Green Lands
West Virginia Mining
& Reclamation Association
1624 Kanawha Blvd. East
Charleston, WV 25311

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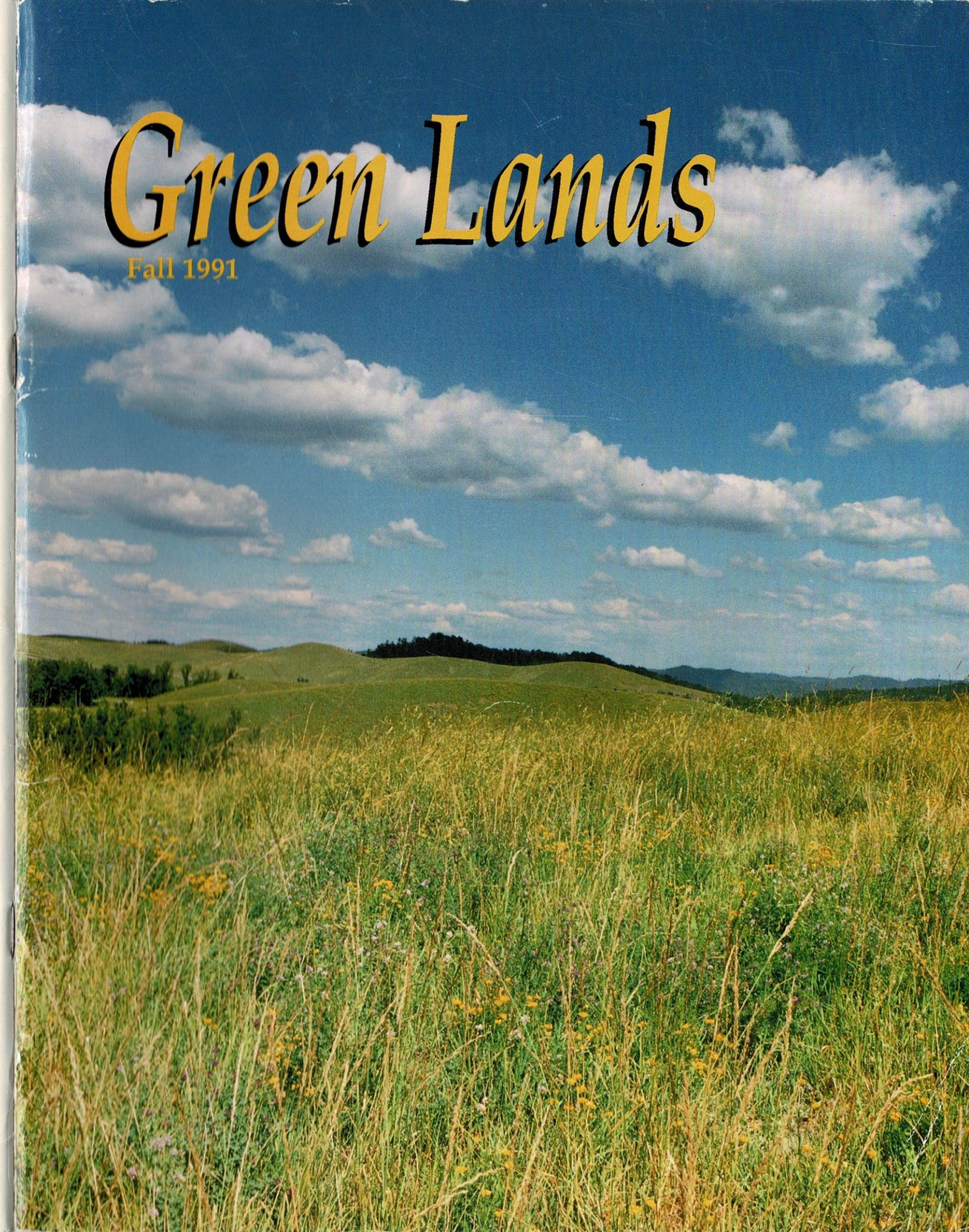
Green Lands

Fall 1991



Green Lands

Volume 21 Number 4

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

Our Cover
Hobet Mining Inc.'s Boone County Surface Mine has long been a source of pride for the West Virginia mining industry. Now it's a national winner.
See page 6.

Index to Advertisers

Hobet's large scale surface mine in Boone County has been returned to the gently rolling countryside of the pre-mining years.

Hobet wins national honors

Hobet Mining, Inc. is the 1991 recipient of the Kenes C. Bowling National Mine Reclamation Award. The award is presented annually by the Interstate Mining Compact Commission in honor of its founding Executive Director.

It is given to mining operations in coal and non-coal categories which have demonstrated excellence in reclamation, based on its compliance, contemporaneous reclamation, drainage control, bond release, and innovation.

Hobet won in the coal category for its Number 21 Surface Mine in Boone County. Hobet was nominated by the State of West Virginia for its "successful reclamation of a large operation which resulted in gently rolling plateaus capable of supporting a variety of post mining land uses, including range lands and wildlife habitat."

The company's reclamation was cited for its "timeliness and efficiency, excellent grading, sloping and revegetation of affected areas, water management practices, including the routine stocking of toe ponds with large mouth bass, channel catfish and hybrid bluegill, and the flourishing of wildlife habitat."

Hobet produces low sulfur coal with electric draglines from sites in Boone and Logan Counties. Hobet Mining, Inc. is an independent subsidiary of Ashland Coal, Inc.

Hobet's outstanding reclamation efforts have resulted in a lush habitat for wildlife.

Hobet excels in every aspect of reclamation, including vegetation and drainage, as illustrated here.

Crown Hill Equipment, Inc.

We have the following items in stock for exchange or outright sale:

- 992C - 13.5 cubic yard Rock Bucket
- 992C - Upper and Lower oil sealed bucket pins
- 992C - Lift, tilt and steering cylinders
- Hydraulic cylinders for 988 / 988B / 777 / 769 / 773 / D9G&H / D8H&K / D8L / D9l
- Exchange final drives for D9H S/N/ range 90V and up
- Exchange D9H - 19K "U" blade
- Rebuilt D9H push arms

- We also have access to a wide range of "take off" parts (planetaries, axles, engines, transmissions, torques) for all makes of Cat equipment.

- Hydraulic pumps and motors for Cat equipment along with a complete line of "wear" parts (bucket teeth, cutting edges, adapters, rollers, tracks, etc.)

Crown Hill Equipment, Inc.
Route 61 - Crown Hill, WV 25052
(304) 595-4111
Now Toll Free 1 - 800 - 950-4445

NORTH AMERICAN GREEN

Shown Actual Size

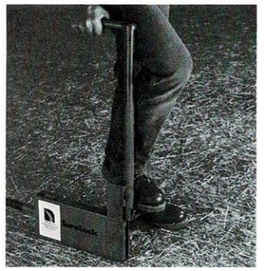
Control Erosion In Heavy Rains. Conserve Moisture When There Is No Rain.

North American Green offers a variety of Erosion Control Blankets to suit a variety of situations:

Just Roll It On

Starting at the top of the slope to be covered just unroll the Blanket. The Blanket should never be stretched so that contact with the soil can be maintained. Follow the simple instructions included with each roll.

Staple It Down



As you unroll the Blanket, staple it firmly to the ground using North American Green Surelock. Generally one staple per square yard will be sufficient. Under adverse conditions more staples might be required. Staple patterns are illustrated in the installation instructions.

Let Nature Do The Rest

North American Green Erosion Control Blankets create an ideal environment for seed to germinate. Because the Blankets are so well constructed, they help prevent the loss of moisture through evaporation, yet because the Blankets are porous, the ground will accept additional moisture through rainfall.

North American Green Products

S75	Straw Blanket for moderate runoffs 4:1
S150	Straw Blanket for heavy runoffs 3:1
SC150	Straw/Coconut Fiber Blanket for heavy runoff 2:1
SCC225	Straw/Coconut Fiber Blanket with seed for heavy runoff 2:1
C125	100% Coconut Fiber Blanket for extreme conditions and ditches.
P-300	100% Nylon Permanent Ditch Liner

Write or call North American Green for more information on the complete selection of Erosion Control/ Revegetation Blankets.

Take the guess work out of erosion control.

