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Green Lands

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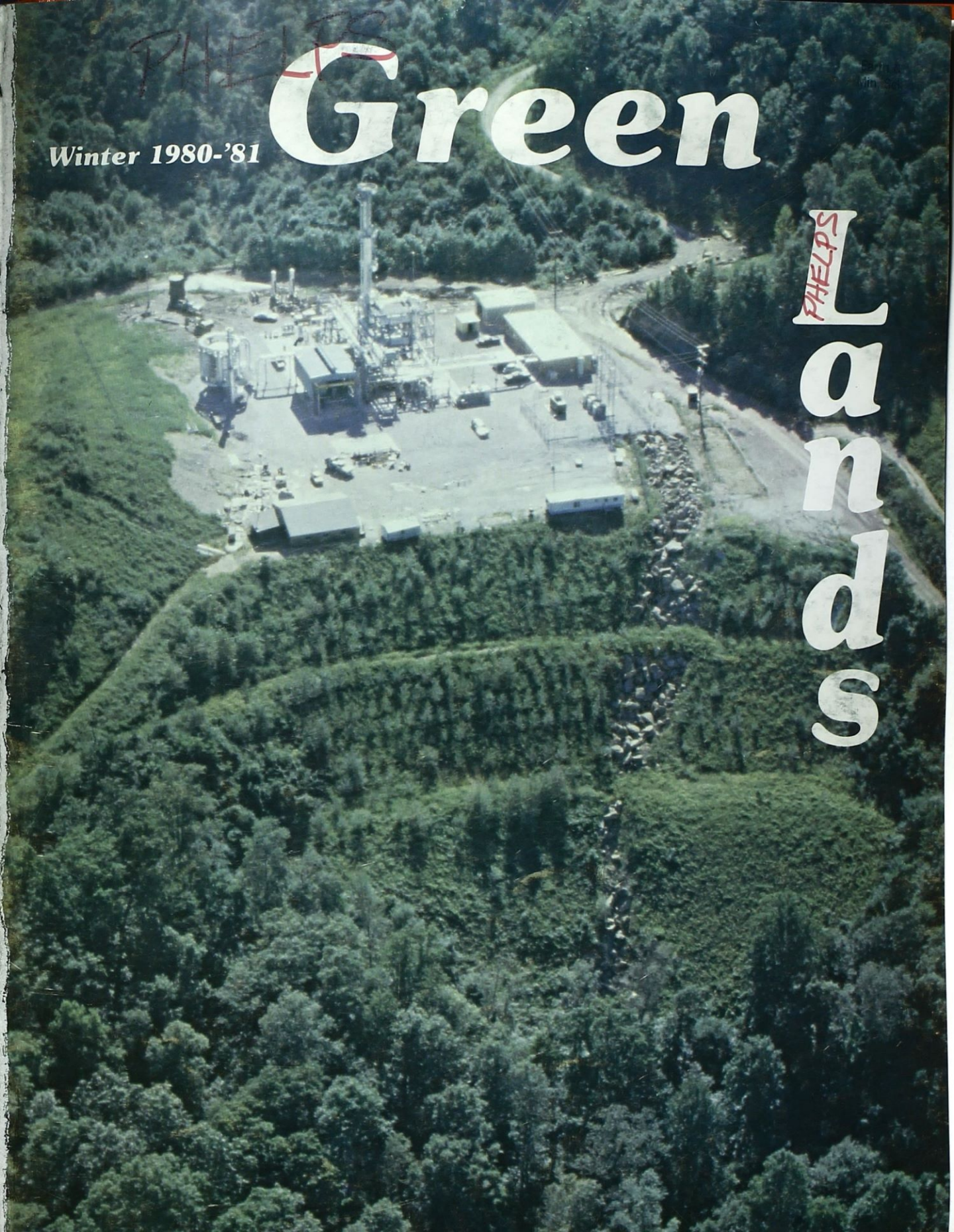
Winter 1980-'81



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Green Lands

Volume 10 number 4

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


ENERGY POLICY
ENERGY POLICY
PAT OLIPHANT

Good luck Mr. President

It was necessary to mix metaphors in the facing cartoon, because there just isn't any way to realistically predict the effect of a Reagan administration on the energy situation.

Clearly, the new President intends to "take the bull by the horns," in this and other areas. But we know from long and sad experience that he who wrestles with the administrative problems facing today's coal industry truly has a "tiger by the tail."

Certainly, Mr. Reagan has made all the right noises during his "president-elect" period, as he did during the campaign. He and his advisors have been particularly impressive in two areas which will be critical to coal in the years just ahead.

One was the appointment of James Watts as Secretary of the Interior, despite the initial outcry from environmental extremists. Second is the proposal from the Reagan camp for a one year moratorium on all new regulations. The immediate benefits of both of these developments should require no further expansion in this space.

In summary, by electing Ronald Reagan, we have voted ourselves a president who is philosophically inclined to do what is necessary to get the energy industries moving ahead. It only remains to be seen whether the bureaucratic tiger will allow him to translate his good intentions to meaningful policy.

We wish him well.

Back to the bottom

If there were two cartoons on these editorial pages, the other would have been borrowed from the **West Virginia Coal Bell,** the new sister publication to **Green Lands.**

The illustration is of West Virginia Governor Jay Rockefeller squatting near an open fire, frying pan in hand. Sprinting from the scene are four flapjacks (artistic license) which represent the coal industries of Ohio, Kentucky, Pennsylvania, and Virginia. There's a fifth flapjack, labeled West Virginia coal industry, which has been flipped by the Governor from the frying pan of the "interim program" to the fire of the "permanent program."

Now, if you haven't followed the implementation of the Surface Mining Control and Reclamation Act, then none of this will mean very much to you. But that doesn't pull our flapjack out of the fire, folks, and that's exactly where it is.

Courts in all the states mentioned above, plus several others, have enjoined state government from implementing the permanent regulatory program advanced by the federal government through its autocratic Office of Surface Mining.

Not so in West Virginia, however. Three years of cooperation between State and industry in trying to negotiate Washington into a reasonable regulatory stance came to an end at injunction time. That's when industry officials suddenly faced the combined forces of state and federal bureaucracies. The judge said he couldn't see any reason to disagree with the Governor, and that was that.

The result of all these maneuvers is that West Virginia will have the permanent program this year, and other eastern coal states will not. And that's the short story of how West Virginia maintains its traditional spot at the bottom of the economic pile.

EDITORIALS

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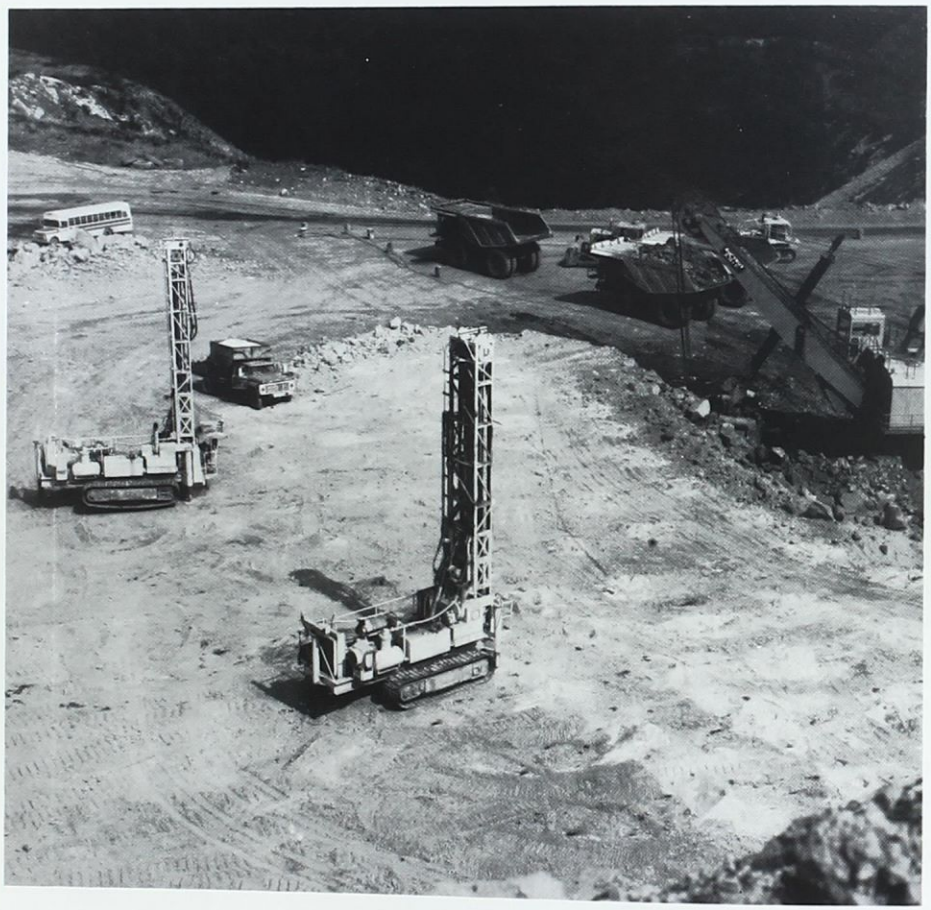

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For better or worse - -

On January 5, in the Region I headquarters city of Charleston, West Virginia, the Office of Surface Mining conducted its obligatory public hearing on the fitness of the proposed regulatory program of the Department of Natural Resources of the State of West Virginia.

With that, the bureaucratic version of federal due process limped toward an anticlimatic conclusion.

As it turns out, the process of enacting and implementing the Surface Mining Control and Reclamation Act pretty well spans the administration of President Jimmy Carter, at least in West Virginia. It was the 95th Congress that debated and passed the third and toughest version of the federal Act. Carter signed it into law on August 3, 1977.

Federal officials made no secret of their intention to secure a permanent program in as many states as possible before the White House and the Department of Interior fell into Republican hands.

This dropped the January 5 West Virginia hearing neatly into the lame duck category. OSM fulfilled the letter of the law and no more in making the West Virginia proposal available to industry prior to the hearing. Industry citizens had, on average, four business days to digest over 1300 pages of the proposed program. For many, the task was made more tedious by the nagging suspicion that their comments rarely make it past an Interior filing cabinet.

OSM, which has observed a decidedly double standard regarding deadlines, has always found time to be its greatest negotiating ally. The State was forced to submit its initial proposal by June 19 of last year. "The Secretary," as OSM is euphemistically referred to in the law, was supposed to respond by September 3. He/it didn't.

When the response was handed down from Washington on October 20, it was labeled "partial approval." This meant simply that part of the program was OK in federal eyes, and part of it was not. Federal and State officials then sat down to hammer out their differences. Unfortunately, the hammer fell mostly on one side of the table.

The deadline for West Virginia to resubmit was federally fixed at December 19. During the interim negotiating sessions, OSM had only to continue saying no until panic finally overtook the State. The final West Virginia program was submitted at 4:55 p.m., December 19. The federal agency, having won its points, was only too happy to meet its final deadline. That was for a final ruling on the West Virginia program, and the proscribed date was January 15, five days ahead of the advent of the reform minded Reagan administration.

Among the major coal producing states of the east and midwest, this process was unique to West Virginia. In Virginia, in Pennsylvania, in Kentucky, Ohio, Indiana, and Illinois, state government was spared this bullying by the actions of the industry groups in respective courtrooms.

West Virginia moves toward primacy

This wasn't possible in West Virginia, however. As in other coal states, industry went to court, seeking to deny by injunction the forced federal intrusion on the rule making process delegated to the states in the original Act.

Perhaps fatigued by the long legal fight, perhaps caught up in the prospect of increased federal funding, the State chose to fight the injunction, and it was duly denied.

Thus in West Virginia, OSM has apparently found its first major eastern success. This is both appropriate and ironic. Appropriate because West Virginia, as a State and as an industry, supported the concept of national legislation, in hopes of benefitting from uniform national mining and reclamation standards. Ironic because the result has been anything but uniform standards.

West Virginia, which has been long recognized as a leader and an innovator in reclamation standards and technique, now stands as the only major eastern or midwestern coal state under the burden of the permanent federal regulatory program.

