EXECUTIVE SUMMARY
RESEARCH AND DEVELOPMENT PRIORITIES SURFACE MINING RECLAMATION

Volume II

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NOTICE

The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies or recommendations of the Interior Department's Bureau of Mines or of the U.S. Government

EXECUTIVE SUMMARY

INTRODUCTION

Workshops were held in eight states during the period from December 12, 1975, through June 25, 1976, under U. S. Bureau of Mines Contract to the University of Missouri-Rolla. The workshops were designed to help define the Bureau's research and development priorities. At each workshop a summary of the current Bureau mine reclamation research was presented which was followed by identification of problems associated with mine land reclamation in the state where the meeting was being held. Discussions included the seriousness of problems locally and how the Bureau could best undertake research to assist the state in solving the problems identified. Participants included representatives of state agencies, educational institutions, and companies involved in surface mining.

Attendance at these workshops totaled 201 persons who displayed a wide variety of opinions and ideas as to what should be done in government research and development efforts. A breakdown of these attendees is as follows: 91 state and Federal employees; 69 mine operators, equipment manufacturers and consultants; 33 educators and researchers; and 8 others representing such varied interests as environmental and conservation groups, news media and students.

Meetings were publicized through news releases published several weeks in advance by the Department of the Interior. Assistance in setting up meetings was furnished by members of the Division of Environment, U.S.B.M. and by Bureau state liaison officers in the state where meetings were held. Selection of individual states for meetings was based upon obtaining information which represented the typical range of reclamation problems to be found throughout the nation.

This executive summary covers the major points of commonality pointed out in the eight separate state reports which follow. Readers who wish

information specific to the states involved are referred to these individual reports.

SUMMARY

The major points which should be considered in the formulation of research and development efforts and new regulatory procedures by the Federal government are as follows:

1. All states visited, with the exception of Alaska, have reclamation laws and functioning enforcement agencies that serve the interest of each state. The water control laws of Alaska serve to control problems associated with their placer mining operations as well as all other mining operations that use or impart on the streams systems. The principal differance in state laws is the degree of experience or time span of the Industry in each state. The older mining areas of Appalachia contrast sharply in this respect with the new mining operations of Montana and Texas.

2. Physical conditions in the individual states are the controlling factors on reclamation practices. Topography, soil conditions, rainfall, temperature, etc., serve to control the manner and the form that reclamation assumes. Broadly speaking, reclamation problems of the nation can be divided into five separate and distinct areas. They are Appalachia, the Mid-Continent region, the Northern Great Plains and Rocky Mountain area, the Southern Great Plains and Gulf area, and Alaska. Each area will be highlighted in the discussion portion of this summary.

3. Conflicting and unrealistic regulations present problems between state, Federal, and local agencies of government. Safety requirements sometimes conflict with good reclamation practice. State requirements and Federal requirements should be formulated together to prevent differences. They should complement rather than duplicate or conflict with each other.

4. Communication between parties, along with education and training, were areas of concern for all states. Principal problems were in information dispersal, the lack of baseline data and the need to upgrade training and education of all concerned. The environmental awareness of the public has called fore more stringent standards and has resulted in rule changes. The expansion of the mineral industry has resulted in many new operations and new operators and the constant turnover in the inspector force dictates that education and training will be a continuing problem.

5. Alaska is unique among our 50 states. It has the largest area, most hostile environment, unusual problems in the permafrost condition, little political support for the mining industry, many fractionated political organizations, special land/mineral ownership problems, critical socio-economic impacts, all coupled with a tremendous potential for surface mining. It requires a unique study program to meet its needs in the research and development area in order to be prepared for future mining operations.

DISCUSSION

Appalachian Region

The states of West Virginia, Pennsylvania, Ohio, and Kentucky, particularly eastern Kentucky, characterize the steep or rolling topographic conditions which normally result in surface mining operations involving contour mining or mountaintop removal mining. The mining industry is well developed and the state laws and inspection agencies have been functioning for many years. All in all they can be considered mature in their outlook toward surface mining. The major problems of the area center upon erosion control, control of sedimentation, revegetation, highwalls associated with contour mining, acid mine water, waste disposal, and reclamation of orphan lands. In general, due to the very adequate rainfall in these areas and the normally

fertile soil conditions, revegetation can be accomplished with relative ease. The same rainfall, however, creates the problems of erosion and sedimentation. Again, by applying existing technology, through the use of such things as terraces, diversion ditches, porous rock drains, siltation dams, quick growing plants, etc., these problems can be controlled. It was apparent that adequate planning by the mine operator is an essential ingredient to the development of good reclamation.

Highwall problems associated with contour mining are rapidly becoming a thing of the past as all states require the mined land to be reclaimed to near its original contour. The block cut and haulback mining system have served to backfill against the highwall and eliminate unsightliness of an abrupt scar on the landscape. These mining systems also eliminate slope stability problems from material being pushed down slope as was done when using old mining systems.

Acid mine water problems vary greatly from region to region and state to state and are associated with local geologic and mineralogic conditions and long-abandoned underground coal mining operations or surface disposal sites. Auger mining practices have, in the past, sometimes contributed to acid problems and it is necessary that auger holes be properly sealed to prevent development of acid water where abundant sulphur is present. It is important to examine the soil chemistry and the ground water hydrology to be able to cope with these problems.

Mid-Continent Area

Although Illinois was the only state visited in this area, it was felt this state reflected conditions in Indiana, western Kentucky, and Missouri. Representatives from Missouri and Indiana attended this workshop. The basic problems of this area centered around a reestablishment of the soil on top of

the mined material, the need for baseline data to determine what has been and what can be done, the reclaiming of land for its highest use and the problem of surface subsidence associated with ground movements from old underground mines. While it was mentioned that a catalogue of abandoned mines should be made, it was pointed out, that the Illinois Survey and Southern Illinois University had conducted such studies. Surface mining in Illinois is by the area stripping method and companies involved in the operations are large and have the financial ability and the engineering knowledge to engage in good reclamation practice. The recently passed Illinois law places very rigid requirements upon the manner in which top soil should be placed back on the spoil area and this presents serious problems for the operator. It was pointed out that soil conditions differ markedly between southern Illinois and northern Illinois so that the same technique of revegetation and the same species of plants can not be used in both areas. Gob piles from old mines present some pollution problems and studies were suggested as to how these piles might be removed or, perhaps, placed back underground.

Northern Great Plains and Rocky Mountains

Montana was the state chosen to represent this region as it has vast reserves of mineable coal occuring both in the plains area and in the Rocky Mountains. It also has recently enacted surface mining reclamation legislation. The problems of this area center around soil chemistry, spoil handling systems, revegetation problems in a semi-arid environment, and political and social problems associated with establishing a new mining industry. The coal mines of Montana are extremely large but are few in number. Decisions made by inspectors in regard to these operations have a major economic impact if changes must be made in the mining systems after operations have started. It is anticipated that major problems can result if close liaison is not maintained

between the Federal agencies and the State Department of Lands in Montana, as vast acreages are under Federal control. This is a particular problem along railway right-of-ways where the land ownership pattern is checkerboarded between the railroads and the Federal government. It can be extremely difficult for a mine operator to develop a reserve in a continuous manner for mining. The state of Montana has developed selective criteria for denial of mining. Research should be done to determine just how realistic this denial procedure is in view of the advancing technology of the surface mining industry. There is a strong environmental awareness on the part of the public and a strong demand upon the elected officials of the state to respond to these environmental feelings. This is reflected in part by the passage of a 30% severance tax which tends to discourage new operations and limit mining within the borders of Montana. Mine operators have, for example, favored the development of new mines in Wyoming and North Dakota due to this higher than normal tax.

Southern Plains - Gulf Area

The State of Texas has large reserves of low-sulphur, lignite coal in which mining is being expanded to feed power generating plants of Texas and other southern states. The areas being mined are blessed with a geologic and climatic condition which makes reclamation and reestablishment of vegetation extremely easy. It was stated that the reclaimed lands are normally better, more fertile and more productive than the original undisturbed land on which the surface had been leached and a hardpan developed. Texas does have a strong reclamation law recently passed, and a young inspection force which will need education and training.

Research into types of vegetation best suited for mined area was mentioned and mining problems involving thin seams and multiseams were discussed.

Texas has a very positive attitude toward new mining operations and there was an optimism shared by both the inspectors and mine operators that they could and would do as good a job of reclamation as was physically possible.

Alaska

Alaska is unique in that it is geographically situated away from the "lower 48", far to the north and represents the largest land mass in a single state. It has the most hostile environment in which mining can be conducted and at the same time is the most sparsely populated. While Alaska has a potential to become a great mining area, at present little mining is being undertaken and there is little likelihood that, under the present political climate, many new mines will be started in the near future. Vast areas of Alaska have been taken out of the mineral exploration domain due to land withdrawals by the Federal government and associated agencies. Alaska does not have a reclamation law as such but it has strong water control laws which serve to control activities associated with placer mining as well as all other types of mining that use and impart upon water systems. The other current mining in the state is a small amount of coal mining, a small amount of base metal mining, and sand and gravel operations which are normally associated with placers. The permafrost conditions in Alaska present a special challenge to the mine operator. New mining systems need to be developed. Transportation is a problem in Alaska as no major railway or highway system exists throughout the state in relationship to mineral resources.

Alaska is plagued with social problems in the form of extremely high wage scales, partly brought on by the construction of the Alaskan pipeline, a transient labor force, lack of trained local persons to meet labor needs, and an extremely high cost of living. These conditions are not conducive to the development of new mineral resources.

CONCLUSIONS

The United States Bureau of Mines research should address the specific problems as stated in detail in the attached reports.

Federal policy should reflect an awareness of the reality that good state land reclamation laws and plans are now being implemented or are being formulated and any new legislation by the Federal government when required should be developed in such a manner as to complement state and local efforts.

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USBM Contract No. H0242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN PENNSYLVANIA

JOINTLY SPONSORED BY PENNSYLVANIA STATE

UNIVERSITY AND UNIVERSITY OF MISSOURI-ROLLA

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INTRODUCTION

This report covers the findings of a workshop held with various segments of the mining industry for the State of Pennsylvania under U.S. Bureau of Mines Contract #H0242034. The meeting was held in New Cumberland, Pennsylvania on June 25, 1976, at the Sheraton Motor Inn. This workshop was jointly sponsored by Pennsylvania State University and the University of Missouri-Rolla. The format of the workshop differed markedly from other workshops in this series in that the entire morning session was devoted to informing the attendees of the many on-going programs in land reclamation at Pennsylvania State University. The afternoon was devoted to open discussion with all attendees involved.

Mr. William Kebblish, State Liaison Officer for Pennsylvania, Mr. Don Donner, Division of Environment, Denver, Colorado and Mr. Dan Jones, Division of Environment, Washington, D.C. were most helpful in assisting the author in setting up this workshop.

A special note of thanks to Dr. Robert Stefanko, Dr. R. V. Ramani, Dr. T. W. Saperstein, Dr. H. L. Lovell and Dr. A. W. McKee, all faculty members of Penn State University, for their assistance and for presenting the morning program at this workshop. Twenty-four persons were in attendance, representing state and federal agencies, the mining industry and universities.

GENERAL CONDITIONS IN PENNSYLVANIA

Pennsylvania has probably the most advanced, mature programs in land reclamation of any state visited in this series of workshops. The state has passed and implemented strong reclamation regulations over an extended period of time. The standards set forth in Pennsylvania have often served as the model for other states in the development of state reclamation laws. A major problem in the state is the large number of small operations scattered throughout the state. Inspection agencies are taxed in their ability to

fulfill their roles. Manpower turnover is a problem in agencies due to relatively low wage scale and this turnover also requires the constant education and training of the inspection force. Regardless of these facts, the rapport between state officials and industry appears good. Both groups feel that sound reclamation practices are being employed but that these practices must constantly be reviewed and improved upon by a strong program of research and development.

MORNING SESSION

Don Donner opened the program with a short review of the present program of the U.S. Bureau of Mines in land reclamation. This was followed by Dr. Ranraui's presentation of facts and figures on Pennsylvania production and its role in mining. Dr. Ramani represented Dr. Stefanko as he could not attend the workshop due to another commitment.

Dr. Saperstein gave a slide presentation which showed conditions in Pennsylvania. His discussion covered good reclamation practice, equipment sizing problems, multiseam mining problems and generally the operational problems of land reclamation.

Dr. Lovell then presented a talk on ground water problems, erosion control, acid water problems, etc. He placed emphasis on the timing and sequence of mining and reclamation. He suggested that the Hittman Assoc. Study for E.P.A. entitled "Manual of Practice to Control Sediments in Mining" was a good guide for operators with sedimentation problems.

Dr. McKee then discussed revegetation problems and submitted the following outline which summarizes his thinking on this topic.

SUMMARY OF REVEGETATION PROBLEMS

1. Need for better and more systematic analysis of site factors before revegetation.
   a. Delineate limiting physical factors

      aspect — stability — moisture availability

      color — compaction

      slope — particle size

   b. Delineate limiting chemical factors

      pl2 — fertility (P, K, Ca, Mg, N)

      lime needs — soluble salts

      water soluble and total Al & Mn
2. Select site use in terms of limiting physical and chemical characteristics.
3. Develop better and alternative mixtures of compatible plant species in accordance with potential site use and limiting chemical and physical factors.
   a. Adaptation of species
   b. Species compatability
   c. Compatability of trees, shrubs, and habacevus species
   d. Identify, test and develop seed sources of native species adapted for use on reclaimed sites
4. Develop and test better establishment strategies for revegetation of disturbed sites.
   a. Ameliorate limiting physical factors

      stabilize slopes

      break up compact layers - disc or rip surface

      modify microclimate - mulches

b. Ameliorate limiting chemical factors

liming (surface, subsurface)

fertilization - slow release sources of N

c. Seeding technique

surface (conventional equipment)

hydroseeding

aerial

d. Mulching techniques

e. Maintenance - if needed lime, fertilization, reseeding, etc.

f. Erosion control

5. Economic factors

6. Research needed for revegetation.

a. Ways to break up compacted layers of spoil after replacement of soil completed

b. Ways to predict acid producing potential of spoil in upper 2 - 3 feet of fill and possible levels of soluble Al and Mn

c. Test sources of slow release N

d. Summarize available data on adaptation and compatability of various species useful for revegetation

e. Test compatability of trees, shrubs, grasses and legumes

f. Identify, test and develop seed production of native species useful for revegetation of coal wastes

g. Summarize available data on seeding techniques and erosion control on coal wastes

h. Economic aspects of revegetation

i. Application of soil to mined spoil

alternatives

depth needed for various purposes

j. Demonstration of revegetation techniques

k. Transfer technology for revegetation from agriculture to mining

RESEARCH PROJECTS SUGGESTED IN OPEN DISCUSSION

Following is a list of areas which the attendees felt should be considered for research by the U.S. Bureau of Mines:

1. Erosion Control
2. Water Pollution and Ground Water Contamination
3. Blasting
4. Waste Disposal of Reject
5. Slope Stability
6. Productive Crops on Reclaimed Land
7. Education and Training
8. Demonstration Plants
9. Equipment Development
10. Anthracite Problems

DISCUSSION

1. Erosion Control

Erosion problems are accentuated due to the need for separating and storing topsoil for later placement on top of the spoil. Mining systems and materials handling techniques must be coordinated to assure that excessive siltation does not take place. As mentioned previously, the Hittman study should serve as a good manual to guide the operator. Soil sampling should be done to determine the characteristics, both physical and chemical, and the manner in which it will act when stacked and when again regraded on top of the spoil.

It was particularly pointed out that inspectors need to be educated and trained specifically in problems of soil erosion. Due to the turn-over in the inspection force, any program must be a continuing one to assure that continuity of effort is carried out from season to season.

2. Water Pollution and Ground Water Contamination

In the past, private wells and springs have been affected by pollution from nearby mining operations, both surface and underground. The attendees emphasized that programs to prevent pollution should be developed that are permanent and that will not break down or deteriorate with time. Normal practice is to bury acid-producing materials and cover them with impervious clay layers. If an understanding is not developed of the flow of water in the natural water table, this sealing action may tend to force pollutants into the natural aquifers. Acid treatment plants have been used, but often they are only temporary remedies for a more deep-seated problem. There is a need to define water sheds and also to develop burial and sealing systems for toxic materials.

There are two letters in the appendix of this report describing the mine drainage treatment facility at Hollywood, Pennsylvania, and some of the work that has been carried on water pollution control in the past. These letters point out that, while EPA and State research funds have been drawn down to near 0, the Hollywood, plant remains a viable research facility if funding is provided. The plant will continue to be utilized as a research facility, both for the Department of Environmental Resources and for the Pennsylvania State University. The plant is available to others wishing to conduct research with operation and maintenance supervision provided by the Department of Environmental Resources.

3. Blasting

Whenever blasting is carried on near residential dwellings or populated areas nuisance complaints often are generated. These complaints most often center upon noise due to air blasts, dust generated and complaints about blasting vibrations. Often the damage by blasting vibrations is of little consequence when the problem is thoroughly studied. The psychological

problem and the public relations problem generated by blasting causes the operator much more grief. Often these problems can be remedied by changing the time of blasting, limiting the amount of explosives detonated per delay and by a thorough program of education of the neighbors surrounding the property. Blasting has, in some cases, affected underground mines underlying surface operations or in close proximity. While it was pointed out that the Bureau has ongoing programs dealing with all of these problems, the attendees felt that the problem was serious enough that continued research was needed.

4. Waste Disposal of Reject

There is a trend toward more thorough cleaning of coal at the mine site to eliminate as much inert material and sulphur bearing material as possible as an aid to decreasing air pollution. This greater tonnage of reject must be disposed of and studies should be initiated as to the best methods. It was suggested that a study should be undertaken to determine the feasibility of injecting reject into old underground workings.

5. Slope Stability

Regulations in Pennsylvania often call for the slope of the open pit operation to be restored to its original contour. In areas where the slopes are steep in their natural state, this presents a problem when the material is broken in the spoil pile and then put back to the same original contour. Since the material has been disrupted the slopes may be unstable. Several attendees felt there was a need to investigate back-tilted terraces sloping toward the high wall and, in this manner, the long slopes which present erosion and stability problems could perhaps be made more stable. The long, continuous slopes called for under present regulations tend to accentuate the erosion problem. Terraces help but it requires a combination

of good engineering practice plus compaction and vegetation to assure stable slopes.

6. Productive Crops on Reclaimed Land

Attendees felt that research into new plant types which might produce cash crops or crops of a different type than is normally raised in the area might be worth while. These studies should probably be coordinated with agricultural studies.

7. Education and Training

A problem exists in Pennsylvania in that there are many small mine operators mining deposits that are of relatively small size. There is a close relationship between the demand for coal at any particular time and the number of leases that the operator will hold. This fact makes it difficult to reach these operators in a continuing manner to inform them of new technological developments which may improve their reclamation practices. For this reason it was suggested that workshops and training sessions held in close proximity to the mining operations could serve as an effective vehicle to train and educate an operator in whatever is new for him to use.

