Model State Program for

CONTROL AND PREVENTION OF WATER POLLUTION FROM SURFACE MINES

OHIO RIVER VALLEY WATER SANITATION COMMISSION

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* As of December, 1978

MODEL STATE PROGRAM

FOR CONTROL AND PREVENTION OF WATER POLLUTION

FROM SURFACE MINES

December, 1978

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FOREWORD

Coal mining may produce a wide range of environmental problems, including mine drainage, sedimentation, surface subsidence, and surface scarring. Because of extensive coal mining in the Ohio River Valley, acid mine drainage and siltation caused by coal mining are significant problems. Many of the mines in the Valley are no longer active. High costs and the lack of effective technical solutions make the control of pollution from abandoned mines difficult. Some of these problems can be rectified, however, through proper planning prior to mining and adequate financing for mine closure.

To address these problems, an ad hoc work group on mine drainage was formed in 1976 by the Ohio River Valley Water Sanitation Commission's Engineering Committee. The group was charged with the task of developing a model state program for controlling and preventing water pollution from mining activities, particularly coal mining.

The following report is the second in a series of model programs developed by the ad hoc group. Already completed is a report on the control and prevention of water pollution from underground mines. In its next report the committee will address two other potential sources of pollution associated with coal mining--coal preparation facilities and disposal areas for mining refuse.

TABLE OF CONTENTS

		Page
FOREWORD		iii
SUMMARY		vii
INTRODUCTION		1
	Objectives	1
I.	PRE-MINING PLANNING	3
	A. Hydrology/Geology	3
	B. Mining Plan	4
	C. Hydrologic Assessment	5
	D. Drainage Control and Treatment Needs	5
	E. Closure Procedures for Intercepted Underground Mines	6
	F. Reclamation Plan	6
	G. Conformance to Basin/Areawide Plans	7
	H. Legal/Financial Responsibility	8
	I. Inter and Intrastate Environmental Agency Coordination	8
II.	MINE OPERATION	9
	A. Compliance Monitoring	9
	B. Mine Inspection	10
	C. Operation and Maintenance of Pollution Control Facilities	10
	D. "As Mined" Plans	10
	E. Active Mining Enforcement Program	11
III.	POST-MINING CONTROL	13
	A. Reclamation	13
	B. Intercepted Underground Mines and Augering Closures	13
	C. Inspection and Monitoring	14
	D. Term and Scope of Responsibility	14
	E. Post-Mining Enforcement Capability	15

SUMMARY

The following model state program describes an administrative/regulatory program to control and prevent water pollution from surface mines. It addresses the implementation of the Federal Surface Mining Control and Reclamation Act of 1977 (PL 95-87). The program is composed of three elements: 1) preplanning to insure proper functioning of new mines, 2) control of active mine operations to assure that the approved plan is followed during the active life of the mine, and 3) post-mining control to provide satisfactory reclamation and maintenance of abandoned mines.

The pre-mining plan identifies technical details required for approving or disapproving the proposed mining operation, such as the hydrology and geology of the mining site, drainage control and treatment needs, proposed closure procedures for intercepting underground mines, and the reclamation plan. Factors of importance during mine operation include monitoring, mine inspection, operation and maintenance of pollution control facilities, and enforcement for compliance with rules, regulations, and other permit requirements. Post-mining control insures that adverse environmental impacts are minimized through reclamation, closure of intercepted underground mines and augered areas, inspection and monitoring, and enforcement. The program delineates the extent of legal authority necessary for conducting an effective control program and professional expertise required to implement such a program.

INTRODUCTION

This model program for the abatement of water pollution resulting from surface mining is intended to provide administrative/regulatory guidelines for the states signatory to the Ohio River Valley Water Sanitation Compact. It addresses implementation of the Federal Surface Mining and Reclamation Act of 1977 (PL 95-87), as it relates to the impact of surface mining activities on water quality.

At present, each state's program varies in the adequacy of its coverage, the legal authority possessed, and personnel resources available, owing largely to the overall mining conditions in the state. The model program describes elements necessary for an ideal regulatory program to prevent and control water pollution from surface mines. It discusses the areas and extent of controls necessary, the types of legal authority needed to carry out such controls, and personnel resources required to staff such a program.

Objectives

The objective of this regulatory/administrative program is to prevent, to the extent possible, the adverse impact of surface mining activities on both surface water and groundwater quality and quantity. Prevention, as used in this objective, means minimizing the formation of pollutants, minimizing the disturbance of the hydrologic system, and treating any contaminated water in order to meet water quality standards.