Meanwhile, the courts continue to struggle with the backlog of litigation stemming from OSM's constitutionally questionable demands. No one could have illustrated industry frustrations any better than outgoing OSM Director Walter Heine, who recently observed that his regulations had been remanded in "only about 30 instances."

Amid the gloomy prospects of the full implementation of permanent federal standards, there may be a few bright spots, as follows:

*OSM has promised to back off to an "oversight role" in West Virginia. Despite its past performance versus promise record, there does seem to be real hope that the agency will direct its attention elsewhere, for in other eastern and midwestern states, its regulatory foundation is under court attack.

*The West Virginia legislature had the foresight to write into the revised reclamation law the proviso that any federal standard subsequently struck down by the courts will automatically be deleted from State requirements. In this way, the West Virginia industry may benefit if the federal government, either legislative or judicial branch, comes to its senses.

*Failing that, the industry and the State's regulatory agency will at least have a more stable situation to work within. In spite of recent differences, the recently dissolved spirit of cooperation between industry and State is still a thing to be sought after, even if somewhat more cautiously.

*The West Virginia Department of Natural Resources will shortly come into a lot of money, $30 million plus at this writing. This will be psychologically satisfying, since those 30 million dollars and 30 million more like them were extracted from West Virginia coal companies. Also, DNR can put the money to good use in restoring abandoned mine lands, and hopefully to streamline its permitting and regulatory processes.

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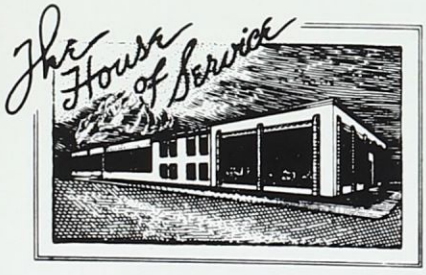

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The trend toward larger valley fills in West Virginia has provided some spectacular aerial views, such as this McDowell County scene.

Valley fill provides key to West Virginia reclamation success

Like so many other innovations in the field of surface mining reclamation, the valley fill method of excess overburden storage was conceived, deployed, and perfected on the steep slopes of West Virginia.

In the early 1970's surface mining in the state was at its peak as a controversial issue. The old shoot 'n' shove mining method was a thing of the past and new techniques were under experiment for handling overburden in an organized manner.

In mountainous southern West Virginia, and to some extent in the northern counties, the central problem to any controlled placement technique is the storage, or disposal, of excess overburden.

The now famous haulback method of contour mining provided an ingenious method of overburden disposal. However, it requires initial storage space for the overburden from the first cut.

The revolutionary mountaintop removal method allows total mineral recovery, and it also creates much needed level land. But it is almost totally dependent on some compatible means of overburden disposal.

The answer to these problems was, and is, the valley fill technique. Valley fill is a self descriptive, if somewhat exaggerated term. Far from literally filling a valley, the technique involves the controlled placement of overburden at the head of an undisturbed hollow adjacent to the mining site.

Traditionally, the material is transported to the bottom of the valley (see related article—page 34). There, it is compacted into four foot layers, and the layers combined to form lifts, or terraces, which gradually rise to meet the coal seam, or the reclaimed mountain top.

The basic idea was deceptively simple; implementation was a bit trickier. Obviously, the greatest care must be given to the engineering considerations of creating a mass of land. The problem, simply put, was one of achieving an engineered assurance that the fill would stay in place over the long term.

The continual flow of water across the face of the fill, the disruption of natural stream channels, the break up of base rock, the temporary removal of vegetation—all these factors have potential bearing on land stability years after the fill is constructed.

The key to avoiding these problems lay in imitating the natural conditions of the undisturbed hollow. By the time valley fill had graduated from theory to practice, it was actually a very sophisticated technique which belied its natural appearance.

Central to the development of the valley fill in West Virginia was the chimney drain rock core. This particular feature was added by civil engi-

The terraced effect of the completed fill diverts surface water to the rock core.

The chimney drain rock core, which extends from the surface to the valley floor, is the key to West Virginia style valley fill construction.

The fill is constructed to generally follow the contours of the hollow, as evidenced by this aerial view of a Buffalo Mining Co. operation in Logan County.

neer James Stover, formerly with the West Virginia Department of Natural Resources, and Pete Pitsenbarger, now the Department's Chief of Reclamation. The chimney drain is actually a variation of the centuries old french drain system.

The chimney drain rock core is, both literally and figuratively, the central element in the West Virginia valley fill. The basic idea is to channel both surface and ground water to the middle of the fill and through the rock core, which acts as a filtering system.

The core is constructed as the fill rises toward the head of the hollow. Although it may appear on the surface to be merely a rock lined diversion ditch, the core actually stretches from the valley floor completely through to the surface. This allows the subsurface water to filter through to the natural stream channel, thus assuring the stability of the fill.

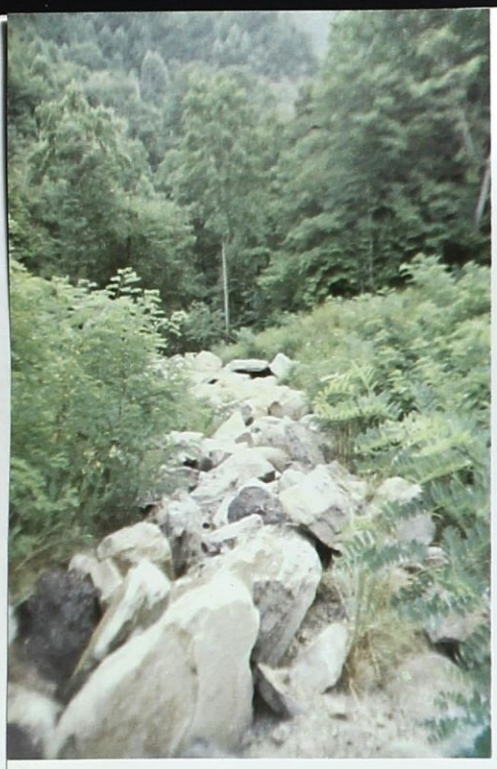
The fill itself is constructed to follow the natural contours of the hollow. Each lift, or terrace, is tilted slightly inward and toward the core. Thus, water is channeled into the middle of the hollow, just as it was when Mother Nature was in charge. Only this time it passes over rock before leaving the hollow. This further reduces sedimentation in receiving streams and retards erosion of the hollow.

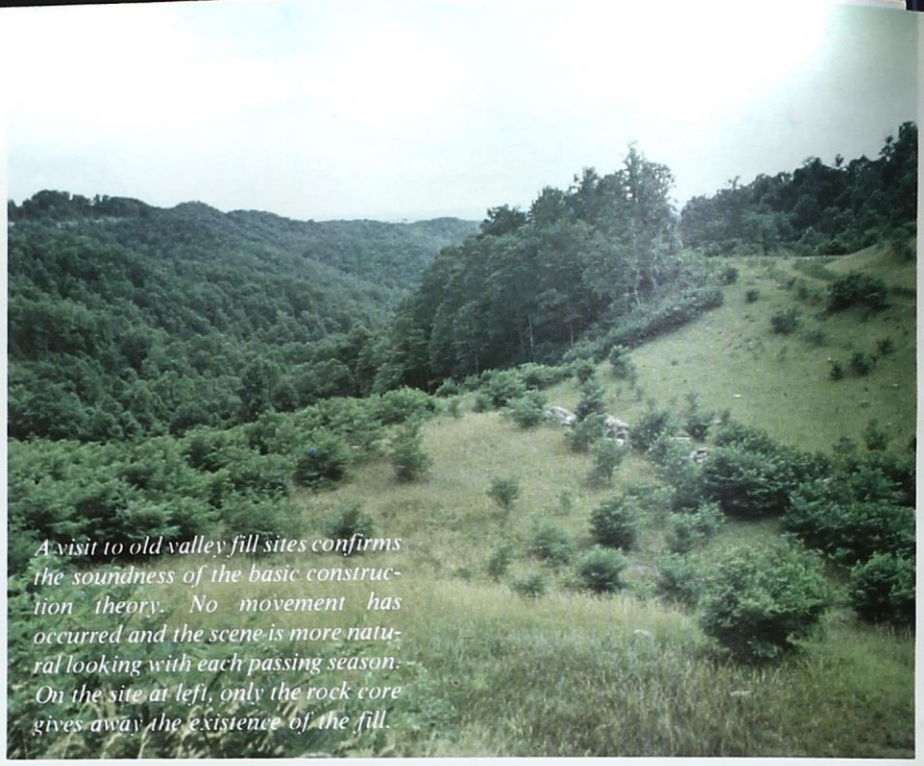
As the fill is constructed, the completed lifts are revegetated; so reclamation of the area is completed concurrently with the actual mine site.

Like all advancements in surface mining reclamation, the valley fill technique was questioned and attacked by those who would prefer that the surface mining industry did not exist. The obviously vulnerable point of attack was the question of long term stability of the fills.

Time, however, has effectively blunted that argument. The first valley fills are now more than eight years old, and aging nicely. The passage of time and the natural vegetative cycle have returned these older areas to nature so effectively that they are nearly undetectable to the untrained eye.

The principles of the West Virginia valley fill have permitted the construction of large fills in relatively steep terrain, demonstrated on this Logan County site by Amherst Coal Co.

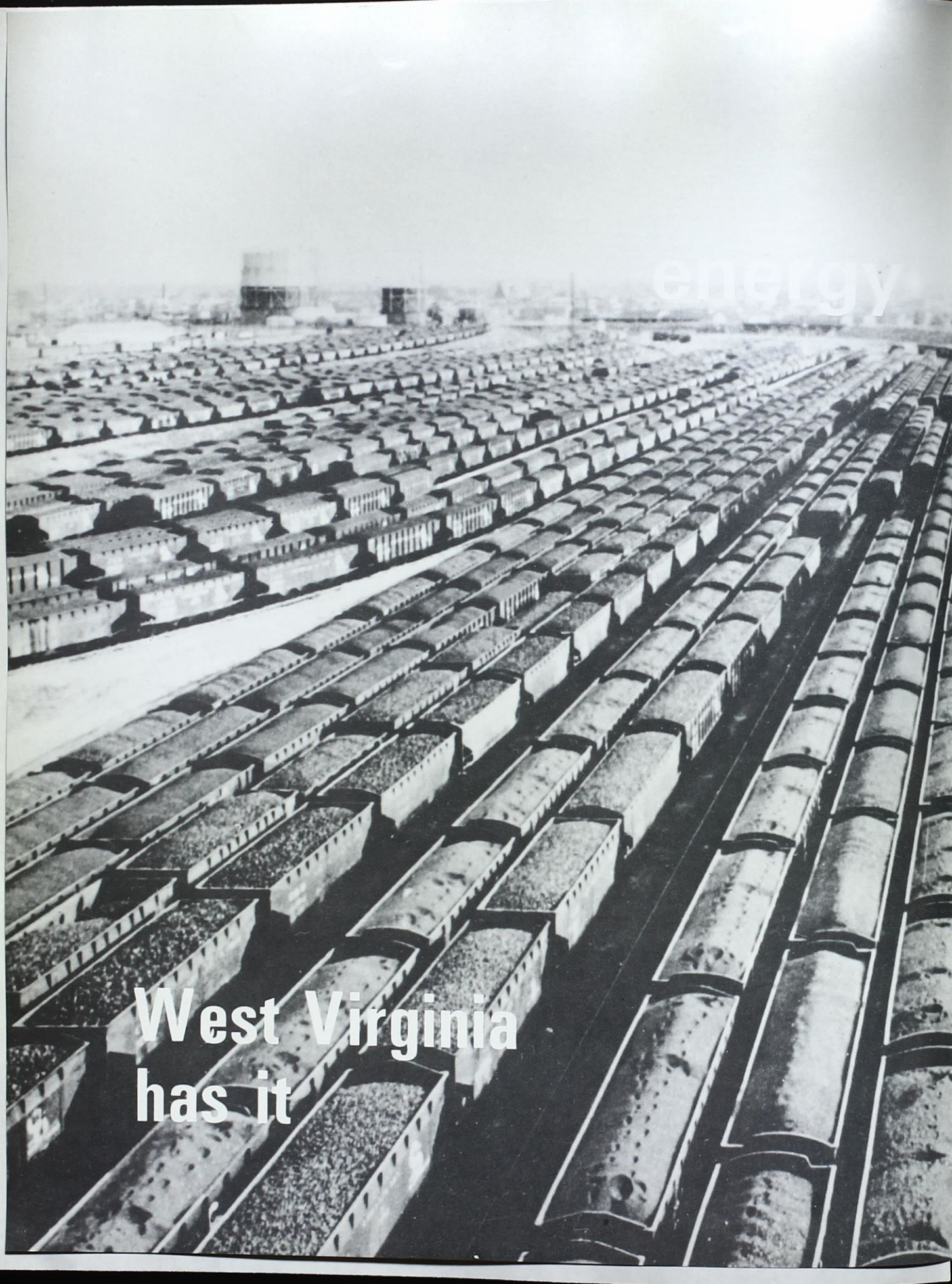




A visit to old valley fill sites confirms the soundness of the basic construction theory. No movement has occurred and the scene is more natural looking with each passing season. On the site at left, only the rock core gives away the existence of the fill.

