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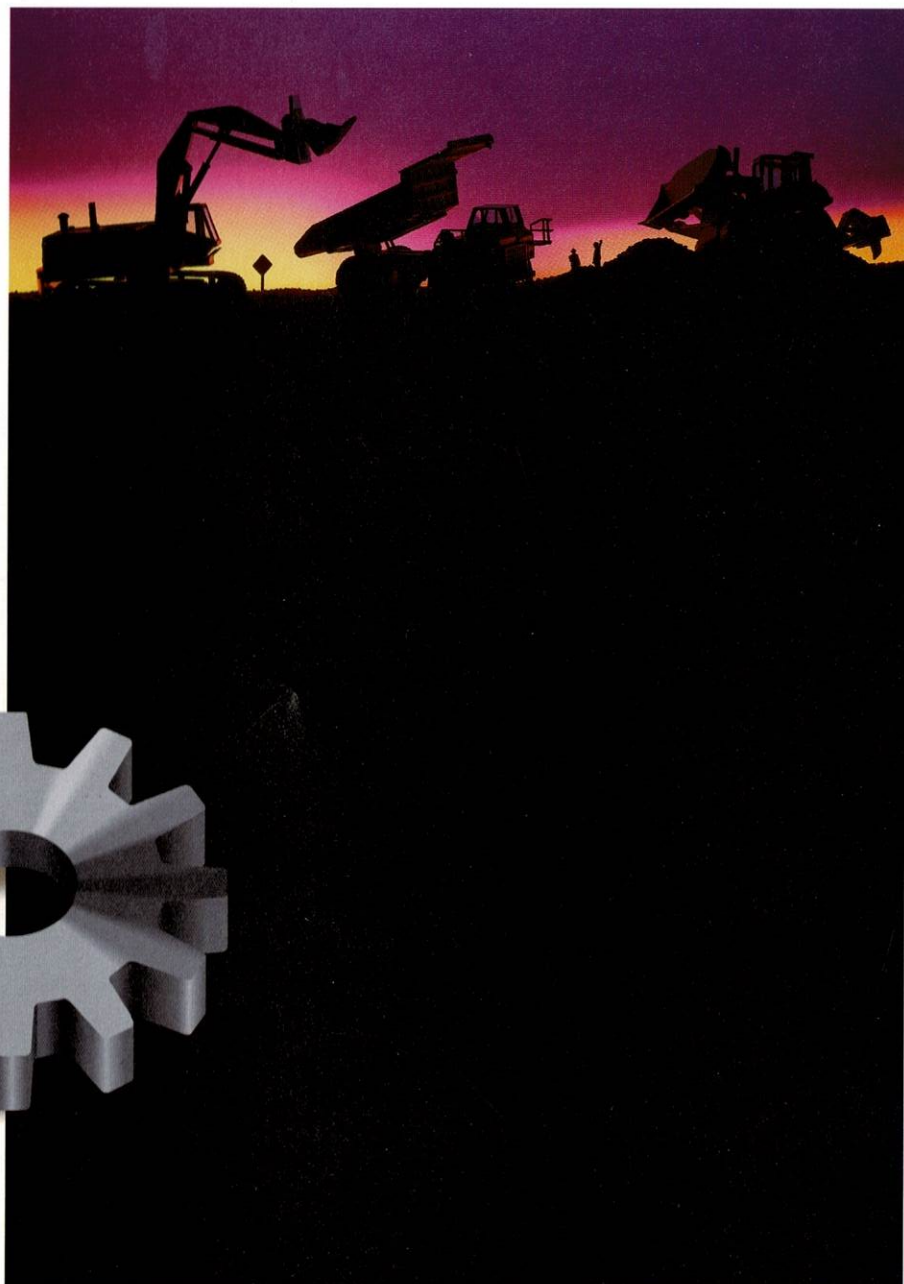
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Green Lands

Summer 1995



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Green Lands

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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, FAX 346-5310.



Our Cover (photo by Chip Ellis)

The wild turkey population has enjoyed a resurgence in West Virginia in recent years. Through modern reclamation, the coal industry can play an important role in wildlife habitat development. Our cover story tells how on pp. 8-9.

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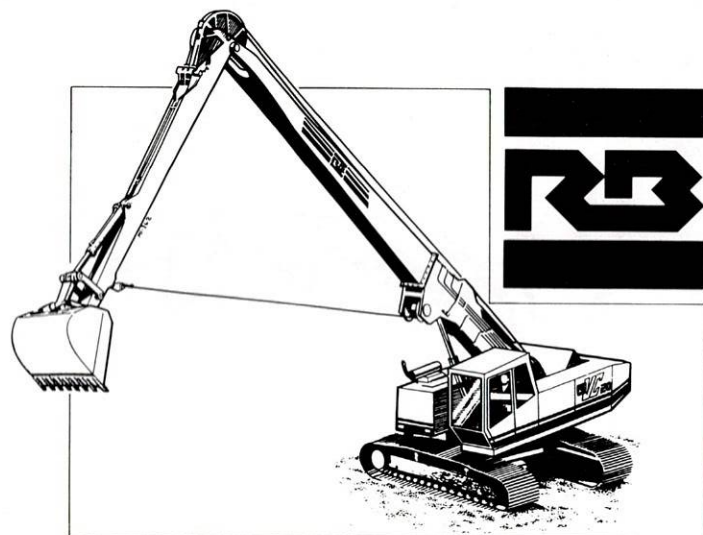
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Turkeys tend to nest near the edge between forest and open areas.

Reclaimed mine sites can be important wildlife habitat

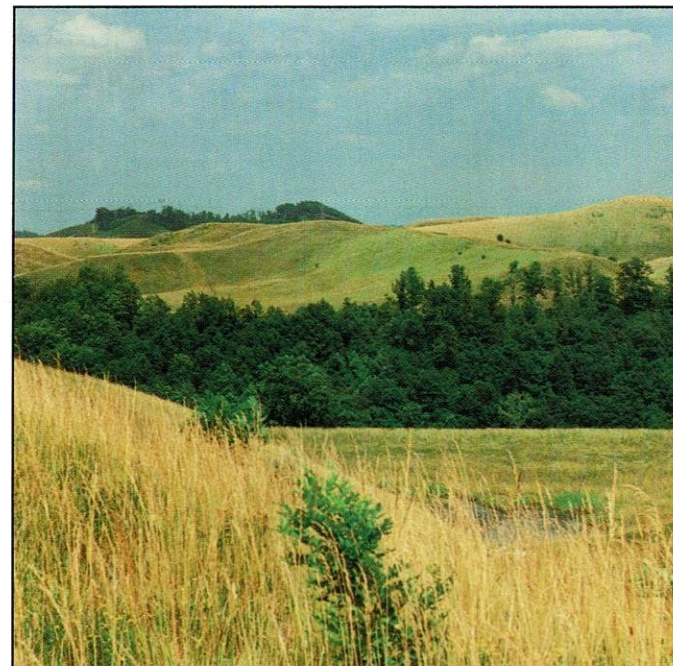
The following article was provided by the National Wild Turkey Federation, headquartered in Edgefield, SC, and by its West Virginia Chapter.

In 1993 the National Wild Turkey Federation and the West Virginia Mining and Reclamation Association signed a Wild Turkey Partnership Agreement that laid the groundwork for the beginning of a cooperative effort to enhance habitat for wild turkeys and other wildlife on reclaimed coal mined lands in West Virginia.

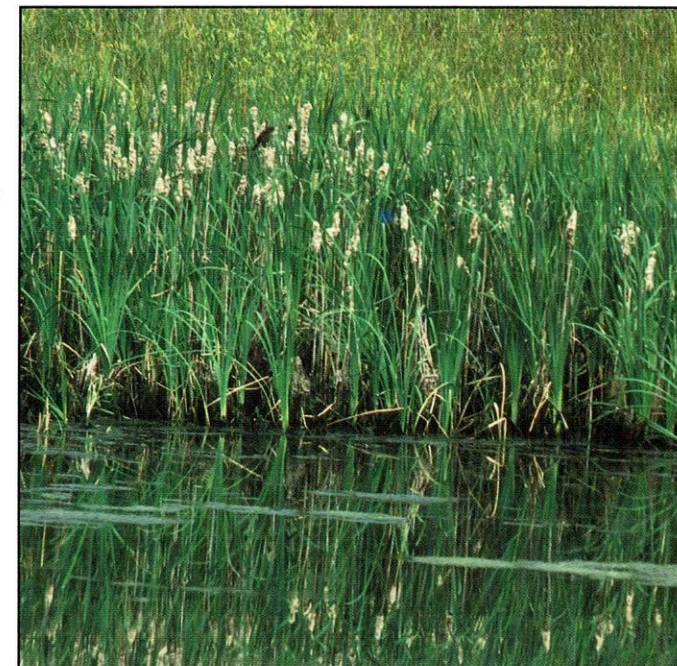
To further enhance this relationship, the West Virginia Chapter of NWTF created an award, the "Wildlife West Virginia Award," that is presented annually to a WVMRA member company that has integrated the development of wildlife habitat, primarily for wild turkeys, into their mine reclamation projects.

The nominees for the award are judged on the ability of their reclamation project to provide basic wild turkey habitat requirements and provide habitat components that may be limited in the surrounding area. Requirements include:

1. Member of WVMRA.
2. Have a completed mine reclamation project at least two years old.
3. Post mining land use must feature wildlife habitat or a combination of wildlife habitat and forest land or wildlife habitat and rangeland.
4. Herbaceous seed mixes and tree/shrub plantings must provide benefits to the wild turkeys.



Wild turkey and other wildlife prefer habitat which includes both open areas for feeding and forest for cover.



Wetlands construction is also an important part of wildlife habitat development.

The inaugural award was presented in 1993 to Hobet Mining, Inc. at the West Virginia Mining Symposium in Charleston. The 1994 recipient was Buffalo Coal Co.

Reclaimed surface mined areas in West Virginia provide important habitat for wild turkeys. The type of habitat most often lacking for wild turkeys is brood habitat. Good brood habitat has relatively low growing vegetation that is not too dense and contains an abundance of insects. The open, herbaceous areas often created after reclamation fit the bill. In a state like West Virginia, which is 71% forested, this brood habitat is especially important.

Turkeys also feed on the abundant seed heads and green vegetation in these open areas and will often nest near the edges. Many other species of wildlife use the areas as well, from deer to hawks, to meadowlarks, bluebirds and butterflies.

What is planted on the reclaimed areas can determine how much use it receives by wildlife. Within the guidelines of reclamation laws there are certain species that are better for wildlife and some that should be avoided whenever possible. Some of the traditional grass species that have been used for decades, like Kentucky 31 tall fescue, are not especially good for wildlife. There are other species that will control erosion, stabilize the site and promote the groundcover needed, and are beneficial to wildlife.

There are two publications available from the NWTF that provide recommended species for planting; NWTF Wildlife Bulletin No 13 - "Regional Recommendations for Planting

for Wild Turkeys" and No. 14 - "Wildlife Habitat Development on Reclaimed Lands." Single copies are free of charge.

On large reclaimed areas, 100 acres or more, the habitat can be enhanced by the planting of tree and shrub seedlings. Most wildlife prefers to stay within 300 feet from the edge of cover, leaving much of the interior of a large reclaimed area used very little.