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Highway 70 East
Madisonville, Ky. 42431
P.O. Box 144 Area Code 502-821-2634

BRANCH
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Prestonsburg, Ky. 41653
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NORTH AMERICAN GREEN
14649 Highway 41 North
Evansville, IN 47711

Don Cussins - WVMRA Chairman for 1991-92

WVMRA Past Chairmen

1966-67	Leo Vecellio, Sr.
1967-68	F. B. Nutter, Sr.
1968-69	Arch F. Sandy, Jr.
1970	John C. Anderson
1970-72	G. B. Frederick
1972-73	James L. Wilkinson
1973-74	Lawson W. Hamilton, Jr.
1974-75	James C. Justice, Sr.
1975-76	H. L. Kennedy
1976-77	Frank D. Jennings
1977-78	James H. Harless
1978-79	John J. Faltis
1979-80	Charles T. Jones
1980-81	Lawrence A. Streets
1981-82	William C. M. Butler, III
1982-83	Donald R. Donell
1983-84	Tracy W. Hylton
1984-85	Carl DelSignore
1985-86	Dwight M. Keating
1986-87	Theodore J. Brisky
1987-88	James W. Anderson
1988-89	Roy G. Lockard
1989-90	Paul F. Hutchins
1990-91	Kenneth G. Woodring

Don Cussins is 25th Association Chairman

WVMRA celebrated its silver anniversary in style from August 8-11, with over 600 members and guests in attendance at The Greenbrier for the Association's 25th Annual Meeting. Fourteen of the organization's 22 living chairmen were in attendance.

In addition to electing a new slate of officers, the membership inaugurated the "Silver Anniversary Club," participated in a full slate of technical sessions, and enjoyed several recreational competitions, as well as a variety of social events.

New Chairman

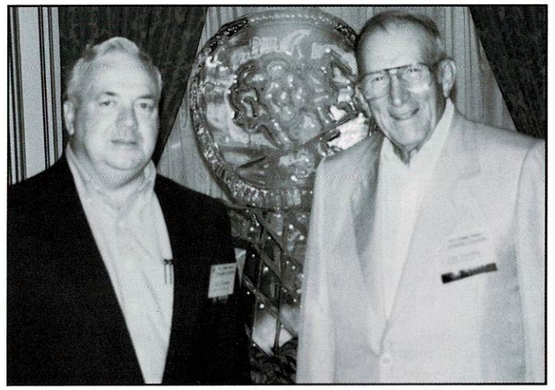
Don Cussins of Bayard is the new Chairman of the Board, as WVMRA enters its second quarter century. He was elected to a one year term, succeeding Ken Woodring of Ashland Coal, Inc. who served as chairman in 1990-91.

The President of Buffalo Coal Co., Don is a native of Davis, graduating from Mountaineer High School. He joined Buffalo Coal in 1960, and was promoted to office manager two years later.

In 1968, he became Secretary-Treasurer of the company, and was named Vice President in 1974. In 1984, he became the President of Buffalo, a company which enjoys a reputation as one of West Virginia's most community minded companies, and a leader in the field of mine reclamation. Buffalo has been in the news in recent months for reconstructing valuable wetlands in the area near Blackwater Falls State Park. Last winter, the company was honored by Ducks Unlimited as the inaugural winner of the "Wetlands West Virginia Award."

Other New Officers

Other new officers elected at the meeting include: 1st Vice Chairman - James J. LaRosa, LaRosa Fuel Co., Inc., Clarksburg; 2nd Vice Chairman - Donald K. Cooper, Imperial-Pacific Investments, Inc., Charleston; Secretary - Gerald W. Ramsburg, C & W Coal Co., Clarksburg; Treasurer - K. O. Damron, Marrowbone Development, Co., Houston, TX; and Associate Division Chairman - D. Stephen Walker, Cecil I. Walker Machinery Co., Inc., Charleston.



New Chairman Don Cussins (l) with Leo Vecellio, who led the Association as President when it was founded in 1966.

Patty Bruce (c), and Mary Ann Steele were honored for their long service to the Association. Mary Ann joined the staff in 1971, while Patty helped open the doors in 1966.

Associate Division Chairman Steve Walker

Board Members

Six representatives from the General Division were re-elected to the board, including Woodring, LaRosa, Cooper, John R. Bryan, The Pittston Coal Group, Lebanon, VA; Paul F. Hutchins, Freeman Branch Mining, Columbus, OH; and James C. Justice, Bluestone Coal Corp., Beckley;

Marcus Ladd of Mingo Logan Coal Co., Wharncliffe, was newly elected from the General Division, and William A. DiRico, Jr. of Arch of West Virginia, Yolyn, was appointed to fill an unexpired term.

Newly elected board members from the Associate Division are Walker; John Wellford of Kimberly Industries, Inc., Charleston; and Roger Fitch of Rudd Equipment Co., Charleston.

New Members

Twenty one companies joined WVMRA as it celebrated its Silver Anniversary.

In the General Division, four companies were added including: **Eagle Carbon, Inc.**, Summersville, Todd A. Dean, representative; **Evergreen Mining Co.**, Summersville, Brian L. Johnson, representative; **VACO Resources, Inc.**, Avondale, Harry M. Charles, Jr., representative; and **Vandalia Mining Corp.**, Summersville, Michael J. Quillen, representative.

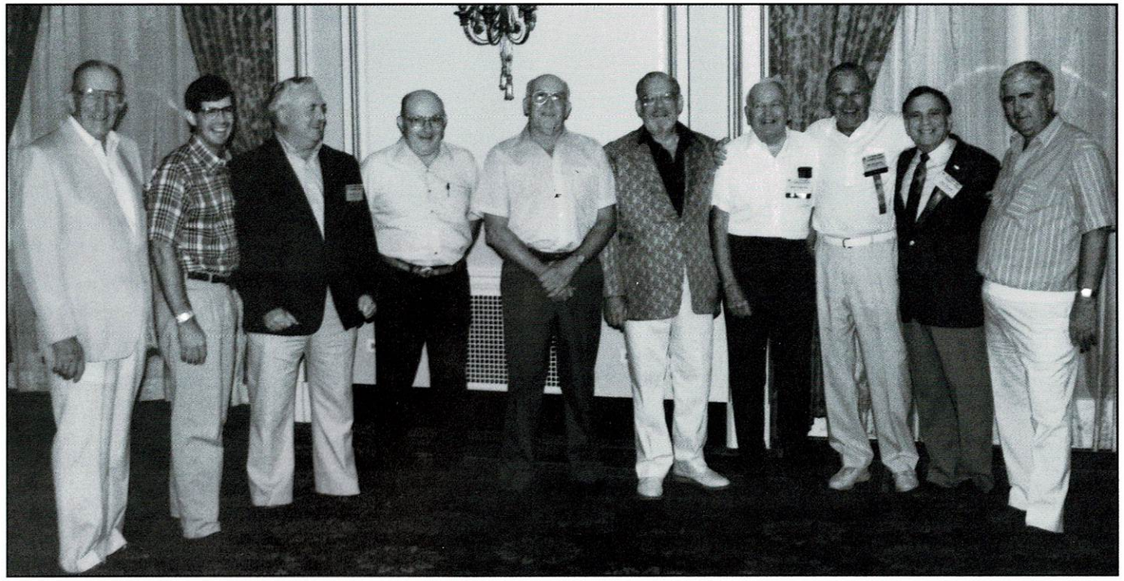
New Associate Division members are: **Arcadian Corp.**, Washington, PA, Thomas P. Dierken, representative; **Black Diamond Construction Co.**, South Charleston, William G. Casto, representative; **BBI Environmental**, Martinsburg, Thomas H. Brand, Jr., representative; **Chesapeake Mining Co.**, Charleston, Donald C. Pauley, representative; **Dames & Moore,** Hurricane, Bill Chambers, representative; **Drill Concepts, Inc.**, Roswell, GA, James L. Chrivia, representative; **Greenbrier Limestone Corp.**, Lewisburg, Reggie Dixon, representative; **Guyan Machinery Co.**, Chapmanville, Joseph D. Lile, II, representative; **Joe Boggs & Associates, Inc.**, South Charleston, Joe Boggs, representative; **McKenzie Engineering**, Summersville, Harry D. McKenzie, representative; **Mountain Explosives Co. (MECO),** Paintsville, KY, John Bussey, representative; **Nelson Brothers, Inc.**, Parrish, AL, Gary Self, representative; **P & A Engineers & Consultants**, Charleston, Michael B. Whiteside, representative; **Savage Industries, Inc.**, Lexington, KY, G.E. Vaninetti, representative; **Waters, Warner & Harris**, Clarksburg, James A. Harris, representative; **Western Pocahontas Properties L.P.**, Huntington, Nick Carter, representative; and **WOPEC**, Lewisburg, Tiff Hilton, representative.

Silver Anniversary Club

The 25th Anniversary Meeting marks the founding of the 'Silver Anniversary Club,' comprised of the original representatives of still active founding companies, former chairmen, and those with long and distinguished service on the Board of Directors or the staff.

