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

Mr. Scott Mandirola, Acting Director
Division of Water and Waste Management
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, West Virginia 25304-2345

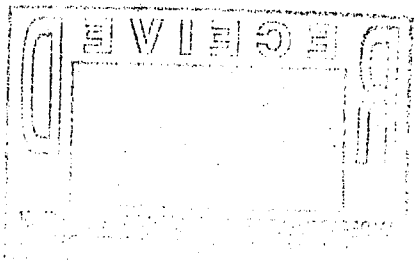
SEP 24 2009

Dear Mr. Mandirolla:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve the Total Maximum Daily Loads (TMDLs) for chloride, iron, aluminum, manganese, pH, fecal coliform bacteria and/or biological impairments on seventy-five (75) waterbodies in the Upper Ohio South River Watershed. The TMDL report, *Total Maximum Daily Loads for Selected Streams in the Upper Ohio South River Watershed, West Virginia*, was submitted by West Virginia on July 29, 2009. EPA commends West Virginia on completion of these TMDLs, developed under the Watershed Management Framework of the West Virginia TMDL program. We recognize the significant effort and dedication of you and your staff in developing these TMDLs.

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

As you know, any new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL's wasteload allocations pursuant to 40 CFR 122.44(d)(1)(vii)(B). Please submit all such permits to EPA for review as per EPA's letters dated October 1, 1998, and July 7, 2009.



If you have any questions concerning these TMDLs, please contact Mr. Kuo-Liang Lai, at 215-814-5473, or Ms. Helene Drago at 215-814-5796.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosures

cc: Mr. Patrick Campbell, WVDEP
Mr. David Montali, WVDEP

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SUBJECT: Approval of Total Maximum Daily Loads (TMDLs) for Selected Streams in the Upper Ohio South River Watershed, West Virginia.

FROM: Helene Drago, TMDL Program Manager
Office of Standards, Assessment and TMDLs (3WP30)

TO: Jon M. Capacasa, Director
Water Protection Division (3WP00)

THRU: Larry Merrill, Acting Associate Director
Office of Standards, Assessment and TMDLs (3WP30)

1. The West Virginia Department of Environmental Protection (WVDEP) has developed Total Maximum Daily Loads (TMDLs) to improve water quality in 75 impaired waterbodies within the Upper Ohio South River Watershed. These waterbodies were listed on West Virginia's 2008 Section 303(d) List of impaired waters for chloride, iron, aluminum, manganese, pH, fecal coliform bacteria and/or biological impairments. A report titled *Total Maximum Daily Loads for Selected Streams in the Upper Ohio South River Watershed, West Virginia,* presents the results of development of 102 TMDLs addressing 120 impairments. EPA has been working with West Virginia since February 2009 to review and approve these TMDLs.

2. Watershed Description -- The Upper Ohio South River Watershed drainage area encompasses nearly 863 square miles with a population of about 96,000. The Upper Ohio South River Watershed is dominated by forest land use, with some barren, grassland, pasture and urban/residential land uses.

3. Contribution to Consent Decree Requirements -- These TMDLs were developed by West Virginia and approved by EPA to fulfill requirements of a 1997 TMDL lawsuit settlement agreement. The 1997 Consent Decree requires either West Virginia or EPA to develop TMDLs for acid mine drainage (AMD) impaired waters (including Wells Run, Long Run, Waddles Run, Pogue Run, Britt Run, and Hollidays Hollow in the Upper Ohio South River watershed) scheduled for completion by September 30, 2009.

4. Stressor Identification for Biologically Impaired Streams -- West Virginia utilized a stressor identification process to determine that ionic stress, organic enrichment, metals and pH toxicity, and sedimentation are the causative stressors for biologically impaired streams addressed in this TMDL report.

5. Affected Parties -- There are six mining-related NPDES permits in this watershed. There are 15 non-mining NPDES permits affected by this TMDL. There are 20 active construction sites operating under West Virginia's Construction Stormwater General Permit. There are three permitted outlets discharging to chloride-impaired streams; all

are high-volume pumped discharges. In the absence of chloride point sources, those existing nonpoint sources have not caused water quality criteria exceedances. Fecal coliform bacteria TMDLs were developed in 66 streams. There are four municipal separate storm sewer systems (MS4s) with 67 CSO discharge outlets. One SSO has been identified that required 100% reduction.

6. Public interest or reaction expected -- A 30-day public comment period was held from March 2, 2009 to April 3, 2009. West Virginia did receive comments from the Appalachian Center for the Economy & the Environment, the West Virginia Rivers Coalition, and EPA Region 3; WVDEP has responded to the comments. The streams biologically impaired by ionic stressors pose several TMDL development challenges at this time. The most concentrated ions observed in WV water quality monitoring data are chlorides and sulfates, and those pollutants are the suspected contributors to the biological impairments. As EPA Region 3 recommended, WVDEP developed chloride TMDLs based on the existing numeric chloride water quality criteria to positively reduce the ionic impact of chloride on the stream biota. However, it is uncertain that the attainment of the chloride water quality criterion alone would resolve the biological impairments; therefore, the biological impairments will remain on the West Virginia Section 303(d) List until such time that the biological impairment TMDLs are developed by WV and approved by EPA.

7. Currently, there is only one active watershed association, the Little Grave Creek Watershed Association, for the Upper Ohio South River Watershed.

