UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
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Decision Rationale
Total Maximum Daily Loads
Tearing Run Watershed
For Acid Mine Drainage Affected Segments
Indiana County, Pennsylvania

Signed

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Water Protection Division

Date: *8/2/06*

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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.

The Pennsylvania Department of Environmental Protection (PADEP) Bureau of Watershed Management electronically submitted the *Tearing Run Watershed TMDL* (TMDL Report) dated May 30, 2006 to the U. S. Environmental Protection Agency (EPA) for final Agency review on June 9, 2006. This report includes the TMDLs for the three primary metals associated with acid mine drainage (AMD) (i.e., iron, manganese, and aluminum) and pH and addresses one segment on Pennsylvania's 1996 Section 303(d) list of impaired waters.

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 eight regulatory requirements pursuant to 40 CFR Part 130:

1. The TMDLs are designed to implement the applicable water quality standards.
2. The TMDLs include a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDLs consider the impacts of background pollutant contributions.
4. The TMDLs consider critical environmental conditions.
5. The TMDLs consider seasonal environmental variations.
6. The TMDLs include a MOS.
7. There is reasonable assurance that the proposed TMDLs can be met.
8. The TMDLs have been subject to public participation.

II. Summary

Table 1 presents the 1996, 1998, 2002, and 2004 Section 303(d) listing information for the impaired segment first listed in 1996.[1]

Table 1. 303(d) Sublist for the Tearing Run Watershed, Indiana County, Pennsylvania

[1]Pennsylvania's 1996, 1998, 2002, and 2004 Section 303(d) lists were approved by the Environmental Protection Agency (EPA). The 1996 Section 303(d) list provides the basis for measuring progress under the 1997 lawsuit settlement of *American Littoral Society and Public Interest Group of Pennsylvania v. EPA.*

Table 1. 303(d) Sub-List								
State Water Plan (SWP) Subbasin: 18-D Two Lick Creek								
Year	**Miles**	**Segment ID Assessment ID**	**DEP Stream Code**	**Stream Name**	**Designated Use**	**Data Source**	**Source**	**EPA 305(b) Cause Code**
1996	2.0	5067	44112	Tearing Run	CWF	305(b) Report	RE	Metals
1998	2.19	5067	44112	Tearing Run	CWF	SWMP	AMD	Metals
2002	2.2	5067	44112	Tearing Run	CWF	SWMP	AMD	Metals
2004	2.2	5067	44112	Tearing Run	CWF	2004 Integrated List	AMD	Metals

Resource Extraction = RE
Cold Water Fishery = CWF
Surface Water Monitoring Program = SWMP
Abandoned Mine Drainage = AMD

See Attachment D of the TMDL Report, *Excerpts Justifying Changes Between the 1996, 1998, 2002, and 2004 Section 303(d) Lists*. The use designations for the stream segments in this TMDL can be found in PA Title 25 Chapter 93t. Section IV, Table 3 shows the TMDLs for the Tearing Run Watershed.

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.

The TMDLs in this report were developed using a statistical procedure to ensure that water quality criteria are met 99% of the time as required by Pennsylvania's water quality standards at Pennsylvania Code Title 25, Chapter 96.3c. Table 3 of the TMDL Report lists the TMDLs for the Tearing Run Watershed, addressing metals and pH in the stream segments listed as PADEP stream code 44112.

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.

III. Background

The Tearing Run Watershed is 4.5 square miles in area and is located in Western Pennsylvania, occupying a south central portion of Indiana County within Center Township. Tearing Run flows from the east into Two Lick Creek on the south side of the Borough of Homer City, which is located along US Rt 119 five miles south of the Borough of Indiana and twenty-seven miles north of the Borough of Greensburg. PA Rt. 56 between Homer City and the Village of Waterman serves as the northern boundary of the watershed, and SR 2018, passing through the Village of Luciusboro, serves as the watershed's southern boundary. Land uses within the watershed include abandoned mine lands, forestlands, and rural residential properties with small communities scattered throughout the area.

