Green Lands

Quarterly Summer 1979

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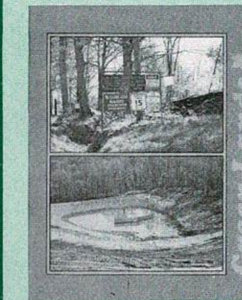
Green Lands



Our Cover

LaRosa Fuel Co.'s Ulderich operation, shown on the cover and on page 9, was technically not yet a coal operation when we visited there. All this work and more was necessary before mining operations could commence. See page 8 for the story.

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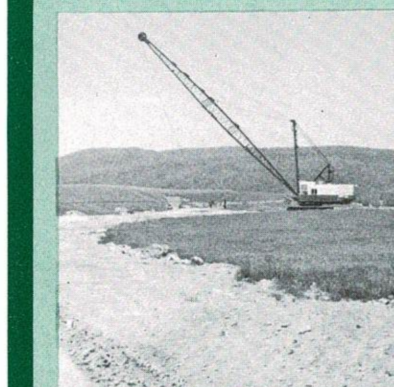

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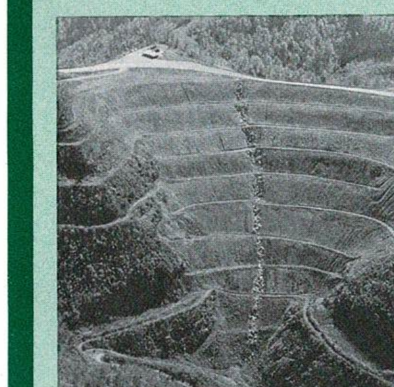

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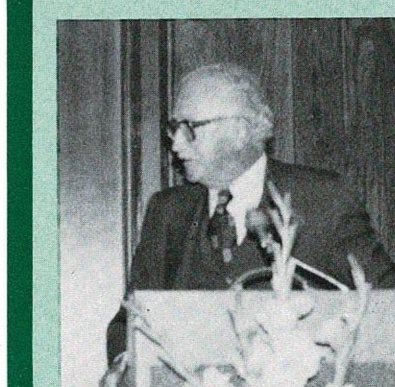

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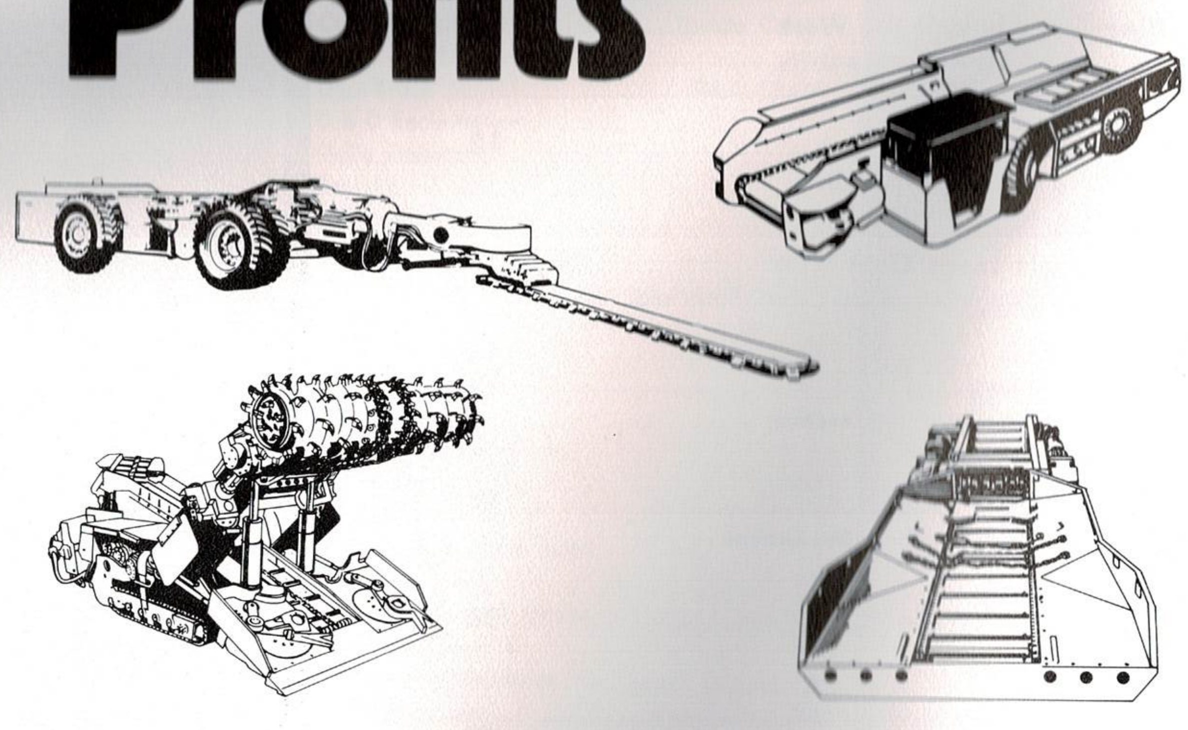
A Used Method of Building Profits



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EDITORIAL

From A Trickle To A Flood

Editor's note: The following is excerpted from remarks by former California Congressman Del Clawson.

From a relative trickle in 1961, when they occupied 12,789 pages in the **Federal Register,** the rules and regulations issued by agencies of the Executive Branch of the federal government have become an avalanche. Last year, the published rules filled up 65,603 pages in the **Register.** Regulations directed at every activity or concern, mundane or arcane, known to the human condition, spew forth each day of the federal work week. Because the rules exert such an awesome power over the personal lives and fortunes of millions of Americans, it is all the more serious for a government based on the consent of the governed, that the power rests with anonymous bureaucrats, usually accountable to no one but their immediate superiors. It is of equal concern that although the rules and regulations purport to implement legislation, the relationship to laws enacted by Congress is often tenuous at best.

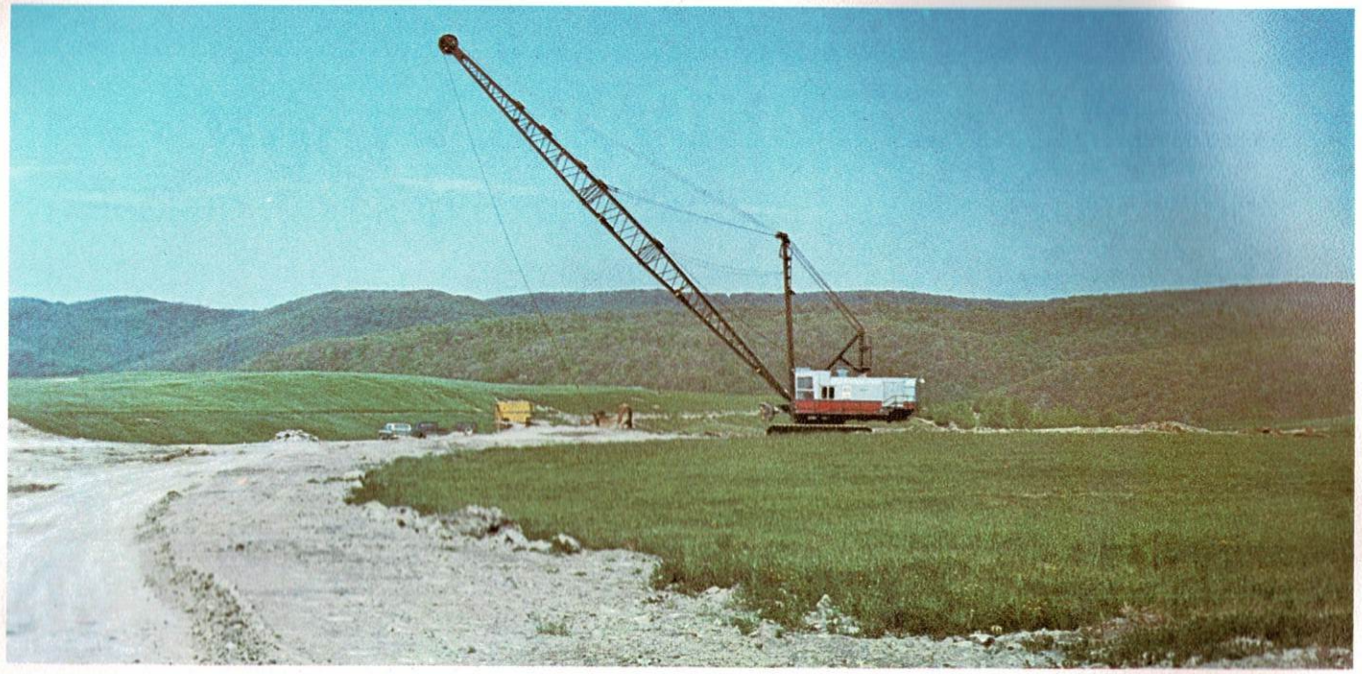
For small business, the cost of compliance with regulations and accompanying paperwork can be crippling, both in actual cash expenditure and employee time lost. The regulations can stifle innovation and initiative, detracting from time which might have been better spent by executives in planning or watching expenses.

It is vital that Congress regain the legislative prerogative usurped by the bureaucracy. And it is important that Congress have a more effective method of representing the interests of the people in agency regulation, to assure them that their valid complaints will be heard.

One of the thorniest problems associated with federal regulation is the difficulty of policing conflicting rules and regulations. Some may originate within the same agencies. But separate agencies may also go to war with each other on regulatory questions.

It is important to have a workable alternative to the rivalry and power struggles of branches in conflict which can keep the government bogged down and obstruct service to the people.

We have to begin somewhere to restore the balance of power in the federal government and to dig out from under the smothering weight of agency regulation. What better way for the Congress to begin than by establishing a uniform method to reject bureaucratic rules and regulations which infringe on the lawwriting prerogative granted to Congress by the Constitution?



The company closed its operation at Kettle Flats before mineral recovery was complete. Federal requirements for upgrading existing facilities simply made further mining uneconomical.

Getting There Is Half The Work

Publicity surrounding federal coal regulation has made many people aware of the tremendous role which land reclamation plans in the surface mining process.

But few outside the coal industry realize how much time, effort, and expense go into a mining operation before the first ton of coal is removed.

After the legal requirements are agreed to, the tedious permitting process begins. This alone may require six months to a year or more, as mining companies may have to win the approval of as many as seven state and federal regulatory agencies.

When all pertinent agencies have given their blessing, the preplan is put into action. Before any coal is mined, the following are necessary; engineering stake out, clearing and grubbing of the construction limits, establishing the haul road, constructing sediment control systems, diversion ditches, and/or rock drainways, installing riser pipes, often establishing fill disposal areas for storage of excess overburden, backfilling, fertilizing, seeding, and mulching of all adjacent disturbed areas, and arranging for constant testing and analysis of the performance of all of these facilities. In addition, before they can be used the haul roads and drainage systems must be certified by a registered professional engineer or approved person. Also, several different identifying and warning signs must be erected at the outer limits of the job site prior to any mining activity.

When all these pre-mining requirements are in place and functioning well, the mining of coal may then proceed. All of this was true even before the advent of federal regulation. West Virginia has, for years, required strict adherence to a pre-mining reclamation plan, concurrent reclamation as the mineral recovery process goes forward, as well as drainage system abandonment and a post-mining reclamation plan.

The Ulderich operation gives the appearance of reclaimed land, though not a pound of coal had been taken when this picture was made. Seeding, fertilization, and mulching will immediately follow the "tracking-in" process illustrated above.

OSM Responds

This photo, and the comments which accompanied it, created quite a stir following publication of our Spring issue. Shown is a rock-core chimney drain fill constructed by Buffalo Mining Co. in Logan County.

Editor's Note: ***Green Lands Quarterly*** *does not make a practice of using the same picture in two consecutive issues; nor do we usually devote space to editorial reply. These pages, however, represent an exception to both of those principles. Officials of the Office of Surface Mining believe that we have mislead our readers. Fortunately, our comment period regarding the last issue remained open for the full 90 days which OSM required to formally respond.*

United States Department of the Interior

OFFICE OF SURFACE MINING

Reclamation and Enforcement
950 Kanawha Blvd., East
Charleston, WV 25301

June 27, 1979

Mr. Benjamin C. Greene
President
WV Surface Mining and
Reclamation Association
1624 Kanawha Blvd., East
Charleston, WV 25311

Dear Mr. Greene:

The 1979 Spring Quarterly of "Green Lands" carried photographs of head of hollow fills of Cedar Coal and Grafton Coal. The text of the accompanying article stated that the fills would not satisfy the permanent program requirements of P. L. 95-87. This statement is misleading and should be clarified for your readers.