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Decision Rationale
Total Maximum Daily Load
For Selected Streams in the Upper Ohio South River Watershed, West Virginia

Jon M. Capacasa, Director
Water Protection Division

Date: _____

Decision Rationale
Total Maximum Daily Loads
For Selected Streams in the Upper Ohio South River Watershed
West Virginia

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) to be developed for those waterbodies identified as impaired by a State where technology based and other controls did not provide for attainment of Water Quality Standards (WQSs). A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a Margin of Safety (MOS), which may be discharged to a water quality limited waterbody.

This document will set forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for chloride, iron, aluminum, manganese, pH, fecal coliform bacteria, and/or biological impairments on selected waterbodies in the Upper Ohio South River watershed. The TMDLs were developed to address impairment of water quality as identified in West Virginia's 2008 Section 303(d) Lists of impaired waters. EPA's rationale is based on the determination that the TMDLs meet the following seven regulatory conditions 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 nonpoint sources can be reasonably met.

From this point forward, all references in this approval rationale are found in West Virginia's TMDL Report *Total Maximum Daily Loads for Selected Streams in the Upper Ohio South River Watershed, West Virginia* (TMDL Report dated July 2009), unless otherwise noted.

II. Summary

Table 1, of the TMDL Report, presents the waterbodies and impairments for which TMDLs have been developed for the Upper Ohio South River watershed by the West Virginia Department of Environmental Protection (WVDEP). The 75 waterbodies were identified on West Virginia's 2008 Section 303(d) List. TMDLs were developed for total iron, dissolved aluminum, manganese, chloride, pH, fecal coliform bacteria and/or biological impairments.

Table 1. Waterbodies and Impairments for TMDLs Developed for the Upper Ohio South River Watershed

Stream Name	NHD Code	Trout	pH	Fe	Al	Mn	Cl	FC	BIO
Grave Creek	WV-OUS-10			X				X	X
North Fork/Grave Creek	WV-OUS-10-AC			X				X	X
Middle Grave Creek	WV-OUS-10-C			X				X	X
North Fork/Middle Grave Creek	WV-OUS-10-C-11							X	
Whitney Run	WV-OUS-10-C-18			X				X	X
UNT/Whitney Run RM 0.3	WV-OUS-10-C-18-A			X				X	
McLain Run	WV-OUS-10-C-2			X					
Toms Run	WV-OUS-10-C-3			X				X	
Leach Run	WV-OUS-10-C-3-B			X					
Little Toms Run	WV-OUS-10-C-4							X	
Meetinghouse Hollow	WV-OUS-10-C-6			X					
Bartletts Run	WV-OUS-10-C-7							X	
Wells Run	WV-OUS-10-C-9							X	
UNT/Grave Creek RM 2.41	WV-OUS-10-D							X	
Lick Run	WV-OUS-10-Q							X	
French Run	WV-OUS-10-R							X	
Burch Run	WV-OUS-10-W							X	
Molleys Hollow	WV-OUS-11-G							X	
Jim Run	WV-OUS-12							X	X
Boggs Run	WV-OUS-15			X				X	
Browns Run	WV-OUS-15-A			X				X	
UNT/Boggs Run RM 2.69	WV-OUS-15-C						X		
Caldwell Run	WV-OUS-16			X				X	X
George Run	WV-OUS-16-A							X	
Wheeling Creek	WV-OUS-17							X	
UNT/Wheeling Creek RM 25.77	WV-OUS-17-AF						X	X	
UNT/Wheeling Creek RM 26.23	WV-OUS-17-AG							X	
UNT/Wheeling Creek RM 26.55	WV-OUS-17-AH							X	
Enlow Fork	WV-OUS-17-AL							X	
Long Run	WV-OUS-17-B			X				X	X
Waddles Run	WV-OUS-17-B-3			X				X	X
UNT/Waddles Run RM 1.72	WV-OUS-17-B-3-A			X					
Pogue Run	WV-OUS-17-B-8			X				X	X
Little Wheeling Creek	WV-OUS-17-H			X				X	
Peters Run	WV-OUS-17-H-1			X				X	X
Battle Run	WV-OUS-17-H-10			X				X	
McGraw Run	WV-OUS-17-H-12							X	
UNT/Little Wheeling Creek RM 8.97	WV-OUS-17-H-19							X	
Middle Wheeling Creek	WV-OUS-17-H-2			X				X	
UNT/Middle Wheeling Creek RM 3.05	WV-OUS-17-H-2-E							X	

