

# **National Pollutant Discharge Elimination System (NPDES) Permit Requirements for Municipal Wastewater Treatment Discharges During Wet Weather Conditions**

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## Acronyms Used

BOD <sub>5</sub>	five-day biochemical oxygen demand
CSO	combined sewer overflow
EPA	Environmental Protection Agency
I/I	infiltration and inflow
NPDES	National Pollutant Discharge Elimination System
POTW	publicly owned treatment works
SS	total suspended solids
SSO	sanitary sewer overflow

## II. BACKGROUND

### A. Why is EPA Taking this Action?

Wastewater collection systems collect domestic sewage and other wastewater from homes and other buildings and convey it to wastewater sewage treatment plants for proper treatment and disposal. The collection and treatment of municipal sewage and wastewater is vital to public health in our cities and towns, and to the viability of our receiving waters. The proper functioning of wastewater systems is among the most important factors responsible for the general level of good health enjoyed in the United States. The United States Centers for Disease Control and Prevention named clean water and sanitation technology one of the

twentieth century's great public health achievements (see *Morbidity and Mortality Weekly Report*, April 2, 1999, v. 48, no. 12, pp. 241-243), while the National Academy of Engineering included such technology on its list of the 20 engineering achievements that had the greatest impact on quality of life in the twentieth century. (National Academy of Engineering, press release, February 22, 2000).

Municipal collection systems and treatment facilities are an extensive, valuable, and complex part of the nation's infrastructure. In the last twenty years, communities have spent \$1 trillion in 2001 dollars on drinking water treatment and supply and wastewater treatment and disposal (see *The Clean Water and Drinking Water Infrastructure Gap Analysis*, EPA, September, 2002). Another source estimates that wastewater treatment and collection systems represent about 10 - 15 percent of the total infrastructure value in the United States. (Fragile Foundations: A Report on America's Public Works. Final Report to the President and Congress. National Council on Public Works Improvement. February 1988.) The collection system and treatment facilities of a single large municipality can represent an investment worth billions of dollars.

The efficiency of wastewater treatment at a wastewater treatment plant depends strongly on the design and performance of the collection system. Many collection systems in the United States are subject to high volumes of infiltration (including rainfall-induced infiltration) and inflow during wet weather conditions. High levels of infiltration and inflow (I/I) increase the hydraulic load on treatment plants, which can reduce treatment efficiency, can exceed the

capacity of components within the treatment process, and in extreme situations make biological treatment facilities inoperable (e.g., wash out the biological organisms that treat the waste).

In 1972, the Federal Water Pollution Control Act, also referred to as the Clean Water Act (CWA), dramatically increased the role of the Federal government in protecting water resources by establishing a framework for upgrading the nation's wastewater infrastructure. With respect to the municipal wastewater infrastructure, the 1972 Act: established a minimum pollution control standard based on the application of secondary treatment; mandated the development of more stringent standards where necessary to protect water quality; established the National Pollutant Discharge Elimination System (NPDES) permit program to ensure implementation of standards; and dramatically increased Federal funding for municipal treatment works.

During the 1970's and 1980's the nation's municipal wastewater infrastructure dramatically expanded and improved, particularly with respect to treatment plants. In 1968, 72 percent of the Nation's municipal wastewater plants were providing secondary treatment and less than one percent were providing greater than secondary treatment (out of 14,051 facilities). By 1996, 59 percent of the Nation's municipal wastewater plants were providing secondary treatment and 27 percent were providing greater than secondary treatment (out of 16,024 facilities). During this time, the overall number of people served by municipal wastewater treatment facilities increased from 140.1 million in 1968 to 189.7 million in 1996 (a 35 percent increase).

In the mid-1980's and 1990's EPA increased its emphasis on addressing wet weather conditions and discharges from municipal collection systems and at treatment facilities. In 1989, EPA published the National Combined Sewer Overflow (CSO) Control Strategy which provided recommendations for NPDES permits for CSOs. See 54 FR 37370 (Sept. 8, 1989). In 1994, EPA issued the CSO Control Policy to provide greater national clarity and consistency in the way NPDES requirements apply to flows in combined sewers and to CSO discharges. See 59 FR 18688 (Apr. 19, 1994). In addition, the Agency increased compliance assistance and enforcement activities associated with sanitary sewer overflows (SSOs) during the 1990s. In 2000, EPA issued the Compliance and Enforcement Strategy Addressing Combined Sewer Overflows and Sanitary Sewer Overflows. This strategy called for each EPA Region to develop an enforcement response plan, including an inventory of SSO violations and a description of how 20% of the priority systems with SSO violations would be addressed each year.

Reducing the frequency and volume of collection system overflows and backups of sewage into buildings, and improving the structural integrity of collection systems have been some of the major objectives of EPA's emphasis on wet weather discharges. Typically, an important component of strategies to reduce collection system overflows and backups into buildings is to increase the conveyance of wet weather flows to the treatment plant. The volume of wet weather flows delivered to treatment facilities can also be increased by measures that reduce exfiltration of wastewater out of a collection system. Increased wet weather flow volumes at treatment plants, along with increased attention to water quality problems caused by wet weather flows have lead to increased attention to the manner by which POTWs manage wet

weather flows.

