UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
4/4/2007

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

Dear Ms. Myers:

The U.S. Environmental Protection Agency (EPA) is pleased to approve Total Maximum Daily Loads (TMDLs) for the *Dunkard Creek Watershed*, Greene County, submitted by the Pennsylvania Department of Environmental Protection (PADEP) dated March 9, 2007, and received by EPA for review and approval on March 19, 2007. 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 impairments of water quality as identified in Pennsylvania's 1996, 1998, and 2002 Section 303(d) lists of impaired waters still needing TMDLs for acid mine drainage metals. A rationale of our approval is enclosed.

As you know, any new or revised National Pollutant Discharge Elimination System permits with applicable effluent limits must be consistent with the TMDL's wasteload allocation pursuant to 40 CFR §122.44(d)(1)(VII)(B).

Any such permit should be submitted to EPA for review consistent with our letter dated October 1, 1998. If you have further questions, please call me or have your staff contact Ms. Mary F. Beck, at (215) 814-3429.

Sincerely,

Signed

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Fred Marrocco, DEP
Ken Bowman, SWRO
Joel Pontorero, Greensburg DMO

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

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

Signed

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Jon M. Capacasa, Director
Water Protection Division

Date: 4/4/2007

Decision Rationale
Total Maximum Daily Loads
Dunkard Creek Watershed
For Acid Mine Drainage Affected Segments

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) 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 water quality-limited waterbody without violating water quality standards.

The Pennsylvania Department of Environmental Protection (PADEP), Bureau of Watershed Conservation, submitted the *Dunkard Creek TMDL*, dated March 9, 2007 (TMDL Report), to the U.S. Environmental Protection Agency (EPA) for final Agency review on March 19, 2007. Dunkard Creek was originally identified on the 1996 Section 303(d) list for impairments due to metals and iron precipitate. The 2002 Section 303(d) list added suspended solids for Dunkard Creek. By addressing the metals and acidity impairment, these TMDLs will also address the iron precipitate impairment. Suspended solids will be addressed at a later date.

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, and 2002 Section 303(d) listing information for the water quality limited segments listed in 1996.

Table 1. Section 303(d) List of Impaired Waters in the Dunkard Creek Watershed

303(d) Sub-List								
State Water Plan (SWP) Subbasin: 19-G Dunkard Creek								
Year	**Miles**	**Segment ID**	**DEP Stream Code**	**Stream Name**	**Designated Use**	**Data Source**	**Source**	**EPA 305(b) Cause Code**
1996	8.5	NA	41420	Dunkard Creek	WWF	305(b) Report	RE	metals
1996	6.5	NA	41420	Dunkard Creek	WWF	305(b) Report	RE	other *
1998	8.5	NA	41420	Dunkard Creek	WWF	SWMP	AMD	metals
1998	6.5	NA	41420	Dunkard Creek	WWF	SWMP	AMD	other *
2002	3.6	98116-1330-ALF	41420	Dunkard Creek	WWF	SWMP	AMD	metals suspended solids
2004	3.6	98116-1330-ALF	41420	Dunkard Creek	WWF		AMD	metals suspended solids

* iron precipitate covering stream rocks
Resource Extraction = RE
Warm Water Fish = WWF
Surface Water Monitoring Program = SWMP
Abandoned Mine Drainage = AMD
See Attachment D, *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 93.

TMDLs were developed for the 1996 Section 303(d) listed Dunkard Creek. 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 96.3(c). Section IV, Table 4 shows the TMDLs for the Dunkard Creek Watershed.

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:

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

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. Conditions, available data, and the

understanding of the natural processes can change more than anticipated by the MOS. The option is always available to refine the TMDL for resubmittal to EPA for approval.

Pennsylvania's Surface Water Assessment Program (formerly the Unassessed Waters Protocol) is PADEP's method of conducting biological assessments of Pennsylvania's waters. PADEP's goal is a statewide assessment of surface waters in Pennsylvania. After completion of the initial assessments, the long-range goal is to reassess all waters on a five-year cycle. Therefore, while the TMDL should not be modified at the expense of achieving water quality standards expeditiously, the TMDL may be modified when warranted by additional data or other information.

