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

Decision Rationale
Total Maximum Daily Loads
Acid Mine Drainage Affected Segments
Saltlick Run Watershed
Fayette 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 *Saltlick Run Watershed TMDL, Fayette County, for Acid Mine Drainage Affected Segments* (TMDL Report), dated April 16, 2008, to the U.S. Environmental Protection Agency (EPA) for final Agency review on May 1, 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 one segment, Unnamed Tributary 40212, 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) Listing; and the 2004 and 2006 Integrated Reports listing of information for the impaired segment first listed in 1996 (Pennsylvania's 1996, 1998, and 2002 Section 303(d) Lists, and the 2004 and 2006 Integrated Reports were approved by the 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 Research Group of Pennsylvania v. EPA*).

Table 1. 303(d) Listed Segments – State Water Plan Subbasin: 19C

HUC: 05020005										
Year	**Miles**	**Use Desig-nation**	**Assessment ID**	**Segment ID**	**DEP Stream Code**	**Stream Name**	**Desig-nated Use**	**Data Source**	**Source**	**EPA 305(b) Cause Code**
1996	0.2	*	*	4900	40212	Saltlick Run, Unt	WWF	305(b) Report	RE	Metals
1998	1.6	*	*	4900	40203	Saltlick Run	WWF	SWMP	AMD	Metals
2002	0.81	*	*	4900	40212	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2004	2.8	*	*	20020809-1100-GJK	40203	Saltlick Run	WWF	SWMP	AMD	Metals
2004	0.7	*	*	20020809-1100-GJK	40210	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2004	1.1	*	*	20020809-1100-GJK	40211	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2004	1.6	*	*	4900	40212	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2004	0.2	*	*	20020809-1100-GJK	40213	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2006	2.77	Aquatic Life	4374	*	40203	Saltlick Run	WWF	SWMP	AMD	Metals
2006	0.75	Aquatic Life	4374	*	40210	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2006	1.09	Aquatic Life	4374	*	40211	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2006	1.6	Aquatic Life	7615	*	40212	Saltlick Run, Unt	WWF	SWMP	AMD	Metals
2006	0.17	Aquatic Life	4374	*	40213	Saltlick Run, Unt	WWF	SWMP	AMD	Metals

Resource Extraction = RE
Warm Water Fish = WWF
Surface Water Monitoring Program = SWMP
Abandoned Mine Drainage = AMD
*Not applicable for listing years.

See Attachment D of the TMDL Report, *Excerpts Justifying Changes Between the 1996, 1998, 2002 Section 303(d) Lists and the 2004, 2006 Integrated Report*. The use designations for the stream segments in this TMDL can be found in PA Title 25 Chapter 93.9L, Section IV. Table 3 shows the TMDLs for the Saltlick 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 Saltlick Run Watershed, addressing metals in the stream segments listed as PADEP stream code, 40203.

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 Saltlick Run Watershed is found in Southwestern Pennsylvania in Menallen and Redstone Townships, Fayette County, just Northwest of Uniontown, PA. The watershed area is found entirely on the New Salem 7.5-Minute Quadrangle United States Geological Survey map. The watershed is small as it only comprises around 500 acres (0.78 square miles).

Saltlick Run is part of the Monongahela River Basin in Fayette County. Saltlick Run drains to Dunlap Creek at the town of Fairbank, PA. Dunlap Creek then flows north for about eight miles before emptying into the Monongahela River at Brownsville, PA. Saltlick Run trends east to west and has six tributaries that drain into it. Only two of the tributaries drain more than 25 acres. The general topography is comprised of alternating hills and valleys with local relief from around 950 to nearly 1,300 feet Mean Sea Level (msl). The watershed is a combination of forest and fields with residential homes located along the mainstem of Saltlick Run.

Saltlick Run is affected by pollution from AMD. This pollution has caused high levels of metals in the watershed. Currently, there are two known operations that have National Pollutant Discharge Elimination System (NPDES) discharge points in the Saltlick Run Watershed: (1) Mon River Energy (Permit ID 26042802); and (2) Fayette Coal and Coke (Permit ID 26052809). However, because they have only erosion and sedimentation control structures and lack mine drainage treatment facilities, no wasteload allocation will be necessary. The discharges that are contributing to the degradation of Saltlick Run's water quality are associated with either long abandoned deep or surface mines, and/or coal and coke mine dumps and are not being treated.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA, Public Law 95-87) and its subsequent revisions were enacted to establish a nationwide program to, among other things, protect the beneficial uses of land or water resources, protect public health and safety

from the adverse effects of current surface coal mining operations, and promote the reclamation of mined areas left without adequate reclamation prior to August 3, 1977. SMCRA requires a surface mining permit for the development of new, previously mined, or abandoned sites for the purpose of surface mining. Permittees are required to post a performance bond that will be sufficient to ensure the completion of reclamation requirements by the regulatory authority in the event that the applicant forfeits. Mines that ceased operating by the effective date of SMCRA (often called "pre-law" mines) are not subject to the requirements of SMCRA.

