UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
11/24/2008

Richard Eskin, Ph.D.
Director, Technical and Regulatory Services Administration
Maryland Department of the Environment
1800 Washington Blvd., Suite 540
Baltimore, Maryland 21230-1718

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve the Total Maximum Daily Loads (TMDLs) for Phosphorus and Sediments for the Triadelphia Reservoir, and Phosphorus for the Rocky Gorge Reservoir, located in Howard, Prince George's, and Montgomery Counties, Maryland. The TMDL Report and revised TMDL Report were submitted by the Maryland Department of the Environment (MDE) on October 3, 2007, and June 14, 2008, respectively, to EPA for review and approval. This TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in Maryland's Section 303(d) List. The water of the Triadelphia Reservoir (basin code 02131108) and the Rocky Gorge (basin code 02131107) was first identified on Maryland's Section 303(d) List as impaired by nutrients (1998) and impacts to biological communities (2002 and 2004). In addition, Triadelphia Reservoir was listed as impaired by sediment in 1998. The listings for impacts to biological communities will be addressed by MDE at a future date. The TMDL described in this document was developed to address localized water quality impairments identified within the watershed.

The TMDL analysis identifies the current loading, relates the current loading to the applicable water quality standard, and identifies the necessary reductions for a total maximum daily load that will achieve the applicable water quality standard. It also identifies individual wasteload and load allocations to the maximum extent supported by the available data.

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 uncertainties in the relationship between pollutant loads and instream water quality); and (7) be subject to public participation. In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. The enclosure to this letter describes how the TMDLs for the Triadelphia and Rocky Gorge Reservoirs satisfy each of these requirements.

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

If you have any questions or comments concerning this letter, please do not hesitate to contact Mr. Kuo-Liang Lai at (215) 814-5473.

Sincerely,

John Armstead for

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Melissa Chatham, MDE-TARSA
Nauth Panday, MDE-TARSA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
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Decision Rationale
Total Maximum Daily Loads
Phosphorus and Sediments for Triadelphia Reservoir
And
Phosphorus for Rocky Gorge Reservoir
Howard, Prince George's and
Montgomery Counties, Maryland

John Armstead for

_____

Jon M. Capacasa, Director
Water Protection Division

Date: 11/24/2008

Decision Rationale

Total Maximum Daily Loads
Phosphorus and Sediments for Triadelphia Reservoir and
Phosphorus for Rocky Gorge Reservoir
Howard, Prince George's, and Montgomery Counties, Maryland

I. Introduction

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

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the phosphorus and sediment TMDLs in the Triadelphia Reservoir watershed and the phosphorus TMDLs in the Rocky Gorge Reservoir watershed. These TMDLs were established to address impairments of water quality, caused by nutrients and sediment, as identified in Maryland's 1996 and 1998 Section 303(d) List for water quality limited segments (see the referenced TMDL report below). The Maryland Department of the Environment (MDE) submitted the report, *Total Maximum Daily Loads of Phosphorus and Sediments for Triadelphia Reservoir and Total Maximum Daily Loads of Phosphorus for Rocky Gorge Reservoir, in Howard, Prince George's, and Montgomery Counties, Maryland* on September 26, 2007. Both Triadelphia Reservoir (basin code 02-13-11-08) and Rocky Gorge Reservoir (basin code 02-13-11-07), also referred to as the Patuxent Reservoirs, lie in the Patuxent River watershed.

EPA's rationale is based on the information contained in the TMDL Report, the Appendices to the report, the Comment Response Document, and MDE's responses to EPA's comments. 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 and load allocations.
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 margin of safety.
7. The TMDL has been subject to public participation.

In addition, EPA considered whether there was reasonable assurance that the load allocations for the nonpoint sources in the TMDLs would be met.

