UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
9/30/2009

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

Dear Mr. Mandirola:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve the West Virginia Department of Environmental Protection (WVDEP) report *Total Maximum Daily Loads for Selected Streams in the Dunkard Creek Watershed, West Virginia*. The draft TMDLs were subject to a public comment period from March 2, 2009 to April 3, 2009. The final TMDLs were submitted to EPA on September 11, 2009.

In accordance with Federal regulations at 40 C.F.R. §130.7, a TMDL must comply with the following requirements: (1) be designed to attain and maintain 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. Based on the information provided by WVDEP, the TMDLs for Selected Streams in the Dunkard Creek 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 is enclosed.

On September 9, 2009, prior to submission of the final TMDLs, EPA personnel investigated reports of a fish kill in Dunkard Creek. EPA personnel are continuing to work with representatives of the U.S. Fish and Wildlife Service, the WVDEP, the West Virginia Department of Natural Resources, the Pennsylvania Fishing and Boating Commission, and other appropriate agencies to investigate and respond to this fish kill. The investigation is not complete. EPA anticipates that information developed as a result of the investigation may necessitate development of new TMDLs and/or other actions, such as enforcement. EPA intends to coordinate closely with WVDEP to evaluate new information generated by the investigation into this fish kill and to devise an appropriate and timely response.

While the investigation into the fish kill remains ongoing, EPA believes it is appropriate to approve these TMDLs. The TMDL analysis may provide information useful to the investigators. While additional action may prove necessary, implementation of the load allocations and wasteload allocations set forth in these TMDLs will provide a greater level of protection to address water quality in Dunkard Creek than currently exists.

As you are aware, any new or revised National Pollutant Discharge Elimination System permits must be consistent with the assumptions and requirements of applicable TMDL wasteload allocations pursuant to 40 CFR §122.44(d)(1)(vii)(B). Please submit all such permits to EPA for review pursuant to our letters dated October 1, 1998, and July 7, 2009.

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

Sincerely,

/S/

Jon M. Capacasa, Director
Water Protection Division

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

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Decision Rationale
Total Maximum Daily Loads for
Selected Streams in the Dunkard Creek Watershed
West Virginia

/S/

Jon M. Capacasa, Director
Water Protection Division

Date: 9/30/2009

Decision Rationale
Total Maximum Daily Loads
For Selected Streams in the Dunkard Creek 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. 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. TMDLs are intended to address known or predictable inputs of pollutants. TMDLs generally do not address impairments that arise because of a one-time event, such as a spill.

This document will set forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for chloride, iron, fecal coliform bacteria and/or biological impairments on selected waterbodies in the Dunkard Creek 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 information provided by WVDEP and a determination, based on that information, 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 (NPS) 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 Dunkard Creek 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 Dunkard Creek watershed by the West Virginia Department of Environmental Protection (WVDEP). The 45 waterbodies were identified on West Virginia's 2008 Section 303(d) List. TMDLs were developed for total iron, dissolved

chloride, fecal coliform bacteria and/or biological impairments.

Table 1. Waterbodies and Impairments for TMDLs Developed for the Dunkard Creek Watershed

