EPA Project XL
Excellence and Leadership in Environmental Protection

Proposal for Best Management Practice (BMP) Surface Coal Remining Permits
Pennsylvania Prototype Study

September 30, 1999

Introduction

The Pennsylvania Department of Environmental Protection (PADEP), together with EPA Office of Water and IMCC (Interstate Mining Compact Commission)-member states, has been exploring a new approach to writing coal remining permits based on compliance with best management practices (BMPs) instead of specific NPDES effluent limitations and to monitor performance based on in-stream water quality, instead of at individual discharge points. To do this, remining projects in up to 8 different watersheds will be selected throughout Pennsylvania to serve as a pilot project. The first three of these pilot projects will be ready to implement very soon. As many as 5 more pilot projects may be implemented within the next year. The initial pilot projects are:

Al Hamilton Surveyor Run and Ridge Road Operations, Surveyor Run Watershed, Clearfield County.

2. Amerikohl Rathmel Operation, Soldier Run Watershed, Butler County.

3. River Hill Mid Penn #1 Operation, Pine Run Watershed, Clearfield County.

The project sponsor (for the overall BMP Remining Project as well as individual remining projects) is the Pennsylvania Department of Environmental Protection. Each project watershed is severely degraded by acid mine drainage from abandoned mine discharges and is either currently listed on Pennsylvania's 303(d) list or has been identified as a water body which does not meet water quality criteria due to abandoned mine drainage. For each watershed, we expect that remining efforts will be an integral part of a water quality remediation plan following TMDL development. Water quality improvements from remining will be achieved by implementing Best Management Practices ("BMPs") which are described in the recently drafted by EPA in the Coal Remining – Best Management Practices Guidance Manual, June 1999. Specific BMPs to be employed at each individual site are listed in the project description.

Project Descriptions

Surveyor Run Watershed

Project narrative

The Surveyor Run watershed is approximately two miles northeast of Shawville, PA in Giraerd and Goshen Townships, Clearfield County. Most of the surface watershed area is displayed on the Lecontes Mills, PA U.S.G.S. 7.5 Minute Quadrangle Map. The surface watershed area is approximately 5.7 square miles and consists chiefly of forestlands, and reclaimed and abandoned mine lands. Exhibit A is a map of the lower section of the Surveyor Run watershed showing the key features listed in this narrative.

Surface mining operations conducted in the 1960's. 1970's, and 1980's by Shawville Coal Company left hundreds of acres of abandoned, unreclaimed mine lands in the watershed. Underground mining operations were conducted in the 1950's and 1960's by Lingle Coal Company and A.W. Bigler Coal Company and abandoned.

Both surface and underground mining operations resulted in numerous discharges of acid mine drainage, degrading the quality of Surveyor Run over most of its length, rendering it unsuitable for aquatic life.Surveyor Run is included in Pennsylvania's list of 303(d) stream segments which do not meet in-stream water quality standards and is scheduled for TMDL development.

Instead of issueing a standard remining permit with conventional effluent limits applied to each individual discharge point, the pilot project will require full implementation of BMPs but will monitor performance in-stream.

MP-6 is the key in-stream monitoring point that will be used to measure performance. A topographic map showing the location of the Surveyor Run watershed and the Al Hamilton Remining Operations, and the baseline pollution load and in-stream water quality statistical summary is attached to this proposal.

Remining Operations

Al Hamilton Contracting Company currently operates a surface mine in the watershed and is proposing an additional surface mine. Both sites are remining operations, extracting remaining coal reserves from previously mined and unreclaimed lands and reaffecting preexisting discharges of acidic drainage. The two remining operations will implement various BMPs designed to reduce the loading of acid mine drainage from abandoned mines and improve water quality in Surveyor Run.

Al Hamilton Contracting - Surveyor Run #1 (SMP #17930117)

The active Al Hamilton Contracting, "Surveyor Run #1" Operation was issued on May 8, 1995 and activated in December 1996. The operation will remine approximately 200 acres of abandoned surface mine and eliminate 16,300 linear feet of abandoned highwall. The operation will daylight 37 acres of underground mines. Al Hamilton Contracting Co. will implement the following Best Management Practices to reclaim the site:
daylighting of abandoned underground mines @ 8 acres
revegetation of abandoned mine lands - approx. 48 acres of the site is composed of unregraded or unvegetated spoils.