II. Summary

The TMDL specifically allocates the allowable phosphorus loading to the Triadelphia and Rocky Gorge Reservoir watersheds and the allowable sediment loading to the Triadelphia Reservoir watershed. There are two permitted MS4 (Howard County and Montgomery County) point sources of phosphorus and/or sediment within the Triadelphia Reservoir watershed. The Rocky Gorge Reservoir watershed has one permitted point source of phosphorus and three MS4 (Howard County, Montgomery County, and Prince George's County) permits. The fact that the TMDL does not assign WLAs to any other sources in the watershed should not be construed as a determination by either EPA or MDE that there are no additional sources in the watershed that are subject to the National Pollutant Discharge Elimination System (NPDES) program. In addition, the fact that EPA is approving this TMDL does not mean that EPA has determined whether some of the sources discussed in the TMDL, under appropriate conditions, might be subject to the NPDES program. The TMDLs are presented as an average annual load in pounds/year or tons/year because it was developed to meet TMDL endpoints under a range of conditions observed throughout the year. The average daily TMDL is also presented in pounds/day or tons/day. The average annual and average daily TMDLs are presented in Tables 1 and 2, respectively. Note that maximum daily loads were calculated by flow regime (under low flow and high flow conditions) as indicated in Table 2. Because phosphorus and sediment loads are a function of flow, flow-variable daily loads represent the most useful level of resolution for maximum daily loads for these reservoirs.

Table 1. Summary of Nutrient and Sediment Average Annual TMDLs for Rocky Gorge and Triadelphia Reservoirs

Waterbody	Constituent	Rate	Percent Reduction	TMDL	WLA	LA	MOS
Rocky Gorge Reservoir	Total Phosphorus	lbs/year	48%	24,406	7,429	15,757	1,220
Triadelphia Reservoir	Total Phosphorus	lbs/year	58%	27,700	5,288	21,027	1,385
Triadelphia Reservoir	Sediment	tons/year	29%	22,820	400	22,420	Implicit

Table 2. Summary of Nutrient and Sediment Maximum Daily Loads For Triadelphia and Rocky Gorge Reservoirs by Flow Regime

Total Phosphorus, Triadelphia Reservoir (lbs/day)				
Flow Regime (cfs)	**TMDL**	**WLA**	**LA**	**MOS**
<326	852	356	453	43
>326	17,003	1,504	14,649	850
Total Phosphorus, Rocky Gorge Reservoir (lbs/day)				
Flow Regime (cfs)	**TMDL**	**WLA**	**LA**	**MOS**
<291	770	314	418	39
>291	4,003	1,102	2,701	200
Sediment, Triadelphia Reservoir (tons/day)				
Flow Regime (cfs)	**TMDL**	**WLA**	**LA**	**MOS**
<326	662	40	621	Implicit
>326	25,468	157	25,311	Implicit

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 that considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. The option is always available to refine the TMDL for resubmittal to EPA for approval if environmental conditions, new data, or the understanding of the natural processes change more than what was anticipated by the MOS.

III. Background

Both Triadelphia Reservoir and Rocky Gorge Reservoir lie within the Patuxent River watershed. The Patuxent River drains into the Chesapeake Bay between Washington DC and Annapolis, Maryland. The drainage area of the Triadelphia and Rocky Gorge Reservoirs lies primarily in Howard and Montgomery Counties but also includes small portions of Prince George's County, Maryland. Water supply intakes in Rocky Gorge Reservoir feed the Washington Suburban Sanitary commission's (WSSC) Patuxent Water Filtration Plant near Burtonsville, Maryland. Triadelphia Reservoir, which is upstream of Rocky Gorge Reservoir, is used as a secondary reservoir to maintain capacity in Rocky Gorge Reservoir. The Triadelphia Reservoir watershed covers 77 square miles with predominantly agriculture (~50%), forest (32%), and residential, commercial, or industrial land uses (15%). Rocky Gorge Reservoir watershed, excluding Triadelphia reservoir, covers 55 square miles with predominant land uses including forest (39%), and approximately 28% of developed land. Section 2.0 of MDE's TMDL Report provides additional information about the Triadelphia and Rocky Gorge Reservoir watersheds, including land use information.

The Triadelphia Reservoir (02-13-11-08) and Rocky Gorge Reservoir (02-13-11-07) were first identified on Maryland's 1996 Section 303(d) List of water quality limited segments as impaired by nutrients. In addition, Triadelphia Reservoir was listed as impaired by sediments in 1998. Biological community impairments were added to both reservoirs in 2002 and 2004. Biological impairments within these watersheds will be addressed by Maryland at a future date.

