

Green Lands
West Virginia Mining
and Reclamation Association
1624 Kanawha Blvd., East
Charleston, WV 25301

Address Correction Form

STEVE KEEN
WV DEPARTMENT OF ENERGY
1615 WASHINGTON STREET, E
CHARLESTON, WV 25311

Bulk Rate
U. S. Postage
PAID
Permit No. 1
Ravenswood, WV



JOB REPORT #1 DEMAG H135-S

When a 10,000 ton per month coal operator in central West Virginia wanted to increase production to 30,000 tons per month, Beckwith had the answer.

The DEMAG H135-S boasts significantly reduced operating and maintenance costs with less than half the operating components of the industry's traditional two-engine excavators.

The compact dimensions of the DEMAG H135-S make it ideal for tight working quarters such as multi-seam steep slope contour coal mining. It's the perfect solution for areas where other equipment can become "spoil bound" and maneuvering is often limited due to narrow pits. The DEMAG H135-S is extremely fast,



maintaining cycle times under 25 seconds even under difficult digging conditions. The bucket fills easily, enabling 85-ton trucks to be filled in 4 passes.

With fewer parts to wear or break, the excavator's one engine and three main pumps provide the coal operator with efficient performance, increased availability and lower operating costs.

DEMAG hydraulic excavators are backed by DEMAG's efficient, reliable parts and service organization, with a 24-hour hotline, that gives you the parts, service and training you need, when and where you need it.

The DEMAG H135-S can help you write your own success story. It's available from Beckwith Machinery Company today. For more information, call 412-327-1300 or write Beckwith Machinery Company, P.O. Box 8718, Pittsburgh, PA 15221.

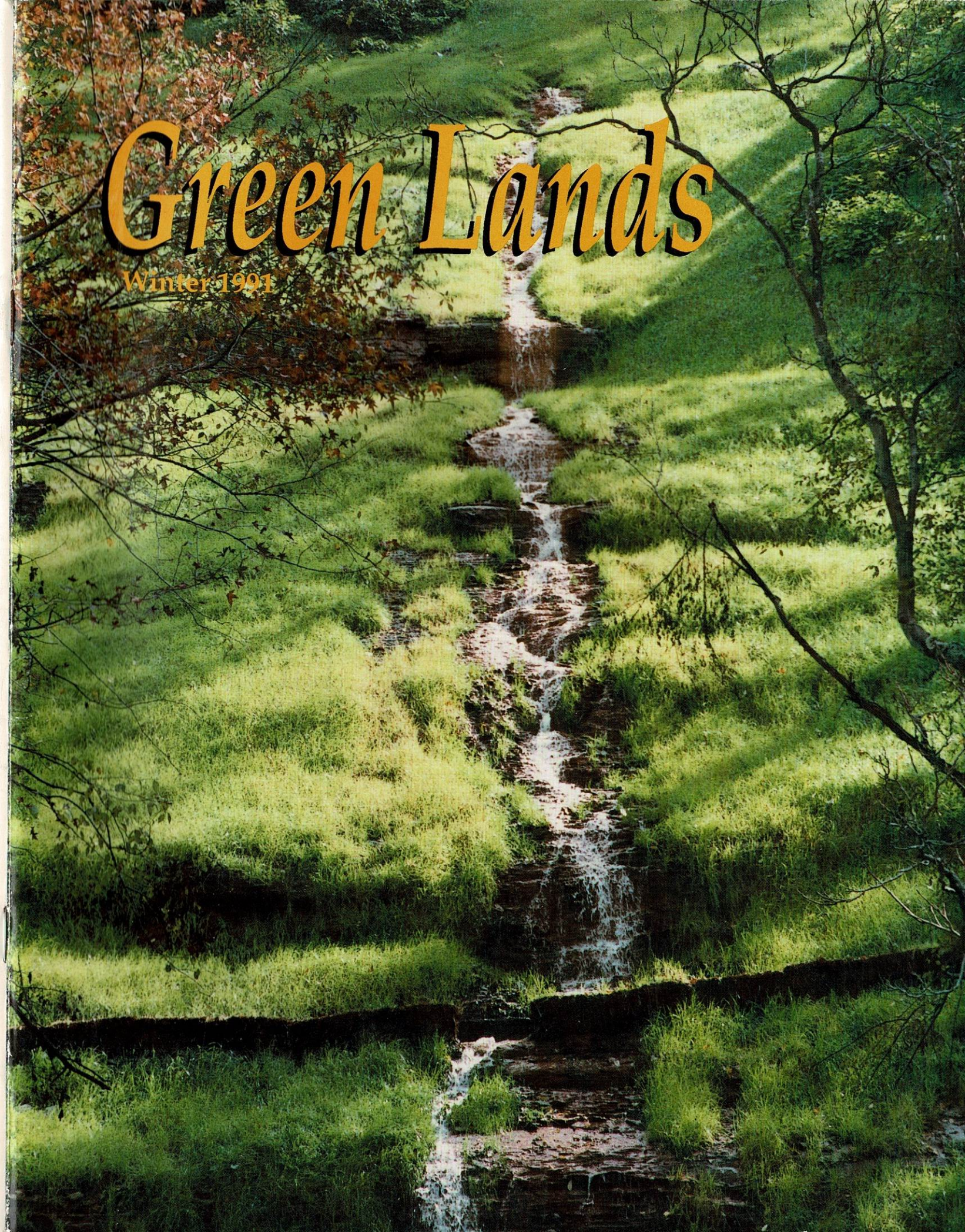
SPECIFICATIONS	
Total Operating Weight:	308,000 lbs.
Bucket Capacity:	13.6 cu. yds.
Engine:	CAT 3412
# of Hydraulic Pumps:	3
Crowd Force:	132,300 lbs.
Breakout Force:	132,300 lbs.
Fuel Consumption:	24 gallons per hour

MANNESMANN
DEMAG

BECKWITH
Machinery Company

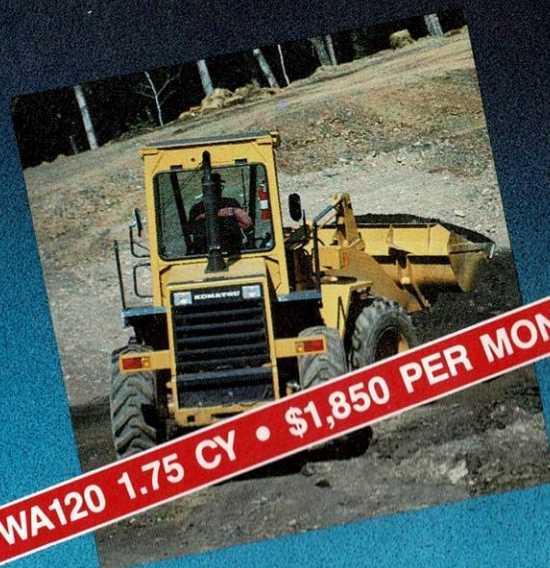
Green Lands

Winter 1991



RISH AND KOMATSU WHEEL LOADER SPECIALS

Compare our rates!



WA120 1.75 CY • \$1,850 PER MONTH



WA180 2.25 CY • \$2,450 PER MONTH



WA250 2.75 CY • \$2,750 PER MONTH

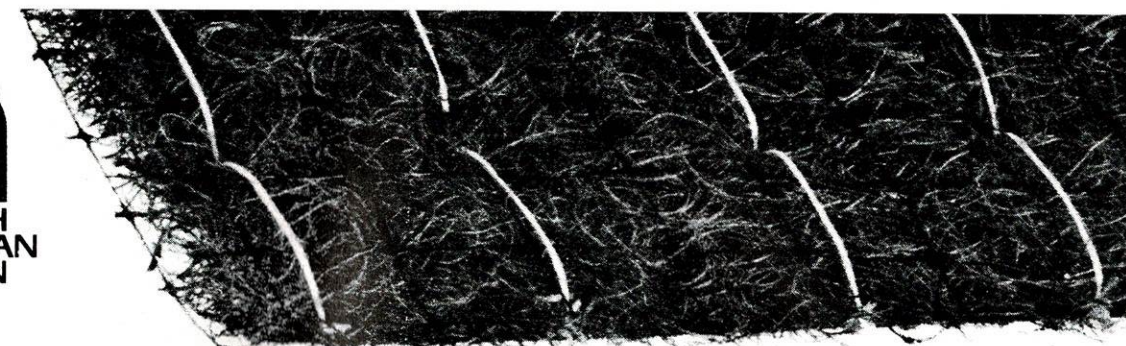
CALL RISH TODAY

Quality Komatsu Wheel Loaders are now available at Rish Equipment Company at special rental rates. Call or drop by your nearest Rish location and discuss your wheel loader requirements with our sales representatives today.

KOMATSU
KOMATSU MARKETING DIVISION

Rish
EQUIPMENT COMPANY

BECKLEY, WV • 304/255-4111
BLUEFIELD, WV • 304/327-5124
BRIDGEPORT, WV • 304/842-3511
PARKERSBURG, WV • 304/422-8441
ST. ALBANS, WV • 304/755-3311
FROSTBURG, MD • 301/689-2211
COEBURN, VA • 703/395-6901



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

\$75

Straw Blanket for moderate runoff 4:1

\$150

Straw Blanket for heavy runoff 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.

CONTACT DISTRIBUTOR'S NEAREST BRANCH

KANAWHA STEEL & EQUIPMENT COMPANY

GENERAL OFFICES
3000 Sissonville Drive
Charleston, W.Va. 25332
P.O. Box 3203 Area Code 304 343-8801

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

BRANCH
106 North Bridge Street
New Martinsville, W.Va. 26155
P.O. Box 288 Area Code 304 455-3430

BRANCH
Old Route U.S. 23 North
Wise, Virginia 24293
P.O. Box 1437 Area Code 703 328-8096

BRANCH
1517 Mellwood Avenue
Louisville, Ky. 40201
P.O. Box 32 Area Code 502 589-6278

BRANCH
Route U.S. 25 East
Middlesboro, Ky. 40965
P.O. Box 8 Area Code 606 248-2054

BRANCH
Route U.S. 23 North
Prestonsburg, Ky. 41653
P.O. Box 126 Area Code 606 886-8123



14649 Highway 41 North
Evansville, IN 47711

Crown Hill Equipment, Inc.