8. Demonstration Projects

Demonstration projects were highly recommended for government funding. There was also strong sentiment expressed for a "technique support program" which could be incorporated with demonstration projects to show the operator first hand just what can be accomplished through the use of the best reclamation practice.

9. Equipment Development

While the attendees felt that the Bureau should do some research work into the conceptional aspects of mine machinery, it was felt that the

equipment manufacturers are best able to build and develop new machines. It was pointed out that the mix of machinery used in mining and reclamation must be carefully considered to obtain the highest degree of efficiency in the total process.

10. Anthracite

Pennsylvania has a large reserve of anthracite coal as yet unmined. The attendees felt that anthracite presented a separate problem in reclamation due to the steep dip of the seam and the thickness of the deposit. The water in the anthracite area presents a severe problem in reopening mines. If this area is to be mined in the future, new mining systems and techniques will have to be developed. The scars of the past will not be repeated. There was some discussion that there is need to develop a covering to obtain growth on old spoil banks which presently dot the anthracite mining regions. It was suggested it might be possible to use a coating of sewer sludge to provide the necessary humus and nutrients to support vegetation.

CONCLUSIONS

Pennsylvania is very similar to Ohio in the type of problems that exist and in their approaches to solutions. The state has a well planned, fully developed, mature reclamation effort. The principal thrust of the U.S. Bureau of Mines should be to complement the state program assisting in areas where some weakness occur and thereby strengthen the total program.

APPENDIX

LIST OF ATTENDEES

Anderson, Howard K., U.S.B.M.-DEA, 2401 E. St. N. W., Washington, D. C.

Barker, Kenneth R., MSA, Evans City, PA 16033

Bitler, John R., U.S.B.M., Pittsburgh (EFOC)

Donner, Don, U.S.B.M., Bldg 20, Federal Center, Denver, CO 80225

Fowler, D.E., Res. Mgmt., DER

Goodman, Stephen D., Pennsylvania State University, 302 Forest Research Lab, School of Forest Resources, University Park, PA 16802

Gunnett, John W., Skelly & Loy, 2601 N. Front St., Harrisburg, PA 17110

Heins, Walter N., DER, Fulton Bank Bldg, 9th Floor, Harrisburg, PA 17120

Johnson, Donald H., Kristignson & Johnson Con. Co., Inc., Lanse, PA

Jones, Daniel A., U.S.B.M., 2401 E. Street, Washington, D.C. 22003

Kebblish, William, U.S.B.M., P.O. Box 783, Harrisburg, PA 17108

Laughlin, Robert D., Pennsylvania Dept. of Commerce, Room 400 S. O. Bldg, Harrisburg, PA 17120

Lovell, Harold L., Pennsylvania State University, Mining Dept., 108 Mineral Industry Bldg, University Park, PA 16802

McKee, Gary W., Pennsylvania State University, 219 Tyson Bldg, Dept. of Agronomy, University Park, PA 16802

Mohney, Franklin H., Pennsylvania Coal Mining Assn., 240 North 3rd St., Harrisburg, PA 17101

Molinski, A.E., Res. Mgmt., DER

Pennock, Roger, Jr., Pennsylvania State University, 119 Tyson Bldg, PSV, University Park, PA 16802

Ranraui, R.V., Pennsylvania State University, 116 Mineral Ind. Bldg, University Park, PA 16802

Saperstein, Lee W., Pennsylvania State University, 123 Mineral Ind. Bldg, University Park, PA 16802

Schaeffer, J.J., Ch. Engr., R & P Coal, Indiana, PA

Schubert, Jeff, Argonne National Lab

Thompson, Dick, Dept. of Env. Resources, Bur. of Surface Mine Reclamation, Fulton Bldg Box 2063, Harrisburg, PA 17120

Vutukuri, V.S., University of New South Wales, Broken Hill Division, Broken Hill, N.S.W., Australia 2880

AGENDA

SURFACE MINING RECLAMATION WORKSHOP FOR PENNSYLVANIA

CO-SPONSORED BY UNIVERSITY OF MISSOURI-ROLLA
AND
PENNSYLVANIA STATE UNIVERSITY

June 25, 1976

Sheraton Inn, Interstate 83 & Pennsylvania Turnpike
Harrisburg, Pennsylvania

8:30 - 9:00	Registration and Breakfast - Coffee and Rolls
9:00 - 9:10	Welcome and Introductions--Dr. Scott, University of Missouri-Rolla
9:10 - 9:40	U. S. Bureau of Mines Present Research and Development Program concerning Surface Mining Reclamation, Mr. Don Dorner, Division of Environment, U.S.B.M., Denver, Colorado.
9:40 -12:00	Problems of Pennsylvania in Surface Mining Reclamation--All Attendees--Dr. Robert Stefanko, Assistant Dean, Pennsylvania State University--Chairman

SUGGESTED TOPIC AREAS

1. Erosion Control
2. Topsoil removal, stockpiling and placement
3. Mining effects on ground water
4. Material handling
5. Disposal of acidic bearing strata
6. Physical characteristics of overburden
7. Physical characteristics of spoil
8. Equating mine characteristics (pit length and depth, size equipment, etc.) to optimum scheduling of reclamation.
9. Tree planting and survival
10. Others suggested by attendees.

12:00 - 1:15	Lunch
1:15 - 4:00	Open Discussion
4:00 - 4:15	Workshop Summary - Dr. Scott
4:15	Adjournment

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES
P. O. BOX 1467
HARRISBURG, PENNSYLVANIA 17120

In reply refer to
RM-AL

June 28, 1976

Professor James J. Scott
School of Mines and Metallurgy
University of Missouri-Rolla
125 Mining Building
Rolla, Missouri 65401

Dear Professor Scott:

I enjoyed attending the workshop on "Surface Mining Reclamation Research and Development Needs for Pennsylvania" on June 25th. The spectrum of comments was most interesting.

To insure that participants will be fully aware of the use of our Mine Drainage Treatment Facility at Hollywood, Pennsylvania, I would like to clarify the status of that facility. You may recall that one of the operators was disturbed that this facility had been "closed".

While EPA and State research funds have been drawn down to almost zero, the plant remains available for valid research if funding is provided. The following two extracts from a March 24, 1976 memo on this subject should clarify this point:

> "The plant has been in use since 1973 when the Department of Environmental Resources became the owner of the installation. A research project on the treatment of acid mine drainage by the Alumina-Lime-Soda Process has just been recently completed. The Hollywood Plant was used for this project from December, 1974 through June, 1975. In addition to this project The Pennsylvania State University has been working on an Acid Mine Drainage Research Project, which started back in 1973 and ran concurrently with the above project. The project is completed although the equipment remains on the site.

Professor James J. Scott June 28, 1976

What are our plans for the plant and will it remain there? The plant will continue to be utilized as a research facility by both this Department and The Pennsylvania State University, and there are no plans for moving or eliminating the plant. The plant is available for use by any college, university or government agency that wishes to conduct research on acid mine drainage, providing this Department is kept informed as to the results of the project. We also reserve the right to provide operation and maintenance supervision."

As for the transfer of technical information, our Mine Drainage Abstracts, A Bibliography, is our best effort at keeping interested people informed of mine drainage efforts on a national basis. Since it is an annotated bibliography, a certain degree of selectivity is inherent in this publication. We have initiated several improvements including four cross-indicies to assist users. A user who is truly interested in a report should have little difficulty in obtaining a copy of a report.

Thank you for inviting me to the workshop.

Sincerely yours,

D. E. Fowler, Special Assistant
for Land and Water
Resources Management

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES

POST OFFICE BOX 2063
HARRISBURG, PENNSYLVANIA 17120

July 27, 1976

James J. Scott, Professor
University of Missouri-Rolla
Mining Engineering
125 Mining Building
Rolla, Missouri 65401

Dear Jim:

I want to thank you for being able to participate in the Bureau of Mines Workshop for Pennsylvania.

You had stated that if we had any other items which did not get placed before the group for discussion that we should submit them to you for your report.

In Pennsylvania, it has been a practice to use clay barriers in certain areas to restrict ground water flows. Also, in certain cases the natural barriers were removed and clay barriers used to replace the natural barriers. Examples of this, are natural barriers which contain old underground entrys or old auger mining. Pollutional discharges can and often do flow out of these openings.

We are compelled by law to attempt to consider permanent types of treatment for pollutional discharges which result after completion of mining and restoration. Special concern are those discharges which result after bonds are released.

Very truly yours,

D. R. Thompson

D. R. Thompson, Chief
Division of Mine Drainage
Control & Reclamation

DRT:gl

USBM Contract No. H0242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN OHIO

James J. Scott

Department Mining, Petroleum and Geological Engineering
University of Missouri-Rolla
Rolla, Missouri 65401

June 18, 1976

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D.C. 20240

INTRODUCTION

This report covers the findings of a workshop held with various segments of the mining industry for the State of Ohio under U. S. Bureau of Mines Contract #H0242034. The meeting was held in Cambridge, Ohio, on June 18, 1976, at the Ramada Inn. Mr. William Miska, State Liaison Officer for Indiana and Ohio, Mr. Dan Jones, Division of Environment, Washington, D.C., and Mr. Don Donner, Division of Environment, Denver, Colorado, were most helpful in assisting the author in setting up this meeting. Eighteen persons were in attendance, representing state and federal agencies, the mining industry and university personnel.

CONDITIONS IN OHIO

Ohio has a history of good reclamation practice for a number of years. Ohio's original land reclamation law was passed in 1948 and was strengthened in 1968 and 1972. The law requires quick reclamation with emphasis upon grasses to provide ground cover and control of water and erosion. Top soil is separated and spread upon the recontoured land in an attempt to provide an adequate seedbed. Costs of reclamation are quite high, perhaps near $3,000 to $5,000 per acre. There are presently between 430 and 480 active mining operations in the state. There is little or no problem in obtaining labor and where mining is presently being done, expansion of these operations is not too difficult. In areas where new mining is planned, the local populace tends to resist the setting up of mining operations. It was generally felt by the conferees that the technology is available to do good reclamation and the principal problem seems to be in seeing that it is planned early in the operation and carried to completion.

The research projects outlined in this report are all classified as being in the technical area but, naturally, some must interface upon the political arena. It was not felt that political problems are serious for the operator in this state.

RESEARCH PROJECTS

Following is a list of areas for consideration for research. No attempt was made to set a priority number on projects.

1. Erosion Problems
2. Acid Mine Water
3. Pre-planning of Reclamation
4. Education and Training
5. Topsoil Separation
6. Realistic Contouring of Mined Lands
7. Mining Systems
8. Social-Economic Effects on Communities
9. Equipment Selection and Mix
10. Blasting Problems
11. Multiseam Mining Problems
12. Transportation
13. Orphan Gob Piles
14. Calcium Sulphate in water
15. Rock Pick-up Problems
16. Demonstration Projects
17. Need for State Liaison Officer for Ohio

DISCUSSION

1. Erosion Problems

Due to heavy rainfalls and the susceptibility to erosion to disturbed lands in Ohio, erosion is a major problem. It is not uncommon to have 3 to 4 inches of rain in 24 hours. Mulching practices, terracing, diversion water drainage ditches, and contouring of slopes

have all been investigated, but it is recommended that further work is needed and dissemination of presently available information to the operator would be helpful.

2. Acid Mine Water

Development of acid mine water and the discharge thereof, is a major problem to coal companies operating in areas where acid-producing materials are abundant and the overburden rock is sandstone. Where limestone exists, the problem is not normally severe due to the neutralizing effect of the lime rock. Problems are encountered in the construction of water impoundments and in the treatment of the acid water. Techniques of burial of acid producing material and the sequential handling of these materials should be investigated. Research should be centered upon elimination of the problem rather than just on control procedures.

3. Pre-planning of Reclamation

The plan of reclamation must be an integral part of the total mine plan if it is to be successful. Costs tend to skyrocket and the final product of reclamation tends to be inferior without extensive pre-planning. This is especially true where very large drag lines are used, and overburden depths are deep. Generally, large operators tend to plan their operations well as they have adequate engineering staffs, but small operators need assistance in their planning efforts.

4. Education and Training

The state of Ohio, as with other states of the union, does not have adequate numbers or adequately educated inspectors, to carry out inspection procedures in the manner in which the administrators would

like. The salary structure is low and this forces hiring of young people, fresh out of school, who lack the fundamental field training needed. The state does have, in my opinion, a good philosophy of "preventative enforcement" which is a program to assist the operator early in the mining process so that he does not do things which presents serious problems of reclamation later. Workshops bringing together inspectors and operators could work to the benefit of both.

5. Topsoil Separation

Costs of moving and stockpiling topsoil to later be used in covering the spoil, necessitates that this work be planned so that the material only be handled once. In some cases, where the natural topsoil is thin and unproductive, it was felt that it might be more economic to rebuild the soil structure from the spoil through liming, fertilizing and soil treatment. The goals should be for long-term control and maintenance of the soil structure.

6. Realistic Contouring of Mined Lands

It was pointed out that a conflict exists between natural conditions and the physical situations created by mining. For example, when regulations require returning land to its original contour, it should be recognized that the spoil material of mining is loose, unconsolidated and may, in actuality, be unstable if placed at the original contour which existed in the area previous to mining. Regulations should be examined to be sure that they take into consideration such physical situations which are beyond the control of the mine operator.

7. Mining Systems

Mining systems must be developed to coordinate with the process

of reclamation. In Ohio, often there is a mix between contour stripping and area strip operations. Under such conditions, flexibility must be maintained to assure good reclamation practice. In some cases the time between mining and reclamation can be very short, but in others it may be quite lengthy.

8. Social Economic Effect on Communities

Expansion of Mining, naturally causes problems with the people residing close to mining operations, but has not been a tremendously serious problem for companies well established in the state. In some cases, mines operate within a few hundred feet of residential areas and are accepted. In other areas, where mining has not been practiced previously, companies find it is quite difficult to open new operations due to the resistance from the local populace. Planning, education and dissemination of information are probably the only ways in which these problems can be overcome.

9. Equipment Selection and Mix

Mining Companies should exercise great care in their selection of new equipment to insure that it can best fit requirements for primary mining and also serve as a viable reclamation vehicle. Large trucks, front end loaders, motor scrapers and large blades on bulldozers have all served to enhance flexibility and mobility so that reclamation can be carried out contiguous to mining and in a most efficient manner.

10. Blasting Practices

Nuisance effects from blasting seem to be more serious problems for the operator than actual damage done to surrounding structures. Education of the operator into the best times of day for blasting, best

atmospheric conditions and techniques to be employed to eliminate dust and noise would be most helpful.

11. Multi-seam Mining Problems

Some companies are mining more than one seam in their stripping operations and this complicates the process of reclamation. Research work in this area should emphasize total resource recovery, elimination of acid producing materials from the soil and maximum efficiency to prevent the necessity for re-handling material.

12. Transportation

County roads in Ohio normally are not constructed to stand up to heavy coal truck traffic. Problems here are similar to those encountered in West Virginia and Kentucky, but no viable solution was presented for the problem. Breakup of the roads does, of course, present a hardship for the local community for its repair and maintenance.

13. Orphan Gob Piles

Orphan gob piles do exist in Ohio that present a problem in acid water pollution and unsightliness. At present, no viable program for irradication of these gob piles exist. It is anticipated that as more coal cleaning is done in the future, that new gob piles will be created which will have to be handled. Research is needed.

14. Calcium Sulphate in Water

It was pointed out that calcium sulphate and the concentration thereof in mine discharges, is a problem that has not been researched properly and on that should be examined. Economic water treatment systems should be developed.

15. Rock Pick-Up Problems

One of the operators pointed out that one of his major labor costs was picking up rocks from reclaimed land. In Ohio, 18,000 acres per year must be picked. At present, no viable rock-picking machine exists, and if one could be developed, it would assist the operator in speeding reclamation and lowering labor costs.

16. Demonstration Projects

All conferees seemed to be in agreement that research projects which demonstrate and show to the operator first hand how good reclamation can be practiced, are of the utmost importance. They expressed a willingness to cooperate in the planning, formulation, and implementation of demonstration projects in Ohio.

17. The Need for a State Liaison Officer for Ohio

It was the feeling of the people in Ohio that they had enough mining activity going on that they needed a Bureau of Mines State Liaison Officer for that state alone. There was no dissatisfaction expressed with Bill Miska's performance, but it was recognized that there was too much going on in mining in Indiana and Ohio for one man to effectively cover the two states.

CONCLUSIONS

Ohio is an example of a mature mining state which has been facing up to its problems in land reclamation for many years. The state agencies and the operators have a good rapport and respect for each other. A willingness was demonstrated to face up to existing problems and to cooperate with the Bureau of Mines in any way possible in its research efforts to improve procedures.

LIST OF CONFEREES

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APPENDIX

UNIVERSITY OF MISSOURI-ROLLA

School of Mines and Metallurgy

Department of Mining, Petroleum and
Geological Engineering

125 Mining Building
Rolla, Missouri 65401
Telephone (314) 341-4751

The University of Missouri-Rolla invites you to participate in a one day workshop on the subject of "Surface Mining Reclamation Research and Development Needs for Ohio". The meeting will be held on Friday, June 18, 1976, starting at 9:00 a.m. at the Ramada Inn, I-70 at Ohio Rt. 209, Cambridge, Ohio 43725.

This workshop is one of several being conducted by the Mining Department, Missouri School of Mines-Rolla to assist the U.S. Bureau of Mines in formulating a comprehensive research and development program to meet the needs of the American Mining Industry. Representatives from State agencies, federal agencies, mining companies and educational institutions have been asked to participate. The U.S. Bureau of Mines will also be represented. The goal of the workshop is to develop a list of projects and problems that exist in Ohio that should be considered by the U.S. Bureau of Mines for research and development studies. I will prepare a report summarizing the conclusions of the workshop and submit it to the U.S. Bureau of Mines so it can be used to assist in formulating future R & D programs. Each attendee at the workshop will also receive a copy of this report.

The tentative agenda for the meeting is attached. I have listed subjects which I feel need to be discussed and I hope each participant will add to this list subjects that he feels are important. Each participant will be allowed ample time to present his views. The morning will be devoted to problem definition with the afternoon for open discussion.

I hope to see you at the meeting. Attendees will be expected to make their own hotel reservations if they need to spend the night. The telephone number of the Ramada Inn is 614-432-5691. If you have questions, please feel free to call me at 314-341-4751. Also, Mr. Bill Miska, State Liaison Officer, U.S.B.M., has assisted me in setting up this workshop and you may wish to discuss the workshop with him. His telephone number is 812-339-6139.

Please let me know if you or your designated representative will attend the workshop. Thank you.

Sincerely yours,

James J. Scott, Professor
Mining Engineering

JJS/jm
Enclosure

AGENDA

SURFACE MINING RECLAMATION WORKSHOP FOR OHIO

June 18, 1976

Ramada Inn, I-70 at Ohio Rt. 209

Cambridge, Ohio

8:30 - 9:00 Registration and Breakfast - Coffee and Rolls

9:00 - 9:10 Welcome and Introductions - Dr. Scott

9:10 - 9:40 U.S. Bureau of Mines Present Research and Development Program concerning Surface Mining Reclamation, Mr. Don Donner, Division of Environment, U.S.B.M., Denver, Colorado.