Triadelphia Reservoir and Rocky Gorge Reservoir have been designated as Use IV-P and Use I-P waterbodies, respectively (Code of Maryland Regulations, COMAR, 26.08.02.08M(6) and COMAR 26.08.02.08M(1)). The water quality goal of the nutrient TMDLs is to reduce a high *chlorophyll a (Chla)* concentration that reflects excessive algal blooms, and to maintain dissolved oxygen (DO) at a level supportive of the designated uses for both reservoirs. The water quality goal of the sediment TMDL for Triadelphia Reservoir is to increase the useful life of the reservoir for water supply by preserving storage capacity.

The TMDLs for the nutrient total phosphorus were determined using a time-variable, two-dimensional water quality eutrophication model, CE-QUAL-W2, to simulate water quality in each reservoir. Nonpoint source loads and urban stormwater loads entering the Rocky Gorge and Triadelphia Reservoirs were estimated using the Hydrologic Simulation Program-Fortran (HSPF) model. The HSPF model is used to estimate flows, suspended solids, and nutrient loads from the watershed's sub-basins, which are linked to the CE-QUAL-W2 models of each reservoir. The TMDLs are based on average annual total phosphorus loads for the simulation period 1998-2003, which includes both wet and dry years, and thus takes into account a variety of hydrological conditions. Section 4.0 of the TMDL Report provides a thorough description of the CE-QUAL-W2 model and calculations. *Chla* concentrations indicative of eutrophic conditions can occur at any time of year and are the cumulative result of phosphorus loadings that span seasons. Thus, average annual phosphorus total loads are the most appropriate measure for expressing the nutrient TMDLs for Rocky Gorge and Triadelphia Reservoirs. Similarly, the sediment TMDL for Triadelphia Reservoir, which is based on the water quality modeling performed for the nutrient TMDLs, is expressed as an average annual load in keeping with the long-term water quality goal of preserving the storage capacity of the reservoir. Sections 4.4.1 and 4.4.2 of the TMDL Report provide a description of the phosphorus and sediment loading cap calculations for both reservoirs (TP) and Triadelphia Reservoir (sediment), respectively. Refer to Tables 1 and 2 above for a summary of allowable loads.

CWA Section 303(d) and its implementing regulations require that TMDLs be developed for waterbodies identified as impaired by the state where technology based and other required controls do not provide for attainment of water quality standards. The TMDLs submitted by MDE are designed to attain acceptable loadings of phosphorus and sediments to Triadelphia Reservoir and acceptable loadings of phosphorus to Rocky Gorge Reservoir in order to attain the narrative and DO water quality criteria and support the designated uses.

IV. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all of the seven basic requirements for establishing phosphorus and sediment TMDLs for the Triadelphia Reservoir watershed and phosphorus TMDLs for the Rocky Gorge Reservoir watershed. EPA, therefore, approves the phosphorus and sediment TMDLs for the Triadelphia Reservoir and the phosphorus TMDLs in the Rocky Gorge Reservoir. This approval is outlined below according to the seven regulatory requirements.

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

Water Quality Standards consist of three components: designated and existing uses; narrative and/or numerical water quality criteria necessary to support those uses; and an anti-degradation statement. The Maryland Water Quality Standards Stream Segment Designation for the Triadelphia and Rocky Gorge Reservoir watersheds are Use IV-P and Use I-P waterbodies, respectively (Code of Maryland Regulations, COMAR, 26.08.02.08M(6) and COMAR 26.08.02.08M(1)). The CE-QUAL-W2 models of Triadelphia and Rocky Gorge Reservoirs were used to determine the maximum total phosphorus loads compatible with water quality standards. Simulated loads were reduced until two conditions were made: (1) no simulated *Chla* concentration in any cell was above 30 μg/L (ninetieth-percentile instantaneous concentration), and (2) the 30-day moving average *Chla* concentration of each modeling cell within 15 meters of the surface was not greater than 10 μg/L. The TMDL scenario was also analyzed to determine whether the reservoir would meet the DO criteria for Use I-P and Use IV-P waters under TMDL loading rates. Instantaneous DO concentrations were also examined from all cells in the surface layer at half-day intervals. Excessive eutrophication, indicated by elevated levels of *Chla*, can produce nuisance levels of algae and interfere with designated uses such as fishing and swimming. The excess algal blooms eventually die off and decompose, consuming oxygen. Excessive eutrophication in Rocky Gorge and Triadelphia Reservoirs is ultimately caused by nutrient overenrichment. An analysis of the available water quality data presented in Section 2.2 of the TMDL Report has demonstrated that phosphorus is the limiting nutrient. In conjunction with excessive nutrients, Triadelphia Reservoir has experienced excessive sediment loads, resulting in a shortened projected lifespan of the reservoir. Therefore, phosphorus and sediment TMDLs were developed for these watershed areas, as appropriate. The overall objective of the TMDLs is to reduce the phosphorus and sediment loadings in order to meet the narrative and DO water quality criteria to support the designated uses. EPA believes that this is a reasonable and appropriate water quality goal.