Charter members of the 'Silver Anniversary Club' are:

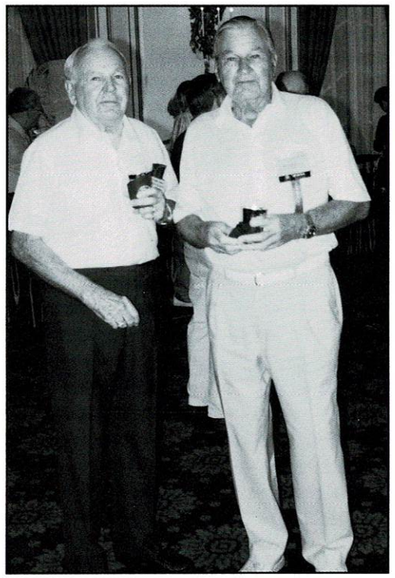
ANDERSON, Bill
ANDERSON, Jack
BAILEY, Kyle
BASHAM, Burke
BRISKY, Ted
BRUCE, Patty
BUNCH, Bob
BUTLER, Bill
CARTER, Alfred
COMPTON, Jim
COTTRELL, Finley
DEARTH, Bernie
DELSIGNORE, Carl
DONELL, Don
FAIRCHILD, Jack
FALTIS, John
FOLIO, Bernard
FREDERICK, Gil
HAMILTON, Lawson
HARLESS, Buck
HARVEY, Bill
HORN, Tom
HUTCHINS, Paul
HYLTON, Tracy
JENKINS, Milford
JENNINGS, Frank
JOHNSTON, Chap
JONES, Charlie
JUSTICE, Jim
KEATING, Dwight
KENNEDY, Mike
LAROSA, Jim
LOCKARD, Chick
LYONS, Morgan
NUTTER, Fil
SANDY, Arch
SCHOLL, Earl
STREETS, Lawrence
SURGEON, Ed
TEETER, Andy
VECELLIO, Leo
VIGNEAULT, Frank
WALKER, Cecil
WHITE, Jim
WILKINSON, Jim
WILLIAMS, Loyd
WOODRING, Ken



WVMRA's Silver Anniversary Annual Meeting brought together fourteen of the men who have served the Association as Chairman. Ten of these gentlemen attended the Saturday afternoon reunion reception. Pictured left to right are Leo Vecellio, 1966-67; Ken Woodring, 1990-91; Don Cussins, 1991-92; Lawrence Streets, 1980-81; Frank Jennings, 1976-77; Lawson Hamilton, 1973-74; Jack Anderson, 1970; Bill Anderson, 1987-88; Don Donell, 1982-83; and Tracy Hylton, 1983-84.

Silver Reunion

Four former Associate Division Chairmen were on hand for the reunion, including (l-r) Jim White, 1980-81; Ed Surgeon, 1990-91; Frank Vigneault, 1981-83 & 1985-87; and Tom Horn, 1972-74.



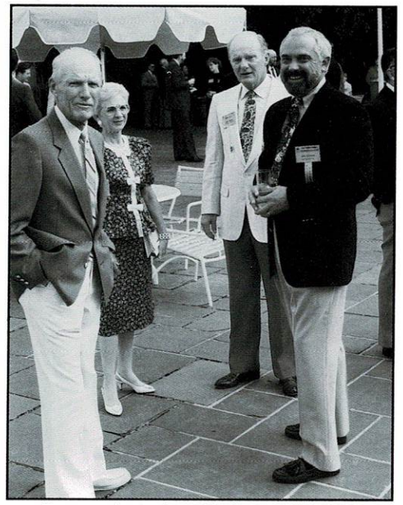
Jack and Bill Anderson, our only "brother act" among former chairmen.

New Chairman Don Cussins and wife Barbara

First Vice Chairman Jim LaRosa and wife Leigh Ann.

Scenes from *The Greenbrier*

Frank Vigneault (l) has the look of a winner at Monte Carlo Night, while Fred Shewey doesn't seem to care either way.



Former Associate Chairman Jim White (l) and his wife Sue, reminisce with John Rader and Jim Chrivia(r))

L-r at the welcoming reception, John and Nan Gunnett, Charlie Miller, Chris Supcoe.

Cecil I. Walker Machinery Co. walked off with the Associate Division "Company Pride" award in the most spirited and closest competition ever.

'Company Pride' competition closest ever

Threatening skies and eventual rain drove some 500 celebrants inside for the annual "Coal Miners' Party." But the foul weather did nothing to dim the enthusiasm of competitors for the "Company Pride" awards, which recognize groups and individuals for expressions of the pride of employment through tee shirts, ball caps, and other apparel.

Always spirited, the competition reached new heights in 1991 as more entrants crowded the field with larger contingents and ever more distinctive outfits.

With inclement weather approaching, the Greenbrier staff transformed the ballroom into a reasonable facsimile of the usual Kate's Mountain site, and the "Company Pride" competition was on.

In recent years, members of the Associate Division have overshadowed their General Division counterparts. On the Associate side, the last two winners were **Austin Powder Co**., and its friendly business rival, **Lilly Explosives Co.**. This year was to be the rubber match.

Defending champion Lilly actually put more people "in uniform" than any other contestant, but Austin was equally impressive with distinctive red shirts emblazoned with the American flag.

Meanwhile, another rivalry sprang up, this time between **Rish Equipment Co**. and **Cecil I. Walker Machinery Co.**. Rish showed off flashy gold shirts with matching wide brim hats, and Walker countered with its white and tan outfit, complete with a message congratulating WVMRA on its silver anniversary.

Cummins Cumberland, Inc. entered the fray, and won a special award, with head-to-toe outfits, and **Penn Line Service, Inc.** was prominent with its red and white contingent. **Linvilles' Coal Preparation Plant, Inc.** also made the finals. Judges enlisted the aid of the audience to pick a winner, but applause was uniformly enthusiastic for all the entrants. In the end, an uninvolved, unbiased, "mystery judge" decided it was Walker by a nose, with rival Rish right behind.

The General Division award was taken home by **"Buck's Bunch,"** a coalition of companies associated with Buck Harless. The runner-up was **Carbon Fuel Co.,** and perennial power **Grafton Coal Co.** also made a strong showing.

All in all, it was the best "Company Pride" competition ever. Plans are already afoot among the finalists and one or two new entries for the 1992 competition, which will no doubt return to the great outdoors of Kate's Mountain.

"Buck's Bunch," a first time entrant, won the General Division version of the "Company Pride" award.

Company Pride - Winners All!

Rish Equipment Co.
Runner-up - Associate Division

Carbon Fuel Co.
Runner-up - General Division

Lilly Explosives Co.

Grafton Coal Co

Cummins Cumberland, Inc.

Penn Line Service, Inc.

Austin Powder Co.

Linvilles' Coal Preparation Plant, Inc.

Associate Welcoming Reception Sponsors

Akers Supply, Inc.
Amherst Industries, Inc.
Appalachian Tire Products, Inc.
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Atlas Powder Company
Austin Powder Company
Beckwith Machinery Company
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Coal Field Machinery, Inc.
Country Boy Seed, Inc.
Crown Hill Equipment, Inc.
Cummins Cumberland, Inc.
Drill Concepts, Inc.
EIMCO Coal Machinery, Inc.
Explosives, Inc.
Explosives Technologies International, Inc.
Fairchild International
Flat Top Insurance Agency
Forke Brothers
GAI Consultants, Inc.
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Gilbert Distributing Company
Gould Energy
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Gress Equipment Company
Guttman Oil Company
H. C. Nutting Company
Hatfield Terminals, Inc.
Heavy Machines, Inc.
Hitachi Construction Machinery Corporation
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Ireco Inc.
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Lilly Explosives Company
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Mack Trucks, Inc.
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Midwest Steel Division/Midwest Corporation
Miller & Miller Auctioneers, Inc.
Mountain Explosives Company
Mt. State Bit Service, Inc.
Nelson Brothers, Inc.
Ohio Seed Company
Penn Line Service, Inc.
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Rag Pickers, Inc.
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Songer Insurance Agency, Inc.
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Sturm Environmental Services, Inc.
Tioga Lumber Company
Trimble Engineers & Constructors, Inc.
Trojan Corporation
Union Carbide Corporation
United National Bank
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WOPEC
Waters, Warner, & Harris
West Virginia Explosives Company, Inc.
Western Pocahontas Properties, L. P.
Worldwide Equipment, Inc.

Thanks for the prizes

Thanks to the generosity of the members listed below, all who participated in our Silver Anniversary meeting had ample opportunity to take home a prize. Over $5000 in gift certificates and three dozen other prizes were handed out over the course of the three day meeting.

A special thanks to Tom Meehan of Anderson of West Virginia, who personally worked to provide photos of some 166 golfers, regardless of score.

