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## CHAPTER 2

### INTRODUCTION TO CSO PERMITTING

The Combined Sewer Overflow (CSO) Control Policy provides a national strategy for the control of CSOs. It presents a uniform, nationally consistent permitting approach that should, for the first time, result in the establishment of both technology-based and water quality-based requirements for all CSOs. Although the permitting approach envisioned for CSOs still fits into the regulatory structure of the National Pollutant Discharge Elimination System (NPDES) program at 40 CFR Part 122 and is similar to the permitting approach that most NPDES permit writers are familiar with and have routinely employed for other point source discharges, it is unlike the conventional NPDES permitting approach in many ways. This chapter is designed to provide the permit writer with a clear understanding of the approach for controlling CSOs that is envisioned by the CSO Control Policy. The remainder of this guidance manual is designed to provide the permit writer with a more detailed understanding of how to integrate CSO controls into the NPDES permitting process.

#### 2.1 OVERVIEW OF CSO PERMITTING APPROACH

The CSO Control Policy envisions that CSO control requirements typically will be implemented through NPDES permits. Generally, NPDES permits include both technology-based and water quality-based effluent limitations. In the absence of national effluent guidelines for CSOs, the CSO Control Policy envisions that technology-based controls (i.e., best available technology economically achievable/best conventional pollutant control technology) will be established on a case-by-case basis using the permit writer's best professional judgment (BPJ) and be expressed in the form of best management practices. The technology-based controls will include, at a minimum, the nine minimum controls (NMC) as determined on a BPJ basis by the NPDES permitting authority. In addition, the CSO Control Policy recommends that, initially, water quality-based effluent limits be expressed in the form of narrative requirements and performance-based standards for the combined sewer system (CSS). Ultimately, the water quality-based effluent limits may also be expressed as numeric effluent limits when data are sufficient to support their development.

The CSO Control Policy expects that CSO controls will be incorporated into NPDES permits in a two-phased process. A Phase I permit will require the permittee to implement the NMC, which are technology-based effluent limits as determined on a BPJ basis, and to document that this requirement has been met. The Phase I permit will also require the permittee to develop a long-term control plan (LTCP). The U.S. Environmental Protection Agency (EPA) expects that implementation of the NMC during Phase I will achieve an interim level of CSO control during the time the permittee is developing an LTCP. EPA expects that Phase I permit requirements will be included in NPDES permits, either as permits become due for reissuance during the usual NPDES permitting cycle or, where appropriate, on an accelerated schedule through the permit modification process.

The Phase II permit typically will be the next permit issued after the Phase I permit. In Phase II, the permittee will be required to implement the CSO controls identified in the LTCP. Typically, water quality-based controls will be expressed as performance standards, and technology-based controls will be the NMC, which may be refined to reflect site-specific conditions. Whereas Phase I typically continues for only one permitting cycle, Phase II might continue for several cycles until all selected CSO controls identified in the LTCP have been constructed and implemented.

Although the two-phased approach may be appropriate if a permittee has not implemented any CSO controls, in many instances, the separation between permit phases may not be distinct and permits may contain both Phase I and Phase II elements. For example, a permittee may have already evaluated and selected CSO controls for a portion of its CSS but not evaluated and implemented the appropriate NMC. Thus, the next permit may include the Phase I requirement to evaluate, implement, and document the implementation of the NMC and may also include a Phase II requirement to implement the selected CSO controls. The CSO Control Policy is designed to accommodate these variations in the development and implementation of CSO control programs.

After the selected CSO controls have been implemented, the NPDES permitting authority should issue the post-Phase II permit. This permit should generally contain requirements to continue NMC implementation, properly operate and maintain the completed CSO controls in accordance with the operational plan, and implement the post-construction monitoring program.

