

SANITARY SEWER OVERFLOWS

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Pending SSO Regulations

What Can Be Expected from the Proposed CMOM Legislation?

Sewer systems that are improperly maintained and operated often-times lead to sanitary sewer overflows (SSOs) due to increased flow in the system (inflow/infiltration [I/I] problems), pipe failures (tree root intrusions, blocked, broken or cracked pipes, and pipe settlement at the joints) and manhole deterioration. The EPA believes that sanitary sewers are the most deteriorated part of the wastewater infrastructure. A primary concern with SSOs is the effect they have on human health. Many times SSOs occur in high public areas such as basements, streets, playgrounds, rivers and streams. The EPA estimates that there are at least 40,000 SSOs per year. The EPA further estimates that approximately 75 percent of all sanitary sewer systems are capable of providing only 50 percent of their original capacity or less.

An EPA document (832-K-96-001 – Summer 1996) provides information relating SSOs to potential health risks. SSOs are a direct threat to public health since they contain raw sewage and therefore have the potential to contain

- bacteria,
- viruses,
- protozoa (parasitic organisms),
- helminths (intestinal worms), and
- bioaerosols (inhalable molds and fungi).



▲ This manhole, discharging sewage into the adjacent stream, depicts the environmental concerns associated with poorly managed sanitary sewer systems. By discharging raw sewage into the environment, sanitary sewer overflows pose a direct threat to human health.

The severity of the diseases that these organisms can spread varies from the common cold and fever to salmonellosis (food poisoning) and gastroenteritis (causing diarrhea and abdominal pain) to life threatening diseases including hepatitis, meningitis and cholera. The public can be exposed to the above organisms and diseases through contact with raw sewage in

- drinking water contaminated by SSOs,
- direct contact in areas of high public access (including inhalation and skin absorption), and
- consuming fish and shellfish harvested from areas where SSOs occur.

Based on additional information from the EPA (EPA 832-K-96-001 – Summer 1996), one SSO in Cabool, Mo., in 1990 caused 279 people to be affected by a pathogenic strain of *Escherichia coli* when contamination from the SSO entered the drinking water mains. Four people died, 32 were hospitalized and 243 became ill with diarrhea and other problems from this event. In addition, the EPA notes a study that estimates a direct relationship between gastrointestinal illness contracted while swimming and bacteria levels in the water. One study indicates that an average of nearly 700 cases of illness per year were reported in the 1980s from eating shellfish contaminated by sewage and other sources. The EPA estimates that the number of unreported cases is 20 times that.

Due to incomplete reporting and inconsistent permitting, most of the data available regarding SSOs are only approximate. One of the primary contributors to incomplete reporting is SSOs that occur in remote areas. These SSOs are difficult to identify and thus many times go unnoticed. However, the data that do exist, although most likely underestimated, presents a strong argument for improved SSO regulations.

Upcoming SSO Regulations

Based on the aforementioned risks associated with SSOs and a presidential directive dated May 29, 1999, the EPA began developing a program that would monitor and regulate SSOs from a national standpoint. These efforts resulted in the development of a proposed SSO rule under the NPDES legislation that was developed by the EPA and the SSO Federal Advisory Subcommittee. The SSO Subcommittee unanimously supported the proposed SSO rule during their October 18–20, 1999 meeting. The proposed rule was released in January 2001 and consists of the following three standard permit conditions for owners of sanitary sewer collection systems.

- **Capacity, Management, Operation and Maintenance (CMOM)** (proposed 40 CFR 122.42[e])
- **Prohibition on SSOs** (proposed 40 CFR 122.42[f])
- **Reporting, Record Keeping and Public Notification** (proposed 40 CFR 122.42 [g])

Under the proposed rule, the EPA also intends to expand the NPDES to include satellite collection systems. In addition, the EPA is discussing utilizing a watershed management approach with the proposed SSO rule in order to prioritize environmental efforts within a given area. The program that is anticipated to have the largest impact in terms of initial effort required from collection system owners is the CMOM program.

Basic Requirements

The proposed CMOM legislation (122.42[e]) contains four basic sections.

- General Standards
- CMOM Program Components
- Communications
- Small Collection Systems



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The General Standards section sets forth the basic provisions for the proposed CMOM legislation. Five basic requirements are set forth and must be met by the permittee.