By creating patches, or preferably travel lanes or corridors of trees and shrubs, it makes more of the area accessible to wildlife, enhances food availability from the fruits and seeds, makes a more aesthetically pleasing site. To be most effective, the travel lanes should be 50-100 feet wide and extend across the reclaimed areas to create a link between undisturbed forest on either side. Other efforts that will enhance wildlife and a company's consideration for the "Wildlife West Virginia Award" include creation of wetlands or water impoundments, erection of bluebird houses, etc.

Reclamation of mined land in the Mountain State provides a unique opportunity to create and enhance wildlife habitat in a manner that is not available to other landowners. Through careful planning and innovation, the habitat after reclamation can be better than what was there originally.

The National Wild Turkey Federation and the West Virginia Chapter are proud to be partners with WVMRA and the coal industry. For further information, or to order the publications mentioned above, contact the NWTF, P. O. Box 530, Edgefield, SC 29824.

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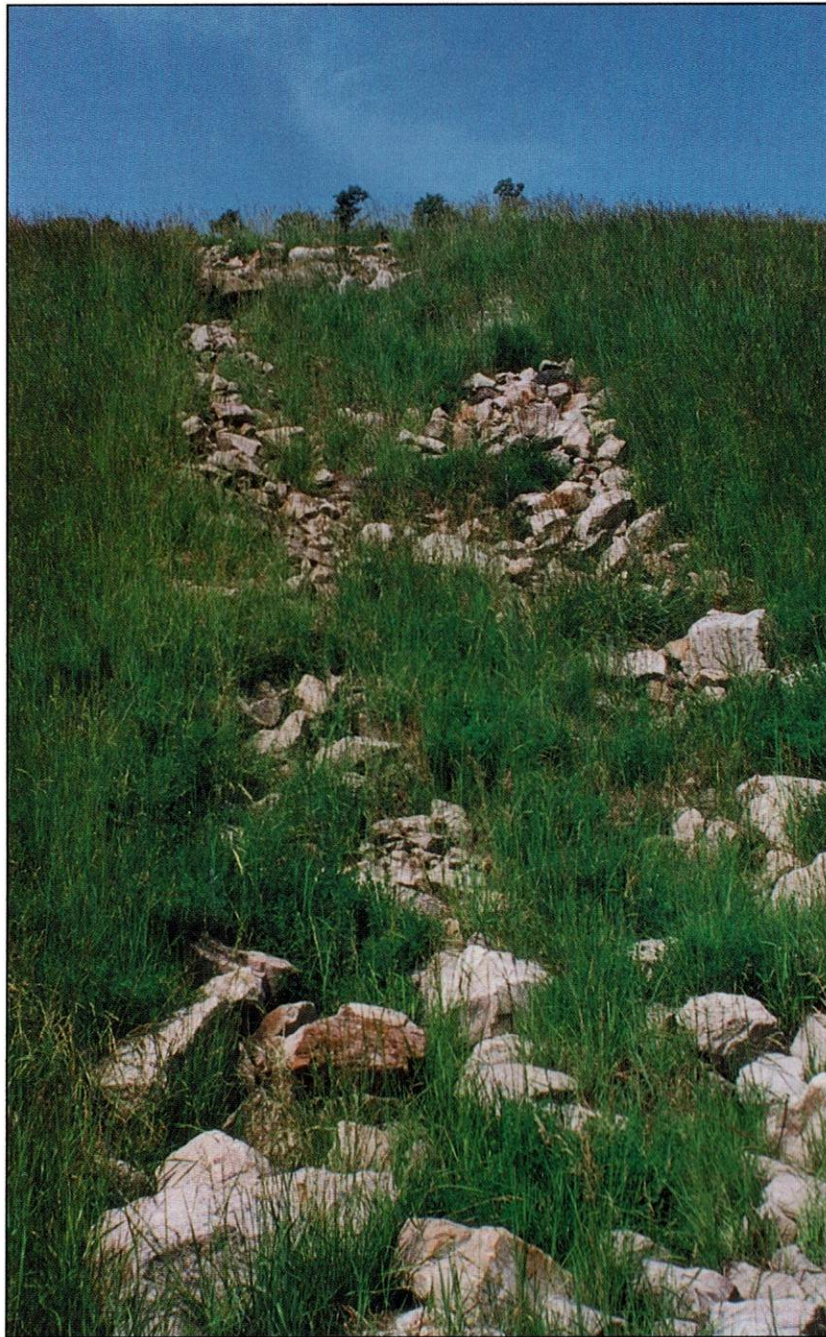


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WV-DEP runs 'Revived Tour II'



Patriot Mining hosted most of the first day of the tour, demonstrating its acid spoil and ash handling techniques. But, this company is pretty adept at drainage control and revegetation as well.

The Interagency Evaluation tour has apparently become an annual event again.

The tour was a fixture on the mining calendar from the late 1960's until it was discontinued in 1985. Officials of the WV Division of Environmental Protection tried a revival two years ago, but a major coal strike preempted those plans.

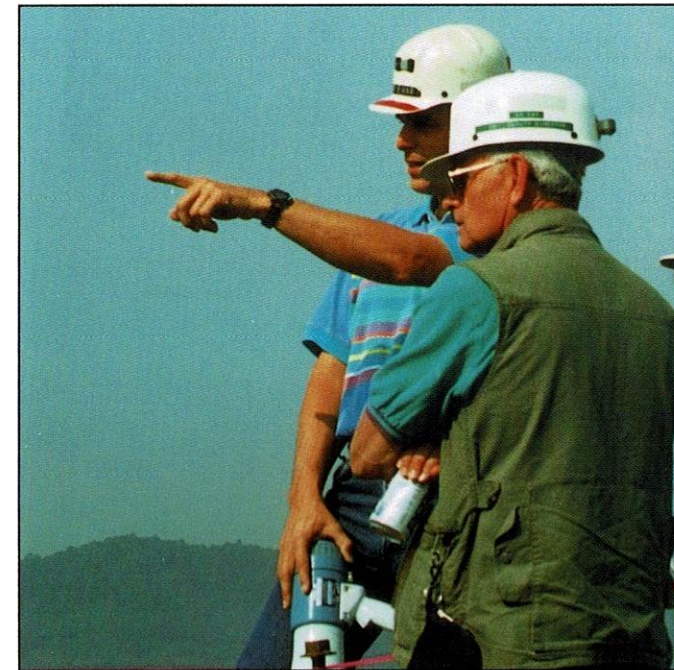
Last year the tour got back off the ground with a streamlined two day version which concentrated on the major mining operations of southern West Virginia, which were a rarity in the old years. This year, DEP expanded the event to three days, beginning on the Pennsylvania border and working its way down Interstate 79 to the Charleston area.

Some 60 representatives of the coal industry, DEP and other assorted interested parties toured 10 operations in seven counties from June 14-16.

Patriot Mining was the focal point of the Wednesday session. The first stop was the Stacks Run Refuse/Ash Area, where Patriot blends old refuse with coal for shipment to the Morgantown Energy Associates power generating facility. The area also serves as a storage area for alkaline ash to be injected into completed underground mines.

At the Albright Refuse/Ash Area, the alkaline ash stockpile is counteracting the acidic runoff refuse deposited from prior mining operations. Excess material is also available for other sites.

In the afternoon, Patriot demonstrated how it handles acidic spoil and applies alkaline amendment. The first day wrapped up with a visit to the American Bituminous Power Partners' Grant Town Power Station. This electric generating facility uses only refuse/gob piles as a source of fuel. The primary refuse sources are from piles left after the closing of Eastern Associated's Federal No. 1 and Bethlehem's No. 41 mines. There is an estimated 30 years of refuse available for fuel in the proximity of the plant. The flyash byproduct of the circulating fluidized bed process will be used to treat acidic conditions at other sites in the area.



Scott Stewart of Dal-Tex explains his company's mining plan to OSM Deputy Director Ed Kay.

On Thursday the tour moved into central West Virginia, with stops at Evergreen Mining, Juliana Mining, and Brooks Run Coal. At Evergreen, tour participants observed a 9,000 foot overland conveyor system and heard the company's discussion on special placement of acidic refuse. Juliana Mining, a more mature operation, was able to show off one of the best vegetated mine sites in the state. Juliana has successfully constructed some of the biggest valley fills in central West Virginia. Brooks Run has used a conveyor belt refuse disposal system to handle over 14 years worth of accumulated refuse. The company mixes a limestone additive at the point of disposal to neutralize acidic material, which has protected the quality of water being released from the site.

Friday began with a return visit to Dal-Tex Coal's Old Hickory mine in Logan County. Repeat visitors from the '94 tour noticed remarkable reclamation progress in the last year, including the elimination of a 630 foot highwall and nearly 800 acres reclaimed. Moving over to Boone County, the tour heard officials at Elk Run Coal's White Knight mine describe a five seam mining plan for proper handling of acidic overburden. The tour concluded with another repeat visit, this time to the Samples Mine in Kanawha County, where, Catenary Coal has made a huge capital investment on a site that has been "mined out" several times in the past. Catenary features a 100 yard drag line, the largest piece of mining machinery in West Virginia.



Dal-Tex, a repeat stop on the tour, was able to demonstrate considerable reclamation progress over the last 12 months.



At Brooks Run Coal Co., a limestone additive is mixed with refuse continually as the fill is constructed.



Juliana Mining is among the industry leaders when it comes to thick, effective revegetation.




Reclaimed acreage surrounds the coal stockpile at Elk Run Coal Co.



Catenary Coal's 100 yard dragline is now the largest piece of mining equipment in West Virginia.

