UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
4/8/2009

Ms. Cathy Curran Myers
Deputy Secretary for Water Management
Pennsylvania Department of Environmental Protection
Rachel Carson State Office Building
P.O. Box 2063
Harrisburg, Pennsylvania 17105

Dear Ms. Myers:

The U.S. Environmental Protection Agency (EPA) is pleased to approve the *Buffalo Creek Watershed TMDL, Somerset County, For Acid Mine Drainage Affected Segments,* dated January 15, 2009, submitted by the Pennsylvania Department of Environmental Protection (PADEP) and received by EPA for review and approval on April 1, 2009. The TMDLs were established and submitted in accordance with Sections 303(d)(1)(c) and 303(d)(2) of the Clean Water Act. The TMDLs were established to address impairment of water quality as identified in Pennsylvania's 1996 Section 303(d) List of impaired waters requiring TMDLs for metals and pH associated with abandoned mine drainage.

In accordance with Federal regulations at 40 CFR §130.7, a TMDL must comply with the following requirements: (1) be designed to attain and maintain the applicable water quality standards; (2) include a total allowable loading and as appropriate, wasteload allocations for point sources and load allocations for nonpoint sources; (3) consider the impacts of background pollutant contributions; (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated); (5) consider seasonal variations; (6) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and instream water quality); and (7) be subject to public participation. In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met. A copy of EPA's Decision Rationale for approval of these TMDLs is enclosed.

As you know, any new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDLs' wasteload allocation pursuant to 40 CFR §122.44(d) (1) (VII) (B). Please submit all such permits to EPA for review as per EPA's letter dated October 1, 1998.

If you have any questions please call me, or have your staff contact Ms. Elizabeth Gaige, at 215-814-5676.

Sincerely,

/S/

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Bill Brown, PADEP
Donald Barnes, Cambria DMO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Decision Rationale
Total Maximum Daily Loads
For Acid Mine Drainage Affected Segments
Buffalo Creek Watershed
Somerset County, Pennsylvania

/S/

Jon M. Capacasa, Director
Water Protection Division

Date: 4/8/2009

TMDL Review Checklist

State: Pennsylvania
303(d) Segments: PA19F-39075
Pollutant: Metals, pH
State Document: Buffalo Creek Watershed TMDL
Somerset County, Pennsylvania, dated January 15, 2009

Date of Submittal: April 1, 2009
Date of EPA Action:
EPA Reviewer: Meredith Carr

Review Element	Adequate? Yes/No	Recommendations/Comments
Submittal Letter	Yes	Final e-mailed on 1/16/2009.
Identification of Waterbody	Yes	Buffalo Creek, PA19F-39075 (CWF)
Consent Decree waters? Year Listed	Yes	One segment listed on 1996 303(d) List; other segments, unnamed tributaries and named tributaries identified on subsequent Section 303(d) lists (see attachment A).
Pollutant of Concern and Sources	Yes	Listed for metals (Al, Fe, Mn) and also impaired with pH Resource Extraction.
Impairment and Designated Use	Yes	Fe, Al, Mn & pH - Cold Water Fishes
Final TMDL	Yes	Summary of listed TMDLs on pp. 13-14 and Attachment D, pp. 36-57 are mass balance computations.
Daily	Yes	See listed TMDLs on pp. 13-14.
Load Allocations	Yes	See the Summary Table on pages 13-14.
Wasteload Allocations	Yes	There are 21 point source discharge permits for existing mines (see table p.7). Future WLAs are provided for 11 mining permits. See Summary Table on pages 13-14, and Attachment D, pp. 36-57.
Margin of Safety	Yes	Implicit – p. 57 @Risk modeling was used to attain 99% compliance.
Seasonal Variations	Yes	See P. 57 and Attachment F.
Critical Conditions	Yes	See P. 58.
Reasonable Assurances	Yes	See pp. 14-18 and Attachment G.
Public Participation	Yes	See P. 17 -- the meeting was held on October 28, 2008. No public comments were received on the Buffalo Creek Watershed.
Technical Analysis/ Supporting Documentation	Yes	Attachments A, B, C, E, F, G and H
Other Comments	Yes	This TMDL does not address identified impairments of Buffalo Creek and some of its tributaries for siltation, which will be addressed in a future TMDL. This TMDL includes WLAs for future mining. To the extent Attachment E includes excerpts from Pennsylvania's Section 303(d) lists, this approval does not purport to approve those lists. Pennsylvania's Section 303(d) lists are approved through a separate process.