The predecessor to the rock core was the flume and other similar mechanical devices. The theory of the rock core is based on diverting water into the natural stream channel.

The Kanawha separation facility of the Columbia Gas Transmission Corp. is the best possible testament to the success of the West Virginia valley fill. Built on a completed Pratt Mining Co. fill, the plant represents a $9 million Columbia belief in the soundness of the West Virginia method.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Technical report

**Submitted by Alfred M. Hirsch, chairman,
John Bragg, Fred Moore, and Terry Sole**

Editor's note: Each year participants in the West Virginia DNR Interagency Evaluation Tour are divided into working groups which submit committee reports evaluating surface mining operations from the viewpoint of their particular discipline. These committee reports are compiled and released by DNR as a "tour report." The following is the 1980 report on hydrology, always a key area of concern, given West Virginia's climate and terrain.

1. INTRODUCTION

Surface Mining may entail interception of aquifers, disruption of aquifer flow, change in recharge patterns to groundwater, and changes in groundwater quality. The more common manifestations of surface mining effects on groundwater include: (1) a reduction in groundwater availability to users that derive their water resources from impacted aquifers; (2) an increase in the total dissolved load of groundwater which reduces groundwater quality available to a user and (3) changes in the quality and quantity of groundwater discharge to surface water.

Groundwater effects of mining may be recognized immediately or, more commonly, after several years subsequent to disturbance of an area. Effects on groundwater availability commonly may be identified shortly after disturbance occurs because water users are aware of reduced well capacity or increased lift costs, associated with water pumping, in a relatively short period of time. Effects on groundwater quality, however, may not be recognized immediately because of the time for acid mine water to form and to reach wells, or to affect biota at groundwater discharge points. At groundwater discharge points, which may include surface seeps or stream channels, the effects ultimately are recognized by staining of rocks, soil, or stream sediment after there already may have been a reduction in the viable biota.

A delayed breakthrough of poor quality leachate long after completion of reclamation can financially affect the mine operator if a breakthrough is identified prior to bond release, or the State if poor quality groundwater affects of previously mined areas are identified after bonds are released. In either case, treatment or remedial action costs far exceed a premining professional evaluation of the geohydrology of the area to be disturbed, a mining plan that handles acid producing materials so to eliminate acid mine drainage problems, or appropriate monitoring to identify as early as possible water quality problems. It, thus, is in the best interest of the mine operator and the State to identify

Report of the Groundwater Hydrology Committee of the 1980 West Virginia Department of Natural Resources Interagency Evaluation Tour

geographically and geologically those areas where groundwater problems can be anticipated and to develop appropriate mining and monitoring plans in such areas, so that long term groundwater problems are avoided.

1.1 Laws and Regulations

Monitoring of groundwater has been implemented only recently in West Virginia at surface mines, indirectly in response to the Surface Mining Control and Reclamation Act (P.L. 95-87) and the regulations promulgated thereto by the Office of Surface Mining (OSM). Section 507 (b) (11) of the Act requires that a determination of the probable hydrologic consequences of mining and reclamation be prepared and submitted as part of an application to mine so that the regulatory authority can assess the ". . .probable cummulative impacts of all anticipated mining in the area upon the hydrology of the area and particularly on water availability (P.L. 95-87, Section 507 (b) (11)." Final regulations were published by OSM in March, 1979 (44 FR 15311-15463), and within these regulations several sections, including 779.15 Groundwater information, 779.17, Alternative water supply information, 780.21 Reclamation plan-Protection of hydrologic balance, 816.50 Hydrologic balance-Groundwater protection, 816.51 Hydrologic balance-Protection of groundwater recharge capacity, and 816.52 Hydrologic balance-Surface and groundwater monitoring, require surface mine operators to acquire information on groundwater to satisfy either the minimum requirements for a Permit Application (Part 779 and 780) or Performance Standards (Part 816). Similar groundwater requirements were promulgated by OSM for surface mines on Federal land and for underground mines (Parts 743, 783 and 784).

To satisfy the Federal requirements the West Virginia Division of Reclamation (DNR) has promulgated regulations (7A.03-Groundwater Monitoring Program) consistent with the intent of OSM, which require surface mine operators to submit in the pre-mining plan a plan to monitor groundwater hydrology. Specifically, the regulations require that the groundwater system in the area of the proposed mines be assessed for quality and quantity and that the effects of mining address both the disturbed, as well as adjacent areas. The regulations further state that when mining activity "may" impact the groundwater system that periodic monitoring of wells be required.

Since promulgation of these regulations, DNR has not given specific guidance to mine operators as to how the intent of these regulations are to be achieved. Rather it has operationally developed a strategy which is being implemented at surface mines. Specifically, DNR generally requires that the operator monitor one or more wells, generally two, periodically for a limited number of parameters (pH, iron and total suspended solids) when a water user is located within one-half mile of the disturbed area (Directive M6, DNR). One well is to be up-gradient (=updip according to commonly accepted practices) and one down-gradient. The well of the water user qualifies as a monitoring well. When no water user is located within one-half mile of the mine, seeps or springs may be substituted for wells. Thus, DNR has taken the position that their concern is the availability of groundwater to the user located geographically within one-half mile of the area of mining. Further, a DNR approved reclamation plan implies that no groundwater quality problems will result from mining because potential acid-producing problems will be mitigated.

1.2 Purposes of the Report

The purposes of this report are (1) to evaluate the groundwater hydrology at each of the surface mines visited; (2) to assess groundwater pollution problems at the mines; (3)

to evaluate the groundwater monitoring program extent at each of the mines; (4) to evaluate the efficacy of the DNR procedures related to groundwater; and (5) to identify areas where the mine operator working with DNR can improve current practices related to the protection and monitoring of groundwater.

To achieve these purposes, the report is divided into three major sections. Section 2.0 describes pertinent geohydrologic factors of each mine site. Section 3.0 summarizes the findings of the committee on the groundwater and monitoring program at the mine sites. Finally, Sectin 4.0 makes recommendations to DNR on improvements to the groundwater program as presently implemented.

This report reflects unanimity of opinions and conclusions that the members of the Groundwater Committee reached during the evaluation tour. Because of time constraints, however, the members of the Committee were unable to review this report prior to submission of the report by the Chairman to DNR. Omissions or errors, therefore, are the responsibility of the Groundwater Chairman who wrote this section of the tour evaluation report.

2. MINES VISITED

Eight mines were visited during the Interagency Tour. This section briefly describes the Geology, Water Quality, and Monitoring Wells at each of the mines. Conclusions based on data available to the Committee, which include review of the mine application, discussions with the mine operator and cognizant inspector, and visual inspection of the mine property are made where appropriate. Surface water quality briefly is included in this section because untreated minesite surface water quality generally provides an indication of groundwater quality.

Sufficient data were available to assess tentatively the effects of mining on groundwater quality, but were insufficient to evaluate the effects on recharge rates, affects on aquifer flow, or on storage characteristics. To make such determinations data on hydrological investigations would need to have been provided.

KELLY COAL COMPANY (Permit 46-78)

Geology

The mine is a contour strip mine that is a second cut mine into the Pittsburgh coal seam which dips 2.5° northwest at the mine. At the northern end of the permit area, three abandoned deep mines into the Pittsburgh coal, which produced acid mine drainage, were daylighted. The Redstone coal seam occurs 40 to 50 feet stratigraphically higher but is thin, not mined and contains more than 3% sulfur. Overburden consists of gray calcareous shales and sandstones.

No distinct aquifer unit was apparent at the exposed highwall. Fractures in the overburden and in the coal provide secondary porosity through which groundwater flows. The Pittsburgh coal seam may be the stratigraphic unit with the greatest hydraulic conductivity, and therefore be considered a potential aquifer.

Water Quality

Water quality of surface and groundwater is good. The pH of all surface and groundwater sampled to date is 7 or greater, and iron is negligible. These data, as well as inspection of the previously reclaimed areas, suggest that groundwater quality has not been affected by surface mining.

Data on the sulfur content of the coal beds, verbally transmitted to the committee, indicate that the coal beds can be the primary source of acid mine drainage. Prior to surface mining the abandoned mines developed in the Pittsburgh seam produced mine drainage with a pH of 4.5-5 and iron content exceeding 10 mg/l. Surface mining, therefore, has reduced acid mine drainage problems.

Groundwater Monitoring

One well, approved by DNR, is used to monitor groundwater quality. The well is a dug well, generally dry, at a residence downdip (northwest) of the disturbed area. The well is stratigraphically below the Pittsburgh seam (about 70 feet), and it may be in alluvial materials rather than bedrock. No water availability or water quality problems associated with mining have been identified at the well.

If there were any groundwater quality impacts due to mining, which there probably are not, the monitoring well is inappropriately located to monitor the effects. The well is stratigraphically too low, too distant, and not correctly constructed to be used reliably as groundwater monitoring well.

PETITTO BROTHERS COAL MINE (Permit 223-75)

Geology

The Pittsburgh and Redstone Coal seams, stratigraphically separated by 40 to 50 feet of calcareous shales and standstones, dip about 1° easterly and are being mined. Each seam is about 5 foot thick and is overlain by

calcareous shales and sandstones. A regular vertical fracture zone with spacing of about 50 feet was observed at the highwall extending from the upper part of the highwall to the pit floor. Seeps were observed along these fractures only.

Water Quality

Surface and groundwater quality was good. Water in the sedimentation pond that is not treated has a pH that ranges from 7 to 8 and iron that is not detectable with the methods used for analyses.

The alkalinity of the overburden, water quality of surface water, and the lack of evidence for leachate formation suggest that there are no groundwater quality problems related to surface mining activity.

Groundwater Monitoring

One monitoring well approved by DNR is located adjacent to an abandonded farm house nearby the sedimentation pond. The well was a water supply well for the farm house and may be a shallow well dug into alluvium. The well is located up-dip, stratigraphically below the Pittsburgh seam, and distant from the mine. It thus can not monitor the effects of surface mining on groundwater.

THOMPSON COAL AND CONSTRUCTION COMPANY (Permits 219-76 and 103-78)

Geology

Nine feet of the Pittsburgh seam which dips less than 1° southeasterly are being mined at this mountain top removal operation. About 50 feet of overburden, predominantly sandstone with lesser gray calcareous shales overlie the Pittsburgh seam at this location. The mine is a second cut mine that now also is daylighting some abandoned small underground mines. Vertical fractures extend from the surface to pit floor, but no seepage was observed during the tour.

Water Quality

The reported water quality of surface and groundwater monitored is good. The value of pH is about 7 and iron generally is not detectable. During the tour, the pH of pit water standing in the Pittsburgh coal in the area where daylighting had occurred was 3.0 and iron was measured at 20 mg/l/. The probable reason for lowered quality of water was the exposure of the seam to air through past deep mining and the preponderance of sandstone overlying the Pittsburgh seam in that part of the mine.

The area in the vicinity of this mine was stripped with no reclamation. Volunteer vegetation now covers the outslopes and pit areas, and no evidence for acid leachate was observed. Based on these observations and the monitoring data, groundwater quality is not adversely affected by the mining operation.