Al Hamilton Contracting - Ridge Road SMP Appl. #17990101
The proposed Al Hamilton Contracting Company, "Ridge Road" Operation will remine 65 acres of abandoned surface mine eliminating 10,700 lineal feet of abandoned highwall. The operation will reaffect or daylight 8 acres of underground mines.
Al Hamilton Contracting Co. will implement the following Best Management Practices on the "Ridge Road" Operation to reclaim the site:

regrading of abandoned mine spoil/highwalls @ 49.7 acres
daylighting of abandoned underground mines @ 8 acres
special handling of acid forming materials - toxic strata from the Lower and Middle Kittanning coal formations will be specially handled to limit further degradation of groundwater.
addition of alkaline material - the operation will employ an alkaline material redistribution plan whereby on-site alkaline strata will be moved and mixed in the affected mine spoil to neutralize the potentially toxic material present in the three areas where no inherent alkality exists. Approximately 71,000 tons of alkaline strata will be redistributed to the three alkaline deficient areas during the course of remining.
revegetation of abandoned mine lands - over 30% of the site is composed of unregraded or unvegetated spoils.

Baseline statistical summary

Al Hamilton Contracting Co.
"Ridge Road Operation"
SMP Appl. #17990101
Baseline pollutional loadings are included for MP #2, MP #4 and MP# 6.

MP #2 - unnamed tributary to Surveyor Run receives baseflow recharge from abandoned surface mining areas, an individual discharge point

MP #4 - collection of seeps from a pre-law deep mine complex and surface mined areas, an individual discharge point

MP #6 - Surveyor Run downstream near the confluence with the West Branch Susquehanna River, the key in-

stream monitoring point

Al Hamilton Contracting Co.
"Surveyor Run #1" Operation"
SMP #17930117
Baseline pollutional loadings are included for MP #7, MP #9, MP #17 and MP #30

MP #7 - Lower Kittanning deep mine discharge

MP #9 - unnamed stream to Surveyor Run

MP #17 - Lower Freeport deep mine discharge

MP #30 - -Lower Kittanning surface mine discharge

Soldier Run Watershed

Amerikohl Mining, Inc., has proposed a surface mining operation in the Soldier Run watershed, which is impaired by acidity and aluminum concentrations although not formally on Pennsyvania's 303(d) list of impaired waters. Soldier Run has been extensively surface and deep mined. The water quality problems at this proposed permit are the result of the abandoned Peterson and Nemo Lower Freeport deep mines. Four of the mine entryways discharge at points labeled D1, D2, D3, and D5. Topographically below the Lower Freeport coal are several highly variable spring flow discharges that are also associated with the deep mines. The water quality from the mine workins is acidic with elevated aluminum concentrations. The mine is located on the Dubois, PA quadrangle at 41o 05' 39" latitude and 78o 49' 26" longitude. A copy of the topographic map, baseline pollution load statistical summary data, and in-stream concentration statistical summary are attached.

The discharges at the site flow to Soldier Run and an unnamed tributary (labeled No. 1). Downstream point S-2 on the unnamed tributary shows elevated acidity and aluminum concentrations. The effects of the deep mine discharges on the tributary are very severe during low stream flow conditions. Downstream point S-4 on Soldier Run also shows impacts of acidity and aluminum. Both points S-2 and S-4 will be used to monitor in-stream performance of the project.

The remining procedures and BMPs proposed at this site are outlined in Module 26 of the Pennsylvania DEP Surface Mining Permit Application, a copy of which has been attached to this proposal. The anticipated benefit is to increase the alkalinity of the groundwater which ultimately reports to the in-stream monitoring points and will improve in-stream water quality. Flows from the deep mines will be collected at a permanent detention pond. Water discharging from this site will have a higher alkalinity concentration and significantly reduced aluminum. This is anticipated to improve water quality in Soldier Run and the unnamed tributary.

BMPs proposed consist of: 1) daylighting approximately 4.4 acres of abandoned mine workings; 2) special handling of potentially acid-forming materials encountered in the course of mining; 3) addition of alkaline material at the rate of 100 tons/acre over 3.5 acres; 4) ripping the underlying alkaline strata (3 to 4 feet) and redistributing it into the backfill over a 6.5-acre area; and 5) collecting deep mine drainage in a permanent pond, allowing the precipitation and settling of aluminum.

Pine Run Watershed

The Pine Run watershed covers approximately 3.9 square miles in northcentral Pennsylvania, due west of the

small village of Belsena in Bigler Township, Clearfield County. The lower portion of Pine Run, from about 2.23 miles above its confluence with Clearfield Creek on down, has been severely affected by acid mine drainage from abandoned underground mines, surface mines, and coal refuse dumps. This degraded portion of the Pine Run watershed covers approximately 1.6 square miles. Although Pine Run is affected to a certain extent above that point, where the first main underground mine drainage (monitoring point MP15) enters the creek, the degradation is not severe enough to eliminate all aquatic life. Below where MP15 enters, fish and aquatic insects are not present. Because of the severity of the pollution within the lower Pine Run watershed, the stream does not meet in of 303(d) stream segments scheduled for TMDL development.

