



INSPIRATION FROM PERSPIRATION AND HARD WORK ETHICS

Yvonne Tucker | Wastewater Trainer/ Technician

The Village of Akron is located in Erie County, N.Y. Originally conceived of and built in the late 1920s in response to the Village being stricken with a typhoid epidemic. A major upgrade was initiated in 1965, and again in the 1980s. The current facility consists of a comminutor and grit channel, a flow equalization tank and primary clarifier, rotating biological contactors, a secondary clarifier, tertiary sand media traveling bridge filters, and anaerobic digestion with covered drying beds. In 2014, the Village opted to resume full-time responsibility for the operation and maintenance of the wastewater treatment plant by not renewing a 10 year long contract operations agreement. Mr. Bob Lucia, a 17 year employee with the Village, had obtained his grade 2 wastewater certification in 2002. He has always maintained his renewal contact hours even though his job duties were in the collection system and not at the treatment plant, since that was covered by the contract operational firm. His son, Robert Lucia Jr. came to work for the Village in 2001, as a part-time, summer worker. Together, they perform the routine collection system maintenance which also includes two lift stations. They have an enclosed trailer with a sewer system camera setup from which they can identify and correct problematic areas of their system. In addition to utilizing this equipment to prevent costly sewer backups, they also assist their neighboring community, Alden with the use of an inter-municipal agreement. As time and scheduling allows, they are able to perform the same valuable services for Alden with their collection system maintenance activities. In return, Alden is able to assist Akron with root cutting equipment and service.

When the Village decided not to renew the contract, they were able to utilize Bob Lucia's wastewater license. Robert Lucia Jr. had accumulated a portion of his experience towards becoming certified by that time. Robert was able to take his certification exam and obtain his Grade 2 license so that the Village employed two individuals with the necessary certification to operate and maintain their wastewater treatment plant.

The transition from working the collection system to full time wastewater operations and collection system O&M has proven challenging, however this father and son team have not only met each and every challenge, they have excelled at it. Stepping into the wastewater treatment plant and evaluating the initial operational status of the plant revealed several major pieces of equipment

that were no longer functioning and or in sad dis-repair. They began to focus their attention toward replacing or rehabilitating pumps that were not working or were running on their last legs.

RBCS

The Rotating Biological Contactors, RBCs were in need of some major maintenance at the time of the transition back to Village O&M. The media and its support system on several of the shafts were in need of replacement due to friction wear on the media supports and this was all performed by the two, in-house.

TERTIARY FILTRATION

The final clarifier effluent is pumped to the tertiary sand filters with traveling bridge technology. Each of the two filters are approximately 20ft long by 8ft wide. The aging equipment was in need of a significant amount of TLC when the operational responsibility was returned to the Village. These sand beds operate on a concept of low-head sand media filter beds supported by a porous plate above an underdrain system. Secondary clarifier effluent enters the filter above the media and flows by gravity through the media to the underdrain system below. As the head loss through the filter increases due to the voids in the filter media becoming clogged, an increase in the water depth above the sand triggers a backwash cycle. A dual pump backwash system configuration consists of one pump mounted on a motorized platform, a traveling bridge, which moves along the length of the basin on rails during the backwash cycle. A backwash pump located in the effluent channel pushes filtered effluent back through the underdrain and up through the sand media. As the sand is lifted from below and fluidized, particulates are released and suspended above the resettled sand which allows for the second pump, mounted on the traveling bridge to pull the dirty water up and away from the filter. The backwash water is returned to the head of the wastewater treatment plant.

ANAEROBIC DIGESTION

The Akron Wastewater Treatment Plant utilizes a two stage anaerobic digestion sludge stabilization process. Anaerobic digestion is the biological degradation of organic material in the absence of air. Sludge solids are pumped from the bottom of the clarifiers to the primary digester. The process provides volume and mass reduction and valuable renewable energy via >>>

biogas production can be harnessed.

Due to the many years of corrosive conditions and the aggressive nature of the material being pumped and transferred, the basement of the anaerobic digesters was in deplorable condition. Sludge pumps were in need of replacement, valves



were corroded, broken, or frozen and or difficult to operate. A valve exercise program was immediately initiated. Two of the sludge transfer pumps were replaced with Volgesang positive displacement pumps. Poor lighting, peeling paint, wet floor from leaking pumps, and sludge stained ceiling and walls created a damp, dark, and generally a just unpleasant area. Bob and Robert set about putting some serious elbow grease into this part of the treatment plant. An area of the facility, few are ever even aware of, let alone encouraged to visit. After stripping all the peeling paint from the concrete and the metal piping system, they primed and painted floors to ceiling, every inch of the lower level. Robert recalls the many hours of scraping and cleaning that went into just preparing for the painting. A lot of work went into cleaning up the polymer make-down and feed system which was completely gooped-up with several inches of “years of polymer” buildup. The



unit now looks like it was set in place a month ago.

