New York State Department of Environmental Conservation

Division of Water

Response To Public Comments On NYSDEC's Phase II Phosphorus TMDL Proposed For New York City's Water Supply Watershed

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I. INTRODUCTION/BACKGROUND

This document is the Division of Water's (DOW) response to public comments on the Phase II Phosphorus TMDL Proposed for the New York City Watershed.

Comments were received from the first week in December 1999 through the close of the official comment period, February 18, 2000. Additional comments received through early April 2000 were also considered. These comments were evaluated by the New York State Department of Environmental Conservation (NYSDEC) and they helped provide the basis to modify the proposal. The final Phase II TMDL was submitted to the U.S. Environmental Protection Agency (USEPA) on June 29, 2000.

Thirty-four (34) comment letters were received, many of which contained the same comments, similar comments and/or recurrent themes. Therefore, responses have been organized to provide a collective answer where possible.

II. PUBLIC PARTICIPATION

The availability of the proposed Phase II Total Maximum Daily Loads (TMDLs) for reservoirs for the Watershed was noticed in the *State Environmental Notice Bulletin* dated November 17, 1999. Four (4) public meetings to discuss the proposed TMDLs were held as follows: on December 8, 1999 in Stamford, NY; on December 16, 1999 and February 4, 2000 in White Plains, NY; and on December 13, 1999 in New York, NY. The public comment period closed on February 18, 2000, but comments that were received into April 2000 were considered as the Phase II TMDLs were revised.

III. GENERAL COMMENTS

1. ***Comment:*** Requests to extend the comment period for the Phase II Draft TMDL Proposal and postpone public meetings until January 2000.

   Response: The comment period was extended from January 9, 2000 to February 18, 2000. Comments received into early April 2000 were also considered as revisions were made to the draft TMDL.

A fourth public meeting was added and held on February 4, 2000 in White Plains, NY.

2. ***Comment:*** Requests that the phosphorus guidance value be set at 15 ug/l for all of New York City's 19 reservoirs or that the Croton System should receive the same level of protection relative to phosphorus loads as the Catskill/Delaware System.

Response: The final Phase II TMDL submitted to USEPA on June 29, 2000 has been revised from the proposal to apply 15 ug/l in three additional reservoirs. The final TMDL is structured such that 15 ug/l is applied as a site-specific interpretation of New York State's Narrative Water Quality Standard for Phosphorus for each of the City's seven source water reservoirs. These reservoirs can receive surface runoff and are located just prior to initial disinfection. They are:

- Ashokan (Catskill/Delaware System)
- Cross River (Croton System)
- Croton Falls (Croton System)
- Kensico (Catskill/Delaware System)
- New Croton (Croton System)
- Rondout (Catskill/Delaware System)
- West Branch (Catskill/Delaware System)

This approach mirrors the New York City Department of Environmental Protection's (NYCDEP) proposal in its March 1999 Guidance Value Report and provides the same level of protection for all source water reservoirs in the Catskill/Delaware and Croton Systems, notwithstanding the fact that the Croton System is scheduled to be filtered.

3. ***Comment:*** All Phosphorus TMDLs should be based on a guidance value of 15 ug/l or lower. Such an approach should be developed for all 19 reservoirs.

Response: Phase II Phosphorus TMDLs are based on 15 ug/l phosphorus applied as a site-specific interpretation of New York State's Narrative Water Quality Standard. This value has been applied to each of New York City's seven source water reservoirs as indicated above and in NYCDEP's March, 1999 Phosphorus Guidance Value Report.

For the remaining 12 upstream reservoirs, New York State's guidance value of 20 ug/l phosphorus has been applied in the Phase II TMDL. This value was used in the Phase I TMDL and indirectly provides considerable protection for drinking water use by limiting eutrophication. However, all water going through the system will have to meet the 15 ug/l value when it arrives at the source water reservoirs. It was felt that this would give added protection for water's best use of drinking water supply until more information is available. Future studies, including EPA's National Nutrient Strategy may result in this value being re-examined.

