CHAPTER 3
OPTIMIZING ADMINISTRATIVE AND MANAGERIAL FUNCTIONS

The quality of the operation and maintenance of a wastewater collection system depends on effective administration of the numerous elements involved in such a program. An effective administration will assure an operation and maintenance program that will keep a wastewater collection system functioning at its top efficiency, maximize its useful life, and minimize costs.

Information for this chapter was primarily obtained from the following sources: U.S. EPA's *Guide for Evaluating Capacity, Management, Operation, and Maintenance Programs for Sanitary Sewer Collection Systems* (DRAFT); EPA's *Asset Management for Sewer Collection Systems—Fact Sheet;* California State University's *Utility Management, Collection Systems: Method for Evaluating and Improving Performance*; and California State University's *Operation and Maintenance of Wastewater Collection Systems* (Volume I & II).

3.1 Standards, Policies, and Procedures

A collection system management program is the backbone for operation and maintenance activities. The purpose of a management program is to promote responsible and effective collection system operation and maintenance.

The goals of a management program should include:

- Protection of the public health, the environment, the wastewater collection system operator, and the prevention of unnecessary property damage.
- Minimization of infiltration, inflow, and exfiltration and maximize collection and conveyance of wastewater to the treatment plant.
- Provision of prompt response to service interruptions.
- Use of allocated funds efficiently.
- Identifying and remedying design, construction, and operational deficiencies.
- Performance of all activities in a safe manner so as to avoid injuries.

Maintenance activities should be documented in *standard operation procedures* (SOPs) that are reviewed for accuracy, efficiency, and effectiveness every two to three years, or as often as necessary to remain up-to-date.

An important component of a properly operated collection system is the system's organizational structure, which should be documented in a staffing plan. This information may take the form of an organizational chart or narrative description of roles and responsibilities, or both. There is no single model for how an organization should be structured. Authority for operation and maintenance activities and roles and responsibilities should be clearly defined, documented, and communicated.

In some systems, maintenance may be carried out by a city-wide maintenance organization, which may also be responsible for such diverse activities as road repair and maintenance of the water distribution system. In this situation adequate lines of responsibility for the collection system must be established within the maintenance organization. Such organizations must clearly identify who's responsible for the collection system and establish mechanisms of communication.

Lines or mechanisms of internal communication within the organization ensure that all employees receive information and have an appropriate forum to provide feedback. The organization should have procedures to facilitate internal communication between the various levels and functions of the organization regarding its management, operations, and maintenance programs.

Effective internal communication requires flow both from the top down as well as from the bottom up. Top-down communication can be through bulletin board posters, paycheck inserts, regular staff meetings, electronic mail or informal brown-bag lunch discussions. Bottom-up communication may include establishment of environmental committees, confidential hotlines, electronic mail, or direct open discussion. Managers may also offer incentives to employees for performance, and encourage them to submit suggestions for ways to improve the performance of the collection system. Since employees are on the "front lines," they are often an excellent source of ideas, issues, and information about what is going on at the work site.

The entity charged with operation, maintenance, and rehabilitation of a wastewater collection system will often document its structure in an *organizational plan,* which shows who reports to whom and identifies the lines of authority. The organizational plan should show each person or job position in the organization with a direct line showing to whom each person reports in the organization.

The organizational plan should include a *job description* for each of the positions on the organizational chart. The inclusion of job descriptions as part of the organizational program helps ensure that all employees know their specific job responsibilities and have the proper credentials to be hired for their job. Employees should not be asked to accept responsibilities for job tasks that are beyond their level of authority or ability in the organizational structure.

3.2 Staffing, Training, and Certification

Staffing

The collection system's personnel requirements vary in relation to overall size and complexity of the collection system. They also depend upon the collection system operators' other responsibilities. In very small systems these responsibilities may include operation of the wastewater treatment plant as well as the collection system. In many systems, collection system personnel are responsible for storm water as well as wastewater collection systems. Determination of staff requirements for a collection system requires a working knowledge of the system and consideration of key variables.

The use of job descriptions helps ensure that all employees know their specific job responsibilities and have the proper credentials to be hired for their job. Using unqualified

personnel risks serious injury, jeopardizes equipment warranties if qualified personnel do not do repairs, raises the potential that collection system components and private property may be damaged, and increases the potential for SSOs.

Training

Collection system operators are exposed to numerous challenging conditions. Adequate training —especially safety training—is necessary for employees to meet these challenges. Personnel should have the required training to effectively carry out the responsibilities of their position.