## **2.2 RESPONSIBILITY OF NPDES PERMITTING AUTHORITIES**

The permit writer plays a critical role in the CSO permitting process, one that differs from the NPDES permit writer's traditional role in several important aspects. First, the permit writer plays a coordination role comparable to that of a team leader. In setting permitting priorities and facilitating the development of CSO permit requirements, the permit writer has the opportunity to develop a broad base of support for the CSO planning process and proposed CSO controls. The permit writer should serve as the focal point for coordination with State WQS authorities and should also work with enforcement authorities, as appropriate, to incorporate compliance schedules into enforceable mechanisms. The permit writer will also coordinate with local agencies, environmental groups, and other interested or CSO-affected members of the public.

The second difference is that the CSO permit writer's role is ongoing. Even after the issuance of the Phase I permit, the permit writer should continuously review interim LTCP deliverables and other submissions, participating in the ongoing consensus-building process, and developing and preparing for the issuance of Phase II permits.

The permit writer may also be able to assist communities in coordinating aspects of their CSO control programs with each other. This might be particularly beneficial for adjacent small communities discharging to the same receiving water. These communities might save significant resources by coordinating the characterization of their sewer systems and monitoring of the CSO impacts on the receiving water quality rather than pursuing these activities independently. The permit writer may encourage community coordination by advising adjacent communities of their mutual interests and opportunities for coordination.

### 2.3 CSO PERMITTING PRIORITIES AND WATERSHED CONSIDERATIONS

In response to the 1989 EPA National Combined Sewer Overflow Control Strategy, 30 States have received approval or conditional approval for CSO permitting strategies. These strategies usually provided a priority-setting plan for CSOs. EPA expects States to evaluate the need to revise their CSO strategies for consistency with the 1994 CSO Control Policy. This represents an opportunity for NPDES permitting authorities to reconsider their CSO permitting priorities in light of current or suspected environmental impacts, watershed permitting initiatives, and other factors. States and EPA Regions should review these strategies and establish appropriate permitting priorities for implementation of the CSO Control Policy.

In establishing CSO permitting priorities, the NPDES permitting authority should consider factors such as the environmental impacts of CSOs (e.g., beach closings, human health hazards, and potential risk to endangered species). The NPDES permitting authority should also consider requiring immediate action for CSOs to areas that meet the CSO Control Policy's definition of "sensitive areas." To assist NPDES permitting authorities in establishing CSO permitting priorities consistent with the CSO Control Policy, EPA developed the *Combined Sewer Overflows—Guidance for Screening and Ranking* (EPA, 1995c). This document provides guidance on establishing permitting priorities for CSSs and provides permittees with a tool for prioritizing individual CSOs within their CSSs to allow for effective allocation of resources.

EPA encourages States to use a watershed approach to set permitting priorities. Under a watershed approach, all surface water, ground water, and habitat stressors within a geographically defined area are understood and addressed in a coordinated fashion, as an alternative to addressing individual pollutant sources in isolation. To support States that want to implement a comprehensive statewide watershed approach, the Office of Water has developed guidance and training designed to assist communities and natural resource agencies that are pursuing a watershed approach. One part of this effort is the release of the NPDES Watershed Strategy. This Strategy encourages NPDES permitting authorities to evaluate water pollution control needs on a watershed basis and to coordinate CSO control program efforts with other point and nonpoint source activities within the watershed.

Applying a watershed approach to the CSO control program is particularly timely and appropriate since an ultimate goal of the CSO Control Policy is development of long-term CSO controls that will provide for the attainment of WQS. Since pollution sources other than CSOs are likely to be contributing to the receiving water and affecting whether WQS are achieved, the NPDES permitting authority needs to consider and understand these other sources.

Total maximum daily loads (TMDLs) provide the basis of equitably allocating cost-effective controls on a watershed basis. By examining the contribution of both point and nonpoint sources, the TMDL process ensures better use of limited resources in achieving WQS. To assist in the development of TMDLs for episodic, wet-weather events, EPA plans to publish technical guidance for estimating TMDLs that address integration of steady state and episodic point and nonpoint sources.