GOLF TOURNAMENTS
Anderson of West Virginia (Tom Meehan) - $10,000 hole-in-one
Arcadian Corp. (Tom Dierken) - $50
Beckwith Machinery Co. (Dave Huffman) - $100
Carter Machinery Co., Inc. (Mark Miller) - Golf balls
Cecil I. Walker Machinery Co. (John Williamson) - $100
Crown Hill Equipment, Inc. (Chris Supcoe) - $50
Cummins Cumberland, Inc. (Dave Hibbs) - $50
Driltech, Inc. (Tim Murphy) - $100
Explosives, Inc. (Bernard Folio) - Champagne
Flat Top Insurance Agency (Ardie McMillion) - $100
Kimberly Industries, Inc. (Steve Cvechko) - $10,000 hole-in-one (men & women)
Lilly Explosives Co. (Tim Warden) - $50
Marathon LeTourneau Co. (Earl Beckman) - $100
McDonough Caperton Insurance Group (Charlie Morton) - $50
Mt. State Bit Service (Skeeter Laskody) - Blaster's lamp
Penn Line Service, Inc. (Larry Roberts) - Golf balls
Petroleum Products, Inc. (Tom Taylor) - $100
Rish Equipment Co. (Dan Pochick) - $100
Rudd Equipment Co. (Roger Fitch) - $100
Union Carbide Corp. (John Rader) - Putter, Linde Star, & trophy
Vencill Corp. (Delmer & Ernest Vencill) - $250

CHILDREN'S PUTTING TOURNAMENT
Carbon Fuel Co. (Phil Longenecker) - $100
Lilly Explosives Co. (Bob Gibson, Jr.) - $100

TENNIS TOURNAMENTS
Cecil I. Walker Machinery Co. (John Williamson) - $100
Cummins Cumberland, Inc. (Ed Surgeon) - $50
Freeman Branch Mining (Paul Hutchins) - $50
Gould Energy (Jim Ashby) - $50
Green Acres Contracting Co., Inc. (Tom Pisula) - $50
Hatfield Terminals, Inc. (Alan Johnston) -$50
Ingersoll-Rand Co. (Jim Green) - $50 & trophy
McDonough Caperton Insurance Group (Andy Teeter) - $50
Mellon Bank, N.A. (Bob Heuler) - $100
Midwest Steel Division/Midwest Corp. (Rick Miller) - $100
Penn Line Service, Inc. (Larry Roberts) - $100
Skelly and Loy (John Gunnett) - $50
Sturm Environmental Services (John Sturm) - $50

FUN RUN
Atlas Powder Co. (Waller Caldwell) - Running shoes
Penn Line Service, Inc. (Larry Roberts) - Hats & vest
Sturm Environmental Services, Inc. (John Sturm) - $50

NAME TAG DRAWING
Crown Hill Equipment, Inc. (Chris Supcoe) - $75
Ingersoll-Rand Co. (Jim Green) - $100
Sii Smith International (Bill Shropshire) - $100
Trimble Engineers & Constructors, Inc. (Bill Trimble) - Silver tea service

MONTE CARLO NIGHT
Allegheny Mining Corp. (Lawrence & Evelyn Streets) - Mirrors
Arcadian Corp. (Tom Dierken) - $50
Austin Powder Co. (Herm DeProspero) - Blaster's clock
Crown Hill Equipment, Inc. (Chris Supcoe) - $100
Cummins Cumberland, Inc. (Ed Surgeon) - $100
Explosives, Inc. (Bernard Folio) - Champagne
Explosives Technologies International, Inc. (Andy Anderson) - $75
Gould Energy (Jim Ashby) - $50
H.C. Nutting Co. (Steve Englehardt) - $100
Ireco Inc. (John Zimnox) - $100
Ingersoll-Rand Co. (Jim Green) - Ingersoll-Rand electric impact wrenches & knives
Johnson Railway Service, Inc. (Barbara Johnson) - Silver coin & silver bracelet
Lilly Explosives Co. (Tim Warden) - $50
Marathon LeTourneau Co. (Earl Beckman) - $100
McDonough Caperton Insurance Group (Charlie Morton) - $50
Midwest Steel Division/Midwest Corp. (Rick Miller) - $100
Mountain Explosives Co. (Eda Bussey) - $50
Mt. State Bit Service, Inc. (Skeeter Laskody) - $50
Nelson Brothers, Inc. (Gary Self) - $100
Penn Line Service, Inc. (Larry Roberts) - Ice bucket
Republic Industries (John Krebs) - Gold coin & silver dollars
Rudd Equipment Co. (Roger Fitch) - $50
Trojan Corp. (Jim Bertiaux) - L. L. Bean gift certificates
Vencill Corp. (Delmer & Ernest Vencill) - $150

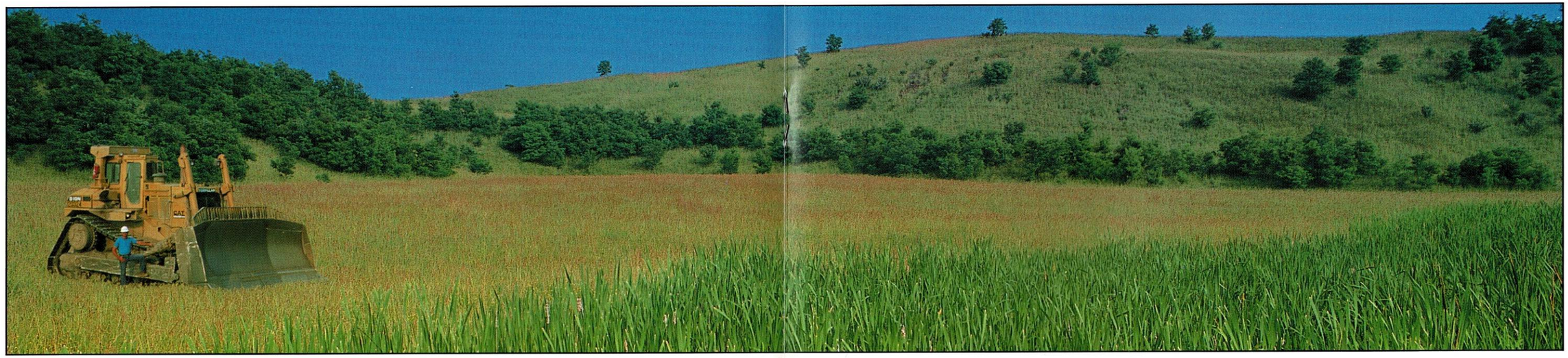
FISHING TOURNAMENT
Akers Supply, Inc. (Dave Akers) - Custom painted hard hat
Ingersoll-Rand Co. (Jim Green) - $50
Mountain Explosives Co. (John Bussey) - $50
Nelson Brothers, Inc. (Gary Self) - $50
Penn Line Service, Inc. (Larry Roberts) - Knife
West Virginia Explosives Co., Inc. (Bruce Wood) - Dome tent, rod & reel, Coleman lantern, Coleman stove
Western Branch Diesel, Inc. (Tim Spencer) - Jacket

BOWLING TOURNAMENT
Children's Division - Johnson Railway Service, Inc. (Barbara Johnson) - Silver coins
Children's Division - Lilly Explosives Co. (Tim Warden) - $100
Anker Energy Corp. (Bruce Sparks) - $100
Beckwith Machinery Co. (Dave Huffman) - $50
Fairfax Fuel, Inc. (Dave Maynard) - $100
Flat Top Insurance Agency (Jack Lee) - $50
Pittsburgh National Bank (Dale Stein) - $50
Spilman, Thomas, Battle & Klostermeyer (Chuck Woody) - $50

TRAP TOURNAMENT
Cummins Cumberland, Inc. (Dave Hibbs) - $100
Driltech, Inc. (Tim Murphy) - $100
Hitachi Construction Machinery (Ed Garbarino) - $200
Nelson Brothers, Inc. (Gary Self) - $50
Penn Line Service, Inc. (Larry Roberts) - Belt buckles
Robinson & McElwee (Joe Price) - Shotgun cleaning kit
Rudd Equipment Co. (Martin Dotson) - $100
Western Branch Diesel, Inc. (Tim Spencer) - Jacket

NEW CHAIRMAN'S BREAKFAST
Crown Hill Equipment, Inc. (Chris Supcoe) - $75
Ingersoll-Rand Co. (Jim Green) - $100

Green, Green Grass of Home.



The economic viability of mining West Virginia coal must be balanced with our long term environmental needs. To mine the coal efficiently and effectively, Caterpillar equipment is your best choice for durability and quality. And Walker Machinery backs up your Caterpillar products with the best field service team in the business, with over 50 field service mechanics and 7 locations to serve you.

Walker's field service mechanics log in hundreds of miles every day, making on-site visits to keep your equipment up and running. And Walker's heavy-duty 2-ton trucks are equipped with booms, generators, cutting and welding torches, air compressors, special Caterpillar tools, service manuals, state of the art diagnostic equipment and gauges for fast, accurate trouble-shooting and repairs.

Steve Walker
President
Walker Machinery

The same Walker service and Caterpillar equipment is also the industry's first choice in providing equipment and service to restore West Virginia's land for future generations use.

"As a West Virginia owned company, we are proud to play an integral part in the delicate balance between mining West Virginia coal and outstanding reclamation efforts like the award-winning site at Hobet Mining, Inc. in southern West Virginia shown here," said Steve Walker, President, Walker Machinery.