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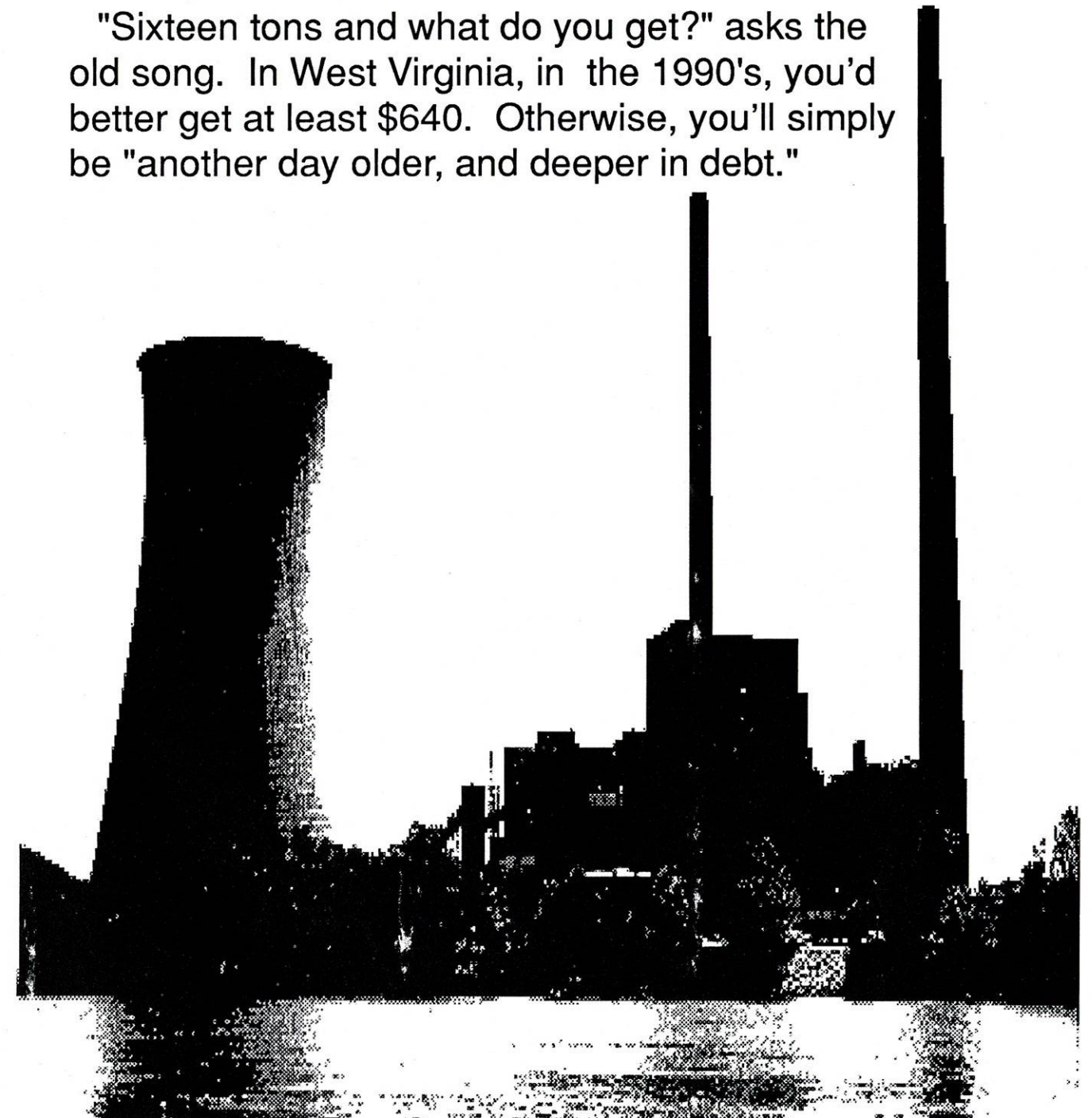
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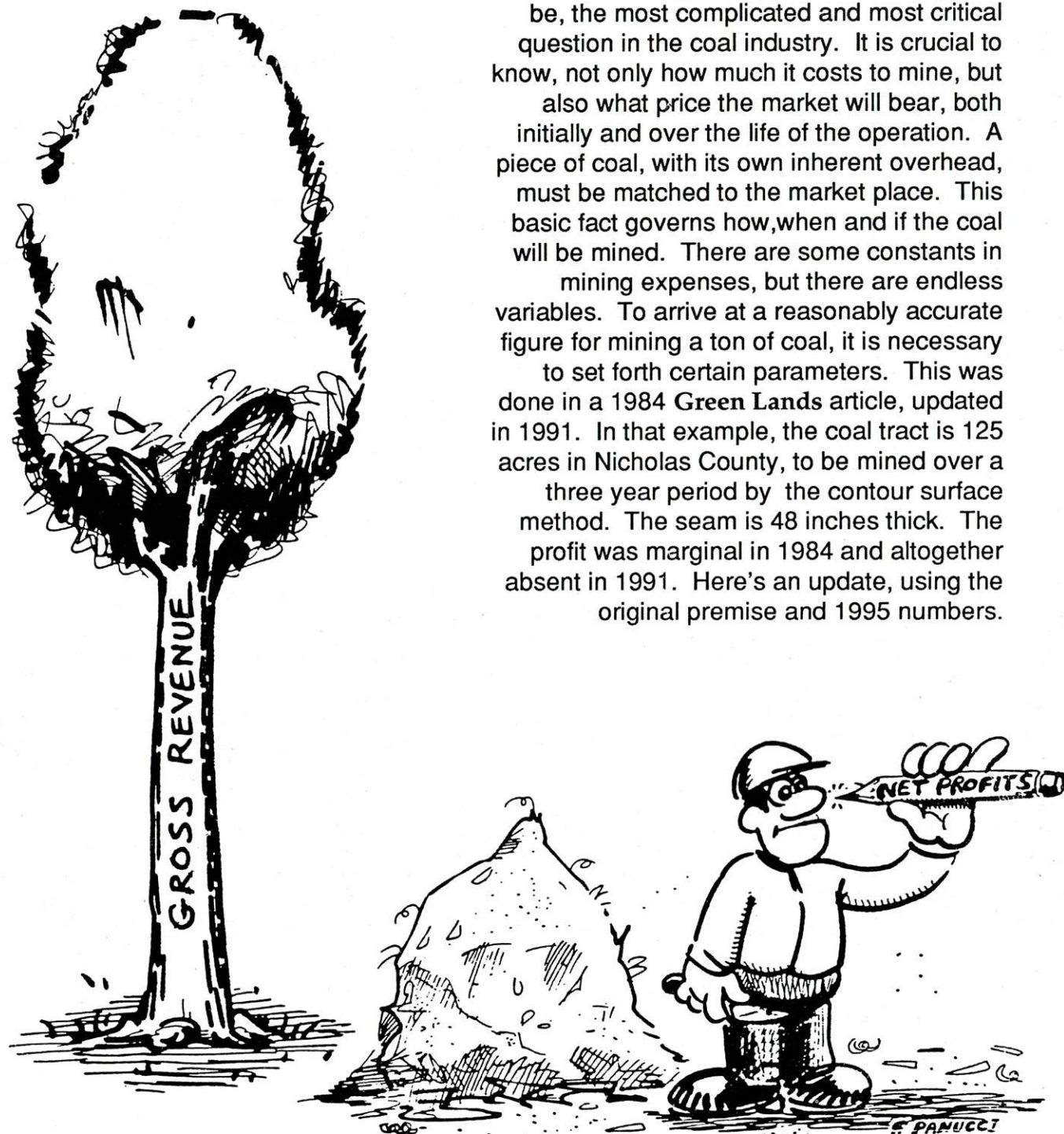
How much a ton?

"Sixteen tons and what do you get?" asks the old song. In West Virginia, in the 1990's, you'd better get at least \$640. Otherwise, you'll simply be "another day older, and deeper in debt."



How much does it cost to mine a ton of coal?

That is, always has been, and always will be, the most complicated and most critical question in the coal industry. It is crucial to know, not only how much it costs to mine, but also what price the market will bear, both initially and over the life of the operation. A piece of coal, with its own inherent overhead, must be matched to the market place. This basic fact governs how, when and if the coal will be mined. There are some constants in mining expenses, but there are endless variables. To arrive at a reasonably accurate figure for mining a ton of coal, it is necessary to set forth certain parameters. This was done in a 1984 *Green Lands* article, updated in 1991. In that example, the coal tract is 125 acres in Nicholas County, to be mined over a three year period by the contour surface method. The seam is 48 inches thick. The profit was marginal in 1984 and altogether absent in 1991. Here's an update, using the original premise and 1995 numbers.



Engineering/Construction

The permit application is quite voluminous, and requires engineering expertise which is usually beyond the inhouse capability of the small company.

Surveying, maps, hydrological studies, and plans for haulroads and drainage systems will commonly cost about \$50,000 for an operation of this size and nature. Again, this is a front end cost, not recoverable in the event of permit denial.

The construction phase of the operation will entail two major projects. One is the drainage system, of which the primary component will be sediment ponds. Three ponds of average size, professionally designed to capture all runoff from a mining operation, will cost about \$90,000. That's a bargain compared to the cost of the haul road, which, like all other mining construction, must be carefully engineered.

The typical haul road in West Virginia, in just moderately steep terrain, will run about \$100 per foot. So, a road of only one mile will cost approximately \$528,000. This makes the total engineering and construction costs \$668,000. These are all expenses which are incurred before any coal production is accomplished.

Employment

A permit of 125 acres can be expected to yield about 75 acres of mineable coal. At 6,000 net tons per acre from a 48 inch seam, the projected total tonnage from this permit would be 450,000.

Setting a production goal of 15,000 tons per month, and allowing for startup, slow production as the permit plays out, and final reclamation, the projected job life of the operation will be about 36 months. Given current productivity figures, this calls for a work force of about 25 miners, plus two foreman, and two office workers.

The average West Virginia coal miner, based on the current UMW contract and average hour totals, makes a weekly wage of approximately \$840. This comes to a weekly payroll of \$21,000. Times 52, and add \$160,000 yearly for the clerks and foremen, and the annual payroll is \$1,252,000.

For the three year life of the operation, and naively allowing for no wage increase over that period, the basic employment cost will be \$3,756,000. This is, as all employers know, only the visible half of the iceberg.

Coal employers, even surface coal operators, pay 55¢ a ton into a federal black lung trust fund, \$247,500 over three years. Regular black lung payments, 1% of the payroll, adds another \$37,560.

Workers' compensation is paid to the State at varying rates. The surface mining rate is \$11.51 per \$100 of the payroll. This amounts to \$432,922 over three years.

Both the state and federal governments take a bite for unemployment compensation. The State gets an amount equal to 2.7% of the first \$8,000 of pay, per employee, per year. This would be \$18,792. The feds take the equivalent of .8% of the first \$7,000, per employee, or \$1,624 per year, \$4,872 over three years.

FICA, the federal social security tax, is 7.65% of each employee's salary. There is a ceiling on this, but it is raised every year, and generally exceeds the working person's income. For these 29 employees, the cost will be \$95,912, times three years, comes to \$287,736.

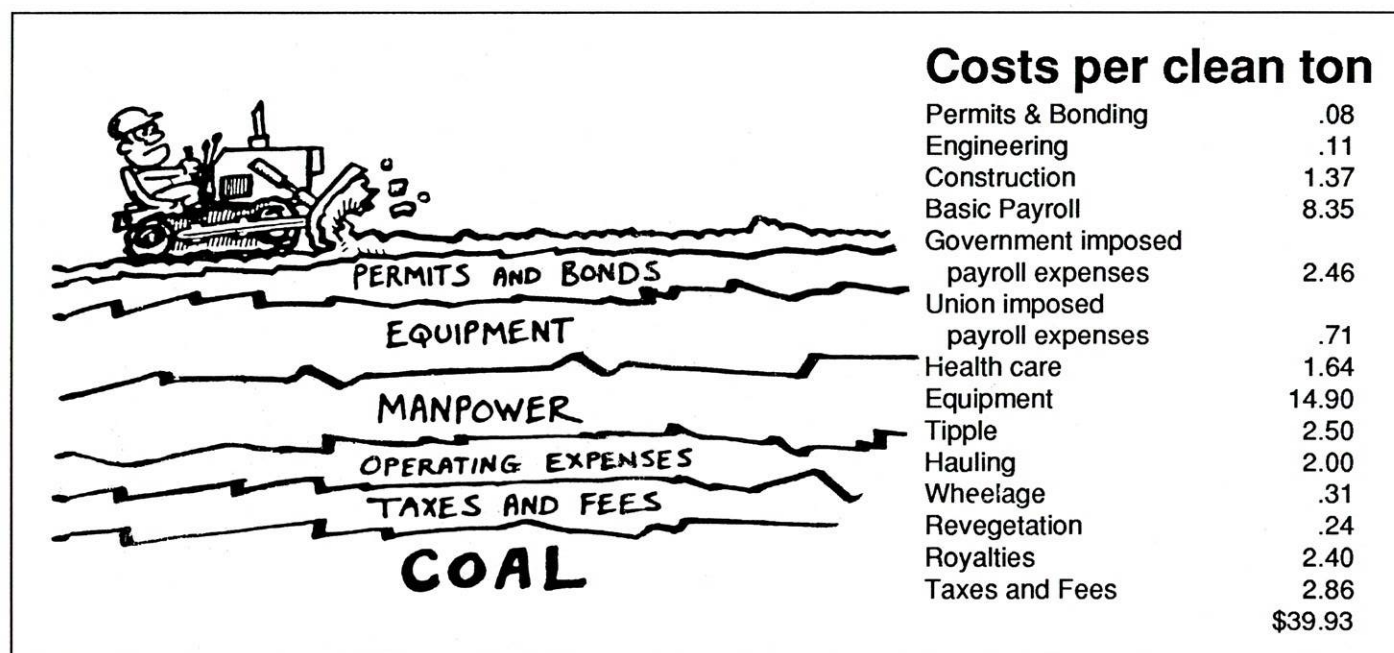
The Mine Safety and Health Administration (MSHA) requires employers to furnish a bathhouse, or to pay a "bathhouse waiver" fee. Small companies, operating in a given area for a limited time, will find it more economical to pay the bathhouse waiver of \$2.75 per day, per employee. That's another \$53,625.