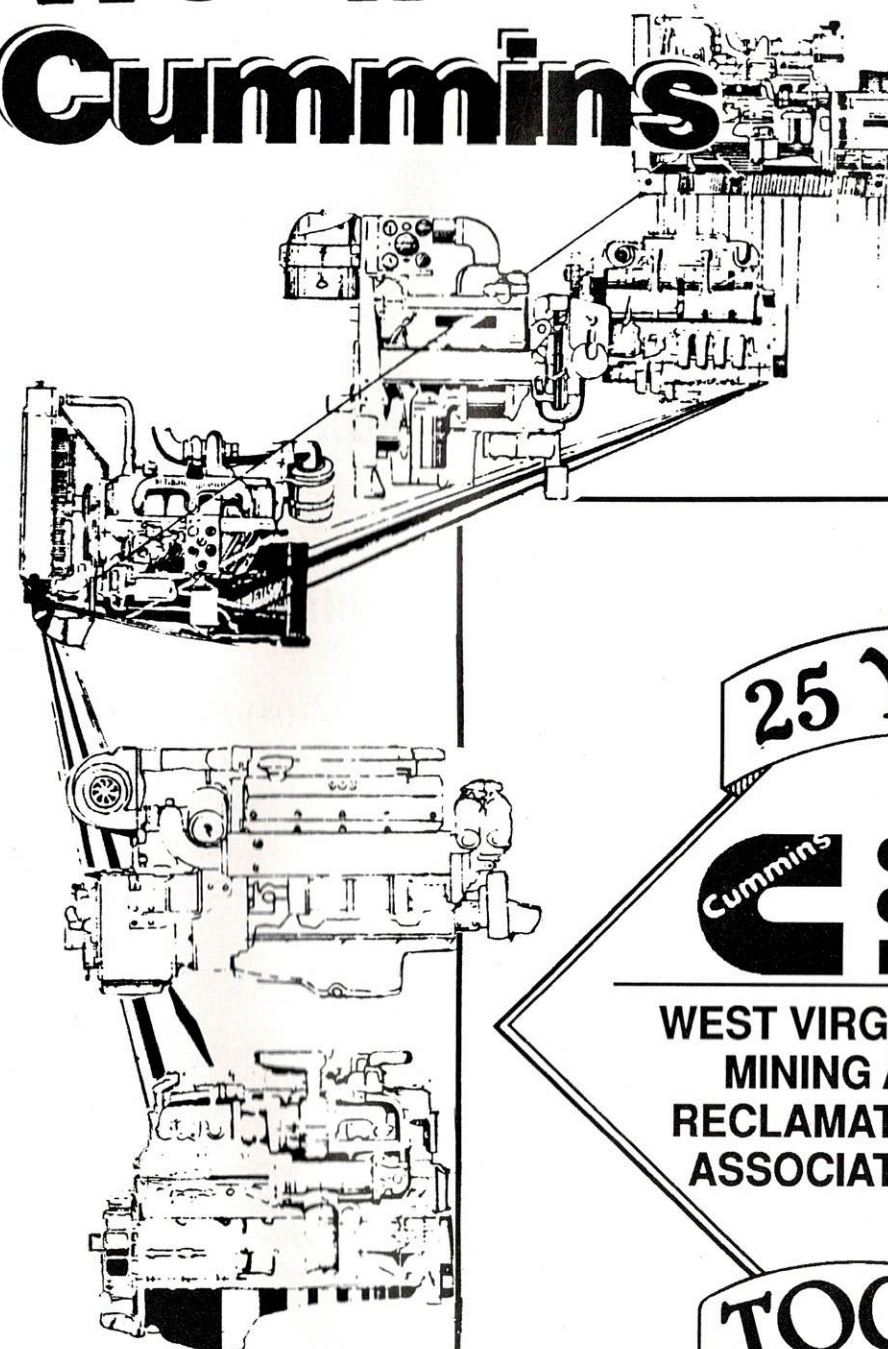
We have the following items in stock for exchange or outright sale:

- 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 / D9I
- 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

We are Cummins

We are Power



25 YEARS



**Cummins
Cumberland,
Inc.**

**WEST VIRGINIA
MINING AND
RECLAMATION
ASSOCIATION**



TOGETHER



**Cummins
Cumberland
Inc.**

Nashville, TN
(615) 366-4341

Louisville, KY
(502) 491-4263

Bristol, VA
(703) 669-4200

Fairmont, WV
(304) 367-0196

Knoxville, TN
(615) 523-0446

Hazard, KY
(606) 436-5718

Evansville, IN
(812) 425-2464

South Charleston, WV
(304) 744-6373

Gunter Reclamation

in Beckley, West Virginia

Hydroseeding • Tree Planting • Mulching

A subsidiary of Ronald B. Gunter Machinery

1415 Dry Hill Road
Beckley, West Virginia

Office (304) 253-5383
Home (304) 253-2674

Index to Advertisers

Akers Supply.....	44	Kimberly Industries.....	28
Anderson of West Virginia.....	1	Lilly Explosives.....	40
Atlas Powder.....	18	Massie Reclamation.....	10
Austin Powder.....	6	McCoy Construction.....	29
Beckwith Machinery.....	back cover	Mt. State Bit Service.....	7
Beckwith Machinery.....	30	Nell Jean Enterprises.....	42
Bell Farms Reclamation Service.....	6	Ohio Seed.....	10
Carter Machinery.....	42	Penn Line Service.....	31
Chamberlaine & Flowers.....	39	Petroleum Products.....	7
C. I. Walker Machinery.....	14	Pioneer Construction.....	17
Crown Hill Equipment.....	2	Rish Equipment.....	inside back cover
Cummins Cumberland.....	3	Rudd Equipment.....	27
Flat Top Insurance.....	inside front cover	Ryder & Co.....	16
Fullen Fertilizer.....	43	Scarlet Oaks.....	44
GAI Consultants.....	44	Steel Supply.....	43
General Paving.....	13	Terra Engineers.....	43
Green Acres Contracting.....	43	The Battle Ridge Companies.....	32
Gunter Reclamation.....	4	Vecellio & Grogan.....	29
Hotsy Equipment.....	39	West Virginia Explosives.....	18
J & G Seeding.....	42	West Virginia Tank Testing.....	44
Kanawha Steel & Equipment.....	1	Worldwide Equipment.....	19

Green Lands

Volume 21 Number 1

- 8 Members Help Out in Barbour County
- 12 'Me? I Still Drive a Truck'
- 31 Congress Extends AML
- 33 Using Ammonia to Treat Mine Waters
- 41 Coal Calendar

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

Ryder & Company created this scene in Fayette County from an abandoned mine site. Now Congress has extended the program under which this feat was accomplished. Our cover story begins on page 20.
(Cover photo by Danny Pritt)

WVMRA Staff & Board of Directors

President
Benjamin C. Greene

Vice President
William B. Raney

Assistant to the President
Patty Bruce

Business Manager
Mary Ann Steele

Editor
Daniel Miller

Chairman
Kenneth G. Woodring - Huntington
First Vice Chairman
R. Donald Cussins - Bayard
Second Vice Chairman
James J. LaRosa - Clarksburg
Secretary
Donald K. Cooper - Charleston
Treasurer
Gerald W. Ramsburg - Clarksburg
Associate Division Chairman
Edward F. Surgeon - Louisville, KY

Directors
J. W. Anderson - Princeton
J. R. Bryan - Lebanon, VA
D. P. Cartwright - Naugatuck
J. M. Compton - Clarksburg
B. H. Daud - Hansford
B. E. Dearth, Jr. - Bridgeport
D. R. Donell - Weirton
J. J. Faltis - Morgantown
P. C. Graney, III - Charleston
J. H. Harless - Gilbert
D. E. Huffman - Bridgeport
J. E. Hull - Charleston
P. F. Hutchins - Columbus, OH
T. W. Hylton - Beckley
Honorary Members
C. T. Jones - Charleston
J. C. Justice - Beckley
P. A. Laskody, Jr. - Morgantown
R. G. Lockard - Weston
J. W. Mullen - Bluefield
R. L. Raines - Bluefield
L. A. Streets - Mt. Storm
J. C. Williamson - Charleston
S. R. Young, III - Gilbert
C. E. Compton - Clarksburg
L. W. Hamilton, Jr. - Hansford
F. B. Nutter, Sr. - Pompano Beach, FL

Professional Technical Service

Computer Aided Blast Design
High Speed Photography
Cost Analysis
Blast Casting
On Job Blast Analysis



State-Of-The-Art Products

Latest Emulsion Technology
Gelatins & Dynamites
Detonating Cord
Cast Boosters
Blasting Agents
Non-Electric Initiation
World's Most Accurate Blasting Caps

Explosives of Tomorrow...Today!
IN SOUTHERN AND CENTRAL WEST VIRGINIA CONTACT...



Tom Ables
112 Village Green
Princeton, WV 24740
(304) 425-4512



Ernie Blair
P.O. Box 424
Mt. Hope, WV 25880
Office: (304) 877-2301
Home: (304) 465-0196



Robert Runyon
P.O. Box 98
Chapmanville, WV 25508
Office: (304) 855-4521
Home: (304) 855-9106

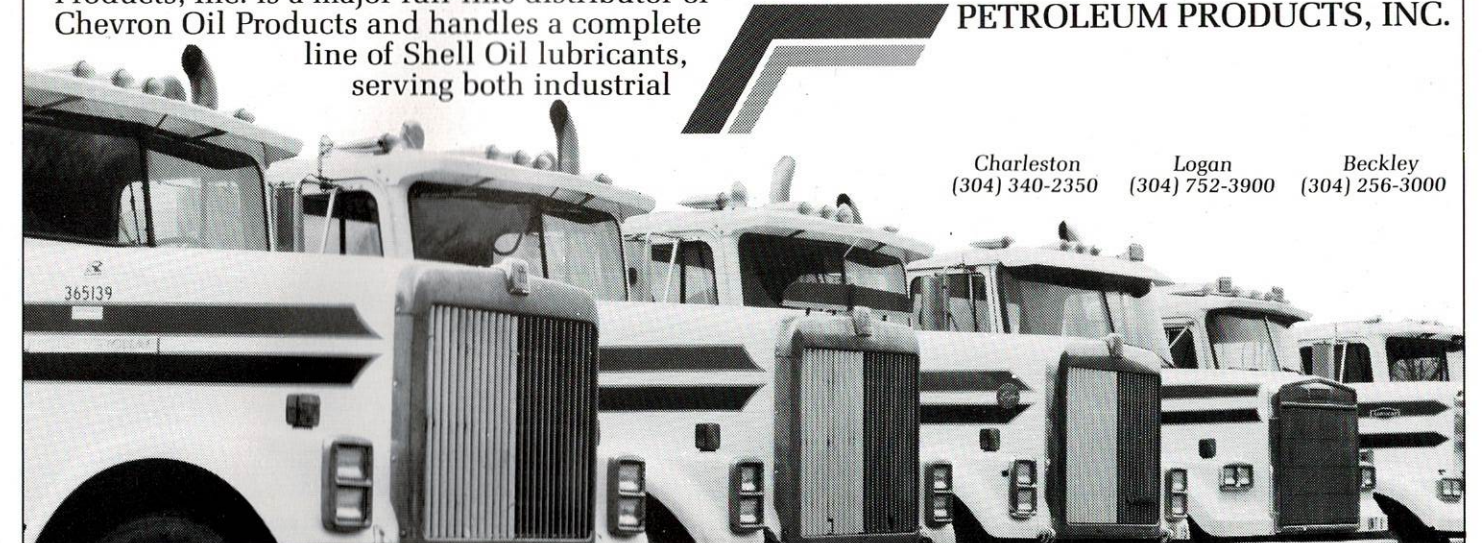
On the move for 50 years.

"Oil is our product, service is our business" is not just a saying at Petroleum Products, Inc. — it's a way of life. Since 1938, we've served the oil needs of coal and other industries in southern West Virginia. Today Petroleum Products, Inc. is a major full-line distributor of Chevron Oil Products and handles a complete line of Shell Oil lubricants, serving both industrial

and retail outlets. We've been on the move for 50 years and we're changing to meet the ever increasing demands of the 1990's. Call us. We're here to serve your needs.

PETROLEUM PRODUCTS, INC.

Charleston (304) 340-2350 Logan (304) 752-3900 Beckley (304) 256-3000



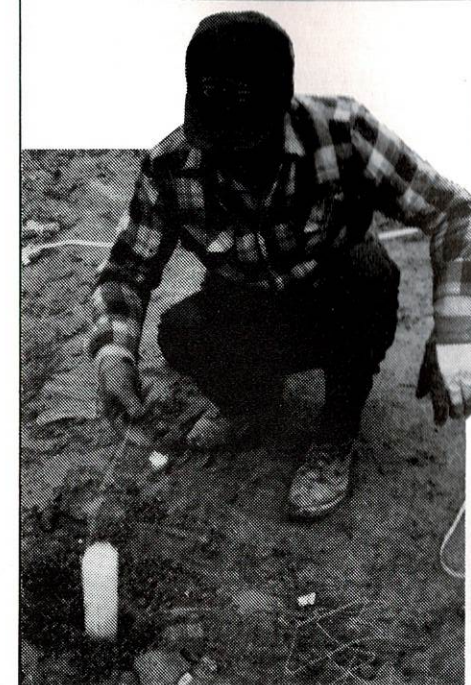
Let us add a farming dimension to your seeding needs

Bell Farms Reclamation Service

Specializing in

- Land Reclamation
- Landscape Seeding
- Erosion Control

Robert Gene Bell
Rt. 1 Box 373A
Summersville, WV 26651
Phone (304) 872-3749



GET THE BLASTING POWER OF MT. STATE BIT SERVICE

When it comes to professional service and dependable products, Mt. State Bit Service simply blows the competition away! Call us today for on-site evaluations and cost estimates on our:

- Complete Line of RAVEN PUMPS
- Complete Line of Explosives and Accessories
- Contract Drilling Services
- Contract Blasting Services

Our mix plant facilities provide packaged ANFO products for both wet and dry conditions with various levels of densities and energies.

