

City of Newburgh, New York

Wastewater Treatment Plant Update 2012



December, 2012

UNDERSTANDING
A VALUABLE RESOURCE



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Introduction

Severn Trent Services is pleased to present this 2012 Wastewater Treatment Plant Update to our client and partner, the City of Newburgh. We have provided reliable, cost-effective wastewater operations to the City since 2003. Far more than being simply a contractor, we partner with the City in providing vital services to the community's residents and businesses.

Throughout the past four years of our public-private partnership with the City of Newburgh, we have provided our professional expertise to assist the Borough during a number of events and challenges, including a facility upgrade, tropical storm events and sludge disposal issues. In the face of these challenges and transitions, as always Severn Trent's prime directive is to:

- provide safe operation
- maintain regulatory compliance
- operate efficiently
- preserve the City's investment in its facilities through optimized maintenance

Severn Trent's work with the City of Newburgh represents our commitment to environmental excellence as well as our dedication to serving the needs of the community.





Operations

Under an inter-municipal agreement between the City of Newburgh and the Town of Newburgh, the 13.5 million gallon per day (MGD) wastewater treatment plant (WWTP) utilizes the activated sludge system and produces an average daily flow of 6.3 MGD. We are responsible for operations and maintenance of the plant as well as its combined sewer overflow (CSO) system. The CSO system is monitored continuously and weekly site visits are made to the regulators for inspection and maintenance. In addition, Severn Trent monitors and tabulates the Town of Newburgh's flow to the WWTP. Flow data is provided to the City Comptroller and the City Engineer for billing purposes.

We regularly respond to inquiries from residents in the Newburgh community. Questions are answered via telephone where possible and if necessary, operators are dispatched to the customer's site to speak with them personally.

Sludge Disposal

In the spirit of partnership with the City, Severn Trent readily accepts discharges of the Water Treatment Plant's alum sludge approximately every six weeks. A



study was done in early 2012 which indicated that the periodic alum sludge releases caused a nutrient deficiency in the Aeration Basins. This nutrient deficiency has a negative impact on the micro-organisms that aerobically treat the wastewater, which in turn adversely affects the overall effluent quality. In order to prevent the negative influence of the alum sludge on routine operations, Severn Trent has undertaken a pilot project to separate the alum sludge from the normal waste stream in the plant and store it in offline tanks.

The intent is to treat, dewater and haul the alum sludge separately from the normal waste sludge stream. Since the regular contract sludge hauler does not accept or process alum sludge, the past practice of alum sludge hauling was done by a separate contractor, at an increased cost over normal sludge, at approximately 6 week intervals. The combined nutrient deficiency and alum sludge hauling practice has been a disruption to plant operations and process control nine times per year. By treating, dewatering and hauling the alum sludge separately from the normal waste sludge stream, the disruption to plant operations and process control will be reduced to one to two times per year minimizing plant operations impacts and reducing the associated man power use and hauling costs.



Chemical Usage

Within the past three years, Severn Trent operators have evaluated annual costs and associated hazards of chemical usage and have researched more cost conscious, less hazardous alternatives. As a result of our findings, potassium permanganate, an oxidant used to remove iron and hydrogen sulfide from water, has been replaced by Endimal. Potassium permanganate is hazardous if swallowed, inhaled or if contact is made with the skin. Though Endimal oxidizes hydrogen sulfide in the same manner as potassium permanganate, it has been found to be safer to handle and generates an annual reduction in chemical costs.

Process Control

Severn Trent's performance plan emphasizes process control procedures consisting of the following six key elements:

- Centralized control of facility processes and process changes
- Analysis, ongoing review and fine tuning of all facility operational parameters
- Implementation of a facility performance measurement system
- Regular meetings with City staff
- Periodic spot checks of facilities
- Weekly operations management meetings to review, strategize and prioritize facility issues



To further improve process control, Newburgh's WWTP underwent a major upgrade from a surface aeration system to a fine bubble diffuser aeration system in 2009. The upgrade was planned and initiated during Severn Trent's contract with the City as an energy saving mechanism and a more efficient means of oxygen transfer in the activated sludge process. Severn Trent personnel commissioned, tested and commenced operation of the new system in 2010.