Training is required for all employees in surface mining procedure. Annual refresher training for this workforce will cost \$9,000. Training for the required Emergency Medical Technician (EMT) will cost \$3,500. Additionally, a labor bond must be posted with the Labor Commissioner of West Virginia, to insure payments of wages and benefits in the event of shutdown. The bond is held for five years in the amount of four weeks of payroll, plus 15%. This bond would cost \$9,660.

There are many costs to bear beyond those imposed by the government. Standard major medical insurance coverage, for instance, will cost around \$700 per month, per employee. In this case, that expense would be \$20,300 per month, \$243,600 per year, \$730,800 for three years worth. Each employee must undergo a thorough examination prior to employment, to identify preexisting conditions, such as lung disease or back injury. This would be about \$8,700.

Signatories to the UMW contract pay 85¢ per manhour and 21.25¢ per ton to the Union pension plans. Do the math and you get a three year expense of \$288,225. Then there's the protective clothing allowance, \$210 per year, per employee, or \$15,750 for three years. Employers also contribute 9¢ per manhour to the Training & Reeducation Fund, a total of \$15,795.

Considering all the auxiliary costs of putting a miner to work, the payroll is increased by nearly 60%. The payroll for this operation over three years will be \$3,756,000 and the extra costs amount to \$2,164,437, for a total employment cost of \$5,920,437.



Permitting

Hiring, equipment procurement, and permit application may all be done simultaneously, but the proper permits must be secured before any mining or construction can take place.

Even asking for a permit to mine coal is not free. When the permit application goes to the West Virginia Division of Environmental Protection, it must be accompanied by a filing fee of \$1,000. This fee is not refundable in the event the permit is denied.

The National Pollution Discharge Elimination System (NPDES) permit also requires a non-refundable application fee of \$500, plus an annual renewal cost of \$100. Then there's the lands inquiry fee of \$150, to determine if the proposed site contains any unique historical, environmental, or geological qualities.

When a Surface Mine Application (SMA) number is assigned, the prospective operator must purchase legal advertising to announce his intention to mine coal, to alert any potential opposition to the permit. This ad must run on four separate occasions, each a week apart. In this case the cost will be \$230.

This process must eventually be repeated three times, one for each phase of the bond release. Add in the cost of legal ads for intent to blast and the total advertising bill is \$1,020, resulting in a total permit application cost of \$2,970.

Bonding

The bond is that amount of money committed by the operator to insure proper and complete reclamation. If reclamation standards are not met, then the bond is forfeited, and the operator will be unable to ever obtain another permit.

The bond is set by law on a site specific basis and will vary from \$1,000-\$5,000 per acre, with a minimum of \$10,000 on any permit. For a permit of 125 acres, by a company with a neutral or no track record, the bond would most probably be set at \$3,000 per acre, or \$375,000. Because a bond is more in the nature of collateral, as opposed to an actual cash outlay, the cost associated here would be approximately \$20 annually per \$1,000 of the total bond amount.

Following successful reclamation, the bond is released in three phases. Phase 1 comes at the end of the mining operation, when the entire area has been regraded to specifications. At this time, 60% of the original bond will be released. Phase 2, involving an additional 25%, may be released two years after reclamation is completed, when the vegetation cover is well established. Phase 3, the final 15%, is held for an additional three years, a total of five years beyond the life of the operation, and in this case, eight years after the job has begun.

The cost of Phase 1 of the surety bond, \$375,000 for three years, would be \$22,500. Phase 2, \$150,000 for two more years, would be \$6,000. Phase 3, \$18,750 for three years, amounts to \$3,375. Thus, the total bonding cost would be \$31,875.

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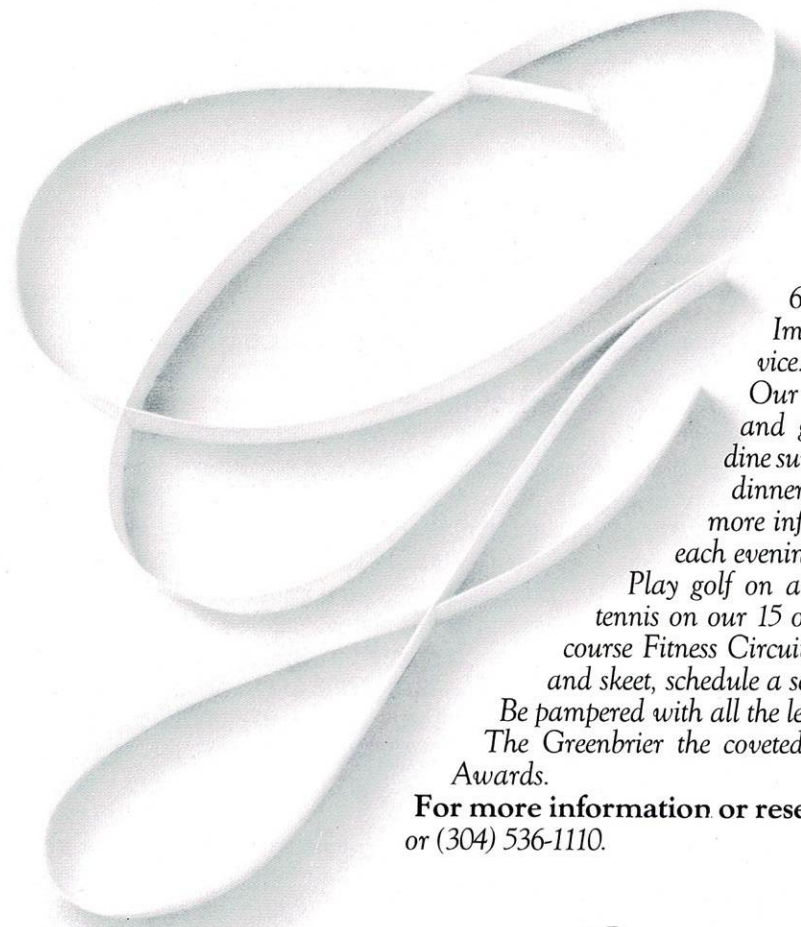
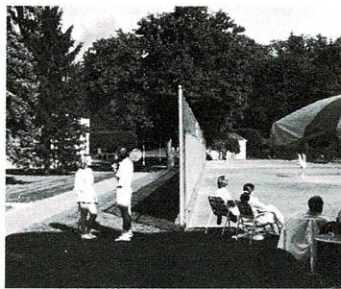
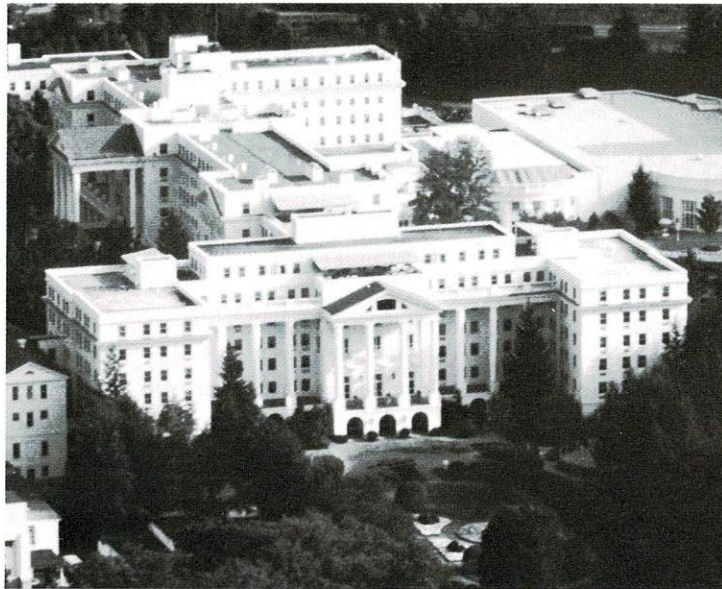
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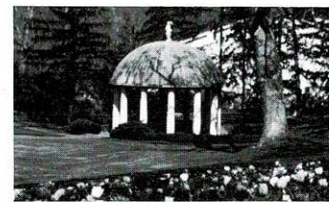
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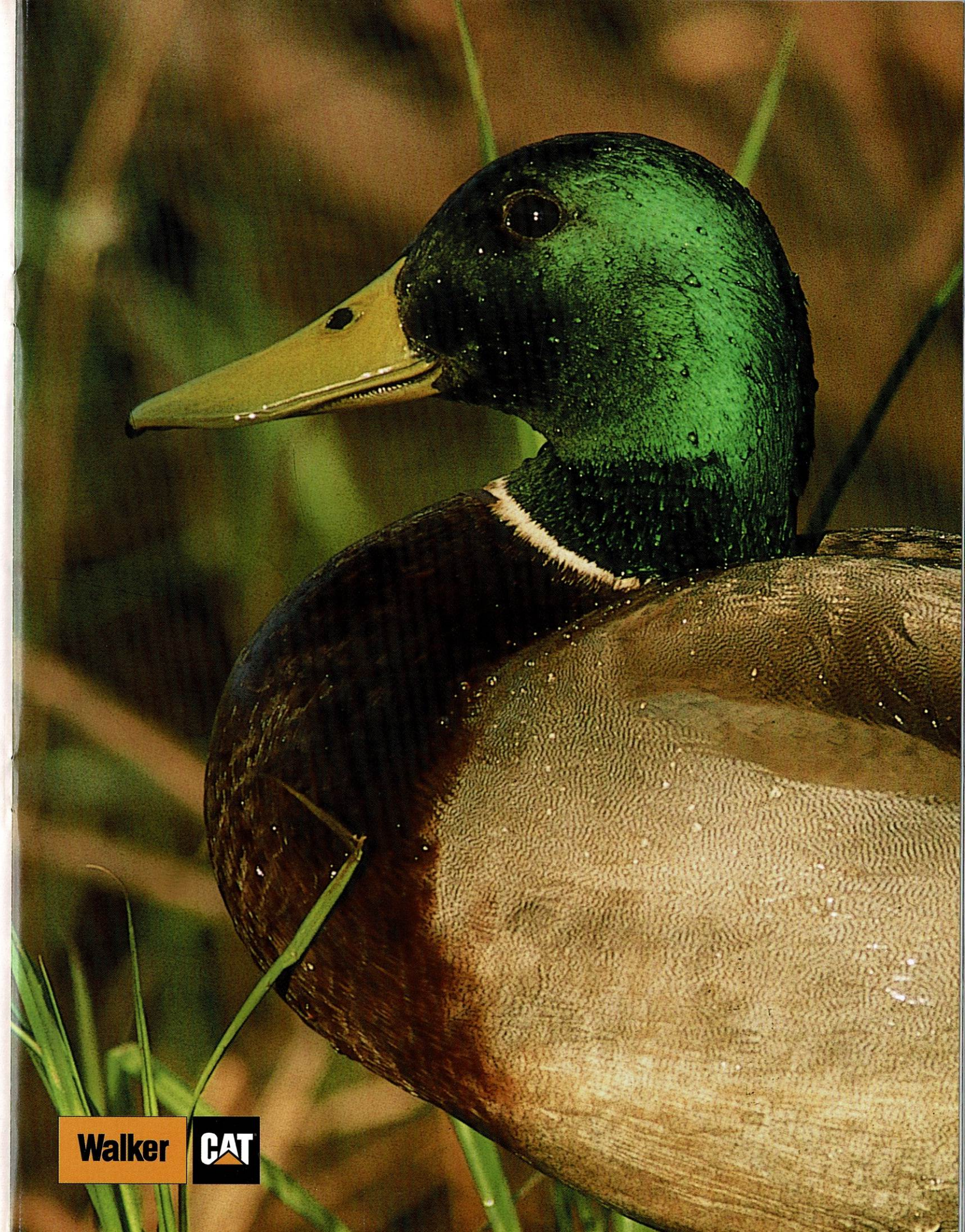
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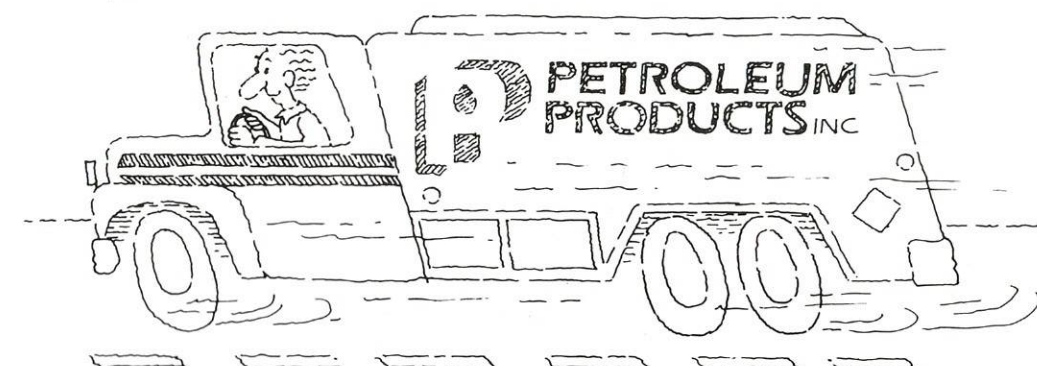
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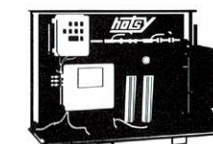
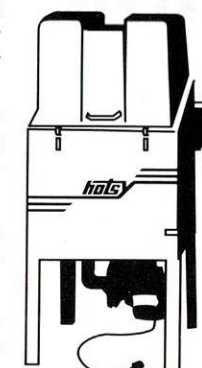


