UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

FEB 28 2013

Mr. Mike Freiman
Chief, Surface Water Division
Mississippi Department
of Environmental Quality
515 East Amite Street
Jackson, Mississippi 39201

Dear Mr. Freiman:

On December 14, 2012, the United States Environmental Protection Agency responded to a petition from the Natural Resources Defense Council requesting the EPA to undertake rulemaking to establish numeric limits for nutrients in discharges from publicly owned treatment works (POTWs) as part of the Agency's secondary treatment regulations (Enclosure 1). After careful consideration, the Agency denied this request and will not pursue national rulemaking to establish uniform technology-based requirements at this time. Instead it is the EPA's preferred strategy to comprehensively control and manage all major sources of nutrients contributing to water quality impairments in particular watersheds. The EPA intends to continue water quality-based permitting of point source discharges of POTWs and other significant point sources of nutrients.

The EPA Region 4 remains concerned about the impact of nutrients on water quality. The most recent data available for Region 4 on the EPA's "Electronic Integrated Reporting under [Clean Water Act (CWA)] sections 305(b) and 303(d) (Water Quality Assessment and TMDL Information)" website (www.epa.gov/waters/ir/) shows that nutrients continue to be a significant cause of water quality impairments as reported by states. As you are well aware, waters that contain excessive nutrients can potentially create conditions harmful to aquatic life, recreational values and human health. Excess nutrients directly cause excess algal growth which then results in the reduction or depletion of oxygen levels that are critical for fish and aquatic life. Elevated nutrients cause nuisance conditions of aquatic plant and algal blooms and can increase the levels and occurrences of toxic cyanobacteria and other harmful algal blooms. Also, there is an increased possibility of the formation of disinfectant by products at drinking water treatment plants when drinking water source waters have elevated levels of total organic carbon as a result of elevated algae concentrations.

The EPA Region 4 wants to ensure that states consistently evaluate permit application data to determine whether the discharge of nutrients may cause or contribute to an excursion beyond the numeric and narrative water quality criteria for nutrients as required by 40 Code of Federal Regulation (CFR) § 122.44(d). CWA sections 301 and 402 require National Pollutant Discharge Elimination System (NPDES) permits to include effluent limitations as needed for discharges to meet water quality standards. The regulation at 40 CFR § 122.44(d), made applicable to states by 40 CFR § 123.25(a), implements these sections by requiring a permit-issuing agency to determine whether point source discharges will cause, have a reasonable potential to cause, or contribute to an excursion beyond applicable water quality criteria; and set water quality-based effluent limitations in permits when the Agency makes an affirmative determination. The regulation applies whether the relevant criteria are

expressed numerically or in a narrative fashion. For narrative criteria, the regulation at 40 CFR § 122.44(d)(1)(vi) provides three methods for setting numeric effluent limitations in permits:

1. Set the limit using a calculated criterion which the permitting agency demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use; such a criterion may be derived using a proposed state criterion or explicit state policy or regulation interpreting its narrative criterion, supplemented with other relevant information;
2. Set the limit based on the EPA's CWA section 304(a) recommended criteria supplemented by other information (where necessary); or
3. Set the limit on an indicator parameter, provided certain conditions are met.

Region 4 expects that states will follow 40 CFR § 122.44(d) and 40 CFR § 122.44(k) when developing permits for nutrient wastewater and stormwater discharges. Specifically, a state must: (1) determine whether nutrient discharges will cause, have a reasonable potential to cause, or contribute to an excursion beyond numeric or narrative standards or criteria as established by state and federal law in proximate and downstream waters; and (2) set numeric effluent limitations which are derived from and comply with state and federal law, when it makes an affirmative determination that reasonable potential exists to cause or contribute to an excursion of numeric or narrative state or federal water quality standards or criteria. *It is generally not appropriate for permits to authorize discharges of existing pollutant loads to waters that are impaired due to excess nutrients.*

When making reasonable potential determinations, 40 CFR § 122.44(d)(1)(ii) requires permit-issuing agencies to use procedures that account for existing controls on point and nonpoint sources of pollutants, the variability of the pollutant or pollutant parameter in the effluent, and where appropriate, the dilution of the effluent in the receiving waters. The EPA encourages states to establish such procedures for making determinations relative to nutrient discharges. Additionally, we encourage states to establish explicit policies that interpret narrative water quality criteria and serve as a basis for establishing water quality-based effluent limits pursuant to 40 CFR § 122.44(d)(1)(vi)(A). The information provided in Enclosure 2 may assist you in developing these procedures. We request that you keep the EPA Region 4 fully informed of any proposed modifications to these procedures or policies as per 40 CFR § 123.62(a); this will allow us to share best practices with all Region 4 states.

I realize there are very real concerns about technical and financial challenges associated with consistently meeting water quality-based effluent limits for nutrients. However, the CWA and its implementing regulations provide some flexibilities and options. For example, the discharger may pursue "pollutant trading" with other NPDES permittees or with non-point nutrient sources in the waterbody to obtain further reductions from these other sources in lieu of reductions at the discharger's outfall. A permitting authority may be able to maintain existing nutrient limits if they are consistent with the assumptions and requirements of any wasteload allocation that has been assigned to the discharge as part of an approved Total Maximum Daily Load (40 CFR § 122.44(d)(1)(vii)(B)). Water quality standards variances established pursuant to CWA § 303(c) and 40 CFR § 131 could provide another basis for maintaining an existing load. 40 CFR § 122.47 allows for compliance schedules to allow dischargers to comply with the CWA.