The Pittsburgh seam may be an aquifer in the area and when exposed to air, such as by underground mine openings, may produce acid mine drainage.

Monitoring Wells

Three installed wells and one house well are used to monitor groundwater quality. The quality of the water to date has been good (pH 7 and iron not detected). The wells are located stratigraphically below the Pittsburgh seam. Logs of these wells were unavailable but they may be appropriate to monitor the effects of mining on groundwater below the coal seam.

DIPPEL & DIPPEL COAL COMPANY (Permits 58-76, 56-77)

Geology

Four feet of the westerly dipping Waynesburg Coal are being mined at this contour mine. About 70 feet of sandstone and calcareous shale overburden separate the Waynesburg from the thin (1.0 foot) overlying Washington coal. The sulfur content of the overburden averages less than 1% but the Washington seam contains more than 5% sulfur and generally is mixed with alkaline overburden before buried. Vertical joints in the highwall area spaced about 3 feet apart in the sandstones but are not continuous into the shale or to the Waynesburg coal, which is the most highly fractured unit in the highwall. The Waynesburg coal and sandstones are highly fractured and, therefore, could yield the greatest flow of groundwater. The pavement of the pit contains sufficient sulfur to require lining before overburden is dumped.

Water Quality

Water quality at this mine varies. At the northern sedimentation pond and in the upper monitoring well, the quality of water is good with a pH of 7 to 8 and iron less than 6 mg/l. Water in the southern sedimentation pond, however, needs to be treated to satisfy effluent limitations and pit water at the mine had a pH of 4, even though manual liming of the water evidently took place prior to the tour visit.

The poorer quality of surface water in the downdip sedimentation pond and in the pit floor suggest that groundwater quality in the reclaimed area also may be poor or become poor in time as the lime on the pavement is consumed or coated. There

were no observed leachate breakthroughs in reclaimed parts of the mine, so that data were too few to determine with certainty whether a groundwater problem can be expected.

Monitoring Wells

Two monitoring wells, approved by DNR, are located up-dip and down-dip of the disturbed area. The upper well does monitor background water quality and was completed in the Waynesburg coal. The lower well is finished stratigraphically below the Waynesburg coal on the opposite side (to the Mine) of an unnamed tributary of Dents Run. This well is located too distant from the mine to monitor mining effects and probably is located in another groundwater shed. Assuming that groundwater flow is in a down-dip direction, a down gradient well finished in the pavement and material immediately above it would be appropriate to monitor effects of mining, but no such well is present.

KING KNOB COAL COMPANY (Permits 66-79, 138-79,101-77, and 6-77)

Geology

About six feet of essentially horizontal Waynesburg coal seam are being mined along the contour and as a mountain top removal operation. The Waynesburg coal is overlain by about 40 feet of a massive sandstone. The noncalcareous sandstone is vertically jointed at intervals of 10 to 20 feet. Joints are filled with limonite stained clay and provide conduits for groundwater flow. The massive sandstone is less fractured than the underlying coal. The coal, thus, locally may be the most suitable bed to be considered an aquifer.

Water Quality

Water quality of surface water satisfies effluent criteria without treatment. Groundwater quality also is good and based on six tests the pH ranged form 7 to 8 and iron was less than 2.3 mg/l. Several thousand feet of previously reclaimed areas were observed. In that area one leachate breakthrough was evident which suggests that toxic overburden does occur in one localized part of the mined area. Visual observation of adjacent mining areas indicate the leachate breakthrough is rare, thus groundwater quality probably is not affected significantly by mining.

Monitoring Wells

Two monitoring wells are located offsite and finised below the Waynesburg coal seam. The monitoring wells may be located properly to monitor the effect of mining.

L. H. & J. COAL COMPANY (Permits 232-76, 51-74)

Geology

About 3.5 feet of the northerly dipping Sewickley and Redstone seams are mined. The underlying Pittsburgh coal previously was mined underground. Fractures due to previous underground mining now dominate such that groundwater flow is downward to the underground mines which serve to drain the entrie area.

Water Quality

Calcareous shales are the dominant rock type between the coal beds. No acid mine drainage is expected to form from water infiltrating the overburden. Water that enters the underground mines is treated by Consol before it discharges to surface waters.

Monitoring Wells

DNR waived the requirement for monitoring wells because the underground mines drain all groundwater.

GRAFTON COAL COMPANY (Permit 95-79)

Geology

About four feet of the Redstone seam are mined along a second-cut contour and a small mountain top removal operation. The southeasterly dipping Waynesburg coal contains about 2.5% sulfur and is overlain by a "hot" shale containing 12% laminar pyrite. Overburden consists predominantly of calcareous shales.

Water Quality

Untreated surface water and water from monitoring wells contain less than 0.75 mg/l of iron. The pH ranges from 7 to 8. The hot shale, when properly buried within the alkaline overburden apparently poses no problem. No leachate breakthroughs were observed in an adjacent area that was reclaimed six years ago.

Monitoring Wells

Two monitoring wells, approved by DNR, were located in the mine area. Both were drilled stratigraphically below the Redstone seam. The upgradient served to monitor the background wake water quality of strata below the Redstone. The downgradient well was too distant and may have been finished in alluvium to be a useful monitor of the effects of mining on groundwater.

CANNELTON INDUSTRIES (Permit 615-70c, 45-77, 83-79)

Geology

The mine is the largest mountain

top removal mine in West Virginia on which mining of multiple seams (Lower and Upper 5 Block and 6 Block) has occurred for almost a decade. Of the more than 2000 acres permitted, about 1100 have been reclaimed. The coal seams generally are low sulfur and are overlain by calcaeous shales and sandstones. In exposed highwalls vertical fractures did not extend from sandstones into shales.

Water Quality

Water quality in sedimentation ponds generally has been good. The pH generally ranges from 7.5 to 8.2 with no detectable iron. The water quality in monitoring wells also is good with pH about 6.4, iron 10 mg/l, and total alkalinity exceeding acidity by 200 mg/l. No leachate breakthroughs were observed in the reclaimed area during a helicopter fly over. Groundwater quality apparently has not been adversely affected by mining during this past decade.

Monitoring Wells

Two monitoring wells per permit have been installed. Three of the wells, one of which was collapsed, were examined by the Committee. These wells were finished below the lower most coal seam. The wells were located generally on the up-dip and down-dip side of the permitted areas, but the number of wells are insufficient to characterize the groundwater hydrology of the 2000 acre site.

VALLEY CAMP COAL COMPANY (Permit 154-77)

Geology

About eight feet total of the Lower and Upper 5 Block are being contour mined at the head of Left Fork of Bufflick. The beds are overlain by irregular beds of calcareous shales and sandstones. Sandstones are vertically fractured but the fractures do not extend into underlying shale beds.

Water Quality

No treatment of surface water is required to satisfy effluent guidelines. The water in a seep located down-dip (northwest) in an auger-hole of the Coalburg seam below the No. 5 Block has a pH greater than 7, less than 1 mg/l iron, and 170 mg/l of total alkalinity in excess of acidity.

Monitoring Wells

No water quality monitoring wells were required by DNR. The seep in the Coalburg seam auger hole is used to satisfy monitoring requirements. The seep does not monitor the impacts of mining in overlying coal seams.

CEDAR COAL COMPANY (Permits 100-79, 201-76, 218-75, 38-80)

Geology

About six feet of the Lower and Upper 5 Block and the underlying Clarion are being mined in this mountain top removal operation. The coal beds are low sulfur and are overlain by massive sandstone beds and shales. Sandstone accounts for approximately 65% of the overburden. Overburden analyses performed to date show that total alkalinity exceeds acidity in almost all beds.

Fractures extend vertically from some of the sandstone beds into the shales. During the initial mining of the Clarion coal seam, water flowed freely from the seam when it was first exposed in a pit. This information suggests that the Clarion seam was an aquifer in this area and was being recharged through overlying sedimentary rocks.

Water Quality

Available water quality data confirm that the alkaline overburden combined with an essential absence of toxic beds prevent the formation of acid mine drainage. Surface mining has not affected groundwater quality adversely. Deep mine discharges that flow from coal beds below those being surface mined contain about 6 mg/l iron and have a pH of about 5.5.

Monitoring Wells

Two monitoring wells, approved by DNR, were observed by the Committee. Both wells, one up-dip and one down-dip (northerly) were drilled to below the lowermost coal seam being mined.

3.0 CONCLUSIONS

The mines visited during the 1980 Interagency Evaluation Tour were similar in terms of (1) groundwater hydrology and impact of mining of groundwater quality; (2) the geologic potential for a decrease in groundwater quality, (3) the general nature of groundwater monitoring at the mines, and (4) the comprehensiveness of available groundwater data. As a general statement, the mines visited during the 1980 tour were located stratigraphically and geographically in areas where groundwater quality problems due to surface mining have been few historically and where few, if any, should be expected given enforcement of current mining

practices by DNR. Available valid or appropriate groundwater data were few.

Because of the basic similarity of mines relative to groundwater, this section describes the conclusions of the committee which generally are appropriate for all the mines visited. Specific exceptions are noted when appropriate.

NO SIGNIFICANT ADVERSE IMPACTS TO GROUNDWATER QUALITY OR TO GROUNDWATER AVAILABILITY WERE EVIDENT AT THE MINES VISITED.

As described in Section 2.0 of this report, no evidence for significant groundwater effects on groundwater quality. At one mine toxic strata below the coal seam may affect groundwater quality. Thus, the intent of the DNR Groundwater Monitoring Program (7A.03) to protect the groundwater resources of the State was satisfied at essentially all of the mines.

MOST OF THE GROUNDWATER MONITORING WELLS AT THE SURFACE MINES VISITED DURING THE 1980 INTERAGENCY TOUR WERE GEOGRAPHICALLY AND STRATIGRAPHICALLY LOCATED INAPPROPRIATELY TO ASSESS THE IMPACTS OF THE SURFACE MINING ON GROUNDWATER QUALITY.

Many of the monitoring wells were located to satisfy minimal DNR requirements and installed at convenient locations to a depth somewhat arbitrarily determined. The wells appeared to serve to monitor background groundwater quality and impacts of mining accidentally, rather than by design.

PREMINING PERMIT APPLICATIONS INADEQUATELY DESCRIBED THE GEOHYDROLOGY OF A PROPOSED MINE SITE AND THE PROBABLE HYDROLOGIC CONSEQUENCES.

At most mines a detailed premining analysis by a professional hydrogeologist would have shown that affects on groundwater quality would have been minimal at some of the mines. Thus, wells to monitor water quality are probably not necessary, and the requirement to install such wells could have been waived by DNR or more correctly located and installed.

THE MONITORING WELLS VARIED IN CONSTRUCTION BUT GENERALLY WERE INAPPROPRIATELY CONSTRUCTED AS GROUNDWATER PIEZOMETERS.

The wells used to monitor groundwater wells varied from hand dug wells, to open-hole wells with surface casing, to wells of unknown design. In general such wells served as water-observation wells to determine the depth to the water table, but not as piezometers from which valid groundwater data can be collected or derived.

4.0 RECOMMENDATIONS

The committee recognizes that few, if any, groundwater related problems were evident at the mines visited on the tour. The reasons for the lack of problems, however, is related to original geologic conditions at each of the mine sites rather than to operational factors. Thus, the committee concluded (Section 3.0) that the number of wells required for these mines were appropriate or could have been less. But the committee also concluded that, were there to have been problems, then the wells were, for the most part, inadequate in number, inappropriate in location, and incorrectly installed.

The recommendations that are proposed in this section, therefore, are directed to DNR in areas or mines where historically groundwater problems have occurred or can be expected to occur based on premining investigations. Given the persistence of groundwater quality problems once they occur and the cost to clean up or treat poor quality groundwater, appropriate premine planning and the implementation of a sound monitoring program in areas where groundwater quality problems are anticipated, are in the best interests of the mine operator and DNR. Excessive premine planning and implementation of an intensive monitoring program in areas such as those visited during this tour are not.