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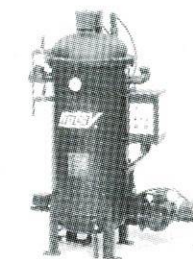
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Equipment

The variety of equipment spreads and methods of obtaining, financing and maintaining equipment is endless. It is easily the biggest single cost category of the mining operation.

The average surface mine will involve bulldozers, loaders, drills, haulage trucks, off-highway trucks, graders, and other trucks specialized for such functions as explosives handling, water pumping and spreading, maintenance, seeding, welding, emergency transport, and others.

Site, market, and company considerations dictate the particular combination of these pieces and how they are utilized. There is no average.

The best measure of equipment cost is accepted industry cost-per-ton standards for basic surface mine functions, and deleting from these, employment costs already covered here.

This allows approximate estimates on the cost of operating and maintaining the necessary equipment over the three year life of the job.

The biggest single expense is exposing the coal, that is, removing, storing, and/or disposing of overburden, which will probably involve valley fill construction.

Mining with a 10:1 overburden to-coal ratio, an average-to-good figure in West Virginia, this expense will amount to \$5,625,000. Loading the coal for transport to the tipple will be another \$430,000. Haul road maintenance will come to \$215,000. Final regrading of the slopes, and preparation for revegetation, will cost \$435,000.

These four basic functions entail a total expense of \$6,705,000, which represents equipment costs on this operation.

The cost of government

The following are cost per ton figures on payroll, taxes, fees, and other expenses imposed by law, and based on the hypothetical mining situation described earlier. Costs of meeting reclamation requirements are not included.

Black lung	.63
Workers' compensation	.96
Unemployment compensation (state and federal)	.05
FICA (social security)	.64
Permits and bonds	.10
Health & safety	.15
Severance & franchise taxes	2.30
Property tax	.03
Fuel tax	.13
Abandoned mine lands (federal)	.35
Special reclamation (state)	.05
	\$5.39



Auxiliary Employment Costs

The following are cost per ton figures for the costs associated with the payroll beyond the basic wage.

Government imposed	2.46
Health care	1.64
Union contract	.71
Subtotal	4.81
Payroll	8.35
Total Employment cost	13.16



Here's where the money goes . . .

Income for 450,000 clean tons at \$41 per ton	\$18,000,000
Permits, bonding, engineering, construction	<u>702,845</u>
	17,297,155
Payroll	<u>3,756,000</u>
	13,541,155
Other employment costs	<u>2,164,437</u>
	11,376,718
Equipment	<u>6,705,000</u>
	4,671,718
Tipple, hauling, wheelage, revegetation	<u>2,271,875</u>
	2,399,843
Royalties	<u>1,080,000</u>
	1,319,843
Taxes & fees	<u>1,287,978</u>
Net profit	\$ 31,865

Other production expenses

Assuming the company does not own its own tippie, it will encounter a cost of \$2 per raw ton for this function. The operator can expect a loss of at least 20% of raw tonnage in the cleaning process. To net 450,000 tons of clean coal, it will be necessary to haul and clean 562,500 raw tons. So, the tippie cost will be \$1,125,000.

The standard cost for hauling is \$1 per ton for the first mile, and 10¢ per ton for each additional mile. Assuming a seven mile haul, the cost would be \$1.60 per raw ton, or \$900,000. Another common operating cost is "wheelage," that is, hauling coal over the property of an adjacent landowner. A common fee would be 25¢ a ton, a total of \$140,625.

The actual revegetation of reclaimed land is another function likely to be contracted out by the small company. At approximately \$850 per acre for lime treatment, fertilizing, mulching, seeding and some tree planting, this will cost \$106,250.

In most cases, the coal operator is mining on private property, and therefore must pay a royalty to the mineral owner. This party gets either a price per ton rate, or more likely, a negotiated percentage of the sale price, typically 6%. Assuming an optimistic break-even sale price of \$40 a ton, the royalty will be \$1,080,000.

Taxes and Fees

Government, in addition to playing a leading role in employment costs, has several direct taxes for the coal operator. Basic to these is the State coal severance tax, which squeezes the industry for 5% of the sale price, which comes to \$900,000 in this case. A business franchise tax takes another 0.75%, and another \$135,000.

Since, in this case, the operator does not own the coal being mined, property taxes will be assessed only on the value of the surface, and so will be approximately \$12,790. The fuel tax rate is 5.35¢ per gallon. It takes a little over two gallons of fuel to mine a ton of raw coal. This results in a three year outlay of \$60,188.

The federal Office of Surface Mining taxes surface mined coal at 35¢ a ton for the reclamation of abandoned mine lands. That's \$157,500. The State gets 5¢ a ton, \$22,500, for essentially the same purpose.

The total direct taxes and fees on this mining operation will amount to \$1,287,978 over three years, around \$2.86 a ton. If that doesn't seem like much, consider that this much government revenue is generated from one medium size operation. Multiplied by West Virginia's average annual tonnage, these figures amount to nearly half a billion dollars a year. These are only direct taxes and fees, exclusive of various government imposed payroll expenses.

Summary

The total overhead for this hypothetical mining operation comes to \$17,968,135. Even this figure assumes no major problems in obtaining a permit, no prolonged work stoppages, no adverse weather conditions, no unpleasant surprises with the coal seam, or any of the other myriad problems which can plague any operation on a day-to-day basis.

With this overhead, the break-even price for mining a ton of coal from the hypothetical mine is about \$39.93. This does not include the charges for transport to the final destination, which could vary as widely as an in-state power plant to a Japanese steel mill. Selling the coal at the tippie will necessarily hold down the sale price.

Building in a standard profit margin for the operator will push the necessary sale price well past the \$40 mark, and beyond the operator's ability to sell it.

These numbers, taken together, do not represent a realistic picture of a viable mining situation. But each number represents a factor that must be taken into consideration by the operator.

The only feasible means of mining this tract of coal is to cut costs, and drastically. A larger, more established company may own the coal it mines, and thus escape paying royalties. It may also utilize inhouse expertise to trim engineering and construction; it may amortize equipment costs.

More efficient ratios of overburden to coal, and raw tons to clean tons, as well as better deals on such items as tipping, hauling, wheelage, and royalties would also improve the situation.

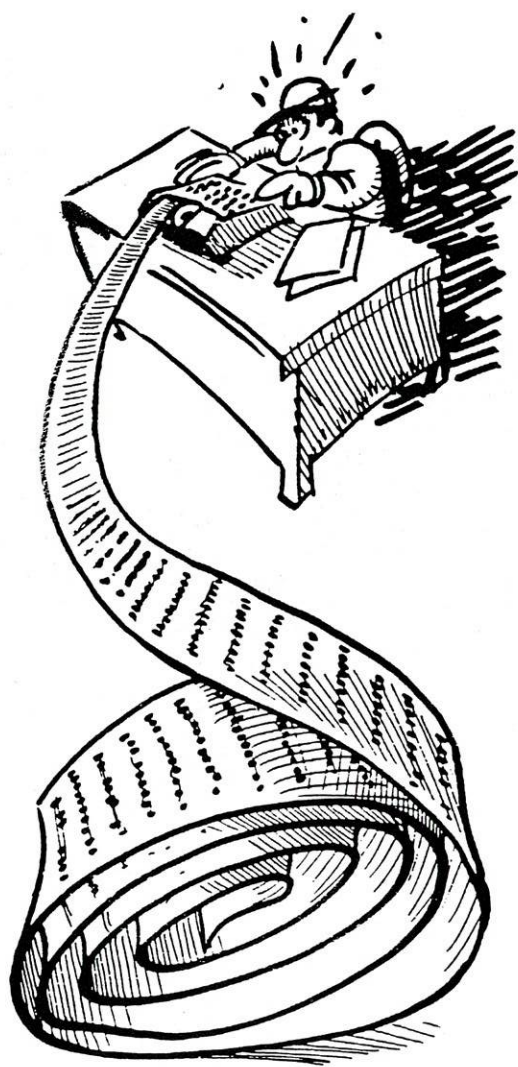
But the bottom line here is that the small operator, considering all relevant factors, can not realistically expect to make a profit by mining this coal tract.