Although it is difficult to draw conclusions concerning compliance from photographs, the fills depicted appear to satisfy permanent program requirements. The regulations provide that where a fill goes to the elevation of the coal seam and not to the ridgeline, it is restricted to 250,000 cubic yards if a central rock core drain is used. If the crest of the fill goes to the elevation of the ridgeline, a central rock core drain can be used without restrictions on the volume.

Other design criteria in the regulations not discernable from the photographs include:

1. Lateral subsurface drains with properly designed filters
2. A rock core system adequate to convey a 100 year storm
3. Filters surrounding the rock core
4. A static safety factor of 1.5
5. Certification by a Registered Professional Engineer
6. Any other requirements in 30 CFR 816.73 and 817.73

The requirements listed above apply only to those fills constructed where the slope of the steepest section of existing topography within the fill area exceeds 20 degrees, or where the average profile of the valley above the toe of the fill exceeds 10 degrees. Fills on more gentle slopes need only meet the requirements of 30 CFR 816.71 or 817.71.

In further reference to your article, the terms "valley fill" and "head of hollow" fill are defined in the permanent regulations at 30 CFR 701.5. The primary differences between these two types of fills are in their location and in the structures they use to control drainage. A head of hollow fill is located at or near the ridgeline in order to reduce upstream drainage, and may, therefore, use the rock core chimney drain. A valley fill is located further downstream and must use a rock underblanket drain. In addition, all upstream drainage must be diverted around a valley fill. More detailed geotechnical and hydrologic criteria for the design and construction of head of hollow and valley fills are contained in the regulations (30 CFR 816.72, 816.73, 817.72, and 817.73).

In the event you have future questions concerning interpretation of our regulations, do not hesitate to contact me, the Regional Office of the Solicitor, or other Regional personnel. Such contacts, prior to publication of such an extensively photographed and researched article, could preclude future misrepresentation of OSM positions.

Sincerely,

Charles A. Beasley
Charles A. Beasley
Regional Director

Our Reply

Green Lands Quarterly *and the West Virginia Surface Mining and Reclamation Association are delighted to receive official notice that the valley fills/head-of-hollow-fills depicted in our Spring issue appear to be in compliance with federal regulations. However, we remain firm in our belief that the need for constant interpretation of regulations for implementation of the permanent program suggests sufficient cause for a serious review and reworking of these standards. The ambiguity apparent in this situation is present in more cases than we have space to illustrate.*

OSM INSPECTION ACTIVITY SUMMARY
JANUARY 1—MARCH 23, 1979

	Number of Inspections	Notices of Violation	Cessation Orders	Citizen Complaints
Region I	776	177	24	29
Region II	662	138	63	48
Region III	213	67	6	6
Region IV	58	9	6	2
Region V	42	17	3	1
Region I				
Maryland	15	1	0	0
Pennsylvania	235	42	7	16
Virginia	133	49	6	1
West Virginia	393	85	11	12
Top Ten (1978) Producing States:				
Kentucky	392	81	32	33
Pennsylvania	235	42	7	16
West Virginia	393	85	11	12
Wyoming	8	6	0	0
Illinois	63	15	0	0
Ohio	52	21	1	0
Virginia	133	49	6	1
Montana	0	0	0	0
Indiana	98	31	5	6
Texas	1	0	0	0

West Virginia Leads OSM Stats

Despite the fact that the Surface Mining Control and Reclamation Act of 1977 was supposed to inflict uniform enforcement on all the coal producing states of America, statistics released by the federal Office of Surface Mining indicate that such is far from the case.

West Virginia, which has slipped to third place among the states in total coal production, and ranks only eighth in surface mining, edged out coal giant Kentucky for the title of "most inspected" during the first quarter of 1979.

Kentucky, which now outproduces West Virginia by more than 50%, was visited only one less time by OSM inspectors and received four fewer notices of violations. Kentucky operators were, however, shut down three times as often as their West Virginia counterparts.

Region I, which contains West Virginia, Virginia, and Pennsylvania, as well as Maryland, led all others in both inspections and notices of violations. Region V, home of many of the nation's largest surface mines, was the least inspected area, with only 42 visitations. Incredibly, Wyoming, the number four coal producer, saw only eight inspections, and Montana, eighth in production, had no operations inspected at all.

None of this comes as any great surprise to West Virginia operators, who have almost uniformly predicted these circumstances repeatedly over the last 18-24 months. State surface mines have long been among the most inspected in the country, being visited by West Virginia Department of Natural Resources personnel every 15 days or less.

Across West Virginia, and much of the rest of the Appalachian coalfields, Congress and OSM have been accused of tailoring the law and the regulations to suit the needs of western operations. Recent production figures seem to bear this out. Inspection figures certainly do. There is a district dropoff in inspection frequency as one moves westward across the OSM map.

The West Virginia Surface Mining and Reclamation Association recently conducted a survey of all mining operations in the Mountain State. Although the response was relatively low, much of the information gathered pointed in rather definite directions.

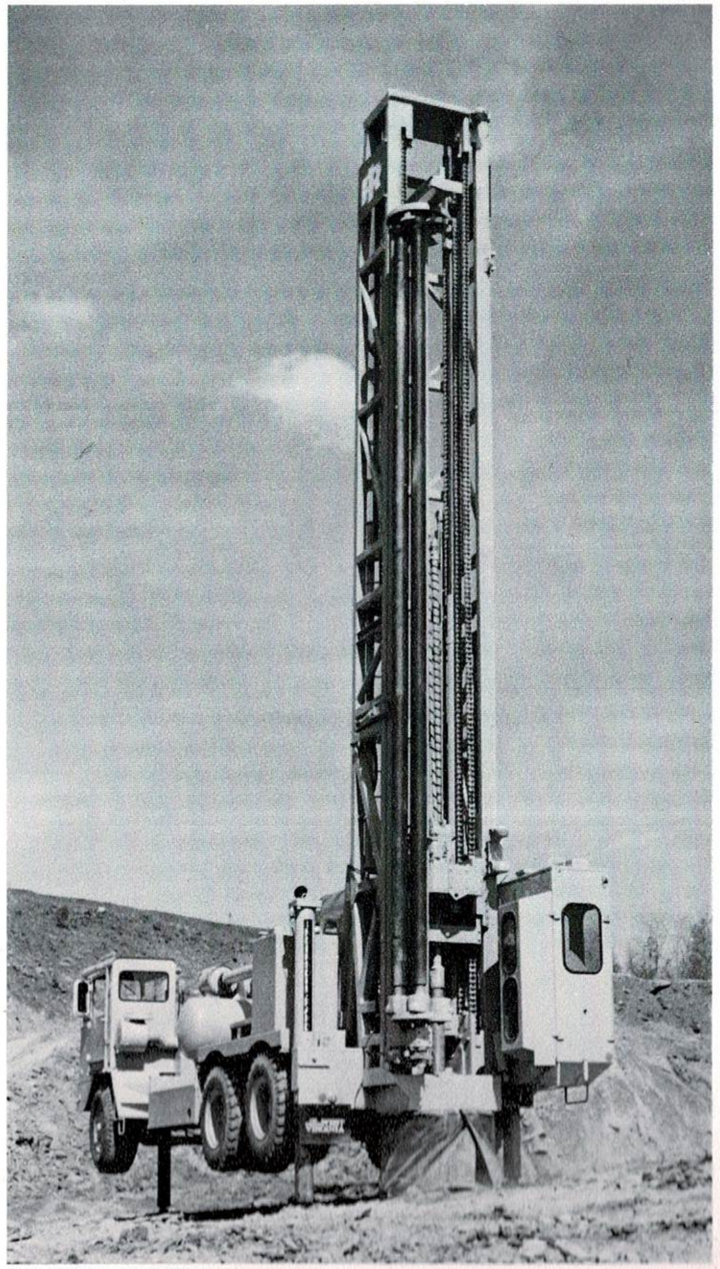
Nearly all operators responding to the survey have read the Surface Mining Control and Reclamation Act of 1977. About two-thirds have read the final regulations.

Three-fourths of these operators have been inspected by OSM personnel. Of this group, nearly two-thirds have received at least one notice of violation. Of those in violation, over half have been fined and 7 have been shut down. All this has occurred in a state which was held up as a model of good reclamation practice during the legislative phase of federal regulation.

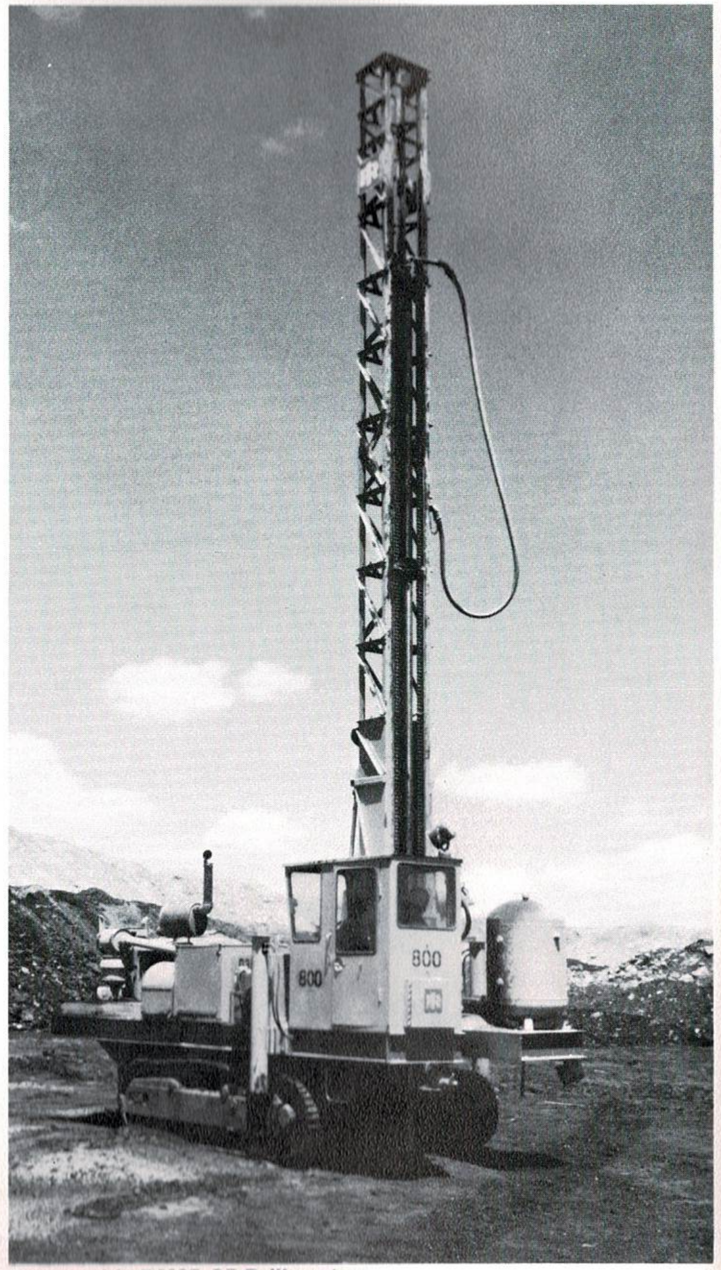
Nearly half of the respondents reported that they are seriously considering leaving the coal industry. Asked to rank problems facing the West Virginia coal industry today, the overwhelming "choice" was government regulation. Asked to evaluate the role of state and federal officials in alleviating coal problems, state government received approval from little more than one in ten. Federal government was unanimously condemned.

WVSMRA COAL INDUSTRY SURVEY

	Yes (%)	No (%)
Have you read the Surface Mining and Reclamation Act of 1977?	89	11
Have you read the permanent OSM regulations issued March 13?	68	32
Have you been inspected by OSM personnel?	75	25
Have you received a notice of violation from OSM?	46	54
Have you received a cessation order from OSM?	07	93
Have you received a civil penalty assessment?	26	74
Are you considering leaving the coal industry?	45	55
Do you feel that West Virginia state officials are doing as much as is practical to help solve the problems facing the West Virginia coal industry?	11	89
Do you feel that the federal officials are doing as much as is practical to help solve the problems facing the West Virginia coal industry?	00	100



Top-head drive T4 Drillmaster



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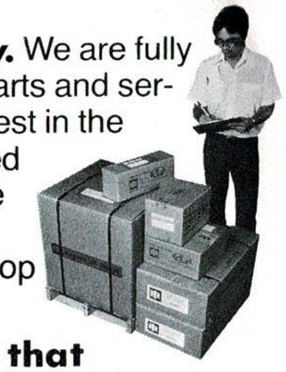

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Suggested Guidelines for Method of Operation in Surface Mining of Areas with Potentially Acid-Producing Materials

Developed by Surface Mine Drainage Task Force

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I. INTRODUCTION

Background: On September 15, 1978, a meeting was held at the West Virginia Department of Natural Resources Operations Center in Elkins, West Virginia. The meeting was called by D.N.R. Director David Callaghan, for the purpose of addressing the problem of acid mine drainage associated with surface mining of the Kittanning coal seams in the Buckhannon, Tygart and Middle Fork River watersheds. At a subsequent meeting, an inter-disciplinary committee was appointed by Director Callaghan. The committee was made up of industry and D.N.R. representatives, as well as technical experts from West Virginia University, the consulting field, and from the Federal Office of Surface Mining. It was charged with the task of defining the problem at hand and of outlining procedures currently available which will provide for recovery of mineral resources while maintaining proper quality of the waters of the state, both during and after operation.