Get the blasting power of Mt. State Bit,
Call 1/800/352/8322

Morgantown, WV
Hurricane, WV
Grantsville, MD
Fairbanks, PA

Mt. State Bit Service Inc., Morgantown, WV (304) 296-1783





Fill dirt from the construction site provided material for a contoured bank behind the school.



Site preparation crews also widened an access road.



Site preparation is complete for Barbour County's new vo-tech building extension.

Members Help Out In Barbour County

Several Philippi area companies joined forces late last summer to overcome financial limitations and bring a Barbour County educational expansion to fruition.

Philip Barbour High School opened in 1963, consolidating Barbour County high schools. The Vocational Tech Center was added in 1979. The diverse, modern Vo-Tech Center is served by the Vocation Advisory Council, a collection of business and industry people from surrounding communities.

In turn, it serves the entire county, adults as well as students, providing training in a wide variety of vocational fields. When it was determined by the advisory committee that an expansion of the facility was in order, the ever present question of funding arose.

State funding of \$690,000 was available. "We had State funds to work with, but without the help and cooperation of these companies and people, what we are doing here now just wouldn't have been possible," says Charles Zinn, director of the Vocational Center.

Zinn referred to the site preparation, for which manpower and equipment were donated by several local companies. He estimates a savings of more than \$100,000. "This was

just a tremendous example of public minded cooperation," Zinn added. "The facility will be a source of pride for Barbour County, and so will the spirit of volunteerism that made it possible."

WVMRA members were key players in the project. **C&W Coal Co.** donated two dozers, a high lift, and surveying services. **Stanley Industries, Inc.** provided a dozer and a water truck. **McCoy Brothers, Inc.** contributed a rock truck and a core drill, **Grafton Coal Co.** came through with a low boy, and **92 Coal Corp.** chipped in with a high lift. These same companies also contributed a whole lot of manpower.

The work itself was a model of efficiency, carried out somewhat in the manner of mountaintop removal surface mining. The primary task was to level a bank just behind the existing facility in order to allow the new building to tie into the older one. The fill dirt was used to level out other areas of the school's rolling terrain. An access road was widened, the adjacent bank was contoured, and a new soccer field was constructed.

The entire site preparation project was completed over a three week period in August. Construction on the new 85 x 100 building is scheduled for completion in September.

Stand back and

Watch Us Grow!

Massie Reclamation, Inc.

We specialize in

- hydroseeding
- tree planting
- straw blowing

P. O. Box 396
Shady Spring, West Virginia 25918

Charles Massie, Owner
(304) 787-3933

Depend upon

The Ohio Seed Company

for all reclamation seed
high quality and prompt delivery



TOLL FREE
1-800-336-7333

The Ohio Seed Company
P.O. Box 87
West Jefferson, Ohio 43162
(614) 879-8366



The **LARGEST** Truck ever delivered in West Virginia 205 Ton DRESSER Haulpak 685E

DRESSER®

Crawler Dozers
Low Ground Pressure Crawler Dozers

Crawler Loaders
Wheel Dozers

Wheel Loaders
Motor Graders
Soil & Asphalt Compactors
Off Highway Dump Trucks

Anderson OF WEST VIRGINIA

For more information on any quality Dresser machine, call the Anderson office nearest you.

CHARLESTON AREA
Route 119 South
Alum Creek, WV 25003
756-2800

BECKLEY AREA
210 George St.
Beckley, WV 25801
255-6699

CLARKSBURG AREA
Lewis County Ind. Park
Jane Lew, WV 26378
884-7821



'Me? I still drive a truck'

A constant strength of the West Virginia Mining and Reclamation Association through its first 25 years has been the diversity of its membership. Throughout this turbulent period, the organization has been able to call on a great variety of talent, size, and business expertise for advice, support, and encouragement.

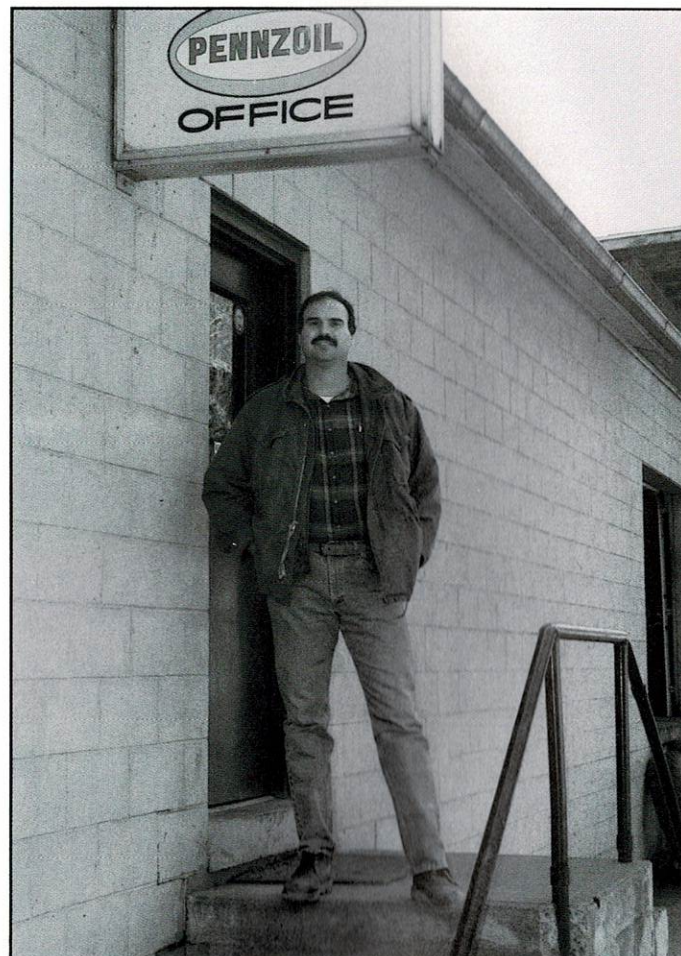
For instance, one of WVMRA's oldest members is a small family owned and run business in Whitesville, West Virginia — B & M Oil Co.

B & M got its start, and its name, in 1963, when Kyle Bailey left the Elk Refining Company to go into partnership with Jim Meadows, the owner of Meadows Oil in Beckley. They formed the B & M Oil Co. In Whitesville, with Meadows as the silent partner, Bailey's wife Nadine as the secretary/bookkeeper, and one truck driver. Though Meadows Oil and B & M were in the same business, and operating in the same general locale, a gentleman's agreement has kept the two company's from stepping on each other's toes for 28 years now.

While he was getting his new company off the ground, Kyle Bailey rented a house about 500 feet down the road from his office. Later he bought the house and there they stayed.

The Baileys retained their relationship with Elk Refining, serving as a distributor for Elk's principal product, Keystone Gasoline. Later, Elk Refining was purchased by Pennzoil, and B & M has remained a Pennzoil distributor to this day, covering southern West Virginia.

In 1968, the Baileys bought Meadows' share of the business, but retained the now familiar name. Nadine became the secretary/treasurer, a post she still holds. In 1974, B & M built a new office facility on the adjacent lot, and converted the old one into a garage.



Kenneth Bailey - truck driver and president

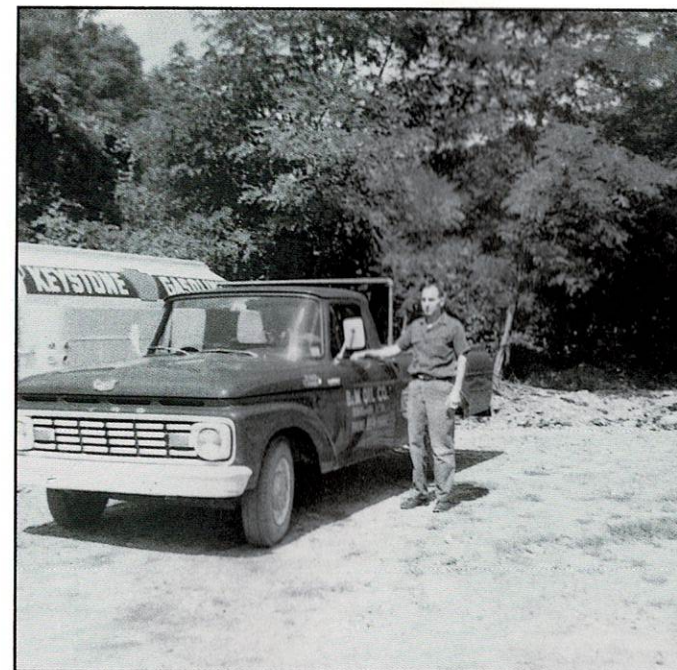
Through the changes, the Bailey's son Ken was growing up in the business. "I started out as a teenager, washing trucks," he recalls. "Later on, I was able to drive them."

And what is his role with the company in 1991. "Well, I'm still driving trucks," he laughs. "Just part-time, though. I'm also the president."

After training at all levels of the company, Ken became its vice president, assuming the mantle of leadership when his father passed away in 1987.

Though he still takes his turn at truck driver when the situation dictates, he has a full-time staff of four drivers and three office people.

B & M Oil has never grown into a huge company in its quarter century plus. But it has provided a good living for a good many folks over those years, and it's the kind of operation that has formed the foundation of WVMRA since the organization's inception 25 years ago this year.



Company founder Kyle Bailey in 1963.



Keystone Oil was the product then, and it's still Pennzoil today.

General Paving Co.

Contractors for the Ruthbelle Project in Preston County and the Kennedy Subsidence Project in Upshur County

Congratulations to all concerned with the nation's foremost Abandoned Mine Lands program. With the cooperation of the coal industry, and the professionals within the West Virginia Division of Energy's AML section, West Virginia will continue to lead the nation in reclamation.

Fenton R. Eddy,
President

Rt 7 East at Richard
P. O. Box 3180
Morgantown, WV 26505
(304) 292-3346

Evan W. Eddy,
Vice President

Field of Dreams.

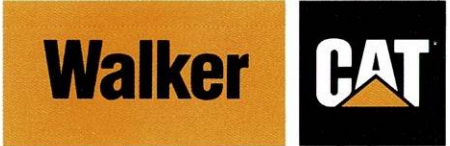


Sometimes dreams do come true. Just ask the kids of Ben Creek, West Virginia. This small community in Mingo County experienced first hand how businesses can give back to the community. • It all started with an old abandoned field, which the folks at Walker thought would make a great basketball court. It didn't take the Walker crew long to recruit some help and break ground. A local company donated the land. Mountain Enterprises provided paving. And Walker donated



equipment, manpower and materials. • The season opener was a success. A nice crowd was on hand and West Virginia University basketball coach, Gale Catlett, conducted a free basketball clinic for the kids. • Making a difference for the community. That's what it's all about. And that's the Walker Difference.

CHARLESTON 304-949-6400
BECKLEY 304-253-2706
PARKERSBURG 304-424-0200
SUMMERSVILLE 304-872-4303
LOGAN 304-752-0300
HUNTINGTON 304-526-4800
JACKSON, OHIO 614-286-7566



The **Walker** Difference

Ryder & Co.

Contractor for the Carbondale Project in Fayette County

Offers heartfelt congratulations to the
AML section of the
West Virginia Division of Energy
on a job well done.

It has been a pleasure
to work with the professional
personnel of WV - DoE.

J. D. Ryder, Jr. - President

Ryder & Co.

410 6th Avenue
St. Albans, WV 25177
(304) 722-3360

Pioneer Construction Co.

Contractors for the
Muddy Creek Project in Preston County,
the Omar Refuse Project in Logan County,
and other AML projects

is proud to be part of the
Abandoned Mine Lands program.