- Properly manage, operate and maintain, at all times, all parts of the collection system that you own or over which you have operational control.
 - Provide adequate capacity to convey base flows and peak flows for all parts of the collection system you own or have operational control.
 - Take all feasible steps to stop and mitigate the impact of sanitary sewer overflows in portions of the collection system you own or have operational control.
 - Provide notification to parties with a reasonable potential for exposure to pollutants associated with the overflow event.
 - Develop a written summary of your CMOM program and make it and the audit under section 5 available to any member of the public upon request.
- legal authority,
 - measures and activities,
 - design and performance provisions,
 - monitoring, measurement and program modifications,
 - overflow emergency response plan,
 - system evaluation and capacity assurance plan, and
 - program audits.

The first step is to identify the major goals of the program. These should be consistent with the general standards presented in section 1.

The CMOM program then should focus on organization. This section of the program should identify positions responsible for implementing tasks presented in the permittee's CMOM program, including lines of authority (an organization chart can be used here). In addition, a chain of communication for reporting SSOs should be established.

Legal authority is another issue that must be addressed per the proposed CMOM legislation. This provision requires the permittee to specify legal authority (through legally binding documents such as sewer use ordinances and service agreements) to assure proper maintenance, design, construction and inspection of the sanitary sewer system. This section of a permittee's CMOM program would assure that the permittee has adequate legal authority to authorize implementation activities.

The measures and activities section is the heart of the CMOM legislation. This section requires the permittee to provide adequate maintenance of facilities and equipment, develop and/or maintain system mapping and provide routine preventative operation and maintenance activities

and training for collection system personnel. In addition, this section requires the permittee to assess the capacity of both the collection system and treatment facilities, as well as to identify structural deficiencies and establish rehabilitation measures.

In addition to the preventative measures discussed above, the proposed CMOM legislation also requires standards to be set for additions to and rehabilitation of the existing sewer system in the design and performance provisions. Standards must be set for the installation of new sewers, pumps and other appurtenances as well as rehabilitation and repair projects. Procedures also should be outlined for inspecting and testing these activities.

The proposed CMOM legislation requires monitoring, measurement and program modifications to occur as needed to keep a CMOM program effective. Under this section, the effectiveness of the CMOM program should be evaluated and appropriate changes should be made. The CMOM program summary should be updated to reflect these changes.

The legislation also requires that an Overflow Response Plan be developed. This section requires the permittee to provide a plan that outlines steps to be taken when an SSO occurs, including notification of health agencies. This plan should provide a framework to ensure that all overflows are properly identified, responded to and appropriately reported. In addition, the plan should provide measures to train personnel and ensure that they follow all overflow response procedures. Emergency operations also must be addressed.

A System Evaluation and Capacity Assurance Plan needs to be developed if peak flow conditions are contributing to

The CMOM Program Components section states that a CMOM program must be developed in accordance with the General Standards. If any element of the General Standards section is not applicable or appropriate, it does not have to be included in the permittee's CMOM program. However, the written summary must identify why that particular element does not apply. The necessary components of a CMOM program as outlined in the proposed regulations are

- goals,
- organization,

an SSO within the sanitary sewer system. Basic elements of this plan are

- evaluation,
- capacity enhancement measures, and
- plan updates.

The basic tenet of the System Evaluation and Capacity Assurance Plan is to assure that the permittee is aware of the current capacity of the system and the peak flows associated with overflow events. In addition, any hydraulic deficiencies within the system should be identified. The permittee also must establish measures to address and correct these deficiencies and update the plan as necessary.

CMOM program audits are an essential part of the proposed SSO rule. They provide a tool for continuous improvement of the CMOM program and thus the sanitary sewer system. The audit must evaluate the effectiveness of the permittee's CMOM program in terms of its deficiencies and its steps to respond to these deficiencies. The audit should be appropriate to the size of the sanitary sewer system and the number of overflows.

The Communications section (section 3) states that the permittee should communicate on a regular basis with those who are interested in their CMOM program. In addition, the permittee also should allow

Smoke testing sanitary sewer lines allows inflow sources within the system to be readily identified. ►

feedback from interested parties as the CMOM program is developed, implemented and updated.

Section 4 addresses small collection systems and allows for the NPDES Authority to make modifications to the CMOM program permit condition. Specifically, systems with an average daily flow of 2.5 mgd or less are not required to develop a written summary of the CMOM program and are not required to perform an audit or prepare an audit report unless an SSO occurs that discharges to waters of the United States. Systems with an average daily flow of 1.0 mgd or less may not be required to implement the legal authority or measures and activities provisions (with the exception of system mapping).

What Can be Expected?

