

Personnel Management

Communities should consider personnel management as important as funding for equipment repair and replacement. Local officials must realize that an adequate, well-trained staff is necessary both to provide cost-effective Operations and Maintenance (O&M) of their facilities and to ensure compliance with all regulatory requirements.

This section will provide some guidelines to help local officials determine the necessary steps to develop the best possible staff.

Developing an Adequate Staffing Plan

Generally, staffing is the largest component of an O&M budget for a wastewater facility. For small communities, these costs comprise the main budget component. Local officials should not try to reduce O&M direct labor costs as a way of cutting budgets. For example, it may be that large amounts of overtime pay are being spent on existing staff. Hiring additional personnel may be a more cost-effective approach to spending personnel dollars. Another factor involved in determining staffing cost effectiveness is the use of outside contractors to perform certain O&M functions. A community might consider using contractors for functions such as major maintenance or overhaul.

Development of a staffing plan will not only ensure cost effectiveness, but will also help local officials meet their responsibility to ensure that wastewater facilities comply with state and federal regulations. Inadequate or poorly trained staff inevitably leads to non-compliance problems and potential fines. In addition to complying with appropriate regulations, local officials also have a responsibility to the citizens of their communities to provide uninterrupted utility service. Protection of the environment is the key consideration in the management of a utility system. An adequate staffing plan is essential to achieving that goal. Here are the steps for preparing a staffing plan:

1. Develop an organizational chart. It is important to have a clear organizational chart to determine how utilities need to be managed. The current trend is to separate water and wastewater utilities from other public works to improve performance, and to enable technical personnel to develop comprehensive expertise in their areas of responsibility. To effectively implement this organizational approach, local officials need adequate information about specific job responsibilities to then determine the number and type of personnel required.

The product of this first step in developing a staffing plan is an organizational chart showing all lines of supervision and authority, all filled and unfilled positions, and an approximation of all needed, but as yet unauthorized positions.

2. Conduct a task analysis. A detailed task analysis will help determine how many workers are needed and the level of experience and expertise necessary for each wastewater facility job. Begin by identifying all O&M tasks that must be accomplished to ensure adequate performance by the facility. Include tasks that are currently being accomplished, as well as those that should be done but might not be due to lack of time, talent, or other resources. The task list should reflect all routine O&M tasks required for the entire year. Some tasks may be daily, while others might be performed weekly, monthly, or even yearly. To develop a comprehensive task list that truly reflects the needs of the facility, an experienced supervisor familiar with the facility should be involved at all stages of the task analysis.

The product of this second step in developing a staffing plan is a comprehensive task list, organized by unit processes.



As stamped on the manhole cover above, communication is at the heart of good management.

3. Determine staffing requirements. The next step is to review the task list and estimate the time each task normally requires. It is necessary to compute the total number of person-hours per task, per technical skill, per year required to provide adequate O&M of the facility. Once that number is determined, it may be divided by the total number of hours that each worker is available per year, taking into account vacations, holidays, etc. In this way it will be possible to derive a number that approximates the personnel hours needed to provide adequate O&M for the facilities in question.

The product of this third step in developing a staffing plan is a break out of required staffing hours, by skill and by task.

4. Create job descriptions. Once the estimated number of staff hours is determined, the organizational chart should be appropriately modified and each staff member's responsibilities redefined. Detailed job descriptions for each position identified on the chart should be prepared or old job descriptions should be modified and updated. Remember to get input from the people actually doing the job. Job descriptions should include areas of responsibility, summaries of required tasks, subordinates supervised, and supervisors to whom reports are made.

The product of this fourth step in developing a staffing plan is an updated set of written job descriptions.

5. Implement staffing changes. After approving the staffing changes recommended by steps 3 and 4, the O&M budget must be modified appropriately. In addition to follow-up budget monitoring relating to these staff changes, management should periodically assess them in terms of improved efficiency and performance of the utility's O&M.

The product of this final step in developing a staffing plan is a new written staffing plan and corresponding budget.

Plant Coverage

Plant coverage guidelines call for enough time for the operators to collect, analyze, and record required samples. The plant should be manned by the Chief Operator or Assistant/Shift Operator a minimum of two (2) hours every day. Additionally, the Chief Operator should be on-site not less than 30 days per calendar quarter. Note that these are the minimum levels of coverage and NYSDEC's Regional Water Engineer may require more coverage depending upon plant size, the receiving water, permit limits, etc.

Certification and Training

The "Grades" of certification are divided into the following levels: 1, 2, 3, and 4. Grade 1 is the lowest level of certification and applies primarily to the smallest plants. Activated sludge plants have an "A" designation. A "Scoring System" is used to determine the required Grade of Chief and Assistant/Shift Operators.

Education requirements vary depending upon Grade. The minimum education required is High School Diploma or High School Equivalency. Classroom training also varies as a function of Grade. For a Grade 2A applicant, the following training is required:

- Basic Operations Course (10 days)

- Activated Sludge Course (5 days)

- Laboratory Proficiency (5 days)

Grade 3/3A operators would also need the Supervision and Technical Operations Course (5 days). Grade 4/4A operators would go on to take the Management Course (4 days).

All applicants must have hands-on operating experience and must have his/her actual operating experience verified. Applications with the necessary documentation are filed with the NYSDEC Regional Offices or County Health Department where appropriate.



Ongoing training is required for certification renewal.

