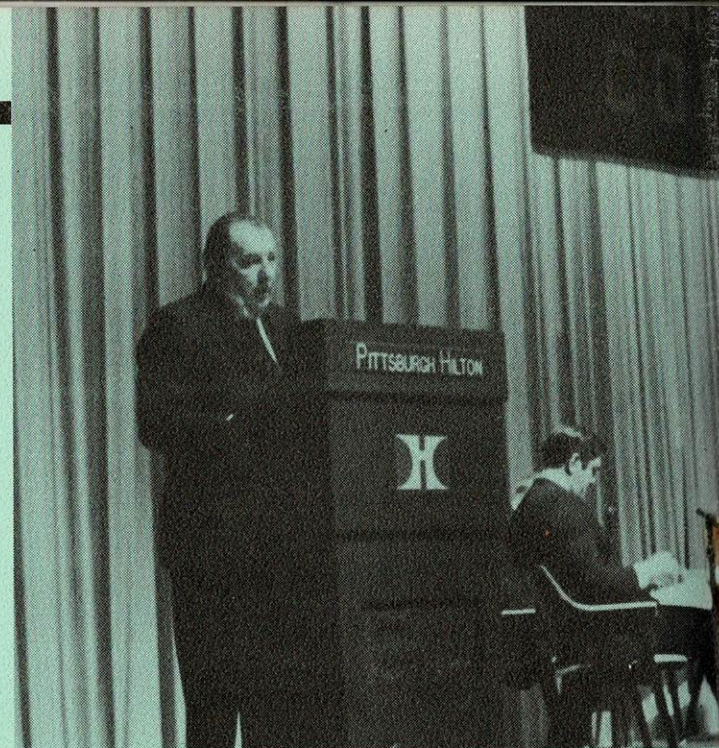


Everyone was talking "coal" in the informal atmosphere of the Hyton's grand Ballroom at Sunday's reception. The crowd was the largest ever to attend an AMC Coal Convention.

ENERGY AND AMERICA'S FUTURE

by
U. S. Senator
Jennings Randolph

In his keynote address, West Virginia Senator Jennings Randolph criticized the administration's energy policies. He called for additional coal-to-gas research and warned against the U.S. becoming too dependent on foreign oil imports.



During the next two years, the Congress, your industry and others — and the American people will be extensively involved in evaluating the status of our national quest for sufficient energy supplies to meet our country's economic requirement — consistent with Federal and State environmental policies.

At issue is the adequacy of the commitment by government, industry, and the public toward simultaneous achievement of environmental and energy goals — for both of these goals are currently jeopardized.

However, I offer the following words of warning: Don't become absorbed in the debate over whether or not government has over-reacted on the environmental issues and miss the forest. For we are in an energy crisis.

REALISM IS NEEDED

Without question, there is need for realism in our country's structuring and implementation of environmental policies. While some of the prevailing policies may be unduly restrictive — until they are rescinded or amended — they are the law of the land, and must be taken seriously.

Admittedly, we — the United States of America — have NOT done well in finding a suitable or equitable balance between energy and the environment. There is blame on all sides. Whatever the cause, the long-term success of Federal environmental policies is threatened. Equally, our vital energy base, our economy, and our security — our national security — is seriously endangered.

Why? Because the respective spokesmen for environmental and economic interests have made insufficient efforts to sit down together — to reason together. Instead they have performed in the role of pressure groups seeking to make the Congress an arbitration board. I say that, through discussion — in a spirit of compromise — there must be developed a consensus on immediate and long-term environmental objectives that mesh —

NOT clash — with our country's energy policies.

PRESIDENT NIXON'S 1973 ENERGY MESSAGE

On April 18, President Nixon transmitted to the Congress his much delayed Message Concerning Energy Resources. And, last Tuesday, the Senate Committee on Interior and Insular Affairs held hearings on the President's Energy Message. This Senator and other ex-officio members of the Senate's National Fuels and Energy Policy Study participated in this hearing.

Senator Henry Jackson of Washington, Chairman of the Interior Committee, and this Senator from West Virginia, Chairman of the Public Works Committee, co-sponsored the study resolution. And, I give you assurance that this Senate study is making real progress. Our work over many months enabled us to better evaluate the President's message.

Frankly, ladies and gentlemen, I was disappointed by the tone of that document from the White House. It had too much "business as usual" ring, even in the face of crisis. I have not heard anything that gives me reason to change in any substantial degree the opinions I expressed in the Senate within hours of receipt of the President's Energy Message.

Although the Message of April 18, 1973, is considerably more ambitious than was his "clean energy" message of June, 1971, this newer one fails to define the elements of a real fuels and energy policy in the nation's interest. It more appropriately can be viewed as a declaration of intent. But it clearly is not a meaningful description of the national policy which this country needs so critically.

Now, the Congress, as provided for in our Constitution, must formulate our country's energy priorities in the establishment of a true National Fuels and Energy Policy. And, the Executive Branch must assume its Constitutional function to implement and administer statutory policies or recommend their modification.

There are several areas that require immediate attention by the Congress: emergency or strategic supplies; oil import controls; and the development of new energy technologies.

EMERGENCY POWERS

The President's message provides recognition of anticipated short-falls in supplies of basic energy resources and their conversion products; however, it does not include a proposal for assuring that essential uses are satisfied during periods of curtailment of energy supplies such as gasoline, diesel fuel, heating oils, or low sulfur fossil fuels.

The Economic Stabilization Act of 1973, which was signed by the President last week, contains a limited mechanism for allocating available fuel supplies during emergency situations or shortages. Senator Jackson's proposed Emergency Fuels and Energy Allocation Act of 1973 (S. 1570), would provide more extensive authority for this purpose. The issue is not whether shortages will occur but how to deal with them.

OIL IMPORTS

A principal thrust of the President's Message is abolition of the Mandatory Oil Import Quota Program; it is to be replaced by a permit program and license fee. As I understand the new program 1973 levels of imports are assured. Also, initially the fees are to apply to future increases in imports. However, over the next seven years the fees will be extended to all imports as a disincentive against imports.

Two aspects of this proposal disturb me: First, it has all the signs of a revenue measure rather than a proposal to manage or limit oil imports. And, second, the President proposes to create this program by Executive Order — not by statute — without an input or review by the Congress. Without question both these aspects of the President's oil import program deserve careful Congressional scrutiny.

GUNS VERSUS BUTTER

There is another point, however, that must be mentioned.

The Administration seems to show too little concern for the foreign policy and economic implications of extraordinarily large imports of oil and liquefied natural gas. For this is occurring at a time when we are on the brink of entering into an era of cutthroat competition for limited international energy supplies with our allies in Europe and Japan.

Now, consider with me these evaluations and estimates by some usually reliable North American economic sources:

Energy imports this year will cost \$7 billion and will rise to at least \$9 billion next year — and will cost between \$11 billion and \$15 billion by 1975. Under current trends, North African and Arabic countries will accumulate \$150 billion to \$200 billion from 1980 to 1985. These countries could store up money reserves exceeding those of ALL world central banks combined, unless investment opportunities are provided internationally for this capital.

Now, isn't this incredible? Some economic authorities doubt whether the U.S.A. can afford to pay such annual bills overseas without the consequences of depression or a generally reduced living standards — and possibly worse conditions.

In other words, our current course endangers our economic position as a world power as well as our national security.

If we are so deficient in energy supplies at home that we may have to place more than 50% of our reliance on foreign oil and gas, how reliable will be our national defense?

We, in the U.S.A., are coming back to that big question — that big confrontation, namely, "guns versus butter". But, in actuality, there never has been a nation so rich that it did not have to come to a facing of the question: "How many guns and how much butter?"

How many people know that even though our country's fuel need for defense is the lowest in 13 years, we still are having trouble filling the demand at that scaled-down level? Notwithstanding, our Navy and our bombers consume petroleum products as if they were water in their wide and questionable sweeps over Indochina.

What is disturbing, however, is the fear creeping in on us from outside our borders that there is a danger of seizure of Middle East energy supplies by force of arms; this probably would trigger World War III.

This frightening potential makes it clear that our first priority must be positive Federal initiatives in energy conservation. Our second priority must be prompt development of new energy technologies and energy supplies from domestic American sources.

Our national interest — perhaps even our national survival — demands that we as a Nation take positive steps to be more energy self-sufficient. It is essential that we maximize the extent to which our needs can be met from secure sources by increased development of all types of domestic supplies, and by more efficiency energy usage.

An energy company executive observed that it is important for us to remember that our dilemma is man-made — and that we still have abundant American energy sources to draw upon. In oil and gas, we are reminded, we have a very large potential re-

source base remaining to be developed offshore and in Alaska. There are also huge potential reserves in the shale deposits in the Rocky Mountain area and nearby in Canada in its tar sands.

Our coal reserves are vast, and, although coal is in a clash with environmental law and regulatory administration and enforcement, it can be a real contributor to our domestic energy supplies and emergency reserve. Coal can be, and should be, an important near-term source of clean synthetic fuels through gasification and liquefaction. However, the cost of either oil or gas from coal or lignite or shale will be higher than what we have been accustomed to. Nevertheless, these secure resources are awaiting development at home. This certainly beats reliance for energy — and security — on foreign sources.

NEW ENERGY TECHNOLOGIES

From press reports, I was encouraged to believe that the President's Message would support increased Federal funding of new coal based energy technologies. For they are needed to assure the over-all viability of domestic energy supplies.

Yet, the President took a very bland approach to the necessary rejuvenation of coal. The President's Message continues to place the burden for the development of new energy technology on the private sector.

Coal is generally recognized as the only domestic alternative to oil imports. At stake is the essential role of this domestic resource in our future energy economy.

The President's Message does little to build upon existing programs which are already constrained by inadequate funding. The thrust is to continue the Federal government's previous bias toward nuclear energy research. The cornerstone of the Administration's proposals is a \$21 million Department of the Interior "Central Energy Fund."

This limited approach by the Administration convinces me that the Federal Energy Management proposed by Senator Jackson and Magnuson and myself, on March 19, is an absolute necessity. The National Energy Research and Development Policy Act of 1973, is a step in the right direction toward joint government-industry demonstration, on a commercial basis, of new energy technologies.

Yet, the one word that most aptly summarizes National Coal Policy is "uncertainty." The present situation was cogently described, last August, by the National Coal Association's Executive Vice President as one of —

"Uncertainty about the continued viability of the coal industry in the face of this Nation's increasing dependence on oil imports; uncertainty about coal's present and future markets due to the increasingly restrictive environmental regulations with no commensurate development of the technology necessary to meet those standards; uncertainty about the ability of coal companies faced with declining productivity and onerous price controls to attract the necessary capital to insure not only their growth, but their continued existence in a capital-intensive industry; uncertainty about mining methods and the ability of coal producers to tap the vast stores of coal found in this country; and uncertainty about the resolve of the Nation to swiftly develop a comprehensive

national energy-environmental policy which will help solve these problems."

In short, time is of the essence. Unless we immediately come to grips and resolve these issues this situation can be expected to deteriorate further.

The current lack of definitive Federal policy guidelines has acted to create a constrained and semiretired coal industry which is unable to respond with the capital, production, and economic vigor necessary to support a new big synthetic gas and oil industry, as foreseen.

Even if it were possible, it would be unrealistic and foolhardy to consider placing our domestic coal industry in mothballs, awaiting the ultimate development of environmentally acceptable means for the extraction and use of coal. The industry is a high-cost, complex, skilled-labor industry, reactive to public policy and market demands. Provided the uncertainties are removed from public policies, the coal industry is capable of assuming its vital role in our future energy economy.

Beginning on June 6, I will convene hearings on factors affecting the use of coal in present and future energy markets. These hearings are to be held by the Senate's Energy Study and were announced this morning by Senator Jackson.

CONCLUSION

The challenge is there — the question is our national acceptance and commitment to meet our energy requirements consistent with environmental policies.

As a Nation, we are now being called upon to exercise stewardship over our natural resources in unprecedented ways. I am reminded of the words of the philosopher George Santayana who once wrote that, "Those who do not understand history are doomed to repeat it." As a country, we have learned to our sorrow the wisdom of this statement, particularly with regard to the irrecoverable degradation of our environment. As a Nation, we have a choice between repeating the mistakes of the past and responsible stewardship over our natural resources.

Those of us in the Congress, who have primary legislative responsibilities, are aware that laws alone will not insure the protection and enhancement of environmental quality. We also must have the full cooperation and participation by both the public and private sectors as well as the consumer, himself.