Use IP and Use IV-P waters are subject to dissolved oxygen (DO) criteria of not less than 5.0 mg/L at any time (Code of Maryland Regulations, COMAR, 26.08.02.03-3A(2), COMAR 26.08.02.03-3B(1), and COMAR, 26.08.02.03-3G(1)), unless natural conditions result in lower levels of DO (COMAR 26.08.02.03A(2)). Triadelphia and Rocky Gorge Reservoirs both regularly exhibit temperature stratification starting in late spring and lasting to early fall. Under stratified conditions, bottom waters in both reservoirs can become hypoxic because stable density differences inhibit the turbulent mixing that transports oxygen from the surface. New standards for tidal waters of the Chesapeake Bay and its tributaries take into account stratification and its impacts on deeper waters. MDE recognizes that stratified reservoirs and impoundments present circumstances similar to stratified tidal waters, and is applying an interim interpretation of the existing standards to allow for the impact of stratification on DO concentrations. This interpretation recognizes that, given the morphology of the reservoir or impoundment, the resulting degree of stratification, and the naturally occurring sources of organic material in the watershed, hypoxia in the hypolimnion is a natural consequence. The interim interpretation of the nontidal DO standards, as applied to reservoirs, is as follows:

- A minimum DO concentration of 5.0 mg/L will be maintained throughout the water

column during periods of complete and stable mixing.

- A minimum DO concentration of 5.0 mg/L will be maintained in the mixed surface layer at all times, including during stratified conditions, except during periods of overturn or other naturally occurring disruptions of stratification.

- Hypolimnetic hypoxia will be addressed on a case-by-case basis, taking into account morphology, degree of stratification, sources of diagenic organic material in reservoir sediments, and other factors.

The analysis of water quality data discussed in Section 2.2 of the TMDL Report has shown that all observed DO concentrations below 5.0 mg/L in the surface layers of Rocky Gorge and Triadelphia Reservoir are associated with stratification or the mixing of stratified waters into the surface layers during periods of reservoir overturn or drawdown. On the other hand, seasonal hypoxia occurs regularly in both reservoirs in the hypolimnion.

MDE used *Chla*, a measure of algal biomass, as the water quality endpoint for the phosphorus TMDL. The *Chla* endpoints selected for the reservoirs are: (1) a maximum permissible instantaneous *Chla* concentration of 30 µg/L in the surface layers, and (2) a 30-day moving average concentration not to exceed 10 µg/L in the surface layers. A concentration of 10 µg/L of *Chla* is roughly equivalent to a score of approximately 53 on the Carlson Trophic State Index (TSI). In addition, MDE chose the median TP concentrations in the surfaces of the reservoirs is at (or above) 34 µg/L as the indicator of eutrophic conditions for the reservoirs. This is the approximate boundary between mesotrophic and eutrophic conditions, which Maryland has determined is an appropriate trophic state at which to manage these reservoirs. Management of these reservoirs at this trophic state is expected to avoid nuisance algal blooms and excessive aquatic macrophyte growth. EPA believes that this is a reasonable and appropriate water quality goal at this time.

To the extent that phosphorus binds to sediments, measures taken to reduce phosphorus loadings will result in concomitant reductions of sediment loads. To estimate the applicable ratio for the sediment load reduction associated with the phosphorus reduction controls, it is necessary to understand the various nutrient management plans for sediment and phosphorus removal. According to MDE, in general the soil conservation and water quality plans remove both sediment and phosphorus; however, the nutrient management plans remove only phosphorus. Thus the reductions are not necessarily 1:1, and Maryland's rationale for predicting sediment load reductions is described more fully in Section 4.4.2 of the TMDL report. MDE believes that the reductions of sediment and phosphorus loads will be sufficient to prevent violations of the State's narrative water quality criteria. EPA believes that MDE's rationale for predicting the sediment and phosphorus loads is reasonable and appropriate.

