

# Albany County Sewer District – How to Stay in Compliance with SPDES Permits

by Richard J. Lyons

The Albany County Sewer District (district) was formed by resolution of the county legislature in 1968 and has been in operation since the spring of 1974. The district is an “enterprise fund” of Albany County government, which is an account for operations financed and managed in a manner similar to private business enterprises. The intent is that full costs of providing the goods or services be financed primarily through charges and fees, thus removing the expenses from the tax rate.



North Plant, Menands, NY



South Plant administration building in Port of Albany, NY

Photo by Vincent Apa

Photo by Rich Malaczynski, PE, NYSDEC

The district owns and operates two wastewater treatment facilities, designated North and South, which provide secondary treatment to the wastewater of eight communities in Albany County. The North Plant is located in Menands and is designed to treat an average daily flow of 35 mgd. The South Plant is located in the Port of Albany and was designed for 19 mgd and is permitted up to 29 mgd. The South Plant treats waste only from the City of Albany, whereas the North Plant treats waste from the cities of Cohoes, Watervliet and parts of Albany, the villages of Menands, Green Island and Colonie, and parts of the towns of Guilderland and Colonie. The district also owns, maintains and operates over 15 miles of intercepting trunk sewers, which include 30 metering pits. The individual member communities own, operate and maintain the collection systems. The population served is close to 200,000 with industrial waste from 10 significant industrial users, including two paper mills, which contribute approximately 25 percent of the waste stream to the North Plant.

The vision of the original Albany County Board of Commissioners and elected officials in the mid-1960s that formed the district has provided a clear path for compliance and sustainability. Municipal agreements/contracts were established with the eight member communities for specific operation and maintenance with debt service obligations. The agreements not only provided specific language for the original district construction debt, but future debt service for improvements and all operation and maintenance costs.

## Sustainability Equates to Compliance

Environmental sustainability has been defined as meeting the needs of the present without compromising the ability of future generations to meet their needs. The district operates as a “business” with the product being a final effluent that meets all permit criteria. To provide sustainability and permit compliance, the district has the following programs in place:

- Five Year Capital Improvement
- Budgets, Billing, Fund Balance and Reserves
- Energy Efficiency (waste heat to energy cogeneration project)
- South Plant Gray Water Interconnection
- Specific Performance Measures (to insure effectiveness, compliance and efficiencies)
- Succession Planning/Education and Training
- Industrial Pre-treatment

## Capital Improvement Program

The Capital Improvement Program (CIP) is a five year plan that is amended annually and is also part of the budget process. The annual submittal of the CIP is mandated by the county charter by

## Process Performance Data – 2009 / North Plant

Parameter	Influent (mg/l)	Effluent (mg/l)	Permit Limit (mg/l)	Discharge Efficiency %	Tons Removed Per Day	Tons Discharged Per Day
BOD	160	3.0	25.0	98.1	14.40	0.28
S.S.	242	7.3	30.0	97.0	21.53	0.67
NH <sub>3</sub>	11.0	3.4		70.5	0.70	0.31
TKN	23.9	5.8	15.2*	75.7	1.66	0.53

Average Flow – 22.0 MGD \*Seasonal June 1 to October 31

resolution of the county legislature. A capital project is defined as any improvement with a cost greater than \$250,000 and a life expectancy greater than six years. The annual submittal evaluates and prioritizes infrastructure needs with anticipated costs, financing, environmental review (SEQRA) and life expectancy with yearly maintenance costs. The entire county's CIP is then evaluated by a committee from the county executive's office and then submitted to the legislature for adoption. It then becomes a component of the annual budget.

The district believes the CIP is the foundation of any asset management plan and without proper planning, compliance would not be achieved. It was noted in the New York State Department of Environmental Conservation (NYSDEC) Wastewater Infrastructure Needs of New York State report (March 2008) that only 40 percent of facilities have developed a capital improvement plan. It should also be noted that a CIP is a living document and at Albany County all projects over \$250,000 have to be submitted and approved by its legislature prior to commencement. Foresight and planning are the keys to compliance and success. Through the CIP program, the district has completed over \$15 million in projects, with the 2010–2014 submittal containing over \$23 million in additional needs.

### Annual Operation and Maintenance Budgets, Billing, Fund Balance and Reserves

Preparation of the annual budget is a five-month process that starts with a requested budget from the department to the county executive with a deadline of July 1. After review, the county executive submits the proposed budget to the legislature no later than the end of September. The county legislature has until December 20 to approve the proposed budget.