One factor is clear to me, namely, that the Administration should change priorities with decisiveness and dispatch. I say this because I see so little evidence of program adjustments to enable an ultra-high attack to be made on problems at the center of the energy crisis.

It is an absolute must that our country be made far more energy self-sufficient. In doing so, we must shift some defense, space, and nuclear programming and funding to non-nuclear energy programs in order to shore up the energy base.

What good are military machines and space vehicles unless we have sufficient energy to build them — replace them or their parts — and to operate them?

And what kind of country will be ours if our limited energy supplies must go largely to the military?

May I suggest that you cogitate on those questions!

Technical Report

Economics Of Land Reclamation

by J. W. Howland
Technical Director
of Reclamation
Pittsburg & Midway
Coal Mining Company
Kansas City, Missouri

What does it cost to reclaim one acre of strip mined land? This sounds like an innocent question, but it is a real bomb. In some instances it could cost as little as \$100 per acre to return strip mined land to productivity, but it could easily cost over 100 times that amount. Our inability to establish an "average" overall cost per acre to reclaim strip mined land merely demonstrates the complexity of the overall problem, and drives home the point that there are no easy solutions. Nevertheless, it does not mean that the issue should be dodged or avoided. The reclamation of strip mined land is a problem of national importance that must be confronted in a firm and positive manner. We must find ways to return strip mined land to productivity; but we cannot lose touch with reality.

The principal challenge is to find ways of keeping land reclamation costs at reasonable levels. Towards this goal, The Pittsburg & Midway Coal Mining Co. has been actively engaged for almost three years in a program designed to upgrade reclamation procedures and develop new techniques that will enable us to keep land reclamation costs in line with land appreciation values resulting from the reclamation effort.

Considerable progress toward achieving this goal was made during the summer of 1972 with the successful field test of a forty foot angle blade mounted on a 385 horsepower tractor. Tests were carried out on area mined spoil banks in southeast Kansas*. However, the forty foot angle blade is only a starting point. Other tools and attachments are currently being built and scheduled for testing, together with the modified forty foot angle blade in a land reclamation program to be carried out in southeast Kansas during the summer of 1973.

Two new attachments scheduled for evaluation are:

1. Twenty-four foot wide Vee blade to be mounted on a 385 horsepower bulldozer. This blade is designed for use in the preliminary phases of land leveling or shaping.
2. Thirty foot grading bar attachment for a conventional bulldozer blade. This unit is designed to smooth the rough graded surface prior to the farming phases of the land reclamation effort.

Preliminary tests with grading bar prototype models have been quite encouraging, but the big Vee type plow remains untested. In fact, Unit No. 1 is still being assembled in the shops of Balderson Inc. in Wamego, Kansas. The computer says the Vee blade will do a creditable job handling about 15% of modern area mined spoil. But we won't really know if the calculations are valid until we get the Vee blade on top of the spoil banks and start moving dirt with it.

It should be stressed that none of these tools or attachments represents the ultimate "secret weapon" that will solve all the problems associated with returning strip mined land to productivity. But each tool is designed to play an important part in reducing costs to acceptable levels.

Data from the 1972 test program of the forty foot angle blade indicate this attachment has an earth handling capacity of 5,600 to 7,200 cubic yards per hour under operating conditions. At 10c per horsepower hour the indicated dirt handling cost is roughly 1c to 1.5c per cubic yard. Using the Vee type blade while "topping out" area mined spoil banks, we hope to be able to handle some 15% of the total yardage involved in the land leveling process at rates of 7,000 to 14,000 cubic yards per hour. When dirt handling conditions (principally distance) exceed the design capacity of the Vee blade, a changeover to the forty foot angle blade will be made. The angle blade is designed to handle an additional 60 percent of the total yardage associated with modern area mined spoil banks before changeover to the conventional bulldozer blade is made.

Actual costs for conventional bulldozers in land reclamation service indicate rates for earth handling of 4c to 6c per cubic yard. Our calculations indicate some 11,000 cubic yards of dirt must be handled to level one acre of modern area mined spoil banks (120 ft. crestline to crestline with 36° repose slope). At 5c (average) per cubic yard, the projected dirt handling cost is \$550 per acre reclaimed to a rough grade condition. This calculated cost is in line with actual reclamation costs.

The objective of the upcoming summer test is to cut overall dirt handling costs by fifty percent or more. Performance of the forty foot angle blade during the 1972 test program was sufficiently encouraging to permit continuation and expansion of the program. We are cautiously confident that some progress will be made toward achieving the objectives. Nevertheless, at this stage of the art of development, it is quite apparent that a tremendous amount of research is needed to overcome the many problems associated with reclaiming strip mined land to productivity. For example, the high volume earth moving potential of the side-casting forty foot angle blade was demonstrated in last year's field test program. But we are also aware that there is a considerable energy loss to the forces of friction and adhesion as the dirt slides across the face of the long steel blade. Tests are currently being conducted by the National Tillage Laboratory of the U. S. Department of Agriculture in conjunction with The Pittsburg & Midway Coal Mining Co. to determine possible methods of reducing and controlling blade friction losses. Liquid acrylic polymers are currently being studied and show some promise. However, much testing must be done in the laboratory before a full scale field test can be made.

Despite many frustrations and seemingly endless delays, progress has been made in developing new tools and techniques to more efficiently reclaim strip mined land. To our way of thinking, efficiency is the key that may ultimately resolve not only the problems associated with reclaiming current mined spoil land, but the orphan banks as well. We are all anxious to see even more progress, but we must proceed with caution. We can meet the challenge of the energy crisis, and at the same time protect and preserve our environment; but it will take serious planning and studied action to achieve these goals. The interrelationship of planning and action must not be underestimated, for we might say that planning without action is futile — but action without planning is fatal.

* See: "New Tools and Techniques for Reclaiming Land", by J. W. Howland presented at the Research and Applied Technology Symposium on Mined Land Reclamation sponsored by The National Coal Association, March, 1973.



Literally hundreds of various technical papers, reports and articles were on display at the Manufacturers Division Information Center. Here interested coal representatives select the topic of their choice and place their orders.



This is just one of the many huge crowds that packed their way into each technical session during the three-day convention. This Tuesday morning session covered various phases of surface mining operations.

Technical Report

Design Parameters For Reclamation

by Bernard D. Youngs
Consultant - Surface Mining
Indianapolis, Indiana

INTRODUCTION

The name of the game in the beginning was called **Mining**, later on it was changed to **Profit**. However, today, the name of the game might very well be called **Reclamation**.

The term reclamation itself is under going an evolution and by some today is referred to as **Rehabilitation**. However, with the active emergence of the Environmentalist, Ecologists, new and rewritten State laws and the anticipation of the forceful and stringent Federal law the new word might very well be called **Restoration**. Restoration according to Webster is defined as a bringing back to a former position or condition.

HISTORY

Some form of land reclamation has been done in overburden areas of coal surface mines for over 40 years. In the beginning the work was done on a company-voluntary basis and was primarily the planting of trees.

Some later the first legal regulations appeared and the spoils were topped by bulldozers followed by tree planting. Interest in the seeding of grasses started. Costs were probably in the range of \$50.00 per acre.

PRESENT

Today legal regulations have progressed to a more sophisticated stage and control is now on the degree of grade, back-filling of inclines and final cuts, growth of vegetation, sedimentation of streams and water quality. Today's equipment to accomplish the earth moving work is basically bulldozers of all sizes and medium size draglines. Costs are approaching the range of \$500.00 to \$1,000,000 per acre.

FUTURE

Legal regulations are continuing to be changed and the requirement of just tomorrow and the future will be greater. Grades will be flatter or at least more compatible with the surrounding country side; back-filling of all voids, that is inclines, final cuts and other openings, will be more demanding; growth of vegetation requirements will be expanded and with this the term top-soiling will become more universal; control of sediments and water quality will become absolute.

To accomplish tomorrow's regulations and pending regulations more and more equipment will be required. Larger and larger bulldozers are and will remain the main grading tool; medium size draglines (5 to 30 cubic yards) will be used more as back-filling requirements increase; small draglines (under 5 yards) will be used increasingly for small earth moving areas, for replacing drainage patterns, and for dam and lake construction in control of sediments, water quality, and water conservation; scrapers in the 20 to 40 cubic yard size will be used more abundantly as top-soiling for growth of vegetation control becomes partially and then totally observed. Costs will be in the range of \$1,000 to \$2,000 per acre.

THE JOB AT HAND

Gentlemen, I wrote this speech yesterday, therefore the tomorrow I referred to is today. The rebuilding of overburden areas of coal surface mines has become an enormous job and should be looked at realistically and earnestly.

A typical midwestern large surface mine might be working on 500 acres per year of disturbed land, by using \$500,000 to \$1,000,000 worth of Capital Equipment and have total production costs approaching \$1,000,000 per year. These facts indicate that this typical mine has taken on a rather large earth moving project. In fact, this is exactly the manner in which the project should be approached. The work should be done diligently and deliberately, not just matter-of-factly. The construction project should have its own economics as to capital costs, production costs, and profit. It should be staffed with a complete compliment of supervisors for around the clock supervision. The construction project should be planned with the same degree of engineering and work efficiency as any other phase or part of the operating mine. Perhaps it is sufficient to say "do the same quality of work on both sides of the pit". Cut and fill stakes, grade stakes, elevations, profiles and cross sections are part of all well planned construction projects. This type of information gives control of costs and profits. The engineering requirements are known and adaptable. Proper development of these plans will require more long range planning of all phases of the mining operation. This is, do not look at just the year at hand, but look at several years, large areas or perhaps the whole field that is to be mined. This might be called **Total Planning**. In addition to the normal planning as to pit alignment, upper drainage, haul roads, power lines and whole mine planning, the same effort must be put forth in the planning and work required for the reclamation, rehabilitation, or restoration of the spoil of overburden areas. These plans should be developed with and on the normal mining contour maps. Some projecting and forecasting is required to be able to show the proper location and elevation of the overburden area. In the normal midwestern type of stripping, hills, streams and other structures are moved in the direction of the spoil. They are physically picked-up by the excavator and moved to the spoil side by a distance roughly equal to the reach of the machine. The engineer must keep this in mind when computing the new grade elevation of the overburden area or when projecting the location of the contours of the newly created overburden area or the newly graded area. Planning and thought must go into the project to be able to forecast the long range mining plan, visualize and map the new overburden area and then the corresponding overburden rebuilding plan. With this much of the plan in hand, it will now be possible to plan in detail the pasture areas, areas where row crops are to be farmed, water areas to be formed, County and State roads to be replaced, areas to be fenced, areas of residential and industrial development, and many others as the various areas require or desire. This planning requires the expertise of mining management, engineering management, construction management, farm

management with good coordination and cooperation with various County, State and Federal management.

Some use is now being made of models to show the total areas before mining and then the total area after mining is completed. This is the **Before** and **After** type of look with two separate models. The **Before** is a model depicting the total area before any mining or disturbance of any kind has been done. The **After** is a model depicting the total area after mining is completed, all mining equipment moved away, and the total area has been reclaimed and revegetated. Models should be a scale and size that is pleasing and pleasant to the eye. It should be a scale that would allow an area representing several years of mining to be shown. A model approximately the size of a desk top, to a proper horizontal and vertical scale is a size that can be easily viewed and absorbed. It has been found by some that to give proper depth to the model the vertical scale should be exaggerated, that is, if the horizontal scale is 1" = 400' the vertical scale should be 1" = 200' to give a proper and realistic depth. The before model by showing the roads, homes, streams and other inherent conditions of the area, allows the viewers to associate with and relate to the total area. John Q. Public always likes to see his own home on such a setting as these models. Models of this type are a great assist in doing the future planning for mining and for reclamation required in the overall **Total Planning**; and also, visually depict and show to the operating staff of each mine and in many cases, John Q. Public a look at the end product. The creating of these models is a good exercise in engineering and mining management since considerable thought and planning must be put into the project to create the **After** model. In the beginning, I feel sure that there will be a considerable amount of trial and error with the first models tried.

PREDICTIONS

New types of equipment techniques will certainly develop to reduce cost and or improve the degree of work performed. One of these might be the use of short coupled wheels with conveyors to first remove total surface or top soil from areas to be mined. Then plane off the spoil tops of the cast overburden when it is necessary for overburden quantities to be transferred from one position to another to accomplish back-filling and grade, and finally for the short coupled wheels and conveyors to replace on top the total surface or top soil quantity. Another might be the increased use of the shovel-truck method for removing overburden from the coal and in doing so place the overburden and top soil separately so as to be strategic to the overburden rebuilding and the **Total Plan**. Still another might be the design and building of some huge planing machine that would hover over the overburden areas and leave only a finished product behind.