Upgrades to the activated sludge process have allowed plant operators to modify process control by utilizing half of the previous tankage, thereby reducing overall aeration basin in-service volume from 3 million gallons to 1.5 million gallons. This has resulted in a more efficient operating process, reduction in biosolids and cleaner effluent. Other benefits of the activated sludge process include:

- A reduction in biosolids, which in turn has reduced the amount of sludge produced and wet tons of dewatered sludge transported to the disposal facility



- A decrease of 14% in electrical use over the past 3 years
- A reduction in the carbon footprint by decreasing energy consumption and sludge hauling

Hydraulic loading and dilution factors of rainwater on the existing biological mass typically result in an increased daily flow from 6.3 MGD to 13.5 MGD during rain events. This additional flow can cause operational and process control challenges. The Combined Sewer Overflow (CSO) system is designed to allow a calculated amount of rainwater runoff to enter the WWTP via the CSO Regulators and sewer collection system. Once the flow set point of the regulator is reached, the flow above and beyond the set point is diverted automatically, via a float and valve system, to the CSO outfalls that discharge into the river. A Wet Weather Program is in place to provide guidance to meet these weather events. The Program provides steps to be taken before, during and after rain events and includes:

- Avoiding bar screen overloads and grinder failures
- Visually observing and monitoring flow patterns
- Monitoring sludge blanket levels
- Maintaining secondary system biomass and solids inventory

Compliance

The facility operates in accordance with the National Pollution Discharge Elimination System under SPDES permit number NY0026310. Sampling for SPDES permit takes place at the chlorine contact tank (CCT) discharge weir in accordance with the Site Sample Plan. The Newburgh facility has been in compliance with all monitoring parameters and to date has experienced only one excursion which was the result of a rain event.

Monitoring Parameter	Permit Level
BOD5	30 mg/L month, 45 mg/L 7 day average
Suspended Solids	30 mg/L month, 45 mg/L 7 day average
Settleable Solids	0.3 mg/L
pH	6.0 to 9.0 SU
Chlorine Residual (seasonal)	2.0 mg/L (May 1 to October 31)
Coliform, Fecal – 30 day geometric mean	200 colonies per 100 milliliters
Coliform, Fecal – 7 day geometric mean	400 colonies per 100 milliliters

The Plant Manager submits monthly corporate responsibility reports to Severn Trent’s Compliance Division for review and evaluation. We also submit the following annual reports to the appropriate regulatory agencies:

- CSO BMP Best Management Practices – NYS DEC
- DMR QA – EPA, NYS DEC
- IPP – EPA, NYS DEC
- Sludge Report (503) – EPA, NYS DEC



To further comply with all federal, state, and local requirements, we administered the City's existing industrial pretreatment program (IPP). In addition, we monitor local businesses that may fall under IPP regulations. For instance, after researching and identifying Unitex Laundry as a source of high volume water usage, Unitex was issued an IPP Significant Industrial User permit, which allows Unitex to be a part of the IPP.

Laboratory

Our in-house lab performs daily testing on influent and effluent settleability, sludge volume Index, TSS, pH, dissolved oxygen and temperature. We monitor daily flows to evaluate and observe all treatment processes at the plant.

Severn Trent participates in the annual EPA DMR QA Study which evaluates the quality of data used to ensure the safety of the nation's waters. Severn Trent's laboratory personnel participate in proficiency testing, which is graded by an independent laboratory. The Newburgh WWTP has received annual Certificates of Recognition for successful evaluations.

Severn Trent employs additional Quality Control and Quality Assurance (QA/QC) procedures to ensure in-house laboratory instruments are properly calibrated and calibration results are documented on appropriate bench sheets to ensure accurate and consistent analysis results. The documentation of these calibrations is maintained on site for 7 years for regulatory review.



Maintenance

Severn Trent's approach to maintenance involves executing effective preventive and corrective measures to increase the lifespan of the WWTP assets. In every project we undertake, Severn Trent implements maintenance protocols and procedures that reflect manufacturers' warranties for existing and newly bought



equipment. As part of our maintenance approach, equipment maintenance and repair history is tracked and available, enabling an educated decision-making process when it comes to repairing or replacing a particular component. Severn Trent's approach to inspection, repair and maintenance of equipment has kept much of the plant equipment operating up to, and past, its anticipated service life. An asset management plan was developed by our Technical Services Group and presented to the Mayor and City Council in 2011 as a guideline for capital improvement projects over the next 10 years. This plan, which is updated annually, identifies each piece of equipment at the WWTP and specifies the following:

- Year Purchased
- Criticality to Operations
- At Risk Rating
- Condition
- Performance

To increase efficiency and productivity with the use of technology, Severn Trent implemented the Hach JOB Cal® Basic (Job Cal) maintenance program in September 2011. A computerized maintenance management system (CMMS), Job Cal assists with maintenance tracking and scheduling for wastewater plant maintenance activities, record keeping and manufacturer's information.