Stream Name	NHD Code	Trout	pH	Fe	Al	Mn	Cl	FC	BIO
Tanyard Run	WV-OUS-17-H-2-F							X	
Laidley Run	WV-OUS-17-H-2-N							X	
Todd Run	WV-OUS-17-H-2-Q			X				X	X
McCoy Run	WV-OUS-17-H-5			X				X	
Point Run	WV-OUS-17-H-7			X				X	X
Roneys Point Run	WV-OUS-17-H-8			X				X	X
Britt Run	WV-OUS-17-M							X	
Grandstaff Run	WV-OUS-17-P							X	
Wherry Run	WV-OUS-17-P-6							X	
Hollidays Run	WV-OUS-17-T							X	
Burch Run	WV-OUS-17-W							X	
Big Run	WV-OUS-17-W-1							X	
UNT/Big Run RM 0.26	WV-OUS-17-W-1-A							X	
Stull Run	WV-OUS-17-Z							X	
Glenns Run	WV-OUS-18		X	X	X	X			X
Graeb Hollow	WV-OUS-18-A			X					
UNT/Glenns Run RM 1.25	WV-OUS-18-B			X					
Short Creek	WV-OUS-21							X	
Girty Run	WV-OUS-21-A							X	
North Fork/Short Creek	WV-OUS-21-F						X	X	
UNT/North Fork RM 1.32/Short Creek	WV-OUS-21-F-3							X	X
Huff Run	WV-OUS-21-F-4						X	X	
UNT/North Fork RM 2.55/Short Creek	WV-OUS-21-F-7							X	
UNT/North Fork RM 2.77/Short Creek	WV-OUS-21-F-8							X	
Weidman Run	WV-OUS-21-F-9							X	X
UNT/Ohio River MP 79.4	WV-OUS-22							X	
Pierce Run	WV-OUS-24-D			X				X	X
UNT/Pierce Run RM 2.67	WV-OUS-24-D-6							X	
UNT/Buffalo Creek RM 5.18	WV-OUS-24-F			X					
Mingo Run	WV-OUS-24-H							X	
Castleman Run	WV-OUS-24-O							X	X
Rices Run	WV-OUS-24-O-13							X	
Longs Run	WV-OUS-24-O-3							X	
Fish Run	WV-OUS-6							X	
UNT/Fish Run RM 0.79	WV-OUS-6-B							X	

Note:
RM is River Mile; MP is Mile Point; UNT = Unnamed Tributary; FC indicates fecal coliform bacteria impairment; BIO indicates a biological impairment.

These TMDLs were developed by West Virginia and approved by EPA to fulfill requirements of a 1997 TMDL lawsuit settlement agreement. The 1997 Consent Decree requires either West Virginia or EPA to develop TMDLs for acid mine drainage (AMD) impaired waters by September 30, 2009. There are six AMD waters, namely, Wells Run (WVO-83-A-15), Long Run (WVO-88-B), Waddles Run (WVO-88-B-1), Pogue Run (WVO-88-B-2), Britt Run (WVO-88-E.9), and Hollidays Hollow (called Hollidays Run in the TMDL report, WVO-88-H.5), in the Upper Ohio South River watershed as the Consent Decree waters. Appendix A of this Decision Rationale is the cross-reference table for the NHD code and Section 303(d) List code.

There are no trout waters in this TMDL as the Middle Wheeling Creek is not designated as Category B-2 (Trout waters) based on the most recent WQS posted on WVDEP's website.

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 explicitly or implicitly. 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 TMDLs for resubmittal to EPA for approval.

A TMDL formula presents the sum of individual wasteload allocations, plus the sum of load allocations, plus a margin of safety. Allocation spreadsheets also provide applicable TMDL WLAs to individual point sources, and LAs to categories of nonpoint sources. A Technical Report provides descriptions of the detailed technical approaches used throughout the TMDL development process. West Virginia developed an interactive ArcExplorer Geographic Information System (GIS) project that shows the spatial relationships between source assessment data for streams in the Upper Ohio South River watershed.

Biological integrity/impairment is based on a rating of the stream's benthic macroinvertebrate community using the multimetric West Virginia Stream Condition Index (WVSCI). Biological impairments were addressed by developing TMDLs for specific stressors. West Virginia utilized a stressor identification process to determine that ionic stress, organic enrichment, metals and pH toxicity, and/or sedimentation were the causative stressors for biologically impaired streams addressed in this TMDL study.

Where the stressor identification process identified organic enrichment as the cause of biological impairment, data also indicated violations of the fecal coliform water quality criteria. The predominant sources of both organic enrichment and fecal coliform bacteria in the watershed are inadequately treated sewage and runoff from pasture land use. WVDEP determined that implementation of fecal coliform TMDLs would remove untreated sewage and reduce agricultural runoff thereby reducing the organic and nutrient loading causing the biological impairment in these streams. Therefore, fecal coliform TMDLs will serve as a surrogate where organic enrichment was identified as a stressor. Likewise, where metals and/or pH toxicity were identified as the cause of biological impairment, data also indicated violations of metals and/or pH water quality criteria, and the metals and pH TMDLs will thus serve as a surrogate for the biological impairment.

To address the sedimentation biological stressor, WVDEP initially pursued the development of sediment TMDLs for these streams using a reference watershed approach. However, all of the sediment impaired streams are also impaired pursuant to total iron water quality criteria, and TMDL assessment of iron included representation and allocation of iron loadings associated with sediment. In each stream, the sediment loading reduction necessary for attainment of the water quality criteria for iron exceeds that which was determined necessary using the reference watershed approach for sediment. Therefore, the iron TMDLs are acceptable

surrogates for biological impairments from sedimentation. Implementation of the iron TMDLs will address the biological impairment caused by sedimentation.

While it is often more efficient to develop TMDLs to address all impairments to a waterbody at the same time, there is no requirement that TMDLs for all stressors be developed simultaneously. West Virginia has provided an explanation as to why it chose not to develop a TMDL for ionic stress at this time.