## **2.4 MECHANISMS FOR REQUIRING CSO CONTROLS**

The CSO Control Policy envisions that, in most cases, CSO requirements and controls will be incorporated into a municipality's existing NPDES permit for its discharge from the publicly owned treatment works (POTW), much like the incorporation of pretreatment and sewage sludge requirements. CSO conditions may be incorporated into the NPDES permit in several ways: 1) by including the conditions in the permit during the next five-year permit renewal cycle, 2) by modifying the permit for cause in accordance with the criteria in 40 CFR 122.62(a) or (b) (most likely through a major permit modification), or 3) by revoking and reissuing the permit for cause in accordance with the criteria in 40 CFR 122.62(b). EPA assumes that, in most cases, CSO conditions will be incorporated into NPDES permits through permit expiration and reissuance during the five-year permit cycle. (This document assumes this scenario for illustrative purposes.) Unless the permit writer intends to incorporate CSO conditions into an NPDES permit immediately, the permit writer should inform affected parties of the impending changes and encourage them to take steps to implement the CSO Control Policy recommendations, especially the NMC, voluntarily.



EPA recommends that the permit writer integrate CSO conditions into an existing NPDES permit in one of two ways. The CSO conditions can be grouped together and contained in a separate section of the NPDES permit the same way that sewage sludge or pretreatment requirements are often placed in a separate section. Appendix A illustrates how CSO conditions can be grouped together in a separate section of an NPDES permit. Alternately, individual CSO conditions can be integrated into separate sections of the NPDES permit. For example, CSO conditions can be integrated into the effluent limitations, monitoring requirements, and special conditions sections of the permit, as appropriate. Exhibit 2-1 contains an overview of the categories of CSO permitting conditions, which are discussed throughout the manual.

Other tools are available to the NPDES permitting authority in cases where the NPDES permit is not the appropriate mechanism to initiate or require CSO control. In some cases, it might be necessary for the NPDES permitting authority to include the CSO conditions in an appropriate enforceable mechanism. An enforceable order can be issued, either independently or in conjunction with an NPDES permit, when a permittee cannot comply immediately with the terms of the NPDES permit and compliance dates have passed. For example, an enforceable order that requires compliance with the NMC (and submittal of appropriate documentation) no later than January 1, 1997, might be necessary in cases where immediate compliance cannot be achieved.

In addition, the NPDES permitting authority may request information on a community's CSS under Section 308 of the Clean Water Act (CWA) (or State equivalent). Much of the example NPDES permit language can be incorporated into a Section 308 information request.

## **2.5 COMPLEX COMBINED SEWER SYSTEMS**

In the most common and simple case, a single system-wide permit is issued for all CSO outfalls from a single authority. For example, a municipality or a small sanitary sewer authority with one POTW treatment plant should be issued one NPDES permit that addresses requirements for the POTW, as well as for CSOs, storm water, sewage sludge, and a pretreatment program, as appropriate.