Tearing Run has been degraded by AMD originating from abandoned coal mines. Although the date is currently unknown, the earliest mining in the area preceded the twentieth century. Early mining involved digging deep shafts into the coal bed, but strip mining later became commonplace. Deep mine entries, refuse piles, subsidence and pooling areas, altered landscapes that were not reclaimed, and acid bearing overburden exposure to air and water have remained in the watershed as a result of past mining operations. These sources have led to the pollution and degradation that the watershed currently experiences.

Previous surface mining within the watershed has occurred on the Lower Kittanning and Upper Freeport coal seams by many companies including R & P Coal Company, Marquise Mining, Amerikohl Mining, M. B. Energy, Inc., and Hawk Contracting Co. All of the deep mining operations that have taken place within the watershed have been above drainage level, and most of the extensive deep mines have been abandoned since 1970.

There are currently five mining operations in the Tearing Run Watershed: four active and one proposed. Keystone Coal Mining Corporation has completed mining in its Waterman No. 1 Mine (SMP 32813031, National Pollutant Discharge Elimination System (NPDES) PA0125547), but the site has two post-mining discharges that require treatment. Britt Energies, Inc. has three recently activated mining operations in the watershed. These are Flickinger Mine (SMP 32030103, NPDES PA0249416), Marbach Mine (SMP 32020106, NPDES PA0249271), and Kinkead Sandstone Quarry (Noncoal SMP 32030301, NPDES PA0249408). Rosebud Mining Co. has proposed an operation for its Brush Valley Deep Mine (SMP 32041301) and is currently awaiting approval. The permitted discharges from these operations are assigned WLAs, including those from the proposed deep mine. All remaining discharges in the watershed result from abandoned mines and are treated as nonpoint sources.

PADEP treats each segment on the Section 303(d) list as a separate TMDL and expresses each TMDL as a long-term average loading. (See the *Tearing Run Watershed TMDL* Report, Attachment C, for the TMDL calculations.)

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 data of SMCRA (often called "pre-law" mines) are not subject to the requirements of SMCRA.

Tearing Run was on the 1996 Section 303(d) list of impaired waters and counts toward the tenth year (2007) TMDL milestone commitment under the requirements of the 1997 TMDL lawsuit settlement agreement. Tenth year milestones include the development of TMDLs for 20% of the waters listed on Pennsylvania's 1996 Section 303(d) list of impaired waters by the effects of AMD (80 waters since 2005) and the remaining waters listed as impaired by non-AMD impacts. Delisted waters may count for 20% of the requirement.

Computational Procedure

The TMDLs were developed using a statistical procedure to ensure that water quality criteria are met 99% 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% of the time, and the simulation was run assuming the data set was log normally distributed. Using @Risk[2], each pollutant source was evaluated separately by performing 5000 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% of the time. A second simulation that multiplied the percent reduction by the sampled value was run to ensure that criteria were met 99% of the time. The mean value from this data set represents the long-term average concentration that needs to be met to achieve water quality standards.

[2]@Risk – Risk Analysis and Simulation Add-in for Microsoft Excel, Palisade Corporation, Newfield, NY, 1990-1997.

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 annual 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 loads were computed based on average annual flow and should not be taken out of the context for which they are intended. They are intended to depict how the pollutants affect the watershed and where the sources and sinks are located spatially in the watershed. A critical flow was not identified, and the reductions specified in this TMDL apply at all flow conditions.

In addition to the above analysis, the WLAs for the 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 reporting 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. Discussions 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. Tearing Run has been designated by Pennsylvania as a cold water fishery with criteria to protect the aquatic life use, and the designation can be found at Pennsylvania Title 25 § 93.9t. To protect the designated use as well as the existing use, the water quality criteria shown in Table 2 apply to all evaluated segments. The table includes the instream numeric criterion for each parameter and any associated specifications.