There are nine stream segments (Boggs Run, UNT/Boggs Run RM 2.69, Brown Run, Graeb Hollow, Short Creek, Girty Run, North Fork/Short Creek, Huff Run, and UNT/Ohio River MP 79.4) that identify "ionic stress" as a significant stressor for biological impairment. Because these waters were not listed on the West Virginia 1996 Section 303(d) List, these waters are not considered Consent Decree waters; and therefore are not required to have ionic stress TMDLs established by September 30, 2009. EPA guidance provides eight to thirteen years from the initial listing date as a reasonable timeframe for States to develop TMDLs. WVDEP first listed the streams as biologically impaired in 2002. EPA plans to work closely with WVDEP to develop strategic monitoring plans to ensure those waters identified in this TMDL as impaired by "ionic stress" will have TMDLs developed consistent with EPA's pace guidance for States. WVDEP has identified four streams which are not meeting the chloride water quality criteria. For streams that are impaired by chloride, WVDEP developed chloride TMDLs based on the existing numeric chloride water quality criteria to reduce the ionic impact of chloride on the stream biota. While the chloride TMDL will provide some reductions to address the ionic stress impairment, it is uncertain that the attainment of the chloride water quality criterion alone would resolve the biological impairments. Therefore, the biological impairments will remain on the West Virginia Section 303(d) List until such time as all TMDLs appropriate to address the biological impairment are developed by West Virginia and approved by EPA. EPA recommends that stressors identified through the stressor identification process conducted as part of these TMDLs be identified on the Section 303(d) list. EPA will continue to work with WVDEP as they develop TMDLs that fully address the biological impairments identified in Boggs Run, UNT/Boggs Run RM 2.69, Brown Run, Graeb Hollow, Short Creek, Girty Run, North Fork/Short Creek, Huff Run, and UNT/Ohio River MP 79.4.

III. Background

The Upper Ohio South River watershed is located in West Virginia, and lies within Brooke, Ohio, Marshall, and Wetzel Counties in West Virginia; and Washington and Greene Counties in Pennsylvania (Figure 3-1). In West Virginia, the watershed drainage area encompasses nearly 863 square miles. The Upper Ohio South River watershed is comprised of the Wheeling Creek, Grave Creek and Buffalo Creek as well as some of their tributaries listed in Table 1. The total population living in the watershed is estimated to be about 96,000 people. The Upper Ohio South River watershed is dominated by forest land use (65.3 %), with some grassland (12.6 %), cropland (2.5%), pasture (4.4 %), urban/residential (9.0 %), mining (0.8 %), and Abandoned Mine Land (AML) land uses (0.2 %). Individually, other identified land uses compose less than five percent of the total watershed area.

West Virginia conducted extensive water quality monitoring from July 2005 through

June 2006 in the Upper Ohio South River watershed. The results of this effort were used to confirm the listing of waterbodies not meeting applicable water quality criteria and to identify impaired waterbodies that were not previously listed. Table 1 presents the 75 waters for which TMDLs are developed. The TMDLs were developed for iron, aluminum, manganese, chloride, pH, fecal coliform bacteria and/or biological impairments, including 102 TMDLs (waterbody/pollutant combinations).

WVDEP utilized the Watershed Management Framework cycle approach for TMDL development. The framework divides the State into 32 major watersheds and operates on a five-year, five-step process. The watersheds are divided into five hydrologic groups (A - E). Each group is assessed once every five years and waters are placed on the Section 303(d) List of impaired waters, as necessary. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the National Pollutant Discharge Elimination System (NPDES) permitting process and efforts toward limiting nonpoint source loading. Throughout the TMDL development process, there are numerous opportunities for public participation and input. The Upper Ohio South River watershed is in hydrologic group E. Further information on West Virginia's TMDL development process is provided in Section 2.1 of the TMDL report.

Computational Procedures

Sections 5, 6, 7, 8, and 9 of the TMDL Report discuss metals, pH, Chloride, fecal coliform bacteria and sediment source assessment while Section 4 describes biological impairments and stressor identification (SI) methods. Sources for metals and sediment in the Upper Ohio South River watershed include mining, non-mining, forestry, oil and gas, roads, agriculture, streambank erosion, other land disturbance activities. The pH impairments in the Upper Ohio South River watershed have been attributed to mining activities. There are six mining related NPDES permits, with 22 associated outlets in the metals impaired watersheds of the Upper Ohio South watershed. Some permits include multiple outlets with discharges to more than one TMDL watershed. A complete list of the permits and outlets is provided in Appendix G of the Technical Report. There are 15 non-mining NPDES permitted facilities within the TMDL watersheds addressed in this report. There are 20 active construction sites operating under West Virginia's Construction Stormwater General Permit. Fecal coliform bacteria sources are point sources, including individual sources covered under the NPDES program such as: wastewater treatment plants and general sewage permits; and unpermitted sources, including onsite treatment systems, stormwater runoff, agriculture, and natural background (wildlife).

Runoff from residential and urbanized areas during precipitation events can be a significant sediment source. EPA's stormwater permitting regulations require public entities to obtain NPDES permit coverage for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in specified urbanized areas. As such, their stormwater discharges are considered as point sources and are prescribed WLAs.