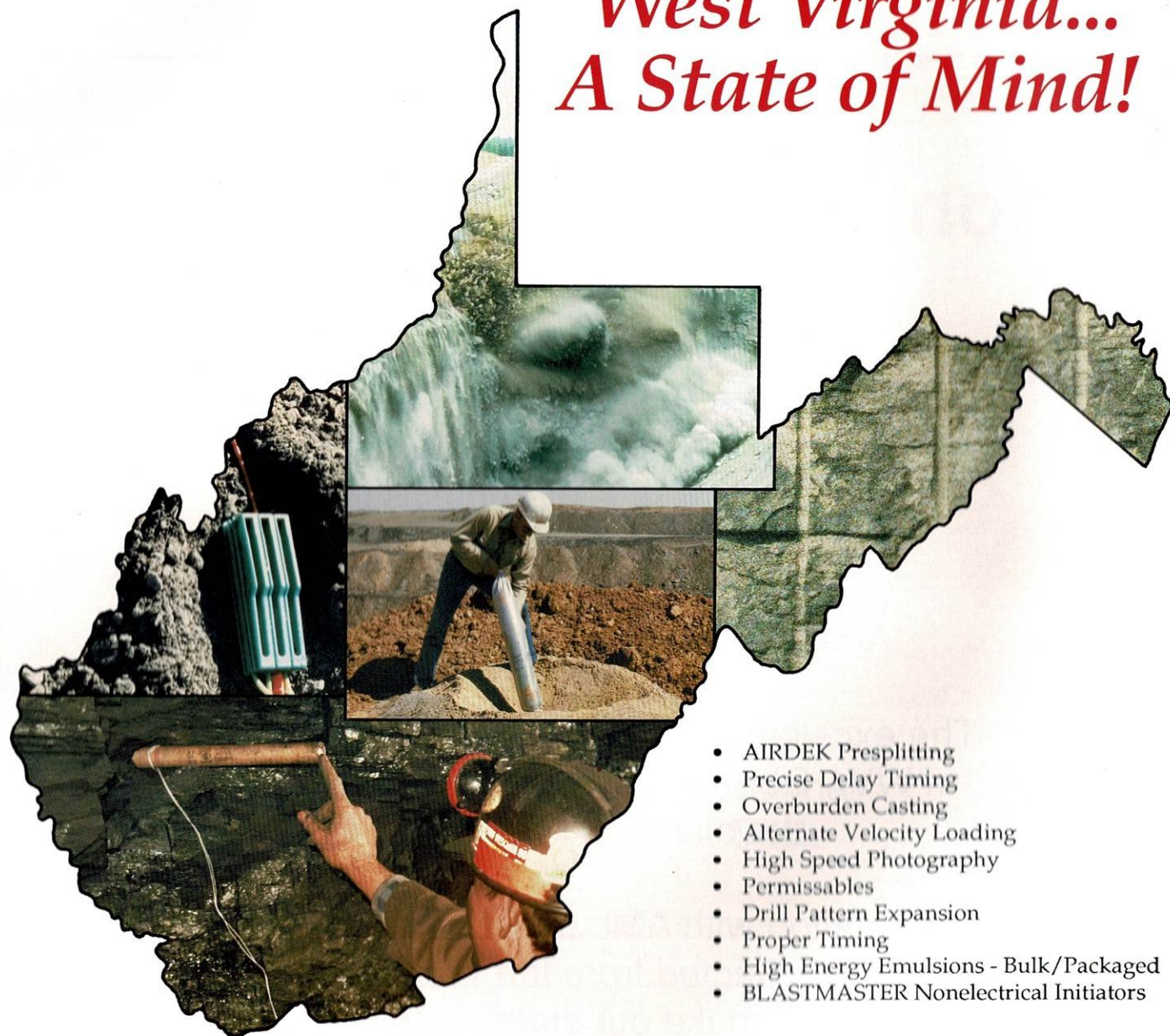
The excellent personnel of the AML section
of WV - DoE have been of immeasurable
assistance in our efforts.

In participation with AML projects, we are utilizing
the dollars collected from the West Virginia coal
industry to make our state more beautiful.

Pioneer Construction Co.

P.O. Box 1672
Widen, WV 25211
(304) 332-5522

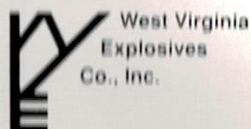
West Virginia... A State of Mind!



- AIRDEK Presplitting
- Precise Delay Timing
- Overburden Casting
- Alternate Velocity Loading
- High Speed Photography
- Permissibles
- Drill Pattern Expansion
- Proper Timing
- High Energy Emulsions - Bulk/Packaged
- BLASTMASTER Nonelectrical Initiators

West Virginia Explosives... A State-of-the-art Explosives Distributor

Call us for an on-site evaluation of your drilling and blasting program.
Bruce Wood, Vice President • Beckley, West Virginia • (304) 252-8505



Atlas Powder Company

ICI A distributor
of ICI explosives products



WORLDWIDE
EQUIPMENT

Corporate Offices
P. O. Box 71
Prestonsburg, KY 41653-0071
(606) 874-2172

Huntington Division
5650 Rt. 60 East
Huntington, WV 25703
(304) 736-3401

Prestonsburg Division
KY 1428 East
Prestonsburg, KY 41653-0071
(606) 874-2172
Hazard.....439-2632
Pikeville.....432-3903
Jackson.....666-4343
Whitesburg.....633-2349

Middlesboro Division
Mack Avenue
Middlesboro, KY 40965
(606) 248-5100

Princeton Division
Inter. 1-77 & U.S. 460
P. O. Box 1433
Princeton, WV 24740
(304) 425-7511

Northern Division
Lewis Co. Industrial Park
P.O. Box 171
Jane Lew, WV 26378
(304) 884-7815

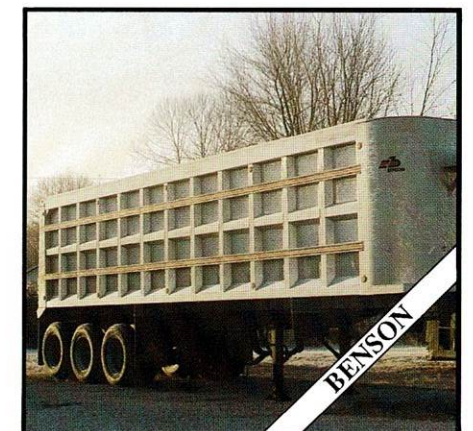
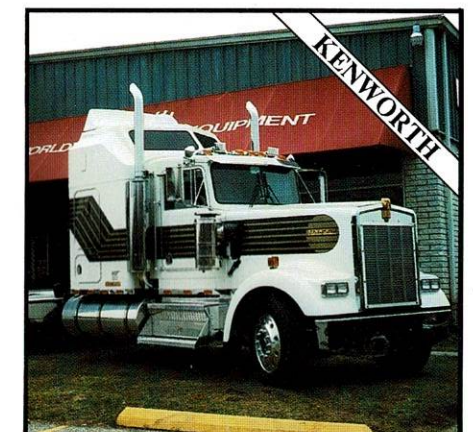
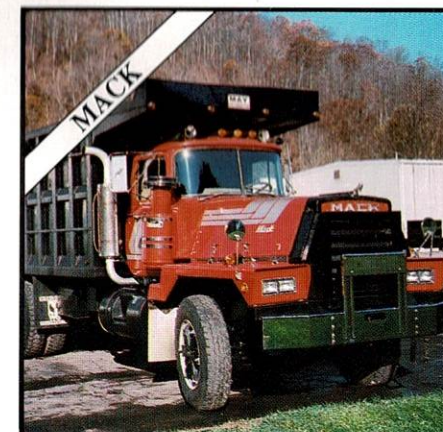
Service Parts, Inc.
U.S. Route 23
Lowmansville, KY 41232
(606) 297-6401

**Appalachian Leasing
Services, Inc.**
P.O. Box 110
Prestonsburg, KY 41653-0110
(606) 874-2175

Hazard Division
Highway 15
P.O. Box 777
Hazard, KY 41701
(606) 439-3022

Lexington Division
945 Nandino Drive
P. O. Box 12073
Lexington, KY 40580-2073
(606) 281-5152

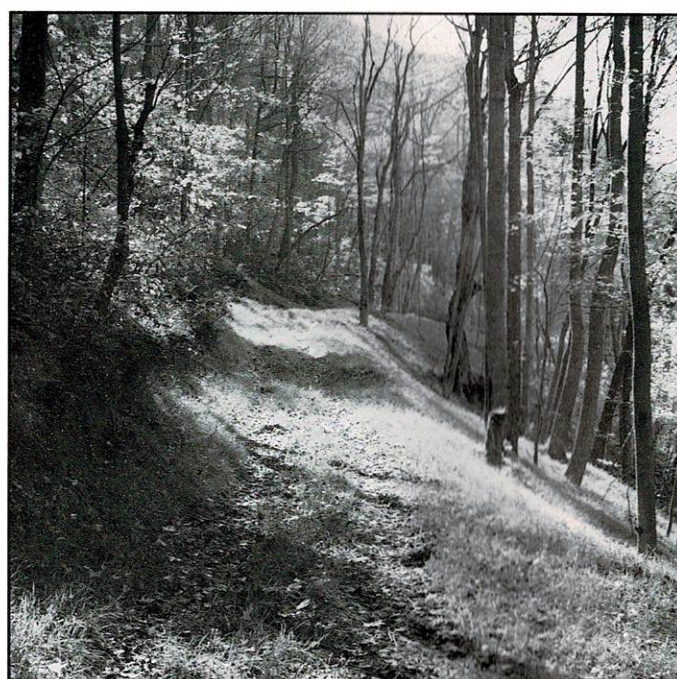
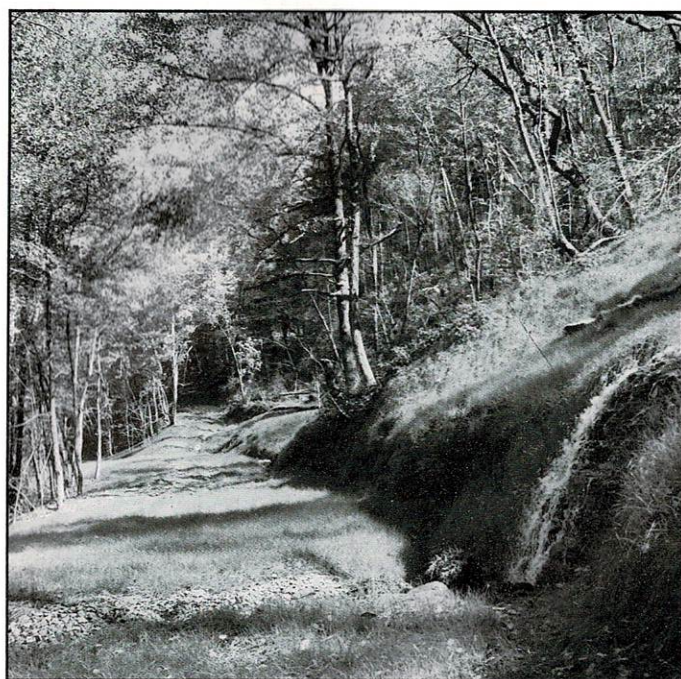
Pac Lease
P.O. Box 12073
945 Nandino Drive
Lexington, KY 40580-2073
(606) 233-3747



Worldwide Brings the World To You!



The Mack Franchise is available in all Worldwide locations except Lexington.



The "Carbondale Portals & Slide Project" in Fayette County, completed by Ryder & Co. of St. Albans, exemplifies the excellent results of West Virginia's AML program.
photos by Danny Pritt

Congress extends AML program

The Abandoned Mine Reclamation Fund, established by the Surface Mine Control and Reclamation Act of 1977, has been reauthorized by Congress.

Due to expire in 1992, the Fund has been extended through September 1995. The Abandoned Mine Reclamation Act of 1990 contains several other significant provisions.