Exhibit 2-1. Categories of CSO Permitting Conditions

TIME	Years after Phase I Permit Issuance			
	0 . . . . . 5 . . . . . 10 . . . . . >	Phase I	Phase II	Post Phase II
<b>NPDES Permit Requirement</b>				
A. Technology-Based	<ul style="list-style-type: none"> <li>• NMC, at a minimum</li> </ul>	<ul style="list-style-type: none"> <li>• NMC, at a minimum</li> </ul>	<ul style="list-style-type: none"> <li>• NMC, at a minimum</li> </ul>	<ul style="list-style-type: none"> <li>• NMC, at a minimum</li> </ul>
B. Water Quality-Based	<ul style="list-style-type: none"> <li>• Narrative</li> </ul>	<ul style="list-style-type: none"> <li>• Narrative + performance-based standards</li> </ul>	<ul style="list-style-type: none"> <li>• Narrative + performance-based standards</li> </ul>	<ul style="list-style-type: none"> <li>• Narrative + performance-based standards + numeric water quality-based effluent limits (as appropriate)</li> </ul>
C. Monitoring	<ul style="list-style-type: none"> <li>• Characterization, monitoring, and modeling of CSS</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring to evaluate water quality impacts</li> <li>• Monitoring to determine effectiveness of CSO controls</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring to evaluate water quality impacts</li> <li>• Monitoring to determine effectiveness of CSO controls</li> </ul>	<ul style="list-style-type: none"> <li>• Post-construction compliance monitoring</li> </ul>
D. Reporting	<ul style="list-style-type: none"> <li>• Documentation of NMC implementation</li> <li>• Interim LTCP deliverables</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of CSO controls</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of CSO controls</li> </ul>	<ul style="list-style-type: none"> <li>• Report results of post-construction compliance monitoring</li> </ul>
E. Special Conditions	<ul style="list-style-type: none"> <li>• Prohibition of dry weather overflows (DWO)</li> <li>• Development of LTCP</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibition of DWO</li> <li>• Implementation of LTCP</li> <li>• Reopener clause for WQS violations</li> <li>• Sensitive area reassessment</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibition of DWO</li> <li>• Implementation of LTCP</li> <li>• Reopener clause for WQS violations</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibition of DWO</li> <li>• Reopener clause for WQS violations</li> </ul>

If a large municipality or sewerage control authority owns and/or operates two or more POTW treatment plants served by CSSs (also owned by the municipality) and each plant has its own NPDES permit, the NPDES permits generally should require an integrated and comprehensive approach to CSO control. This is similar to integrated requirements for a system-wide pretreatment program, where one municipality owns several POTW treatment plants. Each permit should be renewed, modified, or revoked and reissued to include CSO conditions. For example, if a municipality has three POTW treatment plants with individual permits that will be renewed in different years (e.g., treatment plant A's permit will be renewed in 1995, B's permit will be renewed in 1996, and C's permit will be renewed in 1997), conditions addressing **all** CSOs can be incorporated into each permit upon renewal. To begin the LTCP development process without having to wait for all of the permits to be reissued, treatment plant A's permit should address CSOs within the entire jurisdictional boundaries, including the areas discharging to treatment plant B and treatment plant C, and should require development of an LTCP for the entire system. Correspondingly, the NPDES permits for treatment plant B and treatment plant C should contain the same requirements. As an alternative in this same situation, the permit writer may choose to incorporate **all** conditions addressing CSOs only into the first permit to be reissued (i.e., treatment plant A's permit). Incorporating the CSO conditions into only one permit can preclude any confusion or inconsistencies resulting from including the same conditions in several different permits.

In some cases, different parts of a CSS, as well as the treatment plant, might be owned or operated by different sewerage control authorities. In this situation, the permit writer may issue each authority its own permit, containing CSO conditions applicable to the portion of the CSS owned or operated by that authority. The permits should require synchronization, coordinated preparation, and implementation of CSO controls among all authorities within the CSS. Each authority should be responsible for its collection system and CSOs and should cooperate with the treatment plant permittee receiving the flows from the CSS. If a CSS is permitted separately from the treatment plant, the fact sheets for the different permits should cross reference each other for informational purposes. Alternately, the permit writer can issue



a single permit to all co-permittees, incorporating CSO conditions unique to each CSS and treatment plant. Such co-permittee arrangements are subject to consent by the respective co-permittees.

## **2.6 PREVIOUS OR ONGOING CSO CONTROL EFFORTS**

Some permittees might have already completed portions of the CSO control planning and implementation process. The CSO Control Policy recognizes these ongoing CSO control efforts and does not expect duplication of effort. If the permittee has 1) completed or substantially completed construction of CSO control facilities that are designed to meet the water quality-based requirements of the CWA, 2) substantially developed or is implementing a CSO control program pursuant to an existing permit or enforcement order, and such program is considered by the NPDES permitting agency to be adequate to meet the water quality-based requirements of the CWA, or 3) has previously constructed CSO control facilities in an effort to comply with water quality-based requirements of the CWA but has failed to comply due to remaining CSOs, the permit writer should take these efforts into account in determining which of the LTCP elements are still appropriate and consistent with the goals of the CSO Control Policy. However, such a permittee would still be expected to develop an LTCP. Section 3.5.3 presents additional discussion of ongoing efforts.