The commitment of management is essential for a training program to be effective. Resources in the form of funding must be invested in the program for it to be productive. An organization with untrained or poorly trained collection system operators runs significantly more risk for accidents and injuries and of experiencing non-compliance in the collection system and future costly corrective actions (such as a sewer collapse).

New employees should be trained on how to perform standard procedures, coordinate with other public works and private utility crews, operate equipment, and observe health and safety protection requirements.

Informal on-the-job training of new employees often allows improper procedures and mistaken assumptions to be passed on. This type of initiation also places too much emphasis on "what we do" and not enough emphasis on "why we do what we do," so that employees don't have enough information to respond to problems they encounter as they are performing their tasks. A formal orientation/training program addressing wastewater collection system operation and maintenance should be developed for all new employees.

The training program should identify the types of training required and offered. Types of training vary, but may include general environmental awareness training, training related to specific equipment, training on policies and procedures, safety training, and training on conducting operation and maintenance activities.

The collection system agency or organization should routinely assess the effectiveness of training through periodic testing, drills, demonstrations, or informal reviews, and improve training programs based on these assessments.

Employee participation in the training program should be mandatory and tracked. Information that should be tracked for each employee includes:

- Employee identification and title.
- Employee certification and licenses.
- Classes attended.
- Test results, if applicable.
- Continuing education credits awarded.

Lastly, collection system operators and their activities are the most visible segment of the organization. Operators project a public image for their utilities on city and town streets. For this reason, personnel need to be trained in what to expect in public situations and how to deal effectively with the public and present a good image for the municipality.

Certification

There are many benefits to implementing employee certification requirements, including protection of the public's investment in facilities and infrastructure, employee pride, and recognition. Certification assures that facilities and equipment are operated and maintained by qualified operators who possess a certain level of competence. Certification gives collection system operators an upgraded image and provides a measurable goal that operators can strive for by preparing themselves to do a better job. Passing a certification exam is often recognized by an increase in salary and other employee benefits.

3.3 Budgets

Although an adequate budget is not a guarantee of a well-run collection system, an inadequate budget will make this achievement difficult. Funding has significant impacts on staff and their ability to do their job. Funding can come from a variety of sources, including user fees or appropriations from the State or local government.

A key element of the operation budget program is the tracking of costs in order to have accurate records each time the annual operating budget is developed. Having an annual baseline provides documentation for future budget considerations and provides justification for future rate increases. Collection system management should be aware of the procedures for calculating user rates and for recommending and making user rate changes as often as necessary to manage, operate and maintain the efficiency and effectiveness of the utility.

The major categories of operating costs are labor, utilities, and supplies. Cost accounting for these categories should include information on unit costs, total costs, and the amount/quantities used.

The cost of preventive and corrective maintenance and major collection system repairs and alterations are major items in the yearly operating budget and capital improvement program (CIP). The utility should keep an adequate record of all maintenance costs, both in-house and contracted, plus the costs from spare parts. This will assist in the preparation of the next year's budget.

A capital improvement fund must be part of the organization's budget in order to keep the system operating properly in the future. Capital planning starts with a look at changes in the community. Where are the areas of growth in the community? Where are the areas of decline, and what are the anticipated changes in industry within the community? After identifying the changing needs in the community, the existing utility structure should be examined and weak spots identified. Expected capital improvements within the next year, two years, five years, and ten years should also be identified. Once all of this information has been compiled, it can be prioritized and a timetable developed for improving each of the areas identified.

3.4 Asset Management

Asset management, created to foster more efficient financial and physical resource investments and to prolong the life of the infrastructure system components, can be defined as managing infrastructure capital assets to minimize the total cost of owning and operating them while delivering the service level customers desire.

Use of asset management procedures will help protect wastewater collection systems and extend financial resources by:

- Making sure components are protected from premature failure through proper operation and preventive and predictive maintenance.
- Facilitating proactive capital improvement planning and implementation over longer cycles to reduce annual and overall costs.
- Reducing the need for expansions and additions through demand management.
- Reducing the cost of new or planned investments through economic evaluation of options using life-cycle costing and value engineering.
- Focusing attention on results and by clearly defining responsibility, accountability, and reporting requirements within the organization.
- Maintaining stable and justifiable user rates.

An emphasis on asset management can better ensure that the key components of a strategic business plan, such as level of service definition, rate setting, budgeting, financing, and value engineering are taken into consideration.