The TMDLs propose that the violation of the water quality criterion for DO and the narrative standard for nuisance is caused by excessive growth of algae due to phosphorus enrichment. Because phosphorus binds to sediment, sedimentation rates are also related to phosphorus loadings. Reduction of phosphorus loadings associated with sediment will consequently result in a decrease in sedimentation rates and promote attainment of water quality

objectives.

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

Total Allowable Load

The allowable loads for the impaired watershed are calculated based on the endpoints described above. These loads are considered the maximum allowable load the watershed can assimilate and still attain water quality standards. The TMDLs and allocations are presented as mass loading rates of pounds/year or tons/year for the average annual load and pounds/day or tons/day for the average daily load. Expressing TMDLs as annual and daily mass loading rates is consistent with Federal regulations at 40 CFR §130.2(i), which state that TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The average annual and average daily TMDLs are presented in Tables 1 and 2, respectively.

EPA regulations at 40 CFR §130.2(i) state that the total allowable load shall be the sum of individual WLAs for point sources, LAs for nonpoint sources, and natural background concentrations. The TMDLs for phosphorus and sediment for the Triadelphia and Rocky Gorge Reservoir watersheds are consistent with 40 CFR §130.2(i) because the total loads provided by MDE equal the sum of the individual WLAs for point sources and the land-based LAs for nonpoint sources.

Wasteload Allocations

The Technical Memorandum, *Significant Phosphorus and Sediment Point Sources in the Triadelphia Reservoir and Rocky Gorge Reservoir Watersheds*, submitted by MDE specifically identifies the significant point sources of phosphorus in the Rocky Gorge and Triadelphia Reservoir watersheds and the significant sources of sediment in the Triadelphia Reservoir watershed. Wasteload allocations have been made to NPDES permitted wastewater treatment plants (WWTP), municipal separate stormwater dischargers (MS4s), and other regulated dischargers in the Rocky Gorge and Triadelphia Reservoir watersheds. Currently, there are no wastewater treatment plants contributing phosphorus or sediment loads in the Triadelphia Reservoir watershed and the Federal Emergency Management Agency (FEMA) WWTP (MD0025666) is the only wastewater treatment plant contributing phosphorus loads in the Rocky Gorge Reservoir watershed. Two MS4s discharge phosphorus and sediment to the Triadelphia Reservoir watershed: Howard County and Montgomery County. These same two MS4s, as well as Prince George's County, also discharge phosphorus to the Rocky Gorge Reservoir watershed. A WLA to the FEMA WWTP has been made based on permitted flow and concentrations. Howard County, Montgomery County, and Prince George's County are all covered under NPDES Phase I stormwater permits. Annual WLAs have been made to these stormwater dischargers based on the Patuxent River watershed HSPF Model. The Technical Memorandum also includes the discussion of stormwater phosphorus and sediment loads from developed lands and any other NPDES-regulated stormwater dischargers in those Counties that are not operating under the county MS4 permits. Sections 2.1.3 and 4.7, and the Appendix E of the TMDL Report (Tables 2 and 9, and Tables E.1 through E.3) provide further information on point sources in

these watersheds.

Load Allocations

The Technical Memorandum, *Significant Phosphorus and Sediment Nonpoint Sources in the Triadelphia Reservoir and Rocky Gorge Reservoir Watersheds*, submitted by MDE specifically identifies the significant nonpoint sources of phosphorus in the Rocky Gorge and Triadelphia Reservoir watersheds and the significant sources of sediment in the Triadelphia Reservoir watershed. The TMDL summary in Table 1 contains the LA for phosphorus and sediment in the Triadelphia and phosphorus in the Rocky Gorge Reservoir watersheds. According to Federal regulations at 40 CFR §130.2(g), LAs are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loadings should be distinguished. Maryland conducted a nonpoint source assessment in order to estimate the contributions of agriculture, forest, developed, and mixed open land uses to the overall nonpoint source loadings. Figures 5, 6, and 7 of the TMDL Report provide a breakdown of the existing phosphorus and sediment nonpoint source loads to the Triadelphia Reservoir and Rocky Gorge Reservoir watersheds as well as point sources.