All certified wastewater operators are required to renew their certificates every five (5) years. Treatment technologies are changing and operators need to keep abreast with the latest operational approaches. Operators are required to attend seminars and obtain between 20 and 80 training contact hours. Failure to renew means that the certificate has expired and that the operator is not certified. If the Chief Operator's certificate has expired, he/she is not certified and the plant may not be under responsible supervision. In a well-run facility, good training will result in a substantial payback. Local officials need to vigorously support continuing education to comply with the regulations. Certified operators generally do a better job. Annual budgets should include line items for certification training (when appropriate) and for renewal training. Work plans and schedules should allow for time to attend training.

Regulations provide for the suspension and/or revocation of operator certificates if the operator was negligent, or practiced fraud or deceit in the performance of his/her duties. The operators are expected to keep up on maintenance and routine sludge removal. Local officials have to financially support these activities. Falsification of data and discharge monitoring reports is very serious and criminal.

All the certification requirements are described in 6NYCRR Part 650 – *Qualifications of Operators of Wastewater Treatment Plants* and in the *Wastewater Treatment Plant Operator (WWTPO) Manual*. For electronic copies of Part 650 and the WWTPO Manual, visit the following website:

<http://www.dec.state.ny.us/website/dow/bwcp/opcert.html>

For paper copies, contact NYSDEC's Facility Operations Assistance Section, 625 Broadway, Albany, NY 12233-3506 or call 518-402-8089.

Additional Training Needs

In addition to ensuring compliance with certification regulations, a comprehensive training program for wastewater operators will provide other significant benefits for a local government. A well-trained staff is essential for efficient utility O&M. Good training will result in a substantial payback over the years in terms of well-run facilities. Far-sighted local officials will make sure that O&M budgets provide adequate funds for staff to go to the best training available. This may mean sending staff to off-site training events, paying the cost of course registration as well as travel expenses, or having staff attend training programs during working hours and directing other personnel to fill in during that time.

Another training option is to contract on-site training customized to the individual wastewater facility. Not all training needed is technical in nature. Training programs relating to management, supervision, and other important skills, such as effective report writing and use of the computer, are also important in developing a more efficient and productive staff.

If the staff size is sufficiently large, it may be a good idea to designate a training coordinator. This individual can determine staff training needs and watch for appropriate training opportunities or courses. The training coordinator can schedule employees for off-site training, set up on-site training classes, and monitor the training budget. The coordinator should also evaluate the training programs and determine which ones are most effective in improving staff performance. The individual coordinating training should have some technical experience in water or wastewater treatment.

Training Sources

Many sources of training are available for operators of wastewater treatment facilities. Training will be available through the following organizations:

- State environmental training centers
- State regulatory agencies
- Operator associations
- Professional organizations such as the Water Environmental Federation, the American Water Works Association, and the Rural Water Association

In addition, a local government may contract training, including on-site programs, using operations and maintenance consultants, consulting engineers, or manufacturer's representatives.

Quality training opportunities are important for staff development. The best training is not necessarily the cheapest. It is up to local officials to work with their staff to ensure that training being considered develops a staff that can provide effective O&M of the water and wastewater facilities.

Additional Resources

Utility Management and Manage for Success – Effective Utility Leadership Practices

Office of Water Programs

California State University, Sacramento

6000 J Street
Sacramento, CA 95819
Phone: 916-278-6142
Fax: 916-278-5959
www.owp.csus.edu

Benchmarking Wastewater Operations, Collection, Treatment, and Biosolids Management – Final Report

Plant Manager's Handbook – MOP SM-4

The Popular Plant Manager – MOP SM-6

Utility Management Digest

All available from:

Water Environment Federation

601 Wythe Street
Alexandria, VA 22314-1994
Phone: 703-684-1452
Fax: 703-684-2492
www.wef.org

A Supervisory Management Correspondence Course for the Water/Wastewater Field: Internet Version

Office of Executive Development Programs

Michigan State University

3535 Forest Road
Lansing, MI 48910
Phone: 800-356-5705
Fax: 517-353-0796

Training Sources

NY Water Environment Association

525 Plum Street, Suite 102
Syracuse, NY 13204
Phone: 315-422-7811
Fax: 315-422-3851
www.nywea.org

NY Rural Water Association

PO Box 487
Claverack, NY 12513
Phone: 518-828-3155
Fax: 518-828-0582
www.nyruralwater.org

New England Interstate Water Pollution Control Commission

116 John Street
Lowell, MA 01852-1124
Phone: 978-323-7929 or 978-323-7930
Fax: 978-323-7919
www.neiwpsc.org

New York State Department of Environmental Conservation (NYSDEC)

Facility Operations Assistance Section
625 Broadway,
Albany, NY 12233-3506
Phone: 518-402-8089
Fax: 518-402-8082
www.dec.state.ny.us/website/dow/bwcp/foas_main.html

Adirondack Community College

640 Bay Road
Queensbury, NY 12804
Phone: 518-743-2403
Fax: 518-745-1433
Contact: Lou Buck
buckl@sunyacc.edu
www.sunyacc.edu

Corning Community College

1 Academic Drive
Corning, NY 14830
Phone: 607-962-9457
www.corning-cc.edu
Contact: Sheryl Rosenbloom
rosenbloom@corning-cc.edu

Environmental Finance Center The Maxwell School at Syracuse University

Executive Education Department
219 Maxwell Hall
Syracuse, NY 13244
Phone: 315-443-9994
Fax: 315-443-5330
<http://www.maxwell.syr.edu/efc>