The Upper Ohio South River watershed has regulated outlets by one publicly owned treatment work (POTW), 30 sewage treatment "package plants," 27 home aeration units (HAUs), and four MS4s. Designated MS4 entities given WLAs for fecal coliform bacteria include: (1) The City of Wheeling; (2) the West Virginia Department of Transportation, Division of Highways; (3) the City of Bethlehem; and (4) The City of Moundsville. Approximately 67 combined sewer overflow (CSO) outlets are associated with the POTWs operated by Wheeling, Bethlehem, Moundsville, Cameron, McMechen and Benwood. One sanitary sewer overflow (SSO) that required 100 percent reduction has been identified in the watershed. Stressor identification indicated that biological impairments were caused by ionic stress, organic enrichment, metals and pH toxicity, and sedimentation. The Technical Report has expanded details of the pollutant source assessment discussed in Sections 5 and 6.

Permitted discharges associated with mining activities are the most prevalent point sources in regard to the chloride impairments in the watershed. In addition to point sources, nonpoint sources include road de-icing, commercial and industrial de-icing, and fertilizer application, with the primary source being road salt and salt substitutes applied to a dense network of roads and highways in the watershed.

Section 8.0 describes the modeling processes employed during TMDL development with further details provided in the Technical Report. The Mining Data Analysis System (MDAS) was used to represent the source response linkage in the Upper Ohio South River watershed TMDL study area for iron, aluminum, sediment and fecal coliform. MDAS is a comprehensive data management and modeling system that is capable of representing loads from nonpoint and point sources in the watershed and simulating instream processes. MDAS is used to simulate watershed hydrology and pollution transport, as well as stream hydraulics and instream water quality. It is capable of simulating different flow regimes and pollutant loading variations. A customized Microsoft Excel spreadsheet tool was used to determine the fecal loading from failing septic systems identified during source tracking efforts by WVDEP. West Virginia's numeric and water quality criteria and an explicit MOS were used to identify the TMDL endpoints.

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA's policy and guidance. EPA's rationale for establishing these TMDLs is set forth according to the regulatory requirements listed below.

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

The applicable numeric water quality criteria is shown in Table 2-1 of the TMDL report. The applicable designated uses for all the waters subject to this report include: propagation and maintenance of aquatic life in warmwater fisheries and trout-waters, water contact recreation, and public water supply. All of the streams addressed by this TMDL Report are designated as warmwater fisheries.

All West Virginia waters are subject to the narrative criteria in Section 3 of the Standards. That section, titled *Conditions Not Allowed in State Waters*, contains various provisions relative to water quality. The narrative water quality criterion at 46 CSR §1-3.2.i prohibits the presence

of wastes in State waters that cause or contribute to significant adverse impacts on the chemical, physical, hydrologic, and biological components of aquatic ecosystems. This provision is the basis for the "biological impairment" determinations. Biological impairment signifies a stressed aquatic community. WVDEP determines the biological integrity of each stream based on a rating of the stream's benthic macroinvertebrate community using the multimetric WVSCI.

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

A TMDL is the total amount of a pollutant that can be assimilated by the receiving water while still achieving water quality standards. TMDLs can be expressed in terms of mass per time or by other appropriate measures. TMDLs are comprised of the sum of individual WLAs for point sources, LAs for nonpoint sources, and natural background levels. In addition, the TMDL must include an MOS, either implicitly or explicitly, that accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving stream. Conceptually, this definition is denoted by the following equation:

TMDL = Summation of WLAs + Summation of LAs + MOS

For purposes of these TMDLs only, WLAs are given to NPDES permitted discharge points and LAs are given to discharges from activities that do not have an associated NPDES permit, such as bond forfeiture sites, Abandoned Mine Lands (AMLs), failing septic systems, and straight pipes. The decision to assign LAs to these sources does not reflect any determination by WVDEP or EPA as to whether there are, in fact, unpermitted point source discharges. In addition, by establishing these TMDLs with failing septic systems and straight pipes treated as LAs, WVDEP and EPA are not determining that these discharges are exempt from NPDES permitting requirements.

Section 11 of the TMDL Report presents applicable TMDLs for iron, aluminum, manganese, pH, Chloride, and fecal coliform bacteria. Allocation spreadsheets also provide applicable TMDL WLAs to individual point sources and LAs to categories of unpermitted sources. The Metals Allocation Spreadsheet presents detailed iron, manganese, and aluminum TMDLs, LAs, and WLAs. The Chloride Allocation Spreadsheet presents detailed chloride TMDLs, LAs, and WLAs. The Fecal Coliform Bacteria Allocation Spreadsheet presents detailed fecal coliform TMDLs, LAs, and WLAs. The TMDLs are presented as average annual loads in pounds per year, or counts per year, because they were developed to meet TMDL endpoints under a range of conditions observed throughout the year. The TMDLs are also presented as equivalent average daily loads in pounds per day or counts per day.