9:40 - 12:00 Problems of Ohio in Surface Mining Reclamation - All Attendees

SUGGESTED TOPIC AREAS

1. Cost of reclamation.
2. Top soil removal, stockpiling and placement.
3. Mining effects on ground water.
4. Calcium sulphate in treated mine water discharge.
5. Removing rocks from surface of soil.
6. Physical characteristics of overburden.
7. Physical characteristics of soil.
8. Soil erosion.
9. Erosion control structures.
10. Equating mine characteristics (pit length and depth, size equipment, etc) to optimum scheduling of reclamation.
11. Tree planting and survival.
12. Future land use.
13. Governmental permits, inspection, and regulation.
14. Demonstration projects.
15. Problem of existing surface gob piles.
16. Other suggested by attendees.

12:00 - 1:15 Lunch

1:15 - 4:00 Open Discussion

4:00 - 4:15 Workshop Summary - Dr. Scott

4:15 Adjournment

USBM Contract No. HO242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN ILLINOIS

James J. Scott

Department of Mining, Petroleum and Geological Engineering
University of Missouri - Rolla
Rolla, Missouri 65401

April 2, 1976

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D. C. 20240

INTRODUCTION

This report is the 17th of a series reporting findings from workshops held in various segments of the mining industry under U.S. Bureau of Mines Contract No. HO242034. This meeting was held in Springfield, Illinois, on April 7, at the Form Thirty Motel. Mr. Tom Glover, State Liaison Officer, Illinois, Mr. Dan Jones, Division of Environment, Washington, D. C., and Mr. Don Donner, Division of Environment, Denver, Colorado, were most helpful in assisting the author in setting up this meeting. Ten mine operators, eight State of Illinois employees, five federal employees, six university employees, two representatives of trade organizations and a consultant were present at this meeting. A list of projects was developed but no attempt was made to set a priority number on them.

SUGGESTED PROJECTS

The attendees of this workshop were quite mature in their thinking toward land reclamation and openly discussed their problems. Regulatory groups and Operators communicated well and there seemed to be a consensus that Illinois was facing up to its problems through its own reclamation law and, although studies were recommended, no one suggested that the problems of reclamation were insurmountable. It was pointed out that Illinois exports more agricultural products than any other state and, thus, has a great stake in keeping its land productive. This has caused a condition where the value of land for agriculture and the value for coal production are pretty much at a stand-off and there is a great incentive to do a good job of reclaiming

to insure the future revenues inherent to producing agricultural products.

Studies for Illinois are broken into two categories: Political and Technical. No single suggested study seemed to dominate, and in many cases the R and D areas recommended involve only improved communication and understanding on the part of all concerned. Following is a list of projects:

Political

1. Restrictive clauses in State reclamation law.
2. Suggested Illinois Land Reclamation Experimental Station.
3. Federal and State regulations as a disincentive to development.
4. Severance tax.
5. Local zoning.
6. Mining Public Relations program.

Technical

1. Need for base-line data.
2. Catalogue of abandoned mines.
3. Coordination of studies.
4. Demonstration projects.
5. Communication problems.
6. Time needed for reclamation.
7. Continuity of R and D.
8. Compaction studies.
9. Equipment studies.
10. Crop studies.
11. Land for its highest use.

12. Subsidence studies.

13. Cost benefit studies.

14. Gob piles.

15. Blasting problems.

DISCUSSION

Political

1. Restrictive Clauses in State Reclamation Law

Rule 1104 of the Illinois State Reclamation Law which deals with the need for a rooting medium and the composition of the 4 ft. of material which is to be replaced on top of the spoil was cited as an over-restrictive regulation. Certain aspects of the rule were quoted at the meeting and it was agreed that it would be impossible for any normal mining operation to, in a continuous manner, meet all the requirements therein. Research is needed as to how this problem could be resolved.

2. Suggested Illinois Land Reclamation Experimental Station

One of the attendees suggested that there was a need for a Land Reclamation Experimental Station of a type similar to the Agricultural Experimental Station. The discussion that followed pointed out that the agriculturalists presently on the state payroll, could very well play a major role in the revegetation and the re-establishment of fertility in strip mined land. Some consideration should be given to developing a mechanism whereby existing Agricultural Stations in Illinois and in other mining states could be used to advantage in reclamation studies. The author pointed out that this is already being done in some states.

3. Federal and State regulations as a disincentive to development

It was pointed out at this meeting that restrictive regulations could very well become a disincentive to coal mine development. The small operator is most affected by this problem as he does not have the staff nor the financial resources to cope with the studies, the paper work and inspection procedure which is inherent in an overly restrictive governmental program. It was expressed that the federal law should at least set a standard for performance and it was hoped it would be structured so that states could take care of their own local problems.

4. Severance tax

A 25¢ per ton severance tax is under study for the State of Illinois. 15¢ would go to the county and 10¢ to reclamation of abandoned mines. While there was not a great resistance to this type of tax, industry personnel expressed concern that, once it was established, it would never be revoked. It was not felt that this tax would be so severe as to be a disincentive to mine development.

5. Local zoning

In the past, local zoning has, as in the case of Knox County, presented a problem to the mining industry. Recently the Illinois Supreme Court has ruled that the State was the sole regulator for reclamation. This has served to clear up this particular case, but it would not prevent counties from passing other zoning regulations which could effectively prohibit mining in an indirect manner.

6. Mining Public Relations program

It was expressed that there is a need for a better Public Relations

Program to explain to the voters of Illinois the role of the mining industry in its total economy. It is the author's opinion that the conditions in Illinois are not nearly as bad as they are in some other states, as the Illinois legislature has made sizeable appropriations for seed money to develop new coal mining projects in the state. This is exemplified by the funding put forth for the gasification plant at New Athens, Illinois, the Coal Conferences run at Southern Illinois University and the Mining Technology educational program recently started at Southern Illinois University.

Technical

1. Need for base-line data

Physical conditions in Illinois vary greatly from the north to the south. It has been stated that Illinois has the best and the worst conditions for land reclamation. To determine just how good reclamation is, the conditions previous to mining regarding the formations to be stripped, the amount of topsoil, its fertility, the chemical constituents, etc., all need to be known.

2. Catalogue of abandoned mines

There is a need to know where old mines, both surface and underground, are located, how extensive the damage from mining, and what problems exist in the area. Subsidence from underground mines was also cited as a problem in regard to new construction. It was pointed out that the Illinois Geologic Survey has an extensive collection of maps, but some conferees still seemed to think that more work is needed.

3. Coordination of Studies

Many federal agencies such as E.P.A., ERDA, Bureau of Mines, and others under contract with the Federal Government come into Illinois to make studies but there seems to be a lack of coordination between agencies in what they are doing. It would seem that some mechanism should be set up to coordinate their efforts.

4. Demonstration Projects

Several of the companies present stated that they favored demonstration projects which show the practicality of different forms of land reclamation. They are willing to make sites available to qualified agencies and groups to develop meaningful demonstration projects.

5. Communication Problems

Local communication in Illinois seems to be quite good. Legislation associated with the Land Reclamation law has caused communication to peak but it was pointed out that communication should begin long before legislation is formulated. Influences from groups outside of Illinois often cause confusion and there is little communication between the local groups and these outsiders.

6. Time Needed for Reclamation

Good land reclamation takes considerable time. This is exemplified by the fact that some of the old mine lands of Illinois where no reclamation was done by the Mining companies have developed into excellent game cover and lake areas that produce record fish. Sportsmen in these areas would seriously object to anyone coming in and changing these areas to put them back into, say, cropland. Even in areas being mined today that are being reclaimed, it takes a number of

years to bring the land back to its original fertility so that time is of the essence.

7. Continuity of R and D.

For reasons outlined under point 6, it is essential that Research and Development funding be multi-year to obtain the best of reclamation. Data will not be valid if it is obtained under a one season data base. There was discussion that land reclamation experimental stations would serve as a good vehicle to assure continuity of research. It is the author's opinion that the presently existing agricultural experimental station could be used to advantage without setting up a new organization.

8. Compaction Studies

Many forms of land reclamation in which leveling procedures require the movement of heavy equipment over the reclaimed area, serve to compact the surface, and this may or may not be beneficial to good reclamation practice. Studies are needed to determine what degree of compaction is best and if the compacted areas should be broken up by ripping or plowing as a final step in the reclaiming process.

9. Equipment Studies

Equipment for surface mining is well established and is so basic in its engineering principles and design it is not likely that any major changes can be expected to happen quickly. It is important that R and D be carried out to obtain the best utilization of existing equipment. Also, some old methods which, perhaps, are not in favor today, should be restudied in the light of today's earth moving requirements. An example of this type of equipment is the old tower excavator system utilizing a Sauerman scraper bucket which might be used to knock peaks off spoil piles and level ground without excessive compaction.

10. Crop Studies

Illinois produces more beans and corn than any other state in the union and there is a natural tendency to assume that land reclamation should be for the purpose of re-establishing land to raise these crops. One of the attendees pointed out that perhaps these are not necessarily the best crops to be raised on reclaimed lands but that some other plant species might be much better.

11. Land for its Highest Use.

Studies were recommended to determine the highest use of each tract of land mined. Timber is very expensive today in Illinois and it is possible that the changing pattern of economics can make it more desirable to raise timber on what was previously crop land.

In Illinois 70% of the land is owned by the companies that are mining the coal. They obviously are going to be looking for the best use for the property to give them the highest return on their investment. In some cases this might be for recreation or real estate development. Flexibility for developing the highest use is needed.

12. Subsidence Studied.

Much of the underground mining in Illinois is to an extraction of near 50% by room and pillar mining methods. In the Belleville, Maysville, Johnson City areas old mines mined 70 to 90 years ago are presently presenting problems in surface subsidence. Expensive structures on the surface have had to be abandoned as subsidence has taken place and remedial measures to strengthen the structures have proven too costly. Existing underground mining in Illinois is also near 50%. One would question whether or not these mines are creating new subsidence problems for future generations. Liability, as to who is at fault under these

conditions, is in question. An extensive program of research into mining systems, resulting subsidence, true economics of partial extraction of a resource are a few of the areas that should be investigated.

13. Cost Benefit Studies

In the final analysis, the consumer of the coal mined, will have to pay for the cost of reclamation. It was estimated by the conferees that today in Illinois this cost approaches $3 per ton. It is important that the cost benefits from this expenditure be clearly understood so that as new contracts are negotiated that the true cost of reclamation will be incorporated into them. The benefit of specific procedures should be determined, for example, replacing top soil vs. not doing so. In some areas where the top soil was originally thin or almost non-existant, cost-benefit research might show non-top soiling would be best.

14. Gob Piles

Old gob piles probably represent the greatest source of acid water in Illinois. Conferees felt that no new acid mine problems had been created since about 1968. It was felt that gob piles should be researched from a positive aspect to determine if the constituents of these piles are of real value. They can contain appreciable coal for burning, sulphur, or alumina and, perhaps, up to 1% zinc sulfide. Also, it was pointed out that material in the piles ages and changes with time. Also, sampling of these piles is a problem, as the material placed in them varies widely.

15. Blasting Problems

Blasting problems seem to be more psychological than real when the mining companies are dealing with their neighbors. It was pointed

out that it was important to communicate with the people in a community before blasting starts and to do the necessary seismic recordings to prove to them that their homes are not being damaged. The weather conditions and the time of the day when blasting takes place, seems to have the greatest affect on the number of blasting complaints received. While it was pointed out that the Bureau has an ongoing research program on blasting, continued studies were recommended.

CONCLUSIONS

Most of the coal reserves readily mineable by surface methods, have been developed or are under various stages of development at this time. Land ownership of this land is principally in the hands of the mining companies. Good reclamation practices have been employed by some companies for years but all companies are now improving upon their methods and techniques. The strong reclamation law passed by the Illinois legislature should serve to control any future abuses and provide for secondary use of all mined land. The conferees at this workshop are to be commended for their willingness to speak directly to their problems.

APPENDIX

ATTENDEES - Illinois

April 2, 1976

Alten F. Grandt, Peabody Coal Company, 301 N. Memorial Drive, St. Louis, Missouri 63102

John Moeller, Arch Mineral Corp., 500 N. Broadway, St. Louis, Missouri 63102

Don McCaw, Southwestern Ill. Coal Corp., Percy, Illinois

Bill Smith, Ill. Dept. Mines & Minerals, 909 North 22nd St., Murphysboro, Ill. 62966

Thomas M. Good, AMAX Coal Company, 105 S. Meridian St., Indianapolis, Indiana 46205

John T. Devere, Midland Coal Company, P. O. Box B, Trivoli, Ill. 61569

Daniel A. Jones, U.S. Bureau of Mines, 2401 E Street, N.W., Washington, D. C. 20241

Don Donner, U.S. Bureau of Mines, Bldg. 20, Denver Fed. Ctr., Denver, Colorado 80225

W. D. Klimstra, Southern Illinois University, Cooperative Wildlife Research Laboratory, Carbondale, Illinois 62901

Stan Zellmer, Argonne National Laboratory, E.E.S. Building 12, Argonne, Illinois 60439

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Troyt York, Eastern Illinois University, Energy Resource Management Program, 101 Blair Hall, Charleston, Illinois 61920

Thomas O. Glover, U.S. Bureau of Mines, 504 E. Monroe, Ridgely Bldg., Springfield, Illinois 62701

Fred Caspall, Western Illinois University, Tillman Hall 4116, Macomb, Illinois 61455

Ivan Jansen, University of Illinois, Agronomy Department, Urbana, Illinois 61801

J. B. Fehrenbacher, University of Illinois, Agronomy Department, Urbana, Illinois 61801

Edward H. Tyner, University of Illinois, Agronomy Department, Urbana, Illinois 61801

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Russell T. Dawe, Department of Mines and Minerals, 704 State Office Building, Springfield, Illinois 62706

A. T. McMaster, Illinois State Representative, State Capital, Springfield, Illinois 62706

Richard D. McNabb, Division of Reclamation, 613 State Office Building, Indianapolis, Indiana 46204

Lloyd R. Casey, Illinois Department of Conservation, 614 State Office Building, Springfield, Illinois 62706

Donald H. Mann, Old Ben Coal Company, Regional Office, RR #3, Oakland City, Indiana

William S. Miska, U.S. Bureau of Mines, Federal Building, 7th & College, Bloomington, Indiana 47401

Louis S. Weber, Coal Producers Association of Illinois, 314 East Adams, Springfield, Illinois 62701

George E. Dirkes, Illinois Association of Aggregate Producers, 522 W. Burlington, LaGrange, Illinois 60525

Richard E. Powell, Robertson & Association, Eads Mine, P. O. Box 588, Mt. Vernon, Illinois 62864

Steve Cecil, AMAX Coal Co., 105 S. Meridian, Indianapolis, Indiana 46205

Mark Westphal, AMAX Coal Co., 105 S. Meridian, Indianapolis, Indiana 46205

Alfred M. Lawson, AMAX Coal Co., 105 S. Meridian, Indianapolis, IN 46205

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Lyle Adams, Ill. Dept. of Mines and Minerals, 704 State Office Bldg., Springfield, Illinois 62706

USBM Contract No. H0242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN ALASKA

James J. Scott

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University of Missouri-Rolla
Rolla, Missouri 65401

March 25, 1976

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D.C. 20240

INTRODUCTION

This report is the 16th of a series reporting findings from workshops held with various segments of the mining industry under U.S. Bureau of Mines Contract #H0242034. This meeting was held in Fairbanks, Alaska, on March 25, 1976, at the Woods Center on the University of Alaska campus. Mr. Al Service, State Liaison Officer, U.S. Bureau of Mines, Alaska and Mr. Dan Jones, Division of Environment, Washington, D.C. were most helpful in assisting the author in setting up this meeting. Thirty-two participants were involved in this workshop. The bulk of the people were associated with the State or Federal Government in one capacity or another. Only three mine operators were present, along with one consultant and one railroad representative. A rigid set of priorities was not developed at this meeting. Political problems and philosophical discussions dominated. Technical problems of reclamation in Alaska did not seem to be severe.

CONDITIONS IN ALASKA

Geologically, Alaska has all of the necessary requisites to develop into a large, and possibly the largest, mineral producer of all the 50 states. Oil is presently produced in the south and soon will be produced in volume on the north slope as soon as the pipeline is completed. Other minerals are produced only in limited quantities and very few people are employed in mining. Coal, gold and sand and gravel are mined. Mined lands in Alaska are normally worth more after they are mined based on their cost per acre. This is due to the elimination of perma-frost in the mining process, the

fact that vegetation re-establishes itself quickly and that the normal problem of ground settlement, as associated with perma-frost, are not present.

Labor wages are very high and probably are built into the economy so that they will not disappear in the near future. It is common to assume a 25% wage differential over similar jobs in the lower 48 states. While construction workers provide a labor pool for surface mining, little underground mining experience is available in the labor force in Alaska. Housing is a problem in remote areas and wages in the mining camps are normally lower than the inflated wages of the pipeline workers. When pipeline work is complete this differential may no longer exist.

Native culture does not necessarily serve to foster a strong mining industry. It is common for the native to practice "subsistent living" so it is necessary for a mine operator to hire two men to fill one job so that he is sure one of them will be available for work. The native population is the fastest growing labor pool as they have a very high birth rate with their population doubling each 20 years.

The Yukon Territory of Canada contrasts with the State of Alaska in the manner in which it supports and encourages mining development. The geological conditions in the two areas are similar, so one would naturally expect a similarity in the discovery and development of mining properties, all other things being equal. This is not the case as many new mineral properties have been developed in recent years and several others are in early stages

of development in the Yukon, while there are no major properties in Alaska that are actively being developed. The Canadian government constructs railroads to mineral locations and provides early incentives to stimulate mining. Alaska contrasts in the fact that vast areas have been withdrawn from mineral exploration and access has been severely limited.

All of the attendees at this workshop seemed well aware of these conditions and approached the problems created in a very professional, technically sound manner, with limited emotionalism and with a strong posture for environmental concern and conservation.

PROJECT AREAS

While it seems that all problems in Alaska are in some manner politically controlled, the attendees seem to have lived under the situation long enough that this control has become an accepted way of life and one that must be constantly coped with. The author has attempted to break the problems into those considered principally political and principally technical.

I. Political
   1. Multi-agency problem
   2. Time lag
   3. Rule changes
   4. Lack of political support
   5. Restricted access

II. Technical
   1. Environmental impact statements
   2. Baseline data
   3. Vegetation studies

4. Perma-frost problems

5. Mining systems

6. Alaskan Land Reclamation Laws

7. Copper Developments

8. Transportation and Power Supply

9. History of Mining

DISCUSSION

I. Political

1. Alaskan Economy is primarily controlled by a multitude of governmental agencies. It is estimated that 35% of the people in Alaska are directly dependent upon government wages and 70% are in some manner dependent on the government for employment. Research is needed to determine just how to get anything done under such a political climate when jurisdictional areas between agencies overlap and there is little agreement at times as to just what the agencies intend to accomplish. As many as 15 agencies may have to be consulted for a mining operation to obtain access and permission for mining.