Great Lakes Center

1300 Elmwood Avenue
SUNY College at Buffalo
Buffalo, NY 14222
Phone: 716-878-5422
Fax: 716-878-6644
www.buffalostate.edu
Contact: Dr. Harish Sikka
sikkahc@buffalostate.edu

Hudson Valley Community College

80 Vandenburg Avenue
Troy, NY 12180
Phone: 518-629-4830
Fax: 518-629-4870
www.hvcc.edu

SUNY at Delhi

2 Main Street
Delhi, NY 13753
Phone: 607-746-4548
www.delhi.edu
Contact: Loraine Horner
hornerlv@delhi.edu

SUNY at Morrisville

PO Box 901
Morrisville, NY 13408
Phone: 315-684-6670
Fax: 315-684-6609
www.morrisville.edu
Contact: Kathleen White
whitekl@morrisville.edu

Ulster Community College

Cottekill Road
Stone Ridge, NY 12484
Phone: 845-687-5173
Fax: 845-687-5083
www.sunyulster.edu
Contact: Ted Skaar
skaart@sunyulster.edu

NYSDOL, Public Employee Safety and Health
State Office Campus, Building 12
Albany, NY 12240
Phone: 518-457-5508
Fax: 518-485-1150
www.labor.state.ny.us/workerprotection/safety-health/DOSH_DIRECTORY.shtm

US DOL, Occupational Safety and Health Administration
201 Varick Street, Room 670
New York, NY 10014
Phone: 212-337-2378
Fax: 212-337-2371
www.osha.gov/oshdir/r02.html

Collection System and Plant Maintenance

Overview

Maintenance is essential to the sustainability of every wastewater system. A preventive maintenance program combined with good operational practices will reduce the need for much of the corrective or emergency maintenance. A good preventive maintenance program will service not only mechanical and electrical equipment, but also the distribution and collection systems, grounds and buildings.

Maintenance includes all functions required to keep a facility operating in accordance with its original design capacities and performance. This includes repairs to broken, damaged, or worn-out equipment (emergency maintenance), and the periodic replacement of equipment and facilities that have reached the end of their design life (corrective or replacement maintenance).

Maintenance Program Elements

A comprehensive preventive maintenance program will have the following components:

- Equipment and component inventory
- Manufacturer's literature
- Preventive maintenance task list
- Records of maintenance performed
- Technical resources
- Tools and equipment
- Spare parts inventory
- Personnel training
- Budgeting
- Scheduling and monitoring
- Recordkeeping



Proper maintenance of the collection system is critical for optimum system performance. (Town of Tonawanda)

Equipment and Component Inventory

The backbone of any preventive maintenance program is a comprehensive listing or inventory of all system components and equipment. This listing should include a name and code number to every part of the system.

Manufacturer's Literature

For each piece of equipment or component identified in the inventory, the manufacturer's literature should be obtained and compiled. For a new or upgraded facility, it is often the contractor's responsibility to provide manufacturer's information for all installed equipment.

Preventive Maintenance Task List

Once all of the equipment and components have been itemized and the manufacturer's literature has been collected, it is time to develop the comprehensive list of preventive maintenance tasks and to schedule them. Working systematically through each component of the facility, and remembering to address additional areas such as building and grounds maintenance, all preventive maintenance tasks must be identified and a frequency for scheduling should be assigned.

Records of Maintenance Performed

Records must be kept indicating which maintenance tasks have been performed and when. This is helpful for two reasons. First, it is imperative to verify the completion of each maintenance task. Second, to schedule future maintenance activities or to verify the condition of certain equipment, it is always helpful to be able to refer back to the record of past maintenance performed.



All tanks should be inspected once per year.

Technical Resources

Manufacturer's maintenance specifications do not always provide complete information on all maintenance tasks. Certain general maintenance tasks are not covered in detail in manufacturer's maintenance manuals, and many general maintenance tasks are not addressed in manufacturer's information at all.

Tools and Equipment

Every wastewater system must have suitable tools and the required specialized equipment available to perform maintenance. These tools and equipment should be of good quality, because they are likely to be used for many years.

Spare Parts Inventory

It is important to maintain an inventory of spare parts required for preventive maintenance, as well as for corrective and emergency maintenance. The initial inventory must be developed based on the requirements of each preventive maintenance task. Procedures also should be implemented to make sure that parts are replaced in the inventory as they are used. Database management of spare parts inventories is usually necessary in larger utilities.

Personnel Training

Even a well-developed maintenance program with a full staff for implementation will not be able to complete the required work unless the staff are trained in both how to carry out the maintenance program and in the precise skills required to perform specific maintenance tasks. If the maintenance program has not

been developed internally, the consultant or entity that developed it should be required to provide training in its implementation.

Budgeting for Maintenance

Budgeting for maintenance will require that sufficient funding is available for the following:

- *Preventive Maintenance — Operating budget*
 - Labor (staff time, person hours)
 - Parts and supplies
 - Equipment
- *Emergency Maintenance — Operations reserve account*
 - Labor (overtime)
 - Materials, parts, supplies
 - Replacement equipment
 - Contractors
- *Equipment Replacement — Capital reserve account*
 - Evaluation and design
 - Labor
 - Equipment cost
 - Contractors



Replacement valve with preassembly awaiting installation

Estimating Staff Hours for Various Maintenance Functions (Task Analysis)

Sufficient labor must be available and funded for preventive maintenance functions. A good preventive maintenance program will document the schedule and work plan for each maintenance function. This schedule serves as the basis for estimating the labor requirements for preventive maintenance.