Sources for metals, sediment and pH in the Upper Ohio South River watershed are: point sources, including mining, non-mining, and construction stormwater permits; and unpermitted sources of mine drainage from AMLs and bond forfeiture sites; as well as sediment sources including forestry, oil and gas, roads, agriculture, streambank erosion, and other land disturbance activities. There are six mining-related NPDES permits, with 22 associated outlets in the metals impaired watersheds of the Upper Ohio South watershed. Some permits include multiple outlets with discharges to more than one TMDL watershed. A complete list of the permits and outlets is

provided in Appendix G of the Technical Report. There are 15 non-mining NPDES permitted facilities in the watershed that have effluent limits for metals and pH. There are 20 active construction stormwater permits. There are four MS4 permits in the watershed. A complete list of the permits and outlets is provided in the appendices of the Technical Report. The discharges from construction activities that disturb more than one acre of land are legally defined as point sources. Though the sediment introduced from such discharges can contribute metals, they are generally considered to be negligible because of their minimal discharge flows. For these TMDLs, these minor discharges are assumed to operate under their current permit limits and were given WLAs based on their current permit limits. LAs for metals were assigned to AMLs, and sediment sources including forestry, oil and gas, roads, agriculture, and other land disturbance areas. The assignment of LAs to AML or bond forfeiture sites does not reflect any determination by EPA or WVDEP as to whether there are, in fact, unpermitted point source discharges within these landuses. Likewise, by establishing these TMDLs with AML discharges treated as LAs, EPA and WVDEP are not determining that these discharges are exempt from NPDES permitting requirements. There are no trout waters in this watershed.

Fecal coliform bacteria sources are point sources, including individual sources covered under the NPDES program such as wastewater treatment plants and general sewage permits; and unpermitted sources, including onsite treatment systems, precipitation runoff, agriculture, and natural background (wildlife). Fecal coliform bacteria TMDLs were developed in 66 streams and will affect permits including one POTW, one privately owned sewage treatment plant, and one General Sewage. One particular SSO, 67 CSOs, and four MS4 areas have been identified in the watershed. The TMDLs allowed fecal coliform NPDES permits to remain at 200 counts/100 ml (monthly geometric mean), and 400 counts/100 ml (daily maximum). LAs were assigned to pasture/cropland, onsite sewer systems including failing septic systems and straight pipes, residential land uses including urban/residential runoff, and background and other nonpoint sources including wildlife sources from forested land and grasslands in non-MS4 areas. Fecal coliform reductions will require elimination of illicit discharges, straight pipes, and leaking septic systems, which would substantially reduce organic and nutrient loadings.

WVDEP has identified four streams which are not meeting the chloride water quality criteria. For streams that are impaired by chloride, WVDEP developed chloride TMDLs based on the existing numeric chloride water quality criteria to reduce the ionic impact of chloride on the stream biota. Permitted discharges associated with mining activities are the most prevalent point sources in regard to the chloride impairments in the watershed. In addition to point sources, nonpoint sources include road de-icing, commercial and industrial de-icing, and fertilizer application, with the primary source being road salt and salt substitutes applied to dense network of roads and highways in the watershed. Chloride loadings from nonpoint sources are background sources in the watershed. Their representation was based upon precipitation and chloride water quality monitoring at various locations in the watershed not influenced by chloride point sources. In the absence of chloride point sources, those existing nonpoint sources have not caused water quality criteria exceedances.

The TMDL development methodologies prescribe allocations that achieve water quality criteria throughout the watershed. Various provisions attempt equity between categories of sources and the targeting of pollutant reductions from the most problematic sources.

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

The TMDL considers the impact of background pollutant contributions by considering loadings from background sources like wildlife. MDAS also considers background pollutant contributions by modeling all land uses.

4. The TMDLs consider critical environmental conditions.

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

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards. Critical conditions for waters impacted by land based sources generally occur during periods of wet weather and high surface runoff. In contrast, critical conditions for non-land-based point source dominated systems generally occur during low flow and low dilution conditions.

High and low flow stream conditions, and all point and nonpoint source loads were included in the development of these TMDLs, by using a long period of weather data that represented wet, dry, and average flow periods. Accordingly, the TMDL considers critical conditions.

5. The TMDLs consider seasonal environmental variations.

Seasonal variations were considered while considering critical conditions, by running the daily simulation model for six years, from 1998 to 2003 for MDAS. Continuous simulation (modeling over a period of several years that captures precipitation extremes) inherently considers seasonal hydrologic and source loading variability.

6. The TMDLs include a Margin of Safety.

The CWA and Federal regulations require TMDLs to include an 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.

An explicit MOS of five percent was included to counter uncertainty in the modeling process (Section 9.6.1). West Virginia did not include a discussion regarding an implicit MOS, but did use conservative model assumptions (such as assuming all point sources continually discharge at permit limits) to develop the allocations. An explicit MOS was not included for chloride because little modeling uncertainty exists. Nonattainment is directly related to point

sources regulated by WV NPDES permits and water quality criteria will be met if the problematic point sources achieve prescribed criteria end-of-pipe watershed allocations.

7. The TMDL has been subject to public participation.

Section 12.0 describes the public participation process which included two informational meetings prior to allocation of pollutant loads and another public meeting to present the draft TMDLs. The draft TMDLs were advertised in various local newspapers and subject to a 30-day public comment period. The 30-day public comment period was from March 2, 2009 to April 3, 2009, and the public meeting to present the draft TMDLs was held March 11, 2009, in West Virginia. West Virginia did receive comments from the Appalachian Center for the Economy & the Environment, the West Virginia Rivers Coalition, and EPA Region III. WVDEP has responded appropriately to the comments.

IV. Discussion of Reasonable Assurance

EPA requires that there be a reasonable assurance that a TMDL can be implemented.

There are a few primary programs in effect which provide reasonable assurance that the TMDLs will be implemented. Section 14.1 discusses NPDES permit reissuance by WVDEP's Division of Water and Waste Management and Division of Mining and Reclamation. NPDES permitting has been synchronized with TMDL development through West Virginia's Watershed Management Framework.