2. Due to the problems outlined in point 1, a time lag develops which causes severe problems for the mineral developer. Due to the severe climate of Alaska, often only a few months exist in a year during which meaningful exploration can be carried out and development of a property undertaken. Bureaucratic delays may cause an extra 12 months to be wasted before work can be undertaken. To the entrepreneur, developing a speculative mineral occurance, these delays are intolerable.

3. Rule changes by governmental bodies, cause severe

problems to the mineral developer. A case in point is the present consideration whereby a royalty payment, or tax, upon oil production from the north slope may be increased from near 50¢ per barrel to near $2.50 per barrel. While it is probably not possible to bond any community government or state government to a contract in perpetuity, it would seem that previous agreements, whether they be in writing or verbal, should be adhered to. These rule changes have served to effectively dry up risk capital for developments in Alaska for the near future.

4. Lack of political support for the minerals industry at the state and federal level is a serious problem. As outlined in the section on Conditions in Alaska, Alaska contrasts severely with the Yukon territory in the support given by government to mineral development. Without active political support for mining, the minerals of Alaska will remain untapped.

5. Restriction of access to minerals has stymied the prospector and developer in Alaska. Vast blocs of hostile, virtually uninhabitable land has been locked up in National Parks, Fish and Wildlife Preserves and Native lands. While the Natives do plan to develop minerals through the vehicle of Native corporations, the areas in parks and reserves is presently not available for mineral development. If one examines the boundaries of these areas, it almost appears that they were designed to eliminate access and mineral development rather than for any other logical purpose. For example, wildlife refuges set up for duck breeding grounds include the lowlands suitable for this purpose, but also include

mountain ranges completely out of the habitat of the ducks and geese.

II. Technical

1. The quality of environmental impact statements developed for Alaska was questioned. Essentially, the questions involved were: a) How good are they technically? b) Are they factual? c) and, Are they too speculative? The consensus seemed to be that persons developing these studies often were "witch hunting" and looking for the very worst under all settings and conditions rather than truly examining the technical feasibility of the projects to be undertaken.

2. Hard, base-line data is vitally needed to rationally develop new projects. Studies into: a) Water quality, both from a chemical and siltation aspect and the presence of heavy metal ions; b) natural flooding conditions; c) vegetation in the natural state; and d) animal species and what conditions are best for them. These studies should be conducted in virgin areas that have not been affected by previous mining and the results obtained compared with areas where mining is now going on, or is contemplated in the future. It was pointed out by operators at the meeting that natural siltation in many rivers in Alaska far exceeds the permissible siltation discharge allowed from mining operations. Also, vegetation is normally more plush on mined lands than under natural conditions and this attracts wildlife to the area, providing good browse and habitat for increased population. Without hard data, environmental impact statements will probably continue to be somewhat unrealistic.

3. Vegetation studies should be undertaken to determine just what species grow best on reclaimed lands and, in some cases, what should be done to prevent the encroachment of natural species upon roads. It was pointed out that if a road to a mineral property or to a timber operation is left unattended for a few years, it will become virtually impassable due to tree growth and it is sometimes easier to construct a new road than it is to remove this dense vegetation. Research on the best type of grasses is also needed.

4. Perma-frost research is vitally needed in Alaska due to the vast areas that are permanently frozen. Some of the areas recommended for research include: a) How can perma-frost best be shot with explosives? b) Can thawing methods be improved through utilization of modern drilling systems and thermal methods? c) Can sampling of placers be improved, as there is often a large discrepancy between the samples and what is actually found upon mining? d) How better can the colloidal matter associated with placers be handled? e) Research is needed into new materials-handling systems for mining placer, for example, one operator plans to use scrapers for overburden removal. f) How can fine gold recovery be improved? Most fine gold is lost under present dredging methods. g) How can the properties of perma-frost be used to advantage as a support method when mining underground? h) How best can surface structures be placed upon perma-frost, constructed in such a manner as to not destroy the load-bearing capability of it? There are obviously many other areas for perma-frost research, but these were mentioned at the workshop.

5. New mining systems need to be developed which incorporate planning previous to mining which will provide the best conditions for secondary use of land after mining and for reclamation. For example, the stackers on dredges might be redesigned to place the waste material from the placer in a more level manner, thus lowering cost of land-leveling. It is common to use hydraulic mining systems to flush off the silt from the top of the placers and, perhaps some other method can be developed which will create less environmental damage and still accomplish this removal. Mining systems designed to fit the harsh weather conditions of Alaska to allow year round operation would also be beneficial.

6. A discussion developed as to just how Alaska should write its' State Reclamation Law. It was pointed out that conditions in Alaska are unique and are not found in any of the other 49 states, so that the proposed all-encompassing federal law just does not fit for mining problems of the state. This condition serves to strengthen the position that hard, base-line data should be developed as soon as possible and used in a sound, technical manner in drafting regulations.

7. Copper developments in Alaska are presently at a standstill due to EPA air quality standards which effectively eliminate the possibility of construction of a smelter in Alaska. Due to the high cost for transportation, concentration and smelting will probably have to take place at or near the mining site for copper mineralization to be mineable. For this reason the rules need to be reviewed and possibly revised to reflect the realities of limited population, remoteness and minor consequences of a slight lowering of air quality.

8. Transportation and power supply to and from potential mineral properties is a most pressing problem for the state. There is a great need to provide corridors for access to mineralized areas. Due to the rough terrain, mountain passes are of the utmost importance. Land withdrawals have served, in many cases, to block the natural transportation routes and effectively will restrict mining. Due to the long distances involved, it is often necessary to construct power plants at the mining sites rather than run long transmission lines. Unfortunately, a rule has developed that no power plant can be constructed within 60 miles of a boundary of a State Park. This rule seems arbitrary and overly restrictive, particularly, as in a case sited, where a mountain range existed between the proposed power plant site and the park boundary. Prevailing winds were not considered in the development of this rule.

9. A study of the history of mining in Alaska is recommended. The question of how serious are mine reclamation problems in Alaska was asked. It was pointed out that mining has been carried on successfully, with little or no environmental damage in the Nome area for 75 years and in Fairbanks for near 60 years. It would seem that much could be learned from studying the past mining practice and the results obtained through the natural healing process by allowing nature to revegetate these areas.

CONCLUSIONS

Alaska is a unique state and, for this reason, special research projects should be set up to meet its needs. In no state does a more hostile environment exist than in Alaska. It consists of swampy areas, permanently frozen areas, rugged mountains, and has

temperature variations from 70° below zero to 95° above zero. The distances between projects are great and public transportation, roads, and railroads are limited. It is extremely important that persons in the lower 48 listen to the technically knowledgeable people living in Alaska who are trying to develop the natural resources of that state. No outsider can possibly understand and comprehend the problems without seriously studying the state from within.

Comments received from participants will be attached to this report as an appendix.

APPENDIX

Participants

SURFACE MINING RECLAMATION WORKSHOP FOR ALASKA

1.	A. L. Service U.S. Bureau of Mines Liaison Officer-Alaska	Rm G81, Federal Building Anchorage, Alaska 99501
2.	Cleland Conwell State Mine Inspector	University of Alaska P. O. Box 8007 Fairbanks, Alaska 99701
3.	Howard K. Andersen Division of Economic Analysis	Bureau of Mines 2401 E Street, N.W. Washington, D. C. 20241
4.	E. O. Bracken Alaska Division of Economic Enterprise	Pouch E-E Juneau, Alaska 99811
5.	Jerry Shearer	U. S. Geological Survey Conservation Division P. O. Box 259 Anchorage, AK 99510
6.	Edgar T. Hunter	Alaska Gold Company Box 640 Nome, Alaska 99762
7.	Ernest N. Wolff	Mineral Industry Research Laboratory University of Alaska Fairbanks, Alaska 99701
8.	John Mulligan	Chief, Alaska Field Operations Center U. S. Bureau of Mines P. O. Box 550 Juneau, Alaska 99801
9.	Donald J. Cook Professor	Department of Mineral Engineering University of Alaska Fairbanks, Alaska 99701
10.	Nils I. Johansen	Mineral Industry Research Laboratory University of Alaska Fairbanks, Alaska 99701
11.	Paul A. Metz	Mineral Industry Research Laboratory University of Alaska Fairbanks, Alaska 99701
12.	Mark S. Robinson	Mineral Industry Research Laboratory University of Alaska Fairbanks, Alaska 99701
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14.	Ted Trueblood	Alaska Railroad Engineering Department Pouch 7-2111 Anchorage, Alaska 99510
15	P. D. Rao	Associate Professor of Coal Technology Mineral Industry Research Laboratory University of Alaska Fairbanks, Alaska 99701
16.	Pedro Denton	Chief, Minerals Section Alaska Division of Lands 323 E. 4th Avenue Anchorage, Alaska 99501
17.	Jim Barker	U. S. Bureau of Mines University of Alaska Fairbanks, Alaska 99701
18.	Joseph E. Usibelli	Usibelli Coal Mine, Inc. Usibelli, Alaska 99787
19.	Edwin M. Rhoads	Mineral Industry Research Laboratory University of Alaska Fairbanks, Alaska 99701
20.	Earl H. Beistline	Box 80148 Fairbanks, Alaska 99701
21.	Richard H. Bassett	Ecology and Environment, Inc. 808 "E" Street Anchorage, Alaska 99501
22.	R. J. King	Ecology and Environment, Inc. 808 E Street Anchorage, Alaska 99501
23.	Roger Marion	U. S. Bureau of Land Management 555 Cordova Street Anchorage, Alaska 99501
24.	Al George	University of Alaska Land Management Fairbanks, Alaska 99701
25.	R. A. Fedeler	Alaska Department of Fish and Game 1300 College Road Fairbanks, Alaska 99701
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29. Mike Franger

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The University of Missouri-Rolla invites you to participate in a one day workshop on the subject of "Surface Mining Reclamation Research and Development Needs for Alaska". The meeting will be held on Thursday, March 25, 1976, starting at 9:00 a.m. at the Wood Center, University of Alaska Campus at Fairbanks.

This workshop is one of several being conducted by the Mining Department, Missouri School of Mines-Rolla to assist the U.S. Bureau of Mines in formulating a comprehensive research and development program to meet the needs of the American Mining Industry. Representatives from Alaska State agencies, federal agencies, mining companies and educational institutions have been asked to participate. The U.S. Bureau of Mines will also be represented. The goal of the workshop is to develop a list of projects and problems that exist in Alaska that should be considered by the U.S. Bureau of Mines for research and development studies. I will prepare a report summarizing the conclusions of the workshop and submit it to the U.S. Bureau of Mines so it can be used to assist in formulating future R & D programs. Each attendee at the workshop will also receive a copy of this report.

The tentative agenda for the meeting is attached. I have listed subjects which I feel need to be discussed and I hope each participant will add to this list subjects that he feels are important. Each participant will be allowed ample time to present his views. The morning will be devoted to problem definition with the afternoon for open discussion.

I hope to see you at the meeting. Attendees will be expected to make their own hotel reservations if they need to spend the night. The telephone number of the Fairbanks Inn, 1521 South Cushman, is 307/456-6602. If you have questions, please feel free to call me at 314/341-4751. Also, Mr. Alfred L. Service, State Liaison Officer, U.S.B.M., has assisted me in setting up this workshop and you may wish to discuss the workshop with him. His telephone number is 907/265-4304.

Please let me know if you or your designated representative will attend the workshop. Thank you.

Sincerely yours,

Dr. James J. Scott, Professor
Mining Engineering

JJS/gd
Encl.

AGENDA

SURFACE MINING RECLAMATION WORKSHOP FOR ILLINOIS

April 2, 1976

Forum Thirty, 7th & Adams Street
Springfield, Illinois

8:30 - 9:00	Registration and Breakfast - Coffee and Rolls
9:00 - 9:10	Welcome and Introductions - Dr. Scott
9:10 - 9:40	U.S. Bureau of Mines Present Research and Development Program concerning Surface Mining Reclamation, Mr. Don Donner, Division of Environment, U.S.B.M., Denver, Colorado.
9:40 - 12:00	Problems of Illinois in Surface Mining Reclamation - All Attendees

SUGGESTED TOPIC AREAS

1. Transportation and placement of top soil.
2. Material handling equipment for reclamation.
3. Soil conditions, stability, and chemistry.
4. Cost of reclamation.
5. Future land use.
6. Vegetation studies.
7. Governmental permits, inspection, and regulation.
8. Demonstration projects.
9. Problem of existing surface gob piles.
10. Others suggested by attendees.

12:00 - 1:15	Lunch
1:15 - 4:00	Open Discussion
4:00 - 4:15	Workshop Summary - Dr. Scott
4:15	Adjournment

USBM Contract No. H0242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN TEXAS

James J. Scott

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February 13, 1976

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D.C. 20240

INTRODUCTION

This report is the 15th of a series reporting findings from workshops held with various segments of the mining industry under U.S. Bureau of Mines Contract #H0242034. This meeting was held in Austin, Texas, on February 13, at the Hilton Inn. Mr. Murphy Hawkins, State Liaison Officer, Texas, Mr. Dan Jones, Division of Environment, Washington, D.C., and Mr. Don Donner, Division of Environment, Denver, Colorado, were most helpful in assisting the author in setting up this meeting. Sixteen mine operators, five Texas state officials, five federal officials, three professors, one consultant and one representative of the news media were present at this meeting.

CONDITIONS IN TEXAS

The Texas Land Reclamation Law became effective on January 1, 1976. Two public hearings were held on regulations and the regulations become effective on February 23, 1976. After that date, mining companies will be required to file for mining permits, in the case of coal, for five years, and in the case of uranium, for ten years. Texas, therefore, has no experience under the law to date. There will be an intense learning period for both the regulators and the operators over the next few months and years. There was a great deal of optimism expressed at the workshop that Texas problems in land reclamation were not severe and that the companies had in the past done their own reclamation and they felt they could meet any foreseeable problems.

The Texas law covers lignite and uranium operations but does not cover sand and gravel or stone operations. The lignite

problems are not thought to be severe. The deposits are fairly flat-lying, with mineable seams approximately 4 to 15 ft. in thickness, although in some cases thinner seams are removed. Overburden and material between multiple seams consists of essentially unconsolidated sediments of sand and clays. Little or no toxic material is present in the overburden. Sulphur in the coal is approximately 0.5 to 1.5 percent, which is low. It exists in the form of pyrites. The land in its natural state is normally sandy at the surface with a hard pan layer at a shallow depth. The surface tends to dry quickly and the land is not particularly fertile. Topography is slightly rolling and rainfall is approximately 35 inches per year. Lignite production in 1975 was 9 million tons and may go to as much as 70 million tons per year by 1985. If gasification plants are installed, the tonnage could be more.

The physical conditions in Texas make good land reclamation practices relatively easy to utilize. In fact, the statement was made, "If you can't do a good job of surface mine land reclamation in Texas, then you can't do it anywhere."

RESEARCH PROJECTS

Following is a list of areas for consideration for research. They are listed, more or less, in the order in which they were discussed at the meeting.

1. Soil Research
2. Vegetation Research
3. Economic Investigations
4. Effects of Time on Reclamation
5. Public Relations in Mining

6. Long Range Planning
7. Land-Lease Problems
8. Orphan Land
9. Thin Seam and Multi Seam Mining
10. Water Quality and Impoundments
11. Lignite Washing or Treatment
12. In Situ Mining Methods
13. Regional Energy Studies
14. Financial Research
15. MESA
16. Unrealistic Standards
17. Past Lignite Mining Safety Record
18. Slope Stability
19. Equipment Replacement
20. Noise
21. Sanitation
22. Field Demonstration Projects
23. Miscellaneous

DISCUSSION

The author opened this workshop by presenting an overview of his role in this contract of assisting the Bureau of Mines in developing a strong research program to assist the industry in meeting the challenges it faces. The U.S. Bureau of Mines representatives were introduced and Mr. Don Donner gave an overview of the Bureau program in land reclamation studies. Following this presentation, each conferee was asked to present his views

on the problems most needing research. The discussion which followed was an over-view of the conditions in Texas which differ quite markedly from many other states, as set forth in the first section of this report. After this, research projects were developed.

Each of the research projects is discussed but no attempt is made to set a priority number on which is the most important. They are listed in the order in which they were brought up during the workshop.

1. Soil Research

The overburden over lignite is essentially unconsolidated sediments, but, due to the absence of toxic materials, these sediments provide a good material when moved to the surface for the establishment of new vegetation. The sediments are fairly high in calcium and magnesium but do require fertilizer to provide a good growth. The clays are montmorillinites that tend to crack upon drying and swell when wet. Also, a crust may be formed during periods of drought before vegetation is established. Research should be directed toward making the mine reclaimed areas more productive than the original unmined land. Cooperative work between universities and industry indicates that this is possible.

2. Vegetation

Local agriculture agents and university personnel have been investigating native species and imported species as to the best form of plants for reclaimed lands. Contract assistance from the federal government could serve to broaden and expand this intelligence base.

3. Economic Investigations

There is a need to determine the true cost of land reclamation for the purpose of future economic analysis. It was felt that the best methods and equipment are not necessarily now being employed but, to justify changes, a sound basis for commiting funds must be established.

4. Effects of Time on Reclamation

It was pointed out that with sufficient time, old mining areas tend to revegetate and reclaim themselves. Reclamation planning should seriously consider the self-healing characteristics.

5. Public Relations in Mining

As in other states where workshops were held, the operators in Texas felt that the mining industry in Texas has a poor public image and that it needs to be improved. They are proud of their past record and feel that they are being judged upon conditions and situations which do not exist in Texas. Research on methods to change this negative image to a positive one is needed.

6. Long Range Planning

Since the state of Texas is just now entering in to the regulation process, they are very concerned that what they do today will attain maximum benefits. They are not uptight about returning the land to its original condition as they feel good long-range planning will make the land more productive than it was in it's original state. Research to assist in long-range planning was recommended.

7. Land-Lease Problems

Almost all the land in Texas was owned privately but, due to this private ownership, it sometimes presents problems in systematically reclaiming individual leases. Lease owners do not often want overburden moved from or onto their property from another lease. This is a particular problem in uranium mining where pits may be abrupt and deep, which is considerably different than the area stripping techniques employed with lignite mining. Operators try to negotiate the leases to eliminate this problem but some research is probably warranted.

8. Orphan Lands

Orphan lands are not a particular problem in Texas, the only ones of consequence being those produced by past sand and gravel operations. These areas are normally self-healing after approximately 15 years. The operators were opposed to the orphan lands provisions of the federal bill for surface mine land reclamation vetoed last year by President Ford. That bill called for 25 to 35¢ per ton upon coal production in all states, with the tax going for the reclaiming of orphan lands. Since Texas has so small a problem in this area, they were naturally opposed to this tax.