In addition, Severn Trent provides an annual updated of the tool and equipment inventory spreadsheet to the City Comptroller that identifies each item purchased, current inventory and deleted items.



Emergency Response

Mother Nature can significantly challenge our efforts to provide uninterrupted, compliant services. In each situation, Severn Trent staff takes steps in advance to reduce the potential impact as much as possible and then marshals the necessary resources – staff from other locations, vendors and subcontractors – to ensure the people we serve continue to receive vital services.



When Hurricane Sandy impacted the region on October 29 and 30, 2012, Newburgh Severn Trent employees actively participated in the City's Emergency Management Team. To ensure prompt, effective operations during these severe weather events, plant staff did the following:

- Kept City officials informed of plant status, including meeting on site with the City Engineer during peak surge and tide conditions
- Manned the facility around-the-clock and executed the Emergency Management and Wet Weather Operating plans
- Secured all outdoor items that had the potential to become missile hazards
- Moved all equipment and materials to a safe location to prevent flooding damage
- Brought in off line tanks to service high flows
- Designated priority on-call staff to respond to any emergencies



The measures taken by our staff ensured that the WWTP sustained no damage. Minor loss of equipment and operations were not affected, with the exception of above normal flow rates

Additionally, Severn Trent initially discovered, and was the first responder, to both incidents regarding the West Trunk Line breaks which occurred on



July 17th and October 5, 2012. Severn Trent staff remained on site during remediation and repair efforts, documenting the work and providing reports to the City. Severn Trent also staffed the West Trunk site and monitored the



weather conditions during rain events in order to initiate bypass pumping to prevent surcharging of the line while repair and slip lining efforts were in progress. Staff also monitored and was in direct contact with contractors to plan the start dates of all slip lining projects, monitor the work and provide reports to the City Engineer. The City Manager made a brief comment recognizing Severn Trent's efforts in his Manager's Report during the October 9, 2012 regular meeting of the City of Newburgh City Council.



Safety & Training

Promoting the safety of our employees is our highest priority. In keeping with this goal, the entire staff participates in monthly safety meetings and weekly tailgate sessions that address topics related to safety in the plant and in the home. Seasonal training sessions are conducted during the winter and summer months. In addition to meetings and training sessions, we have implemented the following safety improvements to benefit our employees, the City and the surrounding community:

- Visitor guidelines
- Lock out/tag out procedures
- Emergency response and operations
- Risk management plan
- Inclement weather plan
- Fire extinguisher use

Severn Trent purchases and provides staff with personal protective equipment such as safety life rings, steel-toed shoes and safety glasses and critical tools such as gas monitors, and confined space entry equipment.



Community Involvement

We believe in being an integral part of the community in which we live and work. Severn Trent works closely with the City of Newburgh to develop and participate in community activities and programs. Our participation in community activities is typically guided by the plant's Project Manager and allows for considerable flexibility and customization. We have been a proud and continual sponsor of the annual Newburgh International Waterfront Festival, as well as the City's annual Fourth of July Fireworks on the Waterfront event. A Severn Trent Manager plays the role of Santa Clause at the City's Annual Christmas Tree Lighting ceremony.

Santa's Helper, Dale Post of Wappinger Falls, distributes toys to neighborhood youngsters during the City of Newburgh's annual Christmas tree lighting





Looking Ahead

Severn Trent understands that maximizing efficiency is an on-going process. In our continual effort to strive toward operational excellence, we propose the following recommendations for future implementation:

Alternative Dewatering Method – At no cost to the City, our Technical Services Group conducted a preliminary process evaluation to seek an alternative means of sludge disposal. As previously noted in the Sludge Disposal section, plant staff is currently conducting a pilot project to segregate the alum from the normal waste stream and dewater it separately.

We suggest the City consider an alternate and permanent means of dewatering, or sludge removal, directly from the City’s water plant or transporting the sludge to an associated holding or treatment facility to eliminate discharge to the WWTP.