Section 13.2 describes Watershed Management Framework and Watershed Management Network program for reducing the LAs for Fecal Coliform. In addition, reductions from inadequate onsite sewage systems may be accomplished through the creation or extension of centralized sewage treatment systems. Section 13.3 discusses project funding and the administrative process, and provides a link to pending WV projects.

NPS controls to achieve Bacteria and sediment LAs can be implemented through a number of existing programs such as Section 319 of the CWA, commonly referred to as the Nonpoint Source Program.

West Virginia Bureau of Commerce's Division of Forestry registers logging sites on forest industry sites in the West Virginia portion of the watershed. In 1992, the West Virginia Legislature passed the Logging Sediment Control Act. The act requires the use of best management practices to reduce sediment loads to nearby waterbody.

Section 14.2 discusses the Watershed Management Framework process and the West Virginia Watershed Network. The Watershed Management Framework includes a management schedule for integration and implementation of TMDLs and identifies a six-step process for developing integrated management strategies and action plans for achieving West Virginia's water quality goals. Step 3 includes development of TMDLs or other source management strategies. Steps 5 and 6 provide for the preparation, finalization and implementation of a watershed-based plan to improve water quality. In addition, the West Virginia Watershed

Network is an informal association of state and federal agencies, and nonprofit organizations and coordinates watershed-based plans. The Network evaluates restoration potential of watersheds within specific hydrologic groups, including a review of TMDLs and development of watershed-based plans.

Section 14.4 discusses AML projects. As mentioned in the TMDL report, the Office of Abandoned Mine Lands and Reclamation (AML&R) manages the reclamation of lands and waters affected by mining prior to the passage of the Surface Mining Control and Reclamation Act (SMCRA) in 1977. Funding for reclamation activities is derived from fees placed on coal mined which is placed in a fund and annually distributed to state and tribal agencies. Various abandoned mine land reclamation activities are addressed by the program as necessary. In December 2006, Congress passed legislation amending SMCRA and the Title IV program, and in November 2008, the Office of Surface Mining finalized rules to implement the amendments. After an initial ramp-up period, AML&R will realize significant increases in its annual reclamation funding and the flexibility to direct a larger portion of those funds to address water resource impacts from abandoned mine drainage. Title IV now contains a "30 percent abandoned mine drainage set-aside" provision that allows a state to use up to 30 percent of its annual grant to address abandoned mine drainage problems. In regard to water resource impacts, project prioritization will consider treatment practicability and sustainability and will be accomplished under a methodology that provides for the efficient application of funds to maximize restoration of fisheries across AML impacted areas of the State.

Failing septic systems and straight pipes are significant nonpoint sources of fecal coliform bacteria. Hooking up the failing septic systems and straight pipes to public sewer lines will address these nonpoint sources of bacteria to the watershed. Within WVDEP DWWM, the Engineering and Permitting Branch's Engineering Section is charged with the responsibility of evaluating sewer projects and providing funding, where available, for those projects. Many public sewer projects are funded through the State Revolving Fund (SRF) program and are subject to a detailed engineering review of the engineering report, design report, construction plans, specifications, and bidding documents.

Section 15.0 discusses monitoring activities including NPDES compliance, nonpoint source project monitoring, and TMDL effectiveness monitoring.

As mentioned in the TMDL report, permitted discharges associated with mining activities are the most prevalent point sources in regard to the chloride impairments in the watershed. In addition to point sources, nonpoint sources include road de-icing, commercial and industrial de-icing, and fertilizer application, with the primary source being road salt and salt substitutes applied to dense network of roads and highways in the watershed. Chloride loadings from nonpoint sources are background sources in the watershed. Their representation was based upon precipitation and chloride water quality monitoring at various locations in the watershed not influenced by chloride point sources. In the absence of chloride point sources, those existing nonpoint sources were determined not to cause water quality criteria exceedances. All the permitted chloride discharges are water quality based, and the allowable chloride levels were set to protect aquatic life based on current applicable water quality criteria.

The State will use existing programs and authorities to comply with the LA provisions of the TMDL. Nonpoint sources will initially be addressed through the implementation of the existing TMDLs for fecal coliform, chloride, and metals throughout the Upper Ohio South watershed. Reductions in sediment from construction sites, roads, and development areas will also be of benefit for reducing the pollutants of concern. This will be supplemented by additional monitoring and assessment activities to identify hot spots that may require additional remedial activities.