Asset management and *environmental management systems* (EMSs) have valuable attributes and can complement each other, but they are not the same. The asset management approach helps utility owners optimize maintenance and replacement cycles to cost-effectively ensure that the sewer collection system runs smoothly and to accurately predict capital funding needs over a long planning horizon. It assumes that the utility owner has identified its environmental compliance goals and has incorporated them into the planning process. By contrast, EMSs are designed to help an organization identify and manage a full range of environmental, public health, and safety issues—both regulated and unregulated (i.e., surface water, groundwater, air quality, noise, etc.) EMSs are designed to help integrate these issues into an overall system that can help continually improve environmental performance and provide other important business benefits like reduced costs through energy and water conservation, reduced chemical usage, reduced risk of noncompliance, to name a few.

The key elements of asset management are:

- Level of service definition.
- Selection of performance goals.
- Information systems.
- Asset identification and valuation.
- Failure impact evaluation and risk management.
- Condition assessment.
- Rehabilitation and replacement planning.
- Capacity assessment and assurance.
- Maintenance analysis and planning.
- Financial management.
- Continuous improvement.

3.4.1 Components of an Asset Management System

Level of Service Definition

A basic level of service definition for most collection systems will be to deliver reliable sewer collection services at a minimum cost, consistent with applicable environmental and health regulations. Examples include:

- Ensuring adequate system capacity for all service areas.
- Eliminating system bottlenecks due to pipe blockages or other system defects.
- Reducing peak flow volumes through inflow/infiltration (I/I) controls.
- Providing rapid and effective emergency response service.
- Minimizing cost and maximizing effectiveness of CMOM programs.

Performance Measurements

Performance measurements are specific indicators designed to assess whether level of service objectives are being met. Some examples of performance measurements:

- Annual performance goals for sewer system inspection, cleaning, maintenance, rehabilitation, and capital improvement.
- Correlating grease control education and enforcement measures with expected reductions in the number, distribution, and severity of grease blockages.
- Correlating illegal connections (sump pumps, roof leaders, foundation drains, etc.) education with wet weather SSO's.
- Establishing maximum hourly and monthly peak flow volumes.
- Establishing maximum emergency response time to emergency calls, tracking customer complaints and dealing with claims for private property restoration.
- Performing cost-benefit analysis of key completed activities, taking into account expected vs. actual outcome and budgeted vs. actual cost.

Information System

Each utility must analyze its information needs. Begin with an evaluation and documentation of existing information systems. The next step is to perform a side-by-side comparison between identified information needs and existing systems to reveal gaps. A prioritized, phased plan is then developed to fill in the gaps.

For most utilities, information is most efficiently managed by use of asset management software programs that help organize the data, perform many standard analyses, and facilitate planning, scheduling, and budgeting. These programs range in cost and complexity from affordable, simple applications to very complex, expensive solutions–from several thousand dollars to several hundred thousand dollars.

A geographic information system (GIS) links database information to points on the map, which are primarily defined by manhole locations and their connecting sewer segments. The GIS can then be linked to the asset management system, sewer system model applications, and even billing systems.

Asset Identification and Capitalization

Asset identification is the process of identifying and numbering the primary components

in the sewer system. Once the components are assigned unique identifiers, the utility can use a GIS to link information systems and aggregate data for financial, economic, technical and management use.

For instance, sewer main segments would be identified by location, length, material, size, slope, burial depth, beginning and ending manholes, and approximate or actual age. The numbering system used to assign unique identifiers to components should be based on manholes, with the sewer segments numbered according to their relationship to the beginning and ending manholes.

Map data should be verified with physical system inspection methods such as closed-circuit TV (CCTV), sonar/CCTV, static camera, or person-entry. Latitude/longitude coordinates should be established or verified using global positioning surveying (GPS) techniques.

Complete sewer system inspection is an expensive and time-consuming undertaking that must be carefully planned and coordinated to support many aspects of the asset management program. Many communities will need to prioritize and plan inspection over a period of years. Highest priority for inspection should be given to sewers that have known defects, have caused or contributed to SSOs or treatment plant violations, have negatively impacted users, or have the potential to impact sensitive environmental or drinking water sources.

Asset Capitalization

In general, the capitalized amount of an asset is defined as its acquisition cost (design, construction, land acquisition, etc.), plus capital improvements, minus accrued depreciation. For collection system utilities, this valuation could be established at the subsystem level—force mains, sewer mains, service laterals, manholes, etc. or at the overall system level.