TO SATISFY THE INTENT OF THE GROUNDWATER MONITORING PROGRAM (7A.03), DNR NEEDS TO ESTABLISH A FLEXIBLE METHODOLOGY TO ASSIST THE MINE OPERATOR IN THE PROTECTION AND MONITORING OF GROUNDWATER RESOURCES.

No single set of rules which serves to establish the number of monitoring wells, the frequency of sampling, the parameters measured, or the aquifer tests performed can be made to satisfy the variable geologic and mining conditions in West Virginia. Sufficient mining has occurred in the past, however, such that areas where there are no groundwater problems, as well as areas where there are

severe groundwater problems, are fairly well known and could provide a basis for development of such a methodology.

At present the DNR has established a minimum number of wells, parameters to be measured, and the frequency of analyses. Although these can be modified by DNR, they generally are followed at all mines. In addition DNR has accepted wells or other monitoring points that are hydrologically inappropriate, at least at the mines visited during the 1980 tour. This approach, if applied to all areas of West Virginia, is adequate when no groundwater problems occur, but inadequate in areas where problems are anticipated or are known to exist. DNR, therefore, needs to develop a methodology of assessment evaluation and enforcement whereby its approach is based on the probable hydrology of a mine site prior to and subsequent to mining, and not on a pre-established set criteria consisting of a minimum number of monitoring points, parameters, and other required tests.

THE EXTENT AND BREATH OF A GROUNDWATER ASSESSMENT SUBMITTED AS PART OF A PERMIT APPLICATION SHOULD DEPEND ON THE EXTENT OF ANTICIPATED GROUNDWATER PROBLEMS.

When impacts on groundwater are expected to be minimal and the proposed mine is located in an area where groundwater problems are uncommon due to mining, assessment requirements should be minimal. DNR should consider relieving the operator on the number of monitoring points and frequency of analyses required (DNR appears to have implemented this recommendation based on the 1980 Evaluation Tour). There is no need to impose costly requirements on an operator when no such need is shown to exist.

However, when a permit application is received by DNR to mine in an area where groundwater problems are known or expected to occur, the groundwater assessment should be detailed and also include a groundwater monitoring plan, so that DNR has sufficient information to evaluate the mining plan in terms of the potential for groundwater protection and to review the plan to monitor the groundwater quality. The opportunity to prevent groundwater pollution problems should occur early in the planning process, because the cost to prevent potential problems is far less than the cost of remedial action. Expensive reclamation or treatment in perpetuity is much less desirable and more costly than proper planning.

As part of this recommendation, the committee also recommends that a competent hydrogeologist would be the most appropriate person to prepare a detailed assessment. Similarly, a competent hydrogeologist of DNR should review relevent parts of applications where groundwater problems are anticipated.

AT MINES WHERE GROUNDWATER PROBLEMS ARE EXPECTED OR DISCOVERED DURING MINING, A TRAINED HYDROGEOLOGIST OF DNR SHOULD ASSIST THE MINE INSPECTOR IN HIS EVALUATION OF POTENTIAL OR ACTUAL GROUNDWATER PROBLEMS

The mine operator normally seeks the advice of the cognizant mine inspector when a problem arises. Based on discussions with mine inspectors during the tour, most inspectors are neither trained in, nor can be considered or are expected to be hydrogeologists. Nevertheless, they do respond to hydrologic questions that arise and, in part, determine the location of monitoring wells and inspect them as part of their duties. DNR should establish procedures whereby a DNR hydrogeologist can advise mine inspectors so that the inspector can make informed decisions when groundwater questions need to be assessed.

IN AREAS WHERE WATER QUALITY PROBLEMS ARE ANTICIPATED THE LOCATION AND INSTALLATION OF MONITORING WELLS, SHOULD BE APPROVED BY A PROFESSIONAL HYDROGEOLOGIST.

As stated in Section 3.0 many of the monitoring wells observed during the tour are inappropriately placed and poorly designed to serve as water quality monitoring wells. Proper placement and installation of a well requires a determination by a hydrogeologist. Not only is it important to locate the well with respect to horizontal flow, but the depth to which the well is finished also needs to be established.

Figures 1 and 2 illustrate the construction of a monitoring well (piezometer) for a unconfined (water table) and confined (artesian) aquifer. In both, a screen is set in a well pack (washed sand) to test a specific part of the strata penetrated by the well. Unless the screen is isolated from the remainder of the hole, uncertainty arises as to the strata being measured or the significance of the water quality data.

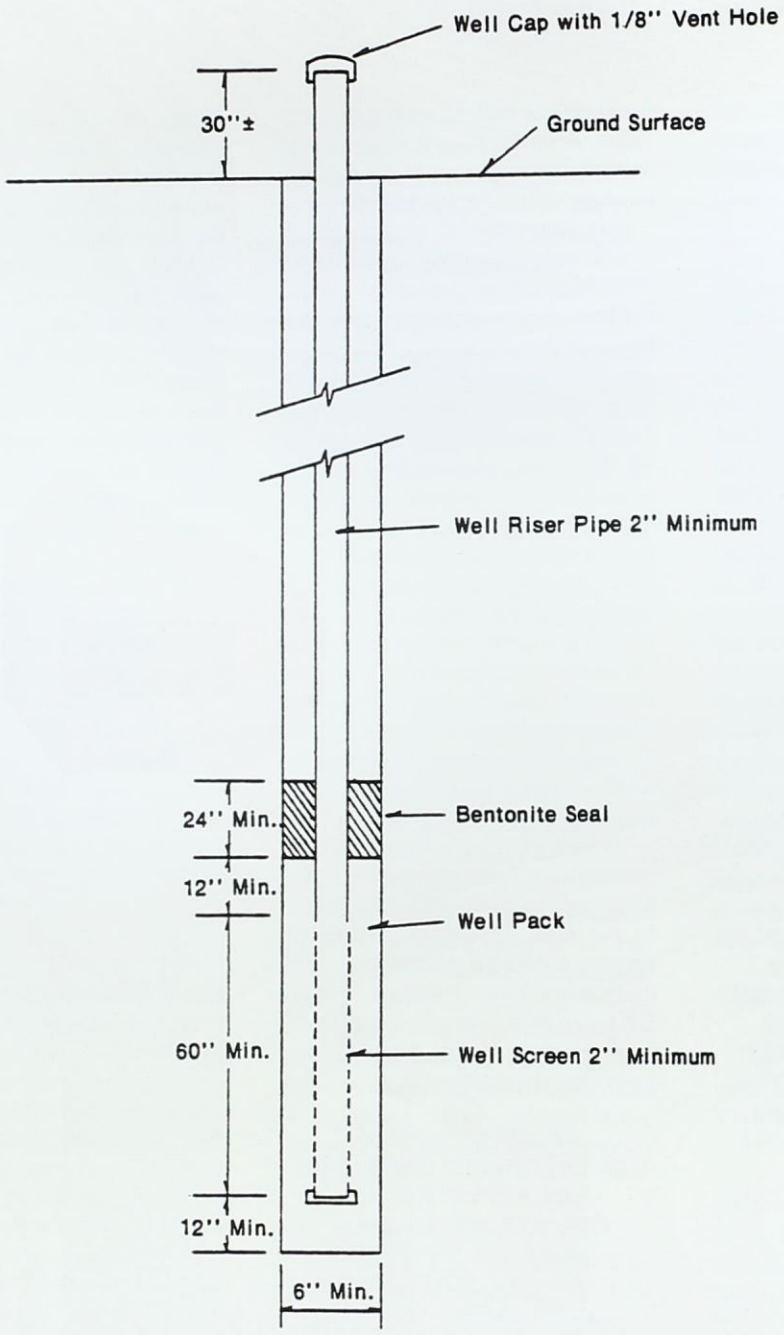

FIGURE 1 UNCONFINED AQUIFER GROUNDWATER QUALITY MONITOR WELL

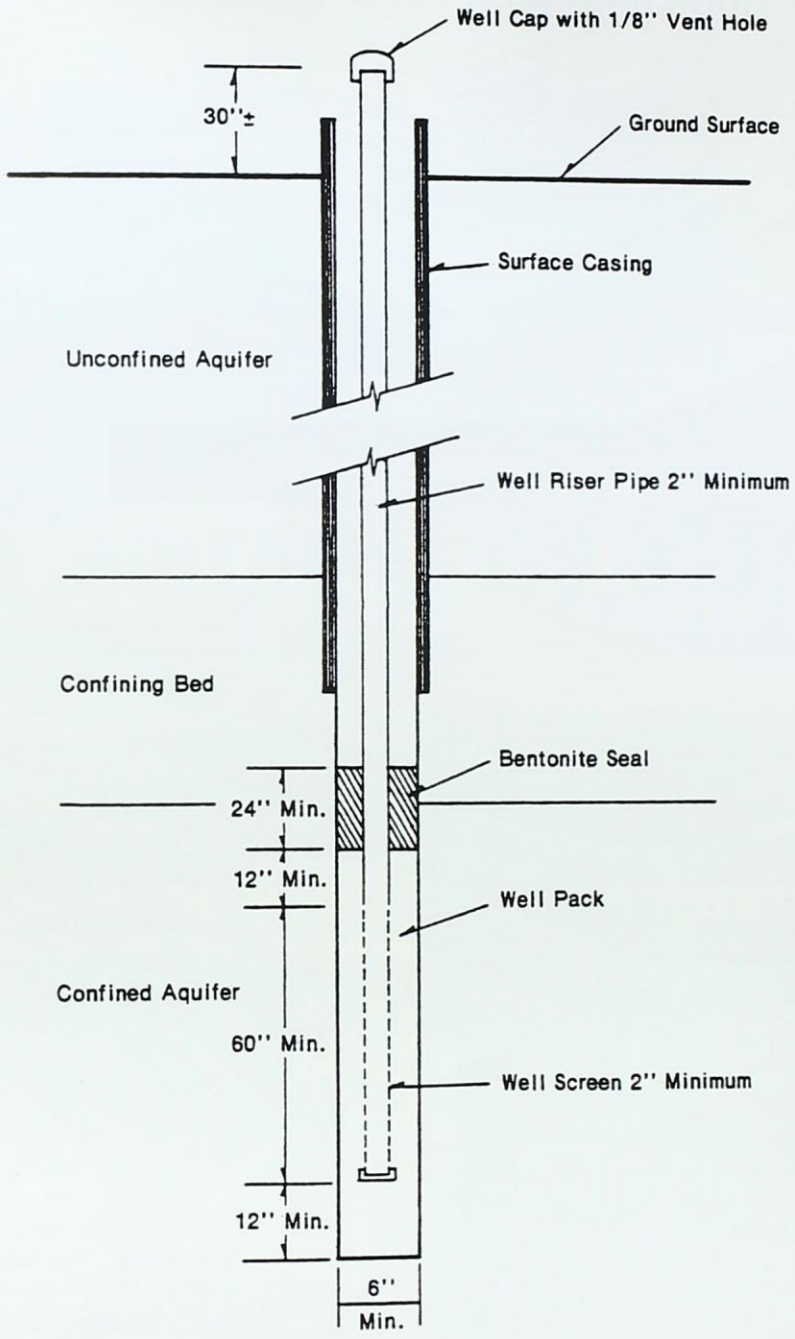

FIGURE 2 CONFINED AQUIFER GROUNDWATER QUALITY MONITOR WELL

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New technique advances valley fill technology

Under a contract with the U.S. Department of Energy, Skelly and Loy has designed a special end-dumped valley fill for Amherst Coal Company's 3A Surface Mine in Logan County, West Virginia that is proving to have these advantages over conventional valley fill construction techniques:

- The end-dump construction method eliminates a one-way haul road 6,000 feet long at a 10 percent grade from the uppermost bench to the fill toe.
- The spoil haulage fleet of three 100 ton trucks performs the same amount of work as ten similar trucks needed for a hauldown fill.
- The utilization of spoil placement equipment at the fill toe is not required until the rock toe buttress, diversion ditches, and face of the fill are constructed.
- Equipment maintenance cost is low not only because of the smaller fleet of equipment, but also because of the reduced grades throughtout the area of equipment travel.
- Because of the reduction in equipment and manpower compared to conventional techniques, significant cost savings can be enjoyed which may approach several dollars per ton.