Appendix A. Cross-Reference Table for NHD Code and Section 303(d) List Code

WV_NHDCode	STREAM NAME	§303(d)LIST
WV-OUS-10	Grave Creek	WVO-83
WV-OUS-10-AC	North Fork/Grave Creek	WVO-83-E
WV-OUS-10-C	Middle Grave Creek	WVO-83-A
WV-OUS-10-C-11	North Fork/Middle Grave Creek	WVO-83-A-1.6
WV-OUS-10-C-18	Whitney Run	WVO-83-A-2
WV-OUS-10-C-18-A	UNT/Whitney Run RM 0.3	WVO-83-A-2-A
WV-OUS-10-C-2	McLain Run	WVO-83-A-0.5
WV-OUS-10-C-3	Toms Run	WVO-83-A-1
WV-OUS-10-C-3-B	Leach Run	WVO-83-A-1-A
WV-OUS-10-C-4	Little Toms Run	WVO-83-A-1.1
WV-OUS-10-C-6	Meetinghouse Hollow	WVO-83-A-1.2
WV-OUS-10-C-7	Bartletts Run	WVO-83-A-1.3
WV-OUS-10-C-9	Wells Run	WVO-83-A-1.5
WV-OUS-10-D	UNT/Grave Creek RM 2.41	WVO-83-A.1
WV-OUS-10-Q	Lick Run	WVO-83-B.7
WV-OUS-10-R	French Run	WVO-83-B.8
WV-OUS-10-W	Burch Run	WVO-83-C
WV-OUS-11-G	Molleys Hollow	WVO-84-A
WV-OUS-12	Jim Run	WVO-85
WV-OUS-15	Boggs Run	WVO-86
WV-OUS-15-A	Browns Run	WVO-86-A
WV-OUS-15-C	UNT/Boggs Run RM 2.69	WVO-86-C
WV-OUS-16	Caldwell Run	WVO-87
WV-OUS-16-A	George Run	WVO-87-A
WV-OUS-17	Wheeling Creek	WVO-88
WV-OUS-17-AF	UNT/Wheeling Creek RM 25.77	WVO-88-M.3
WV-OUS-17-AG	UNT/Wheeling Creek RM 26.23	WVO-88-M.35
WV-OUS-17-AH	UNT/Wheeling Creek RM 26.55	WVO-88-M.4
WV-OUS-17-AL	Enlow Fork	WVO-88-O
WV-OUS-17-B	Long Run	WVO-88-B
WV-OUS-17-B-3	Waddles Run	WVO-88-B-1
WV-OUS-17-B-3-A	UNT/Waddles Run RM 1.72	
WV-OUS-17-B-8	Pogue Run	WVO-88-B-2
WV-OUS-17-H	Little Wheeling Creek	WVO-88-D
WV-OUS-17-H-1	Peters Run	WVO-88-D-1
WV-OUS-17-H-10	Battle Run	WVO-88-D-8
WV-OUS-17-H-12	McGraw Run	WVO-88-D-9
WV-OUS-17-H-19	UNT/Little Wheeling Creek RM 8.97	WVO-88-D-15
PA-OUS-17-H-2	Middle Wheeling Creek	WVO-88-D-2
WV-OUS-17-H-2-E	UNT/Middle Wheeling Creek RM 3.05	WVO-88-D-2-0.4A
WV-OUS-17-H-2-F	Tanyard Run	WVO-88-D-2-0.5A
PA-OUS-17-H-2-N	Laidley Run	WVO-88-D-2-D
WV-OUS-17-H-2-Q	Todd Run	WVO-88-D-2-F
WV-OUS-17-H-5	McCoy Run	WVO-88-D-3

WV_NHDCode	STREAM NAME	§303(d)LIST
WV-OUS-17-H-7	Point Run	WVO-88-D-5
WV-OUS-17-H-8	Roneys Point Run	WVO-88-D-6
WV-OUS-17-M	Britt Run	WVO-88-E.9
WV-OUS-17-P	Grandstaff Run	WVO-88-H
WV-OUS-17-P-6	Wherry Run	WVO-88-H-2
WV-OUS-17-T	Hollidays Run	WVO-88-H.5
WV-OUS-17-W	Burch Run	WVO-88-I
WV-OUS-17-W-1	Big Run	WVO-88-I-1
WV-OUS-17-W-1-A	UNT/Big Run RM 0.26	WVO-88-I-1-A
WV-OUS-17-Z	Stull Run	WVO-88-K
WV-OUS-18	Glenns Run	WVO-89
WV-OUS-18-A	Graeb Hollow	WVO-89-A
WV-OUS-18-B	UNT/Glenns Run RM 1.25	WVO-89-B
WV-OUS-21	Short Creek	WVO-90
WV-OUS-21-A	Girty Run	WVO-90-A
WV-OUS-21-F	North Fork/Short Creek	WVO-90-D
WV-OUS-21-F-3	UNT/North Fork RM 1.32/Short Creek	WVO-90-D-0.8
WV-OUS-21-F-4	Huff Run	WVO-90-D-1
WV-OUS-21-F-7	UNT/North Fork RM 2.55/Short Creek	WVO-90-D-1.6
WV-OUS-21-F-8	UNT/North Fork RM 2.77/Short Creek	WVO-90-D-1.8
WV-OUS-21-F-9	Weidman Run	WVO-90-D-2
WV-OUS-22	UNT/Ohio River MP 79.4	WVO-91
WV-OUS-24-D	Pierce Run	WVO-92-D
WV-OUS-24-D-6	UNT/Pierce Run RM 2.67	WVO-92-D-6
WV-OUS-24-F	UNT/Buffalo Creek RM 5.18	WVO-92-E.1
WV-OUS-24-H	Mingo Run	WVO-92-G
PA-OUS-24-O	Castleman Run	WVO-92-L
WV-OUS-24-O-13	Rices Run	WVO-92-L-4
WV-OUS-24-O-3	Longs Run	WVO-92-L-1
WV-OUS-6	Fish Run	WVO-81
WV-OUS-6-B	UNT/Fish Run RM 0.79	WVO-81-B