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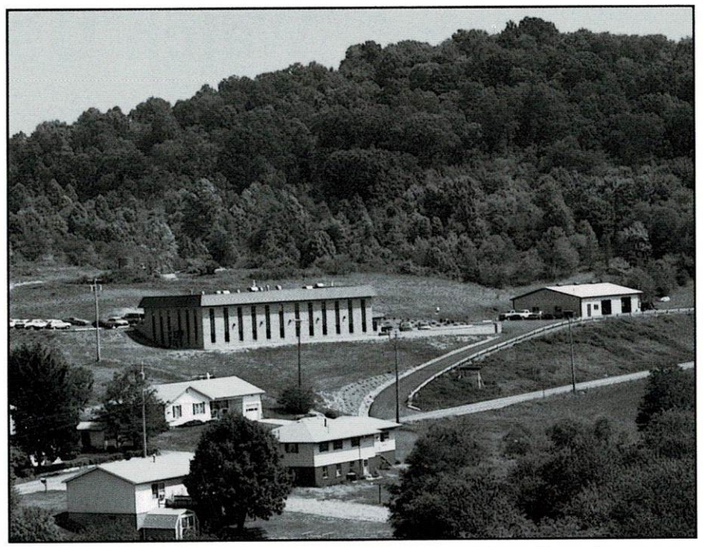
Walker CAT

The **Walker** Difference

John and Beverly Sturm of Sturm Environmental Services, Inc.



New headquarters for SES are visible from the northbound lane of Interstate 79 near Anmoore, in Harrison County.

SES grows with the times

The passage of the Surface Mining Control and Reclamation Act (SMCRA) turned the mining industry upside down and shook out a lot of things, some good and some not so good. One of the good things was Sturm Environmental Services, now in its 13th year of operation.

When the federal law was passed in 1977, John Sturm was a new man at Grafton Coal Co., with a three year stint behind him as Technical Services Director for WVMRA. He was also itching to get out on his own, and SMCRA provided the impetus.

"I started thinking about this type of business when the Office of Surface Mining was created.

"Generally, what I had in mind was kind of 'bird dogging' in front of OSM, consulting with coal companies on what type of environmental and regulatory problems they would be facing, and what solutions were available.

"As it turned out, that wasn't what I did at all. After working in the industry for a short while under the new law, I saw a great need for bigger and more comprehensive laboratory facilities, particularly in northern West Virginia."

That was the beginning of Sturm Environmental Services, which was established in 1979 as a water, soil and overburden laboratory.

Teaming with his wife Beverly, and John Freeman, an old Soil Science classmate at West Virginia University, John launched SES, and its lab, in the Sturm's Bridgeport kitchen. While keeping books for the fledgling business, Beverly wasn't thrilled with the kitchen arrangement.

"Within two weeks," recalls the President, "she had kicked us into the garage, and that's where we operated for the next two months. By then, we needed more space anyway, so I rented a portable building on Brushy Fork Road with 3200 square feet. Later we added another metal building and a trailer, which gave us another 1000 square feet." The expansion in office and lab space was an indication of SES's growing role in the West Virginia coal industry. "We came along at the right time, with the right idea," says John. "There were labs in the area, and I'm sure they were doing a good job, but there weren't enough of them, and there were some needed services that just weren't available."

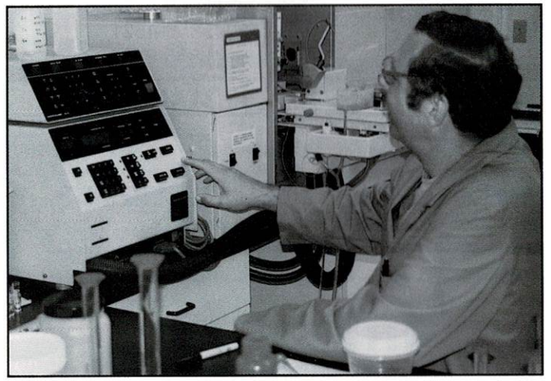
SES employment grew from three to 12 in the first year, and to 25 in the early 1980's. In 1982, the company opened a branch office in Marmet (now in South Charleston), and a year later, another in Oakland, MD. Services expanded, and so did John Sturm's plans.

"After seven or eight years, it was evident that we would have to make other arrangements. I didn't realize it at the time, but conditions were atrocious at our old place. There were no windows, we were short on parking, we didn't have enough electrical outlets, and we were running out of space. It was just awful.

"Then, five years ago, we started a building fund. That was the easy part. The hard part was getting land. We wanted to stay close to I-79, and there just isn't much of that kind of land on the market in this area."

But, John didn't get where he is by allowing himself to be frustrated. A little break, a little "creative planning," and the modern SES facility was off and running.

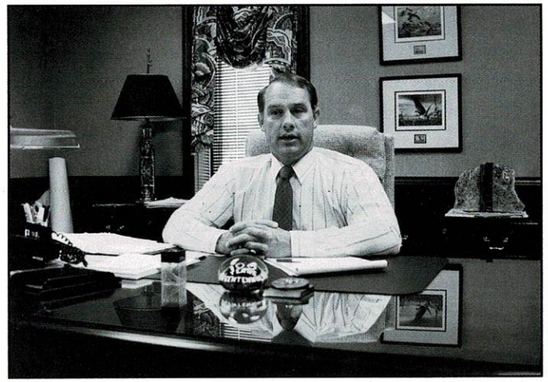
"As luck would have it," John recalls, "I was driving to work one day and saw a guy putting up a 'for sale' sign on this property. When I got to the office, I got on the phone. Later that day, the 'for sale' sign disappeared. It turned out that the land was willed to the WVU Foundation, and so I was able to buy it from them. It's 70 acres in all, and we used about four acres for this facility."



State-of-the-art equipment and a staff of specialists have brought Sturm Environmental Services to the front of its field.

"This facility" is a beautiful 10,000 square foot, two story, multipurpose building, designed by John Sturm, who also served as the contractor. "I got a lot of pleasure out of this project, and I put a lot of myself into it. At one point, I just couldn't stand to be away from it. I was probably a better building contractor right then than I was a businessman. My business suffered some and I lost weight . Now they're both going in the other direction."

Construction began in June, 1990, and the lab was occupied in December. The office portion was completed in February of this year. Bev Sturm was the prime force behind the decor, which includes oak wood cut from the property.



'I saw a great need for bigger and more comprehensive laboratory facilities,' -- John Sturm

Beyond being an attractive facility, the new building is extremely functional, with lab facilities covering the entire second floor. But, even with 5,000 square feet of lab space, there are no empty corners. "We'll probably be crowded even here before too long. We now have specialists in about every phase of environmental technology, including three soil scientists, two hydrologists, five chemists, and two biologists, with five positions yet to be filled. Employment now totals 40.

That's a reflection of the company's ever expanding clientele. In the early years, about 95% of SES time was devoted to the coal industry. "Now," says John, " it's more like 50%, but not because our coal business is off. We've just gotten into some other areas, like aquatic surveys, wastewater analysis, leaching studies, and inorganic and organic analysis."

The business is primarily in West Virginia, but the company has numerous clients in Pennsylvania and Maryland, with some in Virginia, Kentucky and Ohio. The company has worked in 16 states, at times ranging as far as Texas, Louisiana, and Nova Scotia, Canada.

Over the years, SES has evolved into a full service laboratory with staff expertise in agronomy, biology, chemistry, ecology, forestry, geochemistry, geology, hydrology, mining, and pedology.

And Beverly has her kitchen back.

Anoxic Limestone Drains for Acid Mine Drainage Treatment

by Jeff Skousen
West Virginia University

Active vs Passive Treatment Systems

Acid mine drainage (AMD) is typically neutralized by additions of chemicals or other neutralizing agents. Treating AMD in this conventional fashion is expensive and requires time and manpower to keep this "active" treatment system operative. Alkalinity added to acid water with chemicals is effective in removing metals and raising pH, but is expensive. The common chemicals and costs for treating AMD have been detailed recently (See Skousen et al. 1990).

"Passive" systems treat AMD without the continual addition of chemicals or neutralizing agents. The most prominent passive treatment method has been the use of wetlands. Wetlands generate alkalinity slowly and sometimes unpredictably. In most cases, wetlands decrease metal concentrations and acidity in AMD by filtering and cation exchange, oxidation and reduction reactions, and microbiological processes. Much debate and research continues on specific mechanisms of alkalinity generation and metal removal. Researchers at WVU, the U.S. Bureau of Mines, TVA, and others are providing more information through the study of natural and constructed wetlands. As a result, design criteria and materials for wetland construction are continually being refined.