Since 1974, Amherst Coal Company had been excavating hard sandstone, constituting 90 percent of the interburden of the 5 Block and Stockton-Lewiston coal seams. The valley-fill was constructed by hauling the spoil down to the dumping point, placing and compacting it in layers 4 feet thick, and building a rock core chimney. While negotiating with Amherst Coal Company to obtain its consent to participate in a cross-ridge mountaintop mining demonstration, engineers from Skelly and Loy pointed out that the sandstone would be suitable for constructing a durable rock fill as defined by the interim OSM regulations for excess spoil disposal. The end-dump method of spoil disposal became part of the demonstration because Skelly and Loy believed that it would prove to be economical without causing severe environmental impacts and because Amherst Coal Company agreed to selective material placement into the fill.

Prior to beginning the disposal of spoil in the valley, it was necessary to design the fill to satisfy several criteria. The first step in the design was determination of the foundation conditions beneath the site. Five test borings were drilled through the soil overburden and into the underlying bedrock. The samples obtained during the field investigations were tested in Skelly and Loy's soil laboratory to determine their basic classification, in-place density, and strength. Data on groundwater was collected at the time of the drilling, and a survey to locate springs and seeps was conducted.

All of the data accumulated during these investigations was plotted on a cross section of the proposed valley fill. The cross section, shown as Figure 1, clearly depicts the subsurface conditions for study purposes and serves as a computer model for the slope stability analysis. The federal regulations require factors of safety of 1.5 and 1.1 for end of construction and seismic design conditions,

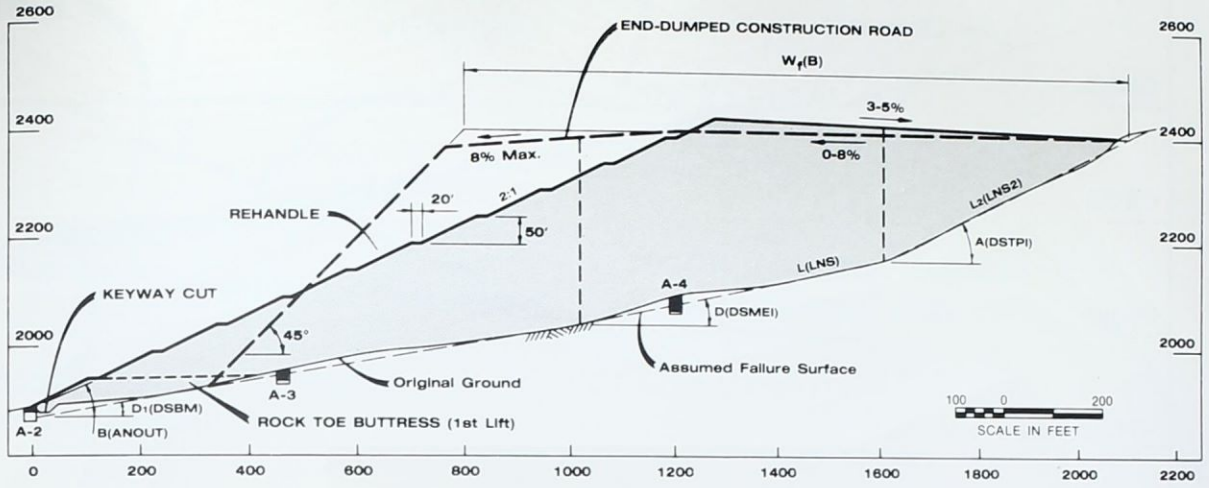


Figure 1. Valley Fill Cross Section.

respectively. Using the sliding wedge analyses of sidehill embankments developed by Dr. Yang H. Huang of the University of Kentucky, the lowest factor of safety obtained exceeded the minimum requirements of the OSM regulations by 15 percent for the end of construction analysis and 57 percent for the seismic condition.

Concurrent with the analysis of soil overburden, samples of the sandstone fill material were subjected to sodium sulfate weathering tests to evaluate their soundness. After five cycles of immersion and drying, the samples showed a weight loss of approximately 15 percent. This low weight loss indicates that the sandstone meets the soundness criterion for rock to be used as concrete aggregate. The soundness of the rock to be disposed of is a key factor in gaining OSM approval.

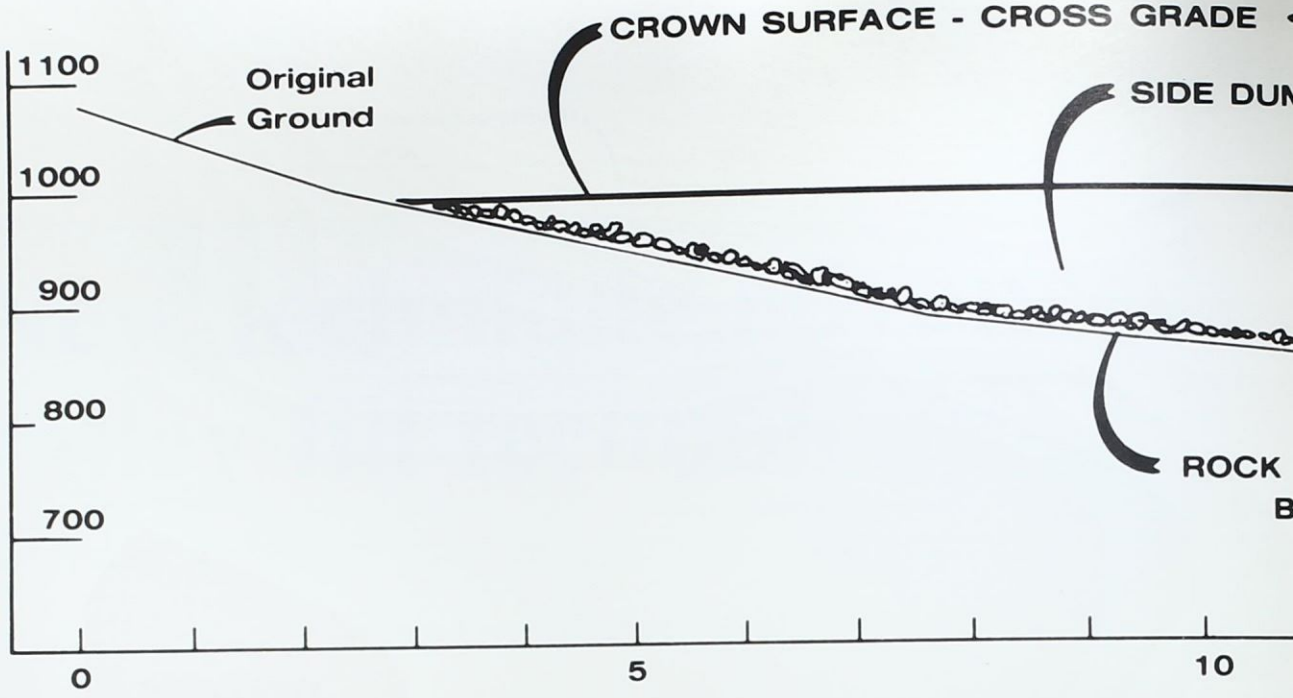
Current state regulations require that valley fills be constructed in layers 4 feet thick and have rock core drainage chimneys along their long axis. End-dumped fills are not permitted. Thus, it was necessary to obtain a variance from the West Virginia Department of Natural Resources before beginning construction. The variance was granted in December, 1979, and disposal of spoil in the fill began during the month of March, 1980.

Construction of the fill is now in the first phase: a haul road is being built from the edge of the ridge along the longitudinal centerline of the valley. End-dumping from the leading edge of the haul road is to continue until the toe of the fill is approximately 150 feet before the location of the toe of the final fill. When this point in construction is reached, a keyway cut will be made to add stability to the fill. The cut will be into competent rock, and its width will be equal to the width of a D-8 dozer blade. The design width of the haul road is 100 feet with a safety berm around most of its perimeter.

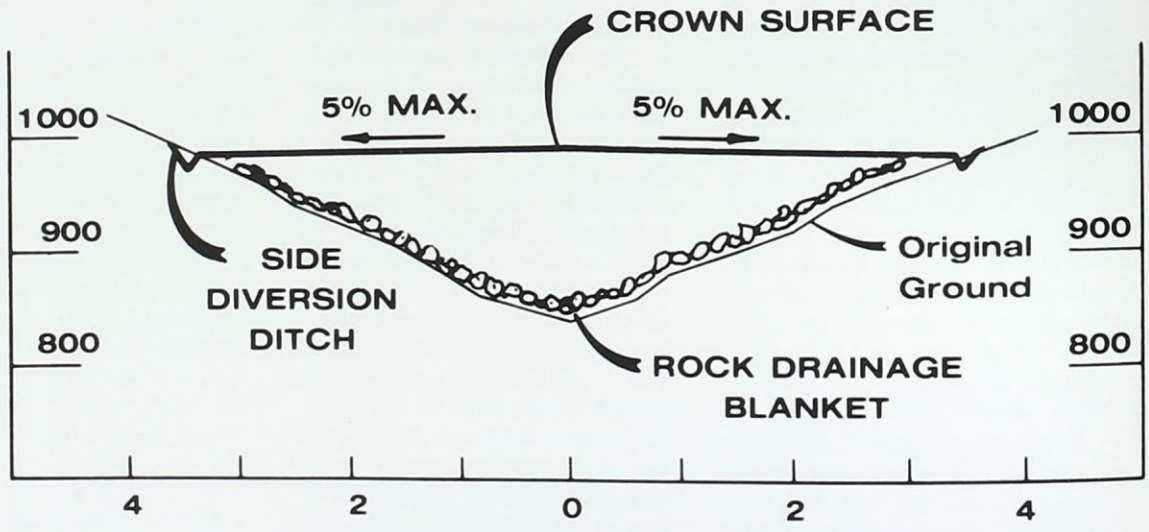
The second phase of fill construction will begin with rehandling of excess material in the haul road. The face of the fill will have final outslopes of 2h:1v with benches 20 feet wide constructed every 50 feet vertically. As opposed to rock core chimney fills, the benches will slope toward "V" type diversion ditches located at the intersection of the benches with the natural ground. The ditches are to be 10 feet wide and 2 feet deep. As the lower benches are completed, they will be topsoiled and seeded.

The remainder of the fill will be constructed by end-dumping from various locations along the haul road outward toward the rim of the valley and rehandling the material as necessary. An important characteristic of this type of fill construction is the segregation of larger boulders and the formation of a rock blanket over the valley floor. This condition is shown in the accompanying photographs. The fact that no seeps or springs were found in the fill area enhanced the feasibility of this construction technique since filter drains were not required. The integrity of the select material utilized in underdrain construction would have been destroyed by this technique.