III. Background

Dunkard Creek Watershed is located in the southeastern portion of Greene County and drains into the Monongahela River approximately 2.8 miles north of the Pennsylvania-West Virginia state line. Land uses include rural residential properties and small villages, minor industrial development, minor agricultural areas, forest, and abandoned and active mine lands.

The Dunkard Creek Watershed is affected by pollution from acid mine drainage (AMD) causing high levels of metals in the watershed. The watershed reflects the hydrologic impacts by past surface and deep mining operations over the past century. Large scale deep mining on the Pittsburgh and Sewickley coal seams occurred throughout the entire watershed. Smaller scale deep mines and surface mines are present in the overlying Pittsburgh rider coal, Waynesburg, and Waynesburg A coal seams. All of the deep mining operations within the watershed are now abandoned and flooding has occurred within the abandoned Pittsburgh and Sewickley deep mines. There are several discharges from abandoned deep and surface mines. Currently, there are numerous active mining operations in the watershed. The majority of these operations are reprocessing old coal banks left behind by previous underground and surface mining.

The TMDL Report identifies ten National Pollutant Discharge Elimination System (NPDES) permits for active mining operations within the Dunkard Creek Watershed. Table 4 of the TMDL Report shows the permitted discharges from eight mine operations with a total of fourteen outlets. Two active mine operations were not given WLAs because they are not permitted to discharge from the permit area. There are numerous active mining operations in the watershed; however, many do not have NPDES permits (no discharge) or are permitted under the NPDES program for erosion and sedimentation control ponds only. The TMDL Report, Attachment C, TMDLs by Segment, provides more information.

Dunkard Creek Watershed has eight permitted point source discharges which are assigned WLAs. All other discharges in the watershed are from abandoned mines and are treated as nonpoint sources. For purposes of these TMDLs only, point sources are identified as permitted discharge points and nonpoint sources are identified as other discharges from abandoned mine lands which can include tunnel discharges, seeps, and surface runoff. Abandoned and reclaimed mine lands are treated in the allocations as nonpoint sources because

there are no NPDES permits associated with these areas. As such, the discharges associated with these landuses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned and reclaimed mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges within these landuses. 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.

PADEP treats each segment defined by the sampling points as a separate TMDL while EPA, for purposes of the national tracking system, identifies TMDLs for each listed Section 303(d) listed segment. The TMDLs are expressed as long-term averages. See the *Dunkard Creek Watershed TMDL* Report, Attachment D, for 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, and public health and safety from the adverse effects of current surface coal mining operations, as well as promote the reclamation of mined areas left without adequate reclamation prior to August 3, 1977. SMCRA requires a 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.

These TMDLs were completed by PADEP to meet 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 percent 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 related impacts. Delisted waters may count for 20 percent of the requirement.

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. The Dunkard Creek Watershed TMDLs allocate loading to seven sampling sites along the mainstem of Dunkard Creek (DUNK01, DUNK02, DUNK03, DUNK04, DUNK05, DUNK06, and DUNK07), and four sampling sites on tributaries to Dunkard Creek including Dooley Run (DOOL01), Mundell Hollow (MUND01 and MUND02), and Rocky Hollow (ROCK01). The *Dooley Run Watershed TMDL* provided TMDL calculations for Dooley Run sampling site DOOL01. WLAs for the eight permitted discharges were included in TMDL for each of their respective downstream sampling sites that receive all the potential flow of treated water from each WLA.

A critical flow was not identified, and the reductions specified in this TMDL apply at all flow conditions. Regression and correlation analyses between flow and concentration almost always produce little or no correlation and disclose no critical condition.

TMDLs for each parameter were determined using a Monte Carlo simulation, @RISK,[1] with the measured, or existing, pollutant concentration data. For each source and pollutant, it was assumed that the observed data are lognormally distributed. Each pollutant was evaluated separately using @RISK.

Using the collected sample concentration parameters, mean and standard deviation, the simulation performs 5,000 iterations and predicts an existing long-term average concentration and this analysis shows whether or not the existing data is from a population where water quality standards are exceeded more than one percent of the time. A second simulation of 5,000 iterations is performed to calculate the percent reduction necessary to meet the criteria 99 percent of the time. Finally, using the calculated percent reductions, a final simulation is run to confirm that the target value for a long-term average concentration will result in meeting water quality criteria 99 percent of the time.