To achieve this objective, the state program must have sufficient information to evaluate a mining proposal, adequate legal authority, sufficient personnel resources, and cooperation among agencies and industries concerned. There are three major program elements where the legal authority, the institutions, and available resources must merge. These elements are pre-mining planning, mine operations, and post-mining control.

The pre-mining plan provides a basis for acting on the permits; the mine operation element implies inspection; and post-mining control includes both permit issuance and inspection of reclamation and maintenance. The program elements regarding mine operation and post-mining control will in some cases overlap because of the federal/state regulations requiring that the surface reclamation be instituted immediately following coal removal operations.

There must be a provision which would require the state program to allow for public participation in the form of a local public hearing before a pre-mining plan is approved. Notice of the public hearing should be given in the newspaper or other media of general circulation in the locality of the proposed mine site and should include exact location of the proposed mine, boundaries, and a description of the mine's proposed ownership.

I

PRE-MINING PLANNING

An adequate pre-mining plan is a prerequisite for successfully ameliorating the adverse impacts of proposed mining operations on surface water and groundwater quality and quantity. It is based on a study which details physical, chemical, hydrologic, and biologic systems operative at the proposed mine site.

Planning includes the development of mining and reclamation plans. It identifies the procedures to be used for spoil segregation and placement, grading, erosion control, water management practices, and treatment needs, along with plans for establishing vegetation on all disturbed areas immediately following the coal removal.

Administratively, the pre-mining plan serves as a mechanism for approving or disapproving a proposed mining operation. Sufficient technical details must be available in the pre-mining plan. It will either provide a sound basis for approving a mining operation or supply sufficient data to deny a mining proposal. Mining activities will not be allowed in an area where reclamation is not physically or economically possible, or where the mining is incompatible with the 208/303(e) plans, or where the proposed mining site is of critical environmental concern.

The program for evaluating a pre-mining plan involves several considerations:

A. Hydrology/Geology

The impact of the proposed mining operation on the mining site's hydrology and geology must be evaluated in order to predict the operation's effect on surface water and groundwater quality and quantity. These predictions may then be used as a basis for the design of appropriate prevention and control measures to ameliorate adverse impacts.

(1) Information Needed

Geologic data, including structure, faults, joints, fractures, porosity, permeability, and types of surface soils, are important factors in the evaluation of a proposed mining plan. The following information must be submitted either by the mine operator or obtained from agency record:

- Geomorphological survey of the area, including surface contour and land forms
- Surface water locations and flow

- Geologic structure--known faults and fractures and their effect on the groundwater flow system--name and thickness of coal seam(s)
- Stratigraphic sequence in the mine area
- Acid and mineralization potential of strata above and below the coal seam
- Regional and local groundwater flow systems
- Permeability and porosity of the strata above and below the coal seam
- Surface and groundwater quality and quantity
- Location and depth to groundwater; oil, gas, disposal, and recharge wells
- Location and extent of adjacent underground mines
- Hydrologic system evaluation of the proposed mining in relation to past and future activities in the area

(2) Authority Needed

State laws and regulations must provide the authority to require the applicant to submit the needed information. There should be provisions in laws and regulations to insure coordination and cooperation among the various state agencies to avoid duplication of effort, early notification of industrial plans for future mining, and prevention of an accumulative adverse impact on a watershed caused by surface mining.

(3) Personnel Needs

There is a need for expertise in hydrology and geology within the state program so that information can be properly evaluated.

B. Mining Plan

The mining plan must be evaluated to determine its compatibility with the hydrologic and geologic features of the mining site. The mining plan must include an assessment of acid-forming and toxic potential of overburden, special handling procedures for overburden and toxic materials, and compatibility of the mining methods with special handling procedures for such material.

The mining method must not aggravate faulting and fracturing to an extent that would be detrimental to reestablishment of the groundwater table after mining.

(1) Information Needed

In order to evaluate the mining plan, the following information is needed:

- Mining methods, i.e., contour, mountain top removal, strip, auger, box cut, head of hollow fill, area mining
- Mine development plan and development schedule

- Location of haul roads
- Construction and drainage plan
- Location of discharges

(2) Authority Needed

The regulatory agency must have the authority to require the above information from the mine operator and to approve or disapprove the proposed mining plan.

(3) Personnel Needs

Expertise in geology and civil engineering is needed to perform a proper evaluation of the mining plan.

C. Hydrologic Assessment

This assessment will evaluate the potential adverse impacts on the surface water and groundwater systems.

