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

Decision Rationale
Total Maximum Daily Load
Leatherwood Creek Watershed
For Acid Mine Drainage Affected Segments
Clarion County, Pennsylvania

Signed

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Water Protection Division

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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 *Leatherwood Creek Watershed TMDL, Clarion County, For Acid Mine Drainage Affected Segments* (TMDL Report), dated March 12, 2008, to the U.S. Environmental Protection Agency (EPA) for final review on March 13, 2008. This report includes the TMDLs for the three primary metals associated with acid mine drainage (AMD), i.e., iron, manganese, and aluminum, and addresses four segments 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 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, these TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met.

II. Summary

Table 1 presents the 1996, 1998, and 2002 Section 303(d) List, and the 2004, 2006 Integrated Report information for the impaired segments first listed in 1996.[1]

Table 1. 303(d) Listed Segments

State Water Plan (SWP) Subbasin: 17C Redbank Creek										
HUC: 05010006										
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	2.9	*	*	5305	48138	Leatherwood Creek	CWF	303 (d) List	Resource Extraction	Metals & Other Inorganics
1996	1.5	*	*	5306	48165	West Fork Leatherwood Creek	CWF	303 (d) List	Resource Extraction	Metals & Other Inorganics
1996	0.6	*	*	5308	48171	West Fork, Unt	CWF	303 (d) List	Resource Extraction	Metals
1996	0.7	*	*	5309	48172	West Fork, Unt	CWF	303 (d) List	Resource Extraction	Metals
1998	4.41	*	*	5305	48138	Leatherwood Creek	CWF	SWMP	AMD	Metals
1998	3.14	*	*	5306	48165	West Fork Leatherwood Creek	CWF	SWMP	AMD	Metals
1998	0.57	*	*	5308	48171	West Fork, Unt	CWF	SWMP	AMD	Metals
1998	0.71	*	*	5309	48172	West Fork, Unt	CWF	SWMP	AMD	Metals
2000	4.41	*	*	5305	48138	Leatherwood Creek	CWF	SWMP	AMD	Metals

[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.*

Year	Miles	Use Designation	Assessment ID	Segment ID	DEP Stream Code	Stream Name	Desig-nated Use	Data Source	Source	EPA 305(b) Cause Code
2000	3.14	*	*	5306	48165	West Fork Leatherwood Creek	CWF	SWMP	AMD	Metals & Other Inorganics
2000	1.25	*	*	5306	48169	West Fork, Unt	CWF	SWMP	AMD	Metals & Other Inorganics
2000	0.62	*	*	5308	48171	West Fork, Unt	CWF	SWMP	AMD	Metals
2000	0.74	*	*	5309	48172	West Fork, Unt	CWF	SWMP	AMD	Metals
2002		*	*	5305	**New survey removed AMD record**	Segment now attaining.				
2002	1.8	*	*	5306		West Fork Leatherwood Creek	CWF	SWMP	AMD	Metals & Other Inorganics
2002	0.6	*	*	5308		West Fork, Unt	CWF	SWMP	AMD	Metals
2002	0.7	*	*	5309		West Fork, Unt	CWF	SWMP	AMD	Metals
2004	4.4	*	*	5305	48138	Leatherwood Creek	CWF	SWMP	AMD	Metals & Other Inorganics
2004	3.1	*	*	5306	48165	West Fork Leatherwood Creek	CWF	SWMP	AMD	Metals & Other Inorganics
2004	0.6	*	*	5308	48171	West Fork, Unt	CWF	SWMP	AMD	Metals
2004	0.7	*	*	5309	48172	West Fork, Unt	CWF	SWMP	AMD	Metals
2004	1.8	*	*	20000810-1600-JJM	48154	Jack Run	CWF	SWMP	AMD	Metals
2004	0.4	*	*	20000810-1600-JJM	48157	Jack Run, Unt	CWF	SWMP	AMD	Metals
2004	0.6	*	*	20000810-1600-JJM	48159	Jack Run, Unt	CWF	SWMP	AMD	Metals