As these issues received greater attention, regulatory agencies, municipal operators of POTWs, and representatives of environmental advocacy groups have expressed confusion over and requested clarification regarding the proper interpretation of certain regulatory provisions in the context of wet weather flow management at POTW treatment plants. Of particular concern are National Pollutant Discharge Elimination System (NPDES) permit requirements for peak wet weather discharges from a publicly owned treatment works (POTW) treatment plant when the portion of the flow that exceeds the capacity of the biological treatment units is routed around biological treatment units and blended with the flows from the biological units (or other advanced treatment units) prior to discharge. Such re-routing where the capacity of biological (or other advanced) treatment units is exceeded might be necessary to avoid damaging the treatment units. Questions have focused primarily on the situation where the final discharge of these blended waste streams would meet effluent limitations based upon the secondary treatment regulations and any more stringent limitations necessary to meet water quality standards.

Today's proposed policy may affect certain actions under consideration by NPDES permit authorities to address comprehensive sewer collection system and treatment activities by POTWs. The Agency seeks comment on what, if any, impact today's proposed policy may have on Federal or State enforcement actions under the CWA or citizen suit actions under Section 505 of the Act, including assurance of implementation of the various criteria identified in the proposed interpretation and draft guidance.

After review of public comments, and following any appropriate revisions, EPA intends that ultimately such policy would provide a framework that (1) ensures appropriate management of wet weather flows at a POTW consistent with generally accepted good engineering practices and criteria for long-term design, (2) clarifies technology-based requirements (3) uses water quality-based effluent limitations to address residual site-specific health and environmental risks, and (4) provides appropriate safeguards, including comprehensive monitoring and protection for sensitive waters.

## **B. Sewage Treatment Issues Associated with Wet Weather Flows**

Although a number of sewage treatment processes are used to comply with Clean Water Act requirements, most municipalities typically use a series of unit operations and processes to treat wastewater prior to discharge. The typical series of unit processes includes: preliminary treatment or screening to remove large solids; primary clarification (or preliminary sedimentation) to remove floating and settleable solids; and biological treatment units (also referred to as secondary treatment units) to remove biodegradable organic pollutants and suspended solids. The most common type of conventional biological treatment unit, an activated sludge process, typically consists of aerator tanks (also called reactors) followed by separate settling basins or clarifiers. Many treatment facilities also provide disinfection to deactivate pathogens and achieve microbial water quality standards. Some facilities also provide advanced treatment which are designed to reduce constituents, such as nitrogen and phosphorus, that are not significantly removed by biological treatment processes, or are designed to provide

greater solids and pathogen reductions than traditional biological treatment processes.

During periods of wet weather, flows received by a POTW's collection system and treatment facility typically increase. Significant increases in influent flow caused by wet weather conditions (e.g., due to infiltration and/or inflow of water into the collection system) can create operational challenges for treatment facilities and potentially adversely affect treatment efficiency, reliability, and control of unit process operations with a treatment plant. Activated sludge systems are particularly vulnerable to high volume peak flows. Peak flows that approach or exceed design capacity of an activated sludge unit can shift the solids inventory from the aeration basin to the clarifier(s), and can result in excessive solids losses from the clarifier(s) (i.e., wash out the biological mass necessary for treatment). The shifting of solids from an aeration basin to a clarifier diminishes treatment rates until after flows have decreased and the solids are returned to the aeration basin. If a clarifier experiences excessive loss of solids, treatment efficiencies can be lowered for weeks or months until the biological mass in the aeration basins is reestablished. In addition to these hydraulic concerns, wastewater associated with peak flows may have low concentrations of oxygen demanding pollutants, which can also decrease treatment efficiencies.

Generally, biological treatment units are designed and operated to maintain a relatively stable population of microorganisms. See 48 FR 52258, 52275 (Nov. 16, 1983). This means that biological treatment units generally cannot be designed to accommodate wide variations in flow volumes and influent strength. Primary clarification units are less sensitive to variations in



flow volumes and influent strength. In addition, primary clarification units can be brought into operation and taken out of operation to respond to changes in flow volume.

Many POTW treatment plants have been designed with primary treatment capacity that is significantly greater than the biological treatment capacity. These treatment plants often have multiple primary clarification units that are operated in parallel, with one or more primary clarification units not operating during low flow conditions, and brought into service during high flow conditions. These POTWs typically provide screening and primary clarification of all flows entering the plant, and, in order to protect their biological treatment units, route flows in excess of full capacity of the biological treatment unit around the biological treatment units. In some cases, chemicals are added to the portion of the flow that is routed around the biological treatment units to enhance solids and/or pathogen removal. Another option is to provide other forms of enhanced physical/chemical treatment for the portion of the flow that is routed around the biological units. Some POTWs discharge flows routed around biological treatment units directly to a surface water, while others blend the flows routed around the biological treatment units with flows that have gone through the biological treatment unit (e.g., for disinfection or other advanced treatment) prior to discharge.

Other design and operational options routinely employed to enhance treatment of wet weather flows without damaging biological treatment capabilities include:

- Increasing the size of secondary clarifiers to accommodate a pre-determined amount of

peak wet weather flow;

- Providing alternative feed patterns in the aeration basin(s);
- Increasing the returned activated sludge capacities relative to those needed for steady flow;
- Providing flow equalization (i.e. short term storage) prior to the biological unit either at the plant or before flows get to the plant; and
- Decreasing peak flow volumes through I/I removal, sewer separation or rerouting flows to a different treatment plant.