SUMMARY

Gentlemen, the name of the game in the beginning was called **Mining**, later it was changed to **Profit**. However, today (and today is tomorrow) the name of the game might very well be called **Reclamation** evolving into **Restoration**.

D & D

Reclamation, Inc.

Land Stabilization Specialists

P. O. Box 1004

Beckley, W. Va. 25801

Tel. a/c 304-253-8309

Erosion and
Sediment Control

General
Consultants

David J. Ozmina
President

R. Wayne Morgan
Operations Super.





Wednesday afternoon's session covering surface mining reclamation was chaired by (left to right) Bernard Youngs, consultant, Indianapolis; Bill Plass, U. S. Forest Service; A. T. Grandt, Peabody Coal Company; R. E. McCarthy, Washington Irrigation and Development Company; and J. W. Howland, Pittsburgh and Midway Coal Mining Company. Bill Plass was recently elected chairman of the newly formed Council for Surface Mining and Reclamation Research in Appalachia.

Technical Report

Revegetating Surface Mined Land

by William T. Plass
Principal Plant Ecologist
Forest Products
Marketing Laboratory
United States
Department of Agriculture
Forest Service
Princeton, West Virginia

Three years ago the environmental revolution exploded, destroying many traditional concepts of land use. The long history of man's abuse of the earth's environment provided the volatile fuel that needed only a spark to ignite it. Scientists studying atmospheric and earth sciences supplied the catalyst. They plotted the deterioration of many parameters important to various forms of life on our planet. Once ignited, the flames of change were fanned by the vocal prophets of doom, who predicted the imminent destruction of the human race. Today, it appears the emotional tidal wave has subsided. We are entering a period of calm. There may now be an opportunity for a more rational approach to our environmental problems. Although the experience has been difficult and expensive, it was needed. The time had come to develop a new approach to our land-use policies.

My purpose today is to briefly review some of the important advances in revegetation techniques that may have national or regional application. I will discuss three major topics: site evaluation; site preparation; and revegetation techniques.

We must accept the fact that the prompt restoration of vegetation on areas disturbed by surface mining begins when the operator considers opening a new mine. The depth and character of the overburden will determine the cost of mining the coal. Likewise, the chemical and physical characteristics of the rock strata above the coal will determine

the cost of reclamation. These costs plus the cost of additional treatments to achieve the land-use objectives will decide the feasibility of opening the mine.

Sound environmental management requires that the operator must know the physical and chemical characteristics of the overburden. He must then modify his mining methods to make the most efficient use of these materials. This is a relatively new concept, so its full impact on reclamation costs has not been realized. It will become more widely understood and used in the future.

In mine spoils, physical characteristics alone are rarely limiting; but they now appear to be much more important than we originally thought. I have shown in greenhouse tests that the emergence of pine was significantly higher when the seed was covered by hard, coarse fragments of rock (1). Fine soil-sized material crusted over and restricted seedling emergency. Grass and legume seed may be similarly affected. Van Lear (2) has shown in the greenhouse that the best fescue growth occurred on spoil having equal portions of fine and coarse material, when no chemical factors limited growth. On spoils with chemical properties limiting plant growth, the effects of the chemical factors intensified on the finer textured spoils and reduced fescue growth. Improved fescue growth occurred on the coarser textured material from the same spoil. Thus, coarser textured toxic spoils may be easier to revegetate than those made up of predominantly fine particles. There is evidence that the color of the surface material influences soil temperature. In extreme cases, solar heating of black and dark grey surface material may kill vegetation in the seedling stage.

The chemical variation among rock strata in the stratigraphic section above the coal seam is a well established fact. An old reliable axiom is to bury the black material. This is founded on evidence in the Midwest and Appalachian coal fields showing that bone and rider coals often contain high concentrations of pyritic sulfur (3). This material can

become extremely acid when weathered. Sandstones and shales may be acid or alkaline. They are variable, and no specific rule can be applied to all situations. Regional studies of overburden characteristics may provide guidelines to judge chemical characteristics based on the composition, texture, or color of the rock strata.

Dr. Smith and others at West Virginia University have made extensive studies of the Mahoning sandstone occurring above the Upper Freeport coal seam in north West Virginia (4). They have identified a weathered zone with greatly reduced sulfur. This zone occurs in the upper horizons of this sandstone layer. Below this weathered zone, the sulfur content increases. He can identify these zones by using a Munsell color chart and freshly broken samples of weathered rock. The high chroma hues are low in sulfur, while the low chroma hues have a high sulfur content.

Berg and May (5) have shown that variations in plant available phosphate occur between rock strata in the same stratigraphic column. It is possible similar variations occur for other essential plant nutrients. Therefore, an operator may have the opportunity to use rock strata high in phosphate to cover the spoil surface. A reduction in costs for fertilizer may result. Also, the vegetative cover may benefit for many years by this careful planning of the mining operation.

An example of the advantages in knowing the chemical characteristics of a highwall were illustrated recently in northern West Virginia. This region of the state has a history of acidic spoils and difficult revegetation problems. Allegheny Mining Company was top-soiling a spoil from the Elk Lick coal seam to meet state revegetation requirements. Sampling the highwall identified a rock strata having low potential acidity and high phosphate. It was possible to modify the mining procedure and spread this material on the surface. Top-soiling was no longer necessary, and a saving in mining and reclamation

costs resulted. This treatment permitted more flexibility in selecting appropriate quick growing plants and a permanent cover.

Once an area is mined and reshaped, there may be a need to evaluate the plantability of the spoil surface. Years ago, pH was adapted as a reliable indicator. It has withstood the test of time, and is still considered a valuable tool in revegetation planning. Field tests are simple and satisfactory for most situations. Forest Service research indicates wide variation in the accuracy of field kits now available, and recommends the LaMotte-Morgan method (6). Battery operated glass electrode pH meters are more accurate, but may not be as convenient. There are several available.

Sampling procedures and intensities have not been standardized. Limstrom's (7) spoil classification system using pH classes satisfies many situations. Grandt (8), working with grasses and legumes in Illinois, modified this system to satisfy his needs. He recognized two more classes: pH 4.0-4.5 and pH 4.6-5.0. Knowledge of the pH scale and the site requirements of grasses and legumes indicates this is a logical subdivision. Since the system was developed in the Midwest where acidity is a common problem, further modification may be necessary for regions with alkaline soils.

Subdivisions may be used in conjunction with the pH classes to describe conditions relevant to a region. Grandt recognizes three classes of spoil based on texture: sandy materials; loamy materials; clayey materials. In West Virginia, we recognize classes of stoniness and steepness of slope. Hodder (9), working with alkaline spoils in Montana, suggests using salt hazard classes. He also suggests recognition of sodic or high sodium spoils. All of these serve a purpose by describing spoils in more specific terms.

Research scientists need to identify specific soil factors affecting vegetation establishment and growth. Complex laboratory analyses can be used to delineate specific spoil characteristics. This is necessary in research, but the techniques are not practical for most field applications. Selected as may be made of some more intensive laboratory tests for difficult revegetation problems, or where land management objectives justify the cost.

Site preparation involves all operations needed to achieve the revegetation objectives. These may be very intensive or minimal, depending on the situation. In all cases the requirements imposed by state regulations must be met. Consideration can then be given to protection of the environment, and the selection of appropriate land-use objectives. The options are as varied as the sites to be revegetated.

Top-soiling is an attractive alternative on some difficult sites. It can be very effective if adequate consideration is given to the physical and chemical characteristics of the top-soiling material. However, it must be recognized that native soils in some situations may be no more productive than the spoil itself. If this is the case, it is preferable to intensify treatments to the spoil to correct toxicities or nutrient deficiencies. These treatments probably would cost less than top-soiling, and would be as effective.

Deficiencies in plant nutrients are as important as acidity related problems on surface mine spoils. It is logical to assume nutrient deficiencies occur to some degree on all spoils. For certain land uses, these deficiencies may be tolerated while other operations require their correction.

It is generally agreed that nitrogen is very deficient on most fresh spoils. Phosphorus deficiencies have been noted in every coal

region east to west. Although the plant available phosphorus in spoils is quite variable, most sites are classified in the low to very low range. Potassium is generally adequate for most revegetation objectives, but deficiencies can occur. Reference to specific deficiencies of other plant nutrients is rare. If deficiencies occur, they apparently are not essential for the revegetation practices now in use. Other nutrient deficiencies may be recognized under intensive management programs involving commercial crops.

Fertilizer technology is well advanced. Many different fertilizer formulations can be used to correct nutrient deficiencies. Rates of application depend on spoil characteristics, the crop to be grown, and the land-use objectives. Ammonium nitrate, triple superphosphate, and diammonium phosphate are high analysis inorganic fertilizers often used in the Appalachian region. A single application at the time of seeding may be satisfactory for many vegetation plans. However, on sites that are difficult to vegetate or where intensive treatments are planned, two or more fertilizer applications should be considered.

When the establishment and growth of vegetation is restricted by conditions relating to the acidity of the spoil, consideration should be given to treatments that will neutralize the acidity. Lime, in a variety of forms, is the material commonly used. On many sites, physical properties prevent the use of scarifying equipment to work the lime into the spoil. Precipitation and weathering may distribute the lime below the surface without scarification on coarse textured spoils. Czapowskyj and Sowa (10) treated extremely acid anthracite breaker-refuse with 2.5 tons of lime per acre. This surface application neutralized the surface 3 inches, and was effective for 7 years. The effects of this treatment could be detected to a depth of 9 inches. It is advisable to apply surface treatments several weeks or months before seeding or planting.

Selected power plant fly ashes offer an alternative neutralizing material. The Bureau of Mines has been studying this material for several years (11). They have found alkaline fly ashes are effective neutralizing materials when applied at rates of 150 tons or more per acre. At these rates, this waste

product supplies significant amounts of several essential macro- and micro-nutrients. Tests have also shown that fly ash treated spoils have higher infiltration rates and higher moisture levels at depths of 2 or 3 feet. The prospects of expanding the use of dry fly ash for surface mine revegetation treatments are good. Analyses of fly ashes from specific sources, and the development of treatment guidelines will encourage greater use of the material.

Seeding and planting, once the site has been prepared, is becoming a complex and exacting science. Operators need to select an dtrain competent personnel to plan and supervise their reclamation and revegetation programs. Mining, regrading, and other site preparation treatments create the conditions that will determine the plant material options. In addition to site characteristics, the revegetation specialist must consider state regulations, landuse objectives, site protection, and aesthetics. The operator who has planned his reclamation before mining and has created a site capable of supporting a wide variety of plant materials is in a favorable position.

Species selection may be based on personal preference or convention, but the most reliable is selection on the basis of site characteristics. It is time we reconsider the use of the traditional fescue-ryegrass-lespedeza mixtures. We must recognize that many spoils are as good as or better than our native soils. They will support with proper treatment a wide variety of plant materials. There are opportunities for agricultural, range, forest, wildlife, and horticultural crops. We must know the capabilities of a site, and select plant materials that will provide prompt site protection and the most economically desirable use of the land.

There is a continuing need for plant material testing. Initially, we are interested in any grass, legume, forb, shrub, or tree that will survive and grow on sites with specific site characteristics. This is being done with many native species in the western coal fields today. Later, as we become more confident of success, species evaluations will involve plant materials with restricted site requirements that provide quick cover, improve the spoil, or yield products having a tangible economic value. The Midwest coal field has



A long, distinguished receiving line of American Mining Congress representatives greeted guests at Sunday evening reception, which followed immediately in the Ballroom of the Pittsburgh Hilton Hotel.

entered this phase, and the Appalachian region is giving more consideration to the opportunities for more intensive management. Species evaluation in all regions has been supported by the Soil Conservation Service plant materials program.

The opportunities to improve growth or yield by genetics have not been fully realized. Some agricultural species have been developed through genetic selection and breeding to produce acceptable yields on acidic soils. I have shown significant differences in the growth of Virginia pine seedlings collected from several seed sources and planted on an extremely acid soil (12). In each region there are species that are accepted for surface mine revegetation. Some of these could be improved through genetic manipulation to provide better site protection, higher crop yields, or a higher frequency of successful seeding or planting.