Additional information, is needed to make the necessary scientific links between upstream reservoir quality and downstream quality in the source water reservoirs. This information includes detailed reservoir, connecting channel and terrestrial modeling that would predict the changes in available phosphorus concentrations within reservoirs and along the rivers and streams that flow into downstream reservoirs.

4. ***Comment:*** TMDLs are meaningless without monitoring and enforcement. Strong monitoring and implementation efforts are necessary components of the TMDL program.

Response: NYCDEP relies on its extensive monitoring and assessment database to track the quality in its drinking water reservoirs. This is a continuing effort. As indicated in NYCDEP's March 1999 Guidance Value report, the quality of the city's drinking water remains high. Additional data ('92-'96) formed the basis for Phase II Phosphorus TMDL development. NYCDEP also maintains this comprehensive monitoring program to support complex eutrophication and hydrothermal models which are under development and will be utilized to adjust loading estimates and where necessary, revise wasteload allocations and load allocations.

In addition to the extensive monitoring database maintained by NYCDEP, there are in place joint NYCDEP and NYSDEC compliance assurance and enforcement programs to assure that all point source discharges in the Watershed meet the effluent limits for phosphorus that result from established WLAs and the requirements of the NYC Watershed Rules and Regulations.

As indicated above, Phase II Phosphorus TMDLs incorporate a site-specific interpretation of NYS narrative standard for nutrients (phosphorus), an improved data base, an enhanced modeling framework, and a reservoir-specific approach to calculate the margin of safety. Continued ambient and point source monitoring by NYCDEP and NYSDEC is necessary to develop multi-tiered reservoir models and assess the impacts of point and nonpoint control measures on reservoir water quality as well as future phosphorus reduction strategies for each reservoir. Funding from the Federal Safe Drinking Water Act (SDWA) grant program has been directed to supporting enhanced monitoring programs for phosphorus.

5. ***Comment:*** Concerns have been expressed about the Department's implementation of the principle of Antidegradation. One issue raised related to the Croton System not receiving the proper level of protection compared to the Catskill/Delaware system. The other issue relates to the "multiple barriers of protection" approach to watershed management and proposes: all reservoirs should be based on 15 ug/l phosphorus or lower; where reservoirs are not water quality limited for phosphorus, loads should be held at existing levels; a conservative approach should be used, protect at the source rather than correct problems later; and hearings should be held regarding social and economic impacts of further development and additional phosphorus loads.

Response: NYSDEC's Antidegredation policy is implemented through a series of general and special laws identified in Policy Memorandum 85-40 dated September 9, 1985. The cornerstone of this policy is assuring that the best usage of each water body is protected. NYSDEC maintains that the best usage, associated with the specific waterbody classification, of each of New York City's 19 reservoirs is protected, in the June 2000 Phase II Phosphorus TMDL.

6. ***Comment:*** There is no justification for the difference between source water reservoirs and upstream reservoirs and the application of 15 ug/l phosphorus vs 20 ug/l. The 20 ug/l value should be applied to all 19 reservoirs pending the results of EPA's National Nutrient Study.

Response: In developing the Phase II TMDL, NYSDEC considered the March 1999 **Guidance Value Report** developed by NYCDEP as being a

comprehensive evaluation and assessment of the existing phosphorus guidance value and its adequacy to protect a public water supply. The report recommends a change in the guidance value in only seven of the 19 reservoirs included in the TMDL. The final TMDL is based upon the recommendations in the NYCDEP report. The distinction between the seven source water reservoirs and the 12 upstream reservoirs is that the source water reservoirs are those which are capable of receiving surface water runoff, and are located just prior to initial disinfection. After disinfection, the water may then be sent into the distribution system.