Year	Miles	Use Designation	Assessment ID	Segment ID	DEP Stream Code	Stream Name	Desig-nated Use	Data Source	Source	EPA 305(b) Cause Code
2004	0.1	*	*	20000810-1600-JJM	48161	Jack Run, Unt	CWF	SWMP	AMD	Metals
2004	0.7	*	*	20000810-1600-JJM	48162	Jack Run, Unt	CWF	SWMP	AMD	Metals
2006	4.42	Aquatic Life	7703	*	*	Leatherwood Creek	CWF	SWMP	AMD	Metals
2006	3.71	Aquatic Life	7704	*	*	West Fork Leatherwood Creek	CWF	SWMP	AMD	Metals
2006	0.62	Aquatic Life	7705	*	*	West Fork, Unt	CWF	SWMP	AMD	Metals
2006	0.73	Aquatic Life	7706	*	*	West Fork, Unt	CWF	SWMP	AMD	Metals
2006	2.53	Aquatic Life	1293	*	*	Jack Run	CWF	SWMP	AMD	Metals
2006	0.38	Aquatic Life	1293	*	48157	Jack Run, Unt	CWF	SWMP	AMD	Metals
2006	0.65	Aquatic Life	1293	*	48159	Jack Run, Unt	CWF	SWMP	AMD	Metals
2006	0.12	Aquatic Life	1293	*	48161	Jack Run, Unt	CWF	SWMP	AMD	Metals
2006	0.81	Aquatic Life	1293	*	48162	Jack Run, Unt	CWF	SWMP	AMD	Metals

*Data unavailable or lost due to the transition in 2006 to the Hydrologic Unit Code.
Cold Water Fisheries =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, Section 303(d) Lists and Integrated Report/List (2004, 2006)*. The use designations for the stream segments in this TMDL can be found in PA Title 25 Chapter 93.9(s). Section IV, Table 3, shows the TMDLs for the Leatherwood Creek 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 96.3(c). Table 3 of the TMDL Report lists the TMDLs for the Leatherwood Creek Watershed, addressing metals in the all the stream segments listed within the basin.

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 Leatherwood Creek Watershed is approximately 10.8 square miles in area and is located in Monroe and Porter Townships, Clarion County. The watershed can be located on the U.S. Geological Survey 7.5-minute quadrangles of New Bethlehem, Sligo and Templeton. Leatherwood Creek flows approximately 10.5 miles from its headwaters to its confluence with Redbank Creek just east of the town of St. Charles in Porter Township, Clarion County. Major tributaries to Leatherwood Creek include the West Branch Leatherwood Creek and Jacks Run. Leatherwood Creek and all of its tributaries are classified as Cold Water Fisheries (CWF) under Title 25 PA Code Chapter 93, Section 93.9(s).

The Leatherwood Creek Watershed is affected by pollution from AMD. This pollution has caused high levels of metals throughout the Leatherwood Creek Watershed. Table 1 gives an explanation of the AMD allocation points in the watershed.

There are currently five Surface Mining Permits (SMP) issued in the Leatherwood Creek Watershed. Two of these permits (Donald L. Shirey, SMP No. 16960805, and Reichard Contracting, Inc., SMP No. 16970801) are small non-coal mining operations. These operations are not issued National Pollutant Discharge Elimination System (NPDES) permits and, therefore, are not required to have AMD related WLAs assigned to them. Mining has been completed on one of the issued surface mining permits in the watershed (Original Fuels, Inc., SMP No. 16990104); it is in Stage II bond release. One of the surface mining permits that is issued in the Leatherwood Creek Watershed (Reichard Contracting, Inc., SMP No. 16040104) is actively mining coal; however, it is located downstream of all impaired segments addressed by the TMDL in the Leatherwood Creek Watershed, so no WLAs are necessary. EPA interprets the absence of a WLA as meaning the WLA is equal to zero. The remaining issued surface mining permit (Neiswonger Construction, Inc., SMP No. 16050111) is in the Leatherwood Creek

Watershed; however, treatment ponds from this permit discharge into Licking Creek outside of the watershed. EPA interprets the absence of a WLA as meaning the WLA is equal to zero.