The coal vein that was the primary target of the earlier mining and that is responsible for most of the degradation is the Clarion No. 1 seam. More recently, the Middle Kittanning and Lower Freeport coal seams have been surface mined, resulting in additional acid mine drainage pollution but less severe impacts to Pine Run. Most of the pollution is associated with past underground mining on the Clarion coal, primarily on the northern side of the creek, where abandoned mine workings can freely drain downdip. Mine workings on the southern side of the stream were developed downdip and have subsequently flooded. Any drainage into Pine Run when the water tables are high is less severe than discharges on the north side. The next major source of pollution to the lower Pine Run watershed is the broad area of coal refuse in the area of an abandoned tipple, also on the north side of Pine Run, and just downstream of MP15. Acidic sulfate salts which form on this refuse material are readily dissolved and flushed int
o the stream during precipitation events. Furthermore, during periods of high runoff, coal fines and waste are washed directly into the stream. The other significant source of pollution is the abandoned Clarion strippings along both the north and south sides of Pine Run. These old strippings have exposed mounds of acidic spoil to the elements and have impounded surface and groundwaters that react with the adjacent spoils.

River Hill Coal Company, Incorporated (River Hill) proposes to remine the Clarion coal over much of the lower Pine Run watershed under their Mid Penn #1 surface mining permit, SMP #17990107. During the course of their remining operations, they will daylight some of the underground workings, completely remove the exposed coal waste, and regrade the abandoned surface cuts and spoils. In the process, the old tipple structure will also be dismantled and the area reclaimed. As a major part of their abatement plan, they will truck in lime and coal ash to integrate alkaline material into a site that is virtually devoid of natural carbonates. The application rates for alkaline addition is quite substantial at 3,000, 2,500, and 1,000 tons per acre. Although it will not be economically feasible for River Hill to daylight all of the underground mine workings, any remaining mine waters that do drain into their backfill will be engineered so that it spreads out and contacts the alkaline material blanketing the pit f
loor. As a direct result of these remining and pollution e
pollutional loading of the individual Subchapter F point source discharges, as well as improve the overall quality of baseflow groundwater runoff and surface runoff into the creek. Consequently, the quality of the downstream monitoring point on Pine Run, at MP24, should also exhibit gradual improvement. A topographic map showing the location of Pine Run and the proposed River Hill operation, baseline statistical data for Pine Run in-stream water quality, and baseline loading data of individual discharge points are attached to this proposal.

Pine Run Watershed--Best Management Practices

The following is a list of the various Best Management Practices (BMPs) that will be employed on the River Hill Coal Company, Incorporated, Mid Penn #1 surface mining permit, SMP #17990107.

Daylighting of abandoned Clarion underground mines: 26 acres

Removal of exposed tipple coal refuse: 5+ acres

Reclaiming of abandoned Clarion strippings (includes refuse): 62 acres

Length of abandoned highwall to be backfilled: 12,000 feet

Selective positioning of acidic overburden (thickness over entire site): 18 feet

Total alkaline addition applied (100% CaCO3 equivalency): 314,600 tons

Project XL Criteria

Superior Environmental Performance

The pilot project is expected to provide superior performance because it will encourage coal operators to undertake remining projects which otherwise would have been too risky or expensive, because of the potential to incur liability for the treatment of preexisting acidic discharges. In the Surveyor Run pilot, the operator is also reclaiming a former coal preparation facility and refuse disposal area, which is adding acid loading to Surveyor Run. Remining (with reclamation to present-day standards) is an effective way to reclaim abandoned mine lands and improve water quality, at little or no cost to taxpayers. These pilots are designed to increase the number of remining operations providing no-cost reclamation and to enhance the degree of reclamation and AMD-abatement measures taken on remining operations.