Table 2. Applicable Water Quality Criteria

Parameter	Criterion Value (mg/l)	Duration	Total Recoverable/ Dissolved
Aluminum (Al)	0.75	Maximum	Total Recoverable
Iron (Fe)	1.50 0.30	30-day Average Maximum	Total Recoverable Dissolved
Manganese (Mn)	1.00	Maximum	Total Recoverable
pH	6.0 - 9.0	Inclusive	N/A

Pennsylvania Title 25 § 96.3c requires that water quality criteria be achieved at least 99% 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% of the time. The Monte Carlo analysis performed 5000 iterations of the model where each iteration was independent of all other iterations and the data set 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 2 were used as the endpoints for these TMDLs. In the case of freestone streams with little or no buffering capacity, the allowable TMDL endpoint for pH may be the natural background water quality, and these values can be as low as 5.4 (Pennsylvania Fish and Boat Commission). However, PADEP chose to set 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 (see the *Tearing Run Watershed TMDL* Report, Attachment B). 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. Although many of the AMD-impacted streams are naturally low in alkalinity, available monitoring data do not always include upstream waters not impacted by AMD. As PADEP does not list waters for inadequate alkalinity, TMDLs are not being developed for alkalinity.

2. The TMDLs include a total allowable load as well as individual WLAs and LAs.

For purposes of these TMDLs only, point sources are identified as permitted discharge points or discharges having responsible parties, and nonpoint sources are identified as any pollution sources that are not point sources. Abandoned mine lands were treated in the allocations as nonpoint sources. As such, the discharges associated with these land uses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges 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 exempt from NPDES permitting requirements.

To determine the WLAs for the NPDES permitted pit water treatment ponds, PADEP first calculated a total average flow for the water reporting 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, (2) if the sum of the measured loads from the upstream points is greater than the measured load at the downstream point, 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 insure

that water quality standards will be met at all points in the stream. EPA finds this approach reasonable.

Table 3 presents a summary of the allowable loads, LAs, and WLAs for the Tearing Run Watershed.

Table 3. TMDL Component Summary for the Tearing Run Watershed

Station	Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Identified* (%)
22 - Mouth of Unnamed Tributary 44115	Aluminum	1.38	1.30	0.50	0.80	0.47	34
	Iron	1.18	1.05	0.80	0.25	0.71	60
	Manganese	1.35	1.14	0.55	0.59	0.61	45
	Acidity	59.4	2.4	0.00	2.38	57.0	96
19 - Headwaters of Tearing Run	Aluminum	0.7	0.7	0.2	0.5	0.0	0
	Iron	3.3	0.6	0.4	0.2	2.7	81
	Manganese	0.7	0.4	0.2	0.2	0.3	46
	Acidity	0.0	0.0	0.0	0.0	0.0	0
21 - Tearing Run upstream of Unnamed Tributary 44115	Aluminum	1.6	0.9	0.0	0.9	0.6	41
	Iron	4.1	1.5	0.0	1.5	0.0	0
	Manganese	3.0	0.6	0.0	0.6	2.1	78
	Acidity	90.1	6.3	0.0	6.3	83.8	93
T-5 - Tearing Run	Aluminum	2.8	2.4	0.0	2.4	0.0	0
	Iron	2.4	2.4	NA	NA	0.0	0
	Manganese	2.0	1.8	0.0	1.8	0.0	0
	Acidity	96.5	10.6	0.0	10.6	0.0	0
4 - Tearing Run upstream of Unnamed Tributary 44114	Aluminum	159.02	0.8	0.3	0.5	157.4	99
	Iron	11.2	1.5	0.4	1.1	208.4	99
	Manganese	10.5	1.7	0.3	1.4	7.6	82
	Acidity	1225.2	0.0	0.0	0.0	1134.3	100
702 - Headwaters of Unnamed Tributary 44114	Aluminum	1.2	1.2	NA	NA	0.0	0
	Iron	ND	NA	NA	NA	0.0	0
	Manganese	2.3	1.2	0.0	1.2	1.1	49
	Acidity	5.6	2.5	0.0	2.5	3.1	55
56 - Unnamed Tributary 44114	Aluminum	8.6	1.6	0.0	1.6	7.0	81
	Iron	8.4	0.4	0.0	0.4	8.0	95
	Manganese	0.8	0.5	0.0	0.5	0.0	0
	Acidity	25.4	4.1	0.0	4.1	18.2	82
3 - Mouth of Unnamed Tributary 44114	Aluminum	12.9	2.0	0.4	1.6	3.9	66
	Iron	23.0	3.2	0.7	2.5	11.8	79
	Manganese	4.6	3.8	0.4	3.4	0.4	11
	Acidity	197.2	15.8	0.0	15.8	160.2	91