During this process, many meetings are held between the department and the County Executive's Office of Management and Budget. Further meetings are conducted with the Albany County Legislature's Audit and Finance Committee. The budget process is lengthy and requires thorough planning and justification. This process has shown over time to provide adequate funding for the district projects and programs that ensure permit compliance.

When the district was formed in 1968, the proposal to the NYS Department of Health (DOH) stated that billings would only be issued for operations and maintenance (O&M) and debt service to the eight member communities and not the individual rate payers. A "lively" debate ensued with DOH who wanted billings to individual households. The district won the debate for billings only to the communities with language in the municipal contracts for both the O&M and debt service charges. The individual communities then pass those costs on to their constituents through specific community formulas (e.g., sewer charges are 100 percent of potable water consumption). The district bills

bi-annually to the member communities for both O&M and debt service per specific formulas in the municipal contracts. The billings, based on the adopted budget, allow for adequate funding and "full cost" treatment charges, which result in compliance.

A **fund balance** is the balance of money that comes in minus the balance of money that goes out or the working capital (assets minus liabilities). The district fund balance value is presently close to \$2 million and, with the support of the county executive and the legislature, past and present uses have been exclusively for infrastructure improvements in the \$500,000 to \$1 million range in lieu of reducing annual O&M charges. The priority for use of fund balance is for long term benefits, not a "one shot deal." This allows for continued sustainability and compliance. Planning is a key component to the fund balance use in the CIP program as transfers to a specific capital project can only be achieved through the annual budget process. The use of the fund balance has reduced debt service charges to the member communities with over \$4 million for smaller projects being paid for in "cash" since 2005.

A **reserve** is an accounting entry that properly reflects contingent liabilities. These funds are earmarked by an organization from its retained earnings for specific future use. The district has three reserve funds, which include the following (values as of March 2009):

- Repair—\$350,410
- Debt—\$263,974
- Pension—\$251,561

These reserves, except for debt, have been left untouched and are considered "rainy day" funds.

### Energy Efficiency

All of the capital projects for improvements to address regulatory compliance and aging infrastructure have had an energy efficient component. As those in the field know, the wastewater sector is an energy intensive operation and investment in efficiency has a significant environmental and economic benefit by reducing greenhouse gases and reducing electric and fossil fuel consumptions. The