Subwatershed	Stream Name	NHD_Code	Fe	Cl	FC	BIO
Dunkard Creek	Dunkard Creek	WV-ML-128	x		x	x
Dolls Run	Dolls Run	WV-ML-128-AC	x		x	x
Dolls Run	Pedlar Run	WV-ML-128-AC-4	x		x	x
Dolls Run	UNT/Pedlar Run RM 1.20	WV-ML-128-AC-4-B	x		x	
Dolls Run	Smoky Drain	WV-ML-128-AC-5	x		x	x
Dolls Run	Berry Hollow	WV-ML-128-AC-6	x			
Jakes Run	Jakes Run	WV-ML-128-AE	x		x	x
Jakes Run	UNT/Jakes Run RM 5.5	WV-ML-128-AE-12	x		x	
Jakes Run	UNT/Jakes Run RM 2.33	WV-ML-128-AE-4			x	
Blacks Run	Blacks Run	WV-ML-128-AF	x			x
Dunkard Creek	Hackelbender Run	WV-ML-128-AG	x			
Days Run	Days Run	WV-ML-128-AJ	x		x	x
Dunkard Creek	UNT/Days Run RM 6.2	WV-ML-128-AJ-10	x			
Dunkard Creek	UNT/Days Run RM 7.3	WV-ML-128-AJ-12	x			
Dunkard Creek	Indian Camp Run	WV-ML-128-AJ-4	x			
Days Run	Shriver Run (ML-128-AJ-8)	WV-ML-128-AJ-8	x		x	x
Days Run	Building Run (ML-128-AJ-8-C)	WV-ML-128-AJ-8-C	x		x	
Days Run	UNT/Days Run RM 5.8	WV-ML-128-AJ-9	x		x	x
Dunkard Creek	UNT/UNT RM 0.89/Days Run RM 5.8	WV-ML-128-AJ-9-C	x			
Dunkard Creek	Kings Run	WV-ML-128-AP	x			
Roberts Run	Roberts Run	WV-ML-128-AR	x		x	
Miracle Run	Miracle Run	WV-ML-128-AV	x		x	
Miracle Run	Thomas Run	WV-ML-128-AV-1			x	
Miracle Run	Scott Run	WV-ML-128-AV-11			x	
Miracle Run	UNT/Miracle Run RM 5.50	WV-ML-128-AV-16	x			
Miracle Run	UNT/Miracle Run RM 6.55	WV-ML-128-AV-18	x			
Miracle Run	Right Branch/Miracle Run	WV-ML-128-AV-3	x		x	x
PA Fork Dunkard Creek	Pennsylvania Fork/Dunkard Creek	WV-ML-128-BA	x		x	
PA Fork Dunkard Creek	Brushy Fork	WV-ML-128-BA-12	x			
PA Fork Dunkard Creek	UNT/Pennsylvania Fork RM 8.2	WV-ML-128-BA-15	x			
PA Fork Dunkard Creek	UNT/Pennsylvania Fork RM 9.55	WV-ML-128-BA-18	x			
PA Fork Dunkard Creek	Pumpkin Run	WV-ML-128-BA-4	x			
WV Fork Dunkard Creek	West Virginia Fork/Dunkard Creek	WV-ML-128-BB	x	x	x	
WV Fork Dunkard Creek	Shriver Run (ML-128-BB-10)	WV-ML-128-BB-10	x			

Subwatershed	Stream Name	NHD_Code	Fe	Cl	FC	BIO
WV Fork Dunkard Creek	Range Run	WV-ML-128-BB-13	x		x	x
WV Fork Dunkard Creek	South Fork/West Virginia Fork/Dunkard Creek	WV-ML-128-BB-14	x	x	x	
WV Fork Dunkard Creek	Middle Fork/South Fork/West Virginia Fork/Dunkard Creek	WV-ML-128-BB-14-A			x	
WV Fork Dunkard Creek	UNT/South Fork RM 3.0/West Virginia Fork/Dunkard Creek	WV-ML-128-BB-14-F	x	x		
WV Fork Dunkard Creek	North Fork/West Virginia Fork/Dunkard Creek	WV-ML-128-BB-15	x		x	x
WV Fork Dunkard Creek	Camp Run	WV-ML-128-BB-15-B	x		x	x
WV Fork Dunkard Creek	Browns Run	WV-ML-128-BB-15-B-1	x			
WV Fork Dunkard Creek	Joy Run	WV-ML-128-BB-15-B-2	x			
WV Fork Dunkard Creek	Briar Run	WV-ML-128-BB-15-B-4	x			
WV Fork Dunkard Creek	Hughes Run	WV-ML-128-BB-3	x			
WV Fork Dunkard Creek	Wise Run	WV-ML-128-BB-9	x		x	x

Note:
UNT = unnamed tributary
RM = river mile
CL indicates chloride impairment
FC indicates fecal coliform bacteria impairment
BIO indicates a biological impairment

Several of these TMDLs 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 is one (1) AMD impaired waterbody (i.e., the mainstem of Dunkard Creek listed as "WVM-1" on WV 1996 Section 303(d) List) in the Dunkard Creek watershed that is a Consent Decree (CD) water. If EPA approves WVDEP's total iron and fecal coliform TMDLs for the subject Dunkard Creek by September 30, 2009, it should be legally determined that the final 1997 CD requirements are complete, because the impairment of total aluminum for the subject stream was delisted and approved by EPA in 2004. According to West Virginia's 2008 Section 303(d) List, there are no trout waters in these TMDLs; therefore, the total iron aquatic life criterion is for warmwater fisheries. Appendix A of this Decision Rationale is the cross-reference table for the NHD code and Section 303(d) List code.

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 TMDLs, 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 Dunkard Creek 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, 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 were identified as the cause of biological impairment, data also indicated violations of metals water quality criteria, and the metals 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 the attainment of 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. The implementation of iron TMDLs will address the biological impairment caused by sedimentation.