## **2.7 COMBINED SEWER SYSTEMS IN SMALLER JURISDICTIONS**

The CSO Control Policy recognizes that the development and implementation of a comprehensive LTCP might be difficult or inappropriate for some small municipalities. At the discretion of the permit writer, jurisdictions with total populations under 75,000 may not need to complete all of the formal steps involved in developing an LTCP. Certain provisions of the CSO Control Policy should not be waived, however, such as implementation of the NMC, public participation under the LTCP, and sensitive area considerations. Although the CSO Control Policy is intended to provide some relief for small municipalities, the permit writer should discuss the scope of the LTCP with the permittee and the WQS authority to ensure that the LTCP includes sufficient information to select appropriate CSO controls. Section 3.5.3 discusses considerations for smaller jurisdictions in greater detail.

## 2.8 MEASURES OF SUCCESS

As municipalities, NPDES permitting authorities, and the public embark on a coordinated effort to address CSOs, serious considerations should be given to "measures of success." For purposes of this discussion, measures of success are objective, measurable, and quantifiable indicators that illustrate trends and results over time. Measures of success generally fall into four categories:

- Administrative measures that track programmatic activities;
- End-of-pipe measures that show trends in the discharge of CSS flows to the receiving water body, such as reduction of pollutant loadings, the frequency of CSOs, and the duration of CSOs;
- Receiving water body measures that show trends of the conditions in the water body to which the CSO occurs, such as trends in dissolved oxygen levels and sediment oxygen demand; and
- Ecological, human health, and use measures that show trends in conditions relating to the use of the water body, its effect on the health of the population that uses the water body, and the health of the organisms that reside in the water body, including beach closures, attainment of designated uses, habitat improvements, and fish consumption advisories.

EPA's experience has shown that measures of success should include a balanced mix of measures from each of the four categories.

As municipalities begin to collect data and information on CSOs and CSO impacts, they have an important opportunity to establish a solid understanding of the "baseline" conditions and to consider what information and data are necessary to evaluate and demonstrate the results of CSO control. Municipalities and NPDES permitting authorities should agree early in the planning stages on the data and information that will be used to measure success and on the extent to which the permit and monitoring plan should include such indicators.

The following list presents examples of potential measures of success for CSO control, organized by the four categories discussed above:

- **Administrative measures:**
  - Number of NPDES permits or other enforceable mechanisms requiring implementation of the NMC
  - Number of NPDES permits or other enforceable mechanisms issued requiring development of LTCPs
  - Number of municipalities meeting technology-based requirements in permits
  - Number of municipalities meeting water quality-based requirements in permits
  - Compliance rates with CSO requirements in permits
  - Dollars spent/committed for CSO control measures
  - Nature and extent of CSO controls constructed/implemented.
- **End-of-pipe measures:**
  - Number of dry weather overflows eliminated
  - Number of CSO outfalls eliminated
  - Reduction in frequency of CSOs
  - Reduction in volume of CSOs
  - Reduction in pollutant loadings (conventional and toxics) in CSOs.
- **Receiving water body measures:**
  - Reduced in-stream concentrations of pollutants
  - Attainment of narrative or numeric water quality criteria.
- **Ecological, human health, and use measures:**
  - Improved access to water resources
  - Reduced flooding and drainage problems
  - Reduced costs and treatment of drinking water
  - Economic benefits (e.g., value of increased tourism, value of shellfish harvested from beds previously closed)
  - Restored habitat
  - Improved biodiversity indices
  - Reduction in beach closures
  - Reduction in fish consumption advisories.

(Note: These measures are included as examples only; EPA is supporting the development of national measures of success for CSOs through a cooperative agreement with the Association of Metropolitan Sewerage Agencies (AMSA). The results of AMSA's efforts are expected to be available in late 1995.)