Skelly and Loy set up a program to monitor the effects of this type of valley fill construction. The program

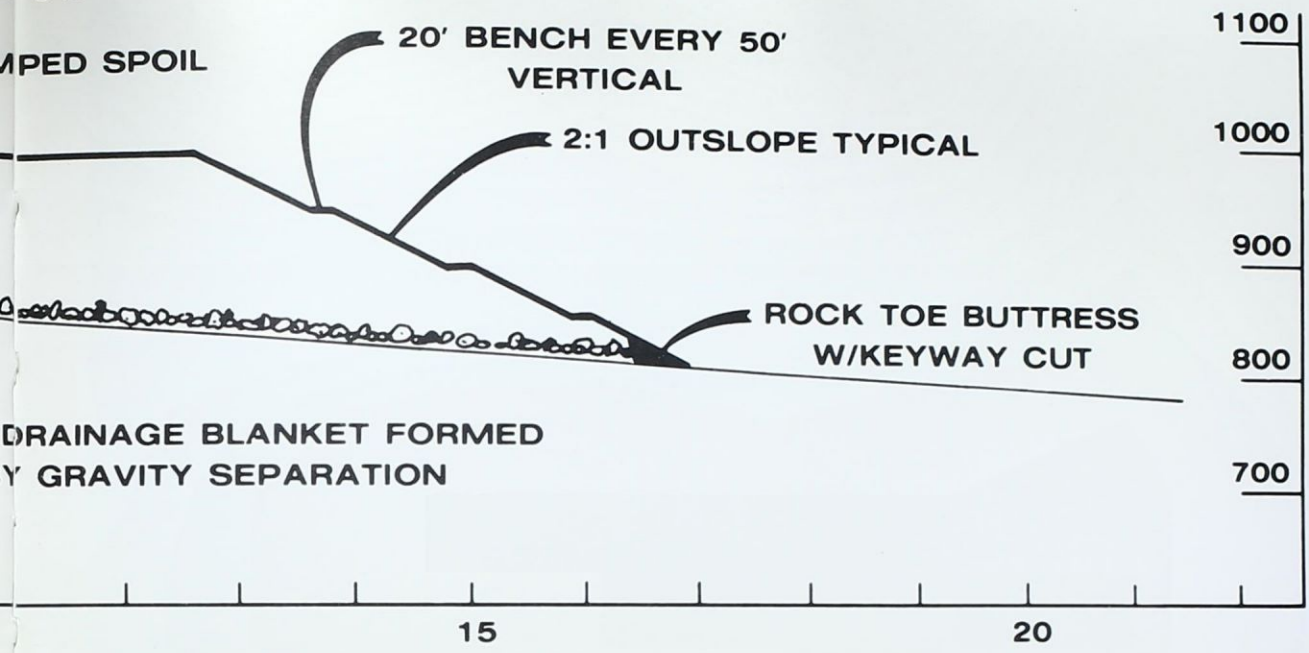


Hollow F



Hollow Fill Cross Section

< 5%



Fill Profile

Side Dumping With Physical Support Construction

Side Dumping With Physical Support Construction

includes water quality monitoring at two locations downstream of the fill, collection of meteorological data, measurement of fill volume and fill settlement, inspection of the rock blanket, and overburden production monitoring. As the monitoring program progresses, the data accumulated will allow conclusive comparisons to be made between the environmental effects of end-dumped valley fill construction and the hauldown technique. However, based on the preliminary results, it appears that end-dumped construction is both economically advantageous and environmentally sound. The cross-ridge mountaintop mining demonstration may be the first step in acceptance of this valley fill concept as a viable means of enhancing mountaintop removal techniques. Amherst Coal Company's cooperation has been the biggest factor in the demonstration's success. This project has proven that technological advances can be made through the collaborative efforts of government and industry.

The site chosen for the experimental fill was Amherst Coal Co.'s 3A mine in Logan County.

The rock drainage blanket is formed by gravity separation.

IS THIS THE STREET WE'RE ON?

Frankly, we feel that this country is running full speed up a dead end street! There appears to be no way out. That seems to be the kind of planning being done by our government, utilities and industry. When the country runs out of oil it will take decades to make up for the time we spent on the dead end street.

Yet, there's plenty of coal for the mining. Coal doesn't have to destroy our landscape or pollute our environment. Sure, it's expensive to reconvert to coal. It's expensive to keep it burning clean. But the coal is there and it is ours. And there's plenty of it.

We're Beckwith Machinery Company, your Caterpillar Dealer, and we think we'd better plan now to use it before we discover there's no way out.

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YOUR CATERPILLAR DEALER

Interview

On election day, 1980, West Virginia's normally obscure spot on the map stood out as an island of Democratic blue in a sea of Republican red. The Mountain State that day was the exception that proved the conservative rule.

But within the state, inconsistency reigned as well. Two Republican candidates for Congress broke the traditional Democratic stranglehold on those offices, and so West Virginia sends a split delegation to the U.S. House of Representatives.

One of the new Congressmen is Mick Staton of Dunbar, who defeated incumbent John Hutchinson for the 3rd District seat. Staton had previously run against the late Rep. John Slack, and had also lost to Hutchinson in the special election following Slack's death. A banker by trade, Staton is regarded as a conservative in the mold so much in favor, currently, with the national electorate. We spoke with Rep. Staton prior to his departure for Washington and the opening of the 97th Congress.

You were portrayed during the campaign, and probably perceived, as a candidate of business. How will this carry over into your term of office?

STATON—That is a characterization which was made to differentiate me from my opponent. I think it would be accurate as well to call me the candidiate of the average citizen. My business stance is simply this. I recognize that government does not create wealth; government does not create lasting employment opportunities; business does that. It's a difference in philosophy from someone who looks to government to solve all of our problems. My idea is to look to business and to individuals to solve those problems. I believe that government's role is to provide a good atmosphere in which to work and grow. It should provide an atmosphere in which a business has a good chance to survive. Whether that business is successful or not, should be up to the abilities of those business people. In that respect my philosophy is oriented toward individuals and free enterprise, as opposed to government and business.

What do you expect will be your working relationship with Governor Rockefeller, and with the other members of the West Virginia congressional delegation over the next two to four years?

STATON—I expect to have a good working relationship with Governor Rockefeller. We're light years apart in our backgrounds, but we have in common the best interests of the State of West Virginia and its people. We may approach problems from divergent points of view, but it will be up to us to meld those views into a

Staton of West Virginia

workable relationship, and I think that certainly can be done. That same line of thinking should apply to my relationship with the other West Virginia congressmen. Congressman Benedict and I will be the new kids on the block and I hope that the senior members of the delegation will give us some guidance in performing our duties as representatives of our districts. I'm sure we can benefit from their wisdom in some of these areas. Certainly, there's no need for us to be complete adversaries, just because we belong to different political parties.

Will the congressional coal caucus be revived?

STATON—As a newcomer to Congress, I can't answer that with any authority. But with the ongoing effort for this country to achieve energy independence, a coal state movement that crosses party and philosophical lines may well be worthwhile. Certainly I would have no problem in being a part of that.

In the new Congress, how far apart will the House and Senate be, philosophically?

STATON—I've heard many people say that the House has a working conservative majority. In both major parties there are people with moderate to liberal stances, but there are some areas where the House has traditionally been more conservative than the Senate. I think that, by and large, the two houses of this Congress will be philosophically in tune, even though they are controlled by different parties. The house of Representatives, of course, will be much more conservative than it has been, based on the election results. All in all, I think you'll see an interesting interplay between a Republican Senate and a Democratic House. Strangely enough, I believe you may see a spirit of cooperation that hasn't been there at times in the past.

Will West Virginia, and West Virginia coal, suffer from the state having voted the "wrong way" in the presidential election? This is what some pessimistic analysts are predicting.

STATON—I don't believe so. Certainly, West Virginia redeemed itself in two congressional races, where the state made a conscious decision to elect Republicans. Those two seats comprise 36 of the 55 counties in the state. I think Cleve Benedict and I will be in a position to exercise some influence that would not normally fall to freshmen congressmen. We may also be the beneficiaries of good feelings toward our state on federal matters. I'm not at all concerned over how West Virginia will fare in Washington under President Reagan.

In recent years, the federal government has verbally stood behind coal as the logical energy alternative to oil. In your opinion, where do we stand today versus that idea?

STATON—I hate to see coal classified as an alternative energy source. It should be considered a primary energy source. If you look back at the time when we first moved from oil to coal, you'll find that that occurred because oil was more plentiful; it was cheaper; it was simply easier to deal with than coal. That's no longer true. And it's my understanding from people in the electric generating business that existing boilers were built to handle a variety of fuels. In other words, the conversion process may not be as difficult as we have been led to believe. Certainly, there are problems to be overcome. But, to me, it makes no sense to continue using a fuel that is four times as expensive per BTU as the supply of coal we have here in West Virginia, and in Kentucky, and basically here in America. You know, we hear all the time about the price of gasoline and the price of heating oil, but it's incredible how reliant on oil we are, from our chemical industry, right down to the clothes on our backs. If oil becomes more abundant due to the coal conversion of power plants and the development of synthetic fuels from coal, then we may well see a desirable ripple effect in the price structure of all those oil based products. In any case, we need to make every effort to encourage and prod and cajol and do whatever we need to do to get power generating plants to go back to using coal. Coal has to become a prime energy source for us, not an alternative.

Do you see any conflict with those goals and the environment, both in terms of environmental concerns and environmental standards that are in place?

STATON—I see some conflict regarding the environmental standards that are in place right now. We have to take a hard look at whether our environmental legislation is realistic, like the Clean Air Act. You know, you can solve the clean air problem right now, simply by not producing automobiles any more, and shutting down all our factories, and taking all those drastic kinds of steps. But I don't think people really

want that done. There are certain things that they are accustomed to, and that they like, and that they don't want to give up. The problem of course, is to strike a reasonable balance, and I think we may have exceeded that in our efforts to protect the environment.

What can the Reagan administration do to improve the energy picture?

STATON—I don't know, at this time, exactly what his legislative package will look like. There have been many concepts under discussion, things like tax incentives, depreciation allowances, and guaranteed loans. I really can't say which ones the President will pursure vigorously and which he intends to put on the back burner. Speaking for myself, I'm generally inclined to favor such things as depreciation allowances, because of the need for business to make a profit. You always have to be concerned about the profitability of business; a business has to be able to operate efficiently. And that goes for public utilities, too. If, for instance, the net result of having people convert to coal would be an increase in the utility bill, then I don't think it's desirable. Obviously what we're after is a decrease in the utility bill, along with an increase in coal production. That's what we have to look at in the weeks just ahead; what vehicle will accomplish these things the quickest and the easiest, whether it's guaranteed loans, which I'm not too crazy about, or whether its fast depreciation or other tax incentives. I don't know yet just what he's going to offer, but I'm anxious to find out, so we can begin to formulate some strategy.

In the general area of energy, how would you rate the President's chances of achieving what he wants, that is in terms of coordination with Congress.

STATON—Excellent. I believe he's going to have a very receptive audience in the Congress because, again, I think that people across the country have indicated, through his election, that they want a change. They elected 22 Republicans out of 34 possible Senate seats, and with this I think they were saying, "things AREN'T better than they were, and I want to try to make things better for me and my children, and I'm going to take this step hoping that a Reagan administration with a different philosophy in the Senate and in the House will do something better for me." So I think he's going to have a very receptive audience in those people who have been elected. I know that I feel a responsibility to do something about that idea in people's minds that things aren't better than they were, that they want to do something to try and upgrade their standard of living. Sometimes this is difficult for people to articulate, but I know what it is, because I've felt it myself. Sometimes, you feel like you just aren't getting anywhere, and it's upsetting. I think what you're seeing is simply a reaction to the particular philosophy that has come out of Washington. People are saying, "I've tried that; it may have been a good idea, but it didn't work; and I'd like to do something different now." So what you're going to see is a willingness on the part of Congress to take different approaches, and that's good news for President Reagan.

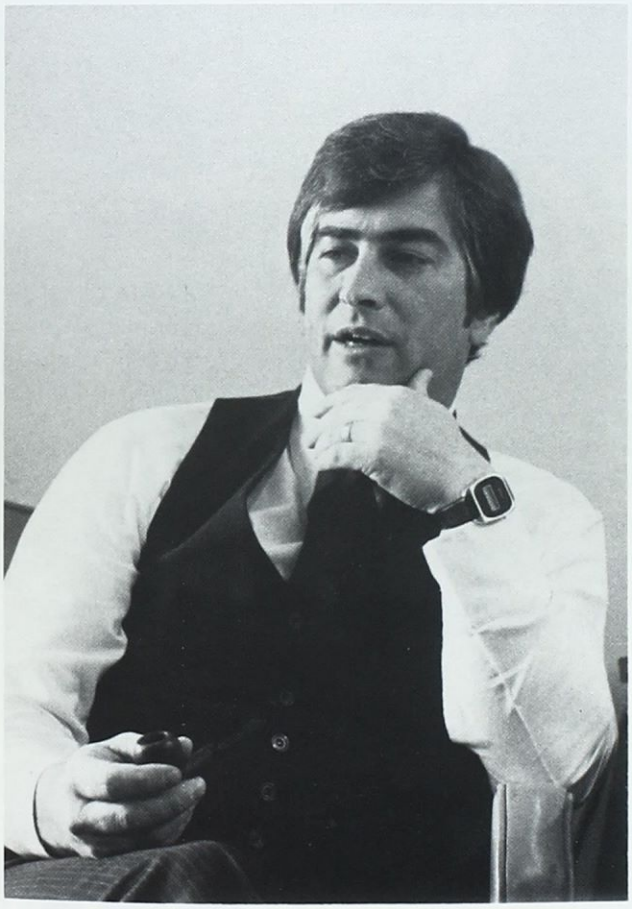
Will this approach have any particular application to energy issues?