The Technical Memorandum, *Significant Phosphorus and Sediment Nonpoint Sources in the Rocky Gorge and Triadelphia Reservoir Watersheds*, submitted by the MDE, specifically identifies the significant nonpoint sources of phosphorus in the Rocky Gorge Reservoir and Triadelphia Reservoir watersheds and the significant nonpoint sources of sediment in the Triadelphia Reservoir watershed. Nonpoint source loads for phosphorus and sediment were allocated to separate land use categories: crop, developed, forest and pasture land uses. In addition, the "Scour" and "Animal Waste" sources are included to account for the total contributions from all possible nonpoint sources. Each land use or source is allocated some percentage of the total allowed phosphorus and/or sediment load originating from nonpoint sources. The nonpoint source loads for phosphorus and sediment were both estimated using the Patuxent River Watershed HSPF model. Each land use load allocation represents average annual load allocations of phosphorous and sediment for Triadelphia Reservoir watershed and average annual load allocations of phosphorus for Rocky Gorge Reservoir watershed. EPA agrees with MDE's rationale that the allocations in the Table E.2 of the TMDL Report represent only one possible allocation to sources; the MDE has the right to allocate the TMDLs among different sources in any manner that is reasonably calculated to achieve water quality standards.

Federal regulations at 40 CFR §122.44(d)(1)(vii)(B) require that, for an NPDES permit for an individual point source, the effluent limitations must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. EPA has authority to object to the issuance of an NPDES permit that is inconsistent with WLAs established for that point source. To ensure consistency with this TMDL, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Triadelphia and Rocky Gorge Reservoir watersheds, any deviation from the WLAs set forth in the TMDL Report and described herein for a point source must be documented in the permit Fact Sheet and made available for public review along with the proposed draft permit and the Notice of Tentative Decision. The documentation should: (1) demonstrate that the loading change is

consistent with the goals of the TMDL and will implement the applicable water quality standards; (2) demonstrate that the changes embrace the assumptions and methodology of the TMDL; and (3) describe that portion of the total allowable loading determined in the state's approved TMDL Report that remains for any other point sources (and future growth where included in the original TMDL) not yet issued a permit under the TMDL. It is also expected that Maryland will provide this Fact Sheet, for review and comment, to each point source included in the TMDL analyses, as well as any local and state agency with jurisdiction over land uses for which LA changes may be impacted. It is also expected that MDE will require periodic monitoring of the point source(s) for total suspended solids, through the NPDES permit process, in order to monitor and determine compliance with the TMDLs WLAs.

In addition, EPA regulations and program guidance provides for effluent trading. Federal regulations at 40 CFR §130.2(i) state: "if Best Management Practices (BMP) or other nonpoint source pollution controls make more stringent LAs practicable, then WLAs may be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs." The state may trade between point sources and nonpoint sources identified in the TMDL as long as three general conditions are met: (1) the total allowable load to the waterbody is not exceeded; (2) the trading of loads from one source to another continues to properly implement the applicable water quality standards and embraces the assumptions and methodology of the TMDL; and (3) the trading results in enforceable controls for each source. Any changes such as these should be subject to public comment. Any revisions to WLAs and/or LAs should be submitted to EPA for review.

Based on the foregoing, EPA has determined that the TMDLs are consistent with the regulations and requirements of 40 CFR Section 130.

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

The TMDLs consider the impact of background pollutants by considering the phosphorus and sediment loads from natural sources such as forested land. The CE-QUAL-W2 and HSPF models also consider background pollutant contributions by incorporating all land uses.

4. The TMDLs consider critical environmental conditions.

EPA regulations at 40 CFR §130.7(c)(1) require TMDLs to account for critical conditions for stream flow, loading, and water quality parameters. The intent of the regulations is to ensure that: (1) the TMDLs are protective of human health, and (2) the water quality of the waterbodies is protected during the times when they are 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[1]. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of

[1]EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable worst-case scenario condition. Critical conditions were considered while considering seasonal variations, by running the model simulation for several years, from 1998 to 2003 that included a range of hydrological conditions including wet year (2003), dry years (1999, 2002), and average years (1998, 2000, 2001).