Species compatibility is a term that will be used more frequently in revegetation planning. The agronomist has recognized this for years in recommending grass and legume mixtures on agricultural soils. It is my belief we have not fully utilized their experience in selecting species and rates for surface mined lands. More recognition also needs to be given to the effect of grasses and legumes on the initial growth of seeded or planted trees and shrubs. Vogel (13) has shown that a dense ground cover reduces the initial growth of planted trees, and that later growth is affected by the species composition of the ground cover. The degree of response varies between tree species. Earlier Forest Service research has shown that trees interplanted with nitrogen fixing tree species grow at a more rapid rate than trees without a nurse crop (14).

Time of seeding is important to seed germination and site protection. In western regions with limited and seasonally distributed rainfall, seedings and plantings must be made when weather conditions are considered optimum for germination and growth. Often the options are very limited. In the Midwest and East, where the average annual precipitation is higher and it is well distributed during the growing season, more options are available to the revegetation specialist. Operators in the Appalachian region are using results from Forest Service research to seed grasses and legumes 8 or 9 months of the year. Summer seedings include summer annuals as a nurse or cover crop for perennial grasses and legumes. In the fall, annual cover crops and cool season grasses and legumes have been successful.

Attempts have been made to develop methods allowing successful tree or shrub planting beyond the traditional spring and fall planting seasons. Several methods using seedlings growing in small containers have proven successful in experimental plantings. Technical problems and expense of these treatments have delayed acceptance of this technique on a large scale.

Materials and treatments that aid germination and early growth are being used in many regions. In the East, mulches and soil stabilizers are being used to reduce erosion losses while the vegetation becomes established. I have tested many different products, and found several effective (15). Success depends to some extent on selecting a material that will provide the desired site protection for specific spoil and weather conditions. On acid spoils, where the opportunities for vegetation establishment are marginal, a heavy mulch may benefit plant establishment. Toxic salts come to the surface by capillary action during

wetting and drying cycles. The mulch, by keeping the spoil surface cool and moist, causes the toxic salts to leach out. In the West, where annual precipitation is low, mulches and soil stabilizers applied after seeding become more useful to conserve moisture and reduce surface temperatures.

The next few years will see many changes in revegetation treatments. It is my belief the direction of change will be toward more intensive management. A higher percentage of the land disturbed by surface mining will be returned to some use that produces a tangible economic return. This is happening in the Midwest. The Appalachian region is giving more consideration to intensive revegetation treatments. It will come about in the West after they have developed reliable revegetation treatments.

APPENDIX BIBLIOGRAPHY

- (1) Plass, William T.
1970. Factors affecting the establishment of direct seeded pine on strip mine spoil. (Unpublished progress report on file with Northeastern Forest Experiment Station, USDA Forest Service, Berea, Kentucky.)
- (2) Van Lear, David H.
1971. Effects of spoil texture on growth of K-31 tall fescue. USDA Forest Service, Northeastern Forest Experiment Station Res. Note NE-141.
- (3) May, Robert F., and William A. Berg
1966. Overburden and bank acidity—Eastern Kentucky strip mines. *Coal Age* 71: 74-75.
- (4) Grube, W. E., R. M. Smith, R. N. Singh, and A. A. Sobek.
1973. Characterization of coal overburden materials and minesoils in advance of surface mining. Research and Applied Technology Symposium on Mined Land Reclamation, pp 134-152. Bituminous Coal Research Inc., Monroeville, Pa. 355 pp.
- (5) Berg, William A., and R. F. Cay.
1969. Acidity and plant-available phosphorus in strata overlying coal seams. *Mining Congress Journal* 55(3): 31-34.
- (6) Berg, William A.
1969. Determining pH on strip-mine spoils. USDA Forest Service, Northeastern Forest Experiment Station Res. Note NE-98.
- (7) Limstrom, G. A.
1960. Forestation of strip-mined land in the central states. USDA Agricultural Handbook No. 160.
- (8) Grandt, A. F., and A. L. Lang.
1958. Reclaiming Illinois strip coal land with legumes and grasses. University of Illinois, Agricultural Experiment Station Bulletin 628.
- (9) Hodder, R. L., and B. W. Sindelar.
1972. Coal mine land reclamation research progress report 1971. Montana Agricultural Experiment Station Res. Report 21.
- (10) Czapowskyj, M. M., and E. A. Sowa.
1973. Lime retention in anthracite coal-breaker refuse. USDA Forest Service, Northeastern Forest Experiment Station Res. Note NE-154.
- (11) Capp, J. P., and D. W. Gilmore.
1973. Soil-making potential of power-plant fly ash in mined-land reclamation. Research and Applied Technology Symposium on Mined Land Reclamation, pp. 178-186. Bituminous Coal Research Inc., Monroeville, Pa. 355 pp.
- (12) Plass, William T.
1973. Genetic variability in Virginia pine increases survival and growth. In R. J. Hutnik and G. Davis [ed.] *Ecology and Reclamation of Devastated Land*. Gordon and Breach, London (In press).
- (13) Vogel, W. G.
1973. The effect of herbaceous vegetation on survival and growth of trees planted on coal mine spoil. Research and Applied Technology Symposium on Mined Land Reclamation, pp. 197-207. Bituminous Coal Research Inc., Monroeville, Pa. 355 pp.
- (14) Dale, M. E.
1963. Interplant alder to increase growth on strip-mine plantations. USDA Forest Service, Central States Forest Experiment Station Res. Note CS-14.
- (15) Plass, William T.
1973. Chemical soil stabilizers for surface mine reclamation. Conference Workshop on Soil Erosion National Highway Research Board, Washington, D. C. (In press).



Speaking at the Tuesday morning discussion of surface mining operations were; (left to right) J. H. Olsen, Utah International; Philip Berger, Philip R. Berger & Associates; L. R. Kelce, Peabody Coal Company; Jack Ratchye, Peter Kiewit Sons Company; and John Sense, Midland Coal Company.

We support the WVSMRA



DOWN AND OUT

When you are down we cannot afford to be out. We are committed to servicing Auger users with a complete stock of parts for our equipment — COMPTON AUGER — and many parts for the other makes of augers. We are available twenty-four hours a day with these parts and/or service personnel to get our customers back in operation as soon as possible.

Members of WVSMRA

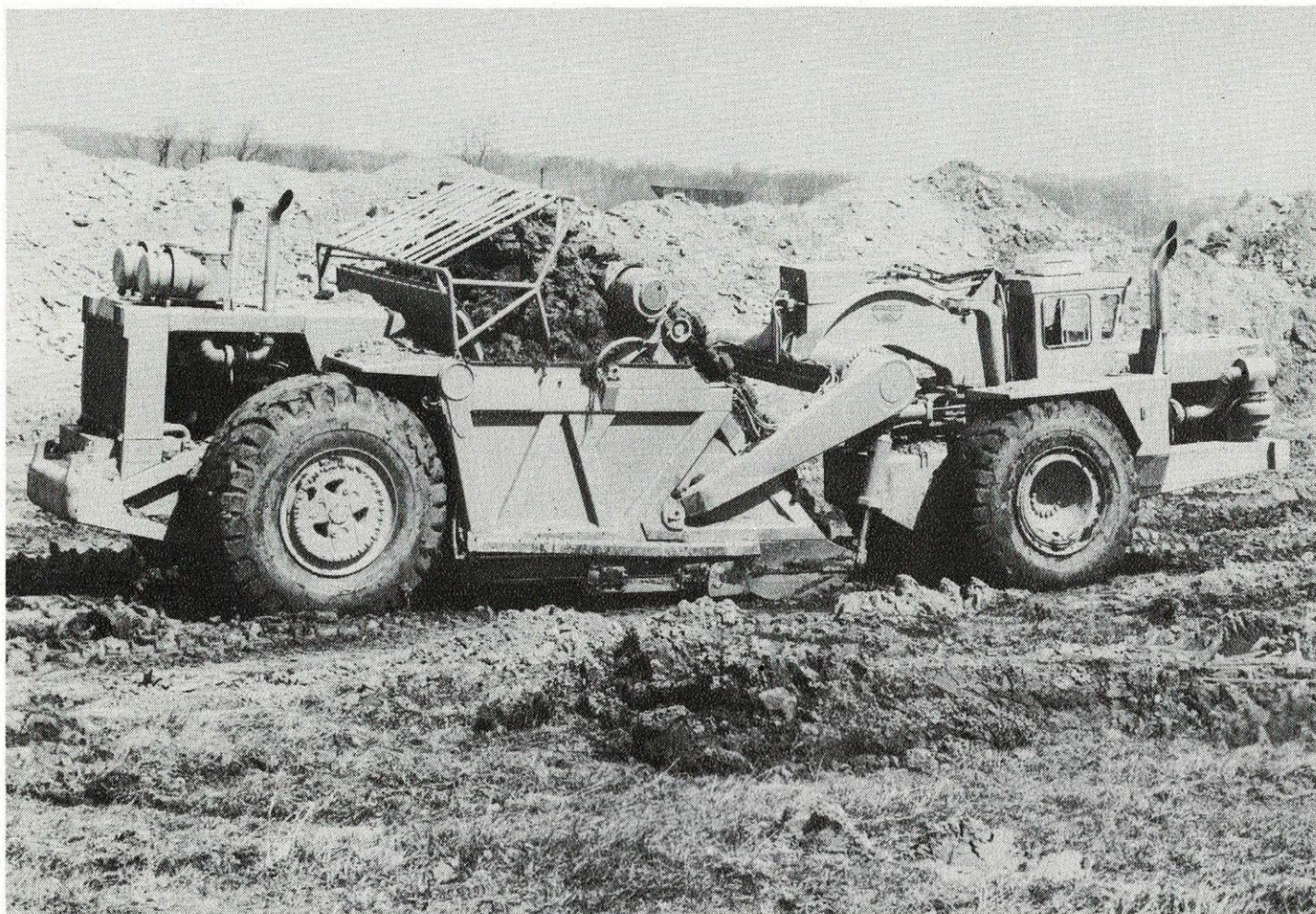
KSMRA

**Distributors: C. I. Walker Machinery Company
Carter Machinery Company, Inc.**

ADVANCED MINING

EQUIPMENT & SERVICES COMPANY

BOX 9387 HUNTINGTON, WEST VIRGINIA 25704 • PHONE 304 429-1331



At several locations throughout the state where the terrain permits, gathering and stock piling of top soil is most efficiently achieved by a pan or scraper. These machines give you complete control and mobility in segregation of materials.

Dr. Richard Meriwether Smith

Choosing Topsoil to Fit the Needs

Soil Scientists have long recognized that the term "topsoil" could not be used consistently to indicate any particular horizon of natural soils. Rather, it was decided prior to 1952 by the Soil Survey Staff of the U. S. Dept. of Agriculture (2) that the only consistent usage of the term was in the sense of "presumed fertile soil material . . . used as a top-dressing". Obviously, the reason for such top-dressings would be to improve the land for some anticipated use. This is the same meaning of the term that is now spreading throughout the country on many kinds of lands.

"Topsoiling" is recommended widely for mined land and other drastically disturbed land areas, but it is practiced for improvement of many natural soils, as well. Examples with natural soils include top dressings following reshaping of upland slopes to accommodate intensive cultivation, and parallel terracing in the corn belt of the

Midwest; the reshaping of lands to permit efficient irrigation in many parts of the arid Western U. S.; the construction of benches for rice paddies throughout much of Asia; the filling of lowlands throughout the World in order to provide sites for agriculture, housing or industry. These, and many more examples throughout historical time, all involve a form of topsoiling for anticipated uses. They have in common the requirement that material must be placed on top which is suitable for the intended use.

Now, if we look at drastically disturbed lands, whether in swamps, rolling hills, or mountains, topsoiling with favorable material for the intended use is likely to be a requirement, regardless of whether the drastic disturbance is a result of urbanization, industrialization, highway construction, reshaping for intensified agriculture, or surface mining to obtain essential stored energy or other mineral resources. Moreover, the incentive for topsoiling with

favorable material is not always the same. In some cases topsoiling is essential to production or to maintenance of the entire undertaking; in other cases topsoiling may be essential because it is required by law. Yet, whether an essential part of the undertaking or a legal requirement of State or Federal government, the practice should have the common purpose of maximum improvement for the intended use of the land.

Having studied coal overburdens, minespoils and mine-soils in some detail we are prepared to suggest that 3 distinct general kinds of topsoil should be recognized and used where appropriate. These three kinds of topsoil may be designated as: (1) synthetic topsoil; (2) weathered topsoil; (3) geologic topsoil. We have been involved in the selection and use of each of these 3 kinds of topsoil or topsoiling materials, and believe that some advantages of each can now be identified and discussed in relation to particular kinds of minespoils and problems. The universal question is how to recognize properties of the minesoil that need improvement and to choose topsoil that improves the properties that are unfavorable.