Additionally, on June 5, 2012, the EPA released the final Integrated Municipal Stormwater and Wastewater Planning Approach Framework after extensive public input including a series of workshops across the country. An integrated planning process has the potential to identify a prioritized critical path to achieving the water quality objectives of the CWA by identifying efficiencies in implementing competing requirements that arise from separate wastewater and stormwater projects, including capital

investments and operation and maintenance requirements. This approach can also lead to more sustainable and comprehensive solutions, such as green infrastructure, that improves water quality as well as supports other quality of life attributes that enhance the vitality of communities. The CWA and implementing regulations, policy and guidance provide the necessary flexibility to implement an integrated planning process. More information is available at cfpub.epa.gov/npdes/integratedplans.cfm.

Based on the recent clarification of how the Agency intends to address nutrients discussed in Enclosure 1, the EPA Region 4 will begin to focus more attention to NPDES permits with discharges of significant nutrient loads to nutrient-impaired waters and to effluent-dominated waterbodies, and will be evaluating the sufficiency of water quality-based permit limits for nutrients in the state draft permits that we review. The EPA is committed to maintaining a high level of cooperation and coordination between your staff and ours in a partnership to ensure successful and effective administration of the NPDES program and to ensure that nutrient discharges do not cause or contribute to exceedances of state water quality standards. If you have any questions, please contact Mr. Chris Thomas at (404) 562-9459.

Sincerely,

James D. Giattina
Director
Water Protection Division

Enclosures:
1. EPA Response to Petition Requesting Secondary Treatment Nutrient Limits and Performance Data
2. Tools for Nutrient Water Quality Based Effluent Limits

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 1 4 2012

OFFICE OF WATER

Ms. Ann Alexander, Esq.
Natural Resources Defense Council
2 North Riverside Plaza, Suite 2250
Chicago, Illinois 60606

Dear Ms. Alexander:

Thank you for the November 27, 2007, letter to Administrator Johnson and the accompanying petition on behalf of the Natural Resources Defense Council and ten other organizations requesting that the U.S. Environmental Protection Agency publish updated information about secondary treatment nutrient removal capability and establish new technology-based nutrient limits as part of the secondary treatment standards. The EPA has thoroughly considered the information you provided in the petition. The EPA's decisions concerning your requests are guided by the Agency's commitment to carry out the objective of the Clean Water Act to restore and maintain the nation's waters.

NRDC's first request cites CWA Section 304(d)(1) in asking the EPA to publish updated information on the degree of nutrient reduction attainable through secondary treatment of effluent discharged by municipal wastewater treatment plants, typically known as publically owned treatment works. In response, the EPA is publishing the most current data available on the degree of effluent reduction attainable through the application of secondary treatment. With respect to nutrients in particular, the EPA notes that secondary treatment technology is not designed for nutrient removal. Nevertheless, the EPA sought out information on incidental removals of nutrients by secondary treatment. Not unexpectedly, however, we found that insufficient data exist to draw any general conclusions about the ability of secondary treatment to remove nutrients.

NRDC's second request is for the EPA to establish new generally applicable technology-based nitrogen and phosphorus (nutrients) limitations as part of the secondary treatment regulations for POTWs. After careful consideration, the EPA is denying this request. We find that a uniform set of nationally applicable, technology-based nutrient limits is not warranted at this time. An effort to set such uniform national limits would require POTWs to incur high costs even where such costs are not necessary to protect water quality. In addition, the record indicates that some POTWs face technical constraints to installing more advanced treatment. Instead of pursuing national rulemaking to establish uniform technology-based requirements, the EPA is effectively pursuing the control of nutrient discharges at POTWs by means of site-specific, water-quality-based permitting. The reasons for this decision are discussed more fully below.

I. The EPA Has Completed a Current Up-To-Date Review of Pollutant Reduction Attainable through the Application of Secondary Treatment

Citing CWA Section 304(d)(1), NRDC first requested that the EPA publish information on the degree of effluent reduction attainable at the present time through the application of secondary treatment for nutrient pollution. In response, the EPA has decided it is advisable at this time to publish updated information on the performance of secondary treatment. Accordingly, the EPA is publishing the "Secondary Treatment Performance Report" (EPA, 2012a).[1] This report summarizes the most current information on the degree of effluent reduction of the conventional pollutants biochemical oxygen demand and total suspended solids attainable by the application of secondary treatment at POTWs. The report gives this information for POTWs with discharge volumes greater than or equal to 10 million gallons per day.

NRDC's petition asks that the EPA specifically publish information on nutrient reductions attainable by secondary treatment technology. The technology that formed the basis for the EPA's secondary treatment regulations, however, is not designed to remove nutrients. Nevertheless, in light of the petition, the EPA did investigate whether there are data on incidental nutrient removals at POTWs that employ secondary treatment technology and only such technology (i.e., without the addition of further, more advanced treatment). We found, however, that very little nutrient removal data exist for such POTWs and we note that such POTWs are not required to report incidental nutrient removal information to the EPA. Where nutrient discharge monitoring data do exist (which is only at about 30 percent of all POTWs), generally it is at facilities that employ not just secondary treatment technology but also more advanced treatment technologies. Consequently, the EPA was unable to draw any general conclusions about incidental nutrient removals at POTWs that employ only secondary treatment technology.

II. Establishment of Nutrient Limits in the Secondary Treatment Standard to Control POTW Nutrient Discharges Is Not Warranted at This Time

The petition also requests that the EPA amend its secondary treatment regulations to establish generally applicable nutrient limits at POTWs. It asserts that the CWA requires the EPA to address POTW pollutant discharges and establish limits achievable by secondary treatment (Pet. at 45). This part of the petition invokes the EPA's authority to establish secondary treatment regulations for POTWs under CWA Section 301(b)(1)(B).[2]

Reducing and eliminating the environmental harm caused by nutrient pollution is one of the EPA's top priorities. The Agency has devoted considerable effort and resources to comprehensively evaluating and addressing nutrients from significant non-point and point sources, including POTWs.
After careful consideration of the information and arguments presented in your petition[3], the EPA has determined that it is not warranted at this time to revise the secondary treatment regulations to establish new effluent limitations for nutrients. As explained further below, we conclude that the need to control

---

[1] The "Secondary Treatment Performance Report" (EPA, 2012a) will be provided to NRDC early in 2013.