The initial findings of the committee indicated that the acid water problem is site specific. Some mining operations and regions exist within the subject watersheds which do not produce acidic water, due to the nature of overburden present and other factors. Also, some existing operations on sites that may otherwise have produced acid water have minimized the problem by utilizing appropriate mining and reclamation methods.

Companies with interests in the area should realize that the potential does exist for many of their operations to produce acid water. The primary environmental objective should be prevention of acid water, both as a matter of economics and of environmental protection. Although acid water can be successfully treated, it is recognized that creating the necessity of treatment for an indefinite term after reclamation, or even perpetual treatment, is not a desirable situation.

Statement of purpose: The intent of this document is to present for consideration procedures which the committee believes will be successful in preventing acid water problems on surface mine sites. The information set forth reflects knowledge available to the committee of the current state of the art. Additional research in some areas and field trials of various procedures are needed and should be encouraged.

All companies continuing or planning operations in the identified problem area, or areas with similar characteristics, must realize that successful mining under these circumstances will in all likelihood require special procedures for material handling, and other measures to prevent acid water problems. The methodologies outlined herein are available to be used as guidelines. They are not to be applied as new regulations, supplements to existing regulations, or permit requirements.

This committee recognizes that problems vary from site to site and should be approached with this in mind. The committee also notes that other methods for mining and reclamation may be presently known or will be developed in the future which will prove successful in preventing acid water problems. In no event should this document be applied to the extent of precluding application of prudent mining practices and sound judgement.

II. BASIC CONSIDERATIONS

In determining a method of operation for surface mining in areas with potentially toxic* materials, several basic characteristics of the mine site should be taken into account:

A. **Groundwater Characteristics** are important in determining appropriate mining and reclamation procedures and in choosing locations and techniques for valley, head-of-hollow, or other off-bench fills. Data on ground water quality, quantity, and location should be accumulated prior to mining, from springs, seeps, and/or wells in the vicinity.

B. **Surface Water Characteristics:** As with groundwater, careful study of premining surface water characteristics, including quantity and quality, should play a part in mine planning. Collection and retention of such data on surface and groundwater before, during, and after mining, will be a basis for final bond release, as regulations are currently proposed. Location and nature of streams, whether ephemeral, intermittent, or perennial, should be accounted for in planning sequence of mining and fill configuration and placement techniques. If large watersheds exist above the area to be mined, and/or intermittent or perennial streams are present, handling measures such as buffer zones, diversion channels, and other conveyances for surface flows around or through disturbed areas may be considered. Small watershed areas and existence of no streams other than those identified as ephemeral may indicate little or no special surface water handling provisions.

C. **Overburden Analysis Data:** Premining analysis* of topsoil, overburden materials, and coal pavement is important to determine material characteristics. If potentially toxic materials are found to be present, special overburden handling techniques may need to be included in mine design and operation.

It is recommended that all surface mining in potentially acid-producing areas be within one kilometer (approximately 3,280 feet)[1] of a rock column that has been sampled and analyzed by approved methods.

If toxic strata are present, a quantitative comparison of alkaline versus acidic materials is suggested. The ratio of the types of strata will be a valuable tool in determining workability of possible techniques for material handling. Standard engineering calculation procedures for earthwork volumes may be adapted for this type calculation.

In addition to acid-base potential, indications as to durability, rock type, color, and other characteristics,** may be useful in certain cases. If mine planning includes use of relatively impermeable layers, materials suitable for that purpose should be identified.

D. **Topography and Land Use:** Site topography will be a determining factor in mining and backfilling methodology. To the extent that steepness of slopes is a factor in applicability of certain regulatory requirements for mining and backfilling, it will affect procedures chosen for the site. Planned post-mining land use, particularly in mountaintop removal and area mining, will influence mining and backfilling methods to some extent. These factors must be meshed with plans for handling water and toxic overburden.

E. **Geologic Considerations:** Geologic characteristics of the site to be mined may involve important considerations in addition to the acid-base potential analysis results.

Dip and strike of the coal should be determined as an indicator of the lay of the pavement subsequent to coal removal.

F. **Equipment to be Used in Mining:** The equipment spread is of major importance. An operation utilizing overburden blending will allow flexibility in equipment selection and usage. Material segregation and selective placement may require special equipment considerations.

G. **Cost:** It is clear that a mining plan must display economic feasibility. Projection of costs will be more important than usual in planning for an operation involving special handling of overburden and other extraordinary expenses.

III. SPECIFIC TECHNIQUES

The following items outline some possible means of preventing, minimizing, or correcting water quality problems associated with surface mining.

*The word toxic, as used throughout this document, is synonomous with "acid-producing", implying the capability to cause water pollution by chemical reaction resulting in increased acidity, low pH, and/or the presence of dissolved iron and other metals. The term does not imply toxicity to humans. See Appendix A for further discussion.

*See Appendix A

1) Smith, R.M. and A.A. Sobek. 1978. Physical and Chemical Properties of Overburdens, Spoils, Wastes, and New Soils in Reclamation of Drastically Disturbed Lands. Am. Soc. Agron., Madison, WI

**See Appendices A and B

A. **Subsurface Water Handling Measures:** Usually, subsurface water will be encountered in the highwall and in or near the coal. We can reasonably expect less such water on the updip side of an area, and more, requiring special attention, on the downdip side.

1. We can utilize the dip of the strata to identify likely areas for subsurface water discharge. In like fashion, we can identify areas where toxic materials may be placed to minimize or prevent contact with water.
2. Shallow fragmenting of pavement materials may be a useful water pollution control measure, if pavement materials are alkaline. By fragmenting, subsurface water flowing into the backfilled mine site may be directed into and across the alkaline pavement.
3. Where large concentrations of subsurface water are encountered, the pavement may be trenched and/or treated to provide quick routes for water to exit the fill in a planned manner. Non-toxic stone, or durable pipes or culverts may be used in the trench.
4. Special care in blasting procedures on the last highwall cut may be considered to reduce highwall fracturing and to reduce recharge of groundwater by infiltration.
5. Collection and planned transfer of water from springs is a useful technique to prevent entry of groundwater into toxic materials in valley, head-of-hollow, or other off-bench fills.

B. **Surface Water Handling Measures:**

1. Highwall diversions may be an effective means of reducing entry of surface water runoff into the mine site.
2. Transfer of point flows across reclaimed areas in pipes, flumes, or lined channels will reduce erosion and infiltration. Such conveyances could be utilized to conduct uncontaminated water away from or across the job site, rather than allowing this water to enter sediment control or treatment facilities.
3. Controlled backfilling, grading and shaping of the final surface may be useful to facilitate runoff and reduce infiltration of surface water.
4. On long slopes, terracing or cross ditching may be useful water control measures. Such ditches could be lined with erosion resistant materials, and infiltration should be prevented by use of low permeability materials, if available.
5. Route earthmoving equipment to achieve fill compaction, especially of outslope areas. Utilize the least permeable materials available as part of the final spoil placement.

C. **Overburden Handling:**

1. Whereas premining overburden analysis is a valuable tool for mine planning, variability of strata quality should be accounted for during operation. As a job progresses, adjustments to operational procedures may be necessary to insure proper handling of potentially toxic materials. Field clues* to overburden quality and selective testing methods* may be applied by operating personnel on a regular basis.
2. Proper interpretation of anaysis results is necessary. Information pertaining to data interpretation is presented in appendix A to this report.
3. Based upon overburden quality and quantity, a choice between overburden blending, segregation of toxic materials, or a combination thereof, may be made. It is generally felt that blending may be used where the alkaline materials are capable of neutralizing the acidic materials. This determination could be based on study of other mine sites with similar overburden, which are known to have no acidic water problems associated with them, and/or detailed evaluation of the site in question. If blending is used, it should be thorough so as to avoid pockets of potentially toxic materials. Where blending is shown not to be a viable option, segregation and isolation of the potentially toxic zones should be considered as another option. Segregation and isolation may be accomplished by use of the following measures:
   a. Control drilling and blasting to allow material segregation during excavation. In addition, it may be beneficial to keep potentially toxic material in large particles, and to create finer particle size in material with excess alkalinity.
   b. If the coal seam and/or closely associated materials are potentially toxic, the pit should be cleaned prior to backfilling, and before shooting the next adjacent cut. These materials should be removed and handled as other potentially toxic materials.
   c. Place non-toxic material on the floor of the pit, and against the final highwall. It is suggested that the layer on the pit floor be at least four to six feet in thickness, and that the column against the highwall be ten to twenty feet wide. If materials with excess potential alkalinity are available, it may be helpful to incorporate them into these layers.
   d. Positive drainage should be provided down the highwall and across the floor of the pit within the layer of non-toxic material. As filling proceeds leave enough room on the outslope side of the fill for a covering of non-toxic material and for surface treatment. Potentially toxic materials should be selectively placed so that they are completely surrounded by non-toxic materials.
   e. Final fill of outslopes should be non-toxic material. It is suggested that material close to the surface be finely shot during excavation, or pulverized by tracking with equipment as it is placed.
4. It pavement materials are potentially toxic, acid-preventive measures could be applied. One alternative is to thoroughly and uniformly coat the pavement with a layer of agricultural or hydrated lime, in order to form a seal and prevent contact of water with toxic strata. The intended effect of the lime coating is not to neutralize total potential acidity, but rather to react with iron in the water to create a non-reactive chemical surface atop the potentially acidic material. Conventional agricultural type lime spreaders have been successfully used for such lime application.

   Other sealers could be used, such as non-toxic clayey soils or weatherable shales, or manufactured sealent materials.
5. Neutralizing reagents may be admixed with overburden to offset potential acidity of the strata. It is probably not necessary that the lime application rate be adequate to neutralize the total excess potential acidity of the overburden. It is felt that the amount of lime used should be in relation to the calculated immediate lime requirements, with due consideration of strata with excess alkalinity.* Further research and field trials are

*See Appendix B for discussion of field procedures

*See Appendix C

recommended to establish proper procedures for admixing.

6. Potentially acidic coal refuse placed in surface mine areas may cause future problems, in that such refuse is often much more toxic than overburden, and may greatly complicate water pollution control. It is recommended that an in-depth study of the chemical characteristics of the refuse and of the site conditions be made prior to such disposal.

D. **Cut-Throughs Into Deep Mined Areas:**
If deep mines are encountered which may affect water quality, study is recommended to adequately consider and arrive at solutions for the potential problem.

E. **Acid Mine Drainage Treatment:**
With proper overburden handling it is felt that coal seams with associated potentially acidic overburden can be mined with no water pollution problems remaining after reclamation. However, it is possible that some water with non-complying pH, acidity, iron, or manganese levels may be generated during operational phases when coal and toxic materials are exposed. If this is the case, treatment measures will be necessary to achieve water quality compliance. Treatment methods involving batch handling, such as spraying with lime slurries or hand or drip feeding of neutralizing agents into ponds or channels are suitable if proper care is applied. However, in many cases flow-through treatment units capable of continuous operation could or should be used. Pre-fabricated neutralizing units are on the market which utilize soda ash (Na_2CO_3) in briquette form or sodium hydroxide (Na OH) solution. These units require no electrical power, and have been successfully used in treatment of surface mine discharges. It is possible to construct treatment systems utilizing lime, a less expensive reagent, but a successful lime treatment unit will generally require mechanical feeding and mixing equipment, in addition to bulk storage facilities. Much greater capital cost is incurred than with the soda ash or sodium hydroxide units. An economic analysis of combined capital and operating costs of the alternative systems may be in order for a given situation.

The water to be treated should be analyzed, or a valid projection of quality made if system choice is made prior to mining. Water quality may be predicted by data from similar operations in comparable strata. The treatment procedure chosen should fit the water to be neutralized, both on the basis of economics, and with reference to suitability of a particular reagent for contaminants to be handled.

If the only quality problem is low pH, neutralization may be a simple procedure with few operational problems. However, high acidity or excessive levels of iron or manganese may dictate more complex treatment methods and special provisions for settling after neutralization.

Appendix A

ACID-BASE ACCOUNT

Acid-base accounting is a dependable criterion by which overburden materials can be evaluated. An acid-base account consists of two measurements: (1) total or pyritic sulfur and (2) neutralization potential. The accounting balances maximum potential acidity (from immediately titratable sources plus sulfuric acid equivalent calculated from total sulfur) against total neutralizers (from alkaline carbonates, exchangeable bases, weatherable silicates or other rock sources capable of neutralizing strong acids as measured by the neutralization potentials).