Failure Impact Evaluation and Risk Management

The potential impacts from sewer line failures should be assessed on a system-wide basis. The goal is to identify those areas of the system that will have the most impact if a failure occurs, and focus asset management resources to minimize the risk.

Condition Assessment

Condition assessment is performed to identify assets that are underperforming, determine the reason for the deficiency, predict when failure is likely to occur, and determine what corrective action is needed and when. The GASB 34 modified accounting option requires that condition assessment be based on an up-to-date inventory of assets. A condition level measurement scale should be used, and a minimum acceptable condition should be established and incorporated into the administrative rules governing the operation of the collection system (municipal ordinance, state or county statute, etc.) Whatever benchmarks are chosen, they should refer primarily to the physical condition of the system and its components.

Components found to be in poor condition, or with severe defects and high failure impact ratings, should be addressed as soon as possible after they are discovered. Less severe defects can be prioritized for more frequent inspection or cleaning, repair, rehabilitation, or replacement.

Rehabilitation and Replacement Planning

Proactive rehabilitation and replacement planning provides the best opportunity for capital cost savings. By rehabilitating or replacing sewers and other components before they fail, the utility automatically avoids costs such as emergency contractor fees, staff overtime, unplanned repairs, and SSO cleanup costs. Additional savings can be achieved through coordination of sewer construction with other construction projects, replacing longer segments, and phasing construction over a period of years.

WHAT IS GASB 34?

GASB stands for Government Accounting Standards Board, which is a private nonprofit body responsible for establishing and improving accounting and financial reporting standards for governmental units. In June 1999, GASB released Statement No. 34 (GASB 34) titled Basic Financial Statements—and Management Discussion and Analysis—for State and Local Governments, designed to provide a new look and focus for reporting public finance in the United States.

GASB 34 came about because the previous accounting method for preparing state and local government financial statements focused on short term financial resources like cash and investments, which leaves infrastructure (such as wastewater collection systems) off the balance sheet and does not include any charge on the income statements for the cost of using those infrastructure assets to provide services.

GASB 34 guidelines allow governments that can demonstrate they maintain their infrastructure at an established level to report their expenses for maintaining and preserving infrastructure assets instead of depreciating them, as was done in the past. Governments wishing to report their infrastructure using this "modified approach" are required to meet certain conditions and disclose publicly the evidence demonstrating their compliance with these conditions. The information to be disclosed includes:

- The assessed physical condition of infrastructure assets (governments must perform such assessments at least every three years, and disclose the results of at least the three most recent condition assessments).
- Descriptions of the criteria the government uses to measure and report asset condition.
- The condition level at which the government intends to maintain the assets.
- A comparison of the annual dollar amount estimated to be required to maintain and preserve the assets at the condition level established by the government with the actual expenses, for at least the last five years.

Wastewater collection utilities that choose to use modified approach accounting will be demonstrating to customers, lending institutions, and regulators a commitment to maintaining the assets for which they are responsible. The commitment may be a symbol of a government's dedication to delivery of excellent service, proper use of public funds, and compliance with environmental and health laws. In addition, the collection system will enjoy the benefit of asset management, including lower capital replacement costs, smoother system operations, less resistance to needed rate increases, and more advantageous commercial lending arrangements.

Additional information pertaining to GASB and GASB 34 can be found at *www.gasb.org/repmodel/index.html.*

Capacity Assurance Planning

Capacity planning should be based on:

- Review of existing capacity constraints.
- Analysis of predicted demand for sewer service based on regional growth patterns.
- Identification of current and future capacity shortfalls.
- Identification and evaluation of alternatives for correcting the deficiencies.

Benefits of Water Conservation and Efficiency

Collection systems operating at or near capacity can benefit from a program to encourage water conservation and efficiency. Water conservation and efficiency have an effect on how much wastewater is produced, thereby having a direct impact on the performance and life of a wastewater system. A reduction in the amount of wastewater generated due to improved conservation and efficiency practices that target both the engineering and behavioral practices of the community can be extremely useful to any wastewater system. However, these conservation and efficiency programs should be tailored to the local conditions, taking into account various factors to determine the proper mix of efficiency measures and the priority of the program.