To determine trade and person-hour requirements for each preventive maintenance function, the function should be broken down into tasks. The tasks can then be analyzed further to determine person-hours required for the specific maintenance function and the specific trades needed.

Setting Up a Reserve Account for Emergency Maintenance

Development of an annual budget for maintenance is relatively easy and straightforward, if emergency maintenance is sufficiently funded as annual reserve account contributions.

Emergency maintenance is perhaps the most difficult function to address when trying to anticipate the funding requirements for an emergency repair reserve account. A good preventive maintenance program will cut down on emergency maintenance requirements. Unforeseen conditions, defective equipment and materials, and acts of nature make it certain that some emergency maintenance will always be a fact of life.



Failure of sludge handling equipment may result in liquid hauling.

Devising Management Systems to Ensure Timely and Cost-Effective Maintenance

Basic preventive maintenance and record keeping systems are typically card systems that can be adapted to the complexity of the facility being served. Simple single card systems use one card for each piece of equipment, with the front detailing the equipment and its maintenance requirements and the back recording maintenance performed (see the Sample Equipment Maintenance Card). Multiple card systems are similar, but use separate cards for equipment information, maintenance requirements, and records of maintenance performed.

Sample Equipment Maintenance Card

Front

Equipment Inventory #: _____

Description: _____

Manufacturer: _____ Serial #: _____

Supplier: _____

Address: _____

Phone: _____

<i>Maintenance To Be Performed</i>	<i>Frequency</i>
_____	_____
_____	_____
_____	_____

Back

<i>Maintenance Performed</i>	<i>Date</i>	<i>Initials</i>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Many utilities are moving away from card systems and using one of the many software programs developed specifically for scheduling and tracking preventive maintenance. When used as part of an asset management strategy, these software programs can be very useful for the wastewater facilities.

A very important part of the preventive maintenance program development and improvement is appropriate scheduling of maintenance activities. Preventive maintenance schedules must consider variations in plant and equipment utilization. For example, in wastewater systems, this may involve scheduling to accommodate seasonal wet weather flows or intermittent industrial discharges.

Scheduling should consider weather and its effect on maintenance activities and personnel. Whenever possible, outdoor maintenance activities should be scheduled when favorable seasonal weather conditions can be expected.

Maintenance Reporting and Record Keeping

Once maintenance is performed, it must be properly recorded in a timely fashion, usually on the same day as performed. Preventive maintenance tasks are not complete until their accompanying paperwork is done.

Additional Resources

Plant Maintenance Program – MOP OM 3

Water Environment Federation

601 Wythe Street

Alexandria, VA 22314-1994

Phone: 703-684-2452

Fax: 703-684-2492

Website: www.wef.org

Protecting and Maintaining Wastewater Infrastructure

This section is a compilation of material provided by J. Kirk Rowland, a NYWEA Past President and Division Head – Water & Sewer Maintenance for the Town of Tonawanda; Richard J. Lyons, NYWEA State Board Representative for the Capital Chapter and Executive Director for the Albany County Sewer District; and Keneck Skibinski, a NYWEA Past President and Chief Operator for the Herkimer County Sewer District.



Mission: cleaner water for future generations

Overview

Wastewater infrastructure is a huge capital investment which must be protected and maintained. It is the responsibility of the elected officials and board members to effectively carry out the associated financial and administrative responsibilities for positive, long term stewardship of this capital asset.

Wastewater infrastructure systems are comprised of many components including the collection system pumping stations, treatment plant and personnel. As was emphasized in “Wastewater 101,” problems with any one component can have an adverse impact on the rest of the system, often with costly consequences. In many municipalities, wastewater infrastructure is the most significant budget expense next to highway projects.

In addition to the costs incurred to design and build infrastructure systems, both capital and operations expenses are affected by current events. Remember the rise in fuel costs during 2005 that was stimulated by Hurricanes Rita and Katrina? Many communities have also been impacted by changing regulations on Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs). Increasingly stringent regulations and rising fuel and materials costs are significantly impacting your wastewater system’s bottom line. To ensure proper long term stewardship, local officials and board members should be familiar with the bottom line.

Budgeting Basics for Wastewater Utilities

In a general sense, the budget can be divided into two basic categories: Operation & Maintenance (O&M) and Capital Expenditures.

The O&M budget provides for the support of routine maintenance, daily operations, and scheduled repairs. Every piece of equipment has a life cycle and will eventually deteriorate to the point of replacement. Without a long term Capital Improvement Plan (CIP) and a funded reserve account to support the CIP, your municipality could find itself without the funds to support needed replacements.

User fees, typically based on metered water consumption, are collected to fund the O&M component. A proper budget ensures that staff, chemicals, and parts are available to keep the system properly operating. A proper budget also helps the municipality to meet their SPDES Permit, which is a legal obligation.

Municipal debt obligations are paid by funds that are typically raised by a tax levy based upon assessed valuation. These funds pay for the debt service on the original bond issued to construct the plant and any other projects that have been undertaken and financed by bonds or bond anticipation notes.

Case Studies

The following two case studies are intended to illustrate the critical importance of budgeting and project planning to help in maintaining a healthy bottom line. Both facilities have won awards for their fine operations and management. An in-depth discussion of financial planning and capital improvement processes follows in Chapter 2.