[2] CWA Section 301(b) states that "there shall be achieved . . . (1)(b) for [POTWs]. . . effluent limitations based upon secondary treatment as defined by the Administrator pursuant to Section 304(d)(1)."

[3] EPA has also considered NRDC's follow-up letter of April 21, 2010, and has also considered, among other things, comments on this petition submitted by the National Association of Clean Water Agencies (NACWA) in letters dated February 29, 2008, Sept. 24, 2009, June 8, 2010, and November 9, 2012, and follow up information submittals by NACWA.

nutrients at POTWs is a highly site-specific matter that is not well-suited to being carried out through a uniform national rule; that not all POTWs nationwide need to meet minimum technology-based limits for nutrients to protect water quality; and that many POTWs would incur high costs individually, and POTWs overall would incur annual costs of tens of billions of dollars nationally to meet such uniform technology-based limits. Instead, as a preferred approach, the EPA finds that the water-quality based permitting provisions of the CWA and the EPA's implementing regulations give the EPA and the authorized states the flexibility to decide where POTW nutrient controls are needed, and to establish such controls, as part of comprehensive efforts to address surface water impairment due to excessive levels of nutrients from both POTWs and other sources.

III. Background on Secondary Treatment

The term "secondary treatment" is not defined in the CWA, and the Act therefore gives the EPA broad discretion to define the term. The legislative history shows that Congress intended secondary treatment to serve as a technology floor consisting of removal efficiencies between 50 and 90 percent for organic suspended solids and BOD through biological treatment. The EPA's existing secondary treatment regulations satisfy the CWA's requirements to establish secondary treatment standards because they set numerical limitations on BOD, TSS, and pH. In short, the EPA has broad discretion to determine whether to revise the existing regulatory definition of secondary treatment to establish new nationally applicable effluent limitations for nutrients as NRDC requests. The EPA finds there are a number of factors that are relevant to this determination, as we describe in the following sections.

Historically, sewage treatment processes were grouped together as primary or secondary based on the technology by which pollutant removal was accomplished, as well as the pollutants removed by those technologies. Primary treatment removes pollutants through liquid-solid separation techniques. Secondary treatment employs biological treatment systems to reduce pollutants, particularly degradable organic materials, not effectively removed by primary treatment. In establishing the secondary treatment regulations, the EPA used the approach, consistent with other sections of the CWA pertaining to establishment of technology-based effluent limits, of evaluating performance data from well-designed and operated treatment plants to determine which pollutants would be effectively and consistently reduced. The EPA selected activated sludge treatment, the most common technology at the time for reducing degradable organic materials not effectively removed by primary treatment, as the primary basis for evaluating the removal performance of pollutants typically expected to occur in the influent to POTWs: BOD, ammonia-nitrogen and other forms of nitrogen, phosphorus, and TSS. The EPA determined that only BOD, TSS, and pH could be effectively and consistently reduced and thus required POTWs to remove 85 percent, on a monthly basis, of BOD and TSS, and to maintain an effluent pH between 6.0 and 9.0. The Agency did not specify numeric limits for nitrogen and phosphorous under secondary treatment because it found under normal conditions activated sludge treatment systems do not effectively or consistently remove these pollutants.[4]

POTWs were required to meet secondary treatment requirements, which represented a minimum technology-based standard of treatment, by 1977. We note that the CWA originally also set a further deadline of 1983 for POTWs to meet a higher (or advanced) level of technology-based treatment termed "Best Practicable Waste Treatment Technology. The Act's legislative history shows that Congress expressly envisioned that nutrients were one of the categories of additional constituents that would be

[4] 48 FR 52272, 52273 (Nov. 16, 1983).

addressed by advanced treatment.[5] However, in the Municipal Wastewater Treatment Construction Grants Amendments of 1981, Congress, recognizing the shortfall of federal funding for the construction of facilities, repealed the 1983 deadline for all POTWs to achieve compliance with BPWTT requirements.[6]

IV. Obstacles to Developing a Uniform National Technology-based Standard for Nutrients at POTWs

To be sure, for many POTWs across the country, nutrient removal technologies can and should be installed, even though it may be costly, in order to meet the water-quality based requirements of the CWA.[7] Nevertheless, while this may be the case at various individual POTWs, the EPA finds there are obstacles to developing a uniform technology-based standard for nutrients that would apply to all POTWs nationwide. After close examination of the most current data, the EPA finds that many POTWs would require significant upgrades to their existing technologies designed to meet secondary treatment standards in order to install nutrient removal technologies. Moreover, at certain POTWs, installing nutrient removal technologies would either be technologically difficult (e.g., due to land constraints) or would involve extremely high costs[8].

We also note that the feasibility of replacing current secondary treatment systems to add nutrient removal is highly site-specific, depending on numerous factors unique to each site. These include the current system's size, design, and retention time, the system's age and remaining useful life, whether combined sewer systems are present (which create significantly higher influent flows during periods of high rainfall), the availability and cost of land for any necessary expansion, zoning codes and local land use concerns, and differences in sludge generation and associated dewatering and disposal costs. In addition to the fact that certain upgrades are technologically difficult or are not affordable at many POTWs, the high variability in what each POTW can achieve at its specific location means it would be very challenging to develop a uniform national rule containing one set of requirements.