See *Design of Municipal Wastewater Treatment Plants* Fourth Edition, 1998, Water Environment Federal Manual of Practice 8, ASCE Manual and Report of Engineering Practice No. 76, Volume 2, page 11-5; *Prevention and Control of Sewer System Overflows* Second Edition, 1999, Water Environment Federation Manual of Practice FD-17.

Other facilities may employ other modifications to manage peak wet weather flows. For example, some facilities divert dilute wet weather flows around primary clarifiers to the biological treatment units in order to ensure adequate organic loadings in the biological units. Given the complexity and site-specific nature of collection systems and treatment facilities, site-specific planning processes are necessary to identify the optimal mix of peak wet weather management measures.

Many States have developed detailed design criteria and/or operating practices for

municipal wastewater treatment facilities. EPA has also developed guidance on design considerations and operation of POTWs, including guidance on the composite correction program approach to identify and address performance limitations and to obtain improved performance at POTWs. *EPA Technology Transfer Handbook: Retrofitting POTWs*, 1989, Hegg, B.A., L.D. DeMers, and J.B. Barber. This guidance identifies specific low cost modifications that can be used to optimize an existing facility's performance which can result in significant improvements of performance at many wastewater treatment facilities without major capital improvements. Hegg, B.A., K.L. Rakness, and J.R. Schultz, 1979, *A Demonstration Approach for Improving Performance and Reliability of Biological Wastewater Treatment Plants* EPA 600/2-79-035, NTIS No. PB-300476, USEPA, Cincinnati, OH.

### **C. NPDES Requirements for POTWs**

The CWA requires that most POTWs achieve effluent limitations based upon secondary treatment as defined by EPA and any more stringent limitations necessary to meet water quality standards prior to discharging to waters of the United States. NPDES permits are issued by EPA or States, U.S. Territories, or Tribes authorized by EPA to do so. Currently, 45 States and one U.S. Territory administer the NPDES permit program. EPA issues NPDES permits in the remaining States and Territories, and in Indian country.

#### **1. Secondary Treatment Regulations**

Section 301(b)(1)(B) of the Clean Water Act, 33 U.S.C. § 1311(b)(1)(B), requires that publicly owned treatment works (POTWs) achieve effluent limitations based upon secondary treatment as defined by the Administrator of EPA pursuant to section 304(d)(1) of the Act. Section 304(d)(1) of the Act directed EPA to publish information, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, on the degree of effluent reduction attainable through the application of secondary treatment. Section 304(d)(4) of the Act, 33 U.S.C. § 1314(d)(4), deems treatment facilities such as oxidation ponds, lagoons, ditches and trickling filters to be the “equivalent” of secondary treatment. That section directed the Administrator to provide guidance on design criteria for such facilities, taking into account pollutant removal efficiencies. Section 304(d)(4) further requires that water quality not be adversely affected by deeming such facilities to be the equivalent of secondary treatment.

EPA promulgated the secondary treatment information regulations at 40 CFR Part 133 to define minimum levels of effluent quality for publicly owned treatment works (POTWs) prior to discharge. The secondary treatment regulations were based on performance data for a sample of well-designed and well-operated secondary treatment plants. The 30-day average effluent limitations in the secondary treatment regulations were based on the 95<sup>th</sup>-percentile value of data representing well-operated POTWs, excluding values attributable to upsets, bypasses, operational errors, or other unusual conditions. With the exception of section 304(d)(4) facilities eligible for treatment equivalent to secondary treatment, the secondary treatment regulations do not otherwise specify the type of treatment process to be used to meet secondary treatment requirements nor do they preclude the use of non-biological facilities. Rather, the basic

decisions on the choice of a technology or alternative waste management technique were left to a case-by-case cost-effectiveness analysis. See 48 FR 52258, 52260 (Nov. 16, 1983).

The requirements of the secondary treatment regulations are expressed as concentration limitations (seven-day and 30-day average effluent concentration limitations for total suspended solids and five-day biochemical oxygen demand (BOD<sub>5</sub>)), percent removal requirements (for total suspended solids and BOD<sub>5</sub>), as well as a limitation on pH. The regulations require that percent removal requirements for total suspended solids (SS) and the five-day measure of biochemical oxygen demand (BOD<sub>5</sub>) be determined according to a 30-day average. The percent removal requirements were originally established to achieve two basic objectives: (1) to encourage municipalities to correct excessive I/I problems in their sanitary sewer systems, and (2) to help prevent intentional dilution of influent wastewater as a means of meeting permit limits. See 50 FR 23382 (June 3, 1985).

For most types of POTWs, the secondary treatment regulations establish a 30-day average percent removal requirement of 85 percent for SS and BOD<sub>5</sub>. Facilities eligible for equivalent treatment considerations under section 304(d)(4) are subject to less stringent percent removal requirements. The secondary treatment regulations provide for case-by-case adjustments to the percent removal requirements to address several special considerations. Under 133.103(a), for treatment works that receive flows from combined sewers, the decision must be made on a case-by-case basis as to whether any attainable percentage removal level can be defined when the plant receives highly dilute influent, e.g., during wet weather flows, and, if

so, what the level should be. For treatment works that receive flows from separate sewers, section 133.103(d) authorizes the permit issuing authority to substitute a less restrictive 30-day average percent removal requirement or a mass loading limit for the percent removal requirement if the permittee demonstrates that:

- i) the treatment facility will consistently meet its permit effluent concentration limitations but its percent removal requirements cannot be met due to less concentrated influent,
- ii) to meet the percent removal requirements, the facility would have to achieve significantly more stringent limitations than would otherwise be required by concentration-based standards, and
- iii) the less concentrated influent is not the result of excessive I/I. Excessive I/I is the quantities of I/I that can be economically eliminated from a sewer system as determined by a cost-effectiveness analysis that compares the costs for correcting the I/I conditions to the total costs for transportation and treatment of the I/I to a treatment facility.