9. Thin Seam and Multi Seam Mining

Lignite seams commonly pinch and swell and often split, which creates a multi-seam problem which complicates the mining system. There is a need to investigate equipment most applicable to these conditions, its cost and its effect upon total resource recovery.

10. Water Quality and Impoundments

The silt in the overburden creates a problem in water quality as it tends to stay suspended. This tends to affect the size, treatment, and retention time for removal. This in turn affects the size of embankments and construction techniques to be employed so that water impoundment research should be considered. Often, when heavy metal ion exists, as in conjunction with uranium operations, these contaminated waters are pumped back underground into the same formation from which they originated. Some ground water hydrology research should be considered to assure that no future contamination problems are being created.

11. Lignite Washing or Treatment

One of the attendees stated that the sulphur in the lignites is in the form of pyrites and often may be concentrated in a fairly narrow band or zone. This may make it possible to obtain a mechanical separation, either during the mining process or in a treatment plant and some research into the merits of such a system should be undertaken. Power plants will be required to install scrubbers to meet air quality requirements if they burn lignites without some pre-treatment.

12. In-Situ Mining Methods

Geologic studies have indicated that there is approximately 10 billion tons of lignite, less than 200 ft. deep, in seams thick enough for mining. If one goes beyond this depth, there is approximately 200 billion tons of lignite

and some consideration should be given to methods which might be employed for extracting this resource. Research into in-situ mining systems is recommended. At the present time there is some in-situ mining of low-grade uranium deposits in Texas. Also, the University of Texas does have some research on underground gasification, sponsored by the National Science Foundation.

13. Regional Energy Studies

Bituminous coal is being shipped to Texas from the northern Great Plains and the Rocky Mountain area. These shipments may increase greatly if a large slurry pipeline is constructed to lower transportation costs. This is bound to have an impact upon lignite mining operations and the time frame under which they will be brought on stream. Ninety five percent of the power generated in Texas is done so by burning natural gas. The growth of the lignite industry will require that conversions take place to change boilers to burn coal or that new boilers be installed capable of burning coal. The sum total of all of these factors should be researched as to its impact, not only upon the state of Texas but also upon its neighbors and the ability of industry to meet the burden under which it will necessarily operate.

14. Financial Research

Concern was voiced by the attendees that the industry will be hard-pressed to generate the necessary dollars to do everything that will be required of it. Mining equipment

costs are soaring, construction costs for power plants are becoming higher, labor costs are high and inflation is not completely checked. Studies to assess the problem should be undertaken.

15. MESA

The question was raised, "Can regulations promulgated by MESA be changed by the presentation of actual data?" It was a consensus that research was needed as to how to present such data to make it effective.

16. Unrealistic Standards

A number of examples were given of regulations which produced conditions that, based upon plain common sense and operating know-how, the operators felt were completely unrealistic. Some of them discussed were: a) Berm construction for road safety, when the berms truly would not prevent a coal hauler from running off an embankment and the berm served to narrow the road so that vehicle congestion was a safety problem. Also they serve to channel water down the roadways, causing erosion and sedimentation problems. b) One operator was cited because he did not have his employees trained for the testing of methane in the open pit lignite operation he was running. There must be some reason for testing for methane in open pits, but the logic of it escaped the attendees at this workshop. c) Electrical ground control systems recommended by MESA are just not working in the lignite operations. Still the inspectors insist that the ground system be employed. d) Back-up

alarms and flashing lights may present more hazards than they eliminate. In the case of one operator, he had 460 loads per day at 4 dumping points in his plant which, when calculated out, means that one truck must be dumped per minute. There may be as many as four trucks in the area at the same time, all with lights flashing, back up alarms ringing, so that there is a considerable noise pollution and safety hazard generated. This operator found that it affected his people psychologically and, while the inspector was sympathetic, he did not feel he could violate the regulations of the law.

All unrealistic standards, wherever they are and regardless of how they originated, should be reviewed in the light of safety and good common sense.

17. Past Lignite Mining Safety Record

The health and safety record of Texas lignite mining has been outstanding, and to the best recollection of those in attendance, there have been no fatalities. They also stated that the mining safety record was actually better than that of the power plants associated with the mines. Research is recommended to find out the reasons for this excellent performance so that the good safety practices perhaps can be transferred to other sections of the nation.

18. Slope Stability

Slope stability has not been a particular problem for lignite miners, but a few problems have been experienced by uranium operators. Operationally they feel they have the situation well in hand, but as these mines move deeper, some

consideration should be given to slope stability research.

19. Equipment Replacement

Regulations in regard to old equipment actually encourage companies to rehabilitate old vehicles and keep them far beyond their efficient life because new equipment must have additional safety and convenience devices built into it. Cabs in the hot summer climate of Texas must necessarily be air-conditioned. A small air conditioner can cost as much as $15,000, and after being placed in a vehicle, presents a maintenance problem. Operators are not anxious to purchase these problems.

20. Noise

When vehicles are operated in a stripping operation noise allowance levels may be alright when the vehicle is operating alone, but when two vehicles come close together, the combined noise may exceed tolerable limits. Some research is needed to determine the seriousness of this problem.

21. Sanitation

The portable toilets available on the market for open pit operations must leave much to be desired. The men will not use them. MESA requires that they be kept close to where vehicles are operating and this causes the operator a constant move-up problem and he also must contract with someone to empty the devices regularly even if they are not used.

22. Field Demonstration Projects

Field demonstrations to show just what can be done in the area of vegetation, maintenance of the vegetation, grading,

etc. was strongly recommended. It was also recommended that these field demonstrations be done with the cooperation of the local industry, university personnel, local agricultural agents and with the full cooperation of the land owner. It was felt that in this way meaningful research would be undertaken and its worth fully demonstrated to all concerned parties.

23. Miscellaneous

Following are a few points which were mentioned but not discussed extensively: a) Research on why many regulations don't make sense. b) Inspector education and training so that industry does not have to educate him. c) Possibility of coordination of inspection by all inspection agencies so that their inspections could be run simultaneously with a minimum of disruption to operations. d) Wheel excavators for materials handling. e) Research on uses for bottom ash and fly ash from power plants. f) Research on condemnation procedures for slurry pipe-line right-of-ways. g) Research on the Corps of Engineer's definition of a navigable waterway.

CONCLUSIONS

Texas is in an enviable position compared with states having old, mature mining industries which have suffered the past sins of mining. All attendees at this conference were forward looking, obviously desirous of establishing mining practices which could serve as a model for other states to imitate and they are blest with a geologic setting in which complete and improved land reclamation may be accomplished.

Any comments received from the attendees will be attached as an appendix to this report.

APPENDIX

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February 14, 1976

Dr. James Scott
University of Missouri
Department of Mining, Petroleum and Geological Engineering
Rolla, Missouri 65401

Dear Dr. Scott:

I want to take this opportunity to compliment you on the successful workshop conducted in Austin, Texas February 13, 1976. Some of the problems voiced by members of the mining industry were most enlightening. It also provided Dames & Moore more insight to the problems facing the mining industry in Texas.

The purpose of this letter is to elaborate on a point I was trying to make during the workshop concerning the use of native grasses for reclamation. These are two basic objectives to be achieved in the reclamation of surface mines: 1) to stabilize the disturbed areas against the erosion forces of wind and water; and, to return the land to an ecologically stable entity.

If the land is to be used for grazing once the mining operation is complete native grasses afford the greatest potential for accomplishing these objectives. Native species, such as little bluestem, develop deeper root systems, which provides greater stabilization; are more drought resistant; and, have more nutritional value. Use of such species should eliminate the need for supplemental irrigation and increase the probability of establishing a vegetative cover during dry years. They also would reduce maintenance costs by reduced fertilizer requirements.

I feel that a research project conducted by the Texas A&M Agricultural Research Station funded by the U. S. Bureau of Mines would be beneficial to the lignite mining industry. This program would consist of establishing demonstration plots at several locations in the lignite area to evaluate the growth and establishment of native species on overburden material.

We know in other states surface mine operations are establishing demonstration plots which, in our opinion, is a duplication of effort. If demonstration plots can be established by one agency the data could be made available to all mine operators. We feel the operators would benefit by reducing their costs.

Again, thank you for the opportunity to participate in this informative workshop.

Yours very truly,

DAMES & MOORE

Alan L. Smith

Alan L. Smith, Ph.D.
Ecologist

ALS:nr

USBM Contract No. HO242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN WEST VIRGINIA

James J. Scott

Department of Mining, Petroleum and Geological Engineering
University of Missouri - Rolla
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February 6, 1976

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D. C. 20240

INTRODUCTION

This report is the 14th of a series reporting findings from workshops held with various segments of the mining industry under U. S. Bureau of Mines Contract No. HO242034. This meeting was held in Charleston, West Virginia, on February 6 at the Daniel Boone Hotel. Mr. Gilley, State Liaison Officer, West Virgina, Mr. Dan Jones, Division of Environment, Washington, D. C., and Mr. Don Donner, Division of Environment, Denver, Colorado, were most helpful in assisting the author in setting up this meeting. Four mine operators, eight West Virginian state officials, eight federal officials, three Coal Association employees, three professors, one consultant, one representative of the news media and one conservationist were present at this meeting. A rigid set of priorities was not developed at this meeting as time would not permit.

RATING OF PROJECTS

This workshop differed from others held on the subject of land reclamation in that political problems as such were not emphasized as major difficulties. For this reason projects are discussed in the order that they were brought up at the meeting with no attempt to set a priority number on them. While some problems do have an interface on politics, the workshop attendees did not dwell upon the political aspects of them. Following is the list of problem areas with a short discussion on each.

1. Steep Slopes
2. Water Quality Research
3. Pre-Mining Conditions
4. Valley Fills
5. Human Resource Problems
6. Creation of Flat Land
7. Total Resource Development
8. Highwall Problems
9. Sedimentation
10. Sealing Old Mines
11. Orphan Mines
12. Water Treatment
13. Pyritic Burial
14. Research into All State Laws
15. Auger Mining
16. Financial Research
17. Timber on Land to be Strip Mined
18. Resource Conservation
19. Transportation
20. Berm Construction and Need
21. Equipment Research
22. Research on Standards
23. Effects of Limiting Mining
24. Education and Training

DISCUSSION

1. Steep Slopes

Block cut mining, as used in Pennsylvania, and the haul-back system, as used in West Virginia, were discussed as methods for mining on extremely steep slopes. Research is needed to determine where each method should be employed, what is the cost of mining and what productivity can be achieved. It was recommended that a field experiment, in cooperation with industry, be conducted where both methods would be used in the same environment and terrain to be sure that a fair comparison of the methods is obtained.

2. Water Quality Research

Research is needed to predict water quality of the run-off from surface operations previous to mining. This prediction can be based on chemical analysis, sampling, past experience and the mining system to be employed.

3. Pre-Mining Conditions

This relates to Point 2 but emphasis should be placed upon determining the quality of the over-burden and the coal to develop base-line data previous to mining which may be employed to aid in the development of the best mining system for the particular property involved.

4. Valley Fills

Standards between states differ as to whether or not valley fills are allowed and, if they are, as to how they should be constructed. Research is needed to define construction criteria.

Such things as: (1) Is a french drain constructed through the center of a valley fill the proper way to obtain sub-surface drainage? (2) How can the velocity of the surface run-off water be limited to prevent excessive erosion into valley-fills? (3) How can valley fill drainage systems be maintained over long periods of time? (4) What degree of compaction is needed and what type of materials can be used and still obtain sufficient compaction?

5. Human Resource Problems

The professional human resource of the state of West Virginia is taxed in its ability to meet the needs of the mining industry. State inspection agencies are understaffed and pay is low. This results in a high turnover of employees and a problem of training of the new employee. Inspections may often be delayed with resulting high down-time costs suffered by the coal operator waiting on the inspection.

6. Creation of Flat Land

Mountain-top mining, as practiced in West Virginia, often levels the entire mountain with the mountain top being placed in a valley-fill and, between the two, considerable flat land is developed. This can be an economic resource to the community and there is a need to define just how this changes the economic base in these areas. It was felt such studies would show the economic advantages of this type of land reclamation as opposed to the more universally accepted practice of returning the land to the original contour and establishing native vegatation.

7. Total Resource Development

While mining coal in West Virginia is a large industry, the land developed under Item 6, coupled with future industry development, can serve to multiply the beneficial effects from mining. There is a need to do research to summarize these total cost benefits to a community but there is also a need to research methods whereby the follow-up industrial development on these lands can be accomplished in a continuous, systematic manner in a logical time-frame after mining. Such systematic development would tend to improve the public image of mining and would demonstrate to the public the close relationship between well planned mining, land reclamation and industrial development.

8. Highwall Problems

While most of the conferees felt highwalls are viewed by the public as unsightly nuisances, there was a feeling that research was needed into the benefits which can be derived by leaving highwalls. Research is needed to determine: (1) The value of the flatland created if the highwall is not back-filled. (2) The amount of energy saved and the decrease in cost if back-filling is not done. (3) The rights of the land-owner in regard to his wishes as to whether or not a highwall should be left. (4) Investigate how other states handle highwall problems, for example, in Maryland a small committee of local people decide what degree of reclamation should be undertaken. (5) A factual program of study should be developed to inform the public of the benefits of leaving highwalls.

9. Sedimentation

Wherever mining is carried out, sedimentation problems exist. The haul-back mining system has eliminated many problems, but enough problems still exist that research in this area is needed.

10. Sealing Old Mines

Present techniques appear to be inadequate in the sealing of old mines as seals seem to break down over a period of time. Better methods are needed.

11. "Orphan" Mines

Old, underground "Orphan" mines are probably the greatest source of polution in West Virginia. These mines fill with water, overflow through their portals, or other openings, perhaps those created by surface augering, and the highly acid waters get into the streams systems. West Virginia does have a program for reclaiming orphan surface mines but has no program for reclaiming underground abandoned properties. Surface operators pay a fee of $60 an acre for each acre they disturb on the surface and this money goes into surface reclamation on orphan land. Research is needed on the underground problem to determine whether or not such a program for underground mining might be warranted, either by the state or federal government.

12. Water Treatment

Research was recommended on a portable water treatment system which could efficiently treat water runoff from a surface operation and then, after a short period of time, be moved to

another location where mining would take place. Requirements are for it to be small, completely portable and operate at low cost.

13. Pyritic Burial

Research is needed to determine just how pyritic materials should be handled, how they should be buried, at what depth and at what location within the backfilling process. It was pointed out that often these materials are placed at the bottom of the fill and this provides a natural watercourse for waters to percolate, become acidic, and then discharge at the toe of the fill area. It was pointed out that perhaps a higher burial of the pyrites would result in a lesser generation of acid water.

14. Research into All State Laws

At the meeting it was pointed out that 38 states now have land reclamation laws. It was felt that a study should be made of all of these laws to determine which regulations may be universally applied, and which are of a more specific nature that related only to a certain geologic setting. It was pointed out that references to alluvial valleys as written into the proposed federal surface mining bill have little or no application in West Virginia but serve to effectively eliminate mining in Montana.

15. Auger Mining

Auger mining is not nearly as widely employed today in West Virginia as it has been in the past. This is perhaps due to the fact that recovery from this system is low, approximately 35%,

and that often undesirable conditions are created near old mine workings and problems may be generated in sealing of auger holes at the surface. Regardless, this system is used often enough, particularly in periods when the coal industry is depressed, so that research is needed to improve it when it is employed.

16. Financial Research

Research is needed to determine how the mining industry can be kept on a long term, firm financial footing. It was pointed out that at the present time, a time of a national energy crisis, many mines in West Virginia can not sell the product they produce and several mines are terminating operations or will be shortly, if conditions do not improve. Also, it was recommended that the financial benefits to the community in which mining exists be researched.

17. Timber on Land to be Strip Mined

One person at the meeting was extremely interested in the timber on land to be stripped and felt it represented a resource that was being wasted, as often timber is not cut and harvested previous to mining. Operators at the meeting pointed out that they try to get timber harvested, but they have great difficulty finding anyone to come in and cut it. Some research is needed to clarify the situation and determine the facts.

18. Resource Conservation

At the present time, surface mining is an excellent method of recovering all of the resource as 100 per cent of the coal can be mined. This compares with an average recovery of 55%

for underground mining and 35% for auger mining. Operators at the meeting stated that they are today, in many places mining through areas which have been underground mined in the past and, because of improved equipment and a higher state of technology, they are now able to recover the pillar remnants and boundary areas of these old mines profitably. They did state it would be much easier and more profitable had these old operations never existed in these areas. Research is needed to determine what mining system should be employed on any given reserve, to maximize recovery in light of existing technology and anticipated technology.

19. Transportation

Both highway and railroad transportation systems in West Virginia are inadequate, in a sorry state of repair, so that problems of coal transportation often are critical. Research is needed as to how the situation can be corrected.

20. Berm Construction

MESA requires that 36" berms be placed alongside haulroads from strip operations, as a safety measure to prevent coal haulers from going over steep embankments. These berms serve to channel water down the roadway, producing serious siltation and erosion problems, which the state water department tries to eliminate. It was pointed out by operators that the 36" berm can not possibly stop a loaded coal hauler from going over the side and they also pointed out that road construction on normal highways throughout the mountains in West Virginia do not have berms. Research is needed to determine whether or not

berms do provide any measure of safety and whether there is any other method which might be better to provide the safety desired.

21. Equipment Research

Operators pointed out the need for research on such items as fire extinguishers and back-up alarms. One operator stated that, due to the vibration on rolling equipment, 50 per cent of the fire extinguishers had to be recharged every week to ten days. Manufacturers do not seem able to provide an extinguisher that will stand up under his conditions. Also, it was stated as regard to back-up alarms, that they are difficult to maintain and they are a significant source of noise pollution. Also, the question was raised as to why a back-up alarm is needed on a bulldozer when it had to be excessively loud to be heard over the noise of the operating vehicle.

22. Research on Standards

Standards in the laws of both the state and the federal, need to be researched from the standpoint of (1) Are they realistic? (2) What are the cost benefits of each standard? and (3) How can all standards be reviewed and subsequently changed if such change is warranted?

23. Effects of Limiting Mining

It was pointed out by the conferees that if federal laws served to prohibit mining because of a geologic setting or for social reasons such as zoning, that these laws effectively act as a condemnation mechanism over that coal resource. It was suggested that since the private land owner would then be

penalized and restricted from the income which would normally be derived from mining his coal, that it was logical for the government to institute condemnation proceedings and purchase the coal from the landowners in a similar manner that it does when constructing highways. Legislation to put such a plan into effect would have far-reaching implications and would be an extremely costly program, but within our society of private land-ownership, a study of this problem would seem warranted.

24. Education and Training

At the present time West Virginia has passed rules and regulations that all new surface miners will receive 40 hours of equipment training before they go on the job and underground miners will receive 80 hours of training. While this is a burden upon the industry, conferees agreed that this training should serve to improve the labor force. Studies were recommended that would look into the role of the man in the whole problem of productivity and safety. Motivational studies, along with ergonomic studies are recommended.