An Innovative Passive System - ALDs

Anoxic Limestone Drains (ALDs) are buried trenches of limestone. Acid water is diverted through these drains and, through reaction with the limestone, pH and alkalinity of the water are increased. Limestone is a cheap and effective way to generate alkalinity, but it must be done under the right conditions or its effectiveness is limited. ALDs create the "right" conditions where limestone can generate alkalinity for long time periods. In an anoxic (meaning insufficient or low oxygen) drain, limestone does not become coated with iron oxides and continues to dissolve.

A recent discovery prompted the design and construction of ALDs. The technique was developed by the Tennessee Valley Authority (TVA). They found that AMD seeping through a coal refuse dam was being treated "passively" by high calcium carbonate limestone in an old haul road buried under the dam. In its buried and anoxic state, the limestone dissolved, raised pH, and added alkalinity to the water and, because the limestone was in this anoxic state, was not being coated or armored by iron oxides. Once the anoxic, alkaline water reached the ground surface, the water was oxidized and the metals precipitated in a sediment pond (Brodie et al. 1991). TVA and the Tennessee Division of Water Pollution Control began building ALDs in 1989 to refine the technology.

The same principle of adding alkalinity with limestone has been used in the construction of ALDs on other sites. Approximately 50 ALDs have been built in Appalachian states as of fall, 1991. ALDs were initially constructed on sites where wetlands were not treating AMD satisfactorily (Brodie et al. 1991). Researchers are now installing ALDs as a stand-alone system.

It is important to realize that ALDs simply raise pH and add alkalinity to acid water. Once the water exits the drain, sufficient area must be provided for metal oxidation, hydrolysis, and precipitation to occur. The type and size of area, be it a ditch, settling pond, or wetland, depend on the metals in the water. Water exiting a drain cannot immediately go into a receiving stream. When used upstream of wetlands, ALDs improve the wetland's capacity to remove metals by adding alkalinity.

Results of ALD Treatment

On two sites where ALDs were built in Pennsylvania, the drains raised pH from 3.3 to 6.5, and changed alkalinity measurements from 0 to between 200 and 300 mg/1 (Nairn et al. 1991). In Tennessee, pH was raised from 3.7 to 6.5. Iron and manganese were precipitated after exiting the drain, and were generally decreased to compliance levels (Turner & McCoy 1990). Similar results were reported (Brodie et al. 1991) on several ALDs in Tennessee and Alabama.

Several operators have installed ALDs in West Virginia. At one site in Preston County, pH increased from 2.8 to 6.5, alkalinity from 0 to 200 mg/l, and acidity decreased from 900 to 140 mg/l. A number of ALDs have been installed on a bond-forfeiture site in central West VIrginia. Seeps on this site were low in dissolved oxygen (<1 mg/l) and varied from 2.8 to 4.1 in pH, and 87 to 1000 mg/l in acidity.

After passing through ALDs, pH varied between 5.7 and 6.5, acidity varied from 0 to 185 mg/l, and alkalinity rose from 0 to a minimum of 84 and a maximum of 269 mg/l. Iron and manganese remained dissolved in the water, and did not precipitate in the drain, while aluminum concentrations were decreased and apparently precipitated in the drain.

Results to date indicate that, under the right circumstances, and if constructed properly, these limestone drains can add up to 300 mg/l alkalinity to water. The amount of generated alkalinity is limited by the dissolution rate of limestone in water. As pH decreases, and as CO_2 evolution increases, limestone is more soluble and higher amounts of alkalinity can be generated .

Researchers in West Virginia are attempting to increase the rate of limestone dissolution by placing organic matter within the drain. The organic material (hay bales) may act as an oxygen sink and, through decomposition, generate CO_2. Concern has been expressed about organic matter plugging the drain, and also about increased biological oxygen demand in the water hindering the oxidation and precipitation of metals once the water exits the drain. Research is being conducted on the effects of organic matter in the drain.

Water Quality Factors

Several factors must be determined before considering the use of an ALD for AMD treatment. Parameters that are important are:

1) Flow rate (maximums and minimums), gpm
2) Dissolved oxygen (DO) content, mg/l
3) Acidity and alkalinity, mg/l
4) Ferric and ferrous iron concentrations, mg/l
5) Aluminum concentrations, mg/l

Flow rates of about 100 gpm have generally been the upper limit for passive treatment systems because of size or area limitations. Some systems have been built for very high flows (i.e. 500 gpm), but water quality was not severe and plenty of space was available to build the system. However, unless the water has low levels of mineral acidity (low Fe, Mn, Al concentrations), AMD of greater than 100 gpm has not been consistently treated satisfactorily by passive systems. Most passive systems perform best on flows of less than 100 gpm.

Dissolved oxygen (DO) content relates to the oxidation/reduction status of the water. Water saturated with oxygen at 15 to 20°C (55-75°F) normally has a DO content of about 10 mg/l. At oxygen concentrations of 2 mg/l or less, and with low ferric iron concentrations, ALDs are effective because limestone armoring is thought to be negligible. If DO is greater than 2 mg/l and there is much ferric iron, limestone armoring increases dramatically and decreases the effective life of the system.

Brodie et al. (1991) suggested the use of oxidation-reduction potential measurements of Eh (an electrical voltage) as an indicator of oxygen status of the water. He recommended ALDs should be used only when Eh of the water is zero or less.

Acidity is measured by the amount of base (OH^- and HCO_3^-) required for neutralization. Acidity in water is related to the hydrogen ion concentration (pH) and also to acidic cations (mineral acidity) present in the water. To neutralize all the acidity, enough alkalinity must be added to convert H^+ to H_2O and Fe^{+2}, Fe^{+3}, AL^{+3}, and Mn^{+2}, etc., to metal hydroxides (e.g. $Al(OH)_3$).

Alkalinity in water is important because it neutralizes

mineral acidity (primarily from Fe and Al ions), raises pH, and helps in the removal of manganese. The alkalinity generated in an ALD is mostly in the form of bicarbonate (HCO_3^-). Upon oxidation after exiting the drain, the precipitation reactions occur more readily in alkaline water.

ALDs have been observed to generate up to 300 mg/l of alkalinity in water when functioning properly. If the water has greater than 300 mg/l of acidity, an ALD by itself will not completely treat the drainage, and thus another "active" or "passive" treatment system must be installed to further improve the quality of the effluent.

Ferrous iron occurs in waters under reduced or low oxygen conditions. When oxygen is introduced into reduced water, ferrous iron oxidizes to ferric iron. As DO concentrations increase, less iron will be in the ferrous state (Fe^{+2}) and more will be in the ferric state (Fe^{+3}). Measuring the quantity of ferrous and ferric iron is critical to determine the potential of using an ALD. For an ALD to work, most of the iron should be in the ferrous or reduced state. Ferrous iron will not precipitate at the pH levels attained in an ALD. However, if ferric iron is present in the acid water and with the generation of alkalinity, ferric hydroxide will precipitate in the drain. By building ALDs to treat water with low DO and low ferric iron concentrations, it is thought that the limestone will not become coated or only very slowly coated after many years. Ongoing research on ALDs will hopefully explain the degree of limestone armoring with small amounts of ferric iron in low oxygen water.

Aluminum is found in all AMD at varying concentrations. Aluminum precipitates in water at or above pH 5.0 through hydrolysis (the splitting of water to H^+ and OH^-) and does not require oxidation. So the use of an ALD will cause aluminum to precipitate in the drain. If high concentrations of aluminum are found in the water (>25 mg/l), the potential exists for aluminum to clog the limestone drain. Observations to date suggest that aluminum compounds formed in ALDs have little affinity for limestone and come out of the system as light, gelatinous flocs. Therefore, aluminum may not clog the drain. After exiting ALDs, manganese precipitation has not been consistent through ALD treatment. Research will hopefully provide information on Al and Mn precipitation.

Figure 1. Excavation of the trench was followed by placing filter fabric in the trench, and then filling the trench with limestone.

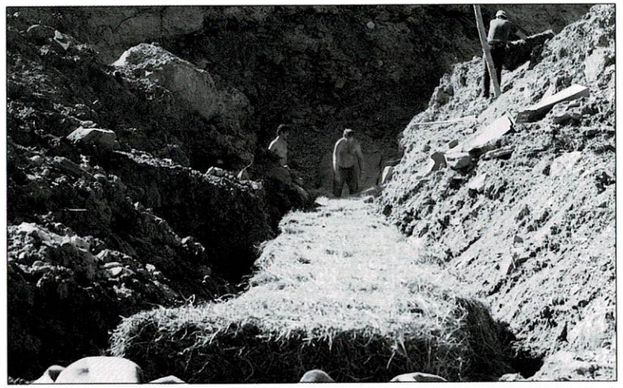


Figure 2. Hay bales were placed on top of the filter fabric lined trench filled with limestone.

Figure 3. The limestone and hay in the trench were covered with plastic.

Design Criteria

Presently, no set designs or sizing parameters exist. There are, however, some items that should be considered based on preliminary observations and experimentation.