For these separate sanitary sewer systems, the determination of whether the less concentrated wastewater is the result of excessive I/I uses the definition of excessive I/I in 40 CFR 35.2005(b)(16) plus the additional criterion that inflow is deemed nonexcessive if the total flow to the POTW (i.e., wastewater plus inflow plus infiltration) is less than 275 gallons per capita per day. See 40 CFR 133.103(d). The 275 gallons per capita per day figure is only a threshold value, and permittees may determine that even higher values of I/I are nonexcessive through a cost-effective evaluation on a case-by-case sewer system basis. See 50 FR 23384 (June 3, 1985) and 54 FR 4225 (Jan. 27, 1989). Guidance for the cost-effectiveness analysis

associated with demonstrating that I/I is not excessive is provided in *Sewer System Infrastructure Analysis and Rehabilitation*, (EPA, 1991, EPA/625/6-91/030).

EPA adopted this approach to provide flexibility to address facilities experiencing various degrees of less concentrated influent that cannot meet the 85 percent removal requirement without significant additional construction, and, at the same time, encourage cost effective I/I reduction. See 40 CFR 133.101(m) and 133.103(d)(3). The approach was based on the following considerations: (1) in general, I/I programs had not been as successful in reducing excessive I/I as expected; (2) many treatment systems without excessive I/I had relatively low concentrations of BOD<sub>5</sub> and SS in the influent; (3) certain treatment technologies could not achieve 85 percent removal under all conditions; and (4) a mandatory requirement of 85 percent removal for all POTWs could have caused overly stringent levels of treatment and use of expensive advanced treatment processes in some cases. See 50 FR 23382 (June 3, 1985).

## 2. Bypass Provision

The NPDES regulations define standard permit conditions which are to be included in all NPDES permits, except that authorized NPDES States are not precluded from omitting or modifying a standard permit condition to impose a more stringent requirement. 40 CFR 122.41 and 123.25 (note). One of those standard permit condition is the “bypass” provision at 40 CFR 122.41(m).

The bypass provision defines bypass to mean the “intentional diversion of waste streams from any portion of a treatment facility.” The regulation prohibits bypasses except for where necessary for essential maintenance to assure efficient operation. 40 CFR 122.41(m)(2). In such cases, the bypass cannot cause effluent limitations to be exceeded. For all other bypasses, the Director of the NPDES program may take enforcement action against a permittee for a bypass, unless:

- (A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- (B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
- (C) The permittee submitted the required notices. 40 CFR 122.41(m)(4)(i).

In order to satisfy the “no feasible alternatives” criterion, adequate back-up equipment should be installed in the exercise of reasonable engineering judgment to prevent a bypass. 40 CFR 122.41(m)(4)(i)(B). The “no feasible alternatives” provision of 40 CFR 122.41(m) requires, among other things, that consideration be given to the feasibility of additional construction to prevent any bypasses that occur because of inadequate capacity. See United States v. City of Toledo, Ohio 63 F.Supp.2d 834 (N.D. Ohio 1999).



The regulation at 40 CFR 122.41(m) also provides that the Director of the NPDES program may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in the bypass provision at 40 CFR 122.41(m)(4)(i). As discussed below, EPA provided guidance on approval of anticipated bypasses at POTWs served by combined sewers in the 1994 Combined Sewer Overflow (CSO) Control Policy. An approved anticipated bypass would be a recognition that the permitting authority had considered the adverse impacts of the bypass and has found that the bypass would or does meet the criteria of 40 CFR 122.41(m)(4)(i)(A), (B) and (C), and would not take enforcement action against a permittee for the bypass. Compliance with 40 CFR 122.41(m)(4)(i), in and of itself, would not shield a permittee from citizen suits for conducting a prohibited bypass. Southern Ohio Coal Company v. Office of Surface Mining, Reclamation and Enforcement, 20 F.3d 1418, 1427 (6<sup>th</sup> Cir. 1994).

The bypass regulation does not dictate that any specific treatment technology be employed. Instead, the regulation requires that a system be operated as designed and according to the conditions of the NPDES permit. See NRDC v. EPA, 822 F.2d 104, 123 (D.C. Cir.1987). For example, seasonal effluent limitations which allow the facility to shut down a specific pollution control process during certain periods of the year are not considered to be a bypass provided the variation in effluent limits is accounted for and recognized in the permit which allows a facility to dispense with some unit processes under certain conditions. See 49 FR 37998, 38037 (Sept. 26, 1984).

As noted earlier, all NPDES permits are required to contain a prohibition on bypasses consistent with or more stringent than 40 CFR 122.41(m). See 40 CFR 123.25 (note). The bypass provision at 40 CFR 122.41(m) defines bypass to mean the intentional diversion of waste streams from any portion of a treatment facility. However, the term “treatment facility” is not defined in the bypass regulation. Today’s notice requests public comment on: (1) a proposed interpretation of the bypass regulations regarding the term “treatment facility” as it relates to the treatment plant at a POTW; and (2) draft guidance on how NPDES authorities can characterize the “treatment facility” in a specific permit for a POTW treatment plant to account for the flow routing scenario. The Agency’s proposed policy would be restricted to POTW treatment plant discharges under peak wet weather conditions where flows in excess of the biological or advanced treatment units are routed around the biological or advanced treatment units and blended with the wastewaters from the biological units (or other advanced treatment units) prior to discharge, and where the final discharge would meet effluent limitations based upon the secondary treatment regulations and any more stringent limitations necessary to meet water quality standards.