And that's why we don't have very many small operators in West Virginia



At a break even price of \$40 per ton, here's where the tonnage goes

----- To pay for this -----		Mine this many tons
Permits	\$ 2,970	74
Bonding	31,875	797
Engineering	50,000	1,250
Construction	618,000	15,450
Payroll	3,756,000	93,900
Government imposed payroll expenses	1,105,167	27,629
Union imposed payroll expenses	319,770	7,994
Health care	739,500	18,488
Overburden removal	5,625,000	140,625
Coal loading	430,000	10,750
Haul road maintenance	215,000	5,375
Regrading	435,000	10,875
Tipple	1,125,000	28,125
Hauling	900,000	22,500
Wheelage	140,625	3,516
Revegetation	106,250	2,656
Royalties	1,080,000	27,000
Property tax	12,484	312
Fuel tax	60,188	1,505
Severance tax	900,000	22,500
Business Franchise Tax	138,375	3,375
Abandoned Mine Lands Fund	157,500	3,938
Special Reclamation Fund	22,500.00	562



A little variance

The hypothetical mining situation set forth here required numerous assumptions. It should be emphasized that this would be a medium size operation in West Virginia. Even so, it is clear that any adjustment in costs would ricochet through three years and 450,000 tons with startling effects.

For example, the bonding procedure described here is a best case scenario. If this were truly a new operator, without an established industry reputation, it is unlikely that he would be able to obtain bonding at any price, and would therefore have to bear the cost of tying up \$375,000 in cash, for eight years.

This operation was calculated to need 25 hourly employees. The addition of even one hourly worker will add over \$200,000 to the three year overhead. A wage increase of just 50¢ an hour adds more than \$100,000 to three year employment costs.

If the operator runs into a little item called "mitigation" in constructing his drainage system, he will also encounter an additional cost of \$200,000 per acre of direct stream impact.

Wheelage, the rate paid for hauling coal across someone else's property, was figured at 25¢ a ton. If the route happens to cross the grounds of two property owners, that's another 25¢ a ton, and that's another \$140,625. By the same token, add another five miles to the highway haul, and you must add 50¢ a ton, or \$281,250 to the overhead.

Haul road distances vary greatly, and the operator doesn't have a great deal of control over it. If this operator happened to need an extra mile of haul road, he would also need an extra \$725,000 to build and maintain it.

And how about royalties? The rate in this situation was 6%. If it were 7%, payments would increase by \$180,000.

The most critical factor in operating expense is the overburden ratio. In the operation described, the ratio is 10:1. If that were 12:1, mining costs would go up by about \$1,125,000.

A little change goes a long way, and so would a little relief.

Be a coal baron for fun and profit

Our hypothetical operator, aiming at the break even point for more than three years of hard work, worry, and financial commitment, made it with room to spare. If he has magically found someone willing to pay \$40 per ton at the tippie, he has enjoyed an income of \$18,000,000. At the same time, he has managed to hold expenses down to only \$17,968,135, leaving him a tidy three year profit of \$31,865, about a fourth of what he pays one of his miners over the same period. This is part of the reward that comes with the prestige and publicity of this unique profession.

To apply, contact the West Virginia Division of Environmental Protection, Charleston, West Virginia. While you're at it, also contact the West Virginia Department of Labor, the West Virginia Office of Miners' Health Safety & Training, the West Virginia Department of Employment Security, the West Virginia Workers' Compensation Fund, the West Virginia Department of Tax and Revenue, the federal Mine Safety & Health Administration, the federal Office of Surface Mining, the U.S. Social Security Administration, the U.S. Department of Labor, the Internal Revenue Service, and several other agencies to be named later.



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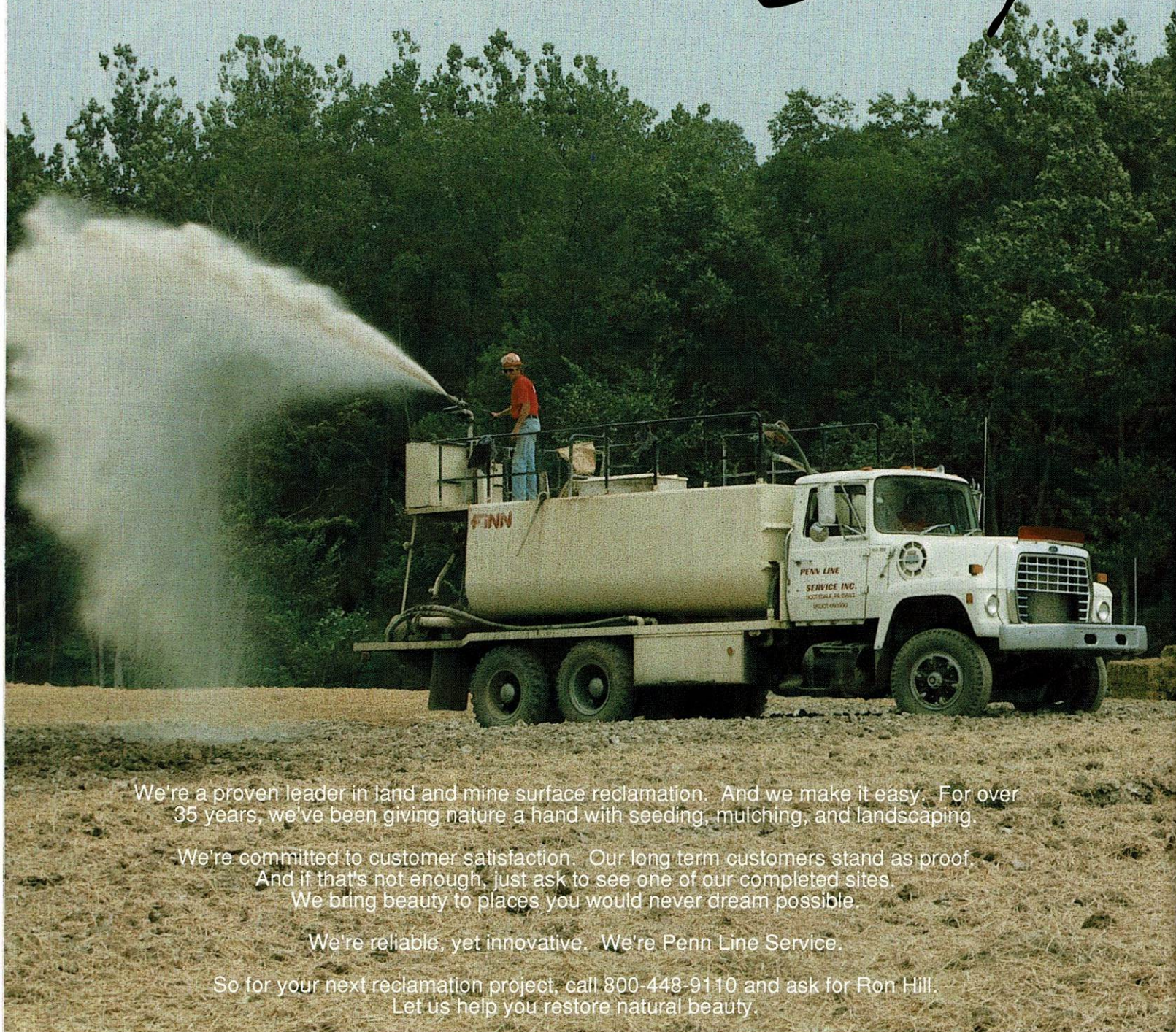


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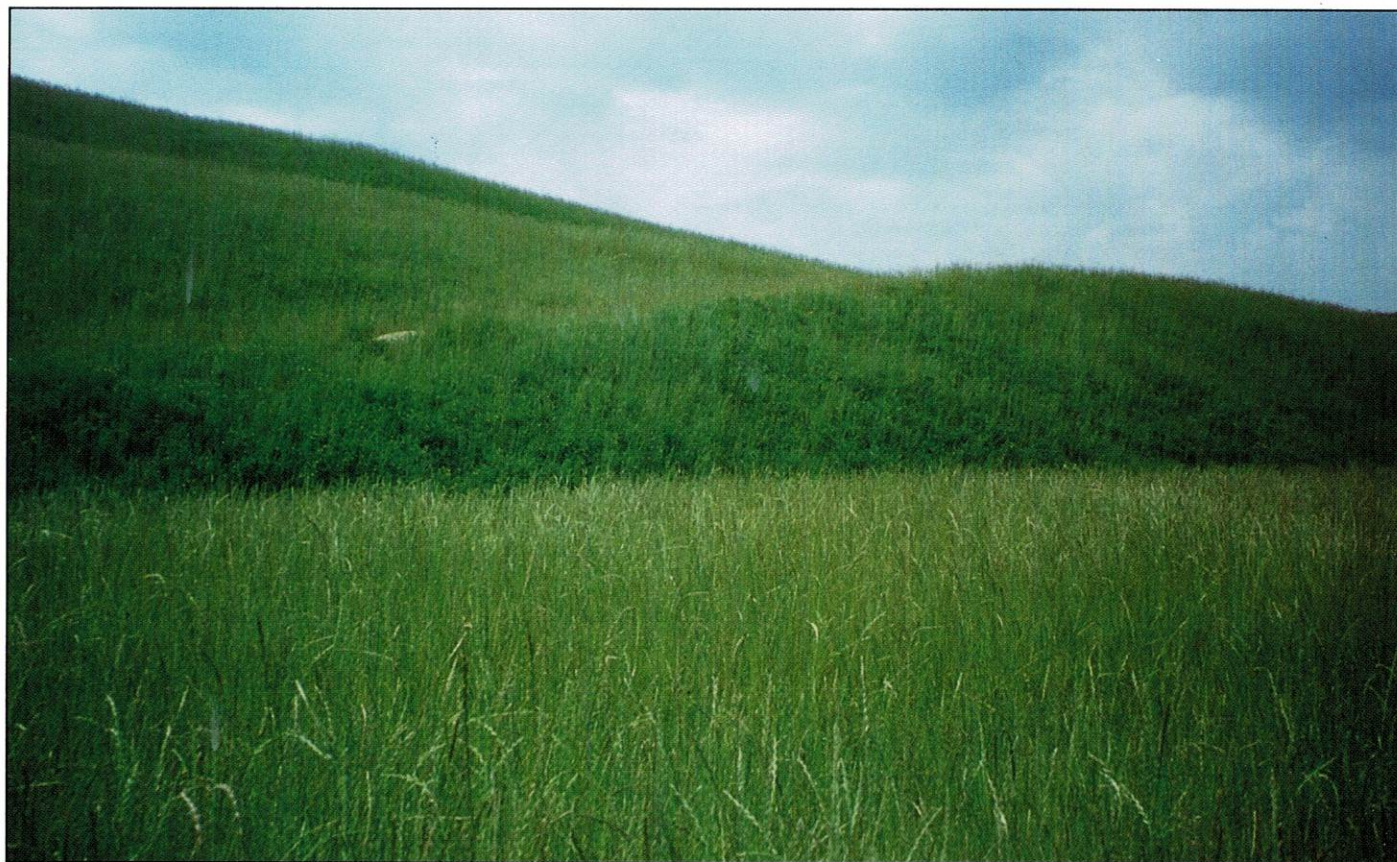
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Mine profile — Samples

Company	Arch of West Virginia, Inc.
Mine	Samples
Location	Leewood in Kanawha County
Active Permits	S-3024-90
Bonded Acreage	2,292
Employees	223
Annual Production	four million tons
Life of Operation	15 years from 1992
Mining Method	mountaintop removal
Equipment Spread	100 yard dragline, 53 yard shovel, 28, 13.5 & 8 yard loaders, 23.5 yard excavator, twelve 240 ton & four 85 ton rock trucks, contractor coal haulage trucks
Coal Seams	Stockton - 96", 5 Block - 60", Lower 5 Block - 14", 6 Block - 40", 7 Block - 36"
Coal Characteristics	2 X 0 product; 12,300-13,000 btu, 10-12 ash, 3-5% moisture, .70-1.2 moisture
Cleaning Plant	selected coal trucked to prep plant with 225 tons per hour capacity, then on 8,200 feet of overland conveyor to train loadout
Transportation	75% of production by CSX through Toms Fork Loadout, remainder by truck to Paint Creek Terminals, Inc., in Crown Hill, WV, for barge loading
Market	electric utilities, primarily in Kentucky, Ohio, Maryland and Alabama
Post Mining Land Use	fish and wildlife habitat



Though the Samples Mine is a relatively new operation, Phase I of the permit area is already green.