The existing and allowable long-term average loads were computed using the mean concentration from @RISK multiplied by the average flow. The TMDL Report points out that the loads are being computed based on average flow and should not be taken out of the context for which they are intended, which is to depict how the pollutants affect the watershed and where the sources and sinks are located spatially in the watershed.

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.

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

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, including: (1) designated uses, (2) criteria necessary to protect those uses, and (3) antidegradation provisions that prevent the degradation of water quality. All of Dunkard Creek has been designated by Pennsylvania for warm water fishes with criteria to protect the aquatic life uses. The designations for these stream segments can be found at Pennsylvania Title 25 §93.9. To protect the designated uses, as well as the existing uses, 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)	1.5 0.3	30-day Average Maximum	Total Recoverable Dissolved
Manganese (Mn)	1.0	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 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 TMDLs and LAs for each parameter results in a determination that any required percent pollutant reduction assures that the water quality criteria will be met instream at least 99 percent of the time. The Monte Carlo simulation used 5,000 iterations where each iteration was independent of all other iterations, and the observed data were assumed to be lognormally distributed for each source and pollutant.

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

The pH values shown in Table 2 were used as the TMDL 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; these values can get 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 *Dunkard Creek 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 is using the following 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 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 to but not identical with 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 does not always include upstream waters unimpacted by AMD. As PADEP does not list waters for inadequate alkalinity, TMDLs are not being developed for alkalinity but PADEP should monitor the waters for alkalinity and if, after these TMDLs are implemented, alkalinity is less than 20 mg/l or natural conditions, PADEP should list the waters for alkalinity and develop TMDLs.

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

There are currently eight active mine operations with permitted discharges for fourteen outlets that received WLAs. Two additional active mine operations were not given WLAs because they are not permitted to discharge from the permit area. WLAs for each permitted discharge are shown in Table 3. No required reductions of these permits are necessary at this time. All of the remaining discharges in the watershed are from abandoned mines and are treated as nonpoint sources. All necessary reductions are assigned to nonpoint sources.

Table 3. Wasteload Allocations for Permitted Dischargers

Parameter	Allowable Average Monthly	Average Flow	Allowable Load
AMD Reclamation Inc. Shannopin Mine Dewatering (NPDES PA0235474, Outlet 001) at DUNK07			
Al	2.0	5.202	86.769
Fe	3.0	5.202	130.154
Mn	2.0	5.202	86.769
Energy Resources Corp. Chocolate Drop Site (MDP 3274SM23, Outlet TP#4) at DUNK07			
Al	<4.0	0.029	<0.97
Fe	<7.0	0.029	<1.69
Mn	<4.0	0.029	<0.97
Cobra Mining, LLC, Dunkard Mine No. 2 (NPDES PA0214825, Outlet 002) at DUNK05			
Al	1.0	0.009648	0.081
Fe	1.5	0.009648	1.21
Mn	1.0	0.009648	0.081
Concorde Corp. Laurita Strip II (SMP 32B77SM3, Outlet 1M) at DUNK05			
Al	2.0	0.004896	0.082
Fe	3.0	0.004896	0.123
Mn	2.0	0.004896	0.082
Concorde Corp. Laurita Strip II (SMP 32B77SM3, Outlet 3M) at DUNK05			
Al	2.0	0.000922	0.015
Fe	3.0	0.000922	0.023
Mn	2.0	0.000922	0.015
Concorde Corp. Laurita Strip II (SMP 32B77SM3, Outlet 4M) at DUNK05			
Al	2.0	0.109872	1.833
Fe	3.0	0.109872	2.749
Mn	2.0	0.109872	1.833
Coresco, Inc., Gapen Surface Mine (NPDES PA0203017, Outlet 002) at DUNK05			
Al	2.0	0.044496	0.742
Fe	3.0	0.044496	1.113
Mn	2.0	0.044496	0.742
Coresco, Inc., Gapen Surface Mine (NPDES PA0203017, Outlet 004) at DUNK05			
Al	2.0	0.044496	0.742
Fe	3.0	0.044496	1.113
Mn	2.0	0.044496	0.742