When establishing CSO measures of success, municipalities and NPDES permitting authorities should consider a number of important factors:

- **Data quality and reproducibility**—Can consistent and comparable data be collected that allow for comparison over time (e.g., trend analysis) and from different sources (e.g., watershed analysis)? Do standard data collection procedures exist?
- **Costs**—What is the cost of collecting and analyzing the information?
- **Comprehensibility to the public**—Will the public understand and agree with the measures?
- **Availability**—Is it reasonably feasible for the data to be collected?
- **Objectivity**—Would different individuals evaluate the data or information similarly, free from bias or subjectivity?
- **Other uses in wet-weather and watershed planning and management**—Can the data be used by State agencies as support for other CSO and watershed planning efforts?

Careful selection, collection, analysis, and presentation of information related to measures of success should allow municipalities, States, and EPA to demonstrate the benefits and long-term successes of CSO control efforts. Notwithstanding the effort to develop national measures of success, municipalities should identify measures, document baseline conditions, and collect appropriate information that demonstrates the cause and effect of CSO impacts and the benefits and success of CSO control. It is likely that measures of success will vary from municipality to municipality and will be determined by the environmental impacts of CSOs on site-specific basis.

## 2.9 COORDINATION WITH STATE WATER QUALITY STANDARDS AUTHORITY

A primary objective of the LTCP is to develop and evaluate a range of CSO control alternatives that will be sufficient to provide for the attainment of WQS, including designated uses of CSO-impacted receiving waters. To ensure that the LTCP will meet this objective, the WQS authorities, along with the NPDES permitting authorities, EPA, and the permittee, should

be involved throughout the LTCP development process. This will enable everyone to have an opportunity to review the proposed type and extent of data and information to be collected during LTCP development. Such data and information should be used to assess the attainability of the designated uses and might assist States in more precisely defining the use(s) of the CSO-impacted waters. For example, the information could be used to refine the existing WQS to reflect the site-specific wet weather conditions for CSO-impacted receiving waters. The CSO Control Policy recognizes that the review and appropriate revision of WQS is, in many cases, an integral part of LTCP development.

The CSO Control Policy discusses several types of WQS revisions in the WQS program that potentially could be used to address wet weather conditions. These types of revisions include the following:

- Development of site-specific criteria
- Modification of a designated use to include a partial use reflecting situations where a certain event (e.g., a storm) precludes the designated use from occurring
- Modification of a designated use to define the use with greater specificity (e.g., warm water fishery in place of aquatic life use protection)
- Temporary variances from water quality standards.

These mechanisms are described in detail in the *Combined Sewer Overflows—Questions and Answers on Water Quality Standards and the CSO Program* (EPA, 1995h). The decision regarding the mechanism to pursue when considering the WQS revisions will be based on a variety of factors. Thus, the permittee should consult with the NPDES permitting authority and State WQS personnel to determine the most appropriate option.

Data needs, monitoring protocols, and models to be used for system characterization and compliance monitoring should be agreed on early in the process. The water quality impacts of the existing CSOs can then be evaluated to establish a baseline, which can be used to assess the effectiveness of CSO controls once they are implemented. These models and protocols can also



be used to predict whether WQS are likely to be attained after the LTCP has been implemented. The information and data collected should assist States in assessing the need for revising WQS and implementation procedures to better reflect site-specific impacts of CSOs. In addition, coordinating the LTCP development and the review and revision, as appropriate, of WQS and implementation procedures should ensure that the permittee's LTCP and the requirements included in the NPDES permit will be sufficient to comply with the water quality-based requirements of the CWA.

Any review and revision of WQS to reflect wet weather conditions should be conducted with full participation of stakeholders within the affected watershed. This should include the sharing of CSO, storm water, and other point and nonpoint source data among stakeholders. This will enable NPDES permitting authorities and permittees to implement a comprehensive watershed management approach and allow permittees to coordinate the development and implementation of their individual LTCPs with one another.