One way to reduce wastewater flows is to adopt engineering practices based on modifications in plumbing, fixtures, or water supply operating procedures on the customer's side of the meter. Installing water-saving devices and repairing leaky pipes, faucets, and toilets could save thousands of gallons of water per person per year, and greatly reduce the amount of wastewater entering the collection system and requiring treatment.

Community-wide water conservation and efficiency programs can also include water use surveys, plumbing fixture retrofit kits, rebate or incentive programs for low-flow toilet and appliance replacement, and informational/educational programs.

Additional information on the benefits of a water conservation and efficiency program and guidance on establishing a program are available from the following sources:

Water Efficiency Fact Sheet—A Technical Overview. National Small Flows Clearinghouse. No. WWFSOM33. 1998. Available at: *www.nsfc.wvu.edu*

On the web:
American Water Works Association—Water Efficiency Clearinghouse.
Available at: *www.waterwiser.org*

EPA's Water Use Efficiency Program
Available at: *www.epa.gov/owm/water-efficiency/index.htm*

Saving Water Partnership, a group of local utilities in Seattle and King County, Washington area that fund water conservation programs.
Available at: *www.savingwater.org*

Maintenance Analysis and Planning

The asset management goal is to maximize planned maintenance and minimize unplanned maintenance. Planning should be performed annually and updated throughout the year as needed to address changing conditions. Maintenance activities are either planned (i.e., inspecting all major lines in the system every 15 years, cleaning all major lines on a rotating basis every five years) or unplanned (i.e., defect repair, emergency blockage removal).

Field crews should be integrally involved with maintenance planning. As the maintenance program proceeds, field staff should be encouraged to provide feedback on which strategies are working and which are not, to allow mid-course corrections if necessary.

Financial Management

The goal of sewer system financial management is to identify how much money will be needed to meet level of service goals and maintain the system at or above the identified minimum condition, forecast when the money will be needed, and use the information to set user fees, other revenues, and debt financing.

Financial forecasting should be performed over a period of five to 10 years, and should be updated annually. The annual estimate of the cost to maintain the system is included in the utility's annual financial report, along with a full accounting of cash flows, debt financing, and financial reserve activity and capital improvements program.

The high up-front costs of capital acquisition often dominate the capital improvement planning process. It is, however, important to evaluate capital improvement alternatives relative to the blend of capital and lifecycle costs and the expected useful life of the asset. Other lifecycle costs that may affect the cost of ownership include the risk of harm to human health or the environment, or the risk of private or public property damage in the event of failure.

Continuous Improvement

Continuous improvement processes are based on periodic review of systems against performance measures to identify any shortfalls. Performance measures can be related to level of service goals, condition maintenance goals, or asset management system goals.

Alternatively, if an operational or capital improvement program is completed and the expected performance improvement is not realized, further analysis may be needed to identify the most effective next actions.

3.5 Safety

The development of a safety program is a necessity for any collection system agency. The purpose of the program is to define the principles under which the work is to be accomplished, to make employees aware of safe working procedures, and to establish and enforce specific regulations and procedures. The program should be in writing (e.g., written procedures, policies and training courses) and training should be well documented. Safety training cuts across all job descriptions and should emphasize the need to recognize and address hazardous situations.

The safety program should explicitly state the organization's safety policy. The safety policy statement should be prepared by the top management of the collection system agency with the close consultation of the agency's safety officer/safety consultant, and select staff, since its purpose is to let employees know that the safety program has the full support of the agency and its management.

The safety policy should:

- Define the goals and objectives of the program.
- Identify the person's responsibilities for each element of the program.
- Affirm management's intent to enforce safety regulations.
- Describe the disciplinary actions that will be taken to enforce safe work practices.

Within the safety program, management has the responsibility to:

- Formulate a written safety policy.
- Provide a safe workplace.
- Set achievable safety goals.
- Provide adequate training.
- Delegate authority to ensure that the program is properly implemented.

The manager/superintendent is the key to any safety program. Implementation and enforcement of the program is the responsibility of the manager. The manager/superintendent should:

- Ensure that all employees are trained and periodically retrained in proper safe work practices and safety equipment.
- Ensure that proper safety practices are implemented and continued as long as the policy is in effect.
- Provide adequate safety equipment.
- Investigate all accidents and injuries to determine their cause.
- Institute corrective measures where unsafe conditions or work methods exist.
- Ensure that equipment, tools, and the work area are maintained to comply with established safety standards.