Attachment A

The following is a list of stream segments for which TMDLs were developed within the Buffalo Creek Watershed.

Table 1. Section 303(d) Listed Segments

State Water Plan (SWP) Subbasin: 19F										
HUC: 05020006 Youghigheny River										
Year	**Miles**	**Use Designation**	**Assessment ID**	**Segment ID**	**DEP Stream Code**	**Stream Name**	**Desig-nated Use**	**Data Source**	**Source**	**EPA 305(b) Cause Code**
1996	7.5	*	*	Not in GIS.	39075	Buffalo Creek	CWF	305(b) Report	RE	Metals
1998	7.5	*	*	Not in GIS.	39075	Buffalo Creek	CWF	SWMP	AMD	Metals
2002	7.5	*	*	Not in GIS.	39075	Buffalo Creek	CWF	SWMP	AMD	Metals
2004	12.9	*	*	20041004-1000-CLW	39075	Buffalo Creek	CWF	SWMP	AMD	Metals
2006	2.7	Aquatic Life	11994	*	39075	Buffalo Creek	CWF	SWMP	AMD	Metals pH
2006	1.12 2.33	Aquatic Life	11952 11955	*	39079	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH pH
2006	0.33	Aquatic Life	11952	*	39080	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH
2006	0.49	Aquatic Life	11952	*	39081	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH
2006	0.99	Aquatic Life	11955	*	39082	Buffalo Creek, Unt	CWF	SWMP	AMD	pH
2006	0.66	Aquatic Life	11955	*	39083	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH
2006	0.59	Aquatic Life	11955	*	39084	Buffalo Creek, Unt	CWF	SWMP	AMD	pH
2006	1.12 1.72	Aquatic Life	11952 11955	*	39085	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH pH
2006	0.06	Aquatic Life	11994	*	39115	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH
2006	0.01	Aquatic Life	11994	*	39117	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH
2006	0.01	Aquatic Life	11994	*	39118	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals pH
2006	1.25	Aquatic Life	11971	*	39126	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals
2006	0.47	Aquatic Life	11971	*	39127	Buffalo Creek, Unt	CWF	SWMP	AMD	Metals

State Water Plan (SWP) Subbasin: 19F										
HUC: 05020006 Youghigheny River										
Year	**Miles**	**Use Designation**	**Assessment ID**	**Segment ID**	**DEP Stream Code**	**Stream Name**	**Desig-nated Use**	**Data Source**	**Source**	**EPA 305(b) Cause Code**
2006	0.74	Aquatic Life	11903	*		Tubs Run	CWF	SWMP	AMD	Metals
2006	0.6	Aquatic Life	11944	*	39102	Millers Run, Unt	CWF	SWMP	AMD	Metals pH

Resource Extraction=RE
Cold Water Fish = CWF
Surface Water Monitoring Program = SWMP
Abandoned Mine Drainage = AMD
See Attachment D, *Excerpts Justifying Changes Between the 1996, 1998, and 2002 Section 303(d) Lists and the 2004 and 2006 Integrated Water Quality Report.* The use designations for the stream segments in this TMDL can be found in PA Title 25 Chapter 93.

Supporting Documentation for Approving Pennsylvania Acid Mine Drainage Affected Watersheds

I. Introduction

The Clean Water Act (CWA) requires that Total Maximum Daily Loads (TMDLs) be developed for those waterbodies identified as impaired by the State where technology based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a Margin of Safety (MOS), that may be discharged to a waterbody without exceeding water quality standards.