- Interest may now accrue on the federal share of AML funds. West Virginia coal operators have now contributed more than \$300 million to the AML fund, which took several years to get off the ground. For 13 years, no interest was collected on these accumulated funds, a major potential source of revenue. This provision will enhance the fund, at no cost to operators.

- Substantial additional funding may be available for high priority projects. From the outset, AML has allocated its funds according to priority criteria in an attempt to address the most serious environmental problems first. Fifty percent of the money collected within a state is made available to that state for AML projects. The other half is directed to the (Interior) Secretary's Fund for use in a variety of areas. Hereafter, 40% of the Secretary's Fund will go to a supplemental allocation to the states for comple-

tion of priority 1 & 2 projects. Thus, each state will be eligible to recover a larger share of the reclamation fees collected from its industry.

- Further funds from the secretarial share may be utilized by states to address projects abandoned after August 3, 1977. These sites, mined during the long interim period between federal legislation and enabling regulation, have not previously been included in AML inventories, though they may have the same environmental urgency as older sites.

- Funding will also be made available for the treatment of acid mine drainage. Each state program is eligible to receive an additional amount, equal to 10% of its AML funds, to be used to "protect, repair, replace, construct, or enhance facilities relating to water supplies . . ." Enabling legislation to take advantage of this provision has been introduced in the West Virginia Legislature.

In West Virginia, plans are underway to accelerate the AML program. Director Pete Pitsenbarger has committed his section to contracting one project in every week of 1991. Meeting this goal would build on an already successful program.

In recent years, West Virginia's AML program has



Pioneer Construction - Omar Refuse - Logan County

achieved commendable results, utilizing industry generated funds to provide employment and enhance the environment. One notable example is the "Carbondale Portals & Slide Project" in Fayette County (cover photo), completed by Ryder & Co. of St. Albans.

Located near Smithers, in western Fayette County, the project involved some 2 million gallons of water, which was trapped in an old underground mine, where seepage was causing surface slides. With private residences located just below the mine site, this project was a definite "priority 1."

After accepting the contract in November of 1989, Ryder & Co. successfully drained the mine, removed two slides from the old bench, and completely revegetated the site.

"This project is emblematic of why the AML program was conceived, and why it was re-authorized," says Construction Administrator Danny Pritt. "In a few short months, a significant environmental hazard was eliminated at no cost to the taxpayer."

"Hopefully, projects of this nature will provide the impetus for Congress to extend the AML program well beyond 1995."



photo by Pete Pitsenbarger

Pioneer Construction - Muddy Creek - Preston County

photo by David L. Smith

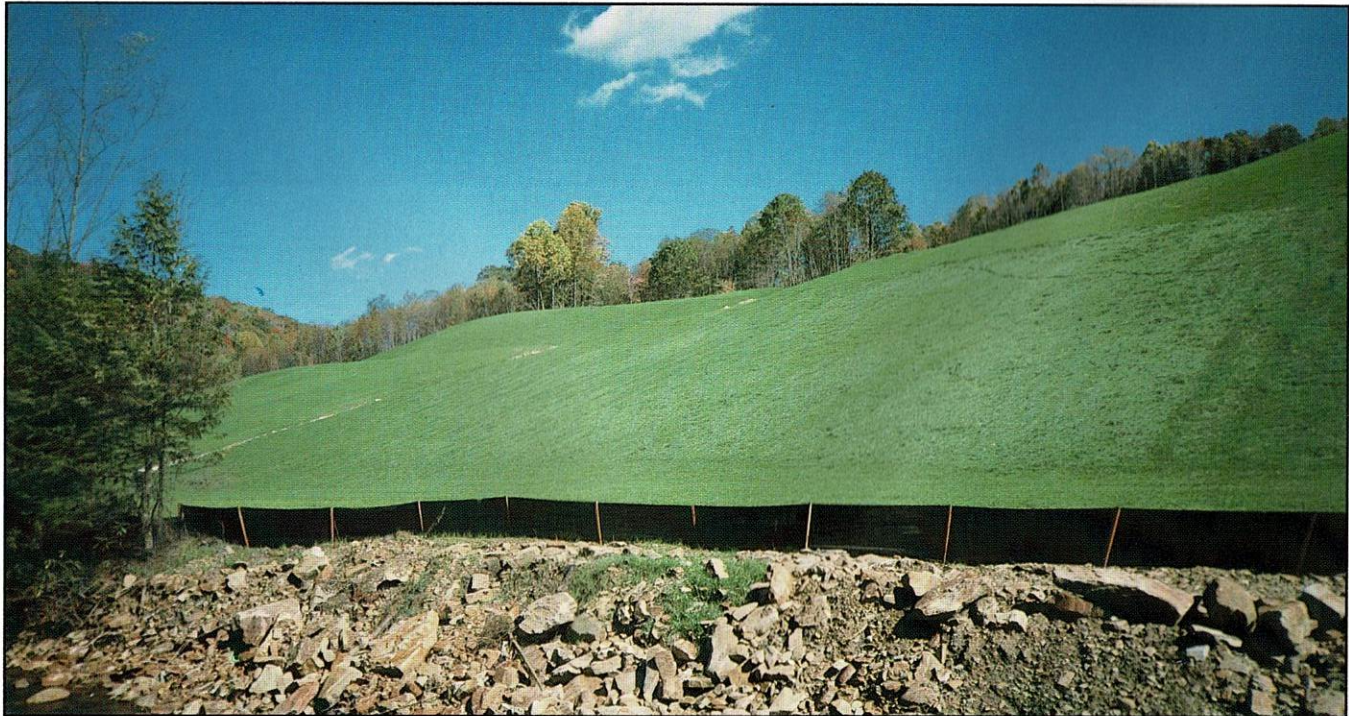


photo by Danny Pritt

General Paving - Kennedy Subsidence - Upshur County

photo by David L. Smith

General Paving - Ruthbelle - Preston County





Kimberly Industries - Sarah Ann - Logan County

photo by Danny Pritt



North American - Harding AMD - Randolph County

photo by Danny Pritt

photo by Danny Pritt

The Battle Ridge Companies - Ridgeview A&B - Boone County



photo by Danny Pritt

Ryder & Sons - Beaver Creek Highway - Randolph County





McCoy Construction - Twin Branch - McDowell County

photo by Danny Pritt



Vecellio & Grogan, Inc. - Big Stick- Raleigh County

photo by Danny Pritt

When reliability counts, count on the Hitachi EX3500 from Rudd Equipment.



The Hitachi EX3500 hydraulic shovel means rugged, reliable performance and high availability that you can count on. That's why so many mine managers, owners, engineers and operators talk to Rudd Equipment for their mining machinery needs.

Extra durability all-around. Like all Hitachi products, the EX3500 features unmatched durability all-around. Extra durable front attachments, an extra tough undercarriage and more will give you high availability.

Reliable hydraulics. The EX3500 incorporates advanced, high-speed hydraulics that provides the reliability that will make your jobs simpler, faster and more productive. In addition, the EX3500 utilizes newly designed electronics and hydraulics systems

that ensure extremely smooth and productive operations.

This chart shows you why:

Weight	Horsepower	Bucket PCSA heaped	
		Shovel	Backhoe
723,000 lbs.	1,684 PS	23.5-32.7 cu. yd.	22.2-32.7 cu. yd.

Rudd reliability throughout. Rudd Equipment is a powerful partner in the tough business of producing coal. That means a total commitment to fast, helpful parts and service response to keep your EX3500 productive and profitable.

To find out how Rudd can make the difference for you, call one of our offices today.

- | | | | |
|----------------------------------|------------------------------------|----------------------------------|----------------------------------|
| Louisville, KY
(502) 456-4050 | Evansville, IN
(812) 867-6661 | St Louis, MO
(314) 487-8925 | Nitro, WV
(304) 755-7788 |
| Corbin, KY
(606) 528-9440 | Indianapolis, IN
(317) 247-9125 | Pittsburgh, PA
(412) 322-1112 | Bridgeport, WV
(304) 592-1050 |
| Allen, KY
(606) 886-1276 | Fort Wayne, IN
(219) 482-3681 | Clearfield, PA
(814) 765-8500 | |

RUDD

EQUIPMENT COMPANY

The Rudd difference is performance.
Experience it for yourself.

Kimberly Industries, Inc.

Contractor for the **Sarah Ann Project** in Logan County, as well as the Chenoweth Ford Landslide, Lando Mines, Gordon Refuse Piles, Mt. Olive Portals, Marfrance Refuse, Crichton Mine Dump and Manila Creek 'B',

Offers congratulations
to West Virginia's coal industry,
and to the West Virginia Division of Energy,
for the cooperation and dedication
which has allowed the
AML program to go forward,
to the benefit of all West Virginians.

John Wellford, President
Kimberly Industries, Inc.
P. O. Box 10088 - Station C
Charleston, WV 25357
(304) 346-3775



Vecellio & Grogan, Inc.

**Contractor for the
Big Stick and East Gulf Projects**

Takes special pride in participating in the
Abandoned Mine Lands program, wherein
West Virginia coal generated dollars
put West Virginians to work.
Congratulations to all concerned.

Vecellio & Grogan

P. O. Drawer V
Beckley, WV 25802
(304) 252-6575

McCoy Construction

Contractors for the Twin Branch Project in McDowell County

Wishes to thank the
West Virginia Division of Energy,
and to congratulate all those who have played
a part in the successful implementation of
West Virginia's AML program.