The first important criterion is the quality of the limestone. In order to obtain high alkalinity levels in the water (near 300 mg/l), a high grade of limestone should be used. A calcium carbonate content of >90% has been recommended because it dissolves quickly, and it has less impurities that may hinder the utility of the drain.

The particle size of the limestone used in ALD construction should range from 1.5 to 4 inches. A mixture of varying sizes of limestone may be beneficial. The small-sized particles provide more surface area for dissolution and alkalinity generation, while large-sized particles dissolve slower for longevity and probably help maintain water transmission through the drain. Smaller sizes (< 1 inch) may not allow enough pore space for water movement , while large, boulder-sized particles may not react quickly enough.

The width and depth of the drain should be sufficient to hold a desired amount of limestone to generate alkalinity for 20 years or longer. Water should cover most, if not all, of the limestone in the drain all year round. Ideally, the drain should be a pool, and be completely full so that as water is added, water overflows through an airtrap outlet (pipe with double elbow). Most drains are 2 to 5 feet deep, 2 to 9 feet wide, and range from 100 to 2000 feet long.

Plastic is placed on top of the limestone to prevent oxygen movement into the limestone. Plastics from 10 to 20 mil thickness have been used with good success. Some ALD designs completely surround the limestone in plastic due to concerns of oxidized water or air intrusion into the drain. Either way, excluding oxygen movement into the drain is critical to the ALD's success. As mentioned, the limestone in some ALDs in West Virginia is being overlain with hay bales. The limestone and hay should be separated by filter fabric and enclosed with plastic. Clogging should not occur.

The plastic should then be covered with a minimum of 2 feet of soil. The soil must be composed of fine earth materials, and compacted to limit oxygen diffusion to the drain. If the soil is coarse-textured, or has numerous rocks, surround the entire trench in plastic. With limestone dissolution over time, the area over the drain may subside. Covering the drain with an additional 2 or 3 feet of soil higher than the ground surface may help. Uneven settling or dissolution could cause holes or fractures to open to the surface. After grading, revegetate with shallow-rooted plant species, preferably grasses.

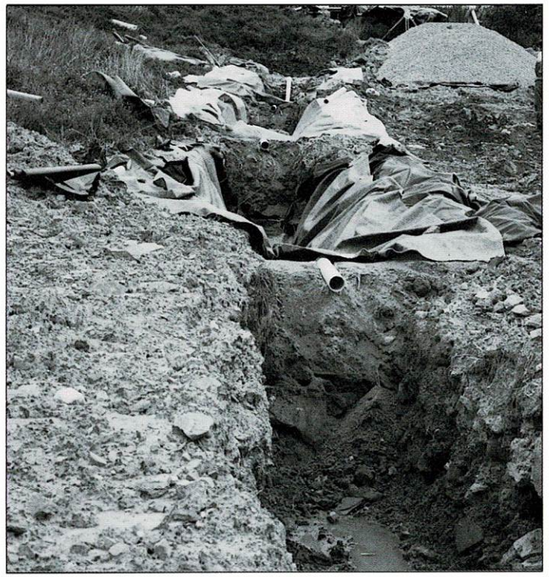


Figure 4 On slopes, cells of limestone trenches may be constructed with inflow and outflow pipes.

Building the Drain

The steps for building an ALD are:

1) Excavate until the seep flows freely and the water table has been determined;
2) Divert the acid water from the area where the drain will be constructed;
3) Excavate the trench almost up to the seep or deep mine opening, keeping the trench on a nearly 0% slope or constructing cells of limestone to maintain inundation;
4) Install the plastic and limestone in the lower part of the drain;
5) Finish the drain by constructing the front part of the drain, intercepting the water, and connecting to the bottom part of the drain.

Be certain that the seep or point source is intercepted when the water is still anoxic (which often requires digging back into the backfill for a seep or extending the ALD through a seal in a mine opening), and then rapidly build the drain and cover it within one or two days. If the water is oxidized, an ALD will not work. Be careful to not allow sediment to wash into the drain during seep excavation or as other earth moving is done.

Characteristic	Site 1	Site 2	Site 3
Design and Engineering	3,500	1,250	0
Labor and Supervision	3,000	6,255	480
Equipment (dozer, loader	8,000	1,300	350
Materials			
limestone	(400 tons) 2,000	(165 tons) 1,125	(70 tons) 700
plastic	600	70	0
filter fabric	800	278	0
pipes and valves	0	328	0
Seed, Mulch, Fertlizer	250	1,250	100
TOTAL	**$18,150**	**$11,856**	**$1,660**

Table 1. Costs for constructing ALDs.
Site 1 is from data in Brodie et al. 1991; Site 2 is in northern West Virginia; Site 3 is in Pennsylvania.

Longevity and Limestone Amounts

In order to estimate the longevity of water treatment and the amount of limestone to place in an ALD, four items must be considered.

1. Acid load of the drainage (tons/year)
2. Estimated life of the drain (years)
3. Calcium carbonate content of limestone (%)
4. Amount of dissolution of limestone (%)

Calculations are as follows (See Nairn 1990)

1. Flow (gpm) x acidity (mg/1) x 0.0022
   = **A** tons/year of acid
2. **A** tons/year x years of life
   = **B** tons of limestone
3. **B** tons/calcium carbonate content (%/100)
   = **C** tons
4. **C** tons/dissolution (%/100)
   = **D** total tons

Example of Limestone Amount

1. Flow = 10 gpm x acidity = 400 mg/1 x 0.0022
   = 8.8 tons/year of acid
2. 8.8 tons/year x 20 years longevity
   = 176 tons of acid in 20 years
3. 176 tons / 90% $CaCO_3$ content (0.9)
   = 195 tons
4. 195 tons / 75% dissolution is expected (0.75)
   = 260 tons

In this example, water treatment during a 20 year period with 75% dissolution would theoretically require 260 tons of 90% calcium carbonate content limestone. An estimate of drain length (for 260 tons with a 3 foot wide by 3 foot deep drain) would be 385 feet long, based on 150 pounds of limestone per cubic foot.

Costs

Constructing ALDs to treat AMD can be very cost effective. Brodie et al. (1991) reported construction and material costs of about $18,950 for an ALD in Tennessee. Chemical treatment with NaOH of the same water was reported to be $30,000 annually. An ALD in West Virginia cost $11,855. A small drain in Pennsylvania cost $1,660 to build (Table 1).

Conclusions

Passive Treatment through the use of ALDs and wetlands offers an environmentally-sound, cost-effective method of treating AMD. Under the right conditions and with proper installation, ALDs may increase the alkalinity in AMD, thereby raising pH and causing more efficient metal precipitation after the water exits the drain. Water quality parameters should be examined carefully before designing and constructing ALDs. The most critical parameters relate to dissolved oxygen content of the water and the amount of ferrous and ferric iron in the water. This methodology shows great potential to treat many point sources of AMD.

Acknowledgements

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The author especially acknowledges Bob Nairn and Bob Hedin of the U.S. Bureau of Mines, and Ben Faulkner for many helpful comments and suggestions. Photgraphs were provided by Roger Green and Ben Faulkner.

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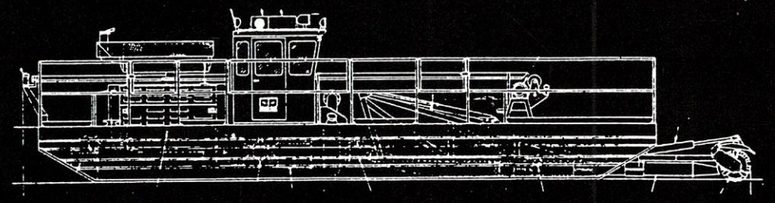