STATON—I think so, because by and large, people are recognizing that one of the things that has made our country a good place to live has been an inexpensive supply of energy; that's what's allowed us to have microwave ovens and automatic dishwashers, and you name it. You get out on a Sunday afternoon and drive your car around and take a nice trip with the family and that type of thing. Those things can't be done in the face of a criticial energy shortage. When you separate the good life from just existence, it's generally the availability of inexpensive energy sources that makes that difference. I read a book, by Cornelius Ryan, I believe, and he was talking about the battle of Berlin, and after it was over, and the Marshall plan was enforced, people would have certain hours of the day when they could use electricity. They wouldn't turn it on except for three or four hours at night, and they'd get up at 2:00 in the morning and do their dishes and wash their clothes, and iron, and so forth, and then go back to bed. That's terrible! We're used to getting up, plugging in the coffee pot, and turning on the shower and taking a nice—I just don't believe people want to go back to a caveman existence, and I don't believe we need to. Americans have worked hard to have a good standard of living, and now it depends on our energy situation. I really don't think Congress will ignore that fact.

A final question—what basic legislative program would you propose or support that will address the energy issue?

STATON—In line with my philo-

sophy of allowing business to run itself, I think the most basic and beneficial thing that this Congress can do for the energy industries would be to enact good strong sunset legislation. By strong I mean a requirement that Congress take positive action to continue programs, as opposed to requiring Congress to take negative action in order to stop something. Often sunset legislation means that if the legislative body does nothing, the program continues. I think the program should stop automatically, unless it is renewed, or reinstated. Once Congress is confronted with the ongoing variety of programs up for review, the tendency will be not to pass as many laws to start with. People will put more thought into starting these programs in the first place. One thing we need to do is to provide some relief to the taxpayers in the form of saying "now this is not eternal life when we start this government program." And if it's a good program, then let it continue. That's the important thing. If it's a bad program, if we've made a mistake, then Congress and the government in general has to be willing to admit it. What's wrong with that? We've all made mistakes, but instead of saddling the people with our mistakes for the rest of their natural lives, let's stop them. That's a thing I think is vitally important to bringing the size of the government back under control.



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Reclamation-spot reports

Hybrid poplar yields

In the spring of 1962, hybrid poplars were established on a reclaimed surface mine in Clearfield County, Pennsylvania, using greenwood cutting supplied by the Ohio Reclamation Association. The two-acre planting site was on the outslope of a spoil bank which had not been severely compacted by heavy equipment. Drainage was good and root penetration was not restricted. The spoil was acid (pH 3.8 - 4.2) but not enough so to severely reduce tree growth. During the first 6 years in the life of the plantation, the region was under the influence of drought. Rainfall was approximately three-fourths of normal amounts.

A mixture of hybrid poplar, white spruce and Scotch pine was planted. The planting pattern was one row of hybrid poplar adjacent to either one or two rows of conifers on 6 x 6 foot spacing. Initial survivial of all species averaged 80 percent or higher. Due to the slow growth of the conifers, there was little competition to the hybrid poplars. Average spacing of the poplars was about 6 x 20 feet.

In 1978, approximately 600 trees were harvested from the 2-acre plantation. According to Walter Davidson—Research Forester at the Forestry Sciences Laboratory in Princeton, WV—after 16 growing seasons, the trees averaged 10 inches in diameter and 65 feet in height. Total yield from the harvest was 90 tons of pulpwood bolts and 9,400 board feet of lumber. This equals a growth rate of about 2 cords per acre per year. Compared to a rate of 0.7 cords per acre per year for yellow-poplar on site index 100, the hybrid poplars have performed exceptionally well on this site.

It is doubtful that the conifers will develop into usable trees because of suppression by the hybrid poplars. In future plantings, it may be better to use alternate rows of a shrub species rather than conifers. Such a planting would be of greater benefit to wildlife and should still eliminate the need for early thinning. Especially beneficial to the poplars would be a nitrogen-fixing shrub such as Autumn olive or European alder. The feasibility of such a planting was demonstrated by Willis Vogel, Range Scientist at the Forestry Sciences Laboratory in Berea, Ky. In Eastern Kentucky, a surface mine (spoil pH 5.4) was planted with hybrid poplar cuttings in alternate rows with autumn olive. After 12 years, the hybrid poplar trees averaged 8.5 inches dbh and were from 55 to 60 feet tall. The autumn olive plants were about 15 feet tall and produced an abundant crop of fruit for wildlife food.

Acid mine drainage task force

On Tuesday, September 23, 1980, the West Virginia Acid Mine Drainage Task Force conducted a tour of several surface mining operations located in the Middle Fork and Buckhannon River drainage areas to evaluate the effectiveness of special overburden handling techniques in improving active and post-mining water quality. Guidelines for overburden handling were published in July, 1979 as state-of-the-art technology. Since that time, many operators have used several variations based on site specific conditions of the basic principles recommended.

In all cases where a conscientious effort has been made in the method of operation to improve water quality, favorable results have been achieved to some degree. Continued observation will be necessary over a longer time period to fully evaluate permanent effects.

Our observations indicate that revegetation and surface stabilization is not a significant problem. All operations either stockpile topsoil or use a topsoil substitute, usually light grey mudstone, with plant nutrients and growth potential equal to or greater than the original topsoil. Chemical characterization to identify this substitute material is being done routinely.

Often surface mining operations intercept abandoned deep mines which discharge low pH water. Usually these deep mines are small and localized. Water discharging from these mines is likely to remain unchanged in quantity or quality as a result of the surface mining unless the full extent of the deep mine is stripped out. Most operators, being aware of the potential for perpetual liability, are now carefully identifying these deep mine sites and performing baseline water quality studies in the pre-mining stage. Additionally, most operators are conducting extensive surface and ground water studies not only of specific permits but of larger coal reserve areas where potentially acid-producing overburden may exist.

Significant progress has been made toward advancing the art of surface mining to improve water quality; however, we have only just begun. Current experimentation is being conducted by both the surface mining industry and the academic community to further our knowledge of the factors involved in acid water production. While it has been demonstrated that our current knowledge and techniques can effectively reduce the probability of adverse environmental effects of surface mining, there are many areas where additional study is imminently needed. The Acid Mine Drainage Task Force is actively encouraging support and participation from both industry and government.

Charles J. Miller
Chairman

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ASSOCIATION NOTEBOOK

Semi-Annual Meeting

Plans are nearly complete for the Association's Semi-Annual Meeting. The three day gathering is scheduled for February 12-14, at Marco Beach, Fla. In addition to the usual social functions, the agenda also includes a Board of Directors meeting, as well as meetings of all Association committees. Technical sessions will focus primarily on the transportation and market problems of today's coal industry.

Annual meeting

While members contemplate the prospect of our winter (Semi-Annual) meeting, plans are going forward for the 1981 summer (Annual) meeting. Program details will be announced as they become available, but members may wish to circle the dates July 30-August 1. That's when we'll gather at the Greenbrier.

New members

The Association extends a warm welcome to the following new members: General Division—B. & B. Coal Co., Inc.; Invesco International Corp. of Alabama No. 4; McNamee Resources, Inc.; Patriot Mining Co., Inc.; Riverside Mining, Inc.; Perry & Hylton, Inc.; Eagle Coal & Dock Co., Inc.; Primrose Coal, Inc.; Associate Division—Bowser-Morner Testing Laboratories, Inc.; Draper-Aden Associates, Inc.; The H. C. Nutting Co.; H.S.W. Investors, Inc.; James D. Harris, Jr.; John McNair & Associates; Josten's Inc.; Mt. State Bit Service, Inc.; Ralph Lemon Co.; Super South Fibers; Vencoal Inc.; West Virginia Welding Supply Co.

The total Association membership now stands at 341.

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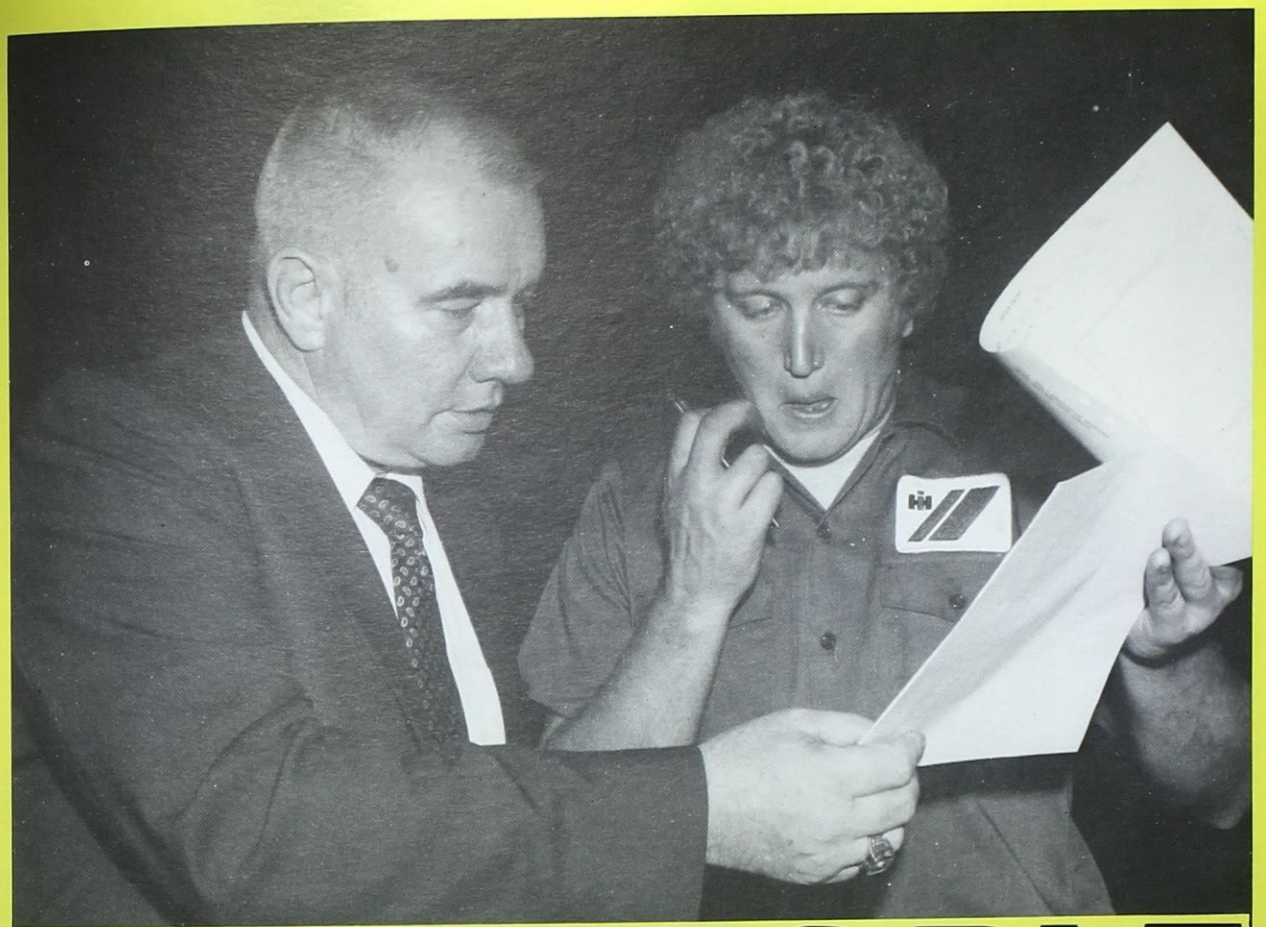

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As Green Lands completes its 10th year of publication, we would like to recognize some friends of long standing. The companies illustrated here have been continuous advertisers in Green Lands for at least five years. We thank them and look forward to recognizing a larger group when the magazine turns 15.