### 3. Combined Sewer Overflow Control Policy

EPA has provided guidance on the planning, selection and implementation of controls to meet technology- and water quality-based requirements for CSOs under the NPDES program in the National CSO Control Strategy, 54 FR 37370 (September 8, 1989), and the CSO Control Policy, 59 FR 18688 (April 19, 1994). The 1994 CSO Control Policy provides comprehensive

guidance for developing site-specific NPDES permit requirements for combined sewer systems to address wet weather CSO discharges from designed overflow points. The Wet Weather Water Quality Act of 2000 amended the CWA to provide that each permit, order or decree issued after December 15, 2000, for a discharge from a municipal combined sewer shall conform to the CSO Control Policy. 33 U.S.C. § 1342(q)(1).

Under the CSO Control Policy, permittees with combined sewer systems were to immediately undertake a process to accurately characterize their sewer systems, to demonstrate implementation of nine minimum controls identified in the Policy, and to develop and implement a long-term CSO control plan that would ultimately provide for compliance with the requirements of the CWA. See 59 FR 18688 (April 19, 1994). The CSO Control Policy identifies EPA's major objectives for long-term control plans.

When developing the CSO Control Policy, EPA recognized that some POTW treatment plants may have primary treatment capacity in excess of their biological treatment capacity. See 59 FR 18693, col. 2. The Policy indicates that one effective strategy to abate pollution resulting from CSOs is to maximize the delivery of flows during wet weather to the POTW treatment plant for treatment. This strategy can maximize the use of available POTW facilities for wet weather flows and ensure that combined sewer flows receive at least primary treatment prior to discharge. In addition, this strategy may enable the permittee to eliminate or minimize overflows to sensitive areas. In recognition of the significant water quality benefits of maximizing flow to the POTW treatment plant, the CSO Control Policy includes it as a

minimum element of a long-term control plan.

To further the objective of maximizing treatment at the POTW treatment plant, the CSO Control Policy provides guidance on the use of an NPDES permit to recognize approval of anticipated bypasses where the criteria of the bypass provision for such approvals are met. The CSO Control Policy clarifies that normally it is the responsibility of the permittee to document, on a case-by-case basis, compliance with 40 CFR 122.41(m) in order to have an anticipated bypass approved in a permit. The Policy indicates that for some CSO-related permits, the study of feasible alternatives in the long-term control plan, along with other information in the permit record, may provide sufficient support for approval of a CSO-related bypass in the permit, and to define the specific parameters under which a bypass can be approved. The Policy provides that where a permit includes an approval of a CSO-related bypass, the permit would define the specific wet weather conditions under which a CSO-related bypass would be allowed and would also specify what treatment, monitoring, and effluent limitations would apply to the bypass flow.

The Policy provides that permits with approved bypasses should also make it clear that all wet weather flows passing the headworks of the POTW treatment plant will receive at least primary clarification, solids and floatables removal and disposal, and disinfection where necessary, and any other treatment that can reasonably be provided.

The CSO Policy further indicates that the “no feasible alternatives” requirement of the bypass regulation can be met if the record shows that the secondary treatment system is properly

operated and maintained, that the system has been designed to meet secondary limits for flows greater than the peak dry weather flow, plus an appropriate quantity of wet weather flow, and that it is either technically or financially infeasible to provide secondary treatment at the existing facilities for greater amounts of wet weather flow. See 59 FR 18694, col.3. The feasible alternative analysis should include, for example, consideration of enhanced primary treatment - e.g., chemical addition and non-biological secondary treatment. *Id.* Other bases supporting a finding of “no feasible alternatives” may also be available on a case-by-case basis. As part of its consideration of possible adverse effects resulting from the bypass, the permitting authority should also ensure that the bypass will not cause exceedances of water quality standards. *Id.*

#### **D. Water Quality Criteria for Bacteria**

In 1986, EPA published *Ambient Water Quality Criteria for Bacteria-1986*, which contained EPA’s recommended water quality criteria for bacteria for protection of bathers from gastrointestinal illness in recreational waters. The water quality criteria established levels of indicator bacteria, namely *Escherichia coli* (*E. coli*) and enterococci, that demonstrate the presence of fecal pollution and which should not be exceeded in order to protect bathers in fresh and marine recreational waters. Prior to its 1986 recommendations, EPA recommended specific levels of fecal coliforms to be used as the indicator organism to protect bathers from gastrointestinal illness in recreational waters.

The data supporting the 1986 bacteria water quality criteria were obtained from a series

of epidemiological studies that examined the relationship between swimming-associated illness (namely, acute gastrointestinal illness) and the microbiological quality of the waters used by recreational bathers. The epidemiological studies demonstrated that fecal coliforms, the indicator originally recommended in 1968 by the Federal Water Pollution Control Administration of the Department of Interior, are correlated less strongly with swimming-associated gastroenteritis than other possible indicator organisms. Two indicator organisms, *E. coli* and enterococci, exhibited a strong correlation to swimming-associated gastroenteritis, the former in fresh water only and the latter in both fresh and marine waters. The strong correlation is due to the indicator organisms being more similar to many of the pathogens of concern in their ability to survive treatment and in the environment. Enterococci are also resistant to saline environments, enhancing their utility as an indicator in marine waters. In addition, *E. coli* and enterococci are less frequently found than fecal coliforms in environmental settings where fecal contamination is known to be absent.