Station	Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Identified* (%)
T-4 - Tearing Run upstream of Unnamed Tributary 44113	Aluminum	70.4	3.5	0.0	3.5	0.0	0
	Iron	26.1	7.8	0.0	7.8	0.0	0
	Manganese	14.5	3.6	0.0	3.6	1.6	31
	Acidity	1019.1	9.2	0.0	9.2	2.1	19
SW-43 - Headwaters of Unnamed Tributary 44113	Aluminum	4.0	0.3	0.0	0.3	3.7	92
	Iron	0.8	0.4	0.0	0.4	0.4	54
	Manganese	2.7	0.3	0.0	0.3	2.4	88
	Acidity	49.4	0.0	0.0	0.0	49.4	100
T-3 - Mouth of Unnamed Tributary 44113	Aluminum	38.7	1.9	0.0	1.9	33.1	94
	Iron	7.2	3.2	0.0	3.2	3.6	53
	Manganese	14.7	2.9	0.0	2.9	9.4	76
	Acidity	545.1	1.1	0.0	1.1	494.6	100
T-1 - Mouth of Tearing Run	Aluminum	174.3	12.2	0.0	12.2	56.1	82
	Iron	138.5	12.5	0.0	12.5	96.5	89
	Manganese	46.3	19.4	0.0	19.4	4.3	18
	Acidity	2110.0	63.3	0.0	63.3	492.7	89

ND = not detected
NA = not applicable, meets water quality standards, no TMDL necessary
* Percent reduction after upstream reductions are made

PADEP allocated to nonpoint sources and point sources, as there are currently five mining operations in the watershed. 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.[3] 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). Therefore, no new mining may be permitted within the watershed without reallocation of the TMDL. Additionally, no required reductions of permit limits are necessary at this time, as all necessary reductions have been assigned to nonpoint sources.

Table 4: Wasteload Allocations of Permitted Discharges

[3]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.

Mine	Station	Parameter	Allowable Average Monthly Concentration (mg/L)	Average Flow (MGD)	WLA (lbs/day)
Britt Energies, Inc. Flickinger Mine SMP 32030103 NPDES PA0249416	TP1	Al	2.0	0.0049	0.08
		Fe	3.0	0.0049	0.12
		Mn	2.0	0.0049	0.08
	TP2	Al	2.0	0.0049	0.08
		Fe	3.0	0.0049	0.12
		Mn	2.0	0.0049	0.08
Britt Energies, Inc. Marbach Mine SMP 3202016 NPDES PA0249271	010	Al	0.6	0.0102	0.05
		Fe	3.0	0.0102	0.26
		Mn	1.1	0.0102	0.09
	011	Al	0.4	0.0102	0.03
		Fe	1.3	0.0102	0.11
		Mn	0.9	0.0102	0.08
	012	Al	0.4	0.0102	0.03
		Fe	1.3	0.0102	0.11
		Mn	0.9	0.0102	0.08
Britt Energies, Inc. Kinkead Quarry SMP 32030301 NPDES PA0249408	004	Al	2.0	0.0051	0.08
		Fe	3.0	0.0051	0.13
		Mn	2.0	0.0051	0.08
	005	Al	2.0	0.0051	0.08
		Fe	3.0	0.0051	0.13
		Mn	2.0	0.0051	0.08
Keystone Mining Corp. Waterman No. 1 Mine SMP 32813031 NPDES PA0125547	23	Al	2.0	0.024	0.4
		Fe	3.0	0.024	0.6
		Mn	2.0	0.024	0.4
	G	Al	2.0	0.0018	0.030
		Fe	3.0	0.0018	0.045
		Mn	2.0	0.0018	0.030