Table 4.1 of the TMDL document identifies the biologically impaired streams and their significant stressors. There are four stream segments (Miracle Run, Building Run, West Virginia Fork/Dunkard Creek, and South Fork/West Virginia Fork/Dunkard Creek) that identify "ionic stress" as a significant stressor for biological impairment. 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.

Because these waters were not listed on the West Virginia 1996 Section 303(d) List, these waters are not considered CD waters and therefore are not required to have ionic stress TMDLs established by September 30, 2009. EPA guidance provides 8 to 13 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 the EPA's pace guidance for States. WVDEP has identified three streams which are not meeting the chloride water quality criteria, two of those streams, West Virginia Fork/Dunkard Creek and South Fork/West Virginia Fork/Dunkard Creek have also been identified as impaired by ionic stress. 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 WVDEP and approved by EPA. EPA recommends that stressors identified through the stressor identification (SI) 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 Miracle Run, Building Run, West Virginia Fork/Dunkard Creek, and South Fork/West Virginia Fork/Dunkard Creek.

III. Background

The Dunkard Creek watershed is located in West Virginia, and lies within Monongalia County in West Virginia, and Greene County in Pennsylvania (Figure 3-1). In West Virginia and Pennsylvania, the watershed drainage area encompasses nearly 180 square miles. The Dunkard Creek watershed in West Virginia is comprised of the West Virginia Fork, Pennsylvania Fork, Miracle Run, Jakes Run, and Dolls Run, as well as some of their tributaries listed in Table 1. The total population living in the watershed is estimated to be about 14,000 people. The Dunkard Creek Watershed is dominated by forest land use (~80%), with some mining (~4.2%), barren (0.02%), grassland (~6.0%), pasture (~2.4%) and urban/residential (~5.2%) land uses.

West Virginia conducted extensive water quality monitoring from July 2005 through June 2006 in the Dunkard Creek 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 45 waters for which TMDLs are developed. The TMDLs were developed for iron, chloride, fecal coliform bacteria and/or biological impairments, including 69 TMDLs (waterbody/pollutant combinations) addressing 83 impairments. In this TMDL, modeling at baseline conditions demonstrated additional pollutant impairments to those identified via monitoring. For Section 303(d) listing of impaired waterbodies, the prediction of impairment through modeling is validated by applicable federal guidance.

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 Dunkard Creek 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, and 8 of the TMDL Report discuss metals, chloride, fecal coliform bacteria and sediment source assessment while Section 4 describes biological impairments and SI methods. Unless otherwise noted, all information regarding source assessment comes from the TMDL report. On September 9, 2009, prior to the submission of the final TMDLs, EPA personnel investigated reports of a fish kill in Dunkard Creek. EPA personnel are continuing to work with representatives of the U.S. Fish and Wildlife Service, WVDEP, the West Virginia Department of Natural Resources, the Pennsylvania Fish and Boat Commission and other appropriate agencies to investigate and respond to this fish kill. The investigation into the cause of the fish kill is not complete. The information generated from that investigation was not complete in time for inclusion in the final TMDLs and is not discussed here. EPA anticipates that information developed as a result of the investigation, when complete, may necessitate further action, potentially including refinement of these TMDLs, development of new TMDLs and/or other actions, such as enforcement. EPA intends to coordinate closely with WVDEP to evaluate new information generated by investigation into this fish kill and to devise an appropriate and timely response.

Sources for metals and sediment in the Dunkard Creek watershed include mining, non-mining, forestry, oil and gas, roads, agriculture, streambank erosion, other land disturbance activities. There are four mining-related NPDES permits, with 35 associated outlets in the West Virginia metals impaired watersheds of the Dunkard Creek watershed. Some permits may 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 is one non-mining NPDES permit within the TMDL watersheds addressed in this report. There are nine 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). Failing septic systems and straight pipes are significant nonpoint sources of fecal coliform bacteria. To calculate loads, values for both failing septic wastewater flow and fecal coliform concentration are needed. To calculate wastewater flows, the TMDL watersheds were divided into four septic failure zones. The initial fecal coliform concentration was determined at the TMDL watershed scale based on past experience of other WVDEP TMDLs. This concentration was further refined during model calibration. Section 7.2.1 of the TMDL report describes the computational procedures. Additional details of the failing septic analyses are elucidated in the Technical Report.

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 industries in specified urbanized areas. As such, their stormwater discharges are considered as point sources and are prescribed wasteload allocations. Currently, there is one NPDES permit (WVG611273) that regulates industrial stormwater activities and implements benchmark values of 100 mg/L TSS and/or 1.0 mg/L total iron for this watershed.