The collection system operators are the direct beneficiaries of a safety program. The operators share the responsibility to:

- Observe prescribed work procedures with respect to personal safety and that of their co-workers.
- Report any detected hazard to a manager immediately.
- Report all accidents, even those that cause minor injuries.
- Report near-miss accidents so that hazards can be removed or procedures changed to avoid problems in the future.
- Correctly use all protective devices and safety equipment supplied to reduce the possibility of injury.

3.6 Security

As has already been discussed, the wastewater collection system represents a sizeable investment by the community, so protecting it is a critical part of managing the system. Collection systems may be vulnerable to a wide variety of threats that can affect operations including natural disasters, operator errors, vandalism, and even terrorism. By adequately preparing, the community's investment, public health, environment, and other assets that rely on the system will be protected.

It is important to reassess the vulnerability of the collection system on a regular basis. Preparedness is not an end point, but a goal that can be achieved only through continued efforts to assess and improve the overall security of the system.

3.6.1 Securing Information

Records, maps, and other information should be stored in a secure location when not in use. Utilities should make back-up copies of all data and sensitive documents on a regular basis. Back-up material should be stored in a secure offsite location. Decision makers need to address how sensitive documents (e.g., schematics, maps, and plans and specifications) will be distributed for construction projects or other uses, and how they will be recorded and recovered after use. Measures to safeguard documents used by bidders for new projects needs to be considered as well.

All computer access should be password protected and passwords should be changed periodically and (as needed) following employee turnover. When possible, each individual should have a unique password that they do not share with others.

Supervisory control and data acquisition (SCADA) systems are computer-monitored alarm, response, control, and data acquisition systems used by collection system operators to remotely monitor and adjust the operation of equipment in the system. SCADA systems can be vulnerable to potential intruders. The most direct approach to evaluate vulnerabilities is penetration testing, which can detect vulnerability and security breaches that could be used to attack and penetrate the entire SCADA system. Hardening is the process of making the system less vulnerable through equipment upgrades, redundancy of components, etc. If you have a SCADA system, consider operating it on a system without internet access to reduce the chance of unauthorized access.

3.6.2 Securing Facilities

Access to critical components of the collection system should be limited to authorized personnel only, and staff need to understand and abide by the access policies that are established. Warning signs can be an effective means to deter unauthorized access. Check regularly to be certain signs are present and legible.

Ideally, all facilities should have a security fence around the perimeter. The fence should be walked periodically to check for breaches and maintenance needs. All windows and doors should be locked. All gates should be locked with chains and a tamper-resistant padlock. Other barriers, such as a concrete "jersey" barrier, can be considered to guard certain critical components from accidental or intentional vehicle intrusion. Systems should ensure that all security measures comply with fire codes.

Suppliers and personnel from co-located organizations should be denied access to codes and/or keys. Change codes frequently, if possible. Entry into buildings should be under the direct supervision of collection system personnel.

Utilities should establish a policy that an authorized person, designated by the collection system agency, must accompany all deliveries. Verify the credentials of all delivery drivers, preventing unauthorized personnel from having access to the collection system.

Utilities should keep a record of locks and associated keys, and to whom the keys have been assigned. This record will facilitate lock replacement and key management (e.g., after employee turnover or loss of keys). Vehicle and building keys should be kept in a lockbox when not in use. Have all keys stamped (engraved) "DO NOT DUPLICATE". Electronic "swipe" card systems can be an effective way to regulate access.

Collection system vehicles should be locked when not in use or left unattended. Remove any critical information about the system before parking vehicles for the night or leaving them unattended. Vehicles usually contain tools that could be used to access critical components of the collection system. Secure and account for tools daily.

Frequent and random patrolling of the above-ground portions and critical components of the collection system by utility staff may discourage potential tampering. It may also help identify problems that may have arisen since the previous patrol. Consider asking local law enforcement agencies to assist by conducting patrols of the collection system. Advise them of your critical components and explain why they are important. Watchful neighbors can be very helpful to a security program. Make sure they know who to call in the event of an emergency or suspicious activity.

When assessing the area around your collection system's critical components, look for objects that could be used to gain entry (e.g., large rocks, cement blocks, pieces of wood, ladders, valve keys, and other tools) and remove them if possible.

Tamper-resistant bolts or other methods may be used to secure manhole covers to rims. Lastly, protection of the collection system must be considered and included in the Emergency Response Plan.

3.6.3 Employees

Personnel should be trained and knowledgeable about security issues associated with the collection system, know what to look for, and know how to report any suspicious events or activities. Periodic meetings of authorized personnel should be held to discuss security issues.