This document will support the U.S. Environmental Protection Agency (EPA) rationale for approving TMDLs for water quality impairments due to Acid Mine Drainage (AMD) in watersheds within the Commonwealth of Pennsylvania.

In some circumstances, Pennsylvania's 1996 Section 303(d) List may also include "other inorganics" (i.e., sulfates) as a cause of impairment for this waterbody. Pennsylvania Department of Environmental Protection's (PADEP) request for the delisting of 1996 "other inorganics" was approved when EPA approved Pennsylvania's 2006 Integrated Report. As PADEP continues to reassess its waters and finds that an "other inorganics" (sulfates) impairment does actually exist, these waters must return to the Section 303(d) List and would then require a TMDL.

EPA's rationale is based on the TMDL Report and information contained in the attachments to the report. EPA's review determined that the TMDL meets the following seven regulatory requirements pursuant to 40 CFR Part 130:

1. The TMDL is designed to implement applicable water quality standards.
2. The TMDL includes a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. The TMDL has been subject to public participation.

In addition, the TMDLs considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met.

II. Determination of Sources of Existing Loadings

In 1997, PADEP began utilizing the Statewide Surface Waters Assessment Protocol to assess Pennsylvania's waters. This protocol is a modification of EPA's 1989 Rapid Bioassessment Protocol II and provides for a more consistent approach to conducting biological

assessments than previously used methods. The biological assessments are used to determine which waters are impaired and should be included on the State's Section 303(d) List.

III. Discussion of Modeling used to Address Designated Acid Mine Drainage Impairments

The TMDLs were developed using a statistical procedure to ensure that water quality criteria are met 99 percent of the time as required by Pennsylvania's water quality standards at Pennsylvania Code Title 25, Chapter 96.3c.

TMDLs are defined as the summation of the point source WLAs, plus the summation of the nonpoint source LAs, plus a MOS, and are often shown as follows:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain applicable water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, utilizes the best available data, and accounts for uncertainty with the inclusion of a MOS value. Since conditions, available data, and the understanding of natural processes can change more than anticipated by the MOS, there exists the option of refining the TMDL for resubmittal to EPA. PADEP treats each segment on the Section 303(d) List as a separate TMDL, and expresses each TMDL as a long term average loading.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA, Public Law 95-87) and its subsequent revisions were enacted to establish a nationwide program to, among other things, protect the beneficial uses of land or water resources, protect public health and safety from the adverse effects of current surface coal mining operations, and promote the reclamation of mined areas left without adequate reclamation prior to August 3, 1977. SMCRA requires a surface mining permit for the development of new, previously mined, or abandoned sites for the purpose of surface mining. Permittees are required to post a performance bond that will be sufficient to ensure the completion of reclamation requirements by the regulatory authority in the event that the applicant forfeits. Mines that ceased operating by the effective date of SMCRA (often called "pre-law" mines) are not subject to the requirements of SMCRA.

Computational Procedure

The TMDLs were developed using a statistical procedure to ensure that water quality criteria are met 99 percent of the time as required by Pennsylvania's water quality standards. A two-step approach was used for the TMDL analysis of impaired stream segments.

The first step used a statistical method for determining the allowable instream concentration at the point of interest necessary to meet water quality standards. An allowable long term average instream concentration was determined at each sample point for metals and acidity. The analysis was performed using Monte Carlo simulation to determine the necessary long term average concentration needed to attain water quality criteria 99 percent of the time,

and the simulation was run assuming the dataset was log normally distributed. Using @RISK[1] each pollutant source was evaluated separately by performing 5,000 iterations of the model where each iteration was independent of all other iterations. This procedure was used to determine the required percent reduction that would allow the water quality criteria to be met instream at least 99 percent of the time. A second simulation that multiplied the percent reduction by the sampled value was run to ensure that criteria were met 99 percent of the time. The mean value from this dataset represents the long term average concentration that needs to be met to achieve water quality standards.