More detailed reservoir and terrestrial models are needed to accurately assess the impacts of upstream phosphorus values on source water reservoirs and the reservoir system as a whole. Additionally, more site-specific data is needed before such models can be used for TMDL development. This is discussed in Section IV of the final TMDL.

7. ***Comment:*** The Margin of Safety (MOS) used in the Phase II Phosphorus TMDLs is inadequate.

Response: In accordance with USEPA guidance, TMDLs can rely on implicit and explicit approaches for the margin of safety. Phase II TMDL calculations have incorporated both. Conservative assumptions that are implicit to this submittal are:

- The TMDL uses permitted flows vs actual flows for point source phosphorus wasteload calculations from sewage treatment plants. In many cases, actual flows are lower than what is permitted and the TMDL thus overestimates the actual loading to the system.

- The assumption that phosphorus loads from upstream reservoirs are treated as direct inputs, with no net loss of phosphorus during the transmission of water to downstream reservoirs. In actuality, some reduction in total phosphorus concentrations can be expected to occur as water flows from an upstream to a downstream waterbody due to uptake by aquatic vegetation.

- TMDL calculations are based on total phosphorus. The Phase II methodology assumes that all the total phosphorus from point and nonpoint sources is available for algal growth. Yet, dissolved phosphorus as a portion of total, is generally more available for algal growth. Therefore, the use of total phosphorus is conservative.

  The explicit margin of safety utilized in Phase II TMDL calculations can range from 10 to 20 percent. A 10 percent MOS factor was applied as a baseline to each reservoir to account for general uncertainty in the analysis. An additional factor was added to the 10 percent baseline to account for the variability in each reservoir's phosphorus data (March 1999 Phase II Methodology Document). A higher MOS was applied as data variability increased.

8. ***Comment:*** Seasonal variation of phosphorus loads has not been accounted for in the Phase II Phosphorus TMDL proposal.

   Response: The Phase II Phosphorus TMDL inherently accounts for seasonal variability. The trophic state of each reservoir is not a spot measurement but a summary statistic typically based on a growing season average of phosphorus. In short, eutrophication is a seasonal condition which is assessed using seasonal averages. New York State's guidance value for phosphorus is applied as a growing season average. It is anticipated that the National Nutrient Criteria will be developed based on growing season average concentrations. Therefore, an annual average load reflects seasonal variability in loadings that contribute to a seasonal condition that is the effect of preceding, longer term, nutrient loadings.

   Detailed reservoir and terrestrial models currently under development may point to an alternative critical phosphorus loading time period that can be applied to future TMDL calculations for each reservoir individually.

9. ***Comment:*** Critical periods of phosphorus loads to the City's reservoirs have not been accounted for in Phase II.

Response: The critical time for eutrophication is the growing season. This is typically May to October. For phosphorus, the limiting nutrient in the eutrophication process, NYCDEP routinely samples from April thru November. Some reservoirs have hundreds of phosphorus measurements each year, so it is unlikely that each reservoir's annual concentration is underestimated.

The critical condition and critical time period for phosphorus loadings must be assessed for each reservoir individually. This requires the use of detailed reservoir and terrestrial models currently under development. It may be that phosphorus loads only need to be regulated during a certain critical period, but that is unknown at this time. Therefore, Phase II has proceeded utilizing the growing/monitoring season approach.

10. ***Comment:*** Phase II allows for higher loadings of phosphorus than Phase I. Please explain.

Response: Phase II TMDL loads are generally higher than those calculated in Phase I. This is the result of using improved analysis of the system and additional monitoring data which shows that current loads are actually higher than those calculated in the Phase I analysis.

For those reservoirs east of the Hudson River, this is mainly due to residence time adjustments based on more sophisticated water budget analyses. These adjustment resulted in higher outflow projections. Higher outflows result in shorter residence times and a greater predicted phosphorus load.