The **Herkimer County Sewer District Wastewater Treatment Plant (WWTP)** is located in Mohawk and is a medium sized facility. This is an example of a realistic operations and management budget that adjusts for increases in the costs. It also looks at:

- Identifying and correcting collection systems deficiencies (e.g., I&I)
- Planning and financing for capital replacement and improvement projects (e.g., new bar screen)
- Reducing energy costs (e.g., variable frequency drives)



Many communities will have to deal with old sewer systems.

The plant is designed for a flow of 6.1 million gallons per day (mgd). It has an annual average flow of 4.3 mgd (weather dependent). There are six staff at the plant. The District is comprised of the following five municipal entities: the Villages of Mohawk, Ilion, Frankfort, and portions of the Townships of German Flatts and Frankfort. Presently (2006), the District has a reserve account (fund balance) of \$700,000.

The District's O&M budget for 2006 is \$1.03 million. Since 1984, the District has accepted hauled liquid wastes such as septage, landfill leachate, municipal sludge, and non-hazardous commercial waste. The District averages \$210,000 annually in revenue from these hauled wastes.

The sludge from the plant is high lime stabilized and is then land applied by a contractor. The contractor also hauls sludge to a storage site during the off months. Annually, about 3,000 wet tons are generated and land applied. When compared to the landfill approach, the land application program saved the District over \$100,000 a year. The land application and hauling rate is \$45 per ton. In comparison, the landfill fees are \$79 per ton plus the costs of transporting the sludge with District personnel and vehicles. Land application is a permitted beneficial reuse of the sludge. This approach returns nutrients (nitrogen and phosphorus) and alkalinity to the soil.

The table below summarizes the percentages of the major expenses for the WWTP in the 2006 O&M Budget. Note that 'Personnel' is often one of the major budget line items.

Personnel	22%
Fringe Benefits	15%
Electrical	15%
Chemicals	10%
Solids Handling	16%
Contractual	22%

Three primary treatment facilities were replaced by the secondary treatment plant in 1981. The Villages and Towns continue to own most of the collection system. Some of these sewers are very old vitrified clay pipes that were installed in the late 1800's! These sewers are in need of replacement.

The WWTP experiences SPDES flow violations due to spring thaw and rainfall every two to three years. In the first instance, the NYS-DEC required that the District notify each of the five contributing municipal entities that the violations were occurring due to faulty sewers that allowed inflow and infiltration (I&I). The District asked the municipalities to inform the District of any work that had either been completed or was planned. The Village of Mohawk had completed an 800-foot sewer upgrade on two streets to alleviate cellar flooding during



Operators are our frontline defenders against water pollution.



Pumps and motors don't last forever.

periods of high water on Fulmer Creek which flows through the heart of the Village. The work had alleviated the flooding problems in the sewer, but brought no change to the magnitude of flows at the District's WWTP.

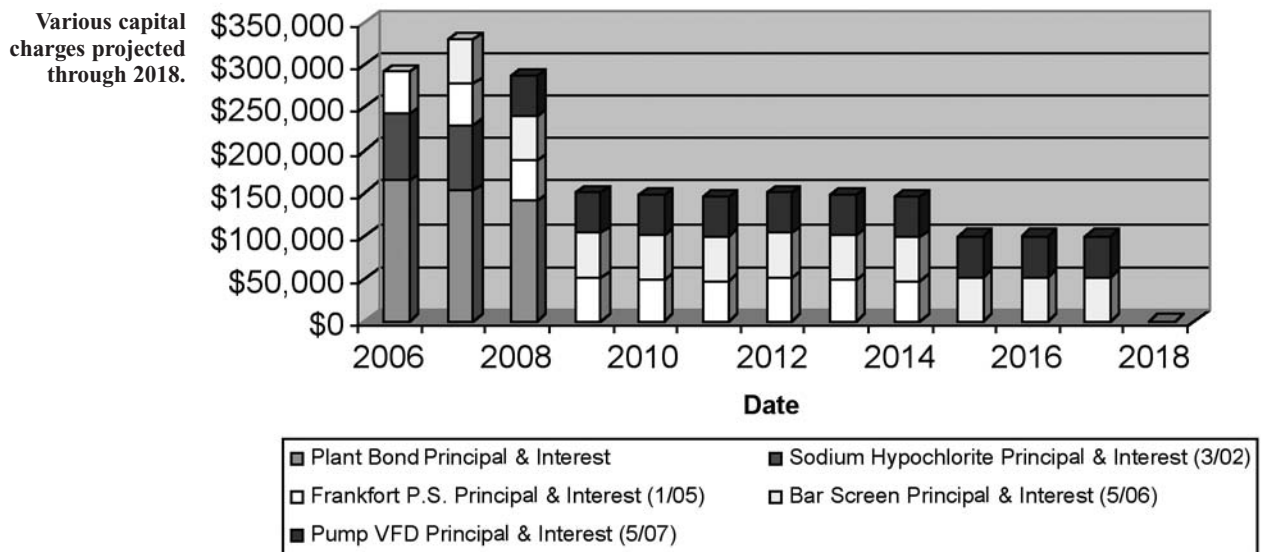
The next violation resulted in a requirement for the District to survey its system to verify that the manhole covers in remote areas were secure and that watertight covers had gaskets in place. This work is presently (2006) ongoing, but it is not expected to have an effect on peak flows. The problem areas lie within the Villages and Towns where an acute lack of funds prevents any real progress.