On each watershed project, a suite of BMPs is designed that are expected to significantly improve water quality. Pennsylvania's past performance with Subchapter F permits bears the effectiveness of BMP implementation on remining projects. A recent study of completed remining operations on over 116 discharges or hydrologic units (draft data as of 8/9/99) showed that approximately 40% of the projects resulted in statistically significant water quality improvements while only 3%, resulted in degraded water quality. Statewide, these projects resulted _____ lbs/day of reduced acid loading, _____ lbs/day of reduced iron loading, _____lbs/day reduction in manganese loading, and _____lbs/day reduction in aluminum loading. Of the 270 remining permits issued by June, 1997, only 5, or less than 2%, had ever incurred long-term treatment liability due to increased pollution loading. The pilot projects are expected to yield results as good as or better than Pennsylvania's existing remining program, while allowing the program to expand into watersheds and undertake projects which otherwise would not have been attempted. Many potential remining projects are never undertaken due to fears of pollution liability, monitoring or treatment site constraints, or site conditions which make it infeasible to write permits with conventional numeric effluent limits. For example, sites where the preexisting drainage discharges directly as baseflow to receiving streams rather than as discrete discharge points, may be difficult or impossible to monitor and develop a loading-based numeric effluent limit.

Initial pilot projects are limited to 303(d) watersheds where remining is anticipated to be one component of a TMDL-driven watershed restoration plan. The pilot projects should, at a minimum, result in equivalent environmental performance but are expected to demonstrate significant environmental improvement. The chief purpose of the projects, however, is to determine if superior environmental results can be obtained.

The beneficial water quality impacts of remining are documented in Hawkins (1994, 1995) and Smith and Dodge (1995). Studies on the effectiveness of remining as a mine drainage pollution abatement tool are summarized in Hawkins (1998), a copy of which is attached to this proposal.

Measurement of Environmental Performance

For each project, environmental performance will be measured at one or more key in-stream monitoring points as well as at the preexisting pollutional discharges. A pre-project water quality baseline of at least one year's duration is first established at each of these points. The principal in-stream water quality station will be

monitored at least semi-monthly for the key mine drainage parameters (pH, acidity, alkalinity, specific conductance, iron, manganese, aluminum, and sulfates). Individual discharges are monitored monthly for the same parameters as well as flow rate, so that pollution loading rates can be determined. A pre-project statistical baseline is established for the in-stream and discharge monitoring points. Baselines for the 3 pending projects are attached to this proposal.

Following initiation of the project, monitoring of the principal in-stream monitoring point(s) continues on a semi-monthly basis. Individual discharges continue to be monitored quarterly. Water quality performance will be reviewed with each quarterly complete site inspection. Annually and at the conclusion of each project, during and post-remining water quality data will be statistically analyzed to determine whether or not there were any statistically significant changes in water quality – both at the in-stream monitoring point and for individual discharge loadings.

This performance monitoring is similar to what is already done on remining permits in Pennsylvania, except that statistical comparisons of baseline versus postmining data will also be conducted on the key in-stream monitoring point. But the main goal of this project isn't just to demonstrate that water quality improvements can be effected by remining. We already know that. But rather that implementation of a BMP-based remining permit can further encourage remining in places that otherwise wouldn't have been worth the operator's expense or risk of undertaking a remining project or where a conventional numerical effluent limitation is infeasible. So although we will look at water-quality performance, we will also judge the overall success of the project on the following criteria:

Acreage of abandoned mine lands remined and reclaimed that wouldn't have been under conventional Subchapter F (Rahall) remining program.
Additional reclamation or remediation projects done in the watersheds as a result of pilot projects.
Effects on in-stream water quality.
Effects on pollution loads from Subchapter F preexisting discharges
Additional BMPs implemented that wouldn't have been required under conventional Subchapter F program.

Flexibility and Innovation in Pollution Prevention, and Feasibility

In-stream water quality monitoring is the most effective way to measure the performance of AMD remediation activities within the watershed as the water quality impact of all remining, reclamation, and abatement activities are manifest at this point. The water quality baseline uses concentration, rather than loading data because:)In-stream concentration data are more stable than load data, rendering a higher quality statistical summary; 2) concentration data are much easier and less costly to collect than load data; 3) pollution loads from individual discharges are manifested in the in-stream concentration; and 4) loading data in large streams tend to be dominated by flow, which makes it difficult and impractical to monitor actual changes in in-stream quality. Accordingly, when using in-stream monitoring as a measure of environmental performance, concentration data are much more practical, and sensitive than loading data. Loading data, as a measure of in-stream water quality performance, would chiefly r
eflect stream flows rather than water quality and would be a very ineffective measure of environmental performance.

The proposed project watersheds are well-suited for the application of alternative remining authorization for the following reasons: 1) It is currently not meeting in-stream water quality standards; 2) remining, employing the appropriate BMPs, is likely to result in an overall improvement to in-stream water quality and reduce the total maximum daily load of mine drainage pollutants; 3) significant reminable coal reserves are present in the watershed; 4) there is significant acreage in the watershed in need of surface reclamation; 5) there are numerous sources of mine drainage entering the watershed, making monitoring at each individual discharge point less practical than in-stream performance monitoring. In some cases, the discharges are in a location that makes monitoring and establishment of numerical effluent limitations very impractical; and 6) there are multiple mining and reclamation activities proposed on ongoing in the watershed, making it more

practical to monitor the combined effect of these pro
jects rather than focusing on the performance of individual projects.