Current system size is a particularly important factor in determining the cost of upgrading systems designed to meet secondary treatment standards. Small POTWs are generally less technologically

---

[5] See H. Rep. No. 92-911, Report of the Committee on Public Works, U.S. House of Representatives, with Additional and Supplemental Views, Federal Water Pollution Control Act Amendments of 1972, at 87-88 (March 11, 1972) ("The term 'best practicable waste treatment technology' covers a range of possible technologies. . . . Particular attention should be given to treatment and disposal techniques which recycle organic matter and nutrients within the ecological cycle. . . . In defining 'best practicable waste treatment technology' for a given case, consideration must be given to new or improved treatment techniques which have been developed and are now considered to be ready for full-scale application. These include . . . phosphorus and nitrogen removal. . . .")

[6] See report of the Senate Committee on Environment and Public Works, Clean Water Act Amendments of 1981, S. Rep. No. 97-204 at 17 (Oct. 7, 1981). In the same legislation, Congress extended the deadline for achieving standards based on secondary treatment to 1988 for certain POTWs.

[7] NRDC said in their April 21, 2010, letter to EPA Office of Water Assistant Administrator Peter Silva that the 2009 EPA report "An Urgent Call to Action: Report of the State-EPA Nutrient Innovations Task Group" (EPA, 2009) suggested that EPA "[c]onsider redefining the secondary treatment requirement for wastewater treatment plants to include nitrogen and phosphorus by adding them to the list of pollutants that require technology-based effluent limits." However, the same report notes that not all POTW permits may need numeric phosphorus and nitrogen limits to address water quality issues.

[8] Feasibility studies conducted for two POTWs in King County, Washington demonstrated the effect that installation of nutrient reduction technologies had on the capacity of the existing facilities. In both instances, new systems were necessary in addition to upgrades to the existing systems to handle the volume of wastewater. At one of the two POTWs, there was no land available on which to build the necessary additional capacity (King County, 2012 and 2011).

sophisticated than large POTWs and thus many would require significant upgrades to remove nutrients at a higher unit cost.[9] Many small POTWs only have basic lagoons and trickling filters to meet secondary treatment requirements. Small POTWs, moreover, have a limited ability to pay for upgrades because they have a small customer base.[10]

If the EPA were to establish new nutrient limitations as part of the secondary treatment standards, they would apply to all POTWs nationally and thus impose technology retrofit or replacement costs regardless of whether their discharges are causing or contributing to water quality problems. Based on recent analysis of costs and efficiencies of nutrient removal technologies, the EPA has determined that retrofitting or replacing secondary treatment technologies at POTWs with a flow of at least 0.5 million gallons per day (MGD)[11] to incorporate advanced nutrient removal would impose costs of from 5 to 12 billion dollars annually (based on a seven percent interest rate) depending on whether facilities could retrofit their current systems or would need to replace them (EPA, 2012b). Not included in this estimate of costs are POTWs with flows of at least 0.5 MGD that have waivers from secondary treatment, use trickling filters or stabilization basins without activated sludge, or that were determined to already have the necessary treatment in place. The POTWs for which the EPA estimated costs represent about 33 percent of all POTWs nationwide but represent nearly 90 percent of the total municipal wastewater treated. The capital investment required to retrofit existing technology is estimated to cost 45 billion dollars. The capital investment required to replace existing technology is estimated to cost 130 billion dollars. Requiring nutrient limits for POTWs of all sizes would result in higher total capital investment costs. On a per gallon basis, it would be more expensive for small POTWs than large POTWs to upgrade to accomplish nutrient reductions because many of the small POTWs would need to replace their current systems. As noted by Symbiont (Symbiont, 2011), smaller POTWs have a proportionately higher cost to achieve nutrient removal, as much as 200 dollars per MGD.

As explained further below, the EPA's decision to deny NRDC's request to add technology-based nutrient limitations to the Agency's secondary treatment standards reflects a reasoned balancing of relevant policy concerns entirely consistent with the intent of Congress, which believed that it would be wasteful of public funds to define secondary treatment in such a way as to require facilities to achieve unnecessary degrees of advanced treatment (U.S. Senate, 1981). The EPA's decision is also consistent with the CWA's legislative history concerning the removal of the deadline for POTWs to meet BPWTT, especially given Congress's express mention that it was under the advanced level of treatment represented by BPWTT that nutrients could be addressed.

---

[9] A study conducted for the State of Illinois examined unit costs for upgrading POTWs to remove nutrients. The study determined that the unit cost for installing phosphorus controls varies greatly based on the size of the POTW with a range of more than 200 dollars per MGD between large POTWs (discharge flow of 10 MGD or higher) and small POTWs (discharge flow of 1 MGD or less) (Symbiont, 2011).

[10] It should be noted further that although large POTWs typically have more sophisticated secondary treatment technologies than small POTWs, such as activated sludge treatment, many may not be able to expand due to the availability and cost of adjoining land parcels.

[11] EPA used the CAPDET model (Computer-Assisted Procedure for the Design and Evaluation of Wastewater Treatment Systems) to estimate the costs associated with nutrient treatment (EPA, 2012b). The limitations of the CAPDET model restricted EPA's ability to estimate the costs for POTWs with smaller flows. Moreover, the cost estimates for POTWs with flows of at least 0.5 MGD do not include costs to install nutrient controls at facilities which use trickling filters or stabilization basins which are more prevalent at POTWs with flows less than 1 MGD.

V. The Continuation of the EPA's Water-Quality-Based Approach for Controlling POTW Nutrient Discharges is Warranted

While nutrient pollution does warrant advanced treatment control at some POTWs to protect water quality, it is unnecessary at others. The CWA requires application of effluent limitations for nutrients that are met by using advanced treatment where necessary to meet applicable water quality standards. These limitations are called water quality-based effluent limits or WQBELS (CWA section 301(b)(1)(C); 40 C.F.R. §§ 122.4(d); 122.44(d)(1)(vii)(A); applicable to the states at 40 C.F.R. § 123.25). Specifically, where secondary treatment is insufficient to protect the quality of the receiving waterbody, POTWs must meet any more stringent water quality-based effluent limits derived to achieve water quality standards.

