LIFT Scholarship Exchange Experience for Innovation & Technology (SEE IT)
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TRIP REPORT

SCHOLARSHIP UTILITY: *Allendale Public Utilities, Allendale Charter Township, MI*

SCHOLARSHIP UTILITY CONTACT: *Chad Doornbos, Superintendent of Public Utilities*
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ATTENDEES: Chad Doornbos, Gary Nestle II

TRIP DATES: September 27-30, 2022

UTILITIES/SITES VISITED: Utrecht WWTP, Weert WWTP, Panheel WWTP Netherlands and Royal HaskoningDHV Head Quarters

TECHNOLOGIES/INNOVATIONS SEEN:

- Aqua Nereda Aerobic Granular Sludge process

TRIP BACKGROUND and RATIONALE:

Allendale currently operates a 1.6 MGD Rotating Biological Contactor (RBC) plant. Our RBC's are air driven and you do not see this anymore. Also, RBC's are unable to do biological nutrient removal and are unable to nitrify. As we are looking at doubling the capacity of our facility and discharge limits are continuing to become more stringent, we are looking at a process that can do biological nutrient removal. For us to do this, we have to abandon our current technology and invest in a technology that will fit these parameters. This will be large investment on the utilities part, and we want to make sure our money is spent wisely for the near future as well as the long-term future needs of the utility. We looked at many process' through our feasibility study such as an Oxidation Ditch, Moving Bed Biofilm Reactor, Vertical Loop Reactor, Membrane Bioreactor and Nereda. As Nereda is fairly new to the US, we were hesitant to look at it in further detail.

Unlike conventional activated sludge, Nereda is a granular sludge. This sludge settles much faster than conventional, and given the structure of the granule, it is very robust to upsets and shock loadings. The Nereda process is essentially a batch treatment process that allows for aeration, biological nutrient removal and settling all in one tank. Chemicals can be added to the process to assist but is very unusual to do so.

This trip will give us the opportunity to see the sight in full operation and talk with the operators of the facility to get firsthand knowledge of the operations and the success and setbacks that the facility may have had.

TRIP SUMMARY:

Why did you select the specific utility and technology for the visit?
APU chose these facilities as they were at a common Latitude as our facility. Also, it is where the AGS process was developed and perfected. The reason for considering the AGS technology was the level of treatment, ease of operation and the reduced footprint.

on your visit, do you think this technology/approach works for your utility?
This trip was key for us to understand the technology. Our trip included a visit to the Royal HaskoningDHV Headquarters. Here we were able to delve into the technology and basic plant design, which was a real benefit to the Utility to learn firsthand an in depth look into AGS. We do believe that this technology will work for our facility. Nereda gives us everything that we are looking for: biological nutrient removal, reduced chemical usage, small footprint, energy efficiency and resiliency. As we continue to look at ways to handle our sludge, the smaller footprint will allow us to continue to expand our facility without the worry of land availability.

How useful was the trip in your decision-making process?
The trip was very useful to our decision making. We talked with operators who shared lessons learned in plant design/build, start-up and daily operations. We were also able to see how the AGS treatment works integrated with other existing treatment processes.

What were some of the trip highlights and takeaways?
The sites that we visited are a combined storm and sanitary system. Just prior to our arrival, the Netherlands received a couple days of rain. The facilities were able to handle the large swing in flow and treat the combined flow. This shows us that the Nereda technology can handle our swings being in a college town.

As the Weert facility was being engineered, the Central Water Authority provided the wrong the loadings to Royal HaskoningDHV. The result was a plant that was built to a lower capacity. The facility was designed for a MLSS-loading of 8 grams per liter when the operational numbers were 12-15 grams. You normally design to 8 grams as this is already substantially higher than for activated sludge and allows for operation flexibility. In this case running a higher concentration of granules, they are still able to meet their discharge limits showing the flexibility that AGS has.

The ease of operation of the facility. As we toured the facility's, we asked what was one of the most common complaints about the Nereda process? The main complaint was the amount of analyzer calibrations that needed to take place. Also, all the plants in the province were monitored from the Central Water Authority. From this location, operators could make adjustments as needed to optimize the treatment.

As a bonus to the trip, while we were visiting the Panheel facility, we were able to look at their sludge thickening process. They were using a gravity belt thickener, and from what we observed, the AGS sludge was thickened to what we saw at a conventional activated sludge facility.

In looking at the sheer size of the facilities prior to Nereda, Nereda shows that there is intensified treatment in a much smaller footprint. As cities and towns continue to grow and encroach on the facilities, you are able to expand your plant in a much smaller footprint than with other forms of treatment.


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