Since the District does not own the leaking sewers, the District has to work collaboratively with each contributing municipality to address the root causes of the SPDES violations. To compound the issue, there is no recent information available on the condition of these sewers. The last I&I study was completed in 1974. It is unlikely that the problem areas have improved.

It is anticipated that a new I&I study would be the first step in correcting the problems. The District would then develop a corrective action plan. Informal discussions have revealed the Village's and Town's frustrations. The Village and Town can only charge for repairs on properties with tax levies. However, the District could charge the tax exempt properties to lessen the burden.

The table on the next page shows the District's Capital Budget for 2006. This money is collected from tax levies as a breakout on the Herkimer County taxes. The Plant Bond (25 year obligation) will be fully repaid in 2008. The Sodium Hypochlorite Project that resulted in a change from compressed ton cylinders to liquid chlorine will be fully repaid in 2007 and has a 5-year Bond Anticipation Note (BAN). The Frankfort Pump Station Project (10-year Bond) will be fully repaid in 2015. The Bar Screen Project is planned for construction in 2006 and repayment of either the BAN or Bond is anticipated to begin in 2007. Depending upon the completion of the Bar Screen Project, a Variable Frequency Drive (VFD) Unit Project on the main raw sewage pumps is planned for 2007.

Herkimer County Sewer District



**Herkimer County Sewer District Capital Payments 2006
Bond and Bond Anticipation Notes**

	PLANT	SODIUM HYPO	FRANKFORT PS	BAR SCREEN	PUMP VFD	TOTAL
	25 Year Bond	3/1/2002	1/15/2005	5/1/2006	5/1/2007	COLLECTED
2006	\$164,025	\$78,366	\$49,669			\$292,060
2007	\$152,415	\$77,000	\$48,269	\$52,000		\$329,684
2008	\$140,805	\$0	\$46,869	\$52,000	\$47,000	\$286,674
2009	\$0	\$0	\$50,469	\$52,000	\$47,000	\$149,469
2010	\$0	\$0	\$48,869	\$52,000	\$47,000	\$147,869
2011	\$0	\$0	\$47,219	\$52,000	\$47,000	\$146,219
2012	\$0	\$0	\$50,569	\$52,000	\$47,000	\$149,569
2013	\$0	\$0	\$48,713	\$52,000	\$47,000	\$147,713
2014	\$0	\$0	\$46,856	\$52,000	\$47,000	\$145,856
2015	\$0	\$0	\$0	\$52,000	\$47,000	\$99,000
2016	\$0	\$0	\$0	\$52,000	\$47,000	\$99,000
2017	\$0	\$0	\$0	\$0	\$47,000	\$47,000
2018					\$0	\$0

* All payments include principal and interest.



New and more efficient pumping (Herkimer County Sewer District)

The District has already accomplished many repairs, replacements, and enhancements including the following projects:

- Belt Press Upgrade Project (1990) that replaced two plate and frame pressure filters with a two-meter BDP, Inc. belt filter press. The replacement added approximately 40% more capacity than existed with both plate and frame presses combined. Cost: \$200,000
- Grit Bucket Elevator Project (2000) that replaced a 20-year-old carbon steel unit that was very badly corroded with a stainless steel unit. Cost: \$300,000
- Roofing Replacement Project (2001) that replaced a 21-year-old built up asphalt roof and insulation with new insulation and a rubber roofing membrane. Roofs were replaced on the two main buildings of the WWTP, the Raw Sewage Pump Station, and the Operations Building. Cost: \$74,000
- Sodium Hypochlorite Project (2002) replaced the gaseous chlorine system using one-ton cylinders, which posed a significant community threat, with a liquid sodium hypochlorite system. The hypochlorite system does not pose a significant threat to the local community. Note that the planning for this project was well underway prior to September 11, 2001. Cost: \$320,000
- Frankfort Pump Station Project (2005) replaced all three raw sewage pumps with slightly larger pumps and VFDs with a new control panel and flow metering. Cost: \$389,000

Other projects that are to be phased in to mitigate the financial burden on affected taxpayers are as follows:

- New Bar Screen (2006)
- Dump Pad Extension (2006)
- Raw Sewage Pumps VFDs (2007)
- Upgrade HVAC in Operations Building (2007)

The Bar Screen and Dump Pad projects have been combined to achieve overall cost savings due to their physical proximity and the use of a single bidding process and contractor mobilization. This combined project is also addressing issues with three corroded doors, replacing four hand-operated sluice gates, and a hydraulic sluice gate and piping.

Plans are being formulated for installing VFDs on the three main raw sewage pumps and changing the check valves on the pumps in 2007. However, this will depend upon the final financed cost of the Bar Screen and Dump Pad Projects. A preliminary study has been performed regarding a project to upgrade the electrical heating system in the Operations Building. This will also be sequenced in as the capital budget allows.

A potential future project that could enhance process control would involve changing the mechanical aerators to a fine bubble diffuser system. This would allow for an anoxic selector to be constructed for filamentous organism control. The lack of failures with the existing equipment and the relatively inexpensive power compared to commercially provided power have held this project back.