Under Pennsylvania's current program, remining operations are issued an NPDES permit for point source discharges from the remining operation, including preexisting pollutional discharges that will be affected by the operation. The pollutants at issue for preexisting discharges include acidity, and iron, and may include manganese and aluminum. Discharges from the active portion of the remining operation other than preexisting discharges not encountered by mining are subject to the conventional effluent limitations at 40 CRF 434. This project does not propose to vary from conventional limits for these discharges. Implementation of BMPs will be substituted for numeric limits only on preexisting discharges that are not directly encountered in the remining operation. The same effluent parameters that would be regulated under a conventional remining permit will be regulated under the pilot projects.

Compliance with CWA 301(p)

Each of these project proposals has demonstrated, to our best technical judgement, "that the coal remining operation will result in the potential for improved water quality from the remining operation" and that discharges from or affected by the remining operation will not exceed Pennsylvania water quality standards. What makes these projects different from a conventional remining permit, is that instead of applying individual numeric loading standards to each preexisting discharge, BMP standards will be applied to the permit and its performance will be evaluated at a critical in-stream loading point. We believe that this is justified under 40 CFR 122.44(k), which provides that permits may specify BMPs where numeric effluent limitations are infeasible. However, if in-stream water quality is adversely affected, the permit requires that the pollution load from individual preexisting discharges be examined and compared against the baseline. If the pollution load has increased, the operator must either trea
t the preexisting discharges or take other measures necessary to remediate in-stream water quality. Further, should the operator fail to implement the BMPs as required by the permit, the permit reverts to a conventional remining NPDES permits and conventional effluent limitations apply. For these reasons, we believe that the pilot projects maintain consistency with the statutary requirements of the the Clean Water Act Section 301(p).

Evaluation, Monitoring, and Accountability

The success of the pilot projects in maintaining compliance with environmental laws will be monitored and reported throughout the projects. In addition, each pilot project will be assessed in terms on the amount of abandoned mine lands which have been reclaimed and water quality improvements which have been realized, that would have not occurred under the conventional remining permit program. This will allow a rigorous assessment of superior environmental performance.

Also, because implementation of the BMPs is such an important component of these operations, inspection frequencies on these sites will be increased appropriately so that we can be sure the BMPs have been implemented. The actual inspection frequency will depend on the complexity of the BMPs. We plan to furnish EPA with periodic reports and updates regarding the activity on these pilot sites and water quality monitoring results.

Public Participation

Public notice is required for each of the BMP projects. If requested, DEP holds an informal public conference to discuss the proposal and accepts written and oral comments. Upon approval of the project, all commentors are given notice of our action and how their comments have been addressed. Both before and after permit issuance, all water quality data, the permit and supporting application materials, inspection reports, correspondence, and other associated materials are maintained and made available for public inspection at the appropriate DEP district office. In some cases, citizen watershed organizations have formed around efforts to remediate AMD-impacted streams. Where such organizations exist, DEP will hold stakeholder meetings to

consider the best projects or BMPS to bring about water quality improvements.

Transferability

Pennsylvania has over 2,400 miles of streams degraded by acid mine drainage and an estimated $15,000,000 public liability from abandoned mine lands. There are significant reminable coal reserves throughout the Bituminous and Anthracite regions of Pennsylvania in AMD-degraded watershed, where this pilot project could be directly applied. In addition, as evidenced by the interest of IMCC and as one component of EPAs current examination of coal remining effluent limitations, this project will be applicable to all of the Appalachian coal producing states with prior AMD problems.

Cost Savings

This project proposal will significantly reduce the expenditure of public monies for reclamation of abandoned mine lands by encouraging remining, which reclaims abandoned mine lands to current standards through the extraction of remaining coal reserves. Through remining, remaining coal reserves are utilized, land is reclaimed at no public expense, and water quality can be improved. Further, the proposed project encourages remining by shifting or reducing some of the risk which operators take when the reaffect areas with preexisting pollutional discharges. This risk of incurring liability for water treatment, although slight, frequently discourages operators from remining areas which would otherwise be prime candidates for reclamation through remining. Some relatively minor cost savings and paperwork reduction will be gained through the BMP approach, which will only require quarterly, rather than monthly, monitoring of preexisting discharges after permit issuance.

References

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