The Dunkard Creek watershed has regulated outlets by one publicly owned treatment work (Blacksville POTW), seven sewage treatment "package plants," and 27 home aeration units (HAUs) for fecal coliform bacteria. Fecal coliform bacteria TMDLs were developed in 25 streams in the West Virginia portion of Dunkard watershed.

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.

Section 9.0 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 Dunkard Creek watershed TMDL study area for iron, chloride, 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 are 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, 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 CSR1-3.2.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 load allocations, WVDEP and EPA are not determining that these discharges are exempt from NPDES permitting requirements.

Section 10 of the TMDL Report presents applicable TMDLs for iron, chloride, and fecal coliform bacteria. Allocation spreadsheets also provide applicable TMDLs, WLAs to individual point sources and load allocations to categories of unpermitted sources. The Metals Allocation Spreadsheet presents detailed iron 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 chloride in the Dunkard Creek watershed are: point sources, including mining, non-mining, and construction stormwater permits; as well as sediment sources including forestry, oil and gas, roads, agriculture, streambank erosion, and other land disturbance activities. There are four mining-related NPDES permits, with 35 associated outlets in the metals impaired watersheds of the Dunkard Creek watershed. Some permits may 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 is one modeled non-mining NPDES permit in the watershed that has effluent limits for sediment and iron. There are nine active construction stormwater sites under WV's Construction Stormwater General Permit. 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 forestry, oil and gas, roads, and other land disturbance areas. There are no Bond Forfeiture Sites and only 2.7 acres of AML in the watershed. There are no trout waters in this watershed according to WV 2008 Section 303(d) List.

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 25 streams and will affect permits including one POTW, seven privately owned sewage treatment plant, and 58 registered Home Aeration Units (HAUs). There are no Sanitary Sewer Overflow or Combined Sewer Overflow outlets 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). Load allocations 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-Multiple Storm Sewer System areas. Fecal coliform reductions will require elimination of illicit discharges, straight pipes, and leaking septic systems, which would substantially reduce organic and nutrient loadings as well.

WVDEP has identified three 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.

While this TMDL does not incorporate information generated in connection with the investigation into the September 2009 fish kill and that investigation remains ongoing, EPA believes it is appropriate to approve these TMDLs. The TMDL analysis may provide information useful to the investigators. While EPA recognizes that the results of the investigation ultimately may necessitate additional action, implementation of the load allocations and wasteload allocations set forth in these TMDLs will provide a greater level of protection to address water quality in the Dunkard Creek watershed than currently exists.

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 January 1, 1998 to December 31, 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 9.0). 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 margin of safety was not included for chloride because little modeling uncertainty exists. Nonattainment is directly related to point sources regulated by West Virginia/NPDES permits and water quality criteria will be met if the problematic point sources achieve prescribed criteria end-of-pipe WLAs.

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 10, 2009, in West Virginia. West Virginia did receive comments from the Appalachian Center for the Economy & the Environment (on behalf of the Sierra Club and the West Virginia Rivers Coalition), the Consol Energy, Inc., and EPA Region III. WVDEP has responded appropriately to the comments in Section 12.3 of the TMDL report.

IV. Discussion of Reasonable Assurance

When a TMDL is developed for waters impaired by both point and nonpoint sources and the WLA is based on the assumption that nonpoint source load reductions will occur, EPA's guidance states that the TMDL should provide reasonable assurances that nonpoint sources control measures will achieve expected load reductions in order for the TMDL to be approvable.

WLAs will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA. Furthermore, EPA has authority to object to the issuance of an NPDES permit that is inconsistent with WLAs established for that point source. Section 13.1 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.

The mining permittees represented in the metal TMDLs received WLA's based on water quality criteria, not technology based limits. Therefore, the metal WLA's are not based on the assumption that NPS reductions will occur. In addition, the chloride TMDLs will be achieved by reducing chloride loads from permits and WLA's are based on water quality criteria. Achievements of the chloride TMDLs do not rely on NPS load reductions. Therefore, reasonable assurance that the TMDL will be achieved is not necessary for the metal and chloride TMDLs.

There are a few primary programs in effect which provide reasonable assurance that the TMDLs will be implemented. Section 13.2 of the TMDL report 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.

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.

Section 13.3 discusses NPS controls to achieve the Bacteria LA's, including ongoing public sewer projects. Reductions from inadequate onsite sewage treatment systems may be accomplished through the creation or extension of centralized sewer systems. It also discusses project funding and the administrative process, and provides a link to pending projects for reducing the LAs from Fecal Coliform.