McCoy Construction

P. O. Box 1-1A
Salt Rock, WV 25559
(304) 736-3528

DEMAG MACHINE LOCATIONS

West Virginia

BECKWITH AND DEMAG LOCATIONS

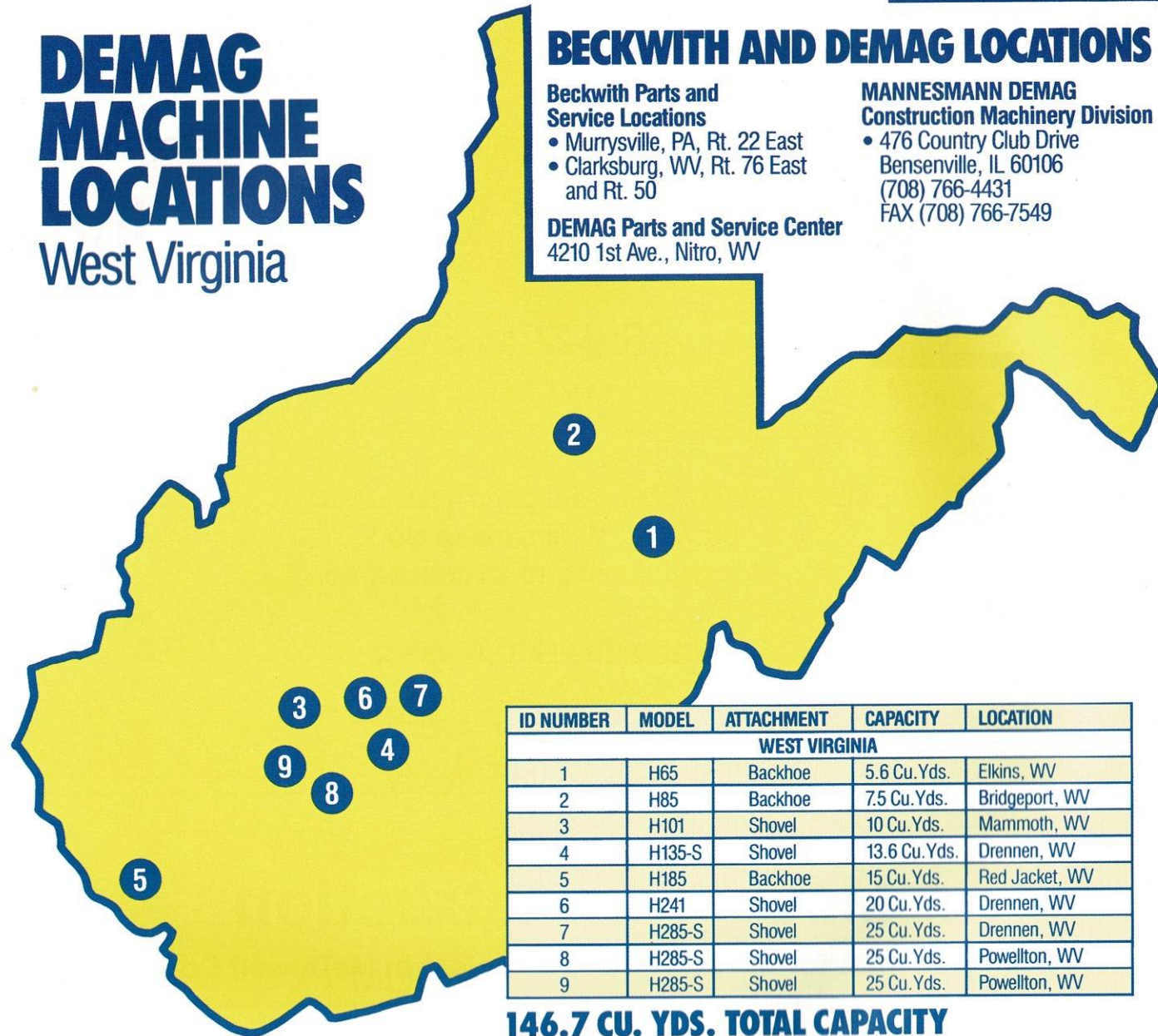
Beckwith Parts and Service Locations

- Murrysburg, PA, Rt. 22 East
- Clarksburg, WV, Rt. 76 East and Rt. 50

DEMAG Parts and Service Center
4210 1st Ave., Nitro, WV

MANNESMANN DEMAG Construction Machinery Division

- 476 Country Club Drive Bensenville, IL 60106
(708) 766-4431
FAX (708) 766-7549



ID NUMBER	MODEL	ATTACHMENT	CAPACITY	LOCATION
WEST VIRGINIA				
1	H65	Backhoe	5.6 Cu. Yds.	Elkins, WV
2	H85	Backhoe	7.5 Cu. Yds.	Bridgeport, WV
3	H101	Shovel	10 Cu. Yds.	Mammoth, WV
4	H135-S	Shovel	13.6 Cu. Yds.	Drennen, WV
5	H185	Backhoe	15 Cu. Yds.	Red Jacket, WV
6	H241	Shovel	20 Cu. Yds.	Drennen, WV
7	H285-S	Shovel	25 Cu. Yds.	Drennen, WV
8	H285-S	Shovel	25 Cu. Yds.	Powellton, WV
9	H285-S	Shovel	25 Cu. Yds.	Powellton, WV

146.7 CU. YDS. TOTAL CAPACITY
109.2 CU. YDS. CAPACITY SINCE 1987

WEST VIRGINIA IS BECKWITH COUNTRY

**MANNESMANN
DEMAG**

BECKWITH
Machinery Company

P.O. BOX 8718 • PITTSBURGH, PA 15221

412-327-1300 • FAX 412-327-9318

M748-0

Restore Natural Beauty



We're a proven leader in land and mine surface reclamation. And we make it easy. For over 35 years, we've been giving nature a hand with seeding, mulching, and landscaping.

We're committed to customer satisfaction. Our long term customers stand as proof.

And if that's not enough, just ask to see one of our completed sites.

We bring beauty to places you would never dream possible.

We're reliable, yet innovative. We're Penn Line Service.

So for your next reclamation project, call 800-333-9110 and ask for Ron Hill.

Let us help you restore natural beauty.

PENN
LINE SERVICE INC.

Diverse Dimensions in Specialty Contracting

Scottsdale, PA 15683 • 412/887-9110

The Battle Ridge Companies

Contractor for the Ridgeview A & B Project in Boone County

Extends congratulations for past successes and best wishes on future projects, as West Virginia's AML program continues to set the standard for land rehabilitation.

Battle Ridge is happy to play a part in this outstanding program.

The Battle Ridge Companies

1000 River East Drive
Belle, WV 25015
(304) 926-7700

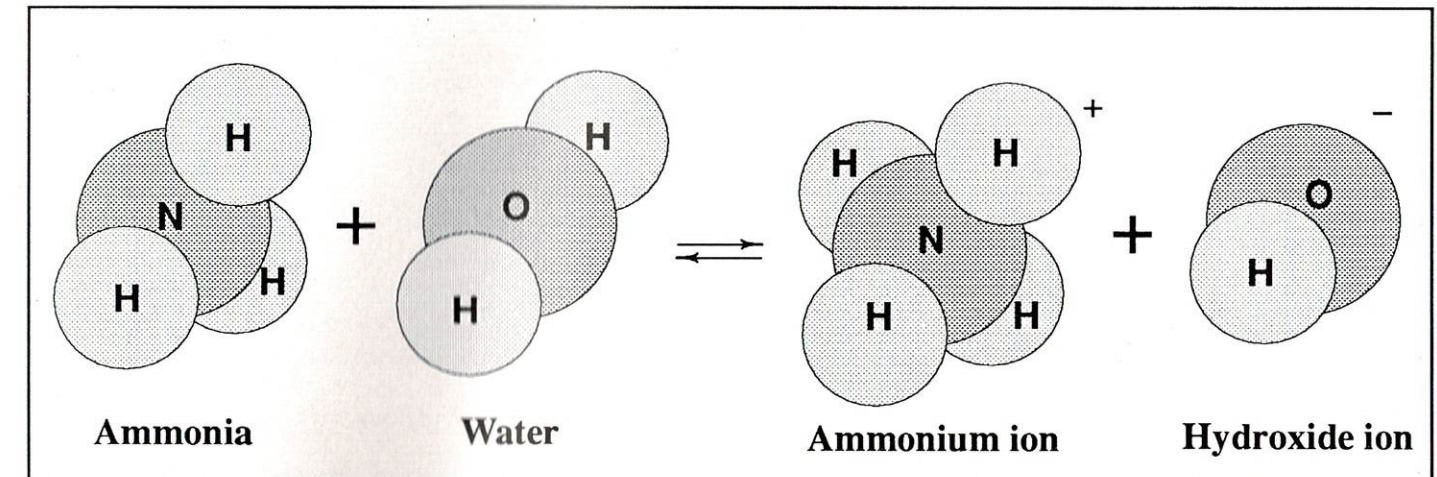


Figure 1 - Ammonia reacts with water to form ammonium ions and hydroxide ions. In this reaction, water acts as an acid (hydrogen donor), and the ammonia acts as a base (hydrogen acceptor).

Using Ammonia to Treat Mine Waters

Ben B. Faulkner

National Mine Land Reclamation Center

Jeff Skousen

West Virginia University

Acid Mine Drainage Treatment

Coal mining sometimes liberates materials within the coal seam or overburden that produce acidity as they are exposed to moisture and air or dissolved oxygen. Pyrite and associated minerals in coal and overburden contain sulfides and metals like iron, manganese, and aluminum. If hydrologic conditions allow the flow of water through these acid generating areas within the mine or refuse area, the resultant water emanating from the backfill, deep mine, or refuse area is acid mine drainage.

In an attempt to protect aquatic life and water uses further downstream, coal operators use various techniques to prevent, ameliorate, or neutralize the acidic drainages. Operators use anhydrous ammonia for the neutralization of acid mine drainage and water treatment in coal preparation plants.

When ammonia is introduced to an acid solution, some of the ammonia reacts directly with the acid, consuming acidity, raising pH, and producing the ammonium ion. Introduced ammonia may also associate itself with several water molecules without undergoing an actual chemical conversion. This hydrated ammonia is commonly referred to as unionized ammonia and is toxic to aquatic life forms at low concentrations.

Simultaneous with other reactions, ammonia may also react directly with water, producing ammonium and hydroxyl (base) ions (Figure 1).

Note: This article is an extract from *Handbook For Use of Ammonia in Treating Mine Waters*, published by WVMRA in November, 1990.

Introduction

Treating water with anhydrous ammonia is not a new practice, but the advantages of ammonia over other neutralizing agents are so great its popularity is increasing in the mining industry. Along with this increase in use has come a stigma of uncertainties as to whether ammonia is a safe, environmentally sound agent.

WVMRA has responded to the pleas of responsible operators for information and assistance on this technology to prepare a handbook providing this assistance. The 28 page handbook was prepared with the help of leading reclamationists and environmental chemists involved with acid mine drainage in West Virginia.



Figure 2 - Ammonia, when injected into acid mine drainage, reacts rapidly to raise pH and to neutralize acidity. Metals dissolved in the water will precipitate as the pH is raised.

The ammonium and hydroxyl ions produced will react with sulfuric acid from mine drainage to produce ammonium sulfate and water. Acidity is consumed and pH is increased. Ammonium sulfate is somewhat soluble in water and acid solutions; a portion may remain dissolved, while some may precipitate (drop out in the treatment pond sludge). Hydroxyl (base) ions will react with dissolved iron to form an insoluble compound, iron hydroxide. Thus, in addition to raising pH, ammonia treatment can also remove dissolved metals from mine drainage (Figure 2).

Once anhydrous ammonia is delivered to the minesite, there is little chance for accident or injury. Ammonia has been safely used in industry and agriculture for many years. Anhydrous ammonia is, however, a hazardous, pressurized gas, which deserves respect.

Dry ammonia, which contains no water, is referred to as anhydrous ammonia. It is a pungent, colorless gas which may be compressed and cooled to a colorless liquid. It is lighter than air, and is extremely soluble in water. Ammonia has been classified by the USDOT as a non-flammable

compressed gas. Having a very narrow flammable range in air, its products of combustion are neither toxic or hazardous.

There are several operational advantages to ammonia for neutralization of acid. The cost is low and stable. Ammonia will not freeze, gel, or solidify at low temperatures so it may be used in all seasons. As a compressed gas, it does not have to be pumped or gravity fed. A storage tank may be located, based on convenience, and not limited by topography or the availability of power. It is homogeneous, and is sufficiently soluble that no additional mixing with the acid solution is necessary. There are no heavy bags or drums to transport or store. Once a tank is in place and properly plumbed, ammonia is delivered and dispensed by means of valves. Tanks may be rented, and the necessary installation costs are only slightly higher than an equivalent caustic system. The reduction in man-hours which is made possible by using ammonia can be quite significant. The rapid and complete reaction with acidic water makes accurate feed control possible resulting in minimal waste.

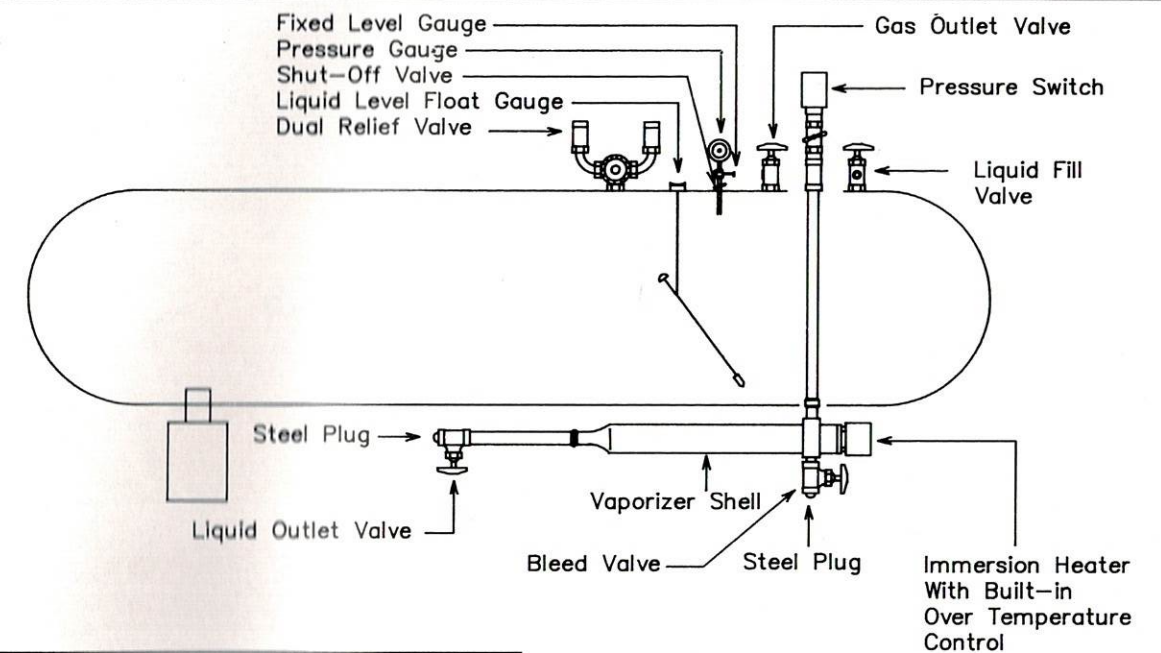


Figure 3 - Typical ammonia tank setup.