The EPA's long-held view, consistent with the requirements of the CWA, is that given the site-specific variation in technological feasibility and costs of nutrient treatment systems, as well as how aquatic ecosystems respond to nutrient additions, POTW nutrient discharges are best addressed through water-quality-based permitting. There are approximately 16,000 POTWs in the U.S., but only about 4,300 are major dischargers with a flow greater than one million gallons per day. As illustrated by an analysis of discharges into the Chesapeake Bay discussed below, advanced nutrient treatment is not necessary at many smaller POTWs in watersheds where water quality standards can be met in other ways, for example, through a combination of controls on stormwater, agricultural point and nonpoint sources and larger POTWs.

In many areas water quality-based permit limits can prevent or correct nutrient-related impairments more effectively than national technology-based nutrient limits due to site-specific variability of waterbody response to nutrients. The EPA's strategy, articulated in the March 16, 2011 memorandum from Nancy Stoner, the EPA Acting Assistant Administrator for the Office of Water, entitled "Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions" (Framework Memo) (EPA, 2011), envisions a number of different approaches which can be tailored to specific circumstances on a state or watershed-based level through close cooperation among the EPA, states, other federal agencies, and stakeholders. This collaborative watershed approach to nutrient controls is accomplishing substantial nutrient reductions in several notable watersheds such as the Long Island Sound (CTDEP, 2007a) and the Great Lakes (Great Lakes Commission, 2012), as well as in many smaller but no less important watersheds. For instance, approximately 8,000 nutrient-related total maximum daily loads (TMDLs) have been established throughout the United States (EPA, 2012c). A number of states have issued POTW permits with numeric nutrient limits. These states include Connecticut, Rhode Island, New Jersey, Pennsylvania, California, and Washington. In addition, the State of Wisconsin began setting water quality-based permit limits for phosphorus in streams, rivers, and lakes, and issued rules that describe how phosphorus criteria will be implemented through watershed-adaptive management plans. Other progress being made by states to control nutrient discharges includes efforts made by North Carolina, which has required nutrient monitoring for more than 96 percent of permitted flows in the state.

POTW water quality-based permit limits are driving the growing trend in the installation of advanced nutrient treatment systems. As shown in the EPA's 2008 Clean Watersheds Needs Survey, 31 percent of POTWs with discharges greater than 10 MGD had treatment systems to remove nitrogen, or phosphorous, or both (EPA, 2008a). POTWs discharging more than 10 MGD account for 70 percent of

national POTW discharge flow. Based on funding requests, an additional 18 percent of POTWs nationwide anticipate installing nitrogen or phosphorus treatment systems, or both, within the next ten years, resulting in a total of 49 percent of POTWs that will have advanced treatment systems.

VI. Past Petitions to Amend Secondary Treatment Regulations to Establish Effluent Limitations for Nutrients

Prior to NRDC's petition, the EPA received two similar petitions to amend the secondary treatment regulations to include nutrients. The EPA denied both Peter Maier's petition, submitted in 1993, and the Chesapeake Bay Foundation's Petition, submitted in 2003. Today's decision on NRDC's current petition is consistent with the Agency's decisions on both of these past petitions.

Mr. Maier challenged the EPA's denial of his petition in a lawsuit brought before the U.S. Court of Appeals for the Tenth Circuit. The Tenth Circuit upheld the EPA's denial, agreeing with the Agency that the CWA does not require the EPA to establish generally applicable technology-based secondary treatment limitations for all pollutants that might be reduced by secondary treatment. Maier v. EPA, 114 F.3d 1032 (10th Cir. 1997). Rather, the court found that the CWA grants the EPA discretion to determine whether it should set generally applicable technology-based limits for specific pollutants such as nutrients. The Tenth Circuit noted that:

> "We should not order the agency to develop generally-applicable parameters [for nutrients] based on the use of new technology, even if cost effective, in the face of the Agency's reasoned judgement that the use of such technology is irrelevant to the attainment of water quality standards in many circumstances."

The court found, moreover, that the EPA's decision to control POTW nutrient discharges through individual permits rather than by adding nutrient limits to secondary treatment standards was supported by the Agency's reasoned explanation that nutrient effects on water quality are highly variable depending on the characteristics of the receiving water, and that water quality-based nutrient limits protect water quality where necessary.

The EPA denied the Chesapeake Bay Foundation petition requesting establishment of technology-based nitrogen limits as part of the secondary treatment standards for similar reasons. POTW nutrient controls are best determined case-by-case for each receiving water segment, providing a better-tailored site-specific response to water quality issues than uniform technology-based regulations. The EPA reasoned, as it did in its denial of the Maier petition, that technology-based nitrogen limits would impose unnecessary expenses on some POTWs where such controls are not needed to protect water quality. The EPA also noted that the Agency and the states in the Chesapeake Bay watershed were already making significant progress to control POTW discharges through water quality-based permitting. The Chesapeake Bay Foundation did not bring a judicial challenge to the EPA's decision.

VII. NRDC's Suggested Uniform Approach for Establishing POTW Requirements is Not Always Necessary to Protect Water Quality

How POTWs should control nutrients to ensure attainment of water quality standards depends upon a variety of water quality-based factors. The water quality-based permitting approach allows permitting

authorities to take relevant physical, chemical, and biological factors into account to ensure that pollutants from POTWs are controlled so not to cause or contribute to an excursion above water quality standards. For example, when establishing a water quality-based effluent limit, the permit writer may consider information about the waterbody (i.e. the size, type, and ecoregion), nutrient loadings from other point and nonpoint sources, controls on those other sources of nutrients, and ambient nutrient concentrations in receiving water. At this time, the EPA believes a discharger-specific approach to POTW nutrient permitting is better suited for protecting water quality in a particular waterbody or watershed because this approach provides permit limits as stringent as necessary, in combination with controls on other point and nonpoint sources, to protect water quality standards.