The second step was a mass balance of the loads as they passed through the watershed. Loads at these points were computed based on average flow. Once the allowable concentration and load for each pollutant was determined, mass-balance accounting was performed starting at the top of the watershed and working downstream in sequence. This mass balance or load tracking through the watershed utilized the change in measured loads from sample location to sample location as a guide for expected changes in the allowable loads.

The existing and allowable long term average loads were computed using the mean concentration from @RISK multiplied by the average flow. The reductions specified in this TMDL will apply to all flow conditions including any critical conditions.

In addition to the above analysis, the WLAs for the National Pollutant Discharge Elimination System (NPDES) permitted pit water treatment ponds were determined. Typically, surface mining operations include an open pit where overburden material has been removed to access the underlying coal, and this pit can accumulate water primarily through direct precipitation and surface runoff. The pit water is pumped to a nearby treatment pond where it is treated to the level necessary to meet effluent limitations. However, precipitation events allow intermittent discharges from the treatment pond. If accurate flow data are available for a treatment pond, they can be used to quantify the WLA by multiplying the flow by the best available technology (BAT) effluent limitations for treatment ponds. However, these flow data are typically not available. Alternatively, PADEP calculated a total average flow for the water draining to the pit using average annual precipitation, the area of the pit, and a runoff factor. Utilizing this value and BAT treatment pond effluent limits, the WLAs were determined.

IV. Discussion of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance.

1. The TMDLs are designed to implement the applicable water quality standards.

Water quality standards are state regulations that define the water quality goals of a waterbody. Standards are comprised of three components: (1) designated uses; (2) criteria necessary to protect those uses; and (3) antidegradation provisions that prevent the degradation of water quality. Pennsylvania criteria to protect the aquatic life use, and the designation can be

[1] @RISK – Risk Analysis and Simulation Add-in for Microsoft Excel, Palisade Corporation, Newfield, NY.

found at Pennsylvania Title 25 §93.9a – 93.9z. To protect the designated use as well as the existing use, the water quality criteria shown in Table 1 apply to all evaluated segments. The table includes the instream numeric criterion for each parameter and any associated specifications.

Table 1. Applicable Water Quality Criteria

Parameter	Criterion Value (mg/l)	Duration	Designated Use
Aluminum (Al) Total Recoverable	0.75	Maximum	Aquatic Life
Iron (Fe) Total Recoverable	1.5	30-day Average	Aquatic Life
Manganese (Mn) Total Recoverable	1	Maximum	Potable Water Supply
pH	6.0 - 9.0	Inclusive	Aquatic Life

Streams placed on the Section 303(d) List with a designated use of high quality (HQ) or exceptional value (EV) are subject to additional protection under Pennsylvania's antidegradation policy. The PADEP must establish instream goals for TMDLs to restore the waterbody to existing (pre-mining) quality. Applicable water-quality criteria for HQ and EV waters are determined using the 95th percentile of a reference Water Quality Network (WQN) stream.

Pennsylvania Title 25 §96.3c requires that water quality criteria be achieved at least 99 percent of the time, and TMDLs expressed as long-term average concentrations are expected to meet these requirements. That is, the statistical Monte Carlo simulation used to develop TMDL WLAs and LAs for each parameter resulted in a determination that any required percent pollutant reduction would assure that the water quality criteria would be met instream at least 99 percent of the time. The Monte Carlo analysis performed 5,000 iterations of the model where each iteration was independent of all other iterations and the dataset was assumed to be log normally distributed.

EPA finds that these TMDLs will attain and maintain the applicable narrative and numeric water quality standards.