Mine	Station	Parameter	Allowable Average Monthly Concentration (mg/L)	Average Flow (MGD)	WLA (lbs/day)
Rosebud Mining Co. Brush Valley Mine SMP 32041301 No NPDES Permit	001	Al	2.0	0.012	0.20
		Fe	3.0	0.012	0.30
		Mn	2.0	0.012	0.20
	002	Al	2.0	0.011	0.19
		Fe	3.0	0.011	0.28
		Mn	2.0	0.011	0.19

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

The TMDLs were developed using instream data, which account for existing background conditions.

4. The TMDLs consider critical environmental conditions.

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.

The data set included data points from all seasons, thereby accounting for seasonal variation implicitly.

6. The TMDLs include a MOS.

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 by assuming that the treated instream concentration variability was the same as the untreated stream's concentration variability. 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% 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. There is reasonable assurance that the proposed TMDLs can be met.

The *Recommendations* section of the TMDL Report highlights what can be done in the Tearing Run Watershed to eliminate or treat pollutant sources. Aside from PADEP's primary efforts to improve water quality in the Tearing Run Watershed through reclamation of abandoned mine lands and through the NPDES permit program, additional opportunities for reasonable assurance exist. PADEP expects that activities such as research conducted by its Bureau of Abandoned Mine Reclamation, funding from EPA's § 319 grant program, and Pennsylvania's Growing Greener program will help remedy abandoned mine drainage impacts. PADEP also has in place an initiative that aims to maximize reclamation of Pennsylvania's abandoned mineral extraction lands. Through Reclaim PA, Pennsylvania's goal is to accomplish complete reclamation of abandoned mine lands and plugging of orphaned wells. Pennsylvania strives to achieve this objective through legislative and policy land management efforts and activities described in the TMDL Report.

There is currently a watershed organization focused on the Tearing Run Watershed. A watershed assessment is underway for the Kiski-Conemaugh drainage basin (including Blacklick Creek and its tributaries, Two Lick Creek and Tearing Run) for which all tributaries and sources of acid mine drainage will be evaluated and prioritized based on their severity and flow. The Kiski-Conemaugh Stream Team and the Blacklick Creek Watershed Association will then focus attention on the top priorities.