Adherence to the Asset Management Plan – Adherence to the asset management plan is vital for the planning and budgeting process and to reduce the cost of repairs and maintenance caused by extended service life. Due to the age of the plant, its infrastructure, utilities and equipment, Severn Trent recommends that the guidelines set forth in the asset management plan be strongly considered, and acted upon, to prevent failure of critical equipment at the WWTP. The Plant Manager and Technical Services Group are available to answer any questions the City may have regarding the plan.

CSO Long Term Control Plan (LTCP) – The Severn Trent Plant Manager is an active participant in the LTCP Committee and has been keenly involved in the modeling, monitoring and planning portion. Severn Trent has worked directly with the engineers to provide data and insight into the system operations. We will continue to be part of the Public Participation and CSO Control Alternatives planning and implementation initiative.

Belt Filter Press and Emergency Generator upgrades – The Severn Trent Plant Manager has worked closely with the City Engineer, Arcadis and contactors in the planning and design phases, bid documents review process and pre-construction stage of this project. He has also done extensive research and made site visits to other WWTPs to evaluate equipment and technologies that will be used in this upgrade.



Regulatory Compliance – Severn Trent was actively involved in complying with the Chemical Bulk Storage (CBS) regulations upgrade, specifically researching, ordering and installing the Sodium Hypochlorite transfer containment pad. We also completed the required 5 Year CBS inspection in 2011, and will continue to complete the annual CBS inspections in October of each year.

Permit Renewals & Regulatory Certifications/Reports – Severn Trent provides annual WWTP Flow Certification data for submission to the New York State DEC and biannually provides data for CBS tank registration. In 2012, Severn Trent is supplying data, and conducting all sampling, for the SPDES Permit renewal application NYS DEC NY-Form 2A and EPA Form 2F NPDES. This SPDES Permit renewal application involves providing extensive data regarding CSO locations, Priority Pollutant Scan of the WWTP Effluent, including concentration and mass calculations and site specific storm water testing and analysis results reporting.

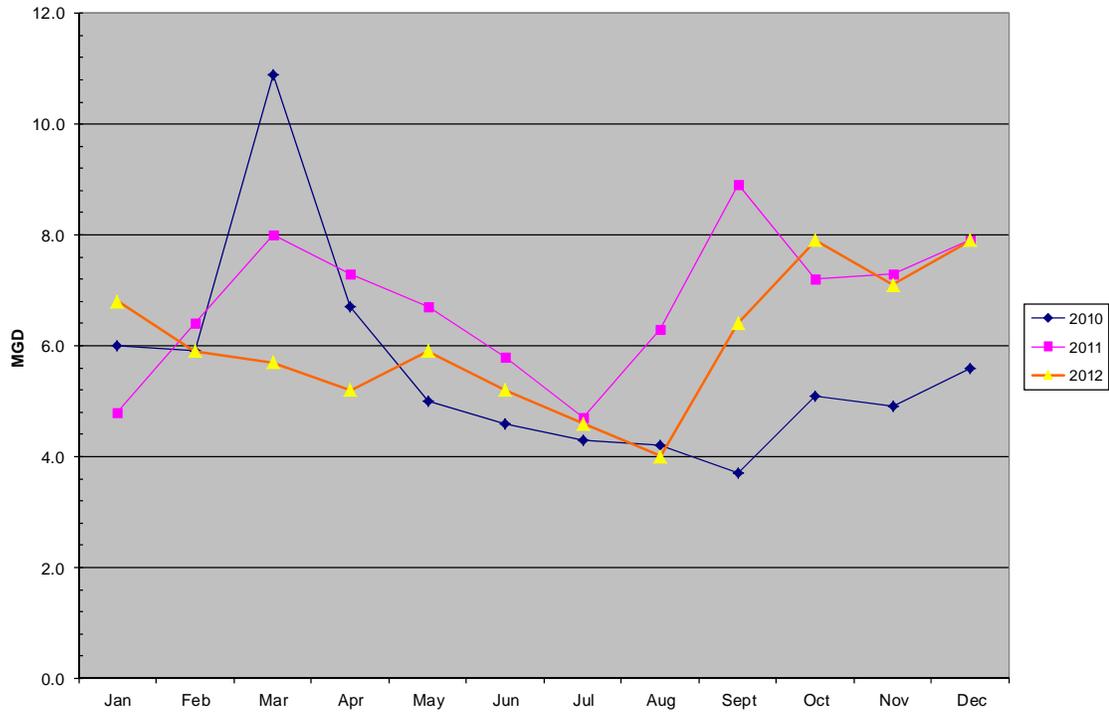
Closing

Far more than being simply a contractor, Severn Trent brings extensive experience gained from a broad range of local and nationwide projects to provide technical assistance, operational solutions and vital services to the City of Newburgh as together we face routine and emergency challenges. Severn Trent looks forward to providing quality services and support to the City of Newburgh for many years to come.