This AMD TMDL document contains one or more future mining allocations. These future allocations were requested by the Knox District Mining Office (DMO) to accommodate one or more future mining operations. The DMO determined the number of and location of future mining allocations. This will allow speedier approval of future mining permits without the time consuming process of amending this TMDL document. All comments and questions concerning future mining WLAs in this TMDL are to be directed to the appropriate DMO. Future mining allocations are calculated using the method described for quantifying pollutant load in Attachment C of the TMDL Report.

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 *Leatherwood Creek 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 SMP 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.

Leatherwood Creek, West Fork Leatherwood Creek, UNT West Fork Leatherwood Creek (48171 and 48172), were on the 1996 Section 303(d) List of impaired waters and count toward the twelfth year (2009) TMDL milestone commitment under the requirements of the 1997 TMDL lawsuit settlement agreement. The twelfth year milestone is the development of TMDLs, or delisting, for all remaining waters listed as impaired by AMD impacts on Pennsylvania's 1996 Section 303(d) List of impaired waters.

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 dataset was log normally distributed. Using @RISK[2], 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% 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 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 loads were computed based on average 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 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 future WLAs were determined.

IV. Discussions of Regulatory Requirements

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

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. Leatherwood Creek and all the tributaries have been designated by Pennsylvania as a CWF with criteria to protect the aquatic life use, and the designation can be found at Pennsylvania Title 25 §93.9(s). 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 §96.3(c) 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 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 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 *Leatherwood Creek Watershed TMDL* Report, Attachment B). EPA finds this approach to addressing pH to be reasonable.

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 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 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.

Table 3. Summary of Leatherwood Creek Watershed Mining Permits

Company Name	SMP Number	Mine Name	Date Issued	Acreage	Coal Seam(s)	Status
Donald L. Shirey	16960805	Shirey	6/19/1997	4	Sandstone	Active
Reichard Contracting, Inc.	16970801	Perrotti	4/29/1997	3.9	Sandstone	Active
Original Fuels	16990104	Gourley	2/8/2000	208.5	MK, UK	Active - Stage II
Reichard Contracting, Inc.	16040104	Shaffer	6/28/2005	62.8	UK, LK, UF	Active
Neiswonger Constrcution, Inc.	1605111	Mohney	5/10/2006	86	UK, MK	Active

The mining activities do not have WLAs as described in Section III of the TMDL Report. They are in areas that are downstream of the impaired area or are discharging to another watershed.

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.

Table 4 presents a summary of the allowable loads, LAs, and WLAs for Leatherwood Creek Watershed. Included in the summary are the allocations for (9) future mining allocations.

Table 4. Summary Table – Leatherwood Creek Watershed

Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Reduction %
Station 8 -- Leatherwood Creek in the Headwaters						
Al	0.47	0.42	-	0.42	0.05	11%
Fe	0.52	0.52	-	0.52	-	-
Mn	3.79	1.34	-	1.34	0.99	65%
Acid	0.0	0.0	-	0.0	-	-
Station 7 -- Leatherwood Creek upstream of confluence with West Branch Leatherwood Creek						
Al	3.68	3.68	*0.56*	3.12	-	-
Fe	6.68	6.68	*2.25*	4.43	-	-
Mn	43.43	17.04	*1.50*	15.54	23.94	59%*
Acid	0.0	0.0	-	0.0	-	-
Station 6 -- Leatherwood Creek downstream of confluence with West Branch Leatherwood Creek						
Al	15.56	11.32	*1.68*	9.64	4.24	28%*
Fe	21.93	20.51	*6.75*	13.76	1.42	7%*
Mn	67.90	20.51	*4.50*	16.01	10.09	33%*
Acid	0.0	0.0	-	0.0	-	-
Station 5 -- West Branch Leatherwood Creek in the Headwaters						
Al	1.78	0.70	-	0.70	1.08	61%
Fe	2.45	1.93	-	1.93	0.52	21%
Mn	25.04	1.50	-	1.50	23.54	94%
Acid	0.0	0.0	-	0.0	-	-

Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Reduction %
Station 4 -- Unnamed Tributary to West Branch Leatherwood Creek						
Al	0.11	0.11	-	0.11	-	-
Fe	0.26	0.26	-	0.26	-	-
Mn	0.90	0.50	-	0.50	0.40	44%
Acid	-35.70	-35.70	-	-35.70	-	-
Station 3 -- Unnamed Tributary to West Branch Leatherwood Creek						
Al	0.14	0.14	-	0.14	-	-
Fe	0.20	0.20	-	0.20	-	-
Mn	6.88	0.83	-	0.83	6.05	88%
Acid	0.0	0.0	-	0.0	-	-
Station 2 -- West Branch Leatherwood Creek upstream of confluence with Leatherwood Creek						
Al	3.17	3.17	*0.56*	2.61	-	-
Fe	4.22	4.22	*2.25*	1.97	-	-
Mn	16.01	5.10	*1.50*	3.60	0	0%*
Acid	0.0	0.0	-	0.0	-	-
Station 10 -- Jack Run in the Headwaters						
Al	12.01	3.71	*0.56*	3.15	8.30	69%
Fe	5.39	5.39	*2.25*	3.14	-	-
Mn	68.89	6.89	*1.50*	5.39	62.00	90%
Acid	0.0	0.0	-	0.0	-	-
Station 9 -- Jack Run upstream of confluence with Leatherwood Creek						
Al	5.97	3.98	*0.56*	3.42	0	0%*
Fe	6.56	6.56	*2.25*	4.31	-	-
Mn	46.74	8.95	*1.50*	7.45	0	0%*
Acid	0.0	0.0	-	0.0	-	-
Station 1 -- Leatherwood Creek downstream of confluence with Jack Run						
Al	17.16	17.16	*1.12*	16.04	-	-
Fe	16.09	16.09	*4.50*	11.59	-	-
Mn	92.24	28.96	*3.00*	25.96	0	0%*
Acid	0.0	0.0	-	0.0	-	-

* Takes into account load reductions from upstream sources.
Numbers in italics are set aside for future mining operations.

PADEP allocated to nonpoint sources and point sources, as there are currently no 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 96.4(d)

[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.

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 beyond what is allocated to future growth, 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.

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.

Seasonal variation is implicitly accounted for in these TMDLs because the data used represent all seasons. The reductions specified in this TMDL apply at all flow conditions.

6. The TMDLs include a Margin of Safety.

PADEP used an implicit MOS in these TMDLs derived from the Monte Carlo statistical analysis. The Water Quality Standard states that water quality criteria must be met at least 99% of the time. All of the @Risk analyses results surpass the minimum 99% level of protection. Another MOS used for this TMDL analysis results from:

- Effluent variability plays a major role in determining the average value that will meet water quality criteria over the long-term. The value that provides this variability in our analysis is the standard deviation of the dataset. The simulation results are based on this variability and the existing stream conditions (an uncontrolled system). The general assumption can be made that a controlled system (one that is controlling and stabilizing the pollution load) would be less variable than an uncontrolled system. This implicitly builds in a MOS.

- An MOS is added when the calculations were performed with a daily iron average instead of the 30-day average.

7. The TMDLs have been subject to public participation.

Public notice of the draft TMDL was published in the *Pennsylvania Bulletin* on February 9, 2008, to foster public comment on the allowable loads calculated. A public meeting was held on February 26, 2008, beginning at 11:00 a.m., at the Knox DMO in Knox, 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/.

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 abandoned mine lands (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 Environmental Protection Agency's Section 319 Grant Program and Pennsylvania's Growing Greener Program (which has awarded almost thirty-seven million dollars since 1999 for watershed restoration and protection in mine drainage impacted watersheds and abandoned mine reclamation). In 2006 alone, Federal funding through the Office of Surface Mining contributed $949,000.00, for reclamation and mine drainage treatment through the Appalachian Clean Streams Initiative and another $298,000.00, through Watershed Cooperative Agreements. According to the Department of the Interior, Office of Surface Mining (www.osmre.gov/annualreports/05SMCRA2AbandMineLandReclam.pdf), during 2005, Pennsylvania reclaimed 54 acres of gob piles; 73 acres of pits; 2,500 acres of spoil areas; 7,658 feet of high-wall; and treated 94,465 gallons of mine drainage under their environmental Priority 3 Program only (Priorities 1 & 2 are for reclaiming features threatening public health and safety with a much larger number of features reclaimed).