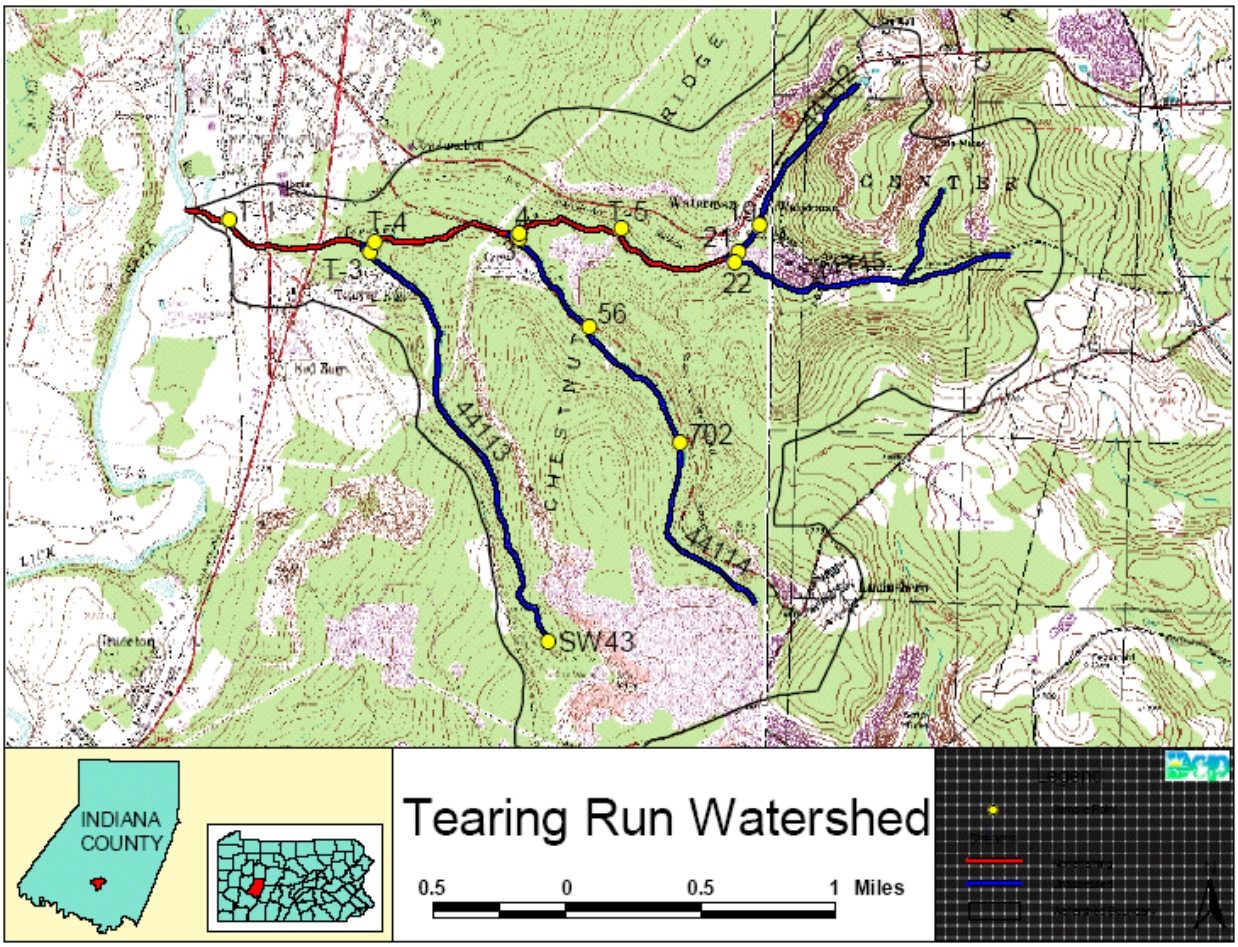
8. The TMDLs have been subject to public participation.