Synthetic topsoils include many kinds of materials. A few with which we are familiar are flyash, sawdust, peat moss, vermiculite, cinders, barnyard manure, grass sod, compost, stone chips and sand, alone or in appropriate mixtures. Usually, such synthetic topsoils are reinforced with pulverized limestone and fertilizers added in accordance with appropriate soil tests. Choice of the best synthetic topsoil for a particular situation raises complex questions that can only be answered, even approximately by a well-trained, experienced person, after consideration of properties of the disturbed soil as well as the future use of the land.

Weathered topsoil is natural top-dressing material occurring in the zone of the earth's crust that has been subjected, throughout geologic time, to the variable chemical and physical processes commonly called weathering. This kind of topsoil can be selected to provide many different properties. However, unless it is taken from poorly-drained land, it will invariably tend to be brown or yellow in color. It is not likely to contain toxic concentrations of soluble chemicals, but it often needs lime and fertilizer amendments for vigorous growth of sensitive plants.

Texture, size and percentage of stone fragments and organic matter content are three properties of weathered topsoil that should be considered together with lime and fertilizer needs. On land that is to be heavily grazed or subject to traffic, sandy loam textures may be preferable to clay topsoils. As much as 50% of small stone fragments may be desirable to help support traffic; and, on erodible slopes, to help reduce runoff and erosion. Surface stones are known to be one of the most effective mechanic aids to the control of erosion (1).

Geologic topsoil may be defined as natural top-dressing material occurring in the rock section below the zone of intense weathering. It must be studied before being used because it may include layers that are biotoxic or potentially toxic when placed on the land surface. At the same time, geologic topsoil often is the most favorable material for topsoiling. This is a natural consequence of the fact that

unweathered geologic sediments contain all of the original lime and other nutrient-rich minerals that were deposited in bottomlands or relatively shallow waters during the geologic time known as the coal eras. In addition, in some cases the products of weathering and leaching have accumulated in the geologic materials, adding potential fertility in excess of original nutrient levels.

It is apparent from these general considerations that topsoiling of disturbed lands is both an art and a science, and that materials are available to achieve desired objectives. The secret of success is to learn the properties of different topsoiling materials and properties needed for planned use of the land. Then the best topsoil can be placed where it will do the most good. Scientific knowledge and laboratory studies are necessary for best results, but there is no substitute for common sense and good judgment on the part of mining operators and other people working close to the rock and soil materials in the field. Many operations people know what materials will give the best results, but they sometimes need scientific and laboratory help in order to apply the best treatments and practices not only for quick reclamation but especially for effective long range management.

References

1. Meyer, L. D., et al, 1972. Stone and woodchip mulches for erosion control on construction sites. Jour. Soil and Water Conservation 27:264-269.
2. Soil Survey Staff. 1951. Soil Survey Manual. Agric. Hdbk. 18, p.185, U. S. Dept. of Agriculture. Manuscript published with the approval of the Director of the West Virginia Agricultural Experiment Station, Morgantown, as Scientific Paper No. 1279.



In many instances the original top soil may not be the best material for revegetation. In this case a selected sub-soil will be segregated and replaced back to the surface.

other useful purposes. The p
 quire backfilling, terracing,
 approximating original contour
 resodding, revegetation, soil co
 stabilization, in order to elimi
 soil pollution, erosion, flood
 from surface mining, or any
 to accomplish reclamation of a
 ful purpose.

(1) The term "terracing" m
 where the steepest contour of
 shall not be greater than twenty
 from the horizontal, with the t
 of the restored area a flat terr
 depressions to hold water except
 retention of water is required
 for reclamation purposes with ad
 vision for drainage.

(b) The term "overburden" m
 the earth and other materials
 excavated for the purpose of expo
 seam as may be necessary in ord
 mine and also means such coal
 materials after removal from th
 slate in the process of surface m
 (c) The term "spill bank" m
 of removed

moves coal therefrom directly through a se
 enters the coal seam from a surface excava
 purpose of removing of overburden for the
 or quantity of determining the location, quality,
 area or land from which coal is extracted by
 a surface coal mining process, including pri
 vate ways and roads pertinent to such area
 and (3) land facilities, or processes resulti
 deposits.

(b) The term "overburden" means all of
 the earth and other materials removed or
 excavated for the purpose of exposing a coal
 seam as may be necessary in order to surfac
 mine and also means such coal
 materials after removal from th
 slate in the process of surface m
 (c) The term "spill bank" m
 of removed

led to be proposed by Mr. JACKSON to S. 630, a b
 provide for the cooperation between the Secretary of
 Interior and the States with respect to the regulatio
 surface mining operations, and the acquisition and recl
 abandoned mines, and for other purposes, viz: S
 the enacting clause and insert in lieu thereof
 is:
 is Act may be cited as the "Surface Mining R
 Act of 1972".

1—STATEMENT OF FINDING AND POL
 c. 101. The Congress finds and declares that—
 (1) extraction of minerals by mining operation
 significant and essential activity which contribute


COMMITTEE ON INTERIOR AND
 INSULAR AFFAIRS
 UNITED STATES SENATE
 PREPARED AT THE REQUEST OF
 HENRY M. JACKSON, Chairman
 COMMITTEE ON INTERIOR AND
 INSULAR AFFAIRS
 UNITED STATES SENATE
 AN Environmental and Economic
 Assessment of Alternatives
 REFACE MINING AND RECL
 BY THE
 COUNCIL ON ENVIRONMENTAL QUALITY
 EXECUTIVE OFFICE OF THE PRESIDENT
 WASHINGTON, D.C.
 PURSUANT TO
 S. Res. 45
 NATIONAL FUELS AND ENERGY
 POLICY STUDY
 Serial No. 93-8 (92-13)

FEDERAL LEGISLATION

For several years Congress has been debating the feasibility of passing into law federal legislation to regulate the surface mining industry nationwide. After years of hearings, field trips and research projects into the various aspects of the issue, it now appears probable that such legislation will be passed either late 1973 or early 1974. In addition to the American Mining

Congress and National Coal Association, many state associations, like the West Virginia Surface Mining and Reclamation Association, have testified at various subcommittee hearings on the need for surface mining in America. Recently the subcommittee on Mines and Mining and the Environment of the Committee on Interior and Insular Affairs of the U. S.

House of Representatives held hearings on surface mine legislation in Washington. The testimonies given by Paul Morton, President of Cannelton Industries, Congressman John Slack and West Virginia Surface Mining and Reclamation Association President James Wilkinson can be found on the following pages.



Garnie Stidham

D/B/A

Ashland Gas Service

Beckley, West Virginia

Pikeville, Kentucky

Distributors for Ashland and Valvoline products. Serving the coal industry with diesel fuel, automotive and industrial oils and greases.

Distributor for Fram automotive and industrial filters. Automotive and industrial batteries.

Distributor for "Conved" Hydro Mulch used in soil reclamation.


Distributor for "Tinex" Moppette Paper Mulch used in soil reclamation.

The above products are distributed by Ashland Gas Service in the West Virginia, Kentucky and Virginia areas. For service please contact one of the following offices:

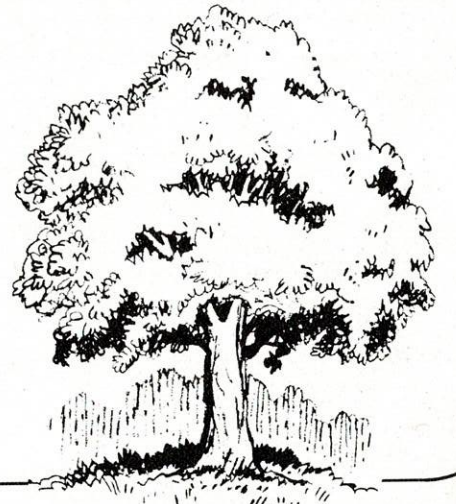
Ashland Gas Service — Beckley, W. Va. 25801
 Phone 253-3397

Ashland Gas Service — Pikeville, Ky. 41501
 Phone 639-4439

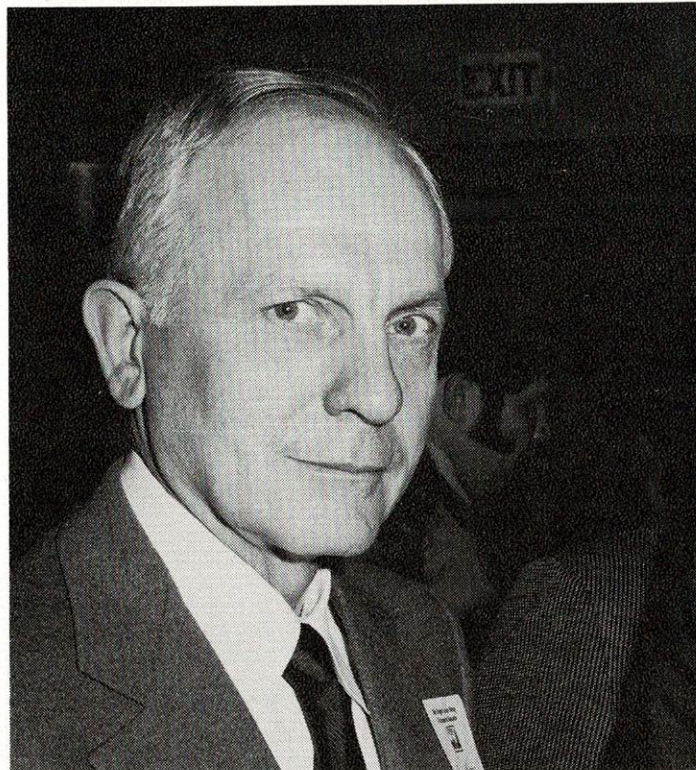
"We Dig People Who Dig Coal"



Member of WWSMRA
 Member of KSMRA



CANNELTON PRESIDENT PAUL MORTON



Statement By

Paul Morton, President

Cannelton Industries, Inc.

Before U. S. House of Representatives
Committee on Interior and Insular Affairs
May 14, 1973

Chairman Udall, Chairman Mink, Members of the Committees:

My name is Paul Morton. I am a West Virginian. I am also president of Cannelton Industries, Inc. and a director of the National Coal Association. My company mines coal in West Virginia, the largest coal producing state in the nation in 1972. I operate both surface and underground mines in and around the Kanawha Valley, where I have lived all my life. Cannelton is a medium sized company. We employ 100 men in our surface operations and they produce 42 percent of our tonnage.

My surface mining operations take place on steep slopes of up to 33 degrees and I believe my reclamation efforts have been highly successful. Before undertaking the surface operations, I had to be certain that the land could be effectively reclaimed. For example, we engineered our earth moving operations and our drainage control to make sure that the area could be stabilized and successfully revegetated. Our operation was pre-planned so that the job would be done right. Upon completion of our operation there will be approximately 2,000 acres of useable level land without leaving any visible highwalls. Flat land is at a premium in the steep mountains. However, certain proposals pending before Congress will arbitrarily close down my surface operations without any regard to the quality of my reclamation work, because I am operating on slopes above 14 and 20 degrees and not returning the land to the approximate original contour. For these reasons I am extremely concerned about the bills now being examined by this Committee.

Mr. Phelps has covered most of the coal industry's major concerns, including the onerous procedural and administrative aspects of the pending bills. I would like to discuss a few other critical items. At this point let me summarize them briefly.

The coal industry is opposed to those provisions in the bills which call for return to the approximate original contour as the primary requirement of reclamation. H.R. 5988, for example, requires return to the original contour without exception in all mountainous and hilly terrain. Even though return to the original contour may be appropriate in some cases, in most instances it would frustrate effective protection of the environment. The steeper the slope, the greater the erosion. As a result of erosion and siltation over the years, there is very little topsoil remaining on natural slopes in Appalachia. Level land, gently rolling terrain, terraces and plateaus are land forms which permit more effective control of erosion, siltation and drainage. Such land forms can hold topsoil, are better suited to vegetation and can be more readily stabilized against slumping and landslides than return of a steep slope. The shape of reclaimed lands should take maximum advantage of these land forms in order to more adequately protect the environment from the effects of erosion, uncontrolled rain water runoff and other such physical damage. Of course, the intended future use should be taken into consideration.