The total or pyritic sulfur content accurately quantifies potential acidity of materials when all sulfur is present as a pyritic mineral. When gypsum is found in an overburden sample or the materials are weathered, sulfur occurs in the form of sulfates. Samples high in organic carbon usually contain organic sulfur. When part of the sulfur occurs in non-acid-producing forms, the maximum potential acidity as calculated will be too high. It is for this reason that such calculations are referred to as maximums and that in doubtful cases appropriate acid and water leachings should be made to rule out those forms of sulfur which do not produce acid. Then from the stoichiometric equation of pyrite oxidation, the maximum potential acidity can be calculated in terms of calcium carbonate equivalent. Overburden material containing 0.1% sulfur (all as pyrite) yields an amount of sulfuric acid that requires 3.125 tons of calcium carbonate to neutralize one thouand tons of the material. The neutralization potential of overburden materials, the second component of a net acid-base account, measures the amount of neutralizers present in the overburden materials. This measurement is found by treating a sample with a known amount of standardized hydrochloric acid, heating to assure complete reaction, and titrating with a standardized base. The result is then expressed in calcium carbonate equivalents. When balanced against acidity from the total measurement, a net acid-base account can be made.

From the acid-base account, potentially toxic material is defined as any rock or earth material having a net potential deficiency of 5.0 tons of calcium carbonate equivalent or more per 1000 tons of material. (The 1000 tons is based on the assumption that an acre plow-layer contains 2 million pounds of soil). Regardless of the acid-base account, materials which have a pH of less than 4.0 in a pulverized rock slurry in distilled water are defined as being acid-toxic.

The choice of the deficiency of 5 tons of calcium carbonate equivalent per 1000 tons of material as the division between toxic and non-toxic material obviously is arbitrary. However, when applied to the large number of samples studied during the past several years of minesoil research at West Virginia University, it corresponds to other supporting laboratory information about these samples as well as to extensive field experiences with minesoils developing in the different rock types. If rock or soil samples were defined to be toxic at much lower calcium carbonate equivalent deficiencies than 5 tons per 1000 tons, we would be declaring many of our natural soils to be toxic. On the other hand, with deficiencies much greater than 5 tons per 1000 tons, toxic concentrations of plant-available aluminum and pH values below 4.0 often develop rapidly.

Rock type is incorporated with the acid-base account because it is useful to categorize the materials which comprise coal overburdens. Knowledge of the rock types can provide an estimate of the texture and base status of a future minesoil as well as stability of rock fragments. For example, sandstones containing moderate amounts of pyrite and lacking sufficient neutralizers become active acid producers when exposed to the atmosphere.

Legend for Acid-Base Status Laboratory Work Sheet

Sample Number—laboratory sample number.

Depth—sample interval represented by sample recorded in depths from the surface.

Rock type—any soil or rock as defined by the following:

Minesoil—soil formed as a result of mining or mining related activities.

Native soil—soil that has not been highly disturbed by man.

Horizon 1—topmost soil layer which is usually darkened by organic matter and has the highest concentration of biological activity.

Horizon 2—lies between horizons 1 and 3 and is often referred to as the "subsoil".

Horizon 3—weathered rock or earthy material to consolidated bedrock or a depth of 1.5 m (5 ft.) whichever is shallower.

Earthy material (EM)—a broad term for any unconsolidated material between a depth of 1.5 m (5 ft.) and consolidated bedrock.

Drift—a broad term for glacial deposits.

Till—unsorted and unstratified drift deposited directly by glacial ice.

Outwash (OW)—stratified and sorted drift deposited from melt-water streams.

Sandstone (SS)—a sedimentary rock consisting of more than 50 percent sand-size particles.

Mudrock (MR)—a broad term for a sedimentary rock dominated by silt-size and/or clay-size particles, but which can contain up to 50% sand if properties are dominated by silt and/or clay. Term is used when a rock cannot be definitely distinguished as either a mudstone or shale.

Mudstone (MS)—a non-fissile mudrock having a moist hardness of less than 2.5 (based on Moh's scale).

Shale (SH)—a mudrock that appears predominatly fissile. Weathers to form chips.

Limestone (LS)—a sedimentary rock consisting dominantly of calcium carbonate which must have a moist hardness greater than 2.5 (based on Moh's scale) and a less than 60 mesh powder color value of at least 7. When pulverized to pass a 60 mesh screen, the powder will fizz freely in 1:3 (acid:water) hydrocholoric acid. Magnesium may substitute for some of the calcium forming dolomitic limestone.

Chert, Flint, Jasper—rocks consisting dominantly of amorphous silica or extremely small (cryptocrystalline) quartz and which have a hardness greater than 6.5 (based on Moh's scale).

Carbolith (Carb)—a coined name to cover dark colored sedimentary rocks that will make a black or very dark (Munsell color value of 3 or less) streak or powder. Rocks included under this name include coal not scheduled for mining, impure waste coal, bone coal, high-carbon shales, and high-carbon muds. In general, such rocks contain at least 25 percent carbonaceous matter oxidizable at 350 - 400° C.

Intercalate (I)—a term coined to describe rocks which contain at least two different rock types that are so intimately interlayered or "intercalated" that they cannot conviently be sampled separately. Intercalates have at least three or more layers within a 13 cm (5 in.) measured section. Usually the "I" is followed by two or three of the dominant rock types (e.g. I-SS/ms; I-SS/ms/carb).

Fizz-a visual numeric estimation showing the presence of carbonates in the less than 60 mesh sample after the addition of a few drops of 1:3 HCl.

0 = no reaction
1 = very slight reaction
2 = slight reaction
3 = moderate reaction
4 = strong reaction
5 = very strong reaction

Color—color of the air-dry less than 60 mesh sample based on the Munsell color system of Hue-value/chroma.

% S—percent sulfur in the sample as detected by a LECO induction furnace.

Max. from %S—maximum amount of acid that can be produced from % Sulfur present in sample expressed in terms of $CaCo_3$ equivalents in Tons/1000 Tons of material. Derived from multiplying %S by 31.25.

Amount present—amount of neutralizers present in sample expressed in $CaCO_3$ equivalents in Tons/1000 Tons of material as determined by the neutralization potential (NP). Negative numbers indicate the presence of free acid.

Maximum needed (pH7)*—amount of neutralizers required to neutralize the maximum acidity possible from %S in Tons/1000 Tons of material.

Excess*—excess neutralizers present in Tons/1000 Tons of material after acid has been neutralized.

H_2O slaking—a visual numeric estimation of the percentage of rock breakdown when the rock is placed in water. It ranges from 0 (0%) to 10 (100%) breakdown.

Paste pH—pH of sample from soil—distilled water paste.

*Both the maximum needed (ph 7) and excess neutralizers are derived from subtracting the maximum from %S from the amount present. If the resulting number is negative, it is listed under the maximum needed (pH 7) column; if positive, it is listed under the excess column.

Typical Acid-Base Analysis Reporting Form

Lab Date __________ Site __________ No. of Samples __________

SAMPLE NUMBER	DEPTH (FEET)	ROCK TYPE	FIZZ	COLOR	%S	$CaCO_3$ EQUIVALENT TONS/1000 TONS OF MATERIAL: MAX. FROM %S	AMT. PRESENT	MAX. NEEDED (pH 7)	EXCESS	PASTE pH

Legend for Nutrient Status Laboratory Work Sheet

Sample number—laboratory sample number.

1:1 pH-pH from 1:1 (Sample: water) ration

L.R.—lime requirement in Tons/acre to acquire a pH of 6.5.

K*—amount of acid extractable potassium in sample in lbs./1000 Tons of material.

0 - 60 Low
61 - 120 Medium
121 - 240 High
241 - Very High

Ca*—amount of acid extractable calcium in sample in lbs./1000 Tons of material.

0 - 1000 Low
1001 - 2500 Medium
2501 - 4000 High
4001 - Very High

Mg*—amount of acid extractable magnesium in sample in lbs./1000 Tons of material.

0 - 100 Low
101 - 250 Medium
251 - 500 High
501 - Very High

Bicarb. extr. Phos.**—amount of bicarbonate extractable phosphorous in sample in parts per 2 million (pp2m). Note: pp2m. = lbs./1000 Tons of material.

0 - 10 Low
10 - 20 Medium
20 - High

*Ratings for the given numerical values are those currently being used by West Virginia University Soil Testing Laboratory.

**Ratings for the given numerical values are from Jackson, M.L. 1958. Soil chemical analysis. Prentice-Hall, Inc., Englewood Cliffs, N.J.

Typical Nutrient Status Report Form

Lab Date ____________ Site ____________________________ No. of Samples ________

		Ton/Acre	Lbs/1000 Tons of Material			PP2M
Sample Number	1:1 pH	L.R.	K	Ca	Mg	Bicarb. Extr Phos.

Interpreting Soil Tests for Mine Soil Revegetation

A color chroma reading is sometimes included because there is a general relationship between chroma and pyritic sulphur. Higher chromas (higher than 2) commonly are associated with lower total and pyritic sulphur and less potential acidity. Note: These relationships do not apply to overburden materials dominated by basic carbonates.

Lime and fertilizer expressed as tons or pounds per acre means the same as tons or pounds per 1000 tons of soil or rock material.

One ton of pulverized limestone is equivalent to 800 pounds of calcium per acre.

When magnesium is lower than 50 pounds per acre plants are likely to suffer from deficienices unless magnesium fertilizer is applied or limestone containing magnesium is used. At least 100 pounds of magnesium is desirable.

Limestone needed refers to immediate acidity, unless an allowance is made for acidity that may form from oxidation of pyrite.

Fifty pounds of nitrogen is recommended, generally, to help assure prompt early growth and ground cover by grasses or other non-legumes. This means that 100 pounds per acre of 33-0-0 should usually be applied to new seedings on minesoils in addition to standard soiltest recommendations, especially where erosion is serious.

Phosphorus (P) recommended is sufficient to raise the available level to 50 pounds per acre. However, maximum growth rates may require as much as 100 pounds per acre (220 pounds of P_2O_5). Conversion, P to P_2O_5 is 2.29 × P; P_2O_5 to P, the conversion is 0.436.

Potassium (K) recommended is sufficient to raise the available level to at least 100 pounds per acre. Maximum growth rates may require 150 pounds per acre (180 pounds of K_2O). Conversion K to K_2O is 1.2 and from K_2O to K is 0.83.

Procedure for Logging and Sampling Overburden Cores for Chemical Analysis

A. General

1. There are 3 basic means of obtaining overburden data from rock strata; core sampling, highwall grab samples, and rock chip (air drill) samples.

   a. When using cores for overburden analysis, the cores should be wrapped in plastic or protected from the weather and stored in a dry place, preferrably in wooden or cardboard boxes.

   b. When highwall samples are collected from each stratum, fresh highwall exposure renders the most accurate results. Full pint containers of each sample are of adequate size for preparation and representation.

   c. When obtaining samples from an air drill hole, place a shovel adjacent to the hole while the drill is in operation and with the aid of the drill operator, estimate 1 foot intervals and transfer sample to pint containers. The samples can be comingled in the preparation room if they are of the same strata.

B. In the Field

1. All pertinent information about the core is recorded.

   a. Location

   b. Total length of core

   c. Coal seams involved

   d. Depth from land surface to top of core

   e. Elevation of land surface

   f. Any physical irregularity (e.g. encounter of extremely hard stratum between 57 - 64')

2. Sampling and logging starts from top of core. Note: see Typical Core Breakdown for Chemical Analysis

3. The core is divided into the six rock types; sandstone shale, mudrock, limestone, intercalate, carbolith, and chert. The rock type and its thickness are recorded along with color (red, green, etc.), fossils (plant or animal), slickensides (prominent or present), nodules, and any other descriptive information which can be observed.