*continued on page 37*

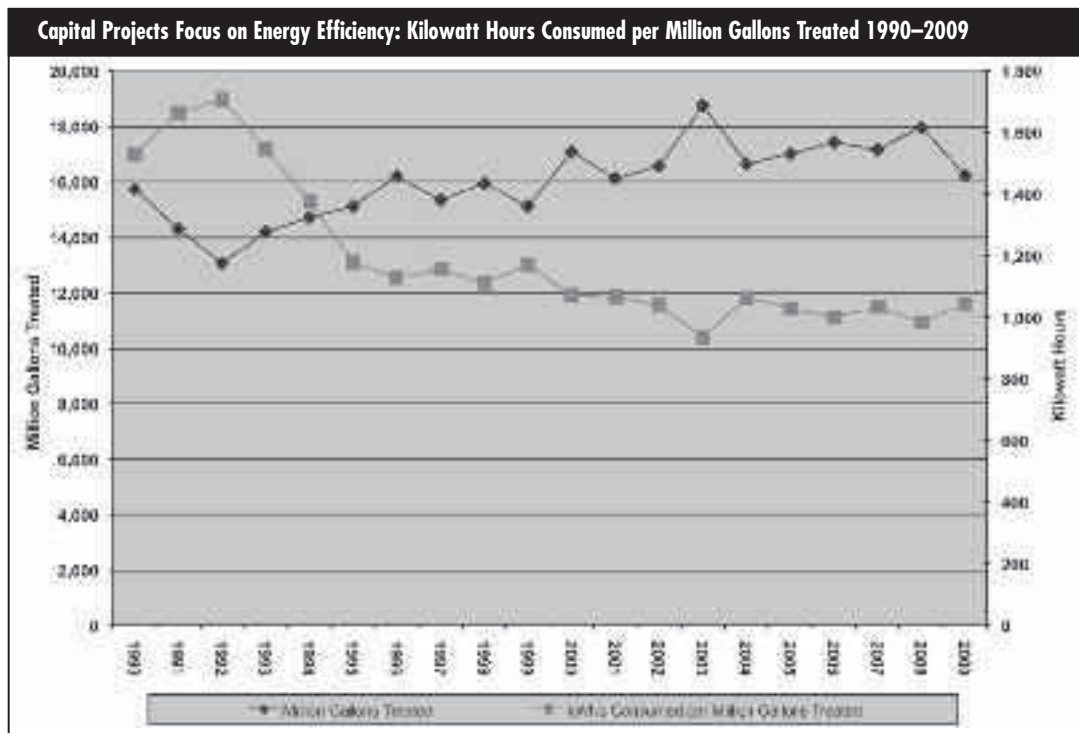


Figure 1

2008 Belt Filter Press Improvements	
➤ Total Project Cost =	\$1,032,091
Equipment & Construction =	\$ 934,851
Engineering =	\$ 97,240
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➤ Project completed	\$27,909 under budget
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➤ Avoided Costs (natural gas) =	
	~\$ 23,000 monthly
	~\$276,000 annually
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➤ Project Pay Back =	~3.7 years

Figure 2

investments in capital projects that focus on energy efficiency have reduced O&M costs while ensuring permit compliance. The results of energy efficient projects have had a dramatic result on electric and natural gas consumptions as illustrated in *Figures 1 and 2*.

The value of the electric consumption reduction in *Figure 1* – comparing kilowatt hours (kWh) per million gallons treated from 1992 to 2009 – shows a reduction per million gallon treated of 1,708 kWh to 1,044 kWh. This equates to 39 percent reduction with a value of \$906,000. In *Figure 2*, the annual savings of natural gas are shown from the belt filter press project with a value of \$276,000 due to increased cake solids. The combined annual savings/avoided costs equal almost \$1.2 million. All the historical improvements that have reduced energy consumptions more than offset the debt service charges, which in 2009 were \$725,000: *Investment does pay dividends.*

**Waste Heat Recovery Cogeneration Project**

**Project Description:** This project involves the installation of a Combined Heat and Power (CHP) System to capture flue gas waste heat and produce electricity from the district's existing incinerator. The district uses multiple-hearth incineration as a permitted disposal method for sewage sludge. The project also includes the addition of an exterior structure on the existing site where new equipment will be installed. The entire project has been deemed eligible for Green Innovative Grant Program (GIGP) funding. The district will obtain co-funding from the NYS Energy Research Development Authority (NYSERDA) for a portion of this project.<sup>1</sup>



Photo by Timothy Murphy, ACSD

Effluent diversion/gray water interconnection chamber construction at the South Plant

**Project Summary:** The Waste Heat to Energy Co-generation Project is an innovative method to create renewable energy from sewage sludge as a bio-mass fuel and reuse this energy as clean power for a portion of the wastewater facility's electrical and space heating needs. The process will reduce demand on outside electrical sources by approximately 69 percent on an average hourly basis (a 3.3 million kWh annual reduction) and will reduce the average weekly consumption of natural gas by an estimated 32 percent (approximately 100,000 therms per year). In addition, the project will result in significant cost savings in water conservation through the reuse of 50,000 gallons per day (gpd) of effluent for equipment cooling and reduction in CO<sub>2</sub> emissions by approximately 1,445 tons/year.<sup>2</sup>

This project will have a significant environmental and economic impact and the district has received a total of \$7.9 million in grant funds (\$5.9 million from the American Recovery and Reinvestment Act (ARRA) and \$2 million from NYSERDA). The total project cost is \$8.56 million. The simple payback on the county share will be approximately one year. The grant funds were the result of proper planning and having the project shovel ready. *“Good fortune is what happens when opportunity meets with planning.”*<sup>3</sup>

**South Plant Gray Water Interconnection**

A resolution was passed by the Albany County Legislature on May 10, 2004 authorizing the district to enter into a 25-year ground lease agreement for purchase of the South Treatment Plant's final effluent/gray water. This agreement provides sale of 3.1 to 7.6 million gallons a day to be used as cooling water for Empire Generating Company, LLC, a 635 net megawatt power plant located in the City of Rensselaer. This will be the largest beneficial use of treatment plant effluent in New York State. The agreement will guarantee a minimum revenue stream of \$300,000 to a maximum of \$750,000 a year to the district. In 2009, the interconnection to the South Plant effluent outfall was completed. This included a 30-inch diameter pipe, which was directionally bored from east to west and tied into a constructed diversion chamber at the South Plant. All engineering and construction costs, which included the diversion chamber, transportation via directional boring and technology for flow measurement, were paid by the Empire Generating Company. The power plant is scheduled for commissioning in the third quarter of 2010.

The waste heat recovery cogeneration and gray water interconnection are truly innovative projects that will provide long term economic benefit to the member communities. The district's four district's charges, have median household incomes of approximately \$33,000.<sup>4</sup> Just over 25 percent of the City of Albany's population is under the poverty line, which is federally defined as a family of three with an annual household income of less than \$18,310.<sup>5</sup> These two projects will reduce the financial burden to financially distressed communities and allow continued investment in needed infrastructure improvements, including mandated projects due to permit modifications.