Elimination of highwalls by backfilling to the original contour requires a tremendous amount of earth moving. As a result it is probably the most costly substantive requirement imposed and yet the degree of environmental protection in most instances is questionable, as I have pointed out above. There are several alternative and less costly methods for dealing with highwalls which can be quite as effective—water impoundment, terracing, stair stepping, sloping, partial backfilling and combinations of these alternatives with vegetation, particularly evergreens and other types of trees. In the future, new techniques may be perfected and become available.

Alternative methods for treating the highwall should be specifically permitted by the legislation while, at the same time, it should not preclude the adoption of newly developed methods.

Slope restrictions which would prohibit surface mining on natural slopes above 20 degrees or any other slope limitations are arbitrary and cannot be substantiated. Many operators would be put out of business even if they are doing good reclamation on the slopes. Although the problems involved in mountainous terrain can be more difficult, effective reclamation is being achieved today on steep hillsides regardless of the degree of slope. As I mentioned before, my operations take place on slopes of up to 33 degrees and our mined area is being stabilized and successfully revegetated.

The prohibition in H.R. 3 against placing spoil on natural outcrops above 14 degrees is also arbitrary. Depending upon the mechanical and physical characteristics of the spoil and the outslope, such as shear strength and liquification, if the amount of the spoil is limited and shaped properly, outslope spoil can be successfully stabilized on slopes well above 14 degrees.

I do not wish to belabor the importance of surface mined coal to the United States. You already know. I am sure, that surface mined coal accounted for almost half of total coal production in 1972, and that surface mined coal shipped to the utilities was responsible for the generation of approximately one-quarter of the nation's electricity. Suffice it to say that in an era of energy crisis we cannot afford to prohibit production of some of the best coal in the world. Much of our Appalachian stripable reserves found on steep slopes of 15 degrees or more is low-sulfur high-Btu and high volatile coal. It is unrealistic to prevent 100 percent recovery of this valuable resource by surface mining when the technology exists to effectively reclaim the land after mining.

Approximately 56 percent of our surface mined coal comes from Appalachia, the region ordinarily associated with mountain mining, and I wish to address myself today to those aspects of the bills before you which would directly affect mining in this area. The American Mining Congress and the National Coal Association, the two organizations which I am representing today, both support realistic federal legislation for the reclamation of surface mined land. My comments are not intended to be in opposition to federal legislation. My remarks are designed, rather, to focus upon certain aspects of the legislation which unnecessarily impair surface coal production and which are not necessary for the successful reclamation of mined land. I particularly want to address some oversimplified panaceas that are not aimed at the real problem and which deprive the operator and the regulator of the flexibility necessary to insure protection of our physical environment.

The problems of surface mining in the mountains are all too familiar. They have been the subject of numerous newspaper and magazine articles and television specials. I am not here to make excuses for the past nor to try to convince you that good reclamation is now being done everywhere. But this does not mean that successful reclamation cannot be achieved in mountainous terrain. What has been done in the past is not an indication of what can be accomplished today. There are today many responsible surface miners using sound engineering principles and employing recently developed techniques with an understanding of agronomy and soil mechanics who are doing a sound job of reclamation on steep slopes by returning mined land in Appalachia to productive use.

Nothing is gained by showing pictures of past mistakes to offset what can and is being done in reclamation today. But today's reclaimed pastureland, forest lands, wildlife habitats, recreation areas, fruit orchards and the like can be used to demonstrate that reclamation can be accomplished and to set goals that operators and regulators should strive for. The confusion and bitterness surrounding the reclamation of mined land has brought us no closer to resolving the problems of reclamation. Time would be far better spent if the issue involving stabilization, erosion, sedimentation and revegetation were clarified so that there would be no need to rely on oversimplified, arbitrary slope restrictions and return to the original contour. There is no panacea—no short cut, each job must be evaluated on its own merits.

As a representative of the coal industry, I will state unequivocally that the technology for successfully reclaiming land that has been surface mined does exist today and must be employed. I will also state that the coal industry is a competitive, profit-oriented business that wants to continue surface mining. However, we do not plan to surface mine at the expense of the environment.

I am too pragmatic to believe that a choice must be made between coal production and environmental protection. We live in a highly technological society which is capable of solving many of the complex issues confronting us. If we live in an era of unprecedented energy demand, we also live in an era of enlightened environmental concern. There is, as far as I can see, no reason why these two objectives cannot both be achieved. With a realistic law, good enforcement and continued improvement of technology, we can continue to surface mine and at the same time effectively protect the environment from significant or lasting physical damage.

Mountain stripping has been the target of considerable criticism in the past. Some of it is justified. I am not here to defend the past neglects or errors of the coal industry. What I do want to do is explain the innovations which have taken place in mountain strip mining in the last few years. It is these new techniques of mining and reclamation which now make it possible to restore almost all mountain lands to productive use. And for the fraction that can only be reclaimed at prohibitive cost, I suggest that future research will develop methods applicable to these critical areas.

Before describing the various methods employed in surface mining, I want to call the Committee's attention to a fact which I believe deserves more serious consideration than has been accorded in the public discussion of this issue. I sincerely believe that the surface mining method of extracting our nation's coal resources is more nearly in accord with rational conservation of natural resource policy than is the deep mining for coal. By surface mining we are presently able to make a total recovery of the resource while this is not possible through deep mining. For example, in my own operations, Cannelton can and will recover all 14 million tons of coal reserves presently held in fee and covered by our present 2,000 acre permit. Even if the reserves could be deep mined with the best in underground methods, we would be able to extract less than 4 million tons from that same reserve. Hence, more than two-thirds of our coal would be non-recoverable if not surface mined.

The implications of this elemental fact should be obvious to the framers of our natural resource policy. Even where deep mining is a possible alternative, it simply does not provide the nation with a viable substitute to surface mining. Sound conservation and rational natural resource policy must permit the continuation of a mining methodology which enhances the maximum recovery of this vital resource.

Most mountain coal available through strip mining lies in a series of seams interspersed with layers of earth and rock. The standard method of recovering this coal has been contour mining. In this process, a bulldozer operator cuts a bench on the hillside at the level of the coal seam. The bulldozer winds around the mountain following the coal and the overburden, resulting from the first cut into the hill, is moved to the outer edge of the bench and the outslope. The men then remove the coal and make more cuts—sometimes three or four—into the mountainside, placing the succeeding ridges of overburden on the bench.

Contouring is often used in conjunction with auger mining—a process which draws the coal from an exposed mountain seam by inserting giant, power-driven bits into the side of the hill.

Contour mining is a traditional way of extracting coal from mountainous regions, but it can present problems if not done correctly. The most obvious is that contouring can create potential slides if spoil materials are not properly deposited on the steep inclines. Indiscriminate placement of the spoil can overload the outslope and cause landslides. If the outslope is covered with logs or stumps, these materials can rot and decay and send the overburden sliding down the hillside. Water seeping between the overburden and the outslope also causes instability.

Research in controlling slides has led coal operators and state agencies to develop new mining methods for hilly regions. One method, developed by Warner Ford, an engineer with the Kentucky Division of Reclamation, is the so-called slope reduction method. The goal is to reduce the degree of steepness of a slope so that the overburden will be less susceptible to gravity's pull. Operators accomplish this goal by first removing all the underbrush from the outslope. Then the overburden from the first cut is shaped and spread thin over a predetermined area, rather than indiscriminately stacked in a pile at the top of the outslope. In spreading the overburden, the degree of incline of a slope can be reduced by as much as 5 to 7 degrees. When the operator takes further cuts, he stacks the overburden on the bench. The slope reduction method has been highly effective in preventing slides; additionally, reclaimers can begin revegetating the outslope almost immediately while mining operations are still in progress.

Still in the experimental stages is another new mining technique called the box cut method. This, like the slope reduction method, is a variation on contour mining designed to remedy the problem of troublesome slides.

In the box cut method, the operator makes his first cut well above the coal outcropping. He temporarily stacks the overburden on a prepared bench above the outcrop while he removes the coal from the cut. When this first step is completed, he fills the cut with the original overburden, then makes another cut to the same slope further down the slope. The overburden from this second section is stacked on top of the first cut. When all the coal exposed by this cut has been removed, the overburden is returned to the trench. The finished effect is a hillside with no overburden on the outslope—hence, no slide potential.

Not only does the box cut method reduce the likelihood of slides, it minimizes the controversial highwall. There is a feeling among many strip mining critics that the vertical bank left after contouring defies successful reclamation. While most highwalls stand out if not treated and do present special problems, I would like to point out that time and vegetation will reduce their visual effect. And, in some instances, they do serve a useful purpose.

To begin with, many highwalls can be treated with vegetation. In Boone County, West Virginia, for instance, there are mountains that were mined 20 years ago where it is virtually impossible to identify the three former highwalls now covered with a dense, young stand of timber. Where several cuts create particularly tall highwalls, operators can, if necessary, carve steps into the bank and plant on them. Additionally, the overburden from above a highwall in certain instances can be graded over the highwall to produce a slope suitable for growing trees or grasses. Water impoundments, where they can be used, terracing, partial backfilling and a combination of these methods are also successful.

The approach which my own company is currently using is a combination of the so-called valley fill method and area mining of mountain tops. Let me first describe the valley fill procedure. Most mountain tops are indented with narrow valleys. Where the coal seams lie near the top of the mountain, we build an earthen dam at the mouth of the valley, then remove the overburden from the coal and store it in the horseshoe-shaped hollow. The result is a wide expanse of level ground—the sort that is at a premium in mountain areas.

In area mining of mountain tops the first cut is spread down the outslope in the same fashion used for the slope reduction method. The remainder of the mountain top is area-mined in the same way the flat lands of Indiana or Illinois are mined. Once the coal has been removed, the land is graded to a gently rolling topography. Land mined in this manner can be planted to forests, grow agricultural crops or be used to graze livestock.

I should like to illustrate the importance of the value of such wide expanse of level ground produced by surface mining by sharing the experience of the people of the Upper Kanawha Valley. Flat land is so extremely limited in this area that an acute shortage of land for housing, schools, and institutions has existed for many years. The existing areas along the narrow Kanawha Valley are completely occupied with residential and industrial developments. This has created a crisis in providing residential housing, for example, for hospital personnel and the faculty at West Virginia Institute of Technology and a site for a new high school complex. In this respect the Kanawha Valley is not unlike many other areas in mountainous terrain which have experienced population growth which is confined to a narrow strip-like corridor development along the rivers. Thus the concept of creating level land to establish a base for further residential, commercial and institutional development in the Upper Kanawha Valley is not a new one—or one conceived by Cannelton Industries. This was a proposal advanced by the late Dr. DeWitt Peck, a community leader, in this area of West Virginia, more than five years ago. This was not achieved, however, because the large capital sums were not available to bring about this urgently needed goal.

In 1967, however, when my company began surface mining operations in this area, it offered the region a unique opportunity to have this vision of Dr. Peck's become a reality as a byproduct of surface mining for coal. Hence, the surface mining of coal provided the economic base which was lacking heretofore.

What is presently contemplated by our company, working together with the West Virginia Institute of Technology, is a level area of about 2,000 acres. Additional land contiguous to this property could be integrated into this project in the future. Under our present mining permit 700 acres would be available for development within a few years. Ultimately we could make 2,500 acres available for a population of 23,000.

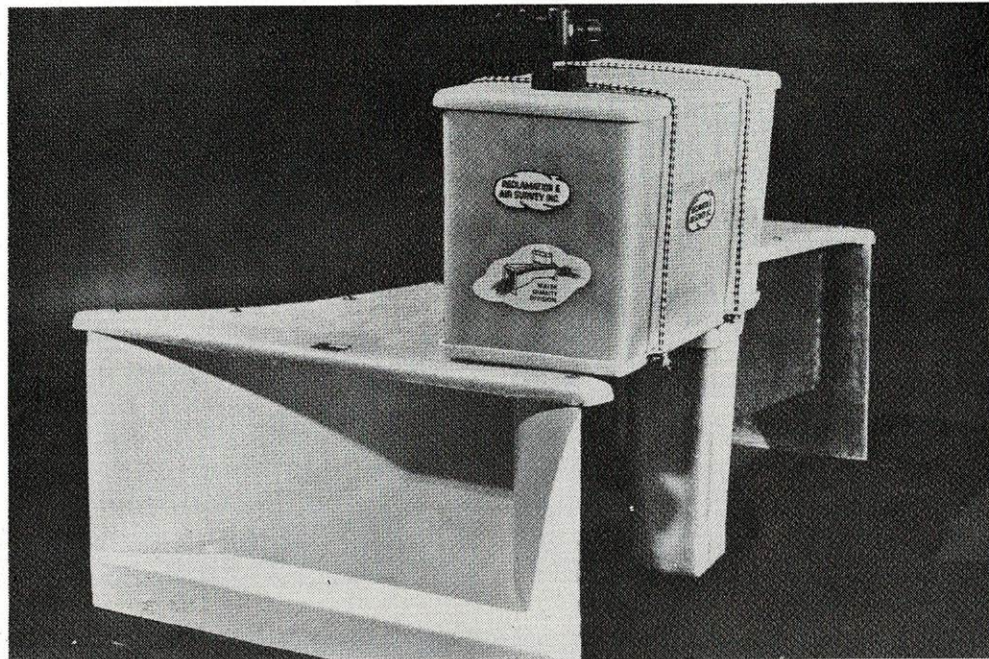
In order to illustrate this concept further, consider a similar instance of the creation of level land in this area by the construction of the Kanawha County Airport at Charleston. The public had to pay, in this instance, for leveling the land in a manner similar to what we are doing in mining.

