

LIFT Scholarship Exchange Experience for Innovation & Technology (SEE IT)
Sponsored by: WE&RF, WEF and NACWA

TRIP REPORT

SCHOLARSHIP UTILITY: *Metropolitan Sewer District, City of Cincinnati*

SCHOLARSHIP UTILITY CONTACT: Jennifer Richmond, Superintendent,
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ATTENDEES: *Achal Garg, Ph.D.*

TRIP DATES: June 5-8, 2017

UTILITIES/SITES VISITED: Grand Rapids

TECHNOLOGIES/INNOVATIONS SEEN: Zero Angle Photo Spectrometry (ZAPS)

TRIP BACKGROUND and RATIONALE (250 WORDS): *What technology did you select to visit? What is the problem you are trying to address? How did you envision the LIFT SEE IT scholarship trip helping your utility?*

I visited the Grand Rapids Water Resource Recovery facility to see the application of Zero Angle Photo Spectrometer (ZAPS) Technology in the field and the benefits to the facility from the use of this technology. The ZAPS technology can provide real-time data on about 30 important water quality parameters to help plant operators optimize the processes and keep the plant in regulatory compliance. The information on parameters such as cBOD, ammonia, total suspended solids and E. coli are crucial for keeping the plant in compliance. I planned to evaluate the ZAPS technology at Grand Rapids Resource Recovery Facility and assess the usefulness of this technology for Metropolitan Sewer District of Greater Cincinnati (MSD).

TRIP SUMMARY (1 page max. Please include 10 photos and a 1-2 minute video montage from the trip. The video does not need to be professional, however if you have the means to create a professional video feel free to do so): *Why did you select the specific utility and technology for the visit? Based on your visit, do you think this technology/approach works for your utility? How useful was the trip in your decision making process? What were some of the trip highlights and takeaways?*

The ability of the ZAPS technology to provide crucial water quality data in real time has helped plant operators to monitor the plant processes continuously, keep the treatment plant at optimal conditions and manage the optimal doses for effluent disinfection. ZAPS can alert the operators when any changes in the water chemistry is detected so that necessary steps can be taken to correct the problems. Many plants have used the microbial information to appropriately dose the disinfectant to save on chemicals or energy needs.

Grand Rapids Water Resource Recovery (wastewater treatment) Facility (WRRF) currently has

installed six ZAPS machines to monitor the water quality of the influent and treated effluent in real time, control UV disinfection dose, reduce energy cost and increase efficiency by optimizing plant processes. During the past several years, the Grand Rapids utility has collected extensive data comparing ZAPS' real-time water information on E. coli, cBOD, ammonia, nitrite and total suspended solids with the laboratory data. A close correlation was found between the ZAPS and lab data suggesting the reliability and accuracy of ZAPS technology in measuring various parameters in the wastewater effluent. This information has helped the Grand Rapids WWTP operators to continuously monitor E. coli and adjust the UV intensity to get the optimal dosage to achieve the desired level of disinfection. ZAPS has helped the Grand Rapids plant to reduce the UV dosage by 38% which resulted in \$54,000 savings annually to the plant.

The purpose of my trip to Grand Rapids Water Resource Recovery Facility was twofold: one, evaluate the instrument at work in the field and, two, work with the professionals at the Facility and learn from their experience with ZAPS. I also wanted to evaluate the potential benefits and savings from ZAPS technology to the Metropolitan Sewer District of Greater Cincinnati. I have accomplished all objective during my trip to Grand Rapids plant.

Based on my experience at Grand Rapids plant, MSD is now preparing for a pilot study with ZAPS. This 4-month study is being planned to run from September through December, 2017. The US EPA's Office of Research and Development will also participate in the study. During the study, multiple water quality parameters will be measured by the ZAPS instrument and compared with the laboratory methods for accuracy. After validation and calibration, the data from the four-month pilot study will be evaluated to determine the effectiveness of ZAPS for MSD and the potential savings to the utility from installing this technology. From the information obtained at Grand Rapids plant, it is expected that MSD Cincinnati will significantly benefit from the ZAPS technology. It is expected to reduce the usage of disinfection chemicals and energy and increase efficiency at the plant, which again will result in the savings of financial resources to the utility. The precise savings will be estimated after completion of the upcoming pilot study.

My travel grant to Grand Rapids WRRF has certainly played a crucial role in finalizing MSD's plans to evaluate the ZAPS technology.