Parameter	Allowable Average Monthly	Average Flow	Allowable Load
Coresco, Inc., Gapen Surface Mine (NPDES PA0203017, Outlet 005) at DUNK05			
Al	2.0	0.044496	0.742
Fe	3.0	0.044496	1.113
Mn	2.0	0.044496	0.742
Coresco, Inc., Gapen Surface Mine (NPDES PA0203017, Outlet 006) at DUNK05			
Al	2.0	0.044496	0.742
Fe	3.0	0.044496	1.113
Mn	2.0	0.044496	0.742
Coresco, Inc., Gapen Surface Mine (NPDES PA0203017, Outlet 007) at DUNK05			
Al	2.0	0.044496	0.742
Fe	3.0	0.044496	1.113
Mn	2.0	0.044496	0.742
Dana Mining Company of PA, Inc. 4-West Mine (NPDES PA0235610, Outlet 002) at DUNK05			
Al	1.0	2.0	16.68
Fe	1.5	2.0	25.02
Mn	1.0	2.0	16.68
Dana Mining Company of PA, Inc. Titus Mine (NPDES PA0215368, Outlet 001) at DUNK05			
Al	2.0	0.0504	0.841
Fe	3.5	0.0504	1.471
Mn	2.0	0.0504	0.841
Dana Mining Company of PA, Inc. Dooley Mine (NPDES PA0213861, Outlet 003) at DUNK07			
Al	2.0	0.0432	0.721
Fe	3.0	0.0432	1.081
Mn	2.0	0.0432	0.721

For purposes of these TMDLs only, point sources are identified as permitted discharge points and nonpoint sources are identified as other discharges from abandoned mine lands which can include, but are not limited to, tunnel discharges, seeps, and surface runoff. Abandoned and reclaimed mine lands were treated in the allocations as nonpoint sources because there are no NPDES permits associated with these areas. As such, the discharges associated with these landuses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned and reclaimed mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges within these landuses. 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.

Table 4 presents a summary of the allowable loads for the Dunkard Creek Watershed. In the instance that the allowable load is equal to the existing load, the simulation determined that water quality standards are being met instream 99% of the time and no TMDL is necessary for

the parameter at that point. Although no TMDL is necessary, the loading at the point is considered at the next downstream point. This is denoted as "NA" in Table 4.

Table 4. Dunkard Creek Watershed TMDLs

Station	Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lb/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	Percent Reduction * %
DOOL01	**Mouth of Dooley Run**						
	Al	0.23	0.23	0.00	NA	NA	NA
	Fe	0.75	0.75	0.00	NA	NA	NA
	Mn	0.27	0.27	0.00	NA	NA	NA
	Acidity	34.84	34.84	0.00	NA	NA	NA
	Alkalinity	671.30					
DUNK07	**Uppermost segment on Dunkard Creek upstream of Meadow Run**						
	Al	ND	NA	88.46	NA	NA	NA
	Fe	532.35	532.35	132.93	NA	NA	NA
	Mn	44.83	44.83	88.46	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	158,191.50					
DUNK06	**Dunkard Creek upstream of UNT 41439**						
	Al	ND	NA	0.00	NA	NA	NA
	Fe	459.92	459.92	0.00	NA	NA	NA
	Mn	64.04	64.04	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	169,703.20					
DUNK05	**Dunkard Creek near Taylortown**						
	Al	506.89	220.87	23.242	197.63	286.02	56
	Fe	858.83	858.83	35.072	NA	NA	NA
	Mn	170.44	170.44	23.242	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	125,769.90					
DUNK04	**USGS gage on Dunkard Creek near Newtown**						
	Al	656.60	278.06	0.00	278.06	92.52	25
	Fe	1,034.97	855.55	0.00	855.55	179.42	17
	Mn	244.83	244.83	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	113,735.80					
MUND02	**Uppermost sample site on Mundell Hollow**						
	Al	0.57	0.57	0.00	NA	NA	NA
	Fe	0.36	0.36	0.00	NA	NA	NA
	Mn	0.21	0.21	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	674.70					