If our plan comes to fruition, we will have accomplished a landmark in reclamation. If it does not, we will be disappointed, of course, but the land will still lend itself well to expanding our livestock herd and increasing our acreage planted to crops or reforestation.

Both the valley fill method and the area mining of mountain tops permit effective control of erosion, siltation and drainage. Stabilization can be readily achieved from the outset and they provide more flexibility in selecting the end use for the land. Additionally both methods can accomplish complete recovery of a coal seam. While this may be difficult for some people to recognize as conservation, it is just that. By taking all the coal in one mining operation, we not only contribute to the nation's energy reserves, we also assure that the land will not be needlessly disturbed a second or third time. This has, unfortunately, been the practice among some operators who take what coal they can easily extract from a hillside, make their profit and leave. Coal that could

(Continued on Page 37)

Introducing



The Jk 517 Water Treatment System

The JK Water Treatment System is a water operated, positive proportionate chemical neutralizer for treatment of deep and surface mine drainage. Features of this unique system include:

- Easy Installation
- Complete Portability
- Requires No Power Supply
- Completely Automatic
- Reinforced Fiberglass and Stainless Steel Construction
- Corrosive Resistant
- Complies With Various States Discharge Standards

For further information on the new JK 517 Water Treatment System contact

Ecology Supply
R.D. No. 4
New Philadelphia, Ohio 44663
(216) 364-1617

Reclamation Industries, Inc.
P. O. Box 947
Clarksburg, West Virginia 26301
(304) 622-5286

Morton (continued from Page 35)

have been mined at the time is left behind. Later, either the same company or another one may come back to mine the remainder of the seam. As a consequence, what reclamation has been performed on the land will be disturbed and will have to be performed again—from the beginning. In most instances, through proper advance planning and by using our newer mining methods, total—or near total—recovery and total reclamation can be achieved in one operation.

I am optimistic about the advances that research has made in reclamation. The four new mining methods which I have described to you—slope reduction, box cutting, valley filling and area mining of mountain tops—are more than theories conceived in a laboratory. I do not mean to imply that we do not do research—we do. The techniques I have talked about are exciting because they permit efficient coal recovery and at the same time make successful reclamation possible.

I do not mean to imply that our new methods are the only means of mining which allow successful reclamation. There are hundreds of instances where hills which have been contour mined are now so well revegetated that most people do not know that they were once active strip operations. But our search for new and better ways to extract coal has made reclamation a less difficult and time consuming task.

Research has also enabled us to solve some of the other problems of mountain mining. Seeding, for example, is not easily accomplished on the steep slopes of West Virginia. The use of the hydroseeder—a machine which sprays a mixture of water and seeds onto a hillside—has allowed us to revegetate hillsides more quickly and effectively than before. Aerial seeding by helicopter is also helpful in our up-and-down terrain.

We've also spent considerable time in cooperation with state, federal and university research teams in tracking down various plant species which will adapt themselves to mined land and thrive in sometimes difficult soil and weather conditions. But just as important as appropriate species is the ground they will be planted in. Fertilizers will provide a necessary shot in the arm to help establish plants initially, but its effects are only temporary: the effects of good soil, on the other hand, will last much longer. If the earth left after mining is acid, we grade it and cover it with a layer of soil more suitable to vegetation.

Grading must be done with caution and skill, however; while some earth moving is always necessary before reclaimers can begin planting, excessive grading—especially in the muddy spring months—compacts the soil and makes it difficult for water to penetrate the surface.

Water—too much or too little of it—is always a concern in reclamation of mined land. Especially on steep slopes, heavy rainfall can erode a hillside and carry silt from old mining operations into the streams below. Again, our research has helped us correct this situation.

In West Virginia we are required by law to construct silt dams or basins which will slow the flow of water to the bottom of a slope and

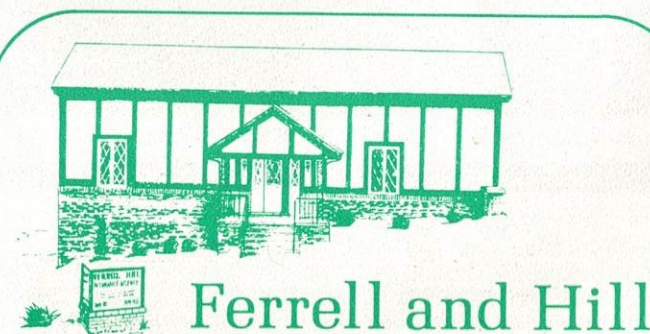
catch sediment and allow it to settle out. These ponds must be built before mining begins and, consequently, they are an integral and carefully planned part of the entire mining operation. Our experiments have also shown that land that is furrowed and planted checks water runoff more efficiently than land that is graded normally.

In view of the substantial progress we have recently made in reclaiming mountain land, total prohibition or prohibition above a certain degree of slope is unrealistic and unnecessary. Those who say that mountain mined land cannot be returned to productive use are not taking into consideration the great strides we have made in the last five years. Not only are we now able to reclaim previously marginal land, we are able to do it faster. There is a necessary lag between the time mining takes place and the day when the land once again blends into the landscape. This lag, however, has in many cases been shortened to a period of one to two years—a period no longer than what we endure when new highways or subdivisions are relandscaped.

If the legislation now being considered by this committee **does** provide for some type of prohibition, each operation should be determined on a case-by-case basis rather than under a blanket policy. I say this because, as I have pointed out, our improved technology is continually allowing us to successfully reclaim lands that were once extraordinarily difficult. In addition, the type of operation, the physical characteristics of each site, the recoverable coal, the economics of the operation and many other factors must all be evaluated to determine whether a proposed reclamation plan is physically and economically feasible. Without examination of each proposed operation, many areas actually capable of being reclaimed through new technology, by a more efficient operator or by an operator who has obtained a better price for his coal, will be unfairly classified as unmineable.

Some of the proposals now being studied would require that topsoil be replaced, but this suggestion should be viewed in the light of what we have learned in recent years. Much mountain topsoil is sparse and is worn out. In some cases strata of earth uncovered in mining provide better growing media than the original top layer. Reclaimers have discovered that knowledge of the soil strata permits the identification of which layer, or combination of layers, of the overburden will best support vegetation. Having determined this, the mining operation is carried out so that this soil will become the upper layer when grading takes place. Buried strata do not, of course, always provide better growing conditions. Sometimes the topsoil **should** be replaced. Again, each situation should be studied individually.

The coal industry favors federal legislation regulating strip mining. We realize that the myriad problems presented by reclamation can be effectively approached through a national policy realistically written and justly administered. What we do ask is that the architects of this law realize that not all mined land is alike, and that a certain degree of flexibility in the reclamation criteria is necessary to return this land to productive use.



Ferrell and Hill Insurance Agency

All Types of Insurance

Dennie L. Hill
James H. Cooke

Telephone 369-1111

492 Main Street
MADISON, WEST VIRGINIA 25130



WILLCO RECLAMATION, INC.

Reclamation and Hydroseeding
Landscape Seeding—Erosion Control

If you want it green call Willco.

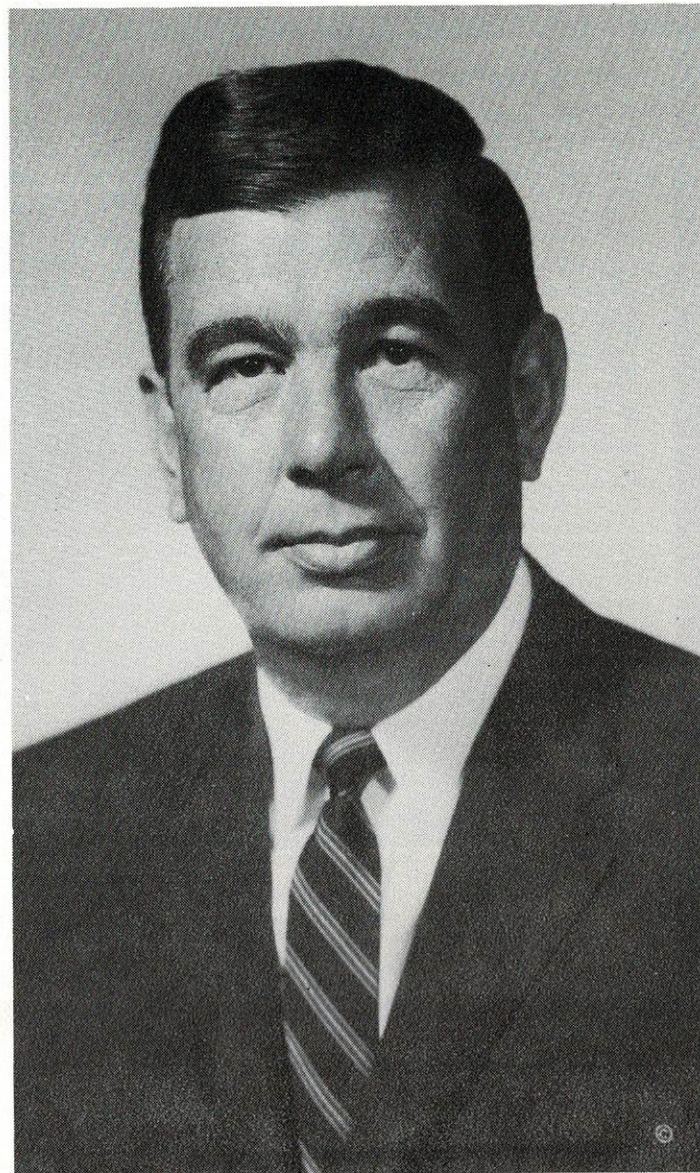
304-872-2287

303 Irish St.

Summersville, W. Va.

26651

**U. S.
CONGRESSMAN
JOHN
SLACK**



**Statement By
Congressman John Slack**
On Surface Mining Proposals
Before The Environment and Mines and
Mining Subcommittees
of The House of Representatives Committee
on Interior and Insular Affairs
April 9, 1973

This Committee has accepted what may be the most challenging and complex task to come before any Committee of the 93rd Congress by undertaking to write equitable and enforceable regulations to govern surface mining.

The subject has been the theme of endless assertions, estimates and conclusions. If effective legislation is to be written and passed into law the Committee will need all of the clear-minded, unemotional, knowledgeable help it can locate.

The central purpose behind the proposal to regulate surface mining is the protection of our environment. It is a praiseworthy goal. It is sufficiently important to justify much effort by all interested parties. It is a goal that will rally support not only among a great majority of the American people but also among responsible elements in the mining industry itself.

As Representative in Congress for one of the nation's largest coal producing districts, I have naturally observed the surface mining controversy with watchful interest. The manner in which the controversy is resolved will have a marked effect on the present status and future prospects of thousands of families in my District and my home State.

After thoughtful review of all that has been said during the past three years, I have asked this opportunity to speak for the purpose of emphasizing only a few cardinal points.

First, the specific purpose of the proposed legislation is NOT to regulate a mineral—not any particular mineral—but rather to place environmental safeguards around a METHOD of extraction.

If limitations are to be placed on a method, then these limitations must apply across the board, no matter what mineral is extracted. Anything less and the environmental pro-

tection goal cannot justify the limitations, and we would be left with a discriminatory proposal mounting the full weight of Federal authority against only one participant in a competitive business area.

We have on the books a prohibition against the use of explosives in Federally-administered streams for the purpose of procuring fish. This law does not apply only to certain kinds of fish; it applies to all aquatic life. It is a law forbidding a METHOD of fishing. This I believe is the point of departure for consideration of surface mining regulation also.