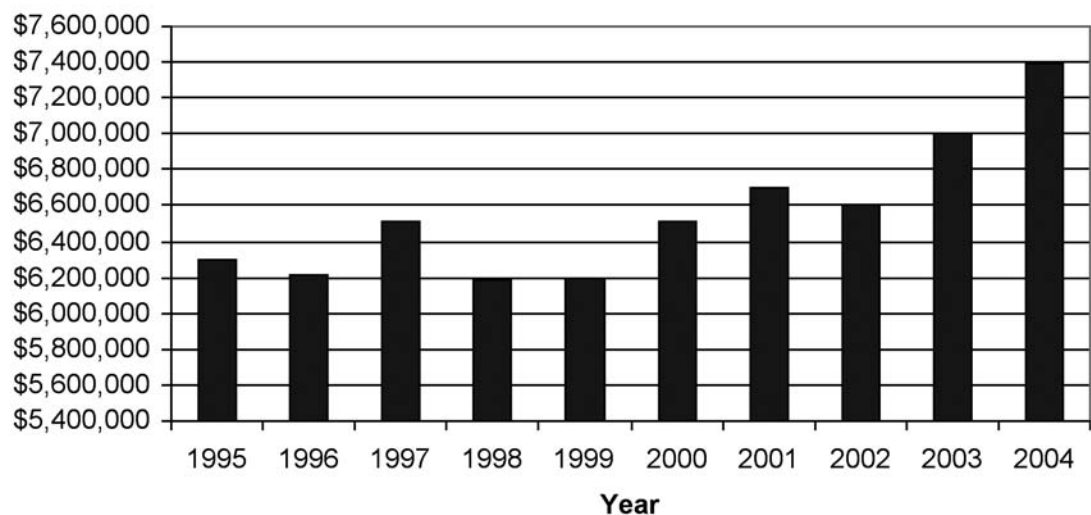
Albany County Sewer District (ACSD) is the second case study and is comprised of two large plants. This is an example pertaining to the following issues:

- Budgeting to meet rising operations and management costs
- Establishing and implementing a Five-Year Capital Plan
- Utilizing a combination of funding sources (e.g., NYSERDA and NYSEFC)
- Savings through enhanced energy efficiencies

The North Plant is located in Menands and is designed for 35 mgd. The South Plant is located in Albany and is designed for 25 mgd. The plants have a total of 30 metering pits and regulating chambers. ACSD serves the following eight (8) communities: City of Albany, City of Cohoes, City of Watervliet, Village of Menands, Village of Green Island, and parts of the Village of Colonie, Town of Colonie, and Town of Guilderland. The collection system serves twelve (12) significant industrial users.

The following chart shows the combined budget for the entire ACSD. Note that the revenue from septage and other hauled waste activity is not included in this chart. The hauled waste revenue has increased 100% in the past three (3) years with about \$1,000,000 being raised annually to help offset the rising operating costs.

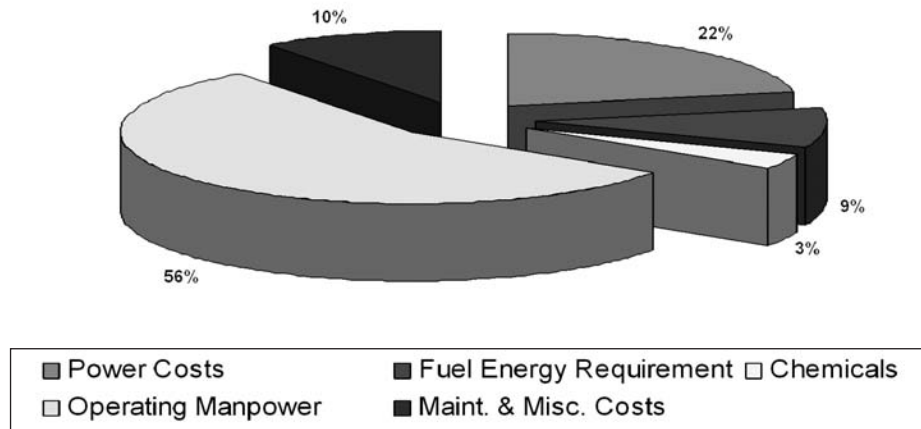
Total ACSD O&M Costs (1995 - 2004)



The chart below shows the various O&M costs for 2004. The breakdown was as follows:

- Power \$1.62 million
- Manpower (including fringe benefits) \$4.3 million
- Fuel \$0.69 million
- Chemicals \$0.22 million
- Maintenance & miscellaneous \$0.74 million

Total Plant O&M Costs \$7,376,778 (2004)



ACSD maintains a Five-Year Capital Plan (Plan) that is updated annually as new improvement projects are necessary. The requirement for the Plan was enacted in 1993 and is required by Resolution 370 of the Albany County Legislature. It defines a Capital Plan Project as any project with a cost greater than \$250,000. The Plan must be approved by the District Board of Commissioners, the County Legislature, and the County Executive. The current Plan includes the following projects:

- 2006–Effluent Disinfection \$9.4 million
- 2007–Phase 2 Roof Replacement \$0.87 million
- 2007–Belt Filter Press \$0.36 million
- 2008–Final Clarifier \$2.1 million