The pH values shown in Table 1 were used as the endpoints for these TMDLs. PADEP developed the pH standard between 6.0 to 9.0 inclusive, which is presumed to be met when the net alkalinity is maintained above zero. This presumption is based on the relationship between net alkalinity and pH, on which PADEP based its methodology to addressing pH in the watershed. A summary of the methodology is presented as follows:

The parameter of pH, a measurement of hydrogen ion acidity presented as a negative logarithm of effective hydrogen ion concentration, is not conducive to standard statistics. Additionally, pH does not measure latent acidity that can be produced from the hydrolysis of metals. PADEP has been using an alternate approach to address the stream impairments noted on the Section 303(d) List due to pH. Because the concentration of acidity in a stream is partially dependent upon metals, it is extremely difficult to predict the exact pH values which

would result from treatment of AMD. Therefore, net alkalinity will be used to evaluate pH in these TMDL calculations. This methodology assures that the standard for pH will be met because net alkalinity is able to measure the reduction of acidity. When acidity in a stream is neutralized or is restored to natural levels, pH will be acceptable ($\geq$6.0). Therefore, the measured instream alkalinity at the point of evaluation in the stream will serve as the goal for reducing total acidity at that point. The methodology that is used to calculate the required alkalinity (and therefore pH) is the same as that used for other parameters such as iron, aluminum, and manganese that have numeric water quality criteria. EPA finds this approach to addressing pH to be reasonable.

PADEP also has an alkalinity standard. Alkalinity (of a minimum 20 mg/l calcium carbonate except where natural conditions are less) is related but not identical to pH. Alkalinity is a measure of the buffering capacity of the water. Adequate buffering prevents large swings in pH with additions of small amounts of acid.

2. The TMDLs include a total allowable load as well as individual wasteload allocations and load allocations.

For purposes of these TMDLs only, point sources are identified as permitted discharge points and nonpoint sources are identified as any pollution sources that do not have a current NPDES permit. The TMDL submitted by PADEP does not provide adequate facility information about the specific activities at either the abandoned or bond forfeiture sites that allow EPA to make any determination that the source is a point source subject to CWA regulation or nonpoint source. Abandoned mine lands (AMLs) and bond forfeiture sites, where the Department or a Trustee is directing reclamation following forfeiture of the performance bond, were treated in the TMDL allocations as nonpoint sources. As such, the discharges associated with these land uses were assigned LAs (as opposed to WLAs). The decision to approve a TMDL that assigns LAs to AMLs, bond forfeiture sites and other sources that do not have an associated current NPDES permit does not reflect any determination by EPA as to whether there are point source discharges that require an NPDES permit within these land uses. In addition, by approving these TMDLs with mine drainage discharges treated as LAs, EPA is not determining that these discharges are in any way exempt from NPDES or SMCRA permitting requirements. To the extent it is determined that one or more of these discharges is subject to NPDES permitting requirements, EPA expects the State/Department to treat these allocations as WLAs and that any NPDES permit effluent limits would conform with 40 CFR §122.44(d)(1)(vii)(B).

To determine the WLAs for the NPDES permitted pit water treatment ponds, PADEP first calculated a total average flow for the water draining to the pit using average annual precipitation, the area of the pit, and a runoff factor. The WLAs were then calculated using this value and the BAT treatment pond effluent limits, and were included in the mass balance along with the LAs.

Once PADEP determined the allowable concentration and load for each pollutant, a mass balance accounting was performed starting at the top of the watershed and working downstream

in sequence. Load tracking through the watershed utilizes the change in measured loads from sample location to sample location as a guide for expected changes in the allowable loads.

PADEP used two basic rules for the load tracking between two ends of a stream segment: (1) if the measured upstream loads are less than the downstream loads, it is indicative that there is an increase in load between the points being evaluated, and no instream processes are assumed, and (2) if the sum of the measured loads from the upstream points is greater than the measured load at the downstream point, it is indicative that there is a loss of instream load between the points, and the ratio of the decrease shall be applied to the allowable load being tracked from the upstream point.

Tracking loads through the watershed provides a picture of how the pollutants are affecting the watershed based on the available information. The analysis is performed to ensure that water quality standards will be met at all points in the stream. EPA finds this approach reasonable.