Saltlick Run was on the 1996 Section 303(d) List of impaired waters and counts 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

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

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 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. Saltlick Run has been designated by Pennsylvania as a warm water fishery with criteria to protect the aquatic life use, and the designation can be found at Pennsylvania Title 25 §93.9l. 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 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 *Saltlick Run Watershed TMDL* Report). 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 Best Available Technology (BAT) treatment pond effluent limits and were included in the mass balance along with the LAs.

Once PADEP determined the allowable concentration and load for each pollutant, a mass balance accounting was performed starting at the top of the watershed and working downstream in sequence. Load tracking through the watershed utilizes the change in measured loads from sample location to sample location as a guide for expected changes in the allowable loads.

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

between the points, and the ratio of the decrease shall be applied to the allowable load being tracked from the upstream point.

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

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

Table 3. Saltlick Run Watershed Summary Table

Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
SALT06 – Unnamed Tributary to Unnamed tributary to Saltlick Run at mouth						
Aluminum	0.020	0.008	-	0.008	0.012	61%
Iron	0.065	0.021	-	0.021	0.044	67%
Manganese	0.012	0.012	NA	NA	NA	NA
Acidity	-9.18	-9.18	NA	NA	NA	NA
SALT05 – Unnamed Tributary to Saltlick Run at mouth						
Aluminum	7.09	0.43	-	0.43	6.468	94%*
Iron	1.94	0.99	-	0.99	0.906	48%*
Manganese	5.46	0.27	-	0.27	5.190	96%*
Acidity	3.95	3.35	NA	3.35	0.60	16%*
SALT04 – Unnamed Tributary to Saltlick Run at mouth						
Aluminum	1.62	1.04	-	1.04	0.58	36%
Iron	1.93	1.43	-	1.43	0.50	26%
Manganese	0.93	0.93	NA	NA	NA	NA
Acidity	-893.06	-893.06	NA	NA	NA	NA
SALT03 – Unnamed Tributary to Saltlick Run at mouth						
Aluminum	0.30	0.19	-	0.19	0.11	39%
Iron	0.48	0.31	-	0.31	0.17	36%
Manganese	0.11	0.11	NA	NA	NA	NA
Acidity	-76.37	-76.37	NA	NA	NA	NA
SALT02 – Saltlick Run downstream of SALT03 Unnamed Tributary						
Aluminum	3.29	2.11	-	2.11	5.25	72%*
Iron	2.63	2.63	NA	NA	NA	NA
Manganese	1.80	1.80	NA	NA	NA	NA
Acidity	-1361.90	-1361.90	NA	NA	NA	NA

Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
SALT01 – Saltlick Run upstream of confluence with Dunlap Creek						
Aluminum	4.28	2.74	*0.28*	2.46	0.36	12%*
Iron	7.43	7.06	*1.13*	5.93	0.37	5%*
Manganese	4.71	4.71	*0.75*	3.96	NA	NA
Acidity	-1689.68	-1689.68	NA	NA	NA	NA
Acidity	-1689.68	-1689.68	NA	NA	NA	NA

NA = not applicable ND = not detected
*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. There are two active non-mining operations in the watershed with NPDES permits, they have only sediment and erosion control structures. The permits lack mine drainage treatment facilities, thus no wasteload allocations will be necessary. 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. The Saltlick Run TMDL has allowed for a future mining allocation on one segment with two pit operations. 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.

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

6. The TMDLs include a Margin of Safety.

The CWA and Federal regulations require TMDLs to include a MOS to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be

met implicitly by using conservative model assumptions to develop the allocations. Alternatively, 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. The TMDLs have been subject to public participation.

Public notice of the draft TMDL was published in the *Pennsylvania Bulletin* and the *Herald Standard* on January 22, 2008, to foster public comment on the allowable loads calculated. The public comment period on this TMDL was open from January 19, 2008 to March 19, 2008. A public meeting was held on February 5, 2008, at the Greensburg District Mining Office to discuss the proposed TMDL.

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

V. Discussion of Reasonable Assurance

Aside from PADEP's primary efforts to improve water quality in the Saltlick 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 Section §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.

Currently, there is no watershed organization interested in the Saltlick Run Watershed. It is recommended that agencies work with local interests to form a watershed group that will be dedicated to the remediation and preservation of these watersheds through public education, monitoring and assessment, and improvement.