5. The TMDLs consider seasonal environmental variations.

See Requirement 4 above.

6. The TMDLs include a Margin of Safety.

The requirement for a MOS is intended to add a level of conservatism to the modeling process in order to account for uncertainty. Based on EPA guidance, the MOS can be achieved through two approaches. One approach is to reserve a portion of the loading capacity as a separate term, and the other approach is to incorporate the MOS as part of the design conditions. MDE has adopted an explicit MOS for phosphorus in accordance with the first approach, whereby the load allocated to the MOS was computed as five percent of the total allowable load.

In establishing a MOS for sediment, MDE has adopted an implicit approach by incorporating conservative assumptions. Because phosphorus binds to sediment, sediment will be controlled as a result of controlling phosphorus. The estimate of sediment reduction is based on the load allocation for phosphorus rather than the entire phosphorus TMDL, including the MOS. Thus the explicit five percent MOS for phosphorus will result in an implicit MOS for sediments. Also, MDE conservatively assumed a sediment to phosphorus ratio of 0.5:1 rather than 0.7:1 in calculated reductions of sediments based on phosphorus reduction measures as discussed in Section 4.4.2 of the TMDL Report.

7. The TMDLs have been subject to public participation.

MDE provided an opportunity for public review of and comment on the phosphorus and sediment TMDLs for the Triadelphia Reservoir watershed and the phosphorus TMDL for the Rocky Gorge Reservoir watershed. The public review and comment period was open from July 20, 2007 through August 20, 2007. MDE received four sets of comments for this TMDL which were addressed in MDE's Comment Response Document.

V. Discussion of Reasonable Assurance

The TMDL report included a section on "Assurance of Implementation." The implementation of point source nutrient controls that will be an integral component to meet water quality standards in these reservoirs will be executed through the state's NPDES permits and the Chesapeake Bay Agreement's Tributary Strategies for Nutrient Reduction. Moreover, Maryland has adopted procedures to assure that future evaluations are conducted for all TMDLs that are established and the NPDES permit for the FEMA WWTP will be consistent with the assumptions made in the TMDL (e.g., flow, nutrients effluent concentrations, CBOD, TSS, etc.).

The implementation of the stormwater and nonpoint source controls will be through two approaches – stormwater NPDES permits and cooperative agricultural reductions. The state and local jurisdictions are required to participate in the stormwater NPDES program. Subsequently, stormwater management programs have been implemented by the Counties to control MS4 discharges to the maximum extent practicable.

EPA requires that there be a reasonable assurance that the TMDLs can be implemented. 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 the authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

Maryland's Water Quality Improvement Act of 1998 (WQIA) requires that comprehensive and enforceable nutrient management plans be developed, approved and implemented for all agricultural lands throughout Maryland. The Act requires that nutrient management plans for nitrogen be completed and implemented by 2002, and plans for phosphorus be completed by 2005. Other nonpoint source control plans are described in the TMDL report.

In 1996, Howard County, Montgomery County, Prince George's County, the Montgomery County Soil Conservation District, the Howard County Soil Conservation District, Maryland National Capital Parks and Planning Commission, and the Washington Suburban Sanitary Commission signed the Patuxent Reservoir Protection Agreement. The agreement committed the parties to the long-term protection of the six priority resources: water supply, terrestrial habitat, stream system, aquatic biota, rural character and landscape, and public awareness and stewardship. The detailed implementation actions under this Agreement were included in the TMDL report (Table 10).

Nonpoint source controls to achieve LAs will be implemented in an iterative process that places priority on those sources having the largest impact on water quality, with consideration given to ease of implementation and cost. BMPs can be implemented through a number of existing programs and funding sources, including: the Water Quality Improvement Act of 1998 (WQIA), the Clean Water Action Plan (CWAP) framework, the Maryland Agriculture Water Quality Cost Share (MACS) program, the Low Interest Loans for Agricultural Conservation (LILAC) program, the Maryland Agricultural Land Preservation Easement (MALPE) program,

and the Chesapeake Bay Agreement's Tributary Strategies for Nutrient Reduction.