The NPSs of concern identified in the metal and sediment TMDLs are forest harvesting, oil and gas, urban roads, stream bank erosion and other insignificant sources. There are only 2.7 acres of AMLs in over an 110,000 acre watershed, and there are no bond forfeiture sites reported in this TMDL. Though it is not mentioned in the TMDL report, the West Virginia Office of Abandoned Mine Lands and Reclamation manages the reclamation of lands and waters affected by mining prior to the passage of the Surface Mining Control and Reclamation Act in 1977. Funding for reclamation activities is derived from fees placed on coal mines which are placed in a fund and annually distributed to state and tribal agencies.

The TMDL report indicates that the 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 14.0 discusses monitoring activities including NPDES compliance, nonpoint source project monitoring, and TMDL effectiveness monitoring.

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 Iron throughout the Dunkard Creek 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-ML-128	Dunkard Creek	WVM-1
WV-ML-128-AC	Dolls Run	WVM-1-A
WV-ML-128-AC-4	Pedlar Run	WVM-1-A-1
WV-ML-128-AC-4-B	UNT/Pedlar Run RM 1.20	WVM-1-A-1-B
WV-ML-128-AC-5	Smoky Drain	WVM-1-A-2
WV-ML-128-AC-6	Berry Hollow	WVM-1-A-3
WV-ML-128-AE	Jakes Run	WVM-1-B.1
WV-ML-128-AE-12	UNT/Jakes Run RM 5.5	WVM-1-B.1-12
WV-ML-128-AE-4	UNT/Jakes Run RM 2.33	WVM-1-B.1-2
WV-ML-128-AF	Blacks Run	WVM-1-B.3
WV-ML-128-AG	Hackelbender Run	WVM-1-B.5
WV-ML-128-AJ	Days Run	WVM-1-C
WV-ML-128-AJ-10	UNT/Days Run RM 6.2	WVM-1-C-5
WV-ML-128-AJ-12	UNT/Days Run RM 7.3	WVM-1-C-7
WV-ML-128-AJ-4	Indian Camp Run	WVM-1-C-2
WV-ML-128-AJ-8	Shriver Run	WVM-1-C-3
WV-ML-128-AJ-8-C	Building Run	WVM-1-C-3-A
WV-ML-128-AJ-9	UNT/Days Run RM 5.8	WVM-1-C-4
WV-ML-128-AJ-9-C	UNT/UNT RM 0.89/Days Run RM 5.8	WVM-1-C-4-C
WV-ML-128-AP	Kings Run	WVM-1-D
WV-ML-128-AR	Roberts Run	WVM-1-D.4
WV-ML-128-AV	Miracle Run	WVM-1-E
WV-ML-128-AV-1	Thomas Run	WVM-1-E-1
WV-ML-128-AV-11	Scott Run	WVM-1-E-4
WV-ML-128-AV-16	UNT/Miracle Run RM 5.50	WVM-1-E-5.2
WV-ML-128-AV-18	UNT/Miracle Run RM 6.55	WVM-1-E-6
WV-ML-128-AV-3	Right Branch/Miracle Run	WVM-1-E-2
WV-ML-128-BA	Pennsylvania Fork/Dunkard Creek	WVM-1-G
WV-ML-128-BA-12	Brushy Fork	WVM-1-G-2
WV-ML-128-BA-15	UNT/Pennsylvania Fork RM 8.2	WVM-1-G-3
WV-ML-128-BA-18	UNT/Pennsylvania Fork RM 9.55	WVM-1-G-6
WV-ML-128-BA-4	Pumpkin Run	WVM-1-G-1
WV-ML-128-BB	West Virginia Fork/Dunkard Creek	WVM-1-F
WV-ML-128-BB-10	Shriver Run	WVM-1-F-4
WV-ML-128-BB-13	Range Run	WVM-1-F-5
WV-ML-128-BB-14	South Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-7
WV-ML-128-BB-14-A	Middle Fork/South Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-7-A
WV-ML-128-BB-14-F	UNT/South Fork RM 3.0/West Virginia Fork	WVM-1-F-7-F
WV-ML-128-BB-15	North Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-6
WV-ML-128-BB-15-B	Camp Run	WVM-1-F-6-A
WV-ML-128-BB-15-B-1	Browns Run	WVM-1-F-6-A-1
WV-ML-128-BB-15-B-2	Joy Run	WVM-1-F-6-A-2
WV-ML-128-BB-15-B-4	Briar Run	WVM-1-F-6-A-3
WV-ML-128-BB-3	Hughes Run	WVM-1-F-0.5
WV-ML-128-BB-9	Wise Run	WVM-1-F-3