Former or disgruntled employees have knowledge of the operation of the collection system and could have both the intent and physical capability to harm the system and its related assets. Requiring employees who will no longer be working at the collection system agency to turn in their identification, keys, and access codes will help limit these types of potential security breaches.

3.7 Emergency Response Plans

The collection system agency should have in place a comprehensive plan for dealing with both routine and catastrophic emergencies. Routine emergencies include such situations as overflowing manholes, backups into homes, line breaks, localized electrical failure, and pump station outages. Catastrophic emergencies include floods, tornados, earthquakes and other natural events; serious chemical spills; widespread electrical failure. Ideally, this plan is written, reviewed and adjusted accordingly over time.

The emergency preparedness and response procedures may be contained in the authority's O & M manual, or may be reflected in the descriptions of equipment and unit operations. However, operators looking for information on emergency procedures can find it more easily in a stand-alone document than when it's combined with other information in the O & M manual

The plan should utilize the most up-to-date information on the collection system. A structured analysis, also called a risk assessment or vulnerability assessment, should be made of the collection system, treatment plant, and the community. The assessment should identify areas where the collection system is vulnerable to failure and determine the effect and relative severity to collection systems operations, equipment, public safety and health of such a failure. The assessment should concentrate on such factors as topography, weather, sewer system size, and other site-specific factors, which reflect the unique characteristics of the system. Once the areas of vulnerability are known, the authority should have appropriate plans in place to ensure collection system operations continue for the duration of the emergency.

The plans must clearly identify the steps staff should take in the event of emergency situations. They should include information on when it is appropriate to initiate and cease emergency operations. The plans should be very specific as to the collection system or repair equipment involved. Instructions should be available that explain how to operate equipment or systems during an emergency event when they are not functioning as intended but are not fully inoperable.

The plan should also include specific procedures for reporting events that result in an overflow or other non-compliance event to the appropriate authorities. Plans should specifically identify emergency situations, responsibilities, actions to be taken, equipment to be used and sources thereof, and notification requirements including those involving regulatory authorities but also other local agencies such as the fire dept, ambulance, Local Emergency Planning Committee (LEPC), etc.

The plan should also contain a mechanism to keep the public/users notified of impacts to them, such as outages (including projected lengths of time), road closings, etc.

Typical components of an emergency program may include:

- General information regarding emergencies, such as telephone numbers of collection system personnel, fire department, and ambulance.
- Identification of hazards (e.g., chlorine storage areas) and use of universal classification system for hazards: Combustible material, flammable liquids, energized electrical circuits, and hazardous materials.

- Vulnerability analysis in which the collection system identifies the various types of emergencies that could occur, such as natural or man-made disasters, power outages, equipment failures, vandalism, or other intentional acts of disruption.
- Emergency response procedures.
- Methods to reduce risk of emergencies.
- Responsibilities of staff and management.

An emergency response plan should provide a framework describing how the collection system agency would notify the public, as well as other entities, of sanitary sewer overflows that may imminently and substantially endanger human health as well as cause inconveniences. The emergency response plans provision should not dictate the specific procedures or the specific information that would be provided through immediate notification. Rather, the emergency response plan, in consultation with potentially affected entities, should establish a framework for case-by-case notification, which depends on the nature of the overflow event and the responsibilities of different local entities.

Given the complexities of immediate notification, it is critical to use the flexibility of a system-specific overflow emergency response plan to identify and clarify specific notification responsibilities and notification protocols. The emergency response plan should identify appropriate authorities at the local, county, and/or State level to receive notification and identify the roles and relationships of the collection system agency, public health authorities, and other authorities, including lines of communication and the identities of responsible officials.

A representative from management should be given the role of dealing with the media to address public concerns. All other employees should refer inquiries to this designated spokesperson when contacted by the media.

Collection system operators must be prepared to respond to routine emergencies with resources that include appropriate procedures, spare parts, repair materials and equipment. Extraordinary emergencies caused by natural events or manmade events tend to affect wider areas and other utilities. These emergencies require greater time and resources due to the complexity of coordinating an effective response. Therefore, it is essential to have in place an effective emergency management plan to reduce the impact of extraordinary and routine emergencies.

Procedures for the emergency response plans should be understood and practiced by all personnel in order to ensure safety of the public, and the collection system personnel responding. Procedures need to be specific to the type of emergency that could occur. It is important to keep detailed records of all past emergencies in order to constantly improve response training, and the method and timing of future responses.