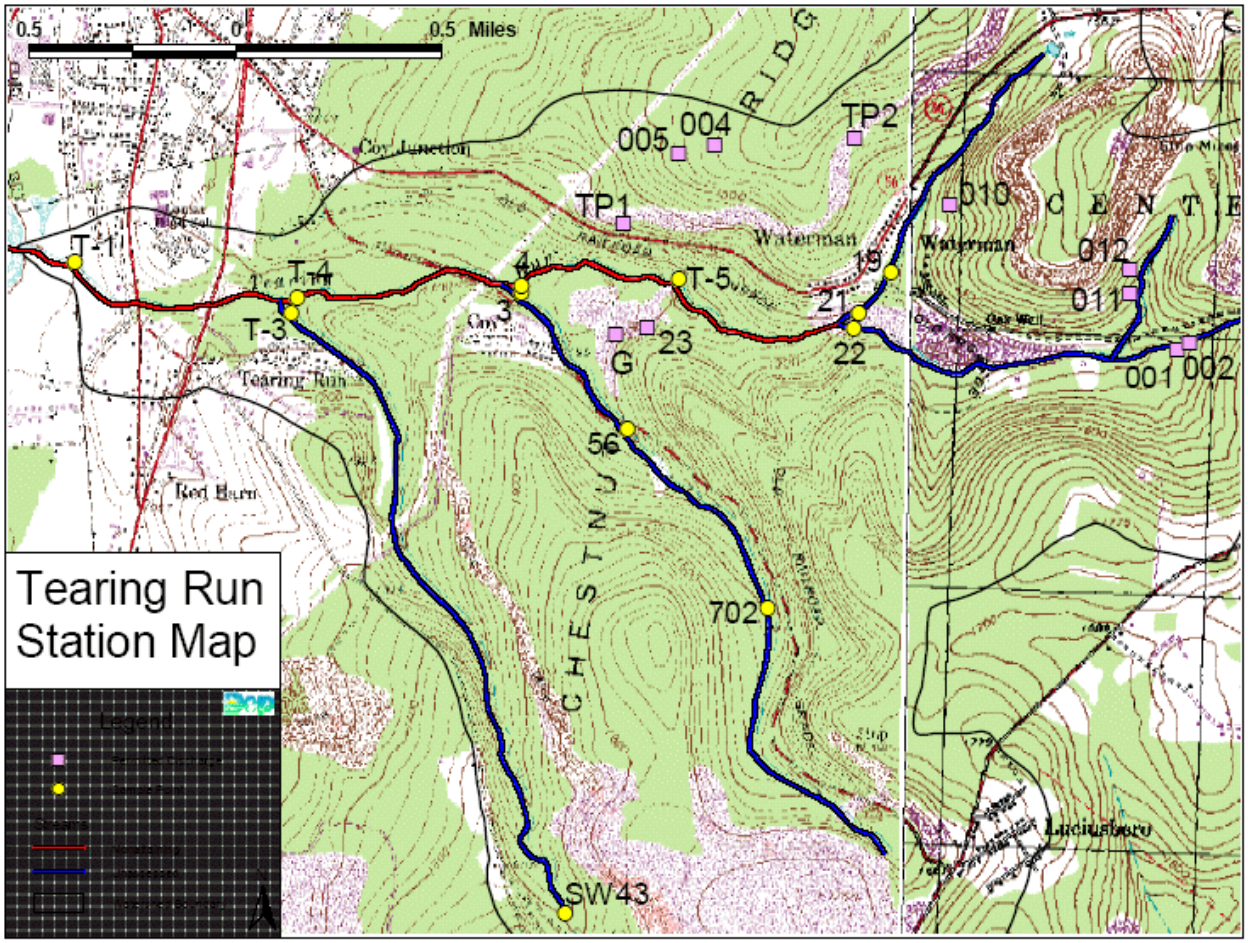
Public notice of the draft TMDL was published in the *Pennsylvania Bulletin* on March 25, 2006, and the *Indiana Gazette*, Indiana, PA, to foster public comment on the calculated allowable loads. The public comment period was open from March 16, 2006 through May 15, 2006. A public meeting was held on March 16, 2006 in the Robert Shaw Building Conference Room, Indiana University, Indiana, PA, to discuss the proposed TMDL. No comments were received.