Higher phosphorus loads west of the Hudson River relate to the use of the Generalized Watershed Loading Function (GWLF) model to estimate loads from various land uses (nonpoint sources). The Phase I TMDL used a simpler approach to estimate nonpoint source loads. The GWLF model accounts for large particulate loads of phosphorus delivered during high flows. The Vollenweider Equation (simplified lake eutrophication model) was adjusted to accommodate these increased loads to WOH reservoirs. The inter-annual variability in phosphorus loads due to precipitation differences that was a part of the Phase II TMDL, was not factored into the Phase I analysis.

Additionally, Phase II generally has higher estimates of nonpoint source phosphorus loads. Estimates of historical nonpoint source loadings, based on monitoring and modeling, are used to calculate the "allowable" load of phosphorus by comparing loads (point and nonpoint) to phosphorus levels observed in the reservoirs. Because of the significance of actual nonpoint source loadings in the development of the TMDL, changes in the nonpoint source estimates result in relatively higher (compared to Phase I) TMDL loads. However, this should not be viewed as a relaxation of watershed protection plans or as an indication of gross calculation errors when compared to Phase I. It is believed that the Phase II estimates of phosphorus loads are better approximations of the actual loads than the estimates used in Phase I.

11. ***Comment:*** It is recommended that filtration avoidance be applied to the Croton Watershed System as well as the Catskill/Delaware Watershed System.

Response: The Filtration Avoidance Determination (FAD) process is separate from the development of TMDLs for phosphorus for each of New York City's 19 reservoirs. The 1997 Catskill/Delaware FAD has recently gone through a mid-course evaluation and is scheduled for a complete review in 2002. This is a health-based determination made by USEPA and the New York State Department of Health (NYSDOH).

12. ***Comment:*** Explain the use of annual average phosphorus loads rather than daily loads.

Response: Phase II phosphorus TMDLs have been developed based on the trophic state and designated best use of each reservoir. The trophic state is a summary statistic typically based on a growing season average of phosphorus. EPA's guidance (USEPA 1991 and others) supports this as an appropriate measure that is related to a state's water quality standard and the problem to be addressed. In the case of nutrients, like phosphorus, an annual or growing season cycle is the accepted method rather than a daily load calculation.

A reservoir could receive a large input of phosphorus from a storm event or Spring snow melt. However, an event alone will not

necessarily result in eutrophic conditions. All of the reservoirs receive the majority of their phosphorus load from nonpoint sources that do not lend themselves to the application of daily load limits. Point source phosphorus loads have daily limits incorporated into SPDES permits, and a summary WLA, identified in the TMDL, as an annual load for each reservoir.

13. ***Comment:*** TMDLs need to be applied at the local level of enforcement.
Response: Many of the programs listed in the Implementation Section of the TMDL will take place at the local level. Subsequent management practices and implementation reports discussed under Section VI, B., Nonpoint Sources will help identify practices and localities targeted. For example:

- A comprehensive watershed management plan is being developed by local government for the Croton System (The Croton Plan). NYSDEC will work with local planning agencies to coordinate this effort with implementation of the TMDL.

- Delaware County has developed a Delaware County Action Plan (DCAP) which identifies phosphorus reduction measures to be implemented at a local level. This DCAP is an excellent example of local government taking responsibility for phosphorus reduction measures.

14. ***Comment:*** Stream-by-stream Load Allocation (LA) calculations are needed.

Response: Stream-by-stream LA calculations may be established in the future as detailed reservoir and terrestrial models become available. There is, at this time, not enough information to establish stream-by-stream LAs.

Additionally, work continues on the development of the Croton System Water Quality Protection Plan. NYSDEC will work with NYCDEP and local government entities on its implementation.

15. ***Comment:*** NYSDEC needs to demonstrate implementation measures that will bring those reservoirs which exceed their TMDL into compliance.

Response: Section VI, Implementation/Reasonable Assurance, has been expanded in the final TMDL. This section provides discussion on the implementation of point source and nonpoint source programs that will work toward bringing water quality limiting reservoirs into compliance. The imple-mentation includes the application of Phase II Stormwater Regulations in the entire Croton System, a program that will help address nonpoint sources of phosphorus.