Typical Core Breakdown for Chemical Analysis

SAMPLE NUMBER	SAMPLE INTERVAL	DESCRIPTION
1	0-3'	Tan fine grained sandstone, with pinkish tint, very hard
2	3'-6'4"	same as above
3	6'4"-10'	Gray, medium grained sandstone with visible biotite and quartz crystals; few carbolith streaks
4	10'-14'	same as above
5	14'-18'	same as above
6	18'-23'	Light gray, medium grained sandstone with few carbolith streaks; section contains oxidized fracture planes
7	23'-27'	same as above
8	27'-31'	same as above
9	31'-35'5"	same as above
10	35'5"-40'	Light tan fine grained sandstone with (weathered) brown fragments and clay nodules, few carbolith streaks
11	40'-45'9"	Gray medium grained sandstone with carbolith streaks
12	45'9"-49'10"	same as above
13	49'10"-51'	Dark gray shaley sandstone with carbolith fragments
14	51'-55'	Gray medium grained sandstone with carbolith streaks
15	55'-59'6"	Medium gray sandstone with many carbolith streaks
16	59'6"-61'6"	Dark gray shale with visible bedding planes
17	61'6"-65'	same as above
18	65'-69'	same as above
19	69'-73'	same as above
20	73'-77'	same as above
21	77'-81'	same as above
22	81'-85'	same as above
23	85'-88'5"	same as above
24	88'5"-92'6"	Firm medium gray sandy shale
25	92'6"-94'	Dark gray shale with sandy sediment streaks
26	94'-97'	coal (Gilbert seam)
27	97'-102'5"	Gray shale with sandy sediment streaks
28	102'5"-107'	Gray sandy shale

C. In the Preparation Room

1. Using the drillers log, the core can easily be subdivided for grinding and chemical evaluation.

2. Each individual stratum is pulverized (60 mesh) separately, using the following guidelines.

   a. If a rock member is less than 1 foot, it is logged but not sampled unless it is a layer of special interest, e.g. containing visible pyrite, limestone, coal, etc.

   b. If the rock member is of considerable thickness, e.g. 30 feet, the number of samples taken from this section depends on rock type. Sandstones, intercalates, and chert are normally sampled every 5 feet; while shale, mudrock, limestone, or carbolith would be sampled every 3 feet. Therefore, 6 and 10 samples, respectively, would be taken in that particular stratum.

   c. If a rock stratum is not of even incremental thickness, e.g. 8 feet of sandstone, the stratum should be sampled from 0-4' and 4-8'.

   d. When an obvious change in properties, such as penetration of the weathered zone below the land surface, occurs at a point within a rock type, the two zones are recorded and sampled as different rock members.

3. After proper subdivision, each entire sample unit is pulverized to pass a 10 mesh (2.0 mm) sieve.

4. The sample is then riffled to obtain a representative sample of approximately 500 gms., and then dried at 50-60°C overnight.

5. Following air drying, the sample is pulverized to pass a 60 mesh (0.25

mm) sieve, riffled to approximately 100 gms., and retained in 4 oz. sample bottles.

6. The remaining sample is retained in appropriate labled containers and stored in a dry and convenient area for future referral.

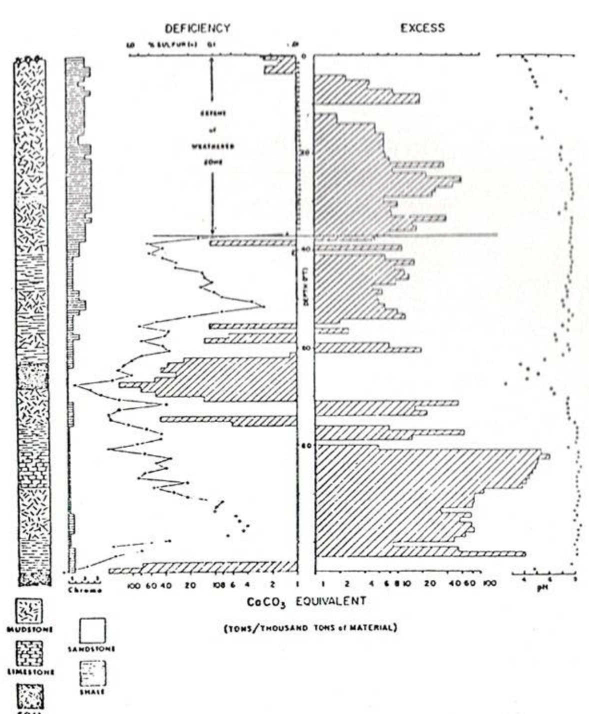
D. In the Laboratory

After the samples are pulverized they are ready for chemical evaluation. All samples should be analyzed for pH, fizz, total sulfur, and neutralization potential. Additional parameters may be required for those samples which are to be placed on the surface after regrading such as calcium, magnesium, potassium, phosphorous, and lime requirements. Other physical properties which in some cases should be looked at are water holding capacity and mechanical size distribution.

For the most part, percent sulfur (%S), and neutralization potential (NP) are the parameters which are the governing factors when looking for potentially toxic overburden.

Laboratory procedures for the parameters can be found in EPA Bulletin EPA-600/2-78-054, "Field and Laboratory Methods Applicable to Overburden and Mine Soils" pages 45-99.

Typical Overburden Section
Pittsburgh and Redstone Sequence



Appendix B
Condensed Guide to Field Clues

Tools:

Dropper bottle containing 10% HCl (1cc of conc. HCl in 3 cc of water).

Munsell Soil Color Charts; one page of Hue 10 YR is usually adequate.

10X hand lens.

Pocket knife, or other tool to scrape powder from rock surface.

Hammer, to break rock fragment exposing fresh face for observation.

Porcelain Streak plate.

Observations and Interpretations:

(A) Sample fizzes when dilute hydrochloric acid is applied—material probably contains over 2% calcium carbonate; a positive test usually indicates favorable material.

(B) Pyrite crystals observable by the unaided eye, or under 10 X lens — likely to be potentially toxic, especially if carbonates are absent.

(C) Powder color Value of 3 or less — high carbon content; indicates probable high pyrite content even if not readily visible; likely to be potentially toxic if carbonates are absent.

(D) Power color Value of 4 or higher — not a true "black shale"; probably not potentially toxic unless pyrite is visible and powder does not react with acid indicating the presence of carbonates.

(E) Rock or powder color Chroma of 2 or less — as applied to rocks deeply buried in an undisturbed section, indicates iron is not oxidized (unweathered rock); pyrite may be present; presence of significant amounts of carbonates may override the influence of pyrite as a potential acid former.

(F) Rock or powder color Chroma of 3 or higher — indicates significant iron oxide staining, indicative of probable absence of pryite because of prior oxidation and weathering over geological time. Material may contain neutralizers, but most probably will require lime and fertilizer to restore nutrient content if used as minesoil surface material.

(G) If steel knife scratches a rock fragment, the rock hardness is 5 or less. If the knife will not scratch the rock, then the hardness is greater than 5.

(H) If a fingernail will scratch a rock, record the rock hardness as less than 2.5. As a general rule the harder a rock (the higher the number) the more resistant it will be to physical weathering.

Notes:

(1) Only laboratory analyses will confirm the composition of materials.

(2) The most meaningful field observations are made on the freshly exposed surface of a broken rock fragment or a fresh highwall exposure, rather than a hand sample casually picked up which may have extraneous surface contamination or changes from exposure to weathering forces.

(3) Care must be taken to insure that the rock mass is being cut and not that sand grains are being pried loose when a hardness "standard" (fingernail or steel knife) is scratched against the rock fragment. This is especially true with sandstone.

References:
(1) Grube, W. E., Jr. and R. M. Smith. 1974. Field Clues Useful for Characterization of Coal Overburden. Green Lands Quarterly. 4(1):24-25.
(2) Sobek, A. A., W. A. Schuller, J. R. Freeman and R. M. Smith. 1978. Field and Laboratory Methods Applicable to Overburdens and Minesoils. Environmental Protection Technology Series. EPA-600/2-78-054. U.S. Environmental Protection Agency. Cincinnati, Ohio.

Laboratory Measurements

The following tests have proven useful for minesoils and overburdens in West Virginia.

A. Routine
1. Color value and chroma.
2. Paste pH.
3. Fizz test for carbonate neutralizers.
4. Neutralization Potential.
5. Total sulfur percentage and conversion to acid.
6.*Immediate lime requirement.
7.*Available plant nutrients by Double Acid Extraction.
8.*Available Phosphorus by Alkaline Extraction.

*If topsoil substitution is anticipated.

B Selective
1. Properties of Hardness and Cementation
2. Water slaking or breakdown (mild simulated weathering)
3. Physical Weathering Potential (vigorous simulated weathering)
4. Electrical Conductivity (mainly in western coal basins)
5. Porosity and Density of Rocks or Soils
6. Weathering Yard Breakdown
7. Moisture Retention
8. Texture
9. Sulfur Fractionation

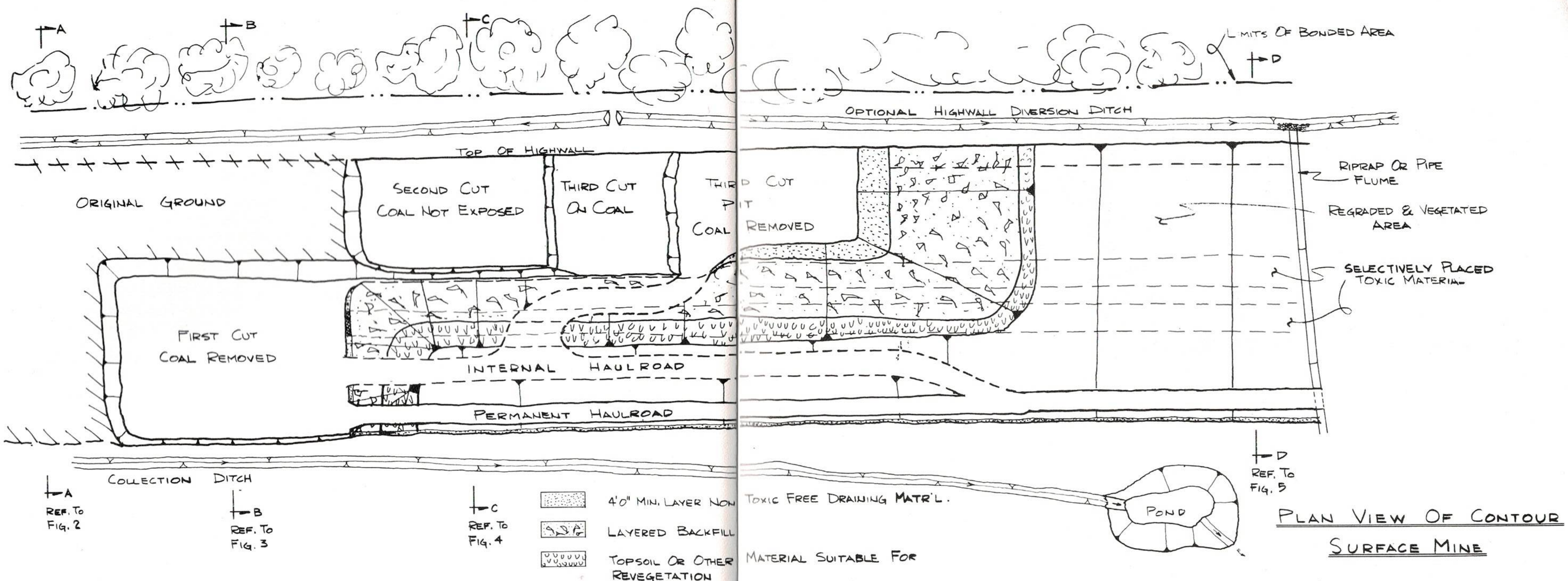
References:
Sobek, A. A., W. A. Schuller, J. R. Freeman and R. M. Smith. 1978. Field and Laboratory Methods Applicable to Overburdens and Minesoils. Environmental Protection Technology Series. EPA-600/2-78-054. U.S. Environmental Protection Agency. Cincinnati, Ohio.

Appendix C
Immediate Lime Requirement

Total sulfur analysis includes sulfide (pyritic), organic and sulfate sulfur. Sulfur in the pyritic form is responsible for the *toxic* acid production from coal overburden materials. High chroma (brown) material *may* contain appreciable amounts of sulfates, and low color value (black *when powdered*) materials *almost always* contain organic sulfur. Therefore, total sulfur analyses will generally over-estimate the total potential acidity of the overburden materials.

Total pyrite weathering may occur over a long time period, and if the potentially toxic material is quickly covered to decrease the air and water supply, the pyrite may never completely oxidize or weather to produce acid. Also, complete neutralization (pH 7.0) is not needed for most purposes. A pH of 5.5 is satisfactory for many land uses and it will insure non-toxic water. Therefore, it is realistic to attempt to neutralize only a fraction of the calculated total potential acidity by lime applications.

Immediate lime requirement is considered to be the titratable acidity or the nega-



tive neutralization potential (amount present column on the laboratory sheet). A reasonable safety factor for immediate lime requirement is 2 times the negative NP.

Somé samples have a positive but low NP, and they also have high total sulfur values. In this situation, the maximum potential acidity from pyritic sulfur should be used to determine lime requirement. A realistic lime requirement figure is probably a third of the maximum potential acidity from total sulfur.

If the overburden has strata with excess bases, no lime will normally be needed if this material is well mixed with the deficient material. The tons of excess $CaCO_3$ equivalent in the total overburden section and the calculated lime requirement should be mathematically compared to determine if admixing of lime is actually needed. Particle size plays an important role at this point. As the particle size of the basic material gets finer, more reactive surfaces are exposed and quicker neutralization of acid takes place. Concurrently, the potentially toxic material should have as large a particle size as possible to reduce acid production.