Environmental Effects of Ammonia

Human Exposure to Ammonia

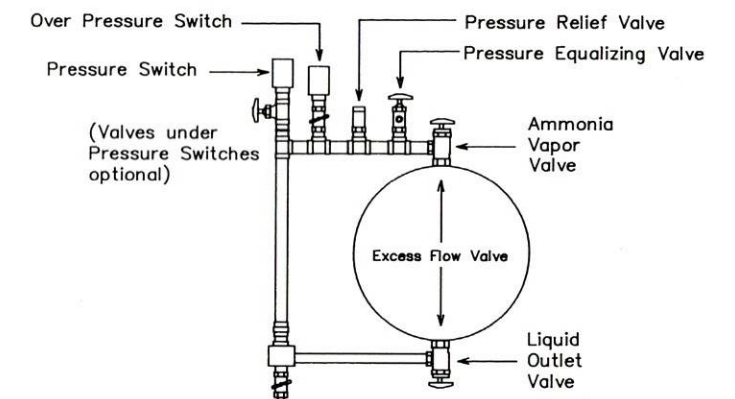
Ammonia, strictly speaking, is not a poison. Ammonia is produced by almost all living creatures; thus it has no cumulative, toxic effect, as lead or mercury have. It does not cause cancer. However, in concentrated form, it has a powerful corrosive action on human tissue. Fortunately, ammonia's pungent odor is detectable at levels lower than what is considered dangerous. It is unlikely an individual would be exposed to levels of ammonia higher than allowed by law.

Only occasional maintenance is necessary on a well-installed ammonia system. All piping, joints, tank, and tank fittings should be examined periodically for signs of corrosion, damage, wear, and leaks (Figure 3).

Leaks in ammonia pipe can usually be detected by odor. All leaks should be approached with caution and with full protective gear (gas masks and gloves with protective clothing). Even a very small leak can be located with sulfur tapers or moist litmus paper.

Regulations and Reporting

United States Department of Labor regulations as set forth in 29 CFR 1910.1000 state; "An employee's exposure to ammonia must be limited to a concentration not to exceed 25 ppm of ammonia in air by volume based upon an 8 hr. time weighted average".



Anhydrous ammonia is reportable under the S.A.R.A. Title III Regulations - "Community Right to Know Act". The purpose of this act is of a twofold nature; to establish a program to provide the public information on hazardous substances and toxic chemicals in the community, and to establish Emergency Response Plans and notification requirements to protect the public. To satisfy the purpose of these regulations, users of anhydrous ammonia must annually submit information to several local and state emergency response organizations.

Environmental Compliance

The use of anhydrous ammonia requires a modification of the operator's NPDES permit. The first step an operator interested in using anhydrous ammonia should take is to analyze the receiving stream for existing total ammonia, nitrogen, nitrites, nitrates, alkalinity, acidity, pH and sulfates. It is possible the operation may be located in an area where the existing ammonia content is high already as a result of sewage, farm drainage, hatchery effluent, or other influence. If the background un-ionized ammonia is at or above the respective stream criteria, the modification will likely be denied. It is strongly suggested that a biological survey be conducted in the receiving stream to document macroinvertebrate diversity prior to the introduction of ammonia. A biological survey is usually limited to the benthics (mostly insects which inhabit the bottom of the stream) which generally exhibit stress from pollution before higher aquatic life.

If the modification is approved, the operator must monitor his discharge and must not cause the receiving stream to exceed the numerical criteria of 0.05 mg/l of un-ionized ammonia (0.02 mg/l if classified as a trout stream).

Biology of Anhydrous Ammonia

Although anhydrous ammonia is a commercial chemical product purchased through a chemical supplier, it is important to realize that its active ion, ammonium, is a natural substance produced by fish and other organisms, including humans, and is released from the body in waste material. It is an integral element in the basic bio-cycles of matter and energy. Ammonia is a biologically active compound present in most waters as a normal degradation product of nitrogenous organic matter (Figure 4).

Several factors have been shown to modify acute NH_3 toxicity in fresh water. Some factors alter the concentration of un-ionized ammonia by affecting the equilibrium of ammonia, and others ameliorate or exacerbate its effects. These factors include dissolved oxygen concentration, temperature, pH, previous acclimation to ammonia, fluctuating or intermittent exposures, carbon dioxide concentration, salinity, and the presence of other toxicants.

Since an increase in temperature and pH will increase the portion of un-ionized ammonia, the summer and fall months can be critical. During droughts, surface runoff is less available to dilute the discharges from fairly steady or belated seepage from surface mines or deep mines. These discharges generally constitute a larger percentage of the stream flow during dry times than during normal flow conditions. Lesser volumes or less buffered surface waters will have a diminished ameliorative effect on either acid mine drainages or over-treated drainages.

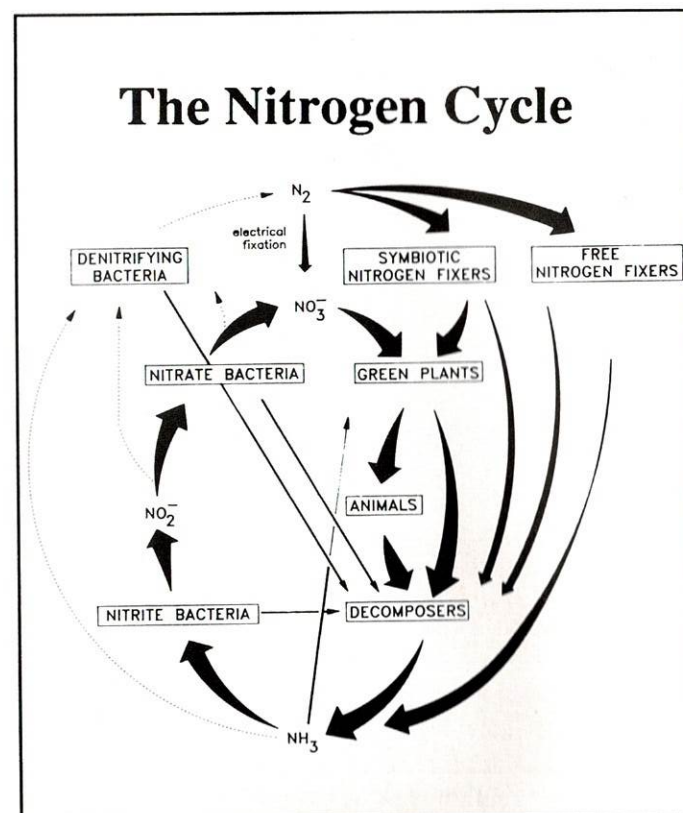


Figure 4 - A graphic representation of the nitrogen cycle. Nitrogen can exist in eight different forms (from NO_3 to NH_4^+), and converts readily between forms.

Eutrophication

Excessive nutrients, such as nitrates and phosphates commonly originate in domestic sewage, run-off from agricultural fertilizer, waste materials from animal feed lots, packing plants, etc. These nutrients cause pollution primarily because they stimulate the growth of microorganisms which often increase the biological oxygen demand (BOD) of the water and reduce the amount of dissolved oxygen available for fish and higher animals.

Even the most modern secondary sewage plants, which precipitate solids and inactivate most bacteria in domestic wastewater, do not remove the basic nutrients such as ammonia nitrogen, nitrates, nitrites, and phosphates. These nutrients stimulate algal growth and lead to plankton blooms, producing obnoxious tastes and odors in water, excessive plant growth causing stagnation and disruption of aquatic ecology. These conditions occur only when more nutrients are introduced into the system than it can handle. Many natural waters are nitrogen limited in their productivity, and small additions can actually be beneficial.



Figure 5 - An ammonia tank equipped with a vaporizer. The vaporizer is a heating element which helps maintain a consistent pressure in the tank for uniform vapor dispensing.

Acidification

It has been suggested that nitrification can occur downstream from a treatment pond and ultimately result in the regeneration of acidity and objectionable levels of nitrates. The bacteria involved in nitrification have an optimal range of growth conditions. The rate of bacterial growth and hence the rate of nitrification is both temperature and pH dependent. In most streams, this oxidation reaction would occur very slowly if it occurred at all.

Obviously, ammonia is a natural substance that is involved in a number of natural processes. The introduction of ammonia into a watercourse for the neutralization of AMD or other coal preparation purposes will enter these cycles and will cause problems downstream only when conditions or concentrations exceed the system's ability to handle the ammonia. Conditions for nitrification are not optimum in most downstream situations. It is more likely that ammonia will undergo further dilution, volatilization, and assimilation prior to entering a nitrification prone environment. Similarly, most ammonia rich sewage discharges are not acidic in nature.

Nitrogen exists in the environment in many oxidation states. Microorganisms interconvert these forms of nitrogen by various oxidative or reductive pathways. Thus, there exists within the environment the potential to remove excess ammonium as gaseous nitrogen. If this capacity did not exist, the runoff from the 12.5 million tons of ammonia used annually in American agriculture would have acidified and eutrophied all our surface waters.

Field Applications of Ammonia Surface Water Applications

Ammonia is not an ideal chemical for all water treatment applications. While it is usually less expensive than caustic soda or soda ash, it may be more expensive than lime products at a capital intensive long-term treatment facility. Each treatment situation is unique with characteristics that will influence chemical and delivery mechanism selection (see *Green Lands* - Fall 1990, pp 31-37, "Acid Mine Drainage Treatment Systems: Chemicals & Costs").

The target pH to achieve effluent limitations is dependent on the type and concentration of metals present in the water, and the available retention time for sedimentation. If manganese is present in the influent water, the pH will have to be raised to approximately 9.8 with ammonia, or to 10.0-10.4 with caustic to precipitate manganese. This would require far more reagent than treating water to remove only iron at pH 8 to 9. It is strongly suggested that bench scale titration or neutralization of the water to be treated be conducted to determine the amount of various reagents necessary to meet effluent limits. The volume and characteristics of the precipitant resulting from the bench tests will indicate the relative difficulty in sludge handling.