(1) Information Needed

- Water quality standards--both surface water and groundwater
- Surface water and groundwater uses
- Data collected under Elements A and B

(2) Authority Needed

The regulatory agency must have the authority to require the above information, establish water quality standards, and make an assessment of water quality based on water uses.

(3) Personnel Needs

Expertise in hydrology, water chemistry, geology, and civil engineering is needed for this assessment.

D. Drainage Control and Treatment Needs

The prevention of pollution from surface facilities and storm-water runoff is necessary to protect water uses. In order to evaluate the impact on water quality, it is necessary to estimate quality and quantity of discharges from the proposed mine and to establish treatment requirements to meet water quality standards and management practices to control storm-water runoff.

The pre-mining plan should include specifications of any proposed treatment facility and engineering design for drainage control. The specifications must be in compliance with state/federal requirements and standards.

(1) Information Needed

- Location and flow of natural drainage courses within the mine area

- Method of dewatering the pit
- Means of transporting contaminated water to the treatment plant and the chemical treatment to be used
- Water diversion plans
- Erosion control plan
- Settling basin size and construction

(2) Authority Needed

The regulatory agency must have the authority to require the above information to be submitted and to approve or disapprove drainage/erosion/treatment plans.

(3) Personnel Needs

Expertise in civil engineering and chemistry is needed to perform this evaluation.

E. Closure Procedures for Intercepted Underground Mines

When a surface mine intercepts an underground mine, it is necessary to seal the underground mine properly so that future seepage out of or into the underground mine will not occur. However, interception of underground mines during surface mining should be avoided where coal barriers or mine seals will be disturbed or where uncontrollable water pollution will result from interception.

(1) Information Needed

- Type of sealing procedure proposed
- Location of seals
- Potential hydraulic pressure expected on the seal and the pressure for which seal is designed
- Design of mine seal

(2) Authority Needed

The state agency must have the authority to require the above information and to approve or disapprove the plan.

(3) Personnel Needs

Expertise in geology, hydrology, and mining engineering is needed.

F. Reclamation Plan

Reclamation of the surface disturbed by mining activities is needed to prevent erosion and sedimentation and to minimize acid mine drainage and ad-

verse hydrologic impacts. Reclamation will limit environmental degradation and return the land to future desirable uses.

(1) Information Needed

In order to be certain that the reclamation is properly done, the reclamation plan must include:

- Limits of the area to be disturbed
- The grading and final slope to be maintained
- The type of cover to be planted on the exposed area
- Plan to minimize adverse impacts to the hydrologic system such as recharge capacities, reestablishment of the groundwater system, etc.
- Drainage plan

(2) Authority Needed

The state agency must have the authority to require the needed information from the mine operator, to require that the land be properly maintained and stabilized, and to approve or disapprove the plans.

(3) Personnel Needs

The state agency performing this function will need experts in agronomy, geology, soil sciences, and civil engineering.

G. Conformance to Basin/Areawide Plans

Areas not suitable for surface mining of coal or environmentally sensitive areas should be included within the scope of the areawide 208 planning process.

(1) Information Needed

The regulatory agency responsible for mining activities should cooperate with those doing the planning. Information on the planning activities--areawide plans and basin plans--must be available to the mining company and the regulatory agency.

(2) Authority Needed

The state agency must have authority to require that the applicant's plans conform to state and areawide water quality management plans.

(3) Personnel Needs

No specific expertise is needed.

H. Legal/Financial Responsibility

The mine operator must take all necessary steps to insure that pollution and adverse hydrologic impacts do not occur. It is conceivable that even with a strong pre-mining program, some mines might have pollution problems, because of frailties in technology and the regulatory program. In order to provide some degree of assurance that any pollution created during active mine operation or after abandonment is abated, the mine operator must assume the financial and legal responsibilities to correct the pollution problems.

(1) Information Needed

In order to evaluate financial responsibility, the state agency must obtain information concerning the identity of the responsible official of the mining company, its corporate structure, and a measure of its financial capabilities.

Other needed information includes reclamation cost per acre and the adequacy of bonding and other financial arrangements to cover the reclamation cost.

(2) Authority Needed

The state regulatory agency must have the authority to require posting of bond or other financial assurity, to collect and spend for reclamation any defaulted bond or hold the operator responsible for any problem arising from his operation, and to prevent a defaulted mine operator or a defaulted bonding agent from doing business within the state.

(3) Personnel Needs

Expertise in law and finance is needed.

I. Inter and Intrastate Environmental Agency Coordination

The activities of regulatory agencies involved in air, water, solid waste, reclamation, and other environmental programs must be coordinated. The state may designate a lead agency with responsibility for interagency coordination.