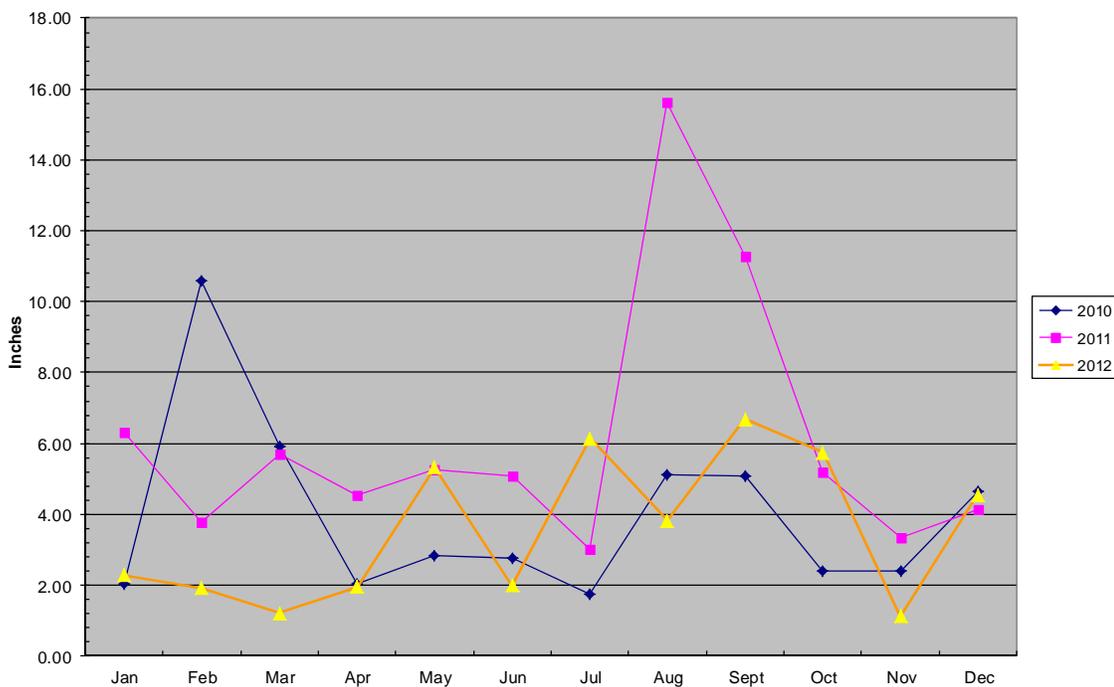


Appendix

City of Newburgh Monthly Average Effluent Flow

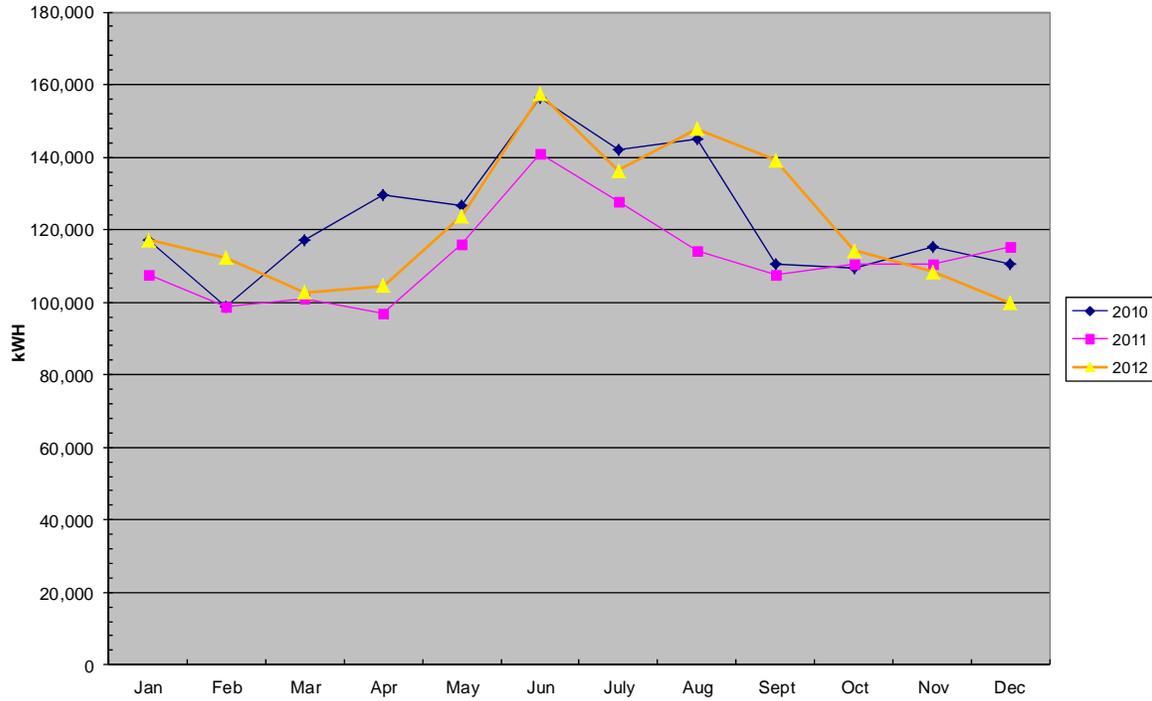


City of Newburgh WWTP Monthly Rain Fall Totals