The Beaches Environmental Assessment and Coastal Health (BEACH) Act was enacted on October 10, 2000. Pub. L. No. 106-284, 114 Stat. 870 (2000). The BEACH Act addresses pathogens and pathogen indicators in coastal recreation waters. Among other things, the BEACH Act added section 303(i) to the Clean Water Act to require States and Tribes with coastal (and Great Lake) recreation waters to adopt new or revised water quality standards by April 10, 2004, for pathogens and pathogen indicators for which EPA has published criteria under section 304(a). The BEACH Act also directs EPA to promulgate standards for States and Tribes that fail to adopt standards for pathogens and pathogen indicators for coastal recreation

waters that are as protective of human health as those published by EPA.

### **III. PROPOSED POLICY**

EPA has received requests from many stakeholders to clarify the NPDES requirements for discharges from POTWs where peak wet weather flow is routed around biological treatment units and then blended with the effluent from the biological units prior to discharge where the final discharge meets permit effluent limitations based on the secondary treatment regulation (40 CFR Part 133) or any more stringent limitations necessary to attain water quality standards. Today's proposed policy has two components, (1) a proposed interpretation of the bypass provision (40 CFR Part 122.41(m)) as it applies to alternative wet weather treatment scenarios at POTW treatment plants that involve blending; and (2) draft guidance on how such an interpretation should be implemented. EPA requests comments on both the proposed interpretation and the draft guidance.

Peak wet weather discharges from POTWs that consist of effluent routed around biological or other advanced treatment units blended together with the effluent from the biological units (or from other advanced treatment units) prior to discharge would not be a prohibited bypass and could be authorized in an NPDES permit if all of the following principles were followed:

1. The final discharge meets effluent limitations based on the secondary treatment regulation (40 CFR Part 133), including applicable 30-day average percent removal

requirements, or any more stringent limitations necessary to attain water quality standards. For treatment works served by sanitary sewers, the Director of the NPDES permit program may substitute lower 30-day average percent removal requirements or a mass loading limit for the percent removal requirement only if the permittee demonstrates the criteria in 133.103(d) are met, including that the less concentrated influent is not the result of excessive I/I. For treatment works served by combined sewers, 133.103(a) provides that the decision must be made on a case-by-case basis as to whether any attainable percentage removal level can be defined during wet weather flows, and, if so, what the level should be.

2. The NPDES permit application for the POTW provides notice of, and specifically recognizes, the treatment scenario that would be used for peak flow management. The treatment scenario, including designed capacity of various units, should be consistent with generally accepted practices and long-term design criteria, and designed to ensure that discharges meet effluent limitations based on the secondary treatment regulation and any more stringent limitations necessary to meet water quality standards (including limitations necessary to meet applicable total maximum daily loadings). The application of the generally accepted practices and long-term design criterion typically would include an evaluation of changes to the base and peak design flows at the treatment plant from the time the peak flow treatment scenario was last recognized by the NPDES authority, and, if circumstances have materially and substantially changed, an evaluation of the cost-effectiveness of a reasonable range of alternatives, which may entail construction of facilities to provide additional wet weather capabilities, such as equalization and/or



storage facilities, or high-efficiency physical/chemical treatment for diverted flows. The application of the generally accepted practices and long-term design criterion should be reevaluated as circumstances change materially and substantially, and at permit reissuance. Any permit issued after EPA evaluates public comments received and takes further action on today's proposed policy should specifically recognize or incorporate by reference the treatment scenario that would be used for peak flow management. EPA notes that requiring documentation of the treatment scenario in the permit would ensure that EPA would have an opportunity to review the documentation during its review of permits issued by an authorized NPDES State. In addition, the public would have an opportunity to review and comment on the specific conditions under which blending would be authorized prior to final approval and issuance of the permit.

3. The treatment scenario that would be used for peak flow management should provide, prior to blending, at least the equivalent of primary clarification for the portion of flow routed around biological or other advanced treatment units.
4. The peak flow treatment scenario chosen by the permittee for use when flows exceed the capacity of storage/equalization units, biological treatment units or advanced treatment units should be operated as it is designed to be operated and in accordance with the treatment scenario reflected in the permit record and conditions set forth in the permit. A portion of the flow should only be routed around a biological or advanced treatment unit when the capacity of the treatment unit is being fully utilized. Additionally, for permits issued after EPA evaluates public comments received and takes further action on today's proposed policy, such a peak flow treatment scenario should only be used when flows

exceed the capacity of storage/equalization units based on generally accepted good engineering practices and long-term design criteria aimed at protecting the structural integrity and function of the treatment units and under the specific circumstances recognized in the permit.