VIII. NRDC's Suggested Uniform Approach Would Impose Significant Unnecessary Costs on Many POTWs

The EPA fundamentally disagrees with NRDC's claim that in most cases, minor retrofits to existing POTWs would enable them to cost-effectively reduce nutrient levels in their discharges. (Pet. At 14). Many POTWs in the United States, the majority of which are small systems,[12] would require substantial upgrades at a very high cost to individual POTWs and to POTWs as a whole across the country. The cost estimates for many of the treatment systems discussed in NRDC's petition are based on the incorrect assumption that most POTWs are already using activated sludge systems, nitrification units, filtration processes, or methanol or chemical addition. Although the petition cites examples of POTWs NRDC claims could achieve significant nutrient reduction with only minor modification, upon investigation, the EPA found that most of the facilities cited are already using some type of advanced treatment method in addition to activated sludge systems in order to meet their permit requirements.

Moreover, many smaller POTWs throughout the country are currently conducting secondary treatment with only trickling filters, lagoons, or oxidation ponds. There is a provision in the Act, Section 304(d)(4), that allows these treatment methods, which generally provide lesser treatment than standard activated sludge systems, to be deemed the equivalent of secondary treatment. In order to construct the nutrient removal technologies discussed in NRDC's petition, such small POTWs, which typically have a limited customer base from which to draw funding, in general would have to completely revamp their systems at a very significant cost. The EPA does not believe in general that there are minor, inexpensive modifications to POTWs using trickling filters, lagoons, or oxidation ponds that would allow them to meet the nutrient limits suggested by NRDC, and NRDC offers no examples of what those minor modifications might be.

The EPA conducted an analysis of the costs and efficiencies of various nutrient removal technologies to examine the claims in NRDC's petition. As noted, most of the POTWs cited in NRDC's petition already have treatment that is considered to be advanced treatment and thus cannot be considered examples of the performance of secondary treatment alone. In addition, several of these POTWs have reported design flows that are at least twice the volume of the actual flow. It is much easier for POTWs to retrofit secondary treatment systems with the needed additional treatment steps for nutrient removal if there is excess capacity in the secondary treatment system. Excess capacity is a site specific condition. It is important to note that POTWs located in areas where growth is anticipated may not be able to use excess capacity to retrofit their systems to achieve nutrient removal.

---

[12] There are approximately 16,000 POTWs in the United States. About 11,700 POTWs, or 73 percent, are classified as "minor" facilities because they have discharge flows of less than 1 million gallons per day.

The EPA has determined that the national cost of retrofitting or replacing secondary treatment technologies at all POTWs to incorporate even the less stringent nutrient limitations advocated in the petition (1.0 mg/L total phosphorus and 8.0 mg/L total nitrogen)[13] would likely exceed 5 billion dollars annually, with a total commensurate capital cost likely to exceed 50 billion dollars based on a seven percent interest rate (EPA, 2012b). These cost estimates have a broad range due to the site-specific nature of upgrade and replacement requirements. There is considerable uncertainty about the exact amount of money required to upgrade POTWs due to a range of site-specific factors such as the age and remaining useful life of treatment systems and components, whether treatment systems could be retrofitted or would have to be replaced, whether combined stormwater systems are present (which create significantly higher influent flows during periods of high rainfall), local differences in electricity costs, availability and cost of land for any necessary facility expansion, differences in amounts of treatment chemicals needed, differences in sludge generation and associated dewatering and disposal costs, and differences in construction loan rates and payback periods. Despite uncertainty about the exact cost, however, the EPA is confident that even at the lower end of the cost estimate range based on conservative assumptions, POTW upgrades to meet NRDC's request would at a minimum require tens of billions of dollars annually.[14]

To support its claim that nutrient treatment is affordable, NRDC also cited a number of studies that provided per capita cost estimates for nutrient treatment ranging from $3.60/year to almost $20/year (Pet. at 35-41.) The EPA's own estimates of per capita costs are higher, finding that these costs range from about $5/year at the low end of the range for retrofit costs to around $63/year at the high end of the range for replacement costs based on a seven percent interest rate (EPA 2012b). In any event, beyond the per capita costs, the EPA finds, as noted, that it is also important to consider the high aggregate costs, estimated in the tens of billions of dollars annually, of a nationwide rule. Given that NRDC's suggested uniform approach for establishing nutrient controls at POTWs is not always necessary to protect water quality, as discussed elsewhere in this letter, the EPA finds that such a uniform approach would impose significant unnecessary costs on many POTWs.

IX. The EPA and Authorized States Continue to Make Significant Progress Controlling POTW Nutrient Discharges through Water Quality-Based Permitting

The significant progress the EPA and authorized States have made controlling POTW nutrient discharges through water quality-based permitting has been fostered through ongoing national regulatory, policy, and information initiatives by the EPA and authorized states to better control nutrients from all sources, including POTWs. State development of numeric nutrient criteria is one such activity resulting from such initiatives. Twenty-five states now have some form of either state-wide or waterbody-specific numeric nutrient criteria (EPA, 2012c). Many of the remaining states have initiated, or plan to begin, processes to develop numeric nutrient criteria.

---

[13] NRDC contends that limits of 0.3 milligrams per liter total phosphorus and 3.0 milligrams per liter total nitrogen are consistently attainable using current technology, and that limits of 1.0 milligrams per liter total phosphorus and 8.0 milligrams per liter total nitrogen averaged yearly can be met with existing technology that uses only improved conventional biological treatment processes.