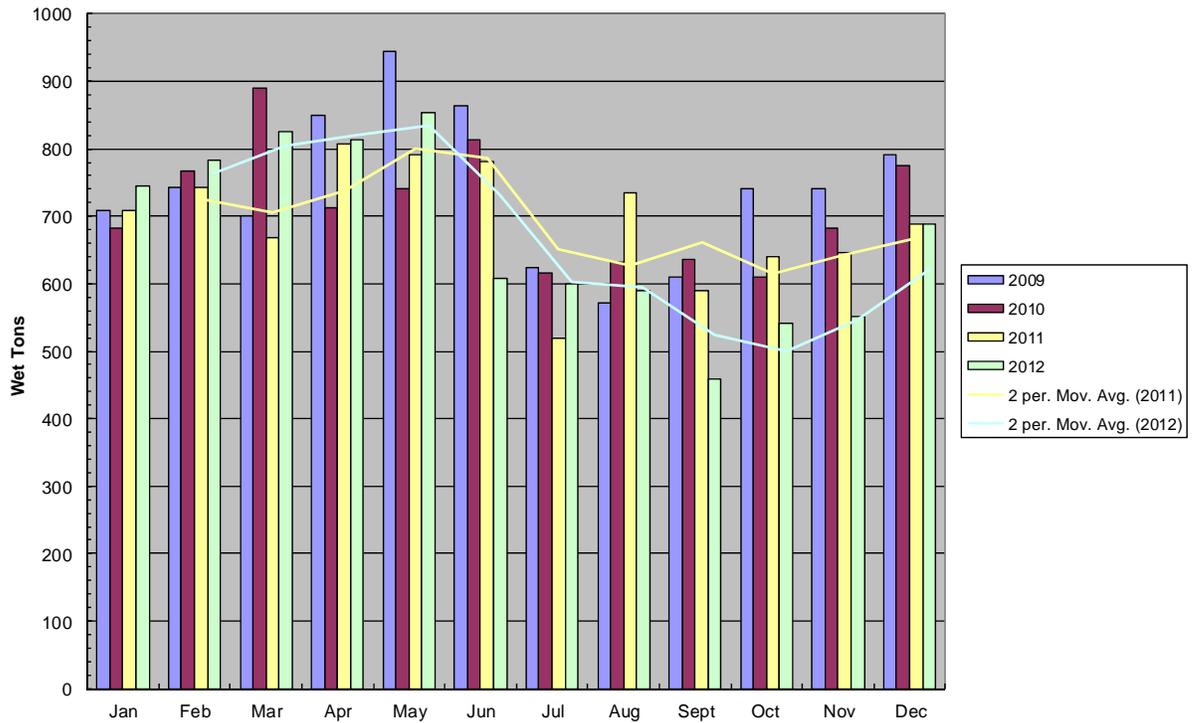




City of Newburgh WWTP Monthly Average Electrical Use



City of Newburgh WWTP Monthly Average Sludge Production





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