5. The permit must require monitoring, including type, interval and frequency sufficient to yield data which are representative of the final blended discharge to ensure compliance with applicable water quality-based effluent limitations. See 40 CFR 122.48(b). The permit should require reporting of the date and volume of blended discharges along with appropriate pollutant parameter concentrations. In addition, the permit should ensure that permittees develop additional information to support the development of water quality-based effluent limitations in subsequent permits, including information to: a) assess potential water quality impacts associated with blended effluent; b) evaluate the effectiveness of the treatment of key parameters, such as pathogens, resulting from alternative flow routing scenarios; and c) characterize ambient levels of such pollutant parameters.
6. The permit must require, at a minimum, that the permittee properly operate and maintain all parts of the collection system over which the permittee has operational control in a manner consistent with 40 CFR 122.41(e). For POTWs served by combined sewers, any permit issued after December 15, 2000, shall conform to the provisions of the 1994 CSO Control Policy, including the development and implementation of a long-term control plan (LTCP), and appropriate requirements for the collection system. As applied to POTWs serving separate sanitary sewers, EPA would interpret “proper operation and

maintenance” to include appropriate removal of infiltration and inflow from parts of collection system over which the permittee has operational control as well as measures to evaluate the structural integrity of the system. Such a demonstration may be made with a program self-evaluation report, appropriate to the size of the system, which includes an identification of program deficiencies and steps to respond to them.

In situations where one or more of the above principles would not be met, EPA would continue to interpret the “intentional diversion of waste streams from any portion of a treatment facility” at a POTW treatment plant to be a bypass subject to the restrictions of the bypass provision as reflected in the permit. The proposed policy upon which EPA invites comment today is not intended to modify the provision for approval of anticipated bypasses at 40 CFR 122.41(m)(4)(ii). See 59 FR at 18693, col.3.

The principles described above for characterizing the “treatment facility” at a POTW plant (as it relates to the bypass provision) are not intended to address or apply to NPDES permit requirements for treatment of flows at a POTW during dry weather conditions or to discharges from facilities other than POTW plants, including industrial facilities where storm water is treated with non-storm water wastewater. The matters addressed in today’s notice focus on situations with elevated I/I levels in municipal collection system resulting from wet weather conditions. EPA has not evaluated and does not propose to interpret its regulations to apply to other circumstances.

EPA requests comment on the use of the six principles listed above to define the conditions under which the blending of effluent routed around the biological treatment unit with effluent from the biological treatment unit, prior to discharge would not be a prohibited bypass and could be authorized in an NPDES permit. EPA specifically requests comment on the

following issues:

- 1) Is the current interpretation of “excessive I/I” under 40 CFR 133.103(d) adequate? What challenges, if any, would facilities face in meeting the percent removal requirements or obtaining an adjustment to percent removal requirements under 133.103(d), including the excessive I/I provisions, as a pre-condition for authorization of blending in an NPDES permit?
  
- 2) In principle 4, which would require that flow only be routed around the biological or advanced treatment unit when the capacity of treatment and storage units is being fully utilized, should EPA define the term “fully utilized”? Are there situations where system operators might need to keep some treatment or storage capacity in reserve, for example, to help prevent overflows or address other peak flow concerns where exceedences of treatment capacity is likely but has not yet occurred? If so, the commenter should describe the situations.
  
- 3) Principle 5 of this draft policy is designed to ensure compliance with applicable water quality-based effluent limitations, including those based on water quality criteria for bacteria. Would this principle be sufficient to protect against discharges of pathogenic organisms or should principle 5 of this draft policy include an explicit requirement for disinfection of blended effluent prior to discharge, where appropriate?
  
- 4) In developing principle 6, what factors should be considered when evaluating if a permittee is properly operating and maintaining their collection system in a manner consistent with 40 CFR 122.41(e)?

Additional considerations for permit writers addressing POTW plants that use peak flow treatment scenarios that consist of effluent routed around biological or other advanced treatment

units blended together with the effluent from the biological units prior to discharge should include:

- A. To the extent practicable, NPDES permit requirements for discharges of peak wet weather flows at the POTW should be developed in a manner that encourages the permittee to consider the relationship between the performance of the collection system and the performance of treatment plants serving the system.
  
- B. Any POTW receiving wastes from an industrial user to which a categorical pretreatment standard applies may, at its discretion and subject to the conditions of 40 CFR 403.7, grant removal credits to reflect removal by the POTW of pollutants specified in the categorical pretreatment standard. The POTW may grant a removal credit equal to or, at its discretion, less than its consistent removal rate. The permit writer should ensure that the POTW's determination of the consistent removal rate adequately reflects the frequency of use of and treatment effectiveness of the peak flow treatment scenarios in a manner that is consistent with 40 CFR 403.7(b). In a similar manner, the permit writer should ensure that the POTW adequately reflects the frequency of use of and treatment effectiveness of the peak flow treatment scenarios in developing local limits for industrial users.
  
- C. NPDES permit conditions that are clear and enforceable.

Under the interpretation proposed today, NPDES authorities would be able to characterize the term "treatment facility" in a specific permit for a POTW treatment plant to account for peak flow treatment scenarios that are consistent with generally accepted good engineering practices and criteria for long-term design in a manner consistent with the principles

previously identified. Where all of the identified principles are followed, flows through a treatment system that is operated as designed and according to the permit would not be considered a bypass, and the permittee would not be required to make each of the demonstrations otherwise required under the bypass provision at 40 CFR 122.41(m)(4)(i), including a demonstration that there were no feasible alternatives to the bypass.

Where a POTW treatment facility has multiple primary clarification units operating in parallel to provide excess primary treatment capacity for high flow conditions, removing one or more primary clarification units from operation during low flow conditions would not be considered a bypass provided the capacity of the primary clarification units remaining in operation is not exceeded. Similarly, where chemical addition is used to enhance wet weather treatment performance (i.e., to enhance solids removal or disinfection), discontinuing chemical addition during low flow conditions would not be considered a bypass if the permit does not call for such chemical addition during low flow conditions.