[14] The petition notes that federal funds may be available to defray the cost of achieving nutrient removal. The availability of federal funds, however, is speculative.

The EPA's ongoing support for state efforts to control nutrients is reflected in several key policy directives, including the EPA's 1998 "National Strategy for the Development of Regional Nutrient Criteria," (EPA, 1998) the 2001 national action plan for the establishment of numeric nutrient criteria (EPA, 2001), the 2007 memorandum directing the EPA regional offices to accelerate progress towards the development of numeric nutrient water quality standards (EPA, 2007b), and the March 16, 2011, Framework Memo to the EPA regional offices (EPA, 2011). The Framework Memo synthesizes essential principles that guide Agency technical assistance and collaboration with states, places a strong emphasis on working with states to achieve near-term reductions in nutrient discharges, and emphasizes development of numeric nutrient criteria and effective use of water quality-based permits.

Additionally, for the past several decades the EPA has collaborated with and provided technical support to local, regional, and state regulators in planning and implementing cost-effective advanced treatment projects for POTWs where nutrient removal is necessary. The EPA has recently published three comprehensive assessments of nutrient removal technologies titled "Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus" (EPA, 2007c), "Municipal Nutrient Removal Technologies Reference Document" (EPA, 2008b), and the "Nutrient Control Design Manual: State of Technology Review Report" (EPA, 2010a). However, as noted, there are existing POTWs that could not implement the technologies discussed in these documents through minor modifications. The cost and technological feasibility of implementation of advanced treatment technologies depends on the site-specific factors discussed above.

One notable example of a comprehensive approach to reducing nutrient discharges is the analysis performed jointly by the EPA, the Chesapeake Bay states, and the District of Columbia (the jurisdictions) to support water quality standards attainment in the Chesapeake Bay. The EPA and the jurisdictions worked collaboratively to set annual loadings caps for nitrogen, phosphorus, and sediment in the Bay and its tidal tributaries through the 2010 Chesapeake Bay TMDL process. The EPA and the jurisdictions, moreover, set nutrient loading allocations for point and nonpoint sources in the Chesapeake Bay watershed in order to meet the loadings caps and attain dissolved oxygen, clarity, and chlorophyll-a water quality criteria in the Bay and its tidal tributaries (EPA, 2010b). State-developed plans to implement the TMDL at the watershed level demonstrate, among other things, the serious and expensive commitments made by communities and states to successfully control POTW nutrient discharges where needed, together with reductions by other point and non-point sources, to achieve the Bay's water quality standards. The analysis of where nutrient controls are needed, performed for these implementation plans, indicates that 420 POTWs responsible for the vast majority of POTW nutrient loadings to the Chesapeake Bay need, and either have or will install, advanced treatment systems. Significantly, it is anticipated that water quality standards will be met in the Chesapeake Bay and its tidal tributaries without requiring approximately 3,300 smaller POTWs in the watershed to bear the expense of installing advanced treatment systems.

As previously mentioned, the EPA's collaborative watershed approach for controlling nutrient discharges has achieved substantial nutrient reductions in several notable watersheds across the United States in addition to the Chesapeake Bay such as the Great Lakes and the Long Island Sound. The Great Lakes, for instance, represents an unprecedented international success in reducing nutrient discharges, accomplished in large part through water quality-based permitting of POTWs. Total phosphorus discharged to the Great Lakes has been reduced below levels specified in the Agreement for Lake

Superior and Lake Michigan, and is at or near the levels needed for Lake Erie and Lake Ontario (Great Lakes Commission, 2012).

Many local governments are confronting difficult financial conditions. Their ability to finance POTW improvements by raising revenues or issuing bonds has declined during the economic downturn and ongoing economic recovery. While technology-based standards serve a foundational role by providing a minimum for dischargers to meet in order to make progress towards achieving water quality standards, raising the technology-based minimum standards for all POTWs may impose unnecessary costs on some municipalities. Given the reduced ability of states, tribes, and municipalities to finance POTW improvements, and given that the EPA already has in place the water quality-based permitting approach available to address POTW nutrient discharges, this is not the appropriate time to revise the definition of secondary treatment in a fundamental way that may impose unnecessary costs on some municipalities.

X. Rulemaking to Establish Technology-Based Nutrient Limits as Part of the Secondary Treatment Standards Is Not Warranted At this Time Given the EPA's Limited Resources and Competing Program Priorities

In considering your request, the EPA has also taken into account its own resource constraints and programmatic priorities. The amount of agency resources in terms of dollars and staff time to undertake rulemaking of this magnitude would be considerable. Such a rulemaking would entail engineering analyses, including site visits and sampling, costing analyses, loading reduction analyses, analyses to statistically derive the limits, benefits analyses and multiple procedural steps to comply with a number of statutes, including not only the Administrative Procedure Act but also the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), the Unfunded Mandates Reform Act (UMRA), and a number of Executive Orders. Based on the EPA's experience developing effluent guidelines for industrial categories, the cost of a rulemaking to establish secondary treatment numeric nutrient limits would be at least 10 million dollars (approximately two million dollars annually for five years) plus six full-time employees per year. At the same time, the Agency's budget has not been increasing. It would be very difficult given these budget constraints to undertake this type of rulemaking without a significant shift away from other priorities.

Courts generally recognize the need to allow Agencies to prioritize their own discretionary authorities. See, e.g., Heckler v. Chaney, 470 U.S. 821, 831-32 (1985). In the discussion above, the EPA has explained why a uniform, national technology-based rule to add nutrients to the secondary treatment regulations would not make sense at this time, given technological feasibility and cost issues and given that the EPA is otherwise pursuing a more effective water-quality-based approach to nutrient controls at POTWs. The EPA accordingly finds it is not warranted at this time to divert its limited resources away from competing program priorities in order to pursue the regulatory revisions requested by NRDC.