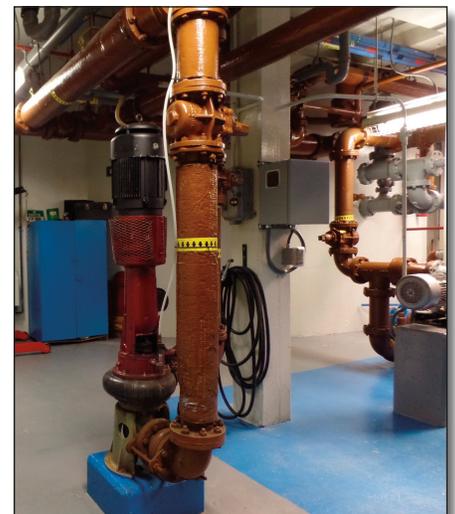
Entering this basement area today reveals a brightly lit, completely clean, ceiling, walls, and floor pump gallery. All the piping is freshly painted, color coded, and protected from further external corrosion. A workbench with every tool necessary to work on each pump, valve, and polymer make-down system



is neatly organized and ready for every work activity that might arise. The floor is kept dust mopped routinely, and wet mopped when necessary. This 50+ year old space and equipment has the appearance of a facility that might have been built in the last five years due to Bob and Robert’s hard work and attention to detail. Having to unclog a pump due to “ragging” and hair ropes creates a mess. However the area is completely cleaned and all traces of the work are washed away.

CLARIFIERS

This past summer, both primary and secondary clarifiers were addressed with a fresh coat of paint on the sidewall exterior surfaces. The primary clarifier was taken offline to replace several portions of the flight chain that were worn almost through.



Addressing this issue when flows allowed, and not waiting for a catastrophic failure to disrupt schedules and process efficiency. While it was drained, the concrete sidewalls were coated with an epoxy that provides underwater protective properties to the concrete. While painting outdoors last summer, Robert also painted the concrete sidewalls of the 20 foot high, 40 foot diameter flow equalization tank in battleship grey which really gives the tank protection and an appealing appearance as well as nice contrast to the red paint that he applied to the stairs.

DRYING BEDS

The sludge drying beds are covered with glass panel greenhouse structures which had lost many of the glass panels and each winter resulted in more loss of glass. It had become a very



hazardous situation on windy days when working the drying beds. Sometimes the sludge would be showered with glass shrapnel as a roof or sidewall glass pane would let loose unexpectedly. Bob researched a replacement polycarbonate product that he was able to obtain and cut replacement panes without the dangers of working with glass.

H-FLUME

Also in 2016, Bob researched a means to optimize the chlorine disinfection so that they could reduce the amount of chlorine usage. He knew that he needed a way to measure the



effluent flow, which fluctuated during a backwash cycle, so that they could automatically increase and decrease chlorine dose as the flow increased and decreased. He and Robert studied all the possible locations after the tertiary sand filters that would be appropriate for flow measurement. Ultimately, an open pipe drop discharge into an aerated contact chamber was chosen. He determined that a fiberglass H-flume could be mounted flush to the face of the concrete wall at the mouth of the open pipe to provide a primary flow measuring device for an ultrasonic flow meter to measure flow. Robert and Bob designed and built a strong support structure to ensure that not only the weight of the flowing water in the flume would be supported, but also the force of buoyancy could be withstood if the contact chamber water level ever backed up and submerged the H-Flume. A great deal of thought in the design and installation of this cost saving project is again evidenced by these two professional co-workers.

ELEMENTS OF SUCCESS

Together, as a team, they take great pride in their work for the Village. A strong sense of satisfaction and accomplishment in the care and maintenance of the buildings and grounds and the



equipment that they are responsible for is apparent throughout the facility. The results of their efforts and attention to detail can be seen everywhere you look, from the brilliant red, painted exterior doors to the sky blue concrete surrounding the grit channel and primary clarifier. Done right, the painting is not just an exercise in creating attractive structures, it is a fundamental procedure to protect and preserve the equipment, the pipes, and the concrete from the harsh environmental conditions that exist in wastewater treatment. To describe what I see when I enter the wastewater treatment plant as I have attempted in this article is truly inspirational. With just the two of them to operate and maintain the wastewater treatment plant, the collection system, two lift stations and, as time allows, provide service to neighboring communities, they are to be commended. They endeavor to create a pleasing work environment, where they work collaboratively and energetically and yet so effortlessly in a relaxed environment. They truly set the bar high, and they show up for work every day with the desire to not



only reach their goal, but to exceed it. Thank you Bob Lucia and Robert Lucia Jr. for your strong commitment to excellence and the professional integrity that you exemplify. 💧💧💧