The ability to deal with emergencies depends on the knowledge and skill of the responding crews, in addition to availability of equipment. The crew needs to be able to rapidly diagnose problems in the field under stress, but they must also select the right equipment needed to correct the problem. Crews therefore need immediate access to appropriate tools and equipment if emergencies are to be dealt with as rapidly as possible. If resources are limited, consideration should be given to contacting other departments or contracting with private industries to respond to some emergency situations, for example, those emergencies that would occur after normal hours of operation.

EMERGENCY ASSISTANCE AGREEMENTS AND MUTUAL AID

In 1994, the Southeastern Connecticut Emergency Response Task Force on Municipal Discharges was formed and began to create a network of resources to facilitate mutual aid to member municipalities in need. One product of the Task Force is an Emergency Assistance Agreement that has been executed among specific municipalities or municipal agencies that operate wastewater systems in Southeastern Connecticut. By its terms, the agreement can also be executed by private entities that operate wastewater systems.

The agreement provides that any party faced with an emergency may request assistance in the form of equipment, supplies, and personnel from any other party and defines the terms and conditions that apply in such circumstances.

The parties to the agreement are expected to designate individuals who are authorized to provide equipment, supplies, and personnel to another party and to specify the means by which they may be contacted.

A similar program exists among numerous communities in southern New Hampshire.

Another mutual aid type option for municipalities might include "joint sharing" of expensive or difficult-to-maintain equipment. Under this option, adjoining or nearby municipalities act collectively to obtain and maintain the equipment, sharing (and reducing) the overall costs of obtaining and operating the equipment.

3.8 Implementation and Effectiveness Analysis

Accurate sewer performance information is an important part of improving collection system performance and is a core task of any asset management program or environmental management system. A collection system agency should periodically monitor the implementation and effectiveness of its operation and maintenance program. Periodic review is essential to evaluate whether the plan is meeting its intended goals and objectives, and to effectively target resources.

Measuring and reporting progress towards achieving goals and objectives is critical towards ensuring that an operation and maintenance program is updated as appropriate to reflect changing conditions, maintenance strategies that prove effective, and new information.

The periodic comprehensive assessment of the operation and maintenance program should be documented in a written report to illustrate the concept of continuous improvement. Components of a periodic comprehensive assessment might include:

- Interviews with system and facility managers.
- Field inspection of equipment and other resources.
- Interviews with field personnel and first level supervisors.
- Observation of field crews.
- Review of pertinent records and information management systems.
- Review of customer complaints, responses, and feedback.

3.9 More Information

The American Public Works Association (APWA) has developed a guidance document for preparing sewer overflow response plans titled *Preparing Sewer Overflow Response Plans—A Guidebook for Local Governments,* which is available (for a fee) from APWA. The APWA website is *www.apwa.net* and their telephone number is 1-816-472-6100.

CHAPTER 3 REFERENCES

Collection Systems: Method for Evaluating and Improving Performance. California State University, Sacramento. 1998.

Guide for Evaluating Capacity, Management, Operation, and Maintenance Programs for Sanitary Sewer Collection Systems (DRAFT). U. S. Environmental Protection Agency. 2000. EPA No. 300-B-00-014.

Utility Management. California State University, Sacramento. 1998.

Operation and Maintenance of Wastewater Collection Systems (Volume I)- Fifth Edition California State University, Sacramento. 1998.

Operation and Maintenance of Wastewater Collection Systems (Volume II)- Fifth Edition California State University, Sacramento. 1998.

Asset Management for Sewer Collection Systems—Fact Sheet. U. S. Environmental Protection Agency. 2002. Available at: *www.epa.gov/npdes/pubs/assetmanagement.pdf*

Draft Notice of Proposed Rulemaking—NPDES Permit Requirements for Municipal Sanitary Sewer Collection Systems, Municipal Satellite Collection Systems, and Sanitary Sewer Overflows. U. S. Environmental Protection Agency. January 4, 2001.

Protecting Your Communities Assets: A Guide for Small Wastewater Systems. National Environmental Training Center. November 2002. Available at: *www.nesc.wvu.edu/netcsc/*

Asset Based Vulnerability Checklist for Wastewater Utilities. Association of Metropolitan Sewerage Agencies. 2002. Available at: *www.amsa-cleanwater.org/pubs/2002avcheck.pdf*

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