CONCLUSIONS

The land reclamation workshop in West Virginia differed from workshops in other states in that there was little political bickering by the attendees. This is perhaps reflected by the fact that West Virginia has had a long experience in inspection and regulation of coal mines and can be considered a very mature coal mining area. There was a very positive attitude reflected by all persons in attendance that solutions to any problems of the

industry are obtainable and they welcomed the opportunity to contribute to the government research and development program. Attendees were asked to submit written comments to be included in the Appendix of this report.

APPENDIX

ATTENDEES - West Virginia

February 6, 1976

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John W. Sturm, Director, Technical Services, WVSMRA, 1624 Kanawahn Boulevard, Charleston, West Virginia 25311

Chuck Varney, Pittston Coal Group Manager of Reclamation, Lyburn, West Virginia 25637

Paul Wave, Engineer, Div. of Water Res., 1201 Greenbrier, St. Charleston, West Virginia 25311

James R. White, Pioneer Fuel Corp., Beckley, West Virginia 25801

Ronald L. Wooten, Asst. Legis. Council, Am. Mining Congress, 1100 Ring Building, Washington, D. C. 20036

UNIVERSITY OF MISSOURI-ROLLA

School of Mines and Metallurgy

Department of Mining, Petroleum and Geological Engineering

125 Mining Building
Rolla, Missouri 65401
Telephone (314) 341-4751

January 12, 1976

The University of Missouri-Rolla invites you to participate in a one day workshop on the subject of "Surface Mining Reclamation Research and Development Needs for West Virginia". The meeting will be held on Friday, February 6, 1976, starting at 9:00 a.m. at the Daniel Boone Hotel in Charleston.

This workshop is one of several being conducted by the Mining Department, Missouri School of Mines-Rolla to assist the U.S. Bureau of Mines in formulating a comprehensive research and development program to meet the needs of the American Mining Industry. Representatives from West Virginia State Agencies, mining companies and educational institutions have been asked to participate. The U.S. Bureau of Mines will also be represented. The goal of the workshop is to develop a list of projects and problems that exist in West Virginia that should be considered by the U.S. Bureau of Mines for research and development studies. I will prepare a report summarizing the conclusions of the workshop and submit it to the U.S. Bureau of Mines so it can be used to assist in formulating future R & D programs. Each attendee at the workshop will also receive a copy of this report.

The tentative agenda for the meeting is attached. I have listed subjects which I feel need to be discussed and I hope each participant will add to this list subjects that he feels are important. Each participant will be allowed ample time to present his views. The morning will be devoted to problem definition with the afternoon for open discussion.

I hope to see you at the meeting. Attendees will be expected to make their own hotel reservations if they need to spend the night. The telephone number of the Daniel Boone Hotel is 304-343-6131. If you have questions, please feel free to call me at telephone number 314-341-4751. Also, Mr. James Gilley, State Liaison Officer, U.S.B.M., West Virginia, has assisted me in setting up this workshop and you may wish to discuss the workshop with him. His telephone number is 304-343-1443.

Please let me know if you or your designated representative will attend the workshop. Thank you.

Sincerely yours,

Dr. James J. Scott
Professor-Mining Engr.

JJS:sml
enclosure

AGENDA

SURFACE MINING RECLAMATION WORKSHOP FOR WEST VIRGINIA

February 6, 1976

Charleston, West Virginia

8:30 - 9:00	Registration and Breakfast - Coffee and Rolls
9:00 - 9:10	Welcome and Introductions - Dr. Scott
9:10 - 9:40	U.S. Bureau of Mines Present Research and Development Program Concerning Surface Mining Reclamation - Mr. Don Donner - Div. of Environment - U.S.B.M. - Denver, CO
9:40 - 12:00	Problems of West Virginia in Surface Mining Reclamation - All Attendees

SUGGESTED TOPIC AREAS

1. Earth movement and placement as they relate to toxic material placement and future effects on water quality.
2. Correlation between overburden characteristics and future effects on water quality.
3. Soils engineering aspects of construction and stability of valley fills.
4. Potential areas for improvements in productivity.
5. Mining systems to enhance reclamation.
6. Highwall problems - scaling and vegetation.
7. Regulation of Reclamation permits, inspection, bonding, approval, etc.
8. Others suggested by Attendees.

12:00 - 1:15	Lunch
1:15 - 4:00	Open Discussion
4:00 - 4:15	Workshop Summary - Dr. Scott
4:15	Adjournment

USBM Contract No. H0242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN KENTUCKY

James J. Scott

Department Mining, Petroleum and Geological Engineering
University of Missouri-Rolla
Rolla, Missouri 65401

December 19, 1975

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D.C. 20240

INTRODUCTION

This report is the 13th of a series reporting findings from workshops held with various segments of the mining industry under U. S. Bureau of Mines Contract #H0242034. This meeting was held in Hazard, KY, on December 19, at the La Citedelle Motel. Mr. Bill Boyd, State Liasison Officer, KY, Mr. Dan Jones, Division of Environment, Washington, D.C., and Mr. Don Donner, Division of Environment, Denver, CO, were most helpful in assisting the author in setting up this meeting. Nine mine operators, four Kentucky state officials, four federal officials, two Coal Association employees, one professor and one representative from the Appelachian Research and Defense Fund were present at this meeting. A rigid set of priorities was not developed at this meeting as time would not permit. Political problems dominated the discussion and it was difficult at times to get the conferees to discuss the technical aspects of land reclamation.

GENERAL RATING OF PROJECTS

Two broad areas of individual projects developed within the framework of this workshop. They were:

1. Political Problems
2. Technical Problems of Mining

The author has broken down these broad areas of the individual projects as follows:

1. Political
   - 1.1 Many Small Mines.
   - 1.2 Overlap of Agencies.
   - 1.3 Communication Problems
   - 1.4 Small Operator Problems

1.5 Land Ownership

1.6 Unscrupulous Operators

1.7 Severance Tax

1.8 Bonding Burden

2. Technical Problems

2.1 Highwall Scaling.

2.2 Siltation Problems.

2.3 Head of Hollow Fill vs Valley Fill

2.4 Inspection Research

2.5 Vegetation of Highwalls

2.6 Acid Problems

2.7 Strip Land Vegetation

2.8 Orphan Land Problems

2.9 Labor Problems Deep Mines

2.10 Auger Mining Research

2.11 Transportation

2.12 Research on Changes Needed in Mining Laws

2.13 Education and Training

A short discussion will be given on each of the areas which the author hopes will reflect the discussion at this workshop. Attendees have been asked to submit letters reflecting their opinion as to the most significant points covered. Documents submitted by conferees are included in the Appendix.

DISCUSSION

The author opened this workshop by presenting an overview of his role in this contract of assisting the Bureau of Mines in developing a strong research program to assist the industry in meeting the challenges it faces. The U. S. Bureau of Mines

representatives were introduced and Mr. Don Donner gave an overview of the Bureau program in land reclamation studies. Following this presentation, each conferee was asked to present his views on the problems most needing research. The discussion which followed varied greatly and, in total, seemed to cover the major problems.

The listing of the two topic areas under "political" and "technical" do not necessarily follow in chronological order. Also, there was no attempt to set a priority number as to which subject was the most important.

1. Political Problems

1.1 Many Small Mines: The state regulatory agencies for land reclamation are hard-pressed to inspect the many surface operations in Kentucky in excess of 1500. These mines are often difficult to get to as roads are inadequate and they are located in areas of rough terrain. This is in sharp contrast with the problems of Western mine operators where very large operations, few in number, are the general rule.

1.2 Overlap of Agencies: There was considerable discussion on the overlap of MESA with the state agencies in Kentucky. Conditions were cited where one agency would not allow a particular operating technique while the other agency approved of it. The mine operator is then at a loss to determine the logical course of action. One of the state representatives stated that he

had a good rapport with MESA but it did require that he initiate the contacts with the local MESA district office and the local inspectors.

1.3 Communication Problems: There seems to be a lack of communication between the aforementioned agencies and also others within the state. An example was given regarding road construction, where one agency required berms for safety to keep vehicles from going off the road and another agency wanted the berms eliminated to prevent erosion and siltation problems due to the channeling effect which developed with their use. The operator preferred to eliminate the berms as road erosion caused a severe maintenance problem. Research needs to be done to resolve problems of this type.

1.4 Small Operator Problems: Small operators, due to their limited financial base, have a whole multitude of problems which are different from the large operator with adequate financing. For example: He cannot hire specialists to cope with his technical problems, he may not meet all of the legal requirements for the right-to-mine, or may have difficulty meeting all the permit requirements. The state regulatory agencies provide some technical assistance but more is needed.

1.5 Land Ownership: Problems exist in Kentucky as in some cases mineral rights have been sold and surface rights belong to others, right-of-ways for mine roads may be difficult to obtain so that land

ownership and access for mining is a problem. After reclamation and before bonding has been released, the land owner may overgraze reclaimed land, effectively destroying vegetation and causing the state land agency to refuse bond release to a mine operator.

1.6 Unscrupulous Operators: It was pointed out that some mine operators are getting an easy to acquire underground mining permit which they use to do a type of mining which is essentially surface mining. For example: Cuts will be made into the side of the hills at the outcrop for a few hundred feet of length and the seam surface-mined on the pretense of establishing an underground portel. These operations then do not fall under the inspection of the surface mine regulatory agency. No land reclamation laws apply and, in essence, we have a loophole in the law which needs to be plugged in the interest of good environmental practice and fair play.

1.7 Severance Tax: It was pointed out that the severance tax on coal mining in Kentucky goes into a general fund and the money that is collected is not used to improve regulations or to assist the mining industry in any direct way. It was felt by the conferees that most of these funds should go back to benefit the industry.

1.8 Bonding Burden: Kentucky state law requires that

land reclamation meet a rigid inspection requirement approximately 1 year after the establishment of vegetation. If, as previously mentioned, the land owner overgrazes the land, or weather conditions have been unfavorable, the reclamation program may not pass. The small operator has a limited bonding capability and bonding companies will refuse to issue more land reclamation bonds to him if existing bonds are not released. The whole procedure of bonding and the requirements of bonding should be reviewed.

2. Technical Problems

2.1 Highwall Scaling: The characteristic highwall of contour mining in Kentucky presents a safety hazards to the miners working close to it. These walls need to be scaled, but at present there does not seem to be on the market, scaling equipment which fully meets the needs of the mine operator. As an example of this problem: One operator spent over $100,000 for a dragline to be used for highwall scaling upon the recommendation of the mine inspectors, and after obtaining the vehicle, he was prevented from using it by the same agency, as they felt it was unsafe to do so. The machine now sits idle at his operation, and the problem of scaling is still not solved. Research is needed.

2.2 Siltation Problems: A major problem for Kentucky in the areas of steep terrain is the problem of

mud and silt being washed down the valleys encoaching upon private property of others and causing a severe, unsightly nuisance problem. Probably no other single problem tends to cause more public relations difficulties than this one. Research on silt dam location, construction, size, etc. is needed.

2.3 Head of Hollow-fill vs Valley-fill: At the present time, fills that completely close off a valley or flowing stream are not allowed in Kentucky. In some cases, they may be desirable to create level land areas for future building and industrial development. Head of hollow-fills are allowed and there seem to be some difficulty in determining just when a head of hollow-fill becomes a valley-fill. Research is needed to determine just where each should be used and whether or not valley-fills could at some times be the best solutions to land reclamation problems.

2.4 Inspection Research: The manner in which inspections are conducted was questioned and, it appeared that some research should be done to determine just how inspections should be conducted, the frequency of inspection and the role of the inspector overall in the development of the mining industry.

2.5 Vegetation of Highwalls: Highwalls are unsightly and there is a need to develop some type of vegetation which will cling to their steep faces and establish a permanent cover.

2.6 Acid Problems: During the meeting it was pointed out that acid mine water problems are not a universal problem in Kentucky. Some areas have the problem, but in others water from the mine is so clear it is used for municipal water systems. Some research is needed in the acid areas to determine better and more effective ways to neutralize acid.

2.7 Strip Land Vegetation: Research into the type of seedings, fertilizers, procedures and systems for dealing with problems in soil chemistry is still needed.

2.8 Orphan Land Problems: The conferees felt that the biggest source of acid pollution in Kentucky today is from "orphan" mines which have been abandoned many years ago but which still generate large quantities of acid mine water. It was pointed out that some of the worst pollution sources are from old underground mines rather than from surface operations.

2.9 Labor Problems, Deep Mines: There does not seem to be a shortage of labor to mine surface coal in Kentucky, as the construction industry is depressed and construction workers are well-trained for running the type of equipment used in strip mining. Underground mining is a different story in that the special skills for operating underground equipment are not in abundant supply.

2.10 Auger Mining Research: Auger mining still produces

an appreciable tonnage of coal and, unfortunately, the system still operates at a fairly low recovery, say, less than 50 per cent, and in many cases serves to isolate blocks of other mineable coal deep in the hillsides which are then not mined. Studies to determine just how auger mining should be employed and how to increase recovery are needed.

2.11 Transportation: Most rural roads in Kentucky are not constructed to carry the weights associated with the coal haulers which operate upon them. In many cases the weight of the empty vehicle exceeds the road design criteria. Although the truckers are violating weight regulations, these regulations are largely ignored by the police as coal mining is such a vital force to the economy of the state. The result is severe deterioration of roads, high cost to the local communities and generally an undesirable situation.

2.12 Research on Changes Needed in Mining Laws: Standards in laws tend to be "cast and concrete" and become very difficult to change. A review of the standards of existing legislation is urgently needed to determine which ones are counterproductive and should be revised.

2.13 Education and Training: Programs are needed to educate the small operator in the most advanced technology so that he may cope with his problems.

Extension type courses or technology transfer courses might be used to accomplish this. They would need to be held near the sites where mining takes place and should be held on a district by district basis and zero in specifically upon the problems of that local district area. Technicians and professionals are also in short supply but, in the case of the small operator, he can probably not afford to hire them anyway. Regulatory agencies and large operators can certainly use them.

CONCLUSIONS

This workshop demonstrated that there was a good rapport between the regulatory groups and the responsible mine operators in the State of Kentucky. In many cases the inspectors were handicapped by the wording of the laws and it was pointed out that it was often difficult to apply plain common sense to the problems at hand. The loopholes in the law which allow unscrupulous miners to operate should be closed as such action as described in this report act to the detriment of the coal mining industry.

APPENDIX

LIST OF ATTENDEES

Willie R. Curtis, U.S. Forest Service, Berea, KY, 40403

J.H. Mosgrove, Kentucky Coal Association, Box 4242, Lexington, KY, 40504

William Hayes, Kentucky Division of Reclamation, Hazard, KY, 41701

James C. Grider, Kentucky Division of Water Resources, Frankfort, KY, 406(

Ray Adkins, Knott-Leycher-Perry Coal Op. Assoc., Box 400, Whitesburg, KY 41858

Dan Jones, Bureau of Mines, 2401 E. St., NW, Washington, D.C. 20241

Don Donner, U.S.B.M., Bldg., 20, Federal Center, Denver, CO, 80239

Chester A. Stevens, Falcon Coal, Jackson, KY, 41339

Arthur Nicholson, P.O. Box 11888, Lexington, KY 40511

Jim Newell, Globe Coal Co., Box 709, Whitesburg, KY 41858

Jerry G. Rose, University of Kentucky, Dept. of Civil Engr., Lexington, KY, 80506

Luther Meade, P.O. Box 984, Whitesburg, KY, 41858

W.T. Boyd, U.S. Bureau of Mines, 330 W. Broadway, Frankfort, KY, 40601

Terry C. Anderson, P.O. Box 453, Jenkins, KY 41537

J.C. Osgood, P.O. Box 3A, R.F.D. 1, Jenkins, KY, 41537

Vernal Chaffin, Garrett, KY

Joe Boyys, Route #2, Box 290, Hazard, KY

Virgil R. Lively, Box 7, Ivel, KY

Willard M. Gillison, Elkhorn Land Corp. Hazard Coal, Whitesburg, KY

Laura Bowers Vandergard, P.O. Box 625, Barbourville, KY
Appalachian Research & Defense Fund

UNIVERSITY OF MISSOURI-ROLLA

School of Mines and Metallurgy

Department of Mining, Petroleum and Geological Engineering

125 Mining Building
Rolla, Missouri 65401
Telephone (314) 341-4751

November 19, 1975

This letter is a follow-up on the recent contact with you by Mr. Wm. Boyd, State Liaison Officer, U.S.B.M., Kentucky. The University of Missouri-Rolla invites you to participate in a one day workshop on the subject of "Surface Mining Reclamation Research and Development Needs for Kentucky". The meeting will be held on Friday, December 19, 1975, starting at 9:00 a.m. at the La Citadelle Motel in Hazard, Kentucky.

This workshop is one of several being conducted by the Mining Department, Missouri School of Mines-Rolla to assist the U.S. Bureau of Mines in formulating a comprehensive research and development program to meet the needs of the American Mining Industry. Representatives from Kentucky State Agencies, mining companies and educational institutions have been asked to participate. The U.S. Bureau of Mines will also be represented. The goal of the workshop is to develop a list of projects and problems that exist in Kentucky that should be considered by the U.S. Bureau of Mines for research and development studies. I will prepare a report summarizing the conclusions of the workshop and submit it to the U.S. Bureau of Mines so it can be used to assist in formulating future R & D programs. Each attendee at the workshop will also receive a copy of this report.

The tentative agenda for the meeting is attached. I have listed subjects which I feel need to be discussed and I hope each participant will add to this list subjects that he feels are important. Each participant will be allowed ample time to present his views. The morning will be devoted to problem definition with the afternoon for open discussion and setting of a list of R & D project areas on a priority basis.

I hope to see you at the meeting. If you have questions, please feel free to call me at telephone number 314-341-4751. Also, you may wish to discuss the meeting further with Mr. Boyd. His telephone number is 502-875-4120.

I'll look forward to meeting you or your designated representative at the workshop. Thank you.

Sincerely yours,

Dr. James J. Scott
Professor-Mining Engr.
University of MO-Rolla
Rolla, MO 65401

JJS:sml

AGENDA

SURFACE MINING RECLAMATION WORKSHOP FOR KENTUCKY

DECEMBER 19, 1975 - LA CITADELLE MOTEL

HAZARD, KENTUCKY

8:30 - 9:00	Registration and Breakfast - Coffee and Rolls
9:00 - 9:10	Welcome and Introductions - Dr. Scott
9:10 - 9:40	U.S. Bureau of Mines Present Research and Development Program Concerning Surface Mining Reclamation - Mr. Don Donner - Div. of Environment - U.S.B.M. - Denver, CO
9:40--12:00	Problems of Kentucky in Surface Mining Reclamation - All Attendees

SUGGESTED TOPIC AREAS

1. Geographic conditions such as transportation routes.
2. Geologic conditions such as steep, mountainous terrain.
3. Climatic conditions such as 50+-inch annual rainfall.
4. Availability of mining equipment.
5. Availability of operating capital.
6. Availability of trained manpower.
7. Changing regulatory authority such as new bonding procedures, etc.
8. Inadequate geologic information such as varying separations between coalbeds.
9. Needs for new grasses, trees and vegetation that will propagate under these constraints.
10. Problems with pyritic materials associated with coalbeds.
11. Others

12:00 - 1:15	Lunch
1:15 - 1:45	Grouping and Review of Problem Areas Brought Out In Morning Session
1:45 - 4:00	Open Discussion and Setting of R & D Priorities
4:00 - 4:15	Workshop Summary - Dr. Scott
4:15	Adjournment

JOHN S. HOFFMAN
SECRETARY

JULIAN M. CARROLL
GOVERNOR

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
OFFICE OF THE SECRETARY
FRANKFORT, KENTUCKY 40601
TELEPHONE (502) 564-3350

November 26, 1975

MEMORANDUM

TO: Commissioner Billy S. Lewis
Division Directors

FROM: Perry R. White, Jr.
Deputy Secretary & General Counsel

RE: Coal Operators Proof of Right to Mine -- Land Permit

The Department does require documents which would constitute a complete chain of title as part of the applicant's request for permit for the area the operator seeks to mine. Either of two procedures will meet our requirements.