Appendix D
Effluent Monitoring Parameters Used For Mine Drainage

pH: pH is the logarithm of the reciprocal of the hydrogen ion concentration. pH expresses the intensity of the acid or alkaline reaction of a solution in terms of the hydrogen ion concentration, but it is not a measure of the total concentration of acid or alkalinity present. The practical pH scale extends from 0, very acidic, to 14, very alkaline, with the middle value (pH 7) corresponding to exact neutrality at 25°C. Presence of strong acids such as sulfuric or hydrochloric markedly reduce the pH value while an equal amount of weak acid, such as carbonic acid, only slightly lowers the pH value. Similarly, alkali increases the pH value to above 7.0 and the degree of change depends on the intensity and the amount of alkali present. pH value below 7.0 indicates acidity; pH value of 7.0 indicates neutrality; pH value of more than 7.0 indicates alkalinity.

State pollution control regulations require all discharges to have a pH of between 6.0 and 8.5, while the Federal Office of Surface Mining requires the pH to be between 6.0 and 9.0.

TOTAL SUSPENDED SOLIDS: Total Suspended Solids is defined as the sediment that is in suspension in water but that will physically settle out under quiescent conditions.

This is determined by filtering a sample through a standard glass fibre filter. The results are expressed in parts per million. The results do not signify the type of pollutants in the water.

Suspended solids eventually settle at the stream beds and reduce the hydraulic capacity of the streams and increase flooding potential. Muddy water affects fish by interfering with their breathing, feeding and reproduction.

OSM regulations for effluent limitations specify maximum allowable total suspended solids concentrations of 70 parts per million and average daily values for 30 consecutive discharge days to be 35 parts per million.

IRON: Iron is a metallic element which is found in abundance in the earth's crust.

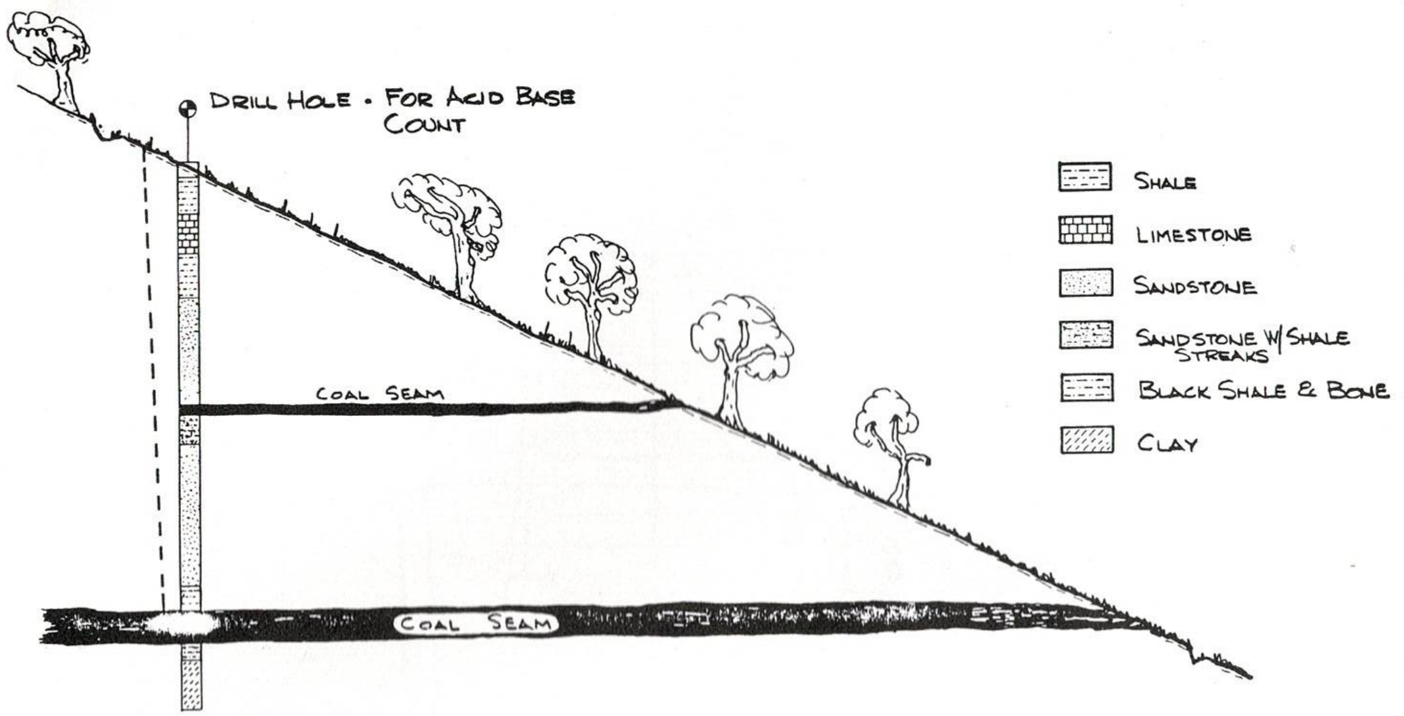
Iron's importance is derived from the stains of "yellow boy" imparted to the stream beds. Soluble iron in the water supply also imparts stains to laundry and porcelain and has a bittersweet taste. Excessive iron concentrations are also considered lethal to fish.

Total iron concentrations are generally determined by either atomic absorption spectrophotometer or colorimetric equipment.

OSM regulations for effluent limitations specify maximum allowable total iron concentrations of 7.0 parts per million and average daily values for 30 consecutive discharge days to be 3.5 parts per million.

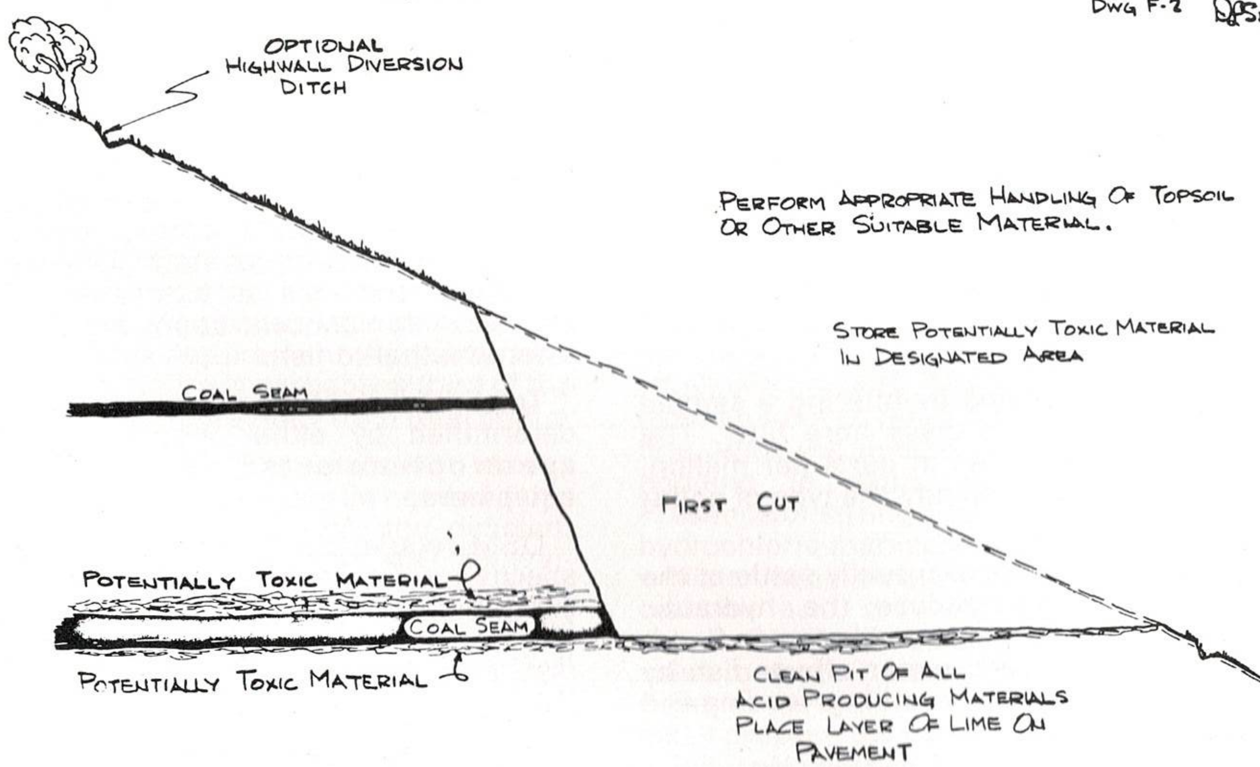
MANGANESE: Manganese is a metallic element which, with few exceptions, exists is the divalent manganous state.

Manganese imparts stains to laundry and porcelain. Excessive manganese concentrations are considered detrimental to aquatic life.

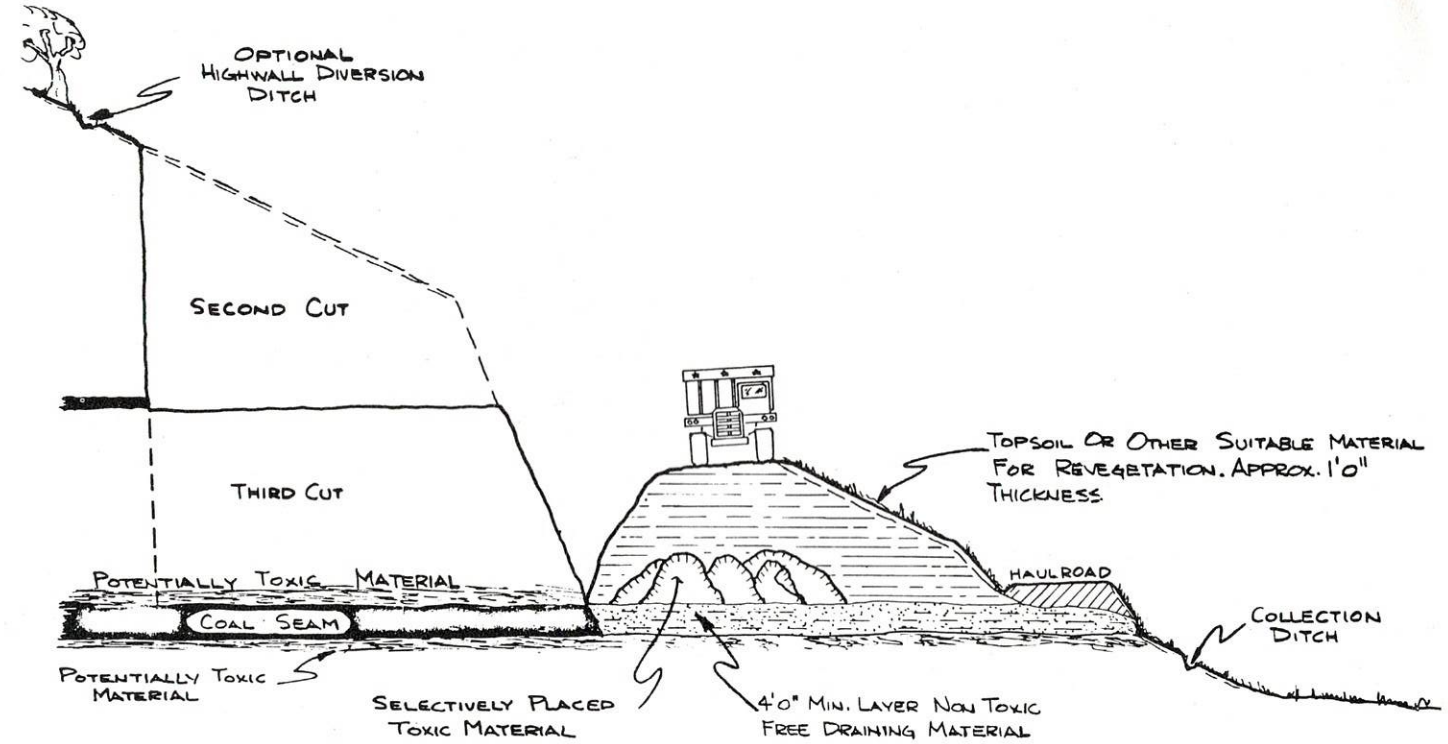


Original Ground
Section A-A
Drainage System Is To Be Installed Before Mining Operations Begin
Figure 2