(1) Information Needed

The mine operator must show the water pollution control agency that he has met notification and permit requirements of other environmental agencies. In addition, the water pollution control agency should consult with other sister agencies, so that all program requirements are coordinated.

(2) Authority Needed

The regulatory agency must have the ability to coordinate its various environmental programs.

(3) Personnel Needs

No special personnel are needed.

II

MINE OPERATION

The period of mine operation begins with site preparation and ends with closure. During this period, there is a potential for surface and subsurface changes that could have an adverse impact on the surface water and groundwater on and off the site. Therefore, the regulatory program during this period is of great importance.

The program regulating mine operation involves several factors:

A. Compliance Monitoring

The inspection and analysis of discharges emanating from surface mine operations are necessary to determine compliance with permits and regulations. Compliance monitoring is a combination of monitoring and inspection by the agency, self-monitoring and reporting by the mine operator, and review of self-monitoring reports by the agency. It includes a quality control program to insure that methods of analysis used by the operator are adequate.

(1) Information Needed

Information needed for the evaluation is the quality and quantity of all point and nonpoint source discharges from the mining area. The parameters needed to evaluate the water quality impacts include, but are not limited to, flow, pH, total suspended solids, acidity/alkalinity, sulfate, and metals associated with the mine drainage. The frequency of sampling will be determined by variability of discharges, type of receiving streams, stage of mine development, field conditions, permit limits, and other regulatory requirements. It could vary from daily to monthly.

(2) Authority Needed

There must be adequate legislation to require self-monitoring by the operator and to allow the regulatory authority to monitor compliance with permits, laws, regulations; to enter private property for the purpose of inspection; and to inspect records.

(3) Personnel Needs

Personnel needed for the evaluation includes civil engineers, environmental engineers, chemists, and field technicians.

B. Mine Inspection

Inspection of mine operations is necessary to insure compliance with pre-mining plans and to evaluate the water-handling procedures.

(1) Information Needed

Information needed for this inspection includes the mine development plan and schedule, the water-handling plan, the haul road maintenance and reclamation plans, including all amendments.

(2) Authority Needed

The state agency must have the authority to require the submission of the above information, to make inspections, and to require corrective action.

(3) Personnel Needs

Expertise needed for this evaluation is training in surface mining and reclamation.

C. Operation and Maintenance of Pollution Control Facilities

The inspection of pollution control facilities is needed to insure that the facilities are being operated in accordance with the design and are being properly maintained.

Proper maintenance and operation of equipment will greatly reduce the chances of failure, thereby minimizing water quality problems and violation of permit requirements.

(1) Information Needed

Information needed for this evaluation includes a description of the maintenance program, maintenance logs, and operating reports.

(2) Authority Needed

Authority must exist to require proper maintenance and operation of water pollution control facilities, notification of facility failure and abnormal discharges, and correction of any facility failure.

(3) Personnel Needs

The personnel required for this evaluation would be field inspectors knowledgeable in maintenance and operation of pollution control facilities.

D. "As Mined" Plans

The periodic submission of a certified map showing the extent of mining operations is necessary to record the mine activities and to compare with the pre-mining plan.

(1) Information Needed

"As mined" plans should be submitted periodically. The maps should show the area mined, area regraded, area revegetated, modifications to water pollution control facilities necessitated by mining and reclamation progress, and intercepted underground mines and augered areas.

(2) Authority Needed

Authority is necessary for the agency to require the submission of the above information.

(3) Personnel Needs

Expertise in water pollution control and surface mine reclamation is needed for this evaluation.

E. Active Mining Enforcement Program

The regulatory agency must have the capability to initiate administrative or criminal actions to obtain compliance and assess penalties for noncompliance with rules, regulations, and other permit requirements.

(1) Information Needed

Violations of permits, regulations, and laws must be documented with sufficient evidence to undertake needed actions.

(2) Authority Needed

The state agency must have sufficient authority to initiate civil and administrative actions such as:

- Verbal orders/instructions
- Violation notices
- Orders (written) to correct violations
- Orders to cease and desist operations
- Permit revocation/suspension
- Future permit denials
- Economic sanctions
- Provide for hearings

To initiate criminal actions such as:

- First level judicial actions by field inspectors for relatively minor offenses (usually heard before a district magistrate)

- Second level judicial court actions for more serious offenses (usually before a criminal court)

(3) Personnel Needed

Personnel required include technical staff able to show that violations have occurred and legal staff to prosecute violators.