1. The operator may submit a lawyer's certification of title such as would be required by a lending institution and which would be warrant to the Department the operator's right to mine the area sought to be permitted. A copy of such a certification is attached hereto.

2. In lieu of the certification the Department will accept a contract, lease, deed or whatever document presented which purports to grant to the applicant the right to mine the area sought to be permitted. Whatever document is used must state that good and favorable consideration is one of the conditions of the agreement but need not state the exact amount of that consideration. When this procedure is employed, the document presented to the Department must be a document that is a recordable instrument and must in fact have been recorded. (County Court Clerk's Office).

This does not mean that the Department will not, when it deems necessary, require additional evidence of the applicant's right to mine the land in question. It does mean that as a matter of routine the Department will accept one of the two instruments referred to above. Obviously, some judgment must be exercised. For example, we should not take certifications from an attorney we have knowledge is insolvent or who is no longer a member of good standing of the Bar Association, nor would these documents be sufficient if in fact other documents purporting to show ownership in someone else have come to our attention.

PRW:cah

cc: Secretary Hoffman

R. R. CRAWFORD
PRESIDENT

MRS. R. J. MULHOLLAND
VICE-PRESIDENT

COMIE TYLER
SECRETARY - TREASURER

ELKHORN - HAZARD COAL LAND CORPORATION
P. O. DWR. 210
WHITESBURG, KENTUCKY 41858
TELEPHONE NO. 606 633-2226

COPY

December 12, 1975

Honorable John S. Hoffman, Secretary
Department for Natural Resources and Environmental Protection
Frankfort, Kentucky 40601

Gentlemen:

We respectfully direct your attention to the attached Memorandum issued by Mr. Perry W. White, Jr. in which he attempts to impose requirements regarding surface mining, that go beyond the intent and purpose of the law. We, therefore, wish to file our objections to said obvious illegal requirement.

This requirement as set forth in Mr. White's Memorandum that the operator must furnish an abstract of title to the property to be worked, or other title requirements, at his expense, has no statutory authority, has no reasonable relationship to the purpose to be accomplished, and is contrary to legislative intent.

As you know, current law on this subject, is a combination of H. B. 9 (4-2-74), H. B. 249 (3-14-74), and S. B. 332 (3-29-74) as set forth in KRS. Chapter 350. Neither of these bills nor KRS Chapter 350 conveys any authority, either expressed or implied for such a requirement. In fact this requirement apparently is something added to the statute by the Department.

KRS 350.060 (8) is very specific as to eligibility requirements for qualifying for a surface mine permit. These requirements are essentially as follows:

The applicant must file an application which shall state:
Location of affected area and means of access to the job.
A statement of the surface owners of the tract to be mined, and owners within 500 feet of the job.
A statement of the owners of the coal.
A statement of the source of the coal he is to mine (not legal verification).
The required copies of maps, filing fees, bonds, etc.
A notarized statement of the consent of the party on whose property is the mining to be done.

The law provides for these statements only. Nowhere in the statute is found the requirements to verify either the ownership of the surface or the

ownership of the mineral.

The purpose of the strip mine law is to regulate the actual mining. The process, method, reclamation and other aspects of the actual mining, and not to set as a court determining titles to land. This is a function of the courts.

The intent of the Legislature is clearly shown in H. B. H. 9 which provides: "It is the intent of the General Assembly in this Act to declare that the notarized statement of consent required by Section 2 of this Act (KRS 350.060) is a perfect legitimate right, and proper requirement to protect the public safety and welfare as it pertains to the broad form deed. It is also the intent of the General Assembly that this Act does not affect any other form of contract in any manner, nor affect underground mining in any manner."

The affidavit of the surface owner is to be accepted as meeting the statutory requirements. If he executes a false affidavit, he will be subject to the courts.

As you are aware, Kentucky Government is composed of three Divisions. The administrative, the Legislative and the Judical. Neither of these divisions is to usurp the power of the other.

Under Mr. White's requirement, this is exactly what would happen. The department would displace the courts in passing judgment on ownership, as Mr. White purports to do on page 2 of his memorandum.

May I cite the following case?

" No administrative board may add to the requirements of a statute nor can it eliminate therefrom any requirement contained in the statutes.
Robertson v Schein, 305 Ky. 528, 204 S. W. (2) 954.

There is a general feeling amoung the surface miners affected, that this purported requirement is just another road block to obstruct surface mining, and an effort to put surface miners to extra needless expense.

Under KRS 13.080, this requirement would be considered a regulation, since it is of general application applying to all surface mines, and seeks to interpret, prescribe and compel certain requirements.

To our knowledge no review or public hearing has been held as required by KRS. 13.085.

It is our hope that this regulation will be reviewed, and that if it is not amended, it be processed as required by the appropriate Statue shown herein-before.

Respectfully yours,

ELKHORN-HAZARD COAL LAND CORPORATION

By Willard W. Gilliam
Willard Gilliam, Land Agent

WG/vth

cc: Honorable Julian M. Carroll, Governor
Director Legislative Research Commission
Attorney General
Harlan County Coal Operators Association
Nation Coal Operators Association
Pike County Coal Associates.

JOHN S. HOFFMAN
SECRETARY

JULIAN M. CARROLL
GOVERNOR

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
OFFICE OF THE SECRETARY
FRANKFORT, KENTUCKY 40601
TELEPHONE (502) 564-3350

December 15, 1975

Mr. Willard Gilliam, Land Agent
Elkhorn-Hazard Coal Land Corporation
Post Office Drawer 210
Whitesburg, Kentucky 41858

Dear Mr. Gilliam:

I have received and read your letter of December 12, wherein you object to the manner in which the Department requires applicants for stripmining permits to present their proof of right to mine the coal underlying the area of land affected in the permit.

As you know, KRS 350.060(2)(d) requires that the applicant furnish this department with evidence of the source of the applicant's legal right to mine the coal on the land affected by the permit. Mr. White and I have given considerable consideration to the manner and the method by which such legal right shall be presented, and the method which is outlined and contained in his memorandum, which was attached to your letter, is the method which I have adopted as the Secretary of the Department for Natural Resources and Environmental Protection.

For your information, the requirements contained in the memorandum are less stringent than those which had been required prior to the issuance of this memorandum and adoption of this method.

Sincerely and respectfully,

John S. Hoffman

JOHN S. HOFFMAN
Secretary

JSH:bs

cc: Perry R. White, Jr.

R. R. CRAWFORD
PRESIDENT

MRS. R. J. MULHOLLAND
VICE-PRESIDENT

COMIE TYLER
SECRETARY - TREASURER

ELKHORN - HAZARD COAL LAND CORPORATION

P. O. DWR. 210
WHITESBURG, KENTUCKY 41858
TELEPHONE NO. 606 633-2226

December 16, 1975

Honorable John S. Hoffman, Secretary
Department for Natural Resources and Environmental Protection
Frankfort, Kentucky 40601

Dear Secretary Hoffman:

Reference is made to your letter of December 15th, a copy of which is attached hereto. Your letter was in response to our letter of December 12th. In the letter we presented our objections to the attempt of your department to impose requirements regarding surface mining, that go beyond the intent and purpose of the law.

We strongly disagree with your interpretation of KRS 350.060 (2) (d), that the applicant must furnish the department with evidence of the source of the applicant's legal right to mine the coal on the land affected by the permit. All the law actually requires is a simple statement of the applicant's right to mine. (This could be that the surface was leased, owned, etc.) How the surface owner who executed his permission to mine on his property, came into possession of his surface is of no concern to the department.

KRS 350.060 (2) states simply that the applicant file an application and that he state (not verify):

(a) Location and description of the area under consideration.

(b) Owner or owners of the surface, and within 500 feet.

(c) Owner or owners of the coal.

(d) Source of applicant's right to mine the coal (Notarized consent).

If an applicant were required to furnish evidence of (d) above, he would also be required to furnish evidence of (b) and (c) since the same language applies to all these sections. One of them cannot logically be singled out.

According to your contention you are setting your department up as a court, to pass judgment on titles to real property.

Also, under your contention, your department appears to be usurping legislative powers by adding requirements to the strip mine laws contrary to legislative intent.

This legislative intent is clearly set out in H. B. 9. The notarized consent of the surface owner is a vehicle used to protect the public interest. Any other requirement goes beyond the law.

The General Assembly was very specific in insisting that no other contract was to be affected in any manner. This is exactly what you are proposing to do.

In the interest of complying with the law and in fairness to the surface mine industry, it would be well for you and Mr. White to give this matter further consideration and withdraw or amend the controversial Memorandum.

We have arrived at a sad state of affairs in Kentucky whenever law-abiding citizens are forced into court to protect their rights against unjustified bureaucratic regulations, which apparently have no legal basis.

Respectfully yours,

ELKHORN-HAZARD COAL LAND CORPORATION

BY: W. Wms.
Willard Gilliam, land agent

WG/vth

cc: Honorable Julian M. Carroll, Governor
Hon. Ed W. Hancock, Attorney General
Legislative Research Commission

USBM Contract No. H0242034

RESEARCH AND DEVELOPMENT PRIORITIES

SURFACE MINING RECLAMATION IN MONTANA

James J. Scott

Department Mining, Petroleum and Geological Engineering
University of Missouri-Rolla
Rolla, Missouri 65401

December 12, 1975

Prepared for the U.S. Department of the Interior
Bureau of Mines
Washington, D. C. 20240

INTRODUCTION

This report is the 12th of a series reporting findings from workshops held with various segments of the mining industry under U.S. Bureau of Mines Contract #H0242034. This meeting was held in Helena, Montana, on December 12, at the Colonial Inn. Mr. George Krempasky, State Liaison Officer, Montana, and Mr. Dan Jones, Division of Environment, for the U.S. Bureau of Mines, were most helpful in assisting the author in setting up this meeting. Four coal companies, a consultant, 3 state officials, an ERDA representative, 3 U.S.B.M. representatives and faculty members from Montana Tech. and Montana State University, were represented at this meeting. All participants were very frank and vocal in their suggestions as to the true problems of the western surface mine reclamation. Dan Jones assisted in taking notes.

A rigid set of priorities was not developed at this meeting and the ranking of projects is that of the author. Political problems completely overrode all technical aspects of land reclamation in regard to coal mining in the State of Montana.

GENERAL RATING OF PROJECTS

1) Political Problems

2) Technical Problems

The author has broken down these broad areas of the individual projects as follows:

1. Political

    1.1 Impact of government regulations.
    1.2 Definition of a logical mining unit.

1.3 Criteria for selective denials for mining.
1.4 Studies to expediate permits.
1.5 Land ownership problems.
1.6 Communication problems.
1.7 Federal review of state agencies.
1.8 Individual state tax programs.

2. Technical Problems

2.1 Study of soil chemistry.
2.2 Spoil handling system.
2.3 Belt transportation systems.
2.4 Revegetation.
2.5 Education and training.
2.6 Research on laws.
2.7 Mine development by districts.
2.8 Bond release criteria.
2.9 Sludge and fly ash disposal.
2.10 Coal drying.
2.11 Coal dusting during transportation.
2.12 Development of a small mining unit.
2.13 Research on geological boundaries vs land ownership boundaries.
2.14 Underground mining research in Montana.
2.15 Air pollution studies.
2.16 Stock-piling studies.
2.17 "Why" research on the mining industry.

A short discussion will be given on each of the areas which the author hopes will reflect the discussion at this workshop. Attendees have been asked to submit letters reflecting their opinion as to the most significant points covered.

DISCUSSION

The author opened this workshop by presenting an over-view of his role in this contract of assisting the Bureau of Mines in developing a strong research program to assist the industry in meeting the challenges it faces. The U.S. Bureau of Mines representatives were introduced and Mr. Don Donner, Division of Environment U.S.B.M., gave an over-view of the Bureau program in land reclamation studies. Following this presentation, each conferee was asked to present his views on the problems most needing research. The discussion which followed varied greatly and,

in total, seemed to cover the major problems.

The listing of the two topic areas under "political" and "technical" do not necessarily follow in chronological order. Also, there was no attempt to set a priority number as to which subject was the most important.

1. Political Problems

1.1 Impact of Government Relations: Federal, State and local regulations tend to impede the process of mining. In some cases, there is over-lap between these agencies. There can very well be developing a major conflict involving state's rights vs federal rights in the development of energy resources. Since the federal government owns so much of the land in the West, it is probable that federal representatives will regulate mining on that land. Federal criteria may not always agree with State criteria and, thus, a conflict can result. The mining operator can very well be caught in the middle so that it is impossible for him to meet all requirements.

1.2 Definition of a Logical Mining Unit: In the process of issuing mining permits, a logical mining unit has not been clearly defined. Without such a definition, the operator is limited in how much land he can put under permit and how far ahead he can extend his mine planning. The state regulator has no clear-cut criteria to use.

1.3 Criteria for Selective Denials for Mining: It seems logical that there must be areas which should

not be mined, even though mineral deposits exist on the property. These areas would be places where the damage done by mining are such that they defy planned reclamation or they deface the surface in such a manner that any secondary use is prohibited. Care must be taken in developing these criteria so that the denial process does not become a vehicle whereby mining can be completely eliminated. Criteria must be developed based on sound geological and engineering data, rather than on emotionalism. If mineral areas are to be denied, these areas should be defined early in the developmental phase so that operators will not expend their financial resources investigating deposits which will, at a later date, be denied to them.

1.4 Studies to Expediate Permits: The permit process is cumbersome, time-consuming, wasteful of manpower and is a tremendous burden on both the regulatory agency and the mining industry. Methods should be researched to determine how this whole process can be streamlined, how to build in the maximum flexibility so that operators and regulator can agree on changes in the mining plan as differing geologic conditions are encountered. Inspectors need to be aware of the effects of their regulations upon mining costs and the disruption to the mining operation which can be caused by an inspectors' unjudicious work order. One of the conferees, who now works for

the Industry and previously worked as a state inspector, stated that he never, during his course of government employment, was really cognizant of the tremendous power which he wielded over the mining company and its cost of operations and, thus, profitability.

1.5 Land Ownership Problems: The checkerboard land ownership of railways, mixed in with federal ownership, private ownership and Indian reservations, cause a tremendous problem for the mining industry in developing a logical mining plan. These problems are further complicated by surface ownership rights vs mineral ownership and rights to mine. Research into ways in which these problems can be resolved without the process of long, tedious, time-consuming court battles, is needed.

1.6 Communication Problems: It was obvious during this workshop that the state representatives from the Dept. of State Lands for Montana, are well respected by the mining industry and that they communicate with the industry in a frank, direct manner. But, even under these conditions, both the state representatives and the industry personnel admitted to serious problems in communication. The mass of paper work associated with mining permits, the time-consuming review, by the limited number of state people of these permits, the necessity for attending numerous public meetings, all contribute to

misunderstandings and problems in the communication area. Research is needed into the best manner in which all parties can be informed but the unessential communication which is so time-consuming, needs to be eliminated.

1.7 Federal Review of State Agencies: Several conferees felt there was a need for the federal government to review the competency of individual state agencies to accomplish the regulation which they are assigned. Wages are normally low, hours are long, often rewards are few for the persons employed by these agencies and, thus, it may be impossible for the agencies to acquire the staffs they need to do the job they so sincerely want to do. The affects of this can be to deter mineral development, to force companies to develop less desirable properties in other states, and to affect the total response capability of the industry to meet the needs of the country.

1.8 Individual State Tax Program. Montana has seen fit to initiate the highest state severance tax on minerals in the Nation, 30% of the sale price on coal. When this tax is compared with the approximate 5% severance tax on coal mined in Wyoming, it has an obvious affect upon any mining company in its development of coal property if it has holdings in both states. The constitutionality of severance tax may come under question, as it is obvious that an even higher tax can effectively prohibit all mining, regardless of the grade of the deposit and

and the desirability of mining it to meet national needs. Research as to its affect on the development of coal resources is vitally needed.

2. Technical Problems

2.1 Study of Soil Chemistry: Many Montana soils are high in sodium and may contain a mineral called leonardite. The properties of leonardite are not fully understood and sodium can be very detrimental to establishing plant life. There are also problems in leaching of the soil and the possiblity that heavy metal ion may be a danger to groundwater near mining operations.

2.2 Spoil Handling Systems: Montana requires that toxic products be buried under a suitable thickness of topsoil. In several cases in Montana, multiple seams are to be mined and the overburden over these various seams can be quite different so that systems need to be developed for the special geologic settings which exist.

2.3 Belt Transportation Systems: There was considerable discussion about the possible use of conveyor belt as a means to more efficiently move overburden materials. There was particular interest in cross-pit belts, which might possibly eliminate the need for ramps and roadways and, thus, simplify mine planning and access.

2.4 Re-vegetation: There is a need for research on both new and native plant species which may be adaptable to the soil and climatic conditions of

Montana. Short-lived cover-type crop species as well as permanent species should be investigated.

2.5 Education and Training: There is a need to educate both the industry and the regulators as to just what is practical and what is impractical in land reclamation. Education and training could improve communications between these parties. Courses and curriculica need to be developed, perhaps in cooperation with local education units to upgrade the quality of inspection and the ability of the industry to respond with improved reclamation procedures.

2.6 Research on Laws: There is a need for research to determine how good or bad present laws are. It is doubtful that any laws are perfectly written and there is a need to determine just how changes can be made to improve laws and simplify their interpretation and implementation.

2.7 Mine Development by Districts: Too often companies develop only a small portion of a mineral deposit in a geologic area. This can result in the leaving of portions of the mineral deposit in small, isolated blocks, which are really not mineable in the future. This is a waste of our natural resources and should be investigated.

2.8 Bond Release Criteria: There is a need to determine just what state reclamation must be completed to allow release of companies from the financial burden imposed by the bonding process. This could be a

particular problem to the smaller operator as he may be limited in the quantity of bonds he can obtain.

2.9 Sludge and Fly Ash Disposal: Due to the high ash content of Western coal, they tend to develop large quantities of fly ash and sometimes sludge from wet scrubbing operations. Research could be carried on to determine how best to dispose of these materials and, also, to determine if they could be put to useful purposes, such as soil conditioners.