PADEP allocated to nonpoint sources and point sources. Where there are active mining operations, Federal regulations require that point source permitted effluent limitations be water quality-based subsequent to TMDL development and approval[2]. In addition, PA Title 25, Chapter 96, Section 96.4d requires that WLAs serve as the basis for determination of permit limits for point source discharges regulated under Chapter 92 (relating to NPDES permitting, monitoring, and compliance).

3. The TMDLs consider the impacts of background pollutant contributions.

All AMD TMDLs are developed using instream data, which account for existing background conditions.

4. The TMDLs consider critical environmental conditions.

According to EPA's regulation 40 CFR §130.7(c)(1), TMDLs are required to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptable low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a

[2] It should be noted that technology based permit limits may be converted to water quality based limits according to EPA's *Technical Support Document For Water Quality-based Toxics Control*, March 1991, recommendations.

reasonable "worst case" scenario condition. For example, stream analysis often uses a low flow (7Q10) design condition because the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum.

The reductions specified in these TMDLs apply at all flow conditions. A critical flow condition was not identified from the available data.

5. The TMDLs consider seasonal environmental variations.

Seasonal variations involve changes in stream flow and loadings as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flows normally occur in early spring from snow melt and spring rain, while seasonally low flows typically occur during the warmer summer and early fall drought periods. The dataset included data points from all seasons, thereby accounting for seasonal variation implicitly.

6. The TMDLs include a Margin of Safety.

The CWA and Federal regulations require TMDLs to include a MOS to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop the allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS.

PADEP used an implicit MOS in these TMDLs, all @Risk analysis results exceeded the 99 percent threshold. This is a more conservative assumption than the general assumption that a treated discharge has less variability than an untreated discharge. By retaining variability in the treated discharge, a lower average concentration is required to meet water quality criteria 99 percent of the time than if the variability of the treated discharge is reduced.

Additionally, calculations were performed using a daily average for iron rather than the 30-day average, thereby incorporating a MOS.

7. The TMDLs have been subject to public participation.

Pennsylvania seeks public participation at the final draft phase of TMDL development in order to receive input from stakeholders and to apprise the stakeholders of the progress made. Time and place of the public meeting is posted in local newspapers and the meeting is held with a minimum 30-day response time for comments prior to final submittal to EPA for approval.

V. Discussion of Reasonable Assurance

Various methods to eliminate or treat pollutant sources and to provide a reasonable assurance that the proposed TMDLs can be met exist in Pennsylvania. These methods include PADEP's primary efforts to improve water quality through reclamation of AMLs (for abandoned mining) and through the NPDES permit program (for active mining). Funding sources available that are currently being used for projects designed to achieve TMDL reductions include the

Section 319 Grant program and Pennsylvania's Growing Greener Program. Additional Federal funding is available for reclamation and mine drainage treatment through the Department of the Interior, Office of Surface Mining (OSM); the Appalachian Clean Streams Initiative; and the Watershed Cooperative Agreements.

The Bureau of Abandoned Mine Reclamation, Pennsylvania's primary bureau in dealing with abandoned mine reclamation (AMR) issues, has established a comprehensive plan for abandoned mine reclamation throughout the Commonwealth to prioritize and guide reclamation efforts to make the best use of valuable funds (www.dep.state.pa.us/dep/deputate/minres/bamr/complan1.htm). In developing and implementing a comprehensive plan for abandoned mine reclamation, the resources (both human and financial) of the participants must be coordinated to ensure cost-effective results. The following set of principles is intended to guide this decision making process:

- Partnerships between the DEP, watershed associations, local governments, environmental groups, other state agencies, federal agencies, and other groups organized to reclaim AMLs are essential to achieving reclamation and abating acid mine drainage in an efficient and effective manner.

- Partnerships between AML interests and active mine operators are important and essential in reclaiming AMLs.