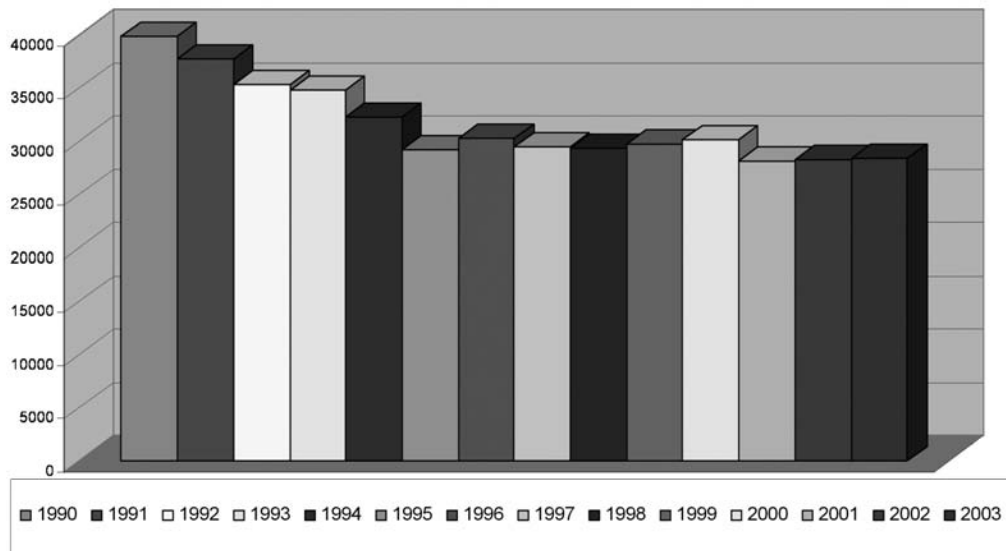
Most projects are financed by NYS Environmental Facilities Corporation (NYSEFC) using the State Revolving Loan Fund (SRF). The ACSD has also received more than \$2.2 million in grants since 1994. The NYS Energy Research Development Agency (NYSERDA) programs and Niagara Mohawk Energy Reduction for Non-Profits provided over \$1 million for the aeration upgrades and all of the associated engineering costs. The 1996 Clean Water/Clean Air Act provided the grant funding for the Influent Pump Project. ACSD has found good use of regionalization and NYSERDA grants that are not available to smaller communities. The largest member community has lost 27% of its population and 42% of the household incomes are less than \$25,000 per year. The ACSD currently maintains a reserve fund of \$1.2 million.

Additionally, ACSD has completed many capital improvement projects, including the following:

- 1994 – Aeration System (fine bubble diffuser system): \$2.8 million
- 1999 – Influent Pumps (VFD’s on raw sewage pumps): \$1.6 million
- 2000 – Emergency Generator: \$0.5 million
- 2002 – Mechanical Fine Screens: \$1.5 million
- 2004 – Roof Replacement (rubber membrane roofing): \$0.5 million
- 2005/2006 – Incinerator Improvements: \$4.5 million
- 2005 – SCADA: \$0.5 million
- 2005/2006 – Concrete Rehabilitation of Sludge Storage Tanks: \$0.55 million

Over the years, ACSD has found significant errors in the electrical charges. It is important to closely review electrical bills. ACSD has undertaken many projects that have resulted in increased energy efficiency and thus lowering energy costs. The Aeration Project (1994) and the Influent Pumps Project (1999) have helped lower energy consumption from 38,000 KWH per day in 1990 to 27,500 KWH per day in 2003. The drop in energy consumption from 1990 to 1993 was facilitated by a focus on process control, as well as heating, ventilating, air conditioning (HVAC), and other changes. The chart below shows energy usage at the North Plant from 1990 through 2003. Note that fluctuations are due to wet weather years and associated pumping costs that are beyond plant personnel control.

Average KWHs/Day North Plant 1990 - 2003



Capital Projects that Focus on Energy Efficiency

ACSD's collections system has issues with Combined Sewer Overflows (CSOs). Similar to the Herkimer County Sewer District, the member communities own, operate, and maintain their own collection systems. Four (4) of the systems that contribute to ACSD have CSOs. The CSOs are permitted to the member communities, but are maintained by the ACSD. ACSD also has adopted a regional approach to controlling the CSOs, using an "east side – west side of the river" approach.

NYSDEC regulations require the development of a Long Term Control Plan (LTCP) for the CSOs. ACSD began this effort in the fall of 2005. The cost of the LTCP is \$4 million, with a \$2 million grant received from the State Environmental Protection Fund (EPF). The cost of the implementation and control devices is estimated to be approximately \$300 million. There is no information available on the impact to the wastewater treatment plants.

The ACSD has been successful in defraying costs to residents through enhanced energy efficiency leading to cost savings. Additionally, excess plant capacity is used to generate approximately \$1 million per year in revenue through the acceptance of hauled liquid wastes, including septage. Additionally, the South Plant effluent has been contracted for reuse as cooling water at a power plant. The disposal of ash from the incinerators was negotiated in a cooperative service agreement for the acceptance of the landfill's leachate. All of the above have helped to control the escalation of O&M costs and the debt load with a decreasing population base.



How long does a roof last? (ACSD's new roof)

Summary

Local officials should visit the treatment plant and become more familiar with its operations, equipment, and staff to ensure that the O&M budget is adequately funded. Revisit user fees regularly. Review the sewer rates on an annual basis. Make smaller, more frequent rate adjustments to meet the needs of future repairs and replacement costs. Remember: if you fail to plan, then you plan to fail! Providing the operators with the tools they need will help move the facility toward long-term sustainability.

Additional Resources

From the New England Interstate Water Pollution Control Commission – *Special Report: Keeping the Plants in Good Hands*

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