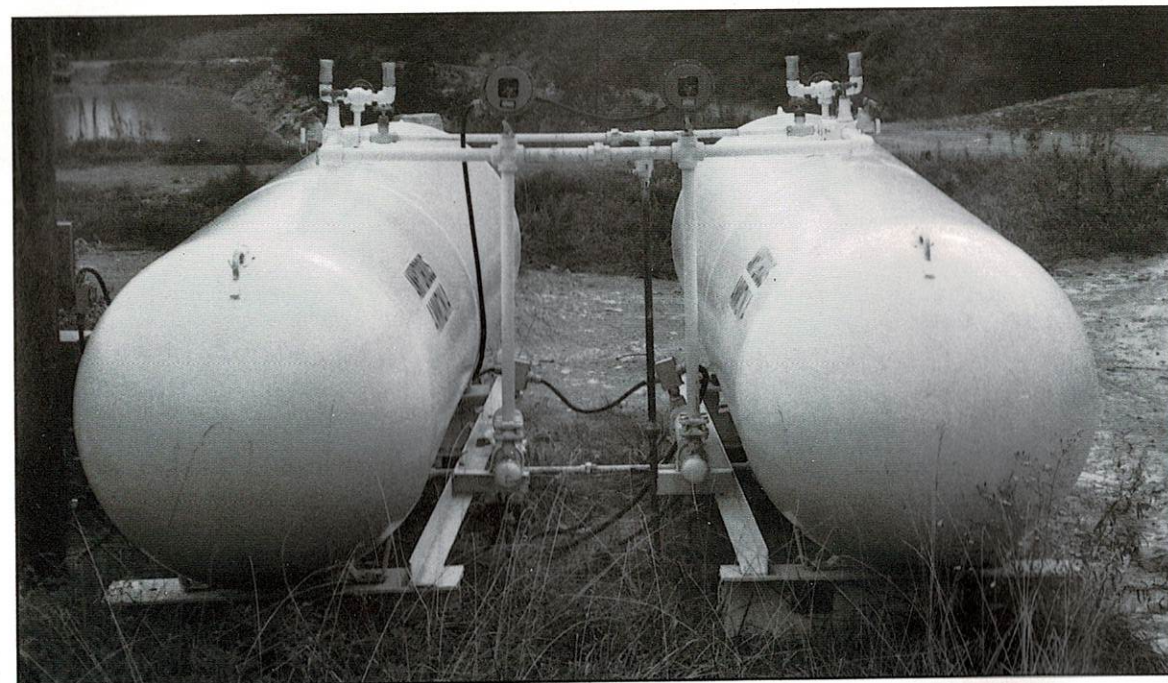


Figure 6 - Small ammonia tanks may be plumbed together to increase internal surface area of the tanks, which improves vapor pressure.

Vapor Dispensing

Anhydrous ammonia may be dispensed either as a liquid or vapor. Vapor is far easier to regulate than liquid. Initially, coal operators used liquid ammonia to batch treat impoundments, sometimes controlling the submerged injector with a solenoid valve tied to a pH probe further downstream. Ammonia is extremely soluble in water but may stratify within the pond when applied in this manner. Additionally, flow rates from the injector site to the pH sensor may be so slow that wide variation in pH occurs due to this response time. Further complicating this treatment arrangement is the influence of varying pressure in the lines due to temperature variation. Many of these operational difficulties can be overcome by dispensing vapor ammonia on a continuous basis at the entrance channel(s) of the impoundment.

Further, it is easier to treat the influent water to a pond in a continuous fashion rather than batch treat a pond. Steady flows with consistent water chemistry can be treated with a minimum of attention, but will still have to be monitored regularly. If line power is accessible, the addition of a vaporizer will greatly aid in regulation during cold weather months (Figures 5 & 6).

Coal Preparation Plants

Ammonia can be used in preparation facilities safely and without odor. Ammonia will not adversely affect the flocculants used in the plant and the gelatinous precipitates will assist in clearing the fines. Ammonia can be added as a vapor or as a liquid when rapid neutralization is desired. This flexibility is a great advantage for plants which wash several seams of coal which have different effects on plant pH. Use of ammonia in preparation plants differs from exterior ammonia treatment installations primarily in that within the plant you are working in a respirable atmosphere without the free flow of air or wind to dilute or remove the ammonia vapor. Additional ventilation in critical areas may be necessary if monitors indicate high levels of ammonia.

Ammonia is a strong reagent. Like most industrial chemicals, it has the capacity to alter the environment into which it is introduced. Unlike many substances, it is a natural, abundant compound which nature can easily handle in moderate amounts. It is the responsibility of the ammonia user to see that those limits are not exceeded by dispensing it in a safe, environmentally sound manner.

Acknowledgements

Thanks to Tiff Hilton, Martha Hilton, Ron Lilly, and Jim Hajec. The *Handbook For Use of Ammonia in Treating Mine Waters*, published November, 1990 by the West Virginia Mining & Reclamation Association, Charleston, WV. This publication is available, at a cost of \$5, From WVMRA, 1624 Kanawha Blvd. E., Charleston, WV 25311.

Chamberlaine & Flowers^{INC.}



INSURANCE
TRAVEL

• 128 South Second Street
Clarksburg, West Virginia 26301
(304) 623-3721

• 114 High Street
Morgantown, West Virginia 26505
(304) 292-8454

• 22 N. Locust Street
Buckhannon, West Virginia 26201
(304) 472-2402

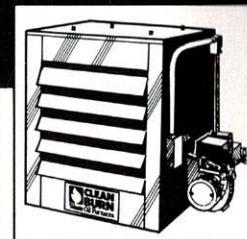


“Insurance and Travel”



Waste Oil? Clean Burn It!

\$500
BUCKS TO BURN
REBATE*
IS BACK!



REDUCES

- Heating Costs
- Disposal Costs
- EPA Liability

- The most durable industrial grade furnace on the market
- Proven quality and dependability with thousands of satisfied customers since 1979
- The industry leader

*\$500.00 rebate good on purchase of the following Clean Burn Waste Oil Furnaces: CB86AH, CB86BH, CB85C & CB85D. Offer good at all participating Clean Burn dealers. Offer void where prohibited.

**CLEAN
BURN**
Waste Oil Furnaces
1-800-331-0183

Hotels Equipment
Company

CLEANING SYSTEMS & CHEMICALS

WE MAKE WARM FRIENDS

CHARLESTON, WV 744-3493
CLARKSBURG, WV 623-6335



LILLY EXPLOSIVES DELIVERS!!



**WE ARE COMMITTED TO
WEST VIRGINIA SURFACE MINING**

**TIM W. WARDEN
GENERAL MANAGER**

**BECKLEY, WV
(304) 683-4301**

Coal Calendar

March

- 9-11 **American Mining Congress/National Coal Association, Fourth Communications Workshop**, Westin-Tabor Center, Denver, CO, contact Carol Sheppard, Workshop Coordinator, AMC, 1920 N St. NW, Washington, D.C. 20036, (202) 861-2839.
- 9-11 **Short Course, "Conveyor Belt Network Design,"** University of Kentucky, Lexington, KY, contact Mary Lou Johnson, Institute for Mining and Minerals Research, 411 Breckinridge Hall, Lexington, KY 40506, (606) 257-2846.

April

- 3-4 **West Virginia Surface Mine Drainage Task Force Symposium**, Ramada Inn, Morgantown, contact Patty Bruce, West Virginia Mining & Reclamation Association, 1624 Kanawha Blvd. E., Charleston 25311, (304) 346-5318.
- 9-11 **1991 Mine Health, Safety & Training Conference**, Charleston Town Center Marriott, Charleston, contact Tony Grbac, West Virginia Department of Energy, 1615 Washington St. E., Charleston 25311, (304) 348-3500
- 19 Due date for papers for the **Pennsylvania Blasting Conference** (November 14-15, 1991), submit abstracts to Chuck Herd, Conference Coordinator, J. Orvis Keller Bldg., Penn State University, University Park, PA 16802, (814) 865-3003.
- 30-2 **Coal Prep 91**, Lexington, KY, contact Sam Posa, Maclean Hunter Presentations, 12371 E. Cornell Ave., Aurora, CO 80014, (303) 696-6100.

May

- 12-16 **1991 National Meeting of the American Society for Surface Mining and Reclamation**, Durango, CO, contact Bill Plass, ASSMR, 21 Grandview Dr., Princeton, WV 24740, (304) 425-8332.
- 20 **Short Course, "Blast Casting,"** West Virginia University, contact Sherry Strahin, Department of Mining Engineering, P.O. Box 6070, Morgantown, (304) 293-7680, FAX 293-5708.
- 21-23 **Short Course, "Surface Mine Blasting,"** West Virginia University, contact Sherry Strahin, Department of Mining Engineering, P.O. Box 6070, Morgantown, (304) 293-7680, FAX 293-5708.

June

- 3-5 **5th U.S. Mine Ventilation Symposium**, West Virginia University, contact Sherry Strahin, Department of Mining Engineering, P.O. Box 6070, Morgantown, (304) 293-7680, FAX 293-5708.
- 10-12 **10th conference on Ground Control in Mining**, West Virginia University, contact Sherry Strahin, Department of Mining Engineering, P.O. Box 6070, Morgantown, (304) 293-7680, FAX 293-5708.

SEEDING, MULCHING, FERTILIZING, TREE PLANTING

J & G Seeding, Inc.

CABIN CREEK, WEST VIRGINIA 25035

GLENN CHAMBERS
JOHN CHAMBERS

PHONE 595-1509



Carter Machinery Company, Inc.

Bluefield 304-325-5411
Lewisburg 304-645-6440
Pineville 304-732-8646

Already Proven and Accepted by Operators and Regulatory Officials Alike

ROAD OIL

NEW PATENTED TECHNOLOGY

- Made with Pine Tar
- Penetrates Deeply
- Binds Stronger than asphalt
- Results in a Tough Dust-Free Surface



EASY TO USE

- Protects the Environment
- Economical
- Just dilute and spray from an ordinary water truck

For more information, or to place an order,
call your Local Distributor



Green Acres

- Seeding & Mulching
- Guard Rail
- Tree Plantings
- Pipe Cleaning

Green Acres Contracting, Inc.

Al Pisula
(412) 887-9517

Jim Chernitsky
(412) 437-3084

Fullen

Fertilizer Company, Inc.

Fertilizer Hydromulch Seeds

Custom Fertilizer Formation
Soil Testing & Quality Delivery Service

Contact
Tim Fullen

P.O. Box 172
Union, WV 24983
(304) 772-3088



George A. Hall, Ph. D., P.E. • Ira S. Latimer, Jr., Geologist

1624 1/2 Kanawha Boulevard, East
Charleston, West Virginia 25311
(304) 346-7035



TELEPHONE (304) 296-2112

COMPLETE STEEL SERVICE

540 DUNKARD
P.O. BOX 676, MORGANTOWN, WV 26507-0676

Hydroseeding

Call Frank Roberts 755-0408
A Division of Union Boiler Co.



scarlet oaks, inc.



GAI
CONSULTANTS
304/925-7730

Full-Spectrum Engineering Consulting Services

- ▲ Civil
- ▲ Mining
- ▲ Environmental
- ▲ Geotechnical
- ▲ Structural
- ▲ Traffic and Transportation

Monroeville, PA ▲ Charleston, WV ▲ Orlando, FL ▲ Raleigh, NC



"Precision Tank Testing & Environmental Services"

WEST VIRGINIA TANK TESTING, INC.
P.O. BOX 446 • BRIDGEPORT, WV 26330

PAUL S. EMBRY
CONSULTANT/TECHNICIAN

OFF. (304) 623-5255
RES. (304) 622-3892

MAGNETITE For Your PREP PLANT



Akers Supply, Inc.
Matewan, W. Va.
304/426-4422

Akers Magnetite, Inc.
Ceredo, W. Va.
304/453-2222

EXIT COMPETITION

ENTER WA 700-1



The all-new WA 700-1 Wheel Loader from Komatsu and Rish Equipment Company is destined for greatness in the rugged terrain of the Virginias during the decade of the 90s.

Komatsu's state-of-the-art hydraulic technology, innovative microprocessor sensing system and solid state controls assure customer satisfaction on this 11.1 yard capacity loader.

Customer satisfaction is making all of Komatsu's products a leading factor in today's construction equipment market. The new WA 700-1 is sure to be among the elite in its class for customer satisfaction.

You're invited to contact Rish today for details on the WA 700-1. Its a contact worth your time and effort.

KOMATSU
KOMATSU MARKETING DIVISION

Rish
EQUIPMENT COMPANY

Total
TEAM CONCEPT

BECKLEY, WV • 127 Pikeview Drive • 304/255-4111 □ BLUEFIELD, WV • Airport Rd. near U.S. 52 • 304/327-5124
BRIDGEPORT, WV • 515 W. Main St. • 304/842-3511 □ PARKERSBURG, WV • State Rt. 14 • 304/422-8441
ST. ALBANS, WV • Rt. 35 • 304/755-3311
FROSTBURG, MD • 101 Frostburg Ind. Pk. • 301/689-2211 □ COEBURN, VA • Route 72, Wise Mtn. Rd. • 703/395-6901