- Preferential consideration for the development of AML reclamation or AMD abatement projects will be given to watersheds or areas for which there is an approved rehabilitation plan (guidance is given in Appendix B to the Comprehensive Plan).

- Preferential consideration for the use of designated reclamation money will be given to projects that have obtained other sources or means to partially fund the project or to projects that need the funds to match other sources of funds.

- Preferential consideration for the use of available money from federal and other sources will be given to projects where there are institutional arrangements for any necessary long-term operation and maintenance costs.

- Preferential consideration for the use of available money from federal and other sources will be given to projects that have the greatest worth.

- Preferential consideration for the development of AML projects will be given to AML problems that impact people over those that impact property.

- No plan is an absolute; occasional deviations are to be expected.

A detailed decision framework is included in the plan that outlines the basis for judging projects for funding, giving high priority to those projects whose cost/benefit ratios are most

favorable and those in which stakeholder and landowner involvement is high and secure.

In addition to the abandoned mine reclamation program, regulatory programs also are assisting in the reclamation and restoration of Pennsylvania's land and water. PADEP has been effective in implementing the NPDES program for mining operations throughout the Commonwealth. This reclamation was done through the use of remining permits that have the potential for reclaiming AMLs, at no cost to the Commonwealth or the federal government. Long term treatment agreements were initialized for facilities/operators that need to assure treatment of post-mining discharges, or discharges they degraded, which will provide for long term treatment of discharges. According to OSM, "PADEP is conducting a program where active mining sites are, with very few exceptions, in compliance with the approved regulatory program."

The Commonwealth is exploring all options to address its abandoned mine problem. During 2000-2006, many new approaches to mine reclamation and mine drainage remediation have been explored and projects funded to address problems in innovative ways. These include:

- Project XL -- PADEP has proposed this XL Project to explore a new approach to encourage the remining and reclamation of abandoned coal mine sites. The approach would be based on compliance with instream pollutant concentration limits and implementation of best management practices (BMPs), instead of NPDES numeric effluent limitations measured at individual discharge points. This XL Project would provide for a test of this approach in up to eight watersheds with significant AMD pollution. The project will collect data to compare instream pollutant concentrations versus the loading from individual discharge points and provide for the evaluation of the performance of BMPs and this alternate strategy in PADEP's efforts to address AMD.

- Awards of grants for: (1) proposals with economic development or industrial application as their primary goal and which rely on recycled mine water and/or a site that has been made suitable for the location of a facility through the elimination of existing Priority 1 or 2 hazards; and (2) new and innovative mine drainage treatment technologies that will provide waters of higher purity that may be needed by a particular industry at costs below conventional treatment costs, as is common use today, or reduce the costs of water treatment below those of conventional lime treatment plants. Eight contracts totaling $4.075 million dollars were awarded in 2006 under this program.

- Projects using water from mine pools in an innovative fashion, such as the Shannopin Deep Mine Pool (in southwestern Pennsylvania), the Barnes & Tucker Deep Mine Pool (the Susquehanna River Basin Commission into the Upper West Branch Susquehanna River), and the Wadesville Deep Mine Pool (Excelon Generation in Schuylkill County).

It is recommended that agencies work with local interests to form a watershed group that

will be dedicated to the remediation and preservation of these watersheds through public education, monitoring and assessment, and improvement projects. Information on formation of a watershed group is available through websites for the Pennsylvania Department of Environmental Protection (www.dep.state.pa.us); AMR Clearinghouse (www.amrclearinghouse.com); U.S. Environmental Protection Agency (www.epa.gov); Susquehanna River Basin Commission (www.srbc.net); and others. In addition, each DEP Regional Office (6) and each District Mining Office (5) have watershed managers to assist stakeholder groups interested in restoration in their watershed. Most Pennsylvania County conservation districts have a watershed specialist who can also provide assistance to stakeholders (www.pacd.org). Potential funding sources for AMR projects can be found at www.dep.state.pa.us/dep/subject/pubs/water/wc/FS2205.pdf.