Dwg F-2 DRSmith

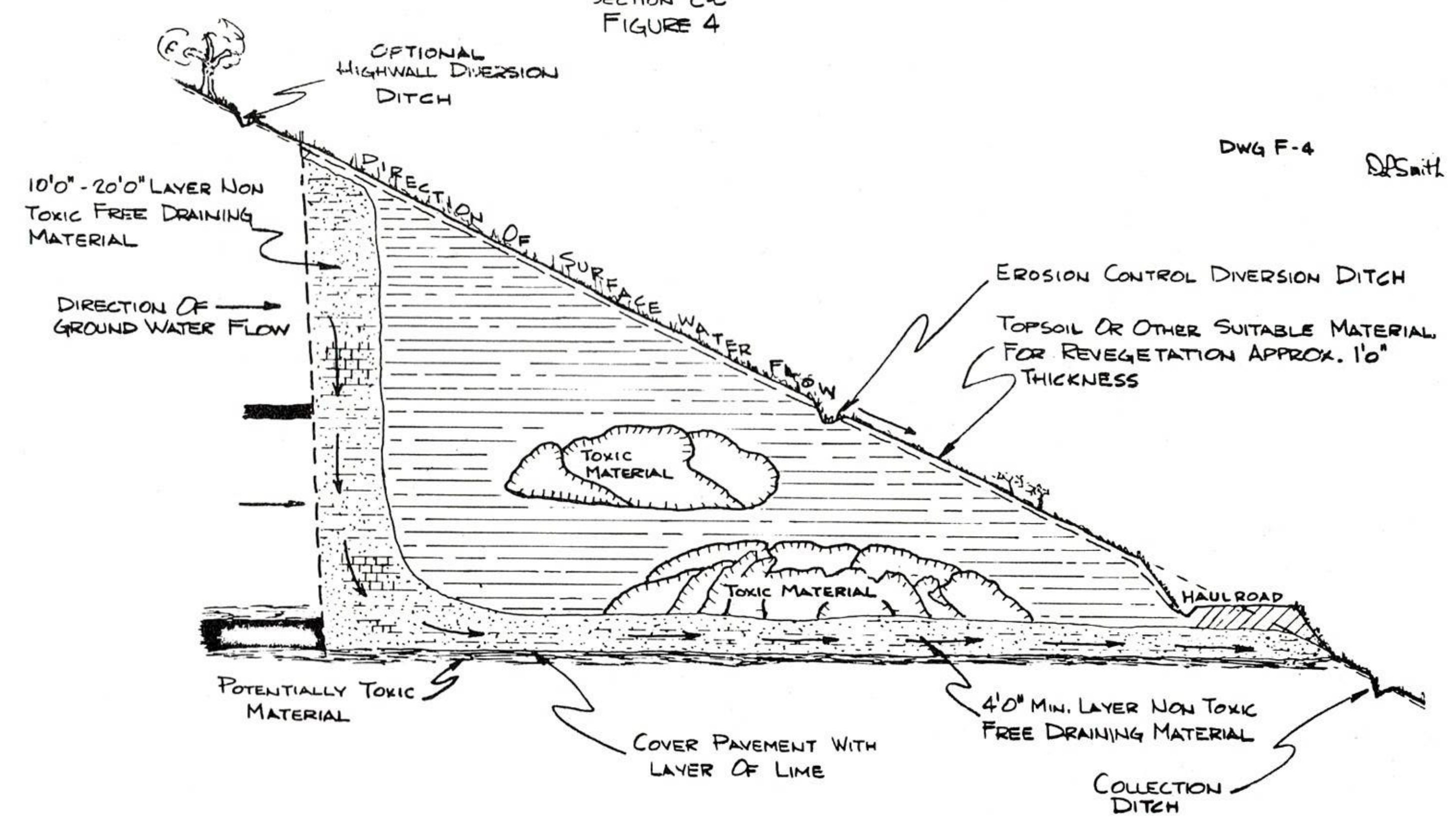


First Cut
Section B-B
Figure 3



Second Cut
Section C-C
Figure 4

Dwg F-4 DRSmith



Backfill & Regrading Plan
Section D-D
Figure 5

Dwg F-5 DRSmith

Total manganese concentrations are determined by atomic absorption spectrophotometer or colorimetric equipment. Manganese concentrations are expressed in parts per million.

OSM regulations for effluent limitations specify maximum allowable total manganese concentrations of 4.0 parts per million and average daily values for 30 consecutive discharge days to be 2.0 parts per million.

ACIDITY: Acidity is defined as the capacity of water to donate protons. It is also known as the quantative capacity to neutralize a strong base to a designated pH.

Acidity is significant because it affects aquatic life; contribution to corrosion is also a factor.

Total acidity is determined by titrating water samples with an alkaline solution of known concentration. It is expressed in parts per million.

OSM regulations have no standards for acidity. Federal NPDES permits normally require acidity monitoring.

ALKALINITY: Alkalinity is the capacity of water to accept protons. It is also known as the quantitative capacity to neutralize a strong acid to a designated pH.

Alkalinity is usually imparted by the bicarbonate, carbonate and hydroxide ions. Stream water quality standards require that alkalinity be higher than acidity at all times. Alkalinity provides a buffer against acid discharges.

Alkalinity is determined by titrating a water sample with an acid solution of known concentration. It is expressed as parts per million.

OSM regulations have no standards for alkalinity. Federal NPDES permits normally require alkalinity monitoring, and specify that total alkalinity must exceed total acidity in water discharged.

NOTES

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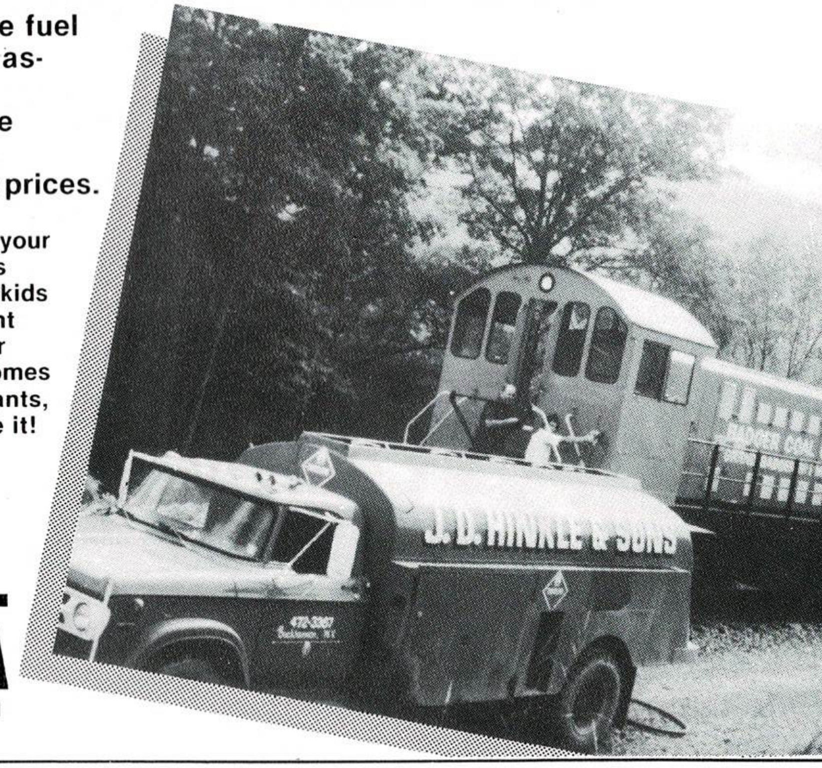

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Testimony

Presented by Benjamin C. Greene, President West Virginia Surface Mining & Reclamation Association to the Senate Subcommittee on Energy Resources & Materials Production Oversight Hearings.

This Act, as with any legislation, was intended to be remedial in nature. Not punitive. To date, its interpretation and implementation have not reflected such an intended principle.

"Wet sidewalks do not cause rain"! Yet anyone involved in the mining of coal or the state regulation of coal mining has been treated with continuing suspicion.

Operatively, the federal Act **has** been punitive!

This broad statement is offered to this forum because the problems originate with the Act, the document which was drafted and approved by Congress. Although not insurmountable, the problems are critical if the program is to ever be viable and effective.

Today, after 20 months with PL 95-87, I offer the following observations on behalf of the West Virginia industry.

One of the most significant problems with the Act is contrary to what one would expect. It is the excessive flexibility of the law. It is the misuse of this flexibility by the administering agency, OSM. It is the absence of flexibility for the industry.

Each time a regulation or policy is questioned, OSM responds that they clearly know what the intention of Congress was in drafting the law. The trouble is that it is not clear. I point out these problems because there is no one more qualified to verify the intent of Congress, than Congress itself.

With the adversarial relationship established by OSM relative to the industry, such statutory flexibility has led to unrealistic regulations, impractical enforcement, counterproductive policy, excessive penalties, and either duplication of or sheer disregard for state enforcement actions.

I will give you an example that happened last week in West Virginia. An OSM inspector, with two other inspectors, spent two full days on an operation in the southern part of our state. There was little activity, other than work being done on the non-coal aspects of the job. Following the evaluation, the inspector complimented the chief engineer on the quality of the haulroad leading to the operation. Simultaneously, he began writing notices of violation. The engineer then questioned the inspector as to what he was doing since he had just admitted the haulageway was one of the best he had ever seen. The inspector replied, "Well you know there is no such thing as a perfect job, I have to find something wrong." He then proceeded to note violations for having moved a sign from one area to another so as to prohibit it from being vandalized. This was used although the sign was still located within 1,000 feet of the county road and prior to entering the operation. He also noted a violation for not having "mobile" blasting signs which can be moved from one specific blasting site to another. There is absolutely no requirement for such signs. Yet a violation was written and, in all probability, an assessment will be forthcoming and the entire argument will encompass several months with attorneys, judges, and considerable expense being involved.

This points out the general attitude which is prevalent in the eastern part of our country, particularly in West Virginia. Such a negative approach, with such one-way flexibility, undermines the actual intention of a regulatory program. It will eventually degrade the entire performance of all the participants. Any progress previously made by the states has been set back several years.

Combine this adversarial attitude with the unlimited flexibility of the Act, and you have a situation which demands your immediate attention.

Another major problem with the act is the complex practice of cross-referencing sections.

Such a maze has brought about standards or requirements which are impossible, at worst, and impractical, at best. They create unnecessary burdens which are unrelated to environmental protection. A profound example is found in Sections 522 and 510. Such confusion could stymie the entire permit application process for no other purpose than harassement. There are numerous examples of such indirect involvement throughout the Act. They must be clarified.

Drainage control is perhaps the most critical and controversial item presently confronting the eastern U.S. coal industry. We agree that drainage must be controlled. We do not, however, agree with the numerical standards which have been established by OSM regulation.

Land disturbance, for whatever purpose, exposes soil to precipitation resulting in some erosion and sedimentation. Control it—yes. Totally eliminate it—no. It is impossible. Yet that is what OSM is attempting to do.

The Act prohibits ". . . additional contributions of suspended solids to streamflow. . .". That is realistic. Such a standard will not permit the degradation of a stream's quality. It recognizes the volumes of research concerning sediment loads in stream basins. It recognizes nature's limitations.

In setting such unrealistic standards, OSM and EPA have assumed that every receiving stream in the nation has a quality of less than 70 ppm suspended solids. That is totally inaccurate. Water from many household taps will not comply with the "average daily limitation" set forth in the regulations.

Even though the Act recognizes natural stream quality, it includes another statement which OSM usually uses to justify the numbers. That is ". . . In no event shall contributions be in excess of requirements set by applicable state and federal law. . .". Any question of the numerical limitations is rebutted by the fact that EPA has (with other qualifications) already set such numbers in their **regulations.** That is a weak unsupported and oversimplified reason. Just because another agency has done it does not make it realistic, or for that matter, right.

Chemical treatment is often mentioned as an alternative. That also is, at best, an inexact and unknown practice. It was observed in one state, on one operation, in the western most part of the country by a congressional committee. Since that observation, it has become a "household" recommendation by OSM as an answer to mining's drainage problems. One example is certainly not a representative sample.

You must give your immediate attention to this most critical issue. Achievement of such standards is not practical with current technology!

Section 515(c) of the Act illustrates another example of mis or over-interpretation by OSM. This section gives the states the option whether to establish a complicated procedure for approving alternative land use plans. It is mandatory for a federal program. This statutory option is not being provided to the states. OSM is mandating each state, if they are to obtain approval of their state program, to include a complex system of requirements for any operation which desires an alternative land use.

To discourage the alternative development of reclaimed land is counterproductive to the future vitality of our region. Level, usable land is a rare commodity necessary for diversified growth. Unrealistic requirements, such as those set by OSM, may be necessary for states or regions that have never experienced such development. For us, and our neighboring sister states, it is a benefit of the mining process. We have learned to capitalize on it in the continued interest of the entire population. Simple compliance by OSM with the evident language of the Act would suffice to provide language of the states. It must be removed as a criteria for state programs.