Recalling the language of the bill brought before the House last year, I would comment on another significant point. If legislation is written to forbid surface mining under certain specific conditions, and this prohibition applies to minerals which, because of geographic location or proximity to the surface can be extracted only by surface mining, then the legislation must provide for compensation to the owners of such minerals.

From personal experience dating back to the years when I served as a County Assessor, prior to my first election to Congress, I can assure the Committee, that mineral reserves located underground are assessed and taxed as property in West Virginia, and no doubt in many other states.

Taxes are paid annually to maintain private ownership and title to the reserves, and to avoid tax delinquency which would result in forced sale at public auction. The reserves are acknowledged as privately-owned taxable property. The owners pay taxes as an investment, in the belief that at some point it will be economically feasible to extract the minerals for marketing, and their profits will reimburse the taxes they have paid.

Frequently the reserves are so located that deep mining is too dangerous for the workers and surface mining is the only feasible method. If the legislation contains a prohibition against extraction in such cases, and thereby eliminates the economic value of property on which property taxes have been paid, and if this is done to support the public purpose defined as environmental protection, then I submit that the Committee must give consideration to the Fifth Amendment to the Constitution which states "...nor shall private property be taken for public use, without just compensation."

A compensation clause must be written in the bill to provide reimbursement to those property owners whose holdings are being declared unrecoverable and unmarketable.

One final point deserves consideration: Surface mining legislation is not a proper battleground for the politics of confrontation. The basic issue is far too important to be permitted to serve as a tourney between those faced with the responsibility for national energy requirements and their opponents clad in the shining white armor of environmentalism.

There are two national imperatives which overshadow the subject matter of the legislation—a major energy shortage on the near horizon, and a balance of payments problem which is already with us. Both will be affected drastically, for good or ill, by the thrust of this legislation.

It is time to "accent the positive, eliminate the negative, latch on to the affirmative, and don't mess with Mr. In-Between" as the old music hall song used to say.

It is time to ignore the unsupported assertion that "the land can't be reclaimed."

It is time to file the old pictures of acidized streams damaged by the mining practices of 1942.

It is time to require some proof when the motives of energy producers are questioned.

Review of advances in mining and reclamation practices and techniques during the past ten years must convince any fairminded person that further technological advances will master the problem of how to recover the minerals and yet pass along to our children a land surface hospitable to natural growth and giving us no cause to stand in shame on the pages of American history.

Let's understand clearly just what's at stake here. We have the world's largest production system and the highest standard of living. It is fashionable in some quarters to speak slightly of our "consumer goods economy." The statement is inaccurate.

We have an energy economy, because our total range of production from the smallest consumer item to the most massive machine tool relies for its birth on a consistent supply of energy. When we act to lower the potential supply of energy, we take the first step toward reduction of our standard of living and abdication of our world position. It is that simple.

So surface mining legislation moves directly to the vital center of our country's existence. For this reason the legislation deserves the most careful and impartial consideration, not only as it relates to today's immediate goals, but also as its requirements project toward our national future.

I thank you.

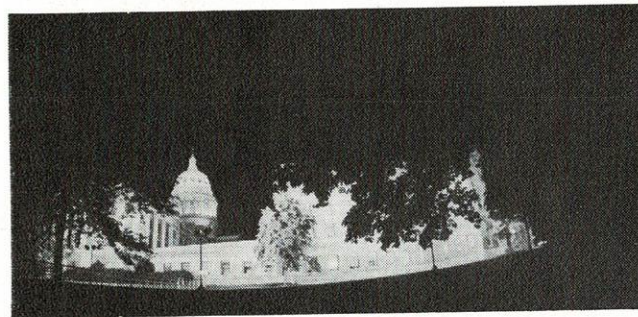
JOHN SLACK

Native West Virginian, educated in public schools and Virginia Military Institute.
Veteran of World War II

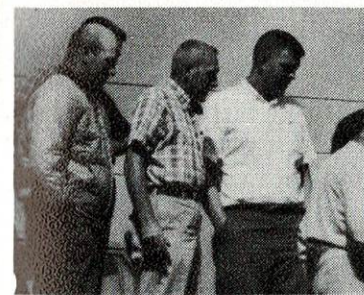
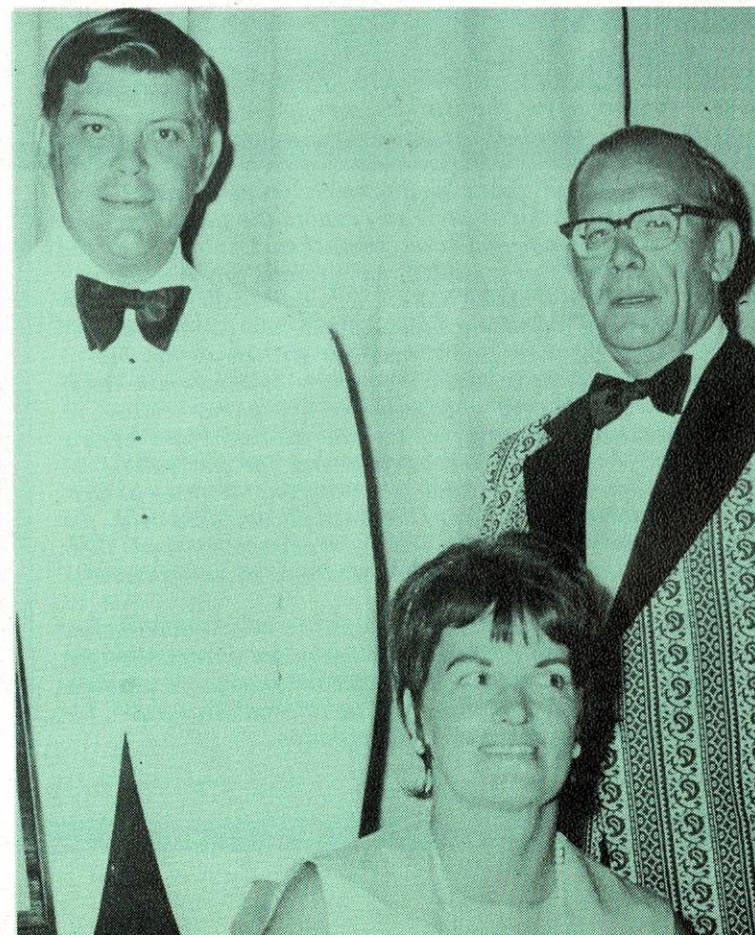
Served in 86th Congress and each consecutive Congress to and including the present 93rd Congress.

Member of the House Committee on Appropriations, the body charged with Constitutional responsibility for the origination of funding for all Federal agencies of our government. Direct subcommittee responsibilities cover appropriation requests for the Departments of State, Commerce, Justice, the Federal Judiciary, and the Subcommittee on Public Works, including all Appalachian development programs.

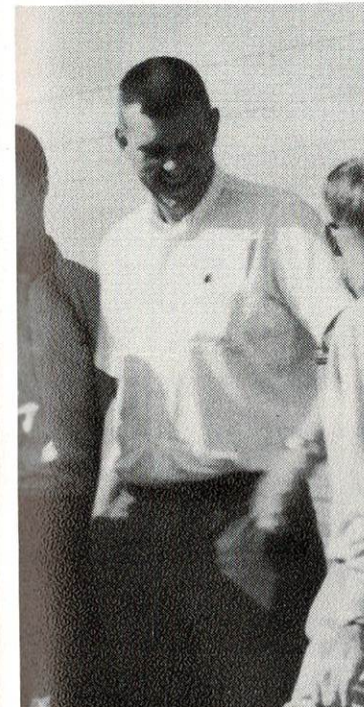
JIM WILKINSON 1966 - 73



1972



1968



1969



1970



1967

WVSMRA President Jim Wilkinson

1972-73 President

1971-72 Chairman, Personnel Committee

1970-71 Second Vice President

1969-70 Chairman, Technical Committee

1968-69 Chairman, Technical Committee

1967-68 First Vice President

1966-67 First Vice President

1966-73 Board of Directors



1973



1966



1972



1973

HEARING ON

FEDERAL SURFACE MINING LEGISLATION

TESTIMONY OF THE WEST VIRGINIA SURFACE MINING AND RECLAMATION ASSOCIATION

By James L. Wilkinson
President

Joint Committee on Mines and Mining and
Environment of The House Committee on
Interior and Insular Affairs
April 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.

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.

By any yardstick of reason those who advocate elimination of surface mining for environmental considerations can only be interpreted as ill-advised and unrealistic. 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 inaccessible areas. Haul roads and bench areas created by surface mining help minimize initial costs of deep mine development.

This is backed up by the Stanford Research Institute's recent report on surface mining in West Virginia. 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 inaccessible underground reserves.

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

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

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. We oppose any approach which singles out surface coal mining as though it is the only disturber of the earth that must be regulated. Statistics show that 60% of the land is disturbed by surface mining for substances other than coal.
- (2) 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.
- (3) 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.

In conclusion, our Association asks that it be given the opportunity to prove to this committee the validity of what I have said today — that reclamation is being accomplished in a successful and productive manner in West Virginia. We make this request because what this committee was told and shown during its tour of our state last week was not, in our opinion, representative of the true reclamation practices under existing law in West Virginia.

Thanks...

In looking over the history of the West Virginia Surface Mining and Reclamation Association, there's one name that comes up numerous times, Jim Wilkinson. He is a charter member of the Board of Directors and has been a member of the Board since the Association was formed in 1966.

Serving as First Vice-President from 1966 through 1968, Jim then stepped down to become Chairman of the Technical Committee from 1968 through 1970. In 1970 and 1971 he served as Second Vice-President and Personnel Committee Chairman, respectively, and was then elected President in June, 1972. During his eight years of service to the Association, he has been a member of the Executive Committee four times.

Jim's term as President has proven to be one of the most hectic and crucial years in the history of the industry. He has expended endless hours and effort, both in Charleston and Washington representing the industry on legislative matters. He testified before the U.S. House of Representatives Committee on Interior and Insular Affairs twice, appeared before the U.S. Senate Committee on

Interior and Insular Affairs this past spring and has made numerous other trips to the nation's Capitol on behalf of the Association.

Jim was personally active in the most important election in the history of the coal industry and more recently has been instrumental in initiating action that may soon bring several million dollars in Federal surface mine reclamation research grants to West Virginia.

In addition, he has maintained his position as Vice-President of Kingwood Mining Company, a name long synonymous with outstanding mining and reclamation in Preston County.

Our parting President has also spent countless days away from his family, on behalf of the Association and we therefore want to thank his wife Shirley, daughter Lee Ann and son John, for their patience.

It is difficult to find the words to show appreciation to a man who has contributed so much to his community, his industry and his state during the past eight years. Surely thanks is not enough, but thanks is what we have for Jim Wilkinson.

West Virginia Surface Mining
and Reclamation Association

Cures for the Common COAL



Coal has a lot of little "health" problems—most of them brought on by the changes in our society and the way we all want to live.

These changes are *good*, but they have created problems for the coal industry—how and where to use coal and in what form.

Consol hasn't been sitting idly by. We're doing something about those problems...something that will not only "cure" them, but create more uses for coal and more and safer jobs.

For example...

Converting Coal into Gas (Gasification)

Consol has developed a process that converts coal into natural gas. Pilot plant is in operation now. The new process will eventually use millions of tons of coal and help overcome the growing shortage of natural gas.

Scrubbing the Sulfur Dioxide Out

Most of the coal in this area has too high a sulfur content for power plants to use under new Federal air pollution standards—but Consol's researchers have developed a sulfur removal process now in pilot plant test. When perfected, a ready market awaits millions of tons of coal.

Converting Coal into Liquid Fuels (Liquefaction)

Techniques originally developed in Consol's laboratories and tested in a pilot plant at Cresap, W. Va., will, in the future, convert coal into petroleum products such as fuel oil to power electric generating plants, requiring huge amounts of coal.

Pelletized Coke

Steelmakers, also, have air pollution problems, and Consol's BNR Formcoke process is solving this problem, too, with clean, nonpolluting formed coke. The process can utilize even poorer grades of coal.

That's just a sample! Consol's dozens of new approaches and innovations to safety, mining methods, production and uses are now in final or advanced stages.

Coal's future is secure.

CONSOL'S RESEARCH WILL SEE TO THAT.

CONSOL
CONSOLIDATION COAL COMPANY
1 Oliver Plaza, Pittsburgh, Pa. 15222 (412) 281-8700