Catenary leads eastern Kanawha revival

The Upper Kanawha Valley has been the scene of a lot of economic activity in the last few years, some of it more publicized than others.

The new prison at Mount Olive, just over the Fayette County line, has gotten a ton of press. Buck Harless' state-of-the-art sawmill on Cabin Creek has opened and prospered in relative obscurity.

Somewhere in the middle is Catenary Coal Co., which has pumped over \$100 million into a mining complex which was thought not once, but several times, to have been mined out.

Catenary Coal Co. is a subsidiary of Arch Mineral Corp. Its major mine is located on the Kanawha/Boone county line.

The mine was originally designated "Red Warrior," but last year, the name was changed to "Samples," in honor of former Arch Mineral President Gene Samples.

Catenary began initial overburden removal at the mine in November of 1991. Since then, construction and mining activity, as well as employment and production, have gone straight up. In the beginning, a work force of 25 ran a truck and loader operation. Now, the centerpiece of the Samples operation is the largest piece of mining equipment in West Virginia, a 100 yard Bucyrus Erie 2570 W Dragline, imported from a sister Arch operation in Illinois. The giant dragline is supplemented by a 53 yard shovel and 12 of the biggest trucks in captivity, 240 ton Dresser 830E's.

Earlier this year, Catenary completed its 8,200 foot overland conveyor and started up the Toms Fork super unit train loadout. A 225 ton per hour preparation plant will come on line later this year. The work force has reached its approximate projected level of 223. At this point, the Samples Mine is less than a third of the way through its projected 15 year lifespan.



Catenary has recently completed reclamation on this refuse area contiguous to the active Samples operation.



The Samples Mine, running at full capacity, keeps a whole fleet of 240 ton rock trucks busy.

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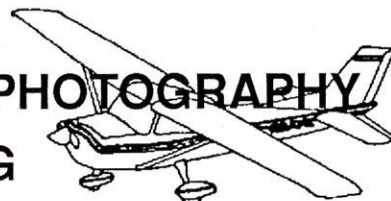
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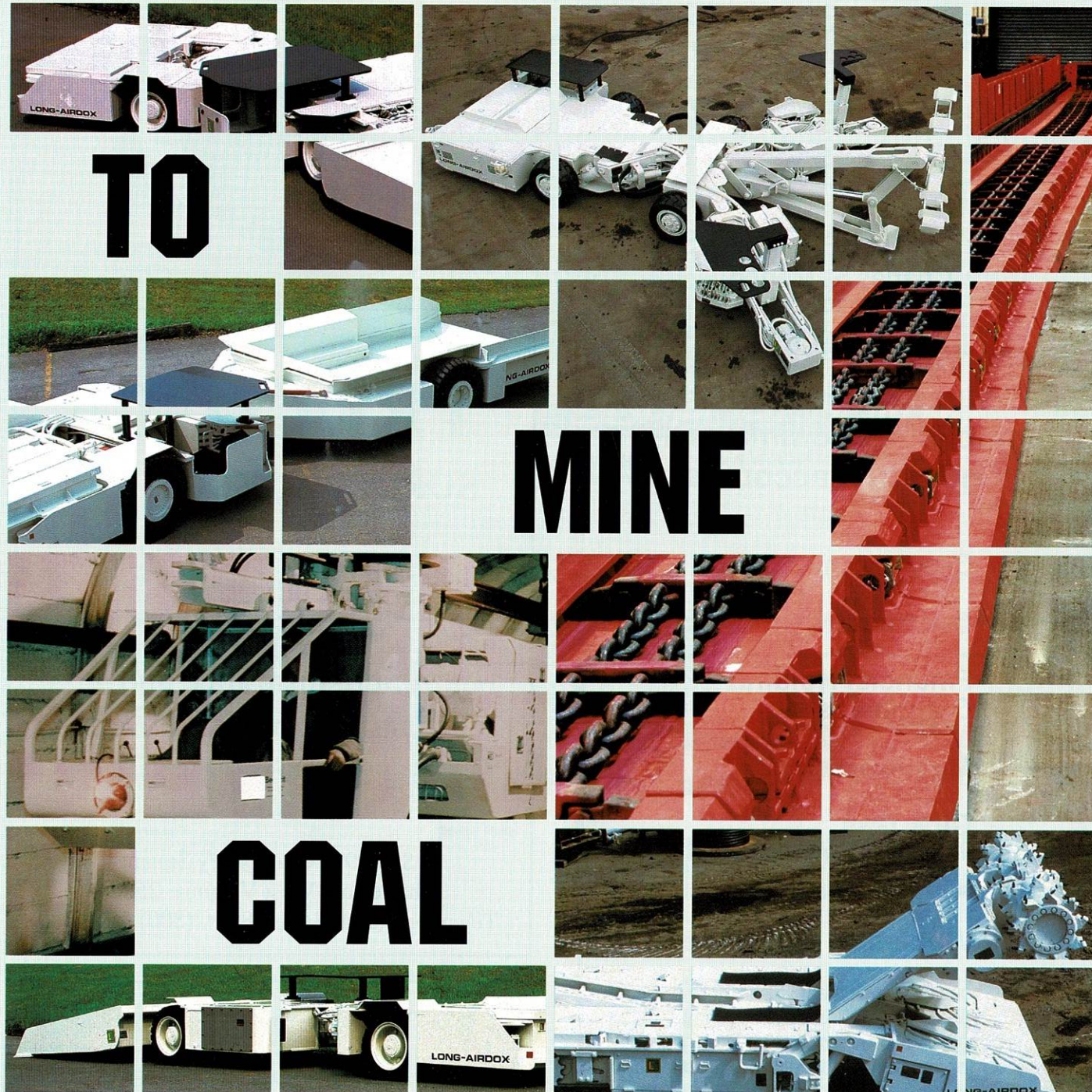
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University Park, PA 16802

Abstract

A demonstration planting using excelsior pads on northern red oak (*Quercus rubra*) and green ash (*Fraxinus pennsylvanica*) seedlings was installed in April 1988. The site was a recently reclaimed surface mine in Raleigh County, WV. Two types of pads were used: TREEGRO type (T) 100 and 200. Bareroot, 1-0 green ash and northern red oak seedlings were hand planted with a mattock. The study design was random pairs of treatment (with pad) and control (no pad) seedlings.

After the first growing season, neither pad affected survival of green ash. However, survival of red oak with T 200 pads was significantly greater than that of controls, and slightly better than seedling survival with T 100 pads. An evaluation after 5 years revealed additional mortality over the entire planting. By treatment, mortality was proportional to the 1-year mortality and seedling growth was highly variable. Red oak with T 200 pads was significantly taller, but overall survival was too low to justify the use of TREEGRO pads for extensive reclamation plantings. Their use might be justified for smaller critical areas.

Introduction

Many techniques have been attempted to alleviate problems caused by competition from herbaceous vegetation on planted seedlings, but none have been totally successful. Bowersox and Ward (1970) compared black polyethylene mulch to mechanical cultivation on the establishment and growth of hybrid poplar.

The polyethylene improved both survival and growth in periods of normal rainfall or limited drought, but showed no advantage in periods of prolonged drought. Bark or wood chip mulches were recommended by Vogel (1981) to aid tree survival on minesoils. Slick and Curtis (1985) reported that mulches can improve survival and also reduce frost heaving of tree and shrub seedlings. However, in disturbed-area reclamation, the only mulches commonly used are those that can be applied with a hydroseeder, and application rates are far too low to aid trees or shrubs.

In 1988, American Excelsior TREEGRO type T 100 and 200 pads¹ were field tested to evaluate their effect on the survival of planted seedlings. The major attributes of the pads are that they retard weed growth and aid in moisture retention around the trunk area. Although these pads are relatively expensive for reforestation projects, it was felt that a knowledge of their capabilities would be helpful in defining problems associated with tree establishment on disturbed areas.

Methods and Materials

A recently reclaimed surface mine in Raleigh County, WV, was selected as the test site for the T 100 and 200 pads. The entire surface of T 100 pads is enclosed in a white polypropylene netting. The netting has six (6 by 6) strands per square inch. The entire surface of the T 200 pads is covered with black 3/4 x 5/8-inch polypropylene netting. The downside surface has a geotextile fabric enveloped within the netting. Both types are available in two sizes, 3 by 3 and 4 by 4 feet. In this case, the 3-foot size was used. The pads are held in place with 6-inch wire staples, 1-inch wide. Nine staples were used per pad. T 100 pads cost \$1.65 each and T 200 pads \$2.25. When the cost of staples and shipping were added, individual costs were \$2.15 and \$2.75, respectively.

The planting medium consisted of a mixture of topsoil and subsoil. It was somewhat rocky and had a pH of 4.5 to 5.0. The area had been limed, fertilized, and hydroseeded two weeks earlier and some grasses were emerging. At the time of planting, the soil was moist.

One-year-old northern red oak and green ash seedlings were planted with a mattock on April 14, 1988. The seedlings were top-pruned to a height of 18 inches and lightly root-pruned at the nursery. The pads were installed on April 18 and 19. Trees in each row were paired, then a pad or no pad treatment was assigned randomly to the first member of each pair. There were 155 oak pairs: 77 with T 100 pads and 78 with T 200 pads, and 103 green ash pairs: 50 with T 100 pads and 53 with T 200 pads.

Results

Survival counts after one growing season are shown in Table 1. The T 200 pads improved the survival of oak over controls or seedlings with T 100 pads. Neither of pad seemed to benefit the survival of ash. A paired t test was used to statistically compare first-year survival.

Table 1. First-year survival of northern red oak and green ash with excelsior pads for mulch, expressed in percentage.

Species	T 100 pad	T 100 control	T 200 pad	T 200 control
Oak	49	30	74*	49
Ash	88	88	81	70

*Significant at $p = 0.05$.

An evaluation of the planting after five growing seasons showed an increase in mortality in all treatments. However, differences in mortality between treatments and controls were not statistically different. The best oak survival was with the T 200 pads. Height measurements taken at age five showed that the oaks and ash with T 200 pads had grown the most. A t test for paired observations was used to compare the heights of treated versus untreated seedlings using those treatment pairs still intact.