III

POST-MINING CONTROL

In the past, many surface mines were abandoned without the benefits of adequate reclamation. Abandonment was often the beginning of a continuing environmental degradation and the source of countless pollution problems, which have imposed huge costs on the public. The long-range costs materialize in the form of stream pollution, flooding, landslides, loss of fish and wildlife habitats, scarred and unreclaimed land, erosion, and loss of aesthetic values.

Post-mining control insures that adverse environmental impacts are minimized through proper reclamation and maintenance when a mine is abandoned. The various considerations involved in post-mining control are:

A. Reclamation

Reclamation of surface areas disturbed by all phases of mining activities is essential for preventing pollution from the area, removing hazards, and making the site aesthetically pleasing and available for alternate uses.

(1) Information Needed

A copy of the reclamation program submitted in the pre-mining plan is required, as well as an evaluation of the program's current adequacy in relation to "as mined" conditions.

(2) Authority Needed

The state agency must have the authority to require compliance with the approved reclamation plan. Authority is also needed to conduct final inspection and require modificiations where necessary.

(3) Personnel Needs

Personnel required would include experts in reclamation procedures and persons familiar with regional plans.

B. Intercepted Underground Mines and Augering Closures

Underground mines intercepted by surface mine operations and augered areas must be properly sealed so that pollution will not occur in the future.

(1) Information Needed

Information needed would include a closure plan approved in the pre-mining plan, an evaluation of its current adequacy, and a statement from the permittee that the approved closure plan was followed.

(2) Authority Needed

The state agency must have the authority to require needed information from the permittee to reevaluate the mine closure plan and to require modifications if needed. The authority to inspect the mine during and after mine closure is also required.

(3) Personnel Needs

Expertise in geology and civil engineering is needed for this evaluation.

C. Inspection and Monitoring

In order to insure that adverse hydrologic impacts on and off the site are minimized, an evaluation of the effectiveness of surface reclamation and other control measures is needed. Information necessary to conduct this evaluation is supplied by inspection and monitoring.

(1) Information Needed

Information needed for inspection and monitoring includes a record of the mine operation and the location of sealed, intercepted underground mines and augered areas. Additional necessary information includes general geologic data already submitted in the premining plan, location and specifications of permanent water diversions and impoundment structures, pre- and post-mining surface and subsurface water quality, and hydrologic data.

(2) Authority Needed

Authority is needed to conduct water quality monitoring, hydrologic assessment, and inspection. Authority to require correction of existing and/or potential problems identified during inspection would be necessary.

(3) Personnel Needs

Personnel needed would include field inspectors having general knowledge of reclamation of surface mines, hydrologists, and civil engineers.

D. Term and Scope of Responsibility

The mine operator should be responsible for the abatement of adverse impacts on surface water and groundwater quality and quantity, both on and off the site. Generally, the term of responsibility is perpetual. Initially, this responsibility should be guaranteed through the posting of a bond by the permittee. The period of bonding shall not be less than five years. The bond shall be released when the regulatory authority is satisfied that reclamation requirements and other hydrologic system protections have been met. This bond release in no way relieves the operator from his perpetual responsibility. The operator may be released from this responsibility only if it is legally accepted by another institution.

(1) Information Needed

The permittee must supply the description of the arrangements that have been made for bonding and perpetual responsibility.

(2) Authority Needed

There must be state legislation which makes the permittee responsible in perpetuity for pollution and/or adverse hydrologic impacts resulting from his operation after reclamation. The authority is also needed to require bonding. The state agency must be able to approve financial and institutional arrangements to insure that any post-mining problems are corrected.

(3) Personnel Needs

Expertise in finance, law/environmental law, insurance, and land reclamation is needed for this program.

(4) Institutions

Responsibility for perpetual care of a mine could create some legal problems if the mine operator were to go out of business. The protection against such uncertainty of post-mining pollution control and hydrologic system protection may be provided through institutional arrangements with the state or mining industry. These institutions may assume responsibility for perpetual care, in lieu of the mine operator, with rights to assess the operator for this care--a concept similar to that of perpetual care cemeteries.

E. Post-Mining Enforcement Capability

When post-mining pollution problems are identified, the regulatory agency must have the capability to initiate administrative or enforcement actions against the mine operator or his legal agent.

(1) Information Needed

Evidence to show that post-mining pollution or adverse impacts on the pre-mining hydrologic system are occurring.

(2) Authority Needed

General authority must be available to require remedial action by the operator or responsible agent.

(3) Personnel Needs

Personnel required include a technical staff to show that violations have occurred and a legal staff to prosecute violators.

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