2.10 Coal Drying: Western coals are quite high in moisture and this moisture represents a substantial transportation cost, especially when coal is shipped upwards of 1000 miles to power plants in the Midwest. Essentially, one can consider that one railroad car in ten is only filled with water. Coal drying before shipment should be investigated.

2.11 Coal Dusting During Transportation: Some companies are using oil sprays on the coal to prevent dust generation during loading and unloading and during transportation of the coal by railroad. Other companies are trying surface treatments of the coal in cars to prevent blowing of dust during haulage. There is need to investigate the affects of dust on vegegation along railroad right-of-ways and also to determine just what methods are most effective in eliminating the problem.

2.12 Development of a Small Mining Unit: Most mines in Montana can be considered large, producing in

excess of a million tons per year. There is a need for research to determine if there is a place for smaller companies to mine in this state. By small, I mean a mine that perhaps would have a total area of a single section.

2.13 Research on Geologic Boundaries vs Land Ownership Boundaries: From the viewpoint of the professional engineer, it would seem logical that mineral deposits should be developed based upon geologically developed boundaries, controls, such as depth of burial, thickness of coal, profitability during mining, etc. Unfortunately, most mining operations are controlled by arbitrary land ownership boundaries which may have little to do with the boundaries of the mineral. This results in wasteful practices, loss of mineable reserves, inefficient land reclamation, etc. Some research is needed to determine how mineral resources can be developed on a district basis, rather than upon land ownership boundaries.

2.14 Underground Mining Research in Montana: Montana is a state recognized for its vast potential for surface coal mining, but little attention has been given to the possibility of mining underground deposits. Studies should be undertaken to determine the extent of underground reserves, their mining by present technology, and overall, their potential as a total energy resource.

2.15 Air Pollution Studies: A review of current air pollution standards should be undertaken to determine the affects of future power generation plants in Montana. Due to the low population density and the lack of heavy industry in the state, it would seem that some relaxation of rigid ambient air quality standards might be considered.

2.16 Stockpiling Studies: Conferees felt that little or no research had been done on stockpiling practices and that some work needed to be done to determine the best location, sizes, and methods of storing coal.

2.17 "Why" Research on the Mining Industry: The conferees felt that some work needed to be done to determine just "why" some conditions seem to be present in the mining industry.

1. Why is the industry viewed in such a bad light by the news media and the general public?
2. Why is it the Federal government is not following its own dictates as stated in the Mineral Policy Act, of 1970, to "foster and develop a strong domestic mineral industry".
3. Why is the State of Montana essentially "anti-coal mining" when a recent poll of the public in Montana showed 2 out of 3 people favor the development of coal mining in the state.

CONCLUSIONS

The conferees at this workshop showed a strong willingness to cooperate in every way to solve the problems of the Montana mining industry. There seemed to be an underlying current of despair that many of the problems defied solution. The source of problems was often in the political area, both on a Federal and State level, with the politicians having little understanding of the technical aspects of mining. State regulatory people and industry personnel showed a strong respect for each other which speaks well for the state Department of Lands of Montana. This cadre of people should serve as an excellent technical group with which the Bureau of Mines should interface closely in any research program initiated for the state.

UNIVERSITY OF MISSOURI-ROLLA

School of Mines and Metallurgy

Department of Mining, Petroleum and
Geological Engineering

125 Mining Building
Rolla, Missouri 65401
Telephone (314) 341-4751

November 11, 1975

Dear

The University of Missouri-Rolla invites you to participate in a one day workshop on the subject of "Surface Mining Reclamation Research and Development Needs for Montana". The meeting will be held on Friday, December 12, 1975, starting at 9:00 a.m. at the Colonial Motel in Helena.

This workshop is one of several being conducted by the Mining Department, Missouri School of Mines-Rolla to assist the U.S. Bureau of Mines in formulating a comprehensive research and development program to meet the needs of the American Mining Industry. Representatives from Montana State Agencies, mining companies and educational institutions have been asked to participate. The U.S. Bureau of Mines will also be represented. The goal of the workshop is to develop a list of projects and problems that exist in Montana that should be considered by the U.S. Bureau of Mines for research and development studies. I will prepare a report summarizing the conclusions of the workshop and submit it to the U.S. Bureau of Mines so it can be used to assist in formulating future R & D programs. Each attendee at the workshop will also receive a copy of this report.

The tentative agenda for the meeting is attached. I have listed subjects which I feel need to be discussed and I hope each participant will add to this list subjects that he feels are important. Each participant will be allowed ample time to present his views. The morning will be devoted to problem definition with the afternoon for open discussion and setting of a list of R & D project areas on a priority basis.

I hope to see you at the meeting. If you have questions, please feel free to call me at telephone number 314-341-4751. Also Mr. George Krempasky, State Liaison Officer, U.S.B.M., Montana, has assisted me in setting up this workshop and you may wish to discuss the workshop with him. His telephone

LIST OF ATTENDEES

Richard L. Hodder, Agricultural Experiment Station, Montata State University, Bozeman, MT, 59715

Jack Reed, Peter Kiewit Mining, Box 746, Sheridan, WY, 82801

Dan Jones, Bureau of Mines, 2401 E. St., NW, Washington, D.C., 20241

William Rosewarne, Decker Coal, P.O. Box 12, Decker, MT, 59025

Tom Finch, Montana College of Mineral Science & Technology, Butte, MT, 59701

Don Donner, U.S.B.M., Bldg. 20, Federal Center, Denver, CO, 80239

Dave Simpson, Westmoreland Resources, P.O. Box 449, Hardin, MT, 59034

Mike Grende, Western Energy Co., 40 E. Broadway, Butte, MT, 59701

Wayne Van Voast, Montana Bureau of Mines & Geology, 3021 6th Avenue, Billings, MT, 59101

Gene Davis, Decker Coal, P.O. Box 12, Decker, MT, 59025

Ted Schwinden, Department of State Lands, 1625 Eleventh Avenue, Helena, MT 59601

C.C. McCall, Department of State Lands, 1625 Eleventh Avenue, Helena, MT, 59601

G.T. Krempasky, U.S.B.M., Liaison Office, 636 North Logan, Helena, MT, 59601

Jack Hallowell, F.E.A., 2717 Airport Way, Helena, MT, 59025

Bob Rudio, 2301 Colonial Drive, Helena, MT, 59025

APPENDIX

number is 406-449-5297.

Please let me know if you or your designated representative will attend the workshop. Thank you.

Sincerely yours,

Dr. James J. Scott
Professor-Mining Engr.
University of MO-Rolla
Rolla, MO 65401

JJS:sml

AGENDA

SURFACE MINING RECLAMATION WORKSHOP FOR MONTANA
December 12, 1975 - Colonial Motel
Helena, Montana

8:30 - 9:00	Registration and Breakfast - Coffee and Rolls
9:00 - 9:10	Welcome and Introductions - Dr. Scott
9:10 - 9:40	U.S. Bureau of Mines Present Research and Development Programs Concerning Surface Mining Reclamation - Mr. Dan Jones - Div. of Environment - U.S.B.M. - Washington, D.C. and Mr. Don Donner, Division of Environment, U.S.B.M. - Denver, Colorado
9:40 - 12:00	Problems of Montana in Surface Mining Reclamation All Attendees

Suggested Topic Areas

1. Multiple Seam Mining-Handling of Parting Seam
2. Criteria for Selected Denial of Specific Sites (Designation of land unsuitable for mining)
3. Coal Analysis of Trace Elements - Determined in Combustible State
4. Materials Handling - Transportation
5. Surface Problems of Underground Mining - Thick Coal Seam - Shallow Overburden
6. Vegetation Studies
7. Ground Water Hydrology Problems
8. Others Suggested by Attendees

12:00 - 1:15	Lunch
1:15 - 1:45	Grouping and Review of Problem Areas Brought Out in Morning Session - Dr. Scott
1:45 - 4:00	Open Discussion and Setting of R&D Priorities
4:00 - 4:15	Workshop Summary - Dr. Scott
4:15	Adjournment

STATE OF MONTANA

DEPARTMENT OF STATE LANDS

STATE CAPITOL HELENA 59601 (406) 449-2074

STATE BOARD OF LAND COMMISSIONERS
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ROBERT L. WOODAHL
ATTORNEY GENERAL
E. V. "SONNY" OMHOLT
AUDITOR

TED SCHWINDEN
COMMISSIONER

SCHOOL LANDS

RESOURCE FOR THE PRESENT

OPPORTUNITY FOR THE FUTURE

February 2, 1976

Dr. James J. Scott
Professor-Mining Engr.
School of Mines and Metallurgy
University of Missouri-Rolla
125 Mining Building
Rolla MO 65401

Dear Dr. Scott:

Thank you for the opportunity to comment on your Surface Mining Land Reclamation Report prepared as a result of the meeting held in Helena, Montana, on December 12, 1975. I apologize for not being able to attend the afternoon session.

In that industry officials and Commissioner Schwinden delivered their views during the morning session, time was not available to express my views verbally. I will take advantage of the occasion by providing my original planned input and commenting on your written report.

My views as to research needs as related to surface mining reclamation in Montana are as follows:

1. Research into rooting depth requirements of native grasses, introduced species, and agricultural crops.

2. Toxic or undesirable levels of soil or overburden materials from a chemical and textural standpoint as they would relate to people, vegetation, domestic stock, wildlife, and fish.

3. Fetilizer application in relation to when and where.

   A. Prior to seeding?

      a) On regraded spoil prior to topsoiling?
      b) On regraded topsoil?

   B. After seeding

      a) Immediately
      b) Some later date.

4. Evaluation and recommendations regarding present marketing contract provisions that hamper, restrict or bind a company in their attempts to meet existing reclamation laws or

future legislation that they may be subject to.

5. Research on desirable wildlife vegetation along the lines of

A. Seed collection;

B. Seed processing;

C. Seed treatment and storage;

D. Germinating requirements.

6. Research of topographic, vegetation and other necessary habitat components toward reclaiming segments of mined lands to:

A. Grouse dancing grounds, nesting, and related requirements;

B. Antelope fawning areas.

7. Spoil mining and handling techniques to facilitate

A. Recovery of multiple seams;

B. Greater mining depths;

C. Efficient recovery;

D. Safety;

E. Problem spoil burial;

F. Chemical effects of long term weathering of spoil;

G. Reestablishment of streams.

8. Research on revegetation of leach dumps and tailings ponds as related to hard rock disturbances.

9. Research on high altitude revegetation in relation to seed handling, collection, storage, germination, seeding methods and species selection.

My comments and discussion on certain topics you addressed in your report are provided below.

I am not sure what was meant when you said that "political problems completely overrode all technical aspects of land reclamation." There are many technical aspects of mine reclamation in Montana that concern me, my staff, and the people of Montana. Montana's law and its requirements are new in many respects and until such time as on site experience is gained, relevant research is conducted and success is clearly demonstrated, I cannot support the inference that the technical aspects of reclamation are minimal or secondary to any other category of problems.

1.2 Definition of a Logical Mining Unit:

Regardless of the presence or lack of a definition of logical mining unit the limiting factor of how much land an operator can put under permit is the twelve month or a one year permit requirement in Montana statutes. He can permit mining activities to cover a one year period.

1.3 Criteria for Selective Denials for Mining:

I agree that care should be taken in developing selective denial criteria that protects areas that should not be mined. The criteria developed should be based not only on geological or engineering data but should envelop soils, hydrology, wildlife, scenic, historic, archeologic, topographic, ethnologic, scientific, cultural and recreational considerations.

I do not believe that mining should totally dominate, obliterate or degrade everything it comes in contact with, either directly or indirectly, as has been the case, in some instances, in the past.

I believe that we should gather the site specific information on the to be affected socioeconomic and natural resources on or near a proposed mine site. Potential problems should be identified, all mining alternatives examined with the objective of avoiding or minimizing those problems and trade offs balanced regarding on site and ramifying off site effects before a decision to mine is made. If the best choice of alternatives to the identified problems points the way toward tipping the scales toward the beneficial side, then a permit to mine should be granted. If the balance indicates a greater sacrifice of socioeconomic and natural resources and on or off site degradation, then a permit to mine should not be granted. In other words, the short and long term benefits of mining should outweigh the short and long term losses.

1.4 Studies to Expediate Permits:

The key to reclamation in my opinion is preplanning. I believe that the permit process is necessary and vital to literally require operators to sit down and plan mining activities with specific reclamation goals in mind. This has been a giant step for many operators. It may be cumbersome now but it should become more familiar and flow smoother in time as the newness wears off. This was to be expected. I do not agree that the preplanning permit process is wasteful of manpower. It is a vitally necessary endeavor from both the regulator and operator's standpoint. Yes, it is a burden but a most welcome one if the industry and regulator is sincerely interested in reaching the desired objective of reclaiming the land. I have over five (5) years of administrative experience in regulating the mining industry. Other nonpreplanning methods of permitting mining endeavors have not secured the required reclamation objective in far too many cases.

Maximum flexibility is a phrase that has been the basis for some gross abuses in the past. If decisions were always based on technical

arguments or reasoning, with mining and reclamation objectives clearly in mind, it perhaps could work. Political interference in this "maximum flexibility" arena can and have in some states resulted in:

1. Unequal treatment of operators;

2. Shortcutting reclamation objectives;

3. Poor reclamation on the ground. Short term economic gains through past abuses to "maximum flexibility" have in many instances caused an increasingly aware public to lay claim to the constantly vocalized theme that the "present laws are not working - strengthen them." As a result, laws are amended and/or new laws are being passed.

I know of no disruption of any mining company by the Reclamation Division of the Department of State Lands. No company has been forced to cease operation based on reclamation administrative abuses. We have abided and conducted ourselves within the statutes and regulations of the State of Montana and will continue to do so. Operators should be keenly aware of the reclamation law and responsibilities both parties are faced with exercising. Costs of reclamation should be clearly assessed, budgeted and based on the requirements of applicable laws prior to the decision to mine. If a proposed mine is not projected to be a profitable operation with all reclamation costs figured in, then it should not be applied for.

1.6 Communications Problems:

I agree that communications is one of if not the weakest link in any social activity that man is involved in. I do believe that communication is improving and will continue as long as an honest, direct dialogue is maintained and personnel turnover by both parties is held to a minimum.

1.7 Federal Review of State Agencies:

Well stated, in my opinion.

2.1 Study of Soil Chemistry:

I would revise this by adding "Study of Soil and Spoil Chemistry." Sodium is a soil/spoil problem, however, major or trace elements are also present in red flag levels in some instances.

2.2 Spoil Handling Systems:

I would clarify the first sentence by rephrasing it thusly: "Montana requires that toxic materials, shale, mineral, or any other material determined by the Department to be acid producing, toxic,

undesirable or creating a hazard shall be buried under adequate fill." The regulations define burial depth to be eight (8) feet from the top of regraded topsoiling materials and near surface spoil layers.

2.8 Bond Release Criteria:

Montana law addresses this question with basic and specific requirements. I do not see this a research goal of the U. S. Bureau of Mines.

2.12 Development of a Small Mining Unit:

I am not sure I understand what is meant in stating that research is needed "to determine if there is a place for smaller companies to mine in this state." Any company, large or small, that meets the requirements of Montana law can legally operate in this state. There are two (2) small operating coal strip mines in Montana at the present time.

2.17 "Why" Research on the Mining Industry:

1. I could talk at great length as to the "why" industry, (in some cases), is viewed in "such bad light" by the news media and the general public. Some of the reasons the public express and I am aware of are:

A. Very few eastern states have been successful in regulating the industry to the letter and intent of their law.

B. Vast acreages of strip mined land in the east under reclamation law and bond still remain unreclaimed. In 1972, there were 15,825 unreclaimed acres in western Kentucky alone, some areas permitted as far back as 1962.

C. The publicizing of state-operator shady deals or under the table maneuvering as revealed through scandals and newspaper releases.

D. The constant crying of "wolf" when new or additional strip mine reclamation was proposed has eroded the credibility of the industry in the public's eye.

E. The constant reports of unlawful political election donations by large energy companies.

F. The public relation efforts some companies have substituted for honest-to-gosh on the ground reclamation. These displays do not work if they are not backed up by quality reclamation.

Once lost, an individual or an industry does not establish credibility and trusting relationships over night. No way! The industry should strive to police itself and assist and encourage its members to do

better, reclamation commitments must be kept and advertising promises must indeed become a reality. It will take time to establish a good reputation; it will require a continuing good working relationship with the regulating agency and it will demand total honesty, patience and endurance. There is no short term substitute.

3. The results of polls fluctuates, it appears, by who is conducting them. You quoted one poll, perhaps it is right, perhaps not. I don't know that Montana is so anti-coal mining as it is pro reclamation with environmental safeguards and controls. There is a distinction, if one can see it.

CONCLUSIONS:

I certainly endorse the willingness to work together toward achieving quality reclamation in Montana and believe we are on that road. The day is gone when all a miner had to do was mine coal with little recognition of other values. I do not believe we will ever return to those days and I, for one, would not want to. I believe that the mining industry should move in the following direction:

A. Voluntarily working toward reclaiming the orphaned areas created by past operators. This type of public relations has real meaning to the public and would reap benefits to the industry. Like it or not, present operators are linked to deeds of the past. Coal operators in Oklahoma are examining this approach. I applaud them.

B. I would hope that the mining industry would work with the regulating agency to sincerely examine ways of perhaps improving on an undesirable premining situation rather than simply minimizing further damages. It seems far too often the operator tries to economically or through engineering reasoning prove why something cannot be done rather than honestly exploring new suggestions or options with an open and nonbiased approach. I am sure that many options are available that are economically and technically feasible if industry would allow and/or encourage their personnel to explore those avenues with an imaginative and inventive mind. This is a vast and often untapped resource.

C. We, (the regulators), are often accused of not responding to industry needs, not having properly educated or experienced staff, reflecting an adversary relationship, being callous and uncooperative. In a self examining way please ponder the following observations.

1. How many operators really view reclamation endeavors with sincere interest and vigor; not as a liability, but as an opportunity.

2. How many manhours are spent periodically evaluating reclamation objectives and progress over and above the amount required to simply secure a permit.

3. Far too often reclamation responsibilities have been

entrusted to mine personnel with little or no professional reclamation expertise, experience, personal interest or delegated authority to get a quality job in a timely fashion.

4. In many cases mine relcamation personnel have not had the budget, manpower or equipment to effectively reclaim the land under the law.

5. How good has communications historically been between a company's reclamation, engineering and production personnel in regard to the permit's reclamation stipulations, requirements and objectives.

6. Has industry's administrative level of management reflected respect of State reclamation laws and regulatory personnel to all mine employees.

7. What bill has the industry authored, sponsored or supported to provide sufficient funds or personnel in order for the State regulatory agency to effectively or efficiently aid the industry in meeting the statutory requirements.

In summary, I appreciate this opportunity to comment on research needs and the report you very ably prepared.

Respectfully,

C. C. McCall

C. C. McCall, Administrator
Reclamation Division

jw