**Performance Measures**

In 2009, a program commenced that was initiated by the county executive to evaluate, quantify and qualify the district's performance. This project determined critical performance criteria as it related to permit compliance/effectiveness and efficiency. All performance measures are charted on a monthly basis and compared to historical data. This allows direct comparisons to effectiveness as it relates to efficiencies.

### Succession Planning, Education and Training Programs

As with most organizations, many employees of the district are from the “baby boom” generation and are reaching retirement age. In 2009, a formal process was initiated to address the future loss of skill sets, institutional knowledge and the like. The process began with defining the mission’s critical positions with an outline of responsibilities and when the employees would eventually retire. Based on the anticipated retirement dates, requests have been filed with the County Civil Service Department for the appropriate tests to be issued so as to establish a qualified list of candidates prior to retirements. Also in 2009, an aggressive educational program began in the operations sector to provide courses to interested employees to become NYS Certified Wastewater Operators. By the end of the year, five employees began that process with one becoming certified. It is anticipated the other four will become certified in 2010.

This program has also moved into the collection systems staff with two staff taking the voluntary collections system certification training. The ultimate goal is that through education, training and transfer of institutional knowledge, our mission of “protecting public health and the water environment” will continue effectively and efficiently. The New York Water Environment Association (NYWEA) has also been an important part of maintaining compliance through education, training and networking, including developing relationships with regulators, NYSERDA, the Environmental Facilities Corporation (EFC) and equipment suppliers.

### Industrial Pre-treatment Program

In accordance with the requirements of the amended Clean Water Act of 1977 (PL95-217): “In 1981 EPA established responsibilities of the Federal, State, and local government, industry, and the public, to implement National Pretreatment Standards to control pollutants which pass through or interfere with treatment plant processes in POTWs or which may contaminate sewage sludge (40CFR403.1).” The Albany County Sewer District developed and submitted its Industrial Pretreatment Program and received approval in May 1984.

The district presently permits 10 Significant Industrial Users with flows ranging from 10,000 to 3.7 million gallons per day. The Industrial Pretreatment Program not only enforces the pretreatment standards established by the US Environmental Protection Agency

(EPA), but also must ensure that industrial users comply with the local limits established by the district to meet its State Pollutant Discharge Elimination System (SPDES) permits for water, air and solid waste discharges. Pretreatment programs provide methods of treating waste at the source rather than at the treatment plant. Often this will reduce pollutants discharged from the industry beyond what is expected by the treatment plant.

### Summary and Challenges

The district has been virtually 100 percent compliant of all permits since its inception and has received numerous awards from the EPA, NYSDEC, National Association of Clean Water Agencies and NYWEA. All of these awards recognized its commitment to compliance and innovation. The district is extremely fortunate to have been conceived with an outstanding infrastructure design, regional approach, municipal agreements and organization that provide a clear path for compliance. All of the facility improvements have reduced energy costs, providing short term return on investments and allowing additional capital improvements without financially burdening the member communities. The district continues to focus on increasing revenue streams from acceptance of bio-solids that defray costs and now will provide “bio-solids to energy” at the North Plant. Even though overall budgets have increased, 2010 marked the fourth consecutive year that overall charges to member communities have not increased due to increased revenues. It also cannot be understated that the county executive and the Albany County Legislature’s strong support for the district’s budgets, capital plan and programs have been a key to sustainability and compliance. The district is also extremely proud of the professional staffs that operate and maintain the plants and intercepting trunk sewers 365 days a year.

The district faces numerous challenges in regards to permit modifications that will increase capital and O&M costs, which include disinfection and combined sewer overflow abatement. In addition, aging infrastructure, an aging work force and increasing pension and health care costs while servicing financially distressed communities will continue to provide challenges. However, with challenges come opportunities and members of the Albany County District feel that it is in a better position than most to be compliant and successful.

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### References

1. Environmental Facilities Corporation GIGP Fact Sheet
2. Environmental Facilities Corporation GIGP Fact Sheet
3. Thomas Alva Edison
4. 2000 Census
5. 2010 NYS Poverty Report



Photo by Rich Malaczynski, PE, NYSDEC

The Andrew M. Weist O&M Excellence Award (2007) from NYSDEC given to the South Plant. Presenting the award is Sandra Allen of NYSDEC and accepting are: Thomas Tommell, chief operator, Richard Lyons, executive director and Michael G. Breslin, Albany County Executive.