The statutory mandate of Section 506(a) is unrealistic as one reviews the activities of the previous 20 months. The fallacy of the eight-month period is particularly evident when speaking of "retrofitting" an existing permit. The interim program was supposed to be a logical first step toward the more thorough permanent program. However, they are being handled as separate and distinct items. Experience has shown that states, operating under the guise of federal direction, have been hampered by confusion and constantly changing policy. When the regulatory agency is hampered, the industry suffers. The pre-application requirements of an approved state program will extend the already lengthy permitting process. To duplicate the paperwork which has already been done, under the interim program, has no relationship to the continued protection of the environment. Yet, this **section of the Act says that it must be done if existing operations are to continue.** With over 500 existing surface mines, 1,200 deep mines, and an undetermined number of mining facilities, the retroactive effect of this section will be devastating.

Another very critical area of the Act that needs attention is Section 515(b)(20). The requirement that bond release not be considered for at least five full years after the last year of augmented seeding is extremely punitive. It has been even further extended by the regulations. Such longevity is not supported by research, expertise, or experience.

Although the length of such a period can be argued, the major point is that this requirement has brought about a complete prohibition of bond writing by surety companies serving the eastern coalfields. It goes without saying what a severe impact this has had on the future and continuing development of our industry. Without bonds, there are no permits!! If final standards are continually changed and retroactively applied to existing operations, there will never be any methodical development.

You must take a close look at this requirement as well as the regulations. They must be amended to reflect actual experience, needs, and original standards.

In addition to the areas already mentioned for which there was little, if any, technical justification, there are two other areas of the Act which are totally contradictory to best accepted practices and proven experiences.

The requirement that all underground mining operations be situated so as not to have a gravity discharge of water disregards all mining industry experiences over the past years. To require miners to constantly work in water threatens their health, safety, and overall performance. For years the mining industry has concentrated on removing water from the underground working area. Now, PL 95-87 mandates that all water will be drained to the working face. I am sure you would find MSHA's opinion of this matter interesting.

The other is the requirement that a barrier of coal be left in place on surface operations. Very little is known of the stability of such "in-place" coal. Such a barrier will likely bring about long-term water pollution, unpredictable water saturation patterns, and a relatively unstable buttress for keying in steep, backfilled slopes. If it were not intended for all parts of the country, the Act should state that. A number of violations have been written because of the requirement.

Another statutory shortcoming is found in the civil penalty section of the Act, Section 518(c). Before a person can formally question an assessment, they must submit the total amount of the proposed penalty with the request. Such a practice is not found in any other federal penalty program, it is inconsistent with the principles of American justice and it certainly places a tremendous burden on the cash flow of a company. To place cash, and many times it has been a large sum of money, in escrow, for as much as 60 days based on the secret report of a new inspector is a matter that deserves your immediate investigation. There are very few instances in which you must pay the fine before you have the hearing!

Although I have alluded to the problems of dual inspection in my comments, I wish to call your specific attention to my written presentation. It better details the problems.

The dual inspection problem has become so significant because of the federal agency's blatant disregard for established state programs. We question the self-designated supremacy of OSM, particularly when compared to the vast knowledge and experience of the states and the industry.

We may have problems with some of the standards, but we will do our best to accomplish reasonable ends if there would just be some agreement between the regulators as to what means must be used to get there!

In their oversight and support posture, OSM should be acting as the cautious consultant, rather than running rampant over the states and the industry. They should only appear when requested by a state!

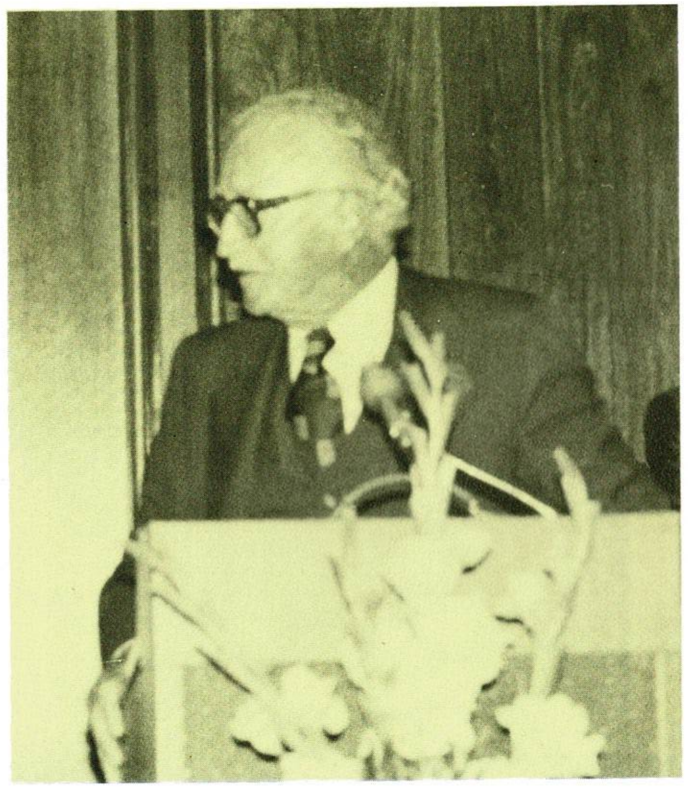
The past year's comments have usually indicated the Act was acceptable to the industry and all the problems rested with the regulations and OSM's enforcement. But, the law is not without problems. It has major problems that must be corrected.

If we are to have a balanced program of energy production and environmental control in this country, it is imperative that sections of this Act be amended. It is your responsibility, as the authors, to initiate changes to do away with the vagueness, duplication, and misinterpretation of intent. If Congress, or the administration, proposes to study the industry and the impact of 95-87, I say it is too late for that. "The cart is before the horse." Such an analysis should have taken place before the bill was approved. However, if such a study is undertaken, the industry should be relieved of any punitive action during that period.

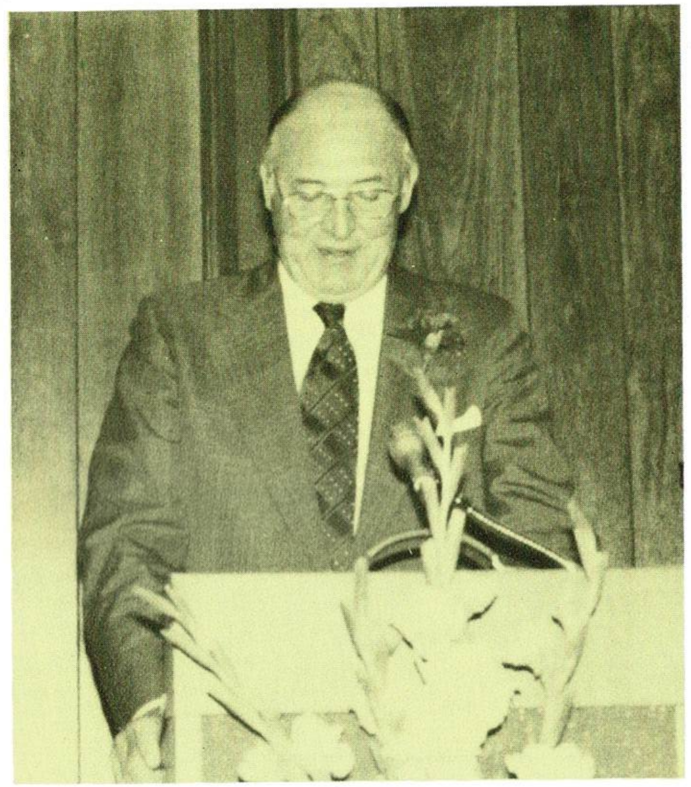
With that I urge your immediate review of the Act, and your action to effect the necessary changes.

Senator, thank you for the opportunity to appear before the committee today.

WVU Honors "Coal Men of The Year"



A. J. "Tony" Frederick



C. I. "Chap" Johnston

West Virginia University has honored three Association members as 1979 "Coal Men of the Year."

In a departure from past years, honorees were selected in the separate fields of deep mining, surface mining, and supply. Paul Morton of Cannelton Industries, Inc. was named "Deep Miner of the Year," A. J. "Tony" Frederick of Capitol Fuels, Inc. was designated "Surface Miner of the Year," and C. I. "Chap" Johnston of Bluefield Supply, Inc. was honored as "Supplier of the Year."

The three were guests of honor at a banquet May 31 at the Lakeview Inn and Country Club in Morgantown. Preceding the dinner, hard core golfers made their way around the 18 rain-soaked holes of Lakeview's championship course.

Plaques commemorating the "Coal Men of the Year" were presented respectively by Jim Thomas, chairman of the West Virginia Coal Association, John Faltis, chairman of the West Virginia Surface Mining and Reclamation Association, and Leo Vecellio, Sr., last year's "Coal Man of the Year."

Among the 250 guests present were past honorees C. E. "Jim" Compton, and James H. "Buck" Harless.

Paul Morton

Wet weather did little to dampen enthusiasm for the scheduled round of golf on Lakeview's championship course. Shown on the first tee are (l-r) Bill Gardener, Lawson Hamilton, Buck Harless, and Chap Johnston.

The Gold and Blue of West Virginia University was much in evidence throughout the day. Pictured here are (l-r) Burke Basham, Vic Baldini, Tony Frederick and Orville Thomas.

OSM'S WEST VIRGINIA CONTACTS

Following is contact information for the Office of Surface Mining's regional, district, and field personnel in West Virginia.

OFFICE OF THE REGIONAL DIRECTORS
(950 Kanawha Blvd., E., Charleston, WV, 25301)

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Patrick B. Boggs	(304) 342-8125	Deputy Regional Director
Jill Bowen	(304) 342-8125	Secretary

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District Manager: James Blankenship

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Office of Surface Mining
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Inspector-in-charge: Tom Sentz

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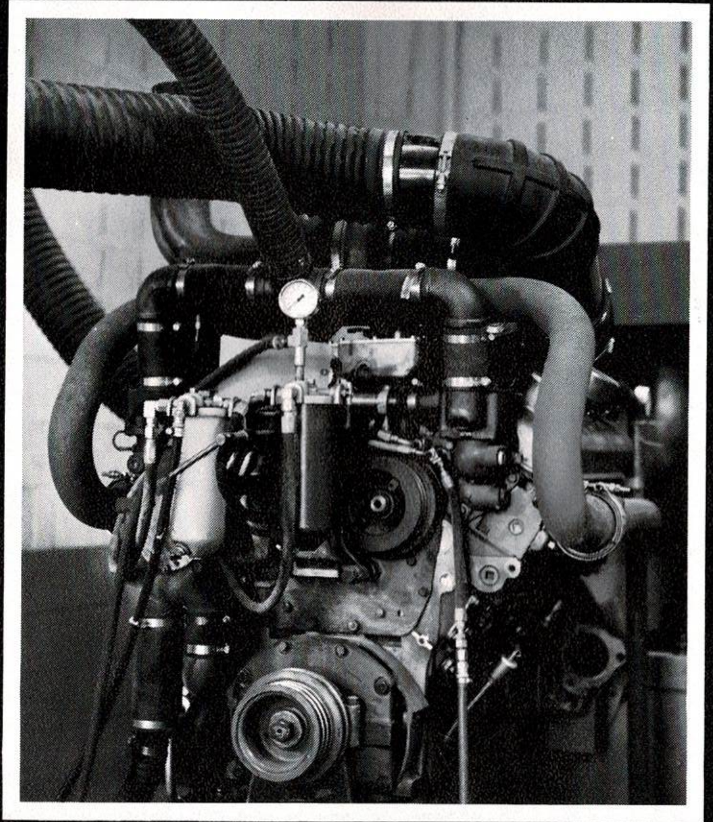
W. W. Whiz-bang



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ASSOCIATION NOTEBOOK

ANNUAL MEETING

An appearance by West Virginia Governor John D. Rockefeller will highlight the Association's Annual Meeting August 9-12 at the Greenbrier Hotel in White Sulphur Springs. Also on the agenda is a tax seminar, a panel discussion featuring members of the State Legislature, and the election of new members and officers of the Association Board of Directors.

LAKEVIEW MEETING

Members are reminded that the Fall meeting of the Board of Directors will take place October 5-6 at the Lakeview Inn and Country Club in Morgantown. This is the same weekend as the WVU-Kentucky football game.

LOUISVILLE COAL SHOW

Time is growing short for making reservations to attend or exhibit in Expo V, the Louisville Coal Show, scheduled for October 23-25 at the Kentucky Fair and Exposition Center. For information regarding available booth space, contact Fred Hufnagel, Exposition Manager, P. O. Box 17413, Dulles International Airport, Washington, D. C. 20041, Tel. (703) 471-5761.

GREEN PAGES

Green Pages, a membership services directory for the Association, is near completion and should be available in time for the Lakeview Meeting. The booklet will feature alphabetical listings of products and services available from associate members, as well as a directory of company names, addresses, and telephone numbers. Plans call for the publication to be updated semi-annually to accommodate changes and new members.