Station	Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lb/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	Percent Reduction * %
MUND01	**Mouth of Mundell Hollow**						
	Al	1.18	0.88	0.00	0.88	0.30	25
	Fe	0.41	0.41	0.00	NA	NA	NA
	Mn	0.15	0.15	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	1,248.60					
DUNK03	**Dunkard Creek downstream of Mundell Hollow**						
	Al	690.75	470.08	0.00	470.08	0.00	0*
	Fe	853.28	853.28	0.00	NA	NA	NA
	Mn	336.35	336.35	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	109,143.30					
DUNK02	**Dunkard Creek near town of Dunkard**						
	Al	748.05	465.91	0.00	465.91	61.47	12
	Fe	5,764.52	854.00	0.00	854.00	4,910.52	85
	Mn	512.30	498.21	0.00	498.21	14.09	3
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	105,520.40					
DUNK01	**Most downstream segment of Dunkard Creek**						
	Al	729.22	498.19	0.00	498.19	0.00	0*
	Fe	3,632.47	977.28	0.00	977.28	0.00	0*
	Mn	431.63	431.63	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	107,293.00					
ROCK01	**Sampling site along Rocky Hollow**						
	Al	0.26	0.26	0.00	NA	NA	NA
	Fe	0.43	0.43	0.00	NA	NA	NA
	Mn	0.08	0.08	0.00	NA	NA	NA
	Acidity	ND	NA	0.00	NA	NA	NA
	Alkalinity	517.20					

LTA = Long Term Average
WLA = point source loads
LA = total nonpoint loads entering segment, including any upstream loads
*Reductions from upstream sources have been subtracted from the reductions necessary at these points; in some cases this results in the situation where no reductions are necessary.

PADEP allocated WLAs to fourteen outlets for eight permitted discharges shown in Table 3 above. Where there are active mining operations or post-mining discharge treatment in the watershed, Federal regulations require that subsequent to TMDL development and approval, point source permitted effluent limitations be water quality-based.[2] In addition, PA Title 25,

[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.

Chapter 96, Section 96.4(d) requires that WLAs shall 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.

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

Dunkard Creek is located in an area that was extensively mined. The TMDLs were developed using instream data which account for existing background conditions.

4. The TMDLs consider critical environmental conditions.

The reductions specified in this TMDL apply at all flow conditions. A critical flow condition was not identified from the data used for this analysis. The average flow for each sampling site was used to derive loading values for the TMDL.

5. The TMDLs consider seasonal environmental variations.

All sample sets included data points from various seasons which, together with the lack of correlations between flow and concentration, indicate that PADEP considered seasonal variations to the extent that data was available.

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 the treated instream concentration variability to be 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 percent of the time than if the variability of the treated discharge is reduced.

With respect to iron, PADEP identified an additional implicit MOS in the analysis and TMDL development by treating the iron water quality criterion as if the 1.50 mg/l were a maximum value instead of a thirty-day average value.

7. There is reasonable assurance that the proposed TMDLs can be met.

The *Recommendations* section highlights what can be done in the watershed to eliminate or treat pollutant sources. Aside from PADEP's primary efforts to improve water quality in the

Dunkard Creek Watershed through reclamation of abandoned mine lands and through the NPDES permit program, additional opportunities for reasonable assurance exist. PADEP expects 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 also help remedy abandoned mine drainage impacts. A Growing Greener Grant/319 Grant has been awarded to the local watershed group for passive treatment of an abandoned deep mine discharge located within the Dunkard Creek Watershed. 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.