The NPDES regulations require that NPDES permits must include water quality-based effluent limitations to control all pollutants or pollutant parameters which the Director of the NPDES program determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to non-attainment of any water quality standard (see 40 CFR 122.44(d)). The potential impact of either blended peak wet weather flows discharged from POTWs or peak wet weather flows that receive biological treatment may raise a number of site-specific water quality issues depending on the performance of treatment technologies under peak flow conditions, the volume of discharges, receiving water conditions, the uses of receiving waters and other factors. Ensuring appropriate characterization of potential human health and environmental risks associated with peak flows with enhanced effluent and ambient monitoring data describing peak flow conditions is important for discharges to receiving waters with

designated uses for primary contact recreation and/or drinking water. Additional information may be needed to determine if POTW discharges that occur under peak wet weather flow conditions would cause, have a reasonable potential to cause, or contribute to non-attainment of a water quality standard. Modeling of the collection system, treatment facility and receiving water may be necessary to characterize the impact of peak wet weather flows on receiving water quality and to predict the improvements that would result from different treatment scenarios.

The NPDES regulations authorize permitting authorities to modify permits for cause. See 40 CFR 122.62 and 124.5. In addition, permits often contain a reopener clause. Examples include general reopener clauses that mirror the causes for modification in the NPDES regulations. Permits also often contain specific reopener clauses for the purpose of modifying conditions based on results of specific pollutant monitoring required in the permit, such as for toxic pollutants. EPA requests comment on whether permits that authorize blending should contain a specific reopener clause. Such a reopener clause could address situations where additional controls are necessary to assure attainment of water quality standards or where new monitoring information justifies the application of different permit conditions.

One of EPA's highest priorities in developing control strategies for wet weather discharges is ensuring adequate control of such discharges to sensitive receiving waters. Sensitive receiving waters, as determined by the NPDES authority in coordination with State and Federal agencies, as appropriate, include: designated Outstanding National Resource Waters; National Marine Sanctuaries; waters with threatened or endangered species (and associated habitat;); waters with primary contact recreation (e.g., beaches and other points of public access); public drinking water intakes or their designated protection areas; and shellfish beds. See the 1994 CSO Control Policy (59 FR 18688, April 19, 1994). Wherever physically possible and economically achievable, discharges of blended effluent to a sensitive area should not be

authorized, except where prohibiting the discharge of blended effluent would provide less environmental protection than additional treatment. Where elimination of the discharge of blended effluent to a sensitive receiving water is not physically possible and economically achievable, the permitting authorities must ensure an adequate demonstration that the discharge will not cause or have reasonable potential to cause or contribute to non-attainment of applicable water quality standards. For such discharges, each subsequent permit term should require a reassessment based on new or improved techniques, or on changing circumstances that influence economic achievability.

EPA strongly encourages States that have not already done so to adopt the recommendations set forth in *Ambient Water Quality Criteria for Bacteria - 1986* or other protective water quality criteria for bacteria based on scientifically defensible methods as their water quality standards to replace water quality standards based on total or fecal coliforms.

Today's proposed policy would provide guidance to EPA Regional and State permitting authorities as well as to municipal permittees and the general public on how EPA intends to exercise its discretion in implementing the statutory and regulatory provisions related to discharges from POTWs where peak wet weather flow is routed around biological treatment units and then blended with the effluent from the biological units prior to discharge and where the final discharge meets permit effluent limitations based on the secondary treatment regulation (40 CFR Part 133) or any more stringent limitations necessary to attain water quality standards. The guidance is designed to implement national policy on these issues.

The statutory provisions and EPA regulations described in this document contain legally binding requirements. Today's document would not substitute for those provisions or regulations, nor is it intended to be a regulation itself. In fact, today's notice invites public



comment on a proposed interpretation of EPA regulations in a specific context and invites comment on guidance to implement such a proposed interpretation. Thus, this document would not impose legally binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA and State decisionmakers would retain the discretion to adopt approaches on a case-by-case basis that differ from this proposed policy where appropriate. Any decisions regarding a particular facility should be made based on the statute and regulations. Therefore, interested parties are free to raise questions and objections about the substance of this proposed policy and the appropriateness of the application of this proposed policy to a particular situation. EPA intends to and States should, consider whether or not the recommendations or interpretations in the proposed policy are appropriate in that situation. EPA may revise today's proposed policy after consideration of public comment, or at some other time in the future. EPA welcomes public comments on this document and will consider those comments in any future revision of today's proposed policy.

EPA's intention is to reduce confusion regarding appropriate consideration of blending at POTWs. Because of significant interest from various stakeholders, the Agency is inviting public comment on the proposed policy, including the proposed interpretation of EPA regulations. To date, EPA has not established a national policy (either through rulemaking or through non-binding guidance to assist in the interpretation of the bypass regulation) regarding whether and under what circumstances wet weather blending at a POTW plant would not constitute a bypass. Prior to today's notice, permitting agencies have interpreted and applied the bypass regulation on a case-by-case basis according to the facts and circumstances presented by a particular POTW. Therefore, by today's notice, EPA also invites comment on whether or not it should conduct rulemaking to implement the proposed policy, specifically, whether the Agency should revise the text of the regulations specifically to address the matters discussed in today's proposal.

Dated:

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G. Tracy Mehan, III,  
Assistant Administrator,  
Office of Water.

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