Also, two reports that are to be developed by NYSDEC are identified in Section VI.B.. These reports will further elaborate on the implementation process. The reports: **Identification of Nonpoint Source Management Practices Report** due six months after the TMDL is submitted to EPA; and **Recommended Practices To Be Implemented Report** due six months later.

It is also noted that Delaware County has developed a comprehensive phosphorus reduction program, which is identified in the DCAP. The measures outlined in the DCAP are directed toward assuring TMDL compliance for phosphorus in the Cannonsville Reservoir.

16. ***Comment:*** Use of 15 ug/l phosphorus is not supported by sound scientific evidence. Further study is needed. A new guidance value is premature since NYSDEC has not met burden of demonstrating a significant change in the evidence.

Response: NYSDEC has not established a ***new guidance value*** of 15ug/l for phosphorus. Section III of the June 2000 Phase II TMDL document explains the process which led to a ***site-specific interpretation*** of New York State's existing narrative ambient water quality standard for phosphorus (Title 6, Chapter X Part 703.2). The 15 ug/l value applied to the seven source water reservoirs is based on the weight of evidence provided by NYCDEP (Water Quality Guidance Value Report of March 1999) that there is a link between phosphorus concentrations, algal growth, and certain indicators of use impairments such as taste and odor complaints.

EPA's National Nutrient Strategy, currently being developed, may lead to a health based criteria for phosphorus for which there is insufficient information to establish at this time.

17. ***Comment:*** The Croton System has varying characteristics; a different phosphorus value may be appropriate for each reservoir.

Response: EPA's National Nutrient Strategy, which will be closely examined, combined with the use of more detailed reservoir models may ultimately lead to a different phosphorus criteria number for each reservoir. The information needed for this type of reservoir-specific analysis, is not yet available.

18. ***Comment:*** The proposed change in guidance value is invalid unless propulgated through rulemaking procedures under SAPA and NYSDEC regulations.

Response: The aesthetic based guidance value of 20 ug/l phosphorus has not changed and remains in effect. The 15 ug/l applied to the seven source water reservoirs represents a site-specific interpretation of NYSDEC's narrative standard pursuant to Section 703.2 of 6NYCRR Chapter X. This is a result of the review of all of the technical information submitted by the NYCDEP (March 1999), the recognition that filtration of the Croton System is not imminent and consideration of the many comments received during the public participation process on the Phase II TMDL proposal.

19. ***Comment:*** The change in guidance value may affect the definition of phosphorus restricted basins under the MOA and the NYC Watershed Rules and Regulations.

Response: The phosphorus guidance value set forth in NYSDEC TOGS 1.1.1 (update June 1998) remains at 20 ug/l. NYCDEP has developed a separate and distinct methodology for determining phosphorus restricted basins and that includes the use of the value set forth in TOGS 1.1.1.

20. ***Comment:*** The impact on Putnam County of a guidance value of 15 ug/l phosphorus could be severe.

Response: The phosphorus guidance value set forth in TOGS 1.1.1 remains at 20 ug/l. The site-specific interpretation of 15 ug/l does not affect point source phosphorus reductions in Putnam County already required by the NYC Watershed Rules and Regulations. These requirements, in-place before the TMDL was developed, are

expected to contribute to the reductions identified in the TMDL. It is anticipated that nonpoint source reductions of phosphorus in Putnam County that are needed to meet TMDLs will be achieved by the appropriate programs identified in Section VI.B., of the June 2000 TMDL. Projects that address nonpoint sources will be eligible for funding under a number of Federal and State programs designed to assist localities in addressing water quality.

21. ***Comment:*** The proposed change in the phosphorus guidance value for TMDL calculations cannot be made without first seeking the agreement of all parties to the MOA, as such a change constitutes an amendment to the MOA. The issue of the phosphorus guidance value should be deferred until the MOA is reviewed in 2002.