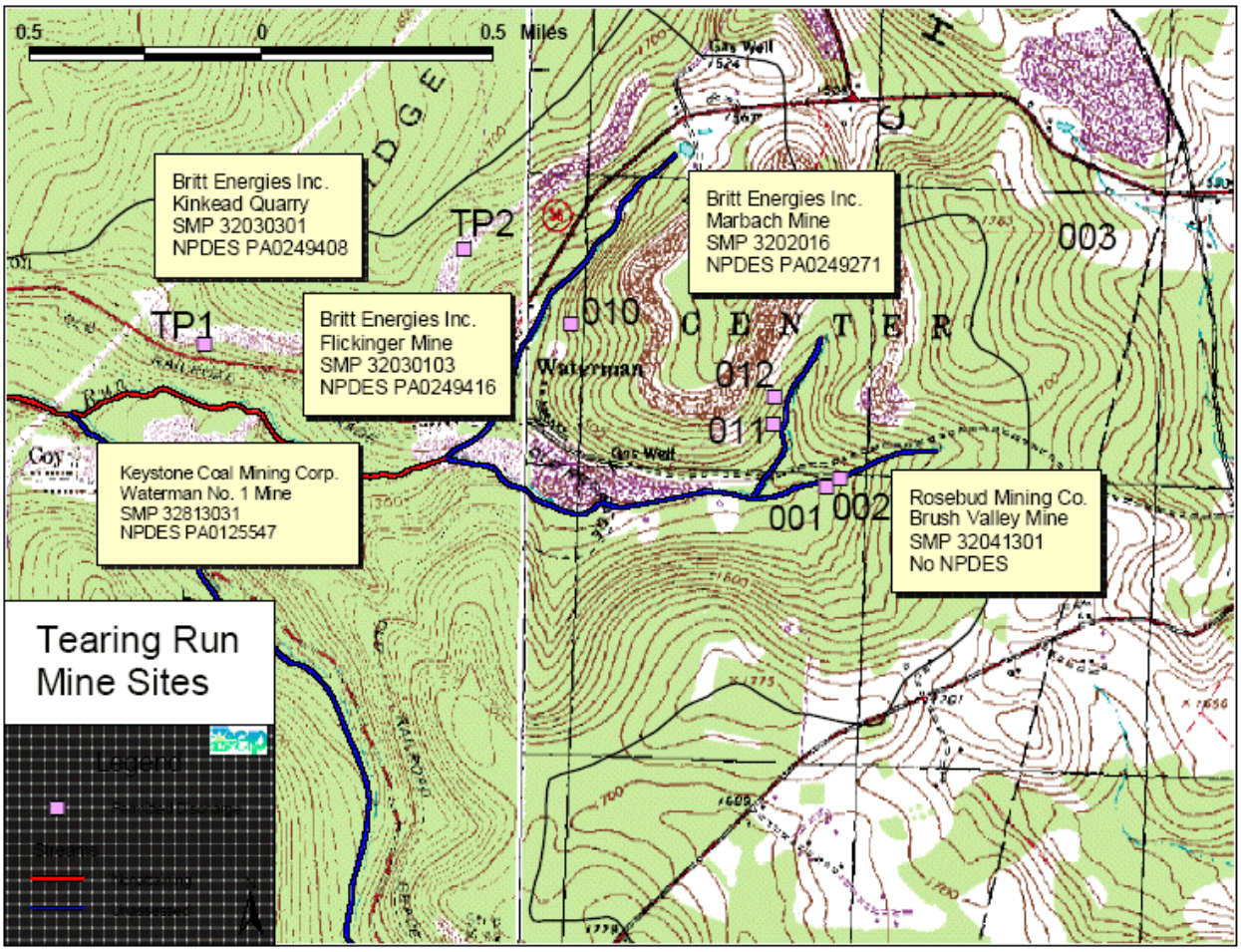
Although not specifically stated in the TMDL Report, PADEP routinely posts the approved TMDL Reports on their web site: www.dep.state.pa.us/watermanagement_apps/tmdl/.

Attachment A

Tearing Run Watershed Maps


T-1
T-4
T-3
T-5
4
2
22
56
702
4411A
4411B
SW43
INDIANA
COUNTY
Tearing Run Watershed
0.5
0
0.5
1 Miles


Tearing Run
Station Map
0.5
0
0.5 Miles
RIDG
CHESTNU
CENTE
Coy Junction
Waterman
Tearing Run
Red Barn
Luciusboro
TP1
TP2
005
004
010
012
011
001
002
T-1
T-3
T-4
T-5
3
4
19
21
22
23
G
56
702
SW43


0.5
0
0.5 Miles
Britt Energies Inc.
Kinkead Quarry
SMP 32030301
NPDES PA0249408
TP2
TP1
Britt Energies Inc.
Flickinger Mine
SMP 32030103
NPDES PA0249416
Britt Energies Inc.
Marbach Mine
SMP 3202016
NPDES PA0249271
003
010
C E N T E R
012
011
Waterman
Coy
Keystone Coal Mining Corp.
Waterman No. 1 Mine
SMP 32813031
NPDES PA0125547
001
002
Rosebud Mining Co.
Brush Valley Mine
SMP 32041301
No NPDES
Tearing Run
Mine Sites
Legend

Tearing Run Sampling Station Diagram
Arrows represent direction of flow
Diagram not to scale