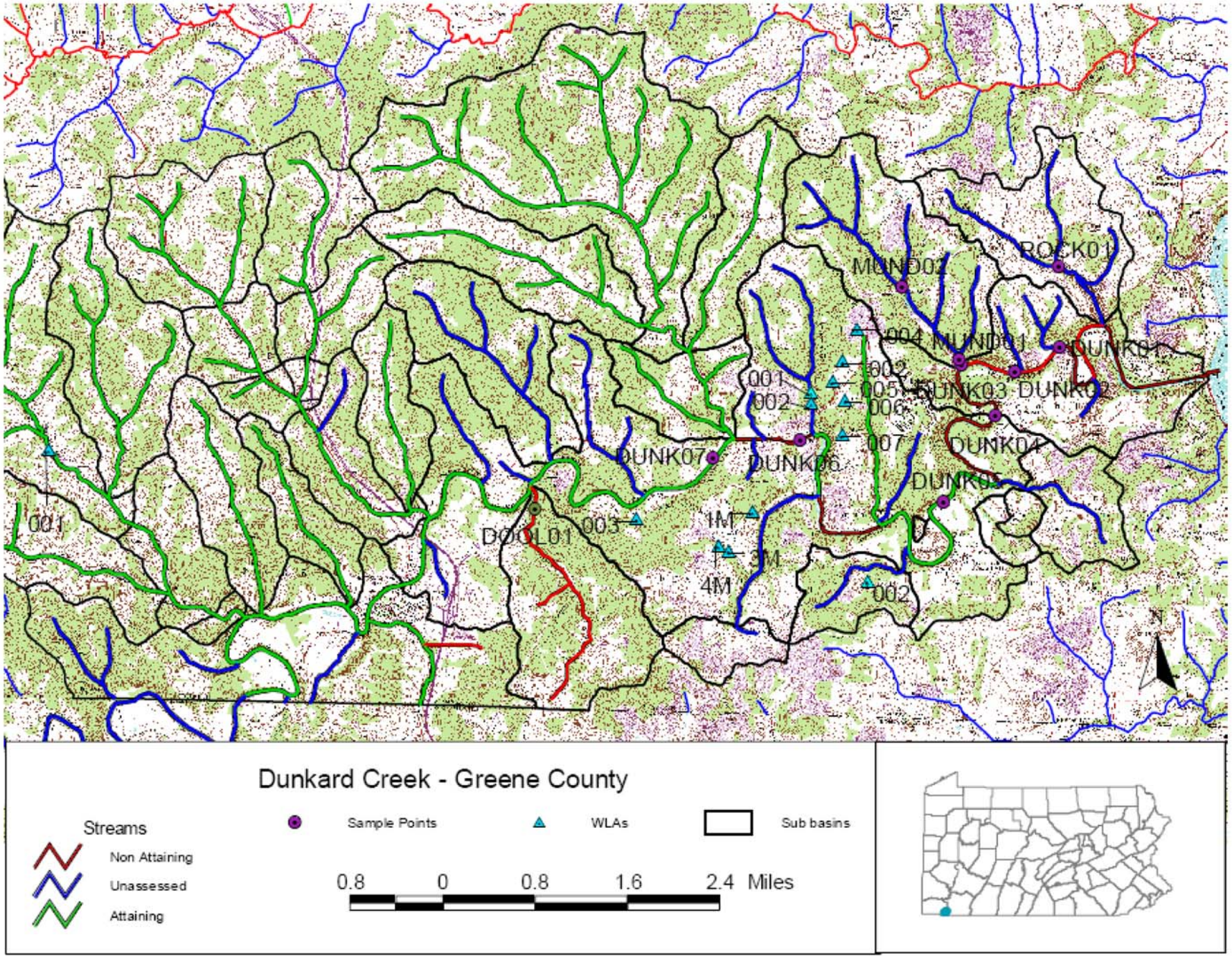
8. The TMDLs have been subject to public participation.

Public notice of the draft TMDL was published in the *Pennsylvania Bulletin* on January 20, 2007 and the *Greene County Messenger* on January 12, 2007 to foster public comment on the allowable loads calculated. A public meeting was held on January 30, 2007 at the Greensburg District Mining Office to discuss the proposed TMDL. The public comment period ended February 23, 2007. Pennsylvania did not receive any comments on these TMDLs.

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

Attachment A

Dunkard Creek Watershed Maps


Dunkard Creek - Greene County
Streams
Non Attaining
Unassessed
Attaining
Sample Points
WLAs
Sub basins
0.8 0 0.8 1.6 2.4 Miles
MUND02
ROCK01
004
MUND01
DUNK01
001
002
005
DUNK03
DUNK02
006
007
DUNK04
DUNK07
DUNK06
DUNK05
001
DOOL01
003
1M
3M
4M
002
N