Response: The development of the Phase II TMDL is itself a part of the MOA (Article VI. #162). Since the water quality criteria used in the TMDL is not specified in the MOA, the use of 15 ug/l does not constitute an amendment. The use of a site-specific value of 15 ug/l in the TMDL does not alter any of the conditions of the MOA including the designation of phosphorus restricted reservoirs or the sewage treatment requirements identified in the MOA and/or NYC Watershed Rules and Regulations.

22. ***Comment:*** Consider incorporating the Delaware County Action Plan (DCAP) into New York State's Phase II Phosphorus TMDL Implementation Plan.

Response: While DCAP was not directly incorporated into the Phase II TMDL, it is expected that the actions identified in the DCAP to address phosphorus loads will implement the TMDL (Section VI). The elements of this plan are expected to support, with reasonable assurance, that the Canonsville TMDL for phosphorus will be met. They will also help mitigate concerns about the actual point source reductions achieved through the requirements of the NYC Watershed Rules and Regulations.

23. ***Comment:*** The Phase II TMDL title should be revised to include the counties located in the watershed or that the Croton, Catskill, and Delaware watersheds be identified.

Response: The title now identifies the eight counties in the watershed.

24. ***Comment:*** Several areas of the Phase II TMDL proposal should be expanded. These are: Margin of Safety, Seasonal Variation, Critical Conditions, Explanation of Phase II Loads, and Implementation/Reasonable Assurance.

Response: The June 2000 Phase II Phosphorus TMDL provides separate and expanded sections on each of the above areas.

25. ***Comment:*** NYSDEC's classification system is faulty. Reclassification hearings have not been held. Also, Croton source water reservoirs should be "AA" throughout.

Response: The proposed reclassification process for the Lower Hudson River Drainage Basin, which includes the New York City Watershed, is a separate process. The process has recently been reactivated and a Notice of Proposed rulemaking is expected to be in the *State Register* in August 2000.

Reclassification of Croton source waters, partially classified "AA", to "AA" in their entirety will be considered during the reclassification process.

26. ***Comment:*** Extend the whole farm planning program to the Croton System.

Response: Some efforts are currently underway in Putnam County through a grant under the Federal Water Resources Development Act (WRDA). The Putnam County Soil and Water Conservation District (SWCD) is conducting an agricultural nonpoint source pollution assessment of farms in the NYC Watershed.

Whole farm planning is an element of New York State's nonpoint source management program and can be an effective means of minimizing pollution from farms. Implementation of a whole farm planning program specifically in the Croton System will be evaluated as part of the two reports that are to be developed by NYSDEC: **Identification of Nonpoint Source Management Practices**; and **Recommended Practices To Be Implemented**.

27. ***Comment:*** In applying the "weight of evidence" approach to phosphorus criteria development, the tendency should have been toward a very conservative value.

Response: The weight of evidence approach was utilized to develop a relationship between phosphorus and chlorophyll *a* levels, and certain water quality variables which have been demonstrated too negatively affect the water quality of the drinking water supplied by the City's reservoirs. This process is discussed in detail in NYCDEP's **Guidance Value Report** of March, 1999 as well as Section III of the June 2000 TMDL submitted to USEPA.

In the report mentioned above, NYCDEP recommended that, at this time, a phosphorus value of 15 ug/l was adequate to protect its source water reservoirs. Phosphorus levels in the upstream reservoirs would be set at 20 ug/l (guidance value TOGS 1.1.1) until additional information and detailed modeling demonstrates the need for a revised value.

In addition, it should be noted that the TMDL is but one of a number of programs that in total, provide "multiple barriers" for the protection of the best use of the waters of the NYC watershed. In the future, USEPA, New York State, New York City and the many municipalities, private businesses and private individuals located in the watershed are committed to comprehensive monitoring programs, reservoir modeling efforts wastewater treatment and nonpoint source management activities.