The proposed CMOM legislation is quickly approaching, with the proposed rule anticipated to be released this spring. It is expected that the rule will become part of the NPDES legislation within the two years following. Therefore, it is in the best interest of the permittee to start developing a Capacity Management, Operation and Maintenance program that incorporates requirements from the proposed legislation.

CMOM Program requirements are to be included in the first NPDES permit that contains CMOM conditions. For satellite systems, a permit application generally must be submitted within 3–5 years of publication of the final rule and based on the receiving treatment facility permit renewal schedule. However, systems that exhibit chronic SSOs or have an SSO that discharges to waters of the United States may be required to submit an application within 180 days.

One of the primary objectives of the CMOM legislation is for permittees to catalog all aspects of their system and maintain procedures in place for maintenance and rehabilitation to occur as needed. Based on the proposed legislation, CMOM programs shall address current capacity problems within the system as well as provide the framework for preventing and addressing potential problems within the system. Developing a thorough CMOM program



will require municipalities to have a strong grasp on the capacity of their system as well as the problems that exist within it. A Gap Analysis is one tool that can and should be utilized to determine the difference between the permittee's current operation, maintenance and capacity assurance protocols and those required to meet the basic tenets of the CMOM legislation. In addition, the following are procedures that exist for evaluating sewer systems.

- Manhole Inspections
- Flow Monitoring
- Smoke Testing
- Dye Testing
- Night Flow Isolation and Measurement
- Closed Circuit Television Inspection
- Hydraulic Modeling

These procedures provide a permittee with information regarding defects within the manholes and pipelines, daily flow values and inflow/infiltration sources. In addition, they provide information regarding system configuration for mapping purposes. This information will prove to be a strong tool in developing a CMOM program.

In addition to this effort, the permittee will be required to create and update the following four documents.

- Written Summary of the CMOM Program
- Overflow Response Plan
- System Evaluation and Capacity Assurance Plan (as needed)
- Program Audit Report

Ultimately, these documents serve as a record that the permittee is following the CMOM legislation requirements. It will be essential for the permittee to maintain proper documentation, especially in the cases when SSOs do occur. In these cases, the permittee will have the burden of



► Manhole inspections provide a general assessment of the sanitary sewer system manholes and identify active and inactive sources of inflow and infiltration.

proof in showing that every effort was taken to prevent the SSOs from occurring.

Additional Considerations

The Governmental Accounting Standards Board (GASB) released GASB – 34 in June 1999, requiring state and local governments to report all infrastructure assets, including sewers, in their annual financial reports. The date that GASB – 34 will take effect varies based on a government’s annual revenues; however, all governments must begin proactive reporting of infrastructure by June 15, 2003.

The upcoming SSO regulations also are expected to be finalized and incorporated into the NPDES legislation within this time frame. Retroactive reporting (back to June 30, 1980) will have to be incorporated into the financial reports after a transition period of four years.

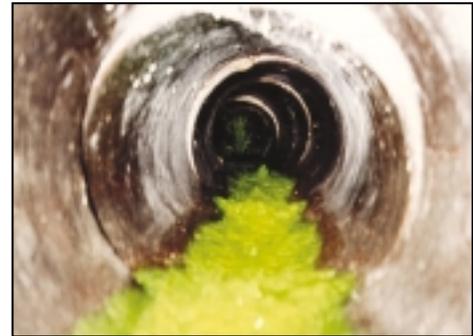
In order to accurately account for this infrastructure reporting, a thorough knowledge of infrastructure inventory and conditions will be necessary. In addition, all infrastructure assets will have to be depreciated unless a state or local government can show that these assets are being maintained at an established level. To comply with this,

Dye testing can be used to confirm and develop accurate mapping of the sanitary sewer system and to identify inflow sources such as roof leaders that may be connected to the system. ►

the government will be required to present an up-to-date inventory, perform condition assessments of the assets and estimate the total amount to maintain the infrastructure assets at the established level.

The development of a CMOM program should be developed in conjunction with sewer infrastructure reporting to eliminate potential redundant efforts. A complete CMOM program will address each of the items to allow governments to report infrastructure assets without having to depreciate them.

In conclusion, permittees should take the next two years as an opportunity to develop a sanitary sewer management program that is in compliance with the proposed CMOM legislation. This will allow for the development of a program that is compatible with both the permittee, the collection system size and complexity, and with the legislation. In addition, a thorough CMOM program will allow for an easier transition into the upcoming required infrastructure reporting and, if completed in con-



junction with GASB –34 requirements, will eliminate redundant efforts.

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