In the oak treatments, T 200 seedlings averaged 4.1 feet and the controls averaged 2.0 feet (significant at $P = 0.054$ df). T 100 oaks averaged 3.0 and 2.5 feet, respectively (not significant, 9 df). The T 200 ash seedlings had the greatest average height at 4.2 feet. Control pairs for the T 200 ash averaged 3.3 feet (not significant at $P = 0.05$, 11 df). T 100 ash seedlings averaged 3.5 feet with the controls averaging 2.6 feet, (significant at $P = 0.05$, 27 df). Table 2 shows fifth-year survival and heights.

¹The use of trade, firm, or corporation names in this article is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U. S. Department of Agriculture or the Forest Service of any product or service to the exclusion of others that may be suitable.

Literature Cited

- Bowersox, T.W., and W.W. Ward. 1970. Black polyethylene mulch an alternative to mechanical cultivation for establishing hybrid poplars. Tree Planter's Notes 21(1):21-24.
- Slick, B.M., and W.R. Curtis. 1985. A guide for the use of organic materials as mulches in reclamation of coal minesoils in the Eastern United States. Gen. Tech. Rep. NE-98. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 144 p.
- Vogel, W.G. 1981. A guide for revegetating coal minesoils in the Eastern United States. Gen. Tech. Rep. NE-68. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 190 p.

Table 2. Five year survival and height of northern red oak and green ash with excelsior pads for mulch.

Species	T 100 pad		T 100 control	
	Survival Percent	Height Feet	Survival Percent	Height Feet
Oak	35	3.0	14	2.5
Ash	74	*3.5	70	2.6

Species	T 200 pad		T 200 Control	
	Survival Percent	Height Feet	Survival Percent	Height Feet
Oak	54	*4.1	27	2.0
Ash	55	4.2	57	3.3

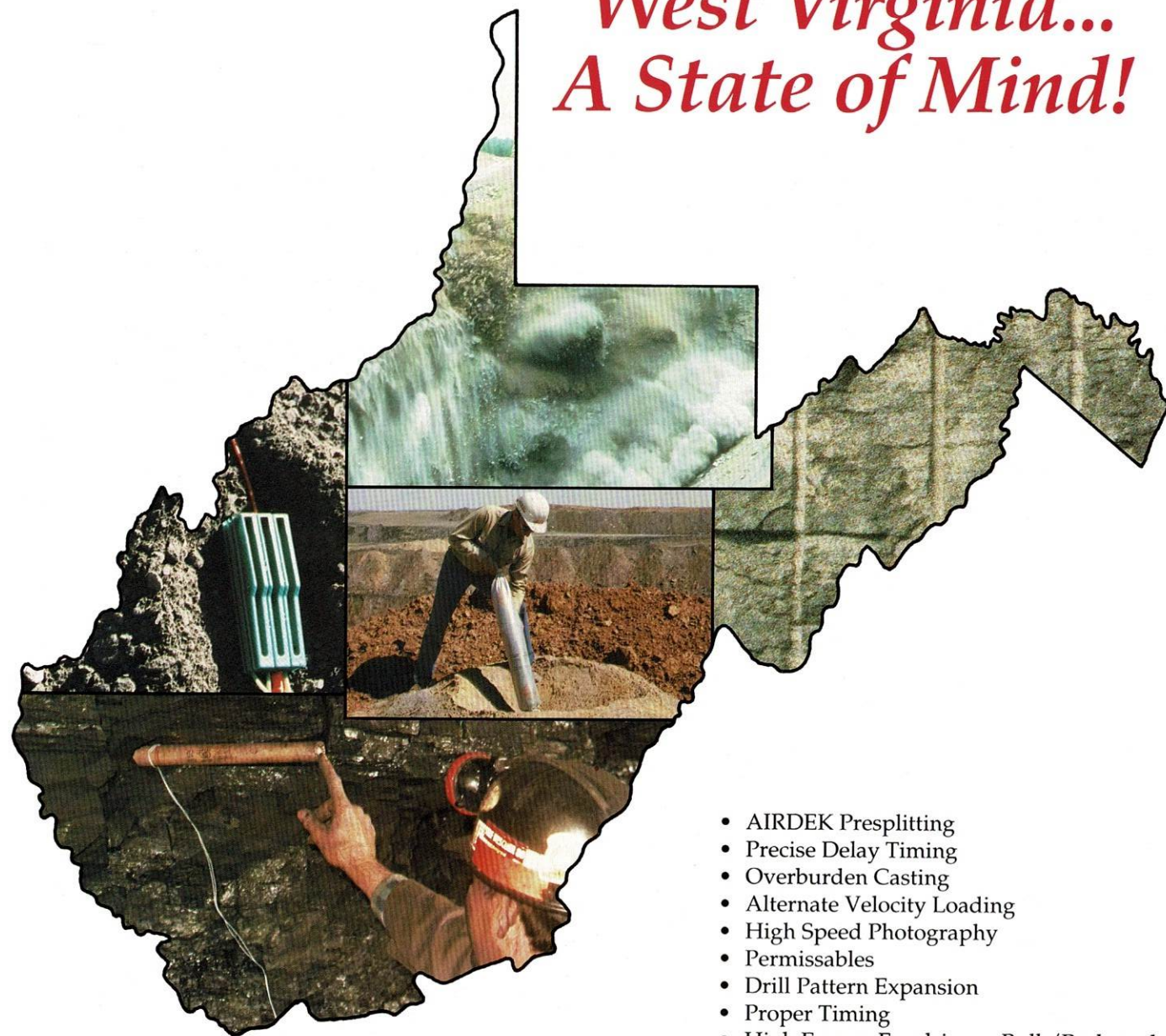
*Significant at $p = 0.05$.

Conclusions

Red oak survival and growth were strongly affected by the T 200 pads. Both height and survival were doubled compared to the controls. Improved survival reflects the intolerance of oak to competition. The competition factor also would influence growth, but in this case, it is likely that improved moisture relations with the T 200 pads also had a great impact. Although the T 100 pads seemed to benefit the growth of green, the differences were small, T 200 green ash controls averaged only 0.2 foot less than the T 100 seedlings. Unlike red oak, survival of the control green ash was as good or better than green ash with excelsior pads. This is a reflection of the higher relative tolerance to competition of green ash compared to red oak. Green ash can be recommended for planting on sites such as this with no special treatment.

On the basis of results obtained in this test, T 200 excelsior pads can be recommended for enhancing survival and growth of northern red oak. However, the cost of the pads must be considered if large-scale plantings are planned. The pads appear better suited for landscape use or small plantings where survival outweighs the added cost.

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COAL CALENDAR

August

- 1-3 14th International Conference on Ground Control in Mining**, Lakeview Resort & Conference Center, Morgantown, WV, contact Sherry Strahin, WVU Department of Mining Engineering, P.O. Box 6070, Morgantown, WV 26506, (304) 293-7680.
- 3-6 WVMRA Annual Meeting**, The Greenbrier, White Sulphur Springs, WV, contact Patty Bruce, WVMRA, 1624 Kanawha Blvd. E, Charleston, WV 25311, (304) 346-5318, FAX 346-5310.
- 13-16 Training Resources Applied to Mining (TRAM)**, Wilson Lodge, Ogleby Park, Wheeling, WV, contact College of Mineral & Energy Resources, WVU, P.O. Box 6070, Morgantown, WV 26505, (304) 293-4211.
- 14-16 Short Course, Recent Developments in Mining Technology**, COMER Bldg., WVU Evansdale Campus, Morgantown, WV, contact Sherry Strahin, WVU Department of Mining Engineering, P.O. Box 6070, Morgantown, WV 26506, (304) 293-7680.

September

- 13-15 Bluefield Coal Show**, Brushfork Armory-Civic Center, Bluefield, WV, contact Greater Bluefield Chamber of Commerce, P.O. Box 4098, Bluefield, WV 24701, (304) 327-7184, FAX 325-3085.
- 22-23 West Virginia Mining & Reclamation Association - Fall Board of Directors Meeting**, Lakeview Resort & Conference Center, Morgantown, WV, contact Patty Bruce, WVMRA, 1624 Kanawha Blvd. E., Charleston 25311, (304) 346-5318, FAX 346-5310.

September

- 24-27 National Mining Association - Annual Meeting**, Denver Marriott, Denver, CO, contact National Mining Association, 1130 17th St. NW, Washington, D.C. 20036, (202) 463-2651, FAX 857-0135.
- 24-27 Interstate Mining Compact Commission- Annual Meeting**, Plaza San Antonio Hotel, San Antonio, TX, contact IMCC, 459B Carlisle Dr., Herndon, VA 22070, (703) 709-8654.
- 27-28 Maryland Coal Association - Annual Symposium**, The Wisp Resort and Conference Center, McHenry, MD, contact MCA, 59 E Main St., Frostburg, MD 21532, (301) 689-6609.

October

- 2-6 Short Course, Engineer Exam Review in Mining/Mineral Engineering**, COMER Bldg., WVU - Evansdale Campus, Morgantown, WV, contact Sherry Strahin, WVU Department of Mining Engineering, P.O. Box 6070, Morgantown, WV 26506, (304) 293-7680, FAX 293-5708.

- 12-14 Kentucky Coal Association - Annual Meeting**, Marriott Griffin Gate Resort, Lexington, KY, contact KCA, 340 S. Broadway, #100, Lexington, KY 40508, (606) 233-4743, FAX 233-4745.

November

- 8-10 Mining Industry Communications Conference**, New Orleans, LA, contact National Mining Association, 1130 17th St. NW, Washington, D.C. 20036, (202) 463-2651, FAX 857-0135.



Each year, Buffalo Coal Co. serves as a one day host for high school students participating in the YMCA/Chamber of Commerce sponsored Free Enterprise Conference. Pictured above, the campers learn about wetland construction from Don Cussins and Steve Shaffer (far right in ball caps) of Buffalo.



Association Notebook

Fall Meeting

WVMRA will take its "Mountaineer Spirit" back to Lakeview Resort for the Fall Meeting of the Board of Directors. The annual weekend in Morgantown will be September 22-23, in conjunction with the WVU-Kent State football game. Following the Friday afternoon Board Meeting, the Association will host members of the WVU staff and other special guests at an evening dinner.

On Saturday morning, we fire it up at a pre-football brunch, then head for the stadium to cheer on the Mountaineers. Though no Association tournament is

scheduled, Lakeview is also an excellent golf opportunity. Members planning to play should make arrangements directly with the Lakeview pro shop, beginning 30 days before the meeting weekend.

Winter Meeting

As a reminder, the 1996 Semi-Annual Meeting will return to Marriott's Desert Springs Resort in Palm Desert, CA, the site of the 1994 event. Make plans for California from January 30 - February 4.



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

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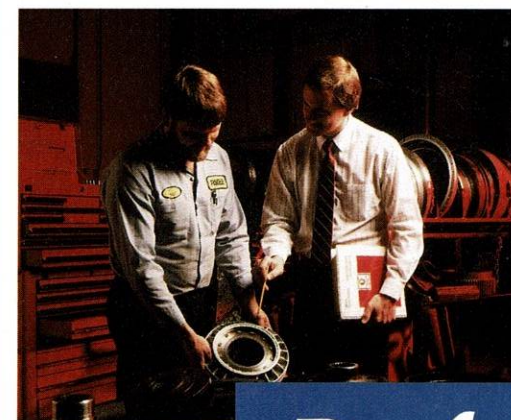
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