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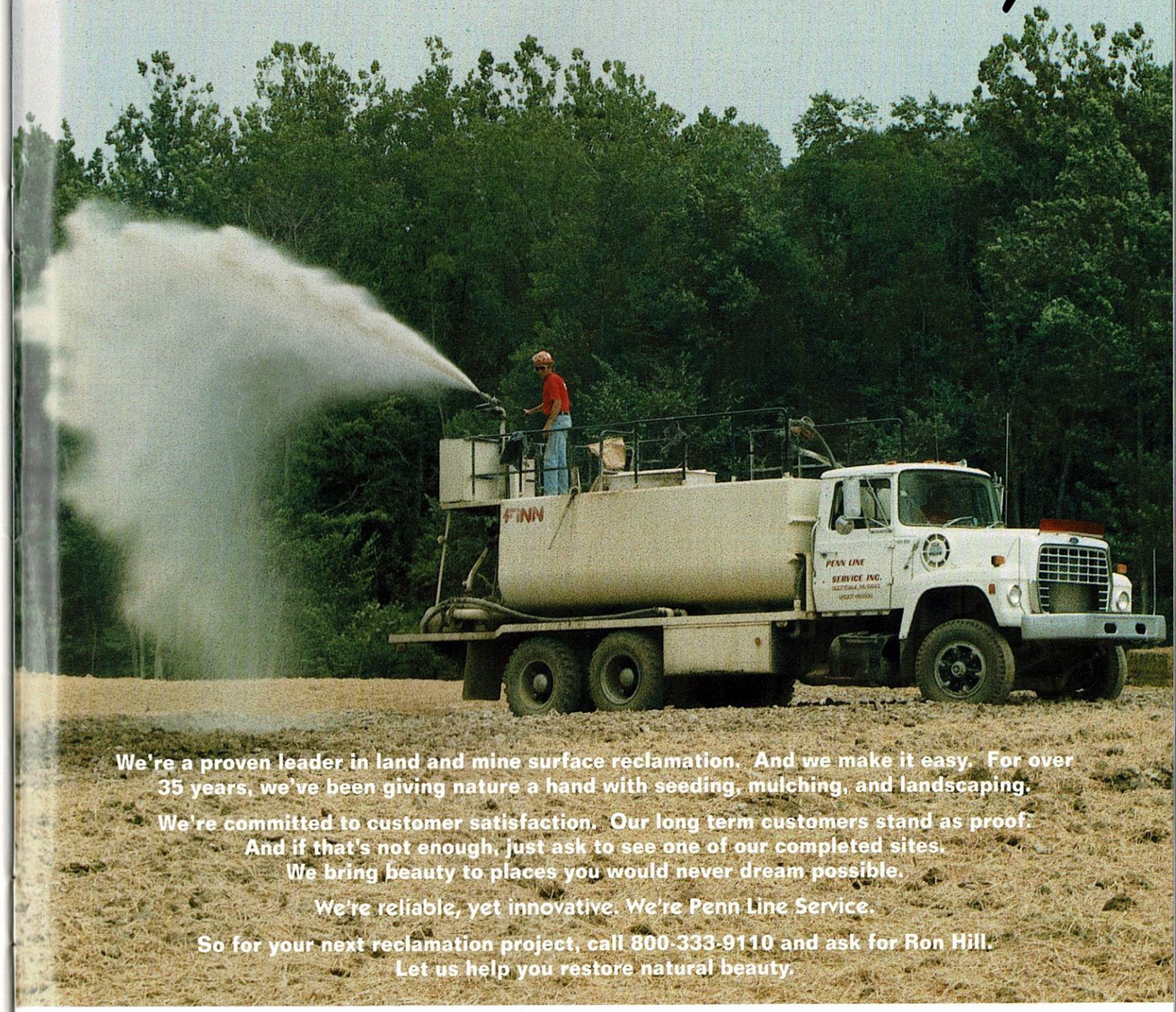

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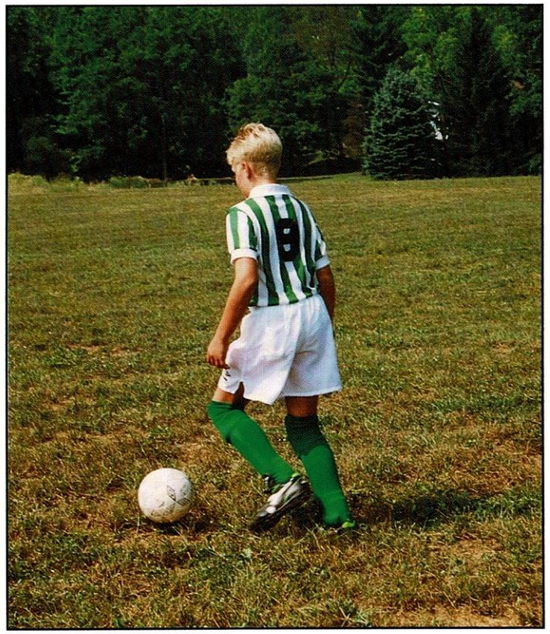
Soccer fields rise from Monongalia hillside



Josh Larew tries out the new soccer field where his father spent so many hours aboard a bulldozer.

Glenn Larew is President of the Cheat Lake Soccer Association. So, modesty dictated that the organization's newsletter describes him as the "coordinator of an extensive volunteer effort" in the construction of three new soccer fields.

In truth, Glenn Larew just about was the effort. There were a lot of contributors to the overall project. There always are in coal country. But the man on the dozer was Glenn Larew, day after day, sometimes night after night. Just ask the neighbors.

"Some of them probably think I'm crazy," Glenn admits. "And we did get one or two complaints about the noise in the evening. But everything has worked out pretty well, and the kids will have a good soccer facility. That's what counts."

The three fields, one Olympic size (65 x 120 yards) and two 60 x 100 yards, were carved out of a hillside on Monongalia County Board of Education property between the Downwood Manor and Meadowbrook housing projects near Cheat Lake.

The project required moving 35,000 cubic yards of dirt, most of it by Glenn Larew, the President of Coaltrain Corp. "I was running the company from the seat of the bulldozer for a while," he recalls.

"I went out in the morning and got the guys started and then came back here. I routed my calls to the house and Jarrell would run back and forth to keep me up-to-date."

While Glenn put in most of the dozer time, he had some help from fellow coal operators who donated engineering, machinery, fuel, and hay.

Generously sharing credit for the project, he observes, "This really was a team effort. I had a lot of help from people like Dick Bolen, Dave Maynard, and Fenton and Evan Eddy.

"The land was available, but it looked like a long process to get anything accomplished, so we just plunged ahead and got it done. The grass is growing, and we've gotten this far at virtually no cost to the Soccer Association. We do need to get fencing and an access road, but the Board of Eductation has promised those things, so our priority right now is to get some bleachers, a concession stand, and other field facilities. All in all, I'd say we'll be playing soccer here next spring at the latest."

Glenn Larew is a man of action. He'd rather run the dozer than talk about it. So, if he says they'll be playing soccer at the Cheat Lake complex next spring, you can go ahead and order your tickers.

The new Cheat Lake soccer complex includes an Olympic size field where only a hillside existed before.

Coal's contributions to Cheat Lake Soccer

Coaltrain Corp.
Fairfax Fuel, Inc.
General Paving Co.
Patriot Mining Co., Inc.

600 machine hours
700 manhours
4030 gallons of diesel fuel

Glenn Larew (c), with son Josh, a player for Patriot Mining, and wife Jarrell, who is also heavily involved in the Cheat Lake Soccer Association.

Coal Calendar

November

13-15 **1991 Eastern Oil Shale Symposium**, Hyatt Regency Lexington, Lexington, KY, contact Geaunita H. Caylor, Symposium Coordinator, University of Kentucky/OISTL, 411 Breckinridge Hall, Lexington, KY 40506, (606) 257-2820, FAX 258-1049.

14-15 **Fifth Pennsylvania Blasting Conference and Exhibit,** Keller Conference Center, University Park, PA, contact Dr. L. Barry Phelps, Penn State University, 125 Mineral Sciences Bldg., University Park, PA 16802, (814) 863-1646.

29 **Deadline for submission of nominations for "1991 Excellence in Surface Coal Mining Reclamation Awards,"** contact Alan Cole, Chief, Public Affairs, Office of Surface Mining, Washington, D. C. 20240, (202) 208-2719.

December

4-6 **Eighteenth Annual Kentucky Blasting Conference,** Heritage Hall, Lexington Center, Hyatt Regency, Lexington, KY, contact Larry Schneider, (606) 254-0367.

5-6 **"Developments Under the Surface Mining Control and Reclamation Act,"** Washington, D.C., contact Sharon Daniels, Eastern Mineral Law Foundation, WVU Law Center, P.O. Box 6130, Morgantown 26506, (304) 293-2470.

January

8-10 **19th Annual West Virginia Mining Symposium,** Holiday Inn - Charleston House, Charleston, contact Patty Bruce, West Virginia Mining & Reclamation Association, 1624 Kanawha Blvd. E., Charleston 25311, (304) 346-5318, FAX 346-5310.

9-10 **"Opportunites for Coal and Mineral Exporters -- Doing Business with Eastern Europe and the European Community,"** Washington, D.C., contact Sharon Daniels, Eastern Mineral Law Foundation, WVU Law Center, P.O. Box 6130, Morgantown 26506, (304) 293-2470.

February

5-9 **Semi-Annual Meeting, West Virginia Mining & Reclamation Association,** Hyatt Regency Hotel, Grand Cayman, contact Patty Bruce, WVMRA, 1624 Kanawha Blvd. E., Charleston 25311, (304) 346-5318, FAX 346-5310.

18-21 **23rd Annual Conference, International Erosion Control Association,** Reno, NV, contact Toney Driver, P.O. Box 4904, 1485 S. Lincoln, Steamboat Springs, CO 80477, (303) 879-3010, FAX 879-8563.

27-28 **"Environmental Regulation of the Mineral Industry,"** Orlando, FL, contact Sharon Daniels, Eastern Mineral Law Foundation, WVU Law Center, P.O. Box 6130, Morgantown 26506, (304) 293-2470.