XI. Conclusion

Based on several decades of experience, and consistent with its past decisions on similar petitions, the EPA concludes that setting uniform, nationwide technology-based nutrient limits is not warranted, for the reasons discussed above. The EPA's preferred strategy, which is in effect across the country, is instead to seek to comprehensively control and manage all major sources of nutrients contributing to water quality impairments in particular watersheds, including POTWs and other significant point and

non-point sources of nutrients, through water quality-based permitting of point source discharges and nonpoint source management measures.

Reducing and eliminating the environmental harm caused by nutrient pollution will continue to be one of the EPA's top priorities. The EPA welcomes further discussions with NRDC and other stakeholders as the Agency continues to build on several decades of accomplishments in comprehensively evaluating and addressing nutrients from all significant non-point and point sources, including POTWs.

Please see the enclosure referencing the documents cited in this letter.

Sincerely,

Michael H. Shapiro
Deputy Assistant Administrator

Enclosure

References

U.S. Senate. 1981. *Clean Water Act Amendments of 1981*. Senate Report Number 204, 97th Congress, Oct. 7, 1981.

U.S. EPA. 1998. U.S. Environmental Protection Agency. *National Strategy for the Development of Regional Nutrient Criteria.* Federal Register. June 25, 1998. Volume 63, Number 122. http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/strategy/nutsi.cfm

U.S. EPA. 2001. U.S. Environmental Protection Agency. Office of Water. *Development and Adoption of Nutrient Criteria into Water Quality Standards*. November 14, 2001.

CTDEP. 2007a. Connecticut Department of Environmental Protection. *Long Island Sound Watershed-based Permitting Case Study. July, 2007*. http://www.epa.gov/npdes/pubs/wq_casestudy_factsht1.pdf

U.S. EPA. 2007b. U.S. Environmental Protection Agency. Office of Water. *Nutrient Pollution and Numeric Water Quality Standards.* Memorandum. May, 25, 2007. http://water.epa.gov/scitech/swguidance/standards/upload/2009_01_21_criteria_nutrient_policy20070525.pdf

U.S. EPA. 2007c. U.S. Environmental Protection Agency. Region 10. *Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus.* EPA 910-R-07-002. Seattle, WA. (April). http://www.epa.gov/region10/pdf/tmdl/awt_report.pdf

U.S. EPA. 2008a. U.S. Environmental Protection Agency. Office of Water. *Clean Watersheds Needs Survey 2008: Report to Congress*. EPA-832-R-10-002. Washington D.C. November. http://water.epa.gov/scitech/datait/databases/cwns/upload/cwns2008rtc.pdf

U.S. EPA. 2008b. U.S. Environmental Protection Agency. Office of Water. *Municipal Nutrient Removal Technologies Reference Document*. Washington, D.C. (September). http://water.epa.gov/scitech/wastetech/upload/mnrt-volume1.pdf

U.S. EPA. 2010a. U.S. Environmental Protection Agency. Office of Water. *Nutrient Control Design Manual: State of Technology Review Report.* EPA/600/R-09/012. http://www.epa.gov/nrmrl/pubs/600r09012/600r09012.pdf

U.S. EPA. 2010b. U.S. Environmental Protection Agency. *Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment.* Washington, D.C. (December 29, 2010). http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/FinalBayTMDL/CBayFinalTMDLExecSumSection1through3_final.pdf

King County Department of Natural Resources and Parks. 2011. *Assessment of Nitrogen Removal Technologies at West Point Plant and Their Impact on Future Water Reuse Program Development.* Seattle, Washington. March 2011.

Symbiont. 2011. *Evaluation of Practical Technology-based Effluent Standards for Phosphorus and Nitrogen in Illinois.* West Allis, Wisconsin. October 18, 2011.

U.S. EPA. 2011. U.S. Environmental Protection Agency. Office of Water. *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions.* Memorandum. March, 16, 2011.
http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/upload/memo_nitrogen_framework.pdf

Great Lakes Commission. 2012. *Priorities for Reducing Phosphorus Loadings and Abating Algal Blooms in the Great Lakes – St. Lawrence Basin: Opportunities and Challenges for Improving Great Lakes Aquatic Ecosystems.* Report of the Phosphorus Reduction Task Force to the Great Lakes Commission.
Ann Arbor, MI. September, 2012.
http://www.glc.org/announce/12/pdf/FINAL_PTaskForceReport_Sept2012.pdf

King County Department of Natural Resources and Parks. 2012. *Assessment of Nitrogen Removal Technologies at the South Treatment Plant and Their Impact on Future Water Reuse Program Development.* Seattle, Washington. June 2012.

U.S. EPA. 2012a. U.S. Environmental Protection Agency. Office of Water. *Secondary Treatment Performance Report.* Washington D.C. November, 2012.

U.S. EPA. 2012b. U.S. Environmental Protection Agency. Office of Water. POTW Nutrient Control Cost Estimates Record Document. Washington D.C. December 4, 2012.

U.S. EPA. 2012c. U.S. Environmental Protection Agency. Office of Water. *Water Quality Assessment and Total Maximum Daily Loads Information (online database).* Updated September 26, 2012.
http://www.epa.gov/waters/ir/

Tools for Nutrient Water Quality Based Effluent Limits

Nutrient Water Quality Criteria

- EPA recommended ecoregional nutrient criteria: http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/ecoregions/index.cfm

- EPA's 1986 "Quality Criteria for Water" http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/upload/2009_01_13_criteria_goldbook.pdf

Water Quality Models for Nutrients

- http://epa.gov/athens/wwqtsc/index.html

Additional Resources

- http://epa.gov/nandppolicy/index.html

- http